

Appendix A - Site Proposal Application

Section 1 – New proposal, Boundary change, or De-Listing an Aquatic Reserve

Site Proponent

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Who have you cooperated with to develop the proposal?

- Doug Myers, former NRNC president and original nominator of the Nisqually Reach Nature Center in 2010.
- NRAR Citizen Stewardship Committee
- Sound View Camp
- Pierce County Planning Department

General site information

A. Site location:

Nisqually Reach Nature Center proposes to expand the existing Nisqually Reach Aquatic Reserve by approximately 4500 acres to include portions of the southern Key Peninsula, all shorelines of McNeil, Pitt and Gertrude Islands as well as Wyckoff Shoal as denoted in the attached map.

B. Site Overview:

1. General site description (including acreage)

The 4500-acre expansion area includes portions of Drayton Passage from Devil's Head northward along the southern Key Peninsula and encompasses the shorelines of the McNeil Island Unit.

The aquatic lands near Key Peninsula adjoin properties at the southern end of the peninsula; these include county park lands owned by Pierce County, and properties protected by conservation easement or ownership by the Great Peninsula Conservancy and Nisqually Land Trust. The McNeil Island Unit includes McNeil, Gertrude and Pitt Islands, acquired in 1984 through a USA transfer, and is adjacent to the unoccupied state correctional center and the Department of Social and Health Services Civil Commitment Center, which is slated to close down. Along with the other prescribed goals of the state's [South Puget Sound Wildlife Area Complex](#), the focus of Gertrude and Pitt Islands are to conserve habitat for the largest harbor seal rookery in South Puget Sound. Only McNeil Island is directly shoreward of the aquatic reserve.

The remoteness of these island and shorelines provides a safe haven for many species due to limited access. These islands also provide habitat for a Great Blue Heron rookery, Bald Eagle nests and haul-out sites for marine mammals, especially harbor seals, all federally protected species (WDFW 2006).

2. *Boundaries description (include section, range and township, county).*

The expansion areas is adjacent to Township 20, R1W, Sections 35 and 36, and Township 19 N R1W, section 2 on the southern end of Key Peninsula; and Township 20, R1E, sections 8, 9, 14, 15, 16, 17,19, 22 and 23; all in Pierce County.

See attached map for privately and publicly owned (other than DNR) aquatic lands adjacent to the proposed site.).

3. *Current county shoreline designation and description.*

In Pierce County, within the expansion area on the southern Key Peninsula, there is one small area of residential development, but the majority is in natural or conservancy designation. All McNeil Island shorelines are natural or conservancy designation as per Pierce County's Shoreline Master Program (<https://www.co.pierce.wa.us/956/Shoreline-Plan>). The expansion area will not add new shorelines in Thurston County.

C. Justification for proposal: (Briefly summarize the reasons for proposing the site as an aquatic reserve based on the criteria discussed in Section 6 and Appendices C, D, E, and F)

Nisqually Reach Aquatic Reserve has operated successfully since its designation in 2011. The Aquatic Reserve Citizen Stewardship Committee (CSC) has been implementing the management plan in conjunction with DNR and local partner organizations and agencies. Environmental protection, education and research objectives of the reserve have increased overall awareness and stewardship of the reserve among the general public and out of state visitors alike.

Moving forward with committee plans to expand the reserve boundaries are consistent with DNR's objectives for the reserve program. McNeil Island is still being used by the DSHS and is off limits to the general public and therefore has some of south Puget Sound's best nearshore habitat. Recently, restoration by state agencies have enhanced this habitat, increasing the conservation value and importance of protection. Unique habitats also exist in the offshore Wyckoff Shoals on the northwestern corner of McNeil Island, the small islets of Pitt Island and Gertrude Island and the extreme southern Key Peninsula where Pierce County owns an anchor property protecting a significant feeder bluff sediment source for an interconnected littoral drift cell with few private properties. This significant shoreline encompasses features not represented in the current aquatic reserve and contains an education and research outpost operated by the Olympia Presbytery as a year-round camp.

The expansion area will capture significant additional shoreline features such as feeder bluffs, shallow lagoons, shoals, eelgrass beds and a unique historic floating kelp bed on the southern Key Peninsula. It includes Gertrude Island on the north shore of McNeil Island, known to historically support a large seal haul out.

Environmental Reserve Information

Ecological and cultural quality of the site

1. Current condition of the site

a. Is the site degraded?

Limited shoreline development, few pre-existing easements for electrical cables, and ongoing aquaculture and wild geoduck harvesting activities characterize ongoing uses of the intertidal and submerged lands encompassed within the proposed expanded reserve. Pierce County has designated shorelines surrounding the reserve for low density residential, natural or aquatic shoreline designations in recent updates to their Shoreline Master Programs, recognizing the undeveloped character and abundant marine resources of the area. Large public landholdings and a history of environmental restoration also characterize the Nisqually Delta, which is an anchor ecosystem within the reserve, including the expansion area.

There are currently several cable use authorizations crossing the tidelands adjacent to Anderson Island. Most of these have been operating for some time. An easement was recently approved for Tanner Electric to lay a new power cable adjacent to an older damaged cable to provide adequate electrical service to Anderson Island.

b. Are there signs of habitat loss within the site?

In the expansion area, there are few waterfront developments except those that provide access for recreation and nature study. Large portions of the new shoreline adjacent to the reserve are selected for their existing and likely future low probability of development because of local zoning or public ownership. Ongoing aquaculture near the Nisqually Delta and wild geoduck harvesting areas such as Wyckoff Shoals have altered natural intertidal and subtidal communities, but substantial native plant and animal benthic environments persist in those areas.

c. Are there signs of habitat loss within the biogeographic region?

South Puget Sound is a high-growth area because of its proximity to Joint Base Lewis-McChord. This growth can affect stormwater quantity and quality delivered through tributaries into the aquatic reserve. Interstate-5, the Burlington Northern Railroad and recently constructed Sounder Commuter Line transportation corridors are a potential pathway for spills of hazardous chemicals and vectors of non-native species. These stressors occur at the opposite end of the aquatic reserve from the proposed boundary expansion. The expanded reserve will benefit from increased resilience by adding nearly 4500 acres of mostly intact marine habitats.

d. Are ecosystem processes (e.g., freshwater flow, littoral drift, nutrient cycling, etc.) intact?

For the most part, the estuarine and nearshore functions of the proposed expansion area are more intact than other areas to the immediate north in the Central Puget Sound basin as well as tidal inlets deeper into South Puget Sound because of extensive waterfront development, sewage treatment, more extensive aquaculture and other disturbances. Freshwater flow from localized bluff seeps and stream drainages on Anderson and McNeil Islands and the southern Key Peninsula continue to flow naturally based on little upland development or shoreline alteration.

Connectivity to the Nisqually River Delta and the Nisqually National Wildlife Refuge, provide seamless protected foraging and refuge habitat for numerous migratory species. The Nisqually National Wildlife Refuge site is notably one of the largest river deltaic environs in the Pacific Northwest, a biologically rich and diverse area that supports a variety of habitats. Additionally, it is one of the most ecologically intact estuarine deltas, containing large tracts of healthy emergent salt marsh areas.

McNeil Island and the southern Key Peninsula also provide reaches of well-preserved shoreline with intact processes and shore forms particularly intermittent embayment habitat areas that provide refuge, feeding, and nursery areas for juvenile salmonids and other marine species.

In addition, the current ecological conditions of the site include varying degrees of human-caused alteration. A number of current uses have modified shore zone areas within the aquatic reserve. These uses include but are not limited to cable crossings, outfalls, pipelines, overwater structures, shoreline armoring and aquaculture. Despite these impacts, in comparison to other parts of the South Sound region, this area is known to have a higher representation of unique, functional habitat areas, greater biological diversity, and less prolific residential shoreline hardening and development.

Shorelines within the expansion areas contain minimal areas of shoreline armoring and only one over-water structure, the fishing pier at Sound View Camp used for nearshore exploration.

2. Restoration potential

a. Is there pending restoration or identified restoration needs at the site?

Significant restoration has occurred throughout the Nisqually Delta region and shorelines of McNeil Island. Ongoing restoration potential exists on McNeil Island and there are proposals to complete this work. Proposed nearshore projects led by WDFW include estuary restoration at Milewa, Bodley/Bradley and Floyds Cove on McNeil Island. The DNR Restoration Program also has plans to remove additional submarine nets and concrete groins from beaches (see links below).

https://www.dnr.wa.gov/publications/aqr_rest_mcneil_feasibility_report.pdf?hmo815j

<https://www.dnr.wa.gov/mcneil-island-shoreline-restoration>

Any restoration project that removes derelict structures or armoring along the shoreline has the potential to increase available spawning habitat for forage fish. Removal of derelict vessels or fishing gear would also improve the integrity of subtidal environments.

b. Would restoration benefits extend beyond site boundaries?

Yes, nearshore habitat in many places throughout Puget Sound have been modified reducing spawning habitat for forage fish thereby reducing the forage base for fish, birds and marine mammals. Any restoration effort within the reserve can help ease impacts to other areas that are not being restored at this time.

3. Does the site have special value for biodiversity or species diversity?

Expanding the Nisqually Reach Aquatic Reserve to include other shorelines of McNeil Island, Pitt Island, Gertrude Island Wyckoff Shoals and the southern Key Peninsula will greatly increase the area and diversity of shoreline habitats, geology and associated biota. A 5-year study of nearshore fish diversity conducted since designation of the Nisqually Reach Aquatic Reserve reveals 22 species including several important runs of juvenile salmonids.

http://www.dnr.wa.gov/publications/aqr_resv_nr_report_20170301.pdf?1tuzudf&iau0jqv

Our original nomination package in 2010 included information from WDFW's synoptic trawl surveys for demersal fish species. The resolution of published reports in recent years does not allow for a characterization of demersal fish at the scale of the aquatic reserve. However, in 2016, a joint agency recharacterization of the dredged material management program vicinity in Nisqually Reach identified 50 fish species and 50 invertebrate species showing some increases and decreases in abundance of key commercially important species as compared to a similar 1987 survey. Of note were high abundances of Pandallid shrimp, red rock crab, graceful crab as well as blackbellied eelpouts, roughfin sculpin and plainfin midshipmen. A complete report of this study is located at the following link:

https://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Monitoring/Final%20Anderson%20Ketron%20Survey%20Report_Apr%202,%202016.pdf

4. Does the proposed site capture habitat used regularly by species of special conservation interest, or vulnerable habitats, life stages or populations? (Vulnerable habitats, life stages or populations include: seal haul-outs, breeding bird aggregations or rookeries, seasonal bird aggregations, seasonal fish aggregations (e.g. feeding, spawning) or fish and wildlife migration routes.

Pigeon guillemot nesting sites have been documented throughout the aquatic reserve's marine bluffs for several decades. Seal and sea lion haul outs have increased in density and diversity of species in the last decade including on the Nisqually Delta flats, Eagle Island, Pitt Island and Gertrude Island. The Nisqually Delta and adjacent marine bluffs are an Audubon Society Important Bird Area. DNR has documented surf smelt and Pacific sand lance spawning habitat on McNeil Island shorelines. WDFW has documented surf smelt spawning habitat (and some Pacific sand lance) along most of the Key Peninsula shoreline to be included. The expansion would also include portions of Pacific herring pre-spawner holding areas south of Key Peninsula. Floating kelp has been declining in South Puget Sound in recent decades due to temperature stress, lack of suitable substrate and competition from invasive species. Devil's Head has an extant population with highly variable abundance year to year, which provides an important area for further study. <http://southsoundscience.org/wp-content/uploads/2018/12/2.-Berry.pdf>

5. Ecological processes that sustain the aquatic landscape – Would protection of the site protect/maintain ecological processes that sustain the aquatic landscape (e.g., freshwater flow, littoral drift, nutrient cycling)?

The Nisqually Reach Aquatic Reserve delta region is an estuarine area that exhibits a wide-range of unique physical features, processes, habitats and associated biodiversity. The abundant and productive waters, especially between the Nisqually Flats and Anderson Island, are primary habitat for breeding, foraging and winter refuge for a diverse suite of species. Juvenile Chinook and chum salmon develop in

the estuarine waters near the delta and migrate along the shorelines of Anderson Island and the Reach utilizing the small “embayments” (pocket estuaries) still common in the region (Ellings 2007). This habitat type occurs on the southwest shoreline of Key Peninsula, and in several sites at McNeill Island. Deepwater habitats support staging, refuge and feeding grounds for forage fish, as well as, providing these functions for many other marine fishes while supporting numerous invertebrates and birds. Nisqually Reach, McNeil, Anderson and Ketron Islands and adjacent marine habitat were identified as a high priority biological diversity area by the Nature Conservancy Puget Trough/Georgia Basin Ecoregional Plan (Floberg et. al. 2004). This designation is underscored in the DNR Marine Priority Habitats approach that promotes preservation of state-owned aquatic lands that provide significant benefits to native aquatic ecosystems. The Nisqually region is identified as having high habitat value and features including the prominent fluvial influences on vegetated estuarine, intertidal and shallow subtidal areas with high biological diversity, important biological and physiochemical processes, and vulnerable habitats and life stages for populations and species of special concern.

Adding the protected shorelines in the proposed expansion area will increase the length and diversity of important shoreline geologic features such as feeder bluffs, depositional spits and their associated lagoons and diverse shallow water habitats. The larger reserve will provide a cohesive protective unit that conserves natural shoreline erosional and depositional processes critical to sustaining fish and wildlife habitats.

6. The cultural quality of the site– Does the site contain or protect significant cultural resources? (Does the site contain heritage, historical, or cultural resources that are eligible for the Washington Register of Historic Places, (RCW27.34.220) or the National Register of Historic Places?)

The Nisqually Reach and the surrounding area are currently and historically occupied by the Puyallup Tribe, Nisqually Tribe and the Squaxin Island Tribe. The territories of the aboriginal Nisqually and Squaxin Island Tribes included lands on Anderson and Ketron Islands and historic shellfish and fishing grounds around Nisqually Reach a Drayton Passage. In 1854, these Tribes participated in the signing of the historic Treaty of Medicine Creek, and together with the Puyallup tribe ceded over two million acres of homelands in western Washington. The signing took place along McCallister (then Medicine) Creek. The treaty was translated into Chinook Jargon a native language with such limitations to be considered inadequate for describing the concepts. While attempting to preserve fishing rights, the treaty removed prime land from tribal ownership.

The circumstances surrounding the signing and details of the treaty are considered to have been the catalyst for the Puget Sound War, a one-year armed conflict between the United States Military, members of the Native American Tribes, and local militia (Carpenter, C.S. et al. 2008).

Another important historic event directly tied to the Medicine Creek Treaty is the Bolt Decision of 1974. This judgment reinforced Section II of the Medicine Creek Treaty – and all other tribal treaties developed since that time - which stated that. “The right of taking fish, at all usual and accustomed grounds and stations is further secured to said Indians, in common with all citizens of the Territory.” In 2002 and 2004 , the federal courts (Judge Rafeedie) applied Tribal U&A rights to shellfish, reflecting the historical region in which finfish, shellfish and other natural resources were collected. This decision clarified the Treaty right to mean, the right to fish for fifty percent of the sustainable harvest biomass of any shellfish

species within the usual and accustomed areas for that Tribe. The Nisqually Reach Aquatic Reserve has usual and accustomed areas for the Nisqually and Squaxin Tribes (Carpenter, C.S. et al. 2008).

The aquatic reserve expansion area proposes to fully incorporate the shorelines surrounding McNeil Island, which has a rich history in Washington as well as significant tribal cultural resources first documented in the original Nisqually Reach Aquatic Reserve proposal.

Ongoing interest in preserving McNeil Island's cultural history by limiting access to and development of the island is consistent with the goals of the aquatic reserve.

<https://doc.wa.gov/about/agency/history/micc.htm>

The State of Washington is involved in joint-agency long range planning for the future use of McNeil Island that includes both cultural and natural resources. The shorelines of McNeil Island preserve important coastal processes from development as well as the species that depend on them in an undeveloped condition.

<https://www.ofm.wa.gov/sites/default/files/public/legacy/reports/McNeilIslandInventoryAndLong-RangePlanningProcessReport.pdf>

Habitats and features represented within the site

7. Does the site contain representative habitats not otherwise protected in the network of protected areas or aquatic reserves?

The Nisqually Reach Aquatic Reserve is unique within the DNR aquatic reserve system due to a dominant river delta feature which provides complex interactions with otherwise glacially derived shorelines that are much more common in Puget Sound. The delivery of freshwater and woody debris and migrations of anadromous salmonids into and out of the Nisqually River are unique features. McNeil Island is one of very few relatively undeveloped islands in South Puget Sound, and limited public access has made it a haven for wildlife. There is no equivalent opportunity for an aquatic reserve in southern or central Puget Sound.

8. Does the proposed site capture species or habitats that are currently much less common than they were historically within the site's "biogeographic region" (See Section 6, Figures 3 and 4)?

Species that require unaltered intertidal mudflats adjacent to extensive marshes and a variety of beach substrate types allows the area within the proposed expanded reserve to represent a broad diversity of habitat types for many species and resiliency to many climatic and disturbance factors. It is difficult to ascertain whether shifts in species populations represent direct habitat linkages or whether they are responsive to larger geographic and climatic shifts within the entire Puget Sound region. Maintaining the reserve diversity of habitat types over time will be crucial to maintaining the diversity of associated species for whatever future assemblage of species occupies a future South Puget Sound.

Viability of the occurrences of interest

9. Site features meet the intent of the reserve - Are species, habitat, or ecosystem processes consistently associated with the reserve site?

As outlined in above answers, the species and habitats are well established and supported in the reserve, and the expansion area will add additional features that support wildlife. These include undisturbed beaches at McNeil, and more pocket embayment and estuary habitat for salmonids and marine bird refuge. One habitat that has declined significantly over recent years is the bull kelp bed near Devil's Head, with the possible disappearance of this important feature in the future.

10. Number of conservation targets (As it relates to information in "Special value for biodiversity or species diversity," question #9 above)

Identify the habitat(s) and associated species you are proposing for conservation. Summarize the conservation goals. Add rows as needed.			
Species Name or special habitat	Conservation Goal	State status	Federal status
Shallow subtidal macroalgae and eelgrass beds –marbled murrelet, Puget Sound Chinook salmon	Protect forage base and juvenile rearing habitats (salmon)	Endangered	Threatened
Intertidal mudflats and shallow subtidal lagoons – Olympia oyster	Protect and expand extant reefs	Candidate	
Deepwater channels – Critical habitat for Bocaccio rockfish;	Protect forage base and habitat	Candidate	Endangered
Deepwater channels -Canary Rockfish	Protect forage base and habitat	Candidate	Species of Concern
Deepwater channels -Yelloweye Rockfish	Protect forage base and habitat	Candidate	Threatened
Deepwater Channels - Gray whale	Protect forage base, limit disturbance	Sensitive	none
Deepwater channels - Pacific harbor porpoise	Protect forage base, limit disturbance	Candidate	

11. Number of ecological processes - Does the site contain unique or distinctive physical habitat features (e.g., oceanographic gyre, oceanographic sill, natural beach spit, side channels, ox bow, estuary, etc.)?

The proposed expansion area contains a large feeder bluff and canopy-forming kelp bed on the southern part of Key Peninsula. This is a unique feature for South Puget Sound. Several "pocket" estuaries also occur along the eastern shoreline of Key Peninsula with shallow subtidal sand flats, lagoons and associated marshes. Pitt Island, Gertrude Island and McNeil Island provide extensive undeveloped shorelines and isolation from upland development. Wyckoff Shoals is a large and relatively shallow subtidal feature.

Defensibility of the site

12. Connectivity to a reserve or protected area network and/or for species and/or habitats

a. Is site adjacent to existing marine or freshwater protected areas administered for preservation or restoration purposes?

The proposed expansion area is contiguous with the existing Nisqually Reach Aquatic Reserve and adjacent to sparsely developed shorelines. Nearby significant protected salt marshes and tidal areas are within the Billy Frank Jr. Nisqually National Wildlife Refuge. The conservation status of McNeil Island in particular will help to protect shoreline processes similar to or even better than the existing reserve. McNeil, Pitt and Gertrude Islands are part of WDFW's South Puget Sound Wildlife Area Complex. Key Peninsula conservation areas owned by Pierce County and Great Peninsula Conservancy will help to ensure the integrity of shorelines, water quality and species in the proposed expansion area.

b. Does the site provide regional habitat connectivity through any of the following functions? Refuge (predator, physiological, high energy), food production, migratory, corridors, spawning, nursery or rearing, riparian vegetation, adult habitat, other functions. Please provide references to support this information.

As the entire Nisqually Reach Aquatic Reserve sits at the mouth of the Nisqually River and just south of the Tacoma Narrows, it has the potential to link populations between Central and South Puget Sound basins with a wide variety of intact and interconnected habitats. These habitats may serve as refugia for many species that find either South Puget Sound or Central Puget Sound conditions temporarily inhospitable. A long-term study of juvenile fish throughout the reserve illustrates this dynamic: http://www.dnr.wa.gov/publications/aqr_resv_nr_report_20170301.pdf

13. Appropriate size to be sustainable - Is the area large enough to be self-sustaining? Is the entire feature identified for conservation included in the proposed site? Does the site include the adjacent areas necessary to support and buffer the conservation features of the site?

Analysis of the Nisqually Reach Aquatic Reserve steering committee suggests that the current reserve boundary was drawn as much for expedience in communicating the aquatic reserve to the public as it was to protect, research and educate about those resources under DNR's Aquatic Reserve Program. Adding the proposed acreage, in particular the full shoreline of McNeil, Pitts and Gertrude Islands will more fully protect the submerged lands around those islands. Similarly, the expansion area to include the southern tip of the Key Peninsula captures unique ecological features and processes that affect an area of marine waters far beyond the new reserve boundary. The increased size of the reserve helps to buffer and complement the existing reserve by adding more diverse habitats and features.

14. Ability to persist over time

a. Can site be successfully managed to maintain the features of interest?

Given the strength of the DNR-Nisqually Reach Nature Center partnership built since the nomination of the original reserve and the active participation of stakeholders in the reserve committees, we feel confident that future engagement within the expansion area will continue to maintain important features.

b. Are there known human-caused, or natural ecological concerns, to continued viability of the site?

As with any marine conservation area, unforeseen accidents such as an oil or chemical spill could be catastrophic to the species and habitats of the reserve. The reserve expansion area is adjacent to very rural shorelines so it adds few new risks that do not already exist along the much more developed I-5 and BNSF corridor that exists adjacent to the existing reserve. South of Tacoma Narrows, commercial ship traffic is greatly reduced compared to the rest of Puget Sound. Throughout South Puget Sound, there are concerns of eutrophication based on the long oceanographic residence time of that basin and significant nutrient inputs within the basin from wastewater and stormwater discharges. However, the proximity to the Tacoma Narrows, depth of the main channel and significant tidal fluctuations may naturally ameliorate this concern in the vicinity of the reserve.

15. Known or anticipated activities that endanger the site or habitat - Are proposed land uses or modifications compatible with reserve designation?

Based on current local zoning and shoreline master program designations, we do not anticipate any significant development pressure that would be incompatible with the reserve goals. The future of Washington State's actions under the Southern Resident Orca Recovery Strategy such as control of pinniped predators could have an unknown effect on interspecies relationships and food web dynamics within the reserve.

16. Potential for factors contributing directly to the area's decline to be prevented - Would reserve status provide protection for habitats, species, or processes of interest from encroachment?

Future Land Use Scenarios

Increased population growth in Pierce and Thurston Counties is expected to place pressure on ground water withdrawal, stormwater runoff, and sewage treatment. The level of impact these uses have on the aquatic reserve is highly dependent upon coordination between the municipal authorities and regulatory agencies, in this case, Department of Ecology. City and county shorelines are regulated under the Shoreline Management Act while land/water use and protection is regulated under the Comprehensive Growth Management Act. Ground water withdrawals, stormwater, and sewage treatment are all regulated under various sections of Ecology's water use and water quality laws.

Tolmie State Park, McNeil Island, Eagle Island State Park and several shoreline parks around Anderson Island will not allow development on large portion of their shorelines adjacent to the reserve and Pierce County protects a large parcel of parkland at Devils Head on the Southern Key Peninsula.

Pipelines, Utility and Transmission Lines

Pipelines can carry a number of different types of substances through an enclosed conveyance system. While most easement crossings for pipelines distribute or transmit materials across aquatic lands, some lead to actual discharge points. Pipelines leading to discharges typically carry treated water to marine outfalls. Transmission, fiber optic and other utility lines carry power and communication services to urban and rural areas. The lines can be buried or laid above ground and on tidelands and bedlands. Lines are typically buried in the nearshore and laid on the bedlands when running to islands. In the past, when lines required replacement, older lines were simply abandoned because removal was considered either

too disturbing or financially not feasible. Abandoned cables, pipelines, and utility lines are an encumbrance on state-owned aquatic lands. Non-essential cable or pipeline rights of ways, easements, or leases may pose a serious threat to the sub-tidal habitats in the aquatic reserve.

Water Quality and Spill Scenarios

The South Puget Sound Geographic Response Plan and Nisqually Geographic Response Plan Scenario planning has identified the following potential risks in South Puget Sound (DOE Spills Program, 2007). The identified risks may or may not actually occur and are defined as an identified probability of spill hazard to the Nisqually River, Nisqually Reach and waters within the Reserve Boundaries. DNR should remain aware of these risks, coordinating through the DOE Spill Response and Prevention Program as needed:

- Train Traffic Spill Risk:
Hazardous materials are transported on the BNSF Railway lines however, railroad transportation of hazardous materials is far safer than transporting material on highways, which has a 16x higher likelihood of an incident (P. Brady, BNSF pers. comm., 2011). Some level of risk remains when transporting hazardous materials on any railroad.
- Vessel Traffic Risk
Marine vessel traffic in the area may increase the risk of spills, discharges, and increase the possibility of “strike” to wildlife in the vicinity of the vessel. This may include fish, diving birds, seals, dolphins, but the most commonly followed example is that of ships or vessels striking whales. Whale strikes by vessels are not known to occur commonly in the Nisqually Reach area (R. Post, pers. comm., 2011)
- Recreational Vessels
The Nisqually Reach area is a popular recreation boating and fishing destination and includes approximately six marinas within or adjacent to the reserve. Recreational vessel traffic represents a medium to high risk of impacts such as litter, physical and chemical impacts to nearshore environments (including prop scour, chronic lubricant and fuel leakage, and shading of aquatic vegetation) as well as increased damage to submerged aquatic vegetation and macro algae from anchoring and gear loss.

Shoreline Modification

Shoreline modification includes bulkheads and armoring. Areas of the South Puget Sound have extensive shoreline armoring. The Thurston County Regional Council reported an estimated 30% - 35% of the county shoreline is armored. Additional shoreline modification within the aquatic reserve poses potential threats to nearshore processes.

Marinas and Public Docks

The siting and construction of a marina can cause extensive physical damage to the environment. Pilings and bulkheads all cause major disruptions to aquatic habitat. Poorly designed dock construction can change wave and sediment patterns, leading to the loss of sand and beaches. Marina slips are commonly leased to third parties, which complicate efforts to monitor and prevent impacts. Because of the risk of pollution from marinas, the Washington Department of Health establishes shellfish closure zones around marinas. Marinas and public docks cause shading, resulting in changes to the euphotic zone and associated primary production, including impacts to aquatic vegetation. They can also impact

water quality and may result in sediment contamination (caused by the use of toxic materials, such as materials treated with creosote), hydrologic alterations, and refuge for predators. Boats that are moored and left in the water year-round or seasonally commonly have their hulls painted with a biocide to restrict growth of marine organisms. Boat launching areas can also be entry point for invasive species (EPA CZMA Reauthorization website).

Other Recreational Use

Other recreational uses within the aquatic reserve boundary include salmon fishing, crabbing, shellfish digging, birding, nature and wildlife photography, kayaking, diving, and environmental education. DNR will promote and encourage appropriate, legal transient public recreational activities within the reserve (such as boating, water skiing, fishing, recreational shellfish digging, swimming, and beach walking) conducted in a manner that preserves the habitats and species of the reserve.

DNR does not regulate commercial or recreational fisheries but has authority over activities that require leases on state-owned aquatic lands (bedlands and tidelands). DNR recognizes that the WDFW and Washington's Treaty Tribe co-manage the state's fisheries, therefore fisheries management is outside the scope of the Aquatic Reserves Program.

Recreational Docks and Mooring Buoys

Recreational mooring buoys may cause scouring of aquatic vegetation and benthic substrate. If properly installed, these impacts may be minor or eliminated. In addition, numerous buoys congregated in one area create the potential for shading of aquatic vegetation and discharge impacts associated with the moored vessel. 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.

Climate Change Scenarios

Global climate change is likely to impact the Nisqually Reach Aquatic Reserve area if future predictions of sea-level rise and increased storm events and flooding occur. Sea level is expected to increase in the Puget Sound Region at an annual increase of .04 - .1 inches (1 - 2.5 mm) per year. A rise in sea-level will result in increased coastal erosion, and potential disappearance of the connectivity of islands at low tides, and an appreciable reduction of the already diminishing land mass of these exposed islands. Changes in the tidal prism, current regime, and permanent inundation of salt marsh areas and vegetated spit/berm will significantly reduce the available nursery and transitional habitat for salmonids, foraging and nesting seabirds, as well as diminishing the availability of suitable haul-out and pupping areas for seals. Preliminary indications that heat stress is a factor affecting the persistence of canopy-forming kelp throughout South Puget Sound.

Finfish Aquaculture

Finfish aquaculture (net pens) has the potential for significant impacts to water and sediment quality, physical effects to the seabed, as well as the opportunity to introduce harmful organisms, diseases and the potential of genetic alteration to local salmon stocks. Net pens cause shading, concentrate fish waste, and can result in disease outbreaks due to the confinement of a large number of fish in a

relatively small area. Some fish pen rearing operations can distribute feed and antibiotics that are not all consumed by the fish and can potentially impact local habitat and aquatic species. There are also threats of negative interactions with native species, predation, and impacts to the local benthic community.

Expanding the reserve to include these important habitats adds an extra layer of protection. All proposed new uses and leases within the aquatic reserve must be consistent with the goals and objectives of the Nisqually Reach Aquatic Reserve Management Plan. The certainty provided by the reserve status, not only removes the potential future threat of new uses that are potentially counter to the NRAR Management Plan, but also sets the tone for upland jurisdictions, other user groups and the general public that this space is important and needs protection. The resilience of the reserve is also strengthened through effective partnerships and community engagement through citizen science that helps galvanize support to address potential stressors and impacts.

Manageability of the site

17. Coordination with other entities, including local jurisdictions and current leaseholders

a. Does the proposal include coordination of reserve actions with other entities, including local jurisdictions and current leaseholders?

Coordination with Key Peninsula communities and significant shoreline landowners is ongoing and is expected to continue throughout the draft reserve expansion process. Coordination with WDFW, Nisqually and Squaxin Island Tribes regarding the consistency with goals of the McNeil Island Refuge are also ongoing. There are a few leases in the expansion area, and DNR will provide information about them to the review committee.

b. Has another entity previously identified this site or areas within the site as a priority for protection?

[Examples include Important Bird Areas (Cullinan 2001), priority areas for Research Natural Area Designation (Dyrness et al. 1975), or priority areas for conservation (e.g., through ecoregional planning, Natural Heritage Program research (Kunze 1984), or similar process (Dethier 1989)]

After the creation of the Nisqually Reach Aquatic Reserve in 2011, The Audubon Society designated Nisqually Reach as an Important Bird area, as documented on their website:

<https://www.audubon.org/important-bird-areas/nisqually-reach>

“The Nisqually Reach is located at the very southern end of the Puget Sound, located directly north of the Nisqually Delta. The Nisqually Delta is a stopover point on the Pacific Flyway migration route for thousands of birds.”

The proposed expansion area contains relatively undeveloped and unarmored shorelines, high bluffs, open water, abundant marine vegetation, variable sized sediment from cobble to silt, multiple pocket estuaries, and a mix of freshwater, estuarine and marine habitats. The area contains abundant relatively intact kelp and eelgrass, with documented spawning habitat for surf smelt, sand lance and wild salmonid species. The area also contains a Pacific herring adult holding area. The abundant fish population provides prime feeding habitat for alcids, grebes, loons, ducks and more.

The original geographic scale of the Nisqually Reach Aquatic Reserve attempted to sew together important conservation areas like the Nisqually Reach Nature Center, Tolmie State Park and the southern shoreline of Anderson Island. The final proposed boundary was settled on based on Nisqually Reach Nature Center's abilities to do outreach to the affected communities, feedback from Anderson Island residents desiring to encompass the whole island and extending to the southern shoreline of McNeil Island based on known resources and protective status. The expansion plan is a logical extension to the original design with the steering committee suggesting a larger boundary and additional key coastal features represented. To our knowledge, there are no specific plans outlining a conservation goal for the expansion area other than the Nisqually Reach Aquatic Reserve Management Plan.

c. Have potential cooperative management partners been identified for management, monitoring, and enforcement?

This will be an ongoing process as the reserve expands. Existing stakeholder forums can be expanded to include representatives of the Southern Key Peninsula and appropriate staff from agencies that manage McNeil Island. Sound View Camp is an ideal partner for many of the aquatic reserve goals. Nisqually Reach Nature Center is reaching out to the managers of that property and programming staff to look for mutual benefits of a future partnership.

d. Is the site adjacent to terrestrial protected areas managed for conservation or restoration purposes?

Yes, McNeil Island is managed as a conservation area by WDFW and Pierce County owns a critical feeder bluff property, "Devil's Head" on the southern Key Peninsula. The Key Peninsula Community Plan identifies desired outcomes for shorelines, fish and wildlife habitats and open spaces that are consistent with the reserve expansion. Several parks and open spaces are included in the expansion area as well as a church camp that has focused programming on citizen science and environmental education, and is negotiating a conservation easement with Nisqually Land Trust. The Great Peninsula Conservancy owns shoreline and pocket estuary parcels just to the north of Devil's Head. <https://www.co.pierce.wa.us/DocumentCenter/View/38488/ADOPTED-Key-Peninsula-Community-Plan?bidId=>

McNeil Island has a 3100+ acre conservation deed that represents 70% of the Island's land area, including most of its shoreline. Expanding the aquatic reserve to the entire shoreline of McNeil Island is consistent with the Aquatic Reserve Management Plan and stakeholder engagement as set forth in the McNeil Island Inventory and Long Range Planning Process Report: <https://www.ofm.wa.gov/sites/default/files/public/legacy/reports/McNeilIslandInventoryAndLong-RangePlanningProcessReport.pdf>

18. Provide a description of how to measure success (i.e., monitoring). Describe what, if any, monitoring needs. Does the reserve proposal include a monitoring plan that measures reserve progress toward goals and provide for adaptive management?

The existing Management Plan monitoring goals will be expanded to the new proposed geography. In particular, Sound View Camp is a potentially rewarding partner for adopting existing and expected future monitoring through their outdoor education department. Ongoing state, tribal and federal agency monitoring programs in the vicinity of the reserve are expected to continue and be reviewed by

the steering committee. McNeil Island shoreline restoration, both proposed and completed, is being monitored.

Nisqually Reach Aquatic Reserve's existing committees, citizen scientists and agency, tribal and organizational partners will continue to compile information reported by stakeholders from the various surrounding communities and ongoing studies.

19. Kinds of enforcement needed to make sure incompatible uses and impacts do not encroach on the reserve. What kind of enforcement is needed to prevent incompatible uses and impacts from encroaching on the reserve?

- DNR review of lease applications for areas within the reserve boundary and other activities to ensure new uses are compatible with the Nisqually Reach Aquatic Reserve Management Plan.
- DNR enforcement of geoduck harvesting limits.
- WDFW Hydraulic Project Approvals must consider potential impacts to known forage fish spawning beaches.
- WDFW enforcement officers and Washington Department of Social and Health Services must prevent unauthorized access to McNeil Island shorelines.
- Washington Department of Ecology must consider the unique ecological features, oceanographic residence time and cumulative nutrient discharges in South Puget Sound that could result in further eutrophication of bottom waters within the reserve boundary and adjust nutrient discharges and water quality certification conditions accordingly.
- Pierce County must enforce their Shoreline Master Program and Critical Areas ordinances adjacent to the reserve.

20. Does the site serve or conflict with the greatest public benefit?

a. Does reserve status represent the greatest public benefit?

For decades, the Nisqually Delta Association advocated for the protection of the Nisqually Delta from various development proposals leading to the creation of the Nisqually National Wildlife Refuge. Nisqually Reach Nature Center's presence, growth and scope of impact also grew throughout those decades. Nisqually Indian Tribe engaged in process-based restoration to restore salmon habitat in the delta followed by a multi-agency response to restore tidal influence to most of the delta with manifold ecological benefits well beyond salmon and birds. The proposed aquatic reserve nomination, subsequent approval and ongoing implementation as well as this expansion proposal reflect a continuing public desire to carve out a place in Puget Sound that fish and wildlife, their habitats and natural processes are allowed to persist in an ever-changing world. The people of this region have decided that the reserve status represents the greatest public benefit.

b. Is reserve status compatible with existing or proposed adjacent uses?

Existing preserved areas, buffers against encroachment of military facilities and a desired rural character for residents continue to emerge as themes for which the Nisqually Reach Aquatic Reserve is a key policy imperative. By expanding the reserve, we place the burden on those who would propose new uses to prove that those are compatible with the goals of the reserve, rather than having the fish and wildlife, habitats and processes unique to the Nisqually Reach region take a back

seat to each new development proposal as has happened repeatedly throughout Puget Sound's history.

Section 2 - Additional information to be provided for SCIENTIFIC RESERVE Proposals

Coordinate your responses to the following questions with answers provided under Environmental Reserve site information, above.

1. Rare site including a wide variety of habitat types and ecological processes (See: "Special value for biodiversity")

The diversity of habitats represented within the reserve and its expansion area owe to the unique location and dominant features of the landscape creating numerous gradients of elevation, bathymetry, bottom type, vegetation, salinity and isolation from human disturbances that make it a natural mesocosm for Puget Sound as a whole.

2. Relatively undisturbed example of habitat that was common historically (See: "What is the current condition of the site?")

Much of the shoreline and subtidal environments within the reserve and its proposed expansion area are in relatively undeveloped states compared to other similar areas of Puget Sound. The major disturbances to the area are actually restoration projects seeking to bring back the processes, habitats and species that were once abundant but constrained by historical land uses

3. Is the site of interest to the scientific community?

a. Does site represent a unique research opportunity?

Nisqually Reach Nature Center, Nisqually Indian Tribe, US Fish and Wildlife Service, NOAA Fisheries, USGS, US Army Corps of Engineers, University of Washington, The Evergreen State College, DNR, WDFW, Ecology, Audubon Society and many others have used the Nisqually Reach as a research area for decades. The Nisqually Reach area is used both as a "control area" for comparing with more developed sites and as a way to document major landscape scale changes in ecosystem processes, community structure and species use of one of the largest estuary restoration projects in the US.

b. Do proponents have a history of successful scientific research?

Nisqually Reach Nature Center (NRNC) has sponsored research symposia throughout its history to compile and highlight research centered on the Nisqually Reach and watershed. NRNC incorporates research findings in its decision-making, education curriculum and citizen science volunteer opportunities and regularly hosts research interns. Ongoing citizen science studies on Pigeon guillemot and forage fish spawning are conducted by Nisqually Reach Nature Center. Research within the reserve is highlighted at the following web page:

<http://nisquallyestuary.org/sciencepresentation.pdf>

4. Species richness - Does site exceed expected species richness for areas of similar size? (i.e., does site contain plant and animal communities suitable for continuing scientific observations (WAC 332.30.106).

See SEPA Checklist: (<http://nisquallyestuary.org/environmentalchecklist.pdf>) for a comprehensive list of species known to occur within the area.

A 2014-2015 trawl survey of the deepest part of the reserve revealed large abundances of Pandalid shrimp capable of supporting many other species as a food source.

<https://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Monitoring/Final%20Anderson%20Ketron%20Survey%20Report%20Apr%202016.pdf>

5. Viability and manageability of the site, able to support rare, special, and unique features?

As a research platform, the existing low levels of disturbance, incorporation into the aquatic reserve system and consistent upland jurisdiction zoning and enforcement can help to sustain the viability and manageability of the site into the future as compared to areas where development proposals both on the shoreline and in the water are more likely to occur. The existence of significant baseline research in the area as mentioned above allows for change analyses that would also be more difficult in a less studied site.

6. Site contains a high degree of biodiversity for habitat type - Does site exceed expected biodiversity as measured using Shannon's diversity index (an index that measures diversity and evenness of species) for similar habitats?

Shannon indices have not historically been calculated in past species richness studies, although the raw data may provide the opportunity to do so. Because of this, it is unclear what expectations exist for an index to compare. This may be a key research goal for establishing a baseline index for the site that allows comparisons in the event of species shifts over time related to climate change, fisheries or other resource management decisions.

7. Is there potential for research manipulation without doing irreparable harm to neighboring systems or habitats in order to advance knowledge (where applicable)

a. Do proposed manipulations affect the physical (e.g., habitat structure or ecosystem processes) or biological composition of the site?

Significant manipulations to the Nisqually Delta and shorelines of McNeil Island have already taken place in the form of process-based restoration projects. Ongoing and potential future monitoring of these manipulations is necessary as the manifestations of those actions continues over time and in the context of other cycles such as sea level rise.

b. Are impacts of manipulation restricted to the site?

The "effect area" of process-based restoration projects far exceeds the footprint of the manipulation. Adding acreage to the aquatic reserve will allow for future research as to the extent of those effect areas.

8. History of monitoring or an opportunity for long term monitoring at the site - Does site have a historical monitoring record?

Nisqually Reach Nature Center (NRNC), Nisqually National Wildlife Refuge and the Nisqually Indian Tribe have a rich history of conducting monitoring within the boundaries of the aquatic reserve, even before designation. For a review of NRNC research projects and related partner studies, see these links:

<http://nisquallyestuary.org/research.html>

<http://nisquallyestuary.org/invertebrates.html>

<http://nisquallyestuary.org/birds.html>

Sound View Camp on the Southern Key Peninsula in the proposed expansion area also conducts winter beach surveys and bird counts as part of their outdoor education curriculum:

<http://www.soundviewcamp.com/nature-blog/2019/1/23/first-ever-winter-beach-monitoring>

<http://www.soundviewcamp.com/nature-blog/2019/1/5/winter-bird-count-numbers>

Education programs at both sites offer curriculum designed to train the future generation of scientists by teaching methods of data collection, observation and manipulation of data. Collaboration between NRNC and Sound View Camp into the future for characterizing and monitoring aquatic reserve biology is an exciting possibility of the expansion proposal.

Section 3 - Additional information to be provided for EDUCATIONAL RESERVE Proposals

1. Network of sites that provides an accessible distribution of sites throughout the state - Are education reserves available within a biogeographic region? (Education reserves may include areas operated by U.S. Fish and Wildlife Service, National Park Service, Washington State Parks and Recreation, or The Nature Conservancy that offer educational curricula.

Yes, this is an expansion of the Nisqually Aquatic Reserve with unique opportunities to connect with new potential community members and connect existing stewards to the new habitats outlined.

2. Network of sites that provides an adequate distribution among habitat types – Is the proposed site a unique example of habitat available for educational opportunities regionally or statewide?

Yes, the expansion area is full of unique habitats some of which are not accessible (McNeil Island) to the public but can be researched by trained and vetted citizen stewards and this information can be disseminated in communications to all of the surrounding communities

3. Sites that attract a range of target audiences – Is the curriculum integrated into an applied educational program (e.g., school, public education program, etc.) and tailored to the unique features of the site.

Nisqually Reach Nature Center works with schools in Pierce and Thurston County, Billy Frank Nisqually National Wildlife Refuge, and The Nisqually and Squaxin Tribes. Our curriculum is inquiry based and uses innovative STEM (science, technology, engineering and mathematics) information to connect students to science in meaningful ways. These experiences let students become the scientist on the beach with hands on techniques. Currently NRNC reaches close to 4000 students in educational programming.

We already have over 70 citizen stewards helping our Pigeon Guillemot, and Forage Fish citizen monitoring program in areas adjacent to the expansion area and would like to engage citizens we currently are working with opportunity within the new expansion and others that we have not reached on Key Peninsula.

4. Sites that are compatible with educational use activities – Are activities and conditions in the areas adjacent to the proposed reserve compatible with the uses proposed for the reserve?

Yes, a long list of public access points are utilized currently by NRNC. Tolmie State Park, Billy Frank Jr Nisqually National Wildlife Refuge, WDFW, DNR, Nisqually Tribe, Squaxin Tribe, Joint Base Lewis McCord. We are excited to expand these opportunities onto Key Peninsula and garner access and information to share with our community about McNeil Island and its unique habitats.

5. Current site conditions or activities adjacent to the site are compatible with the educational reserve – Are activities and conditions in the areas adjacent to the proposed reserve compatible to the uses proposed for the reserve?

Yes, in addition to the education activities mentioned above, NRNC is a member of the Nisqually River Education Project, which connects with public schools throughout the Nisqually Watershed and South Puget Sound: <http://nrep.nisquallyriver.org/for-students/nearshore-investigations-at-nisqually-reach/>

6. Site whose ecological integrity can be preserved while providing public access – How will the unique ecological features of the site be maintained while providing public access for an education program?

In the expansion area, McNeil Island will not be accessed by the general public until the status of the island with DSHS changes. Some of the best nearshore habitats in South Sound exist on this island and will give us a unique opportunity to reach our communities with information about these places. Public access to Pierce County's parkland on the southern Key Peninsula is restricted by lack of parking and trails, as well as a steep bluff. Only small amounts of access to those features at low tide is possible from adjacent private properties.

Within the existing reserve boundary, although public access can have an effect on habitats if kept unchecked, the Nature Center specializes in giving our stewards and visitors a strong ethic connecting them to the environs they visit and to share that with others that they meet. It is hard to care for things if people do not know it exists. Outreach to the Joint Base Lewis McChord community could improve to protect sites like Solo Point which has heavy recreational use by military personnel. A public access trail through Sequelitchew Canyon to the aquatic reserve shoreline is well patrolled by the city of DuPont. The public access boardwalk at Nisqually National Wildlife Refuge is designed to protect sensitive intertidal habitats from direct human contact and is extremely well interpreted by informative signage stressing the uniqueness of the delta region and the aquatic reserve. Access to Tolmie State Park is well managed as a day use park by Washington State Parks and Eagle Island State Park is boat access only. County parks on Anderson Island are managed by the Anderson Island parks and Recreation District.

7. Site has a history of monitoring and an opportunity for long-term monitoring. (Criterion applicable in cases described by Final EIS 3.2.1.4.3) – Does site have a historical monitoring record?

Yes. NRNC now has its own citizen monitoring and education program with monitoring reports available to the public. There is a considerable body of historic monitoring that has been done by the State, Federal and Tribal Governments throughout the aquatic reserve boundary. Sound View Camp publishes beach and bird monitoring reports on their website.