CHERRY POINT AQUATIC RESERVE SITE PROPOSAL APPLICATION

1. GENERAL SITE INFORMATION

A. Site location:

The Cherry Point site is located in northwest Whatcom County along the eastern shore of the Strait of Georgia. The site extends from the southern boundary of Birch Bay State Park to the northern border of the Lummi Indian Nation Reservation. The site excludes three existing leases (BP, Intalco, ConocoPhillips shipping piers) and one proposed lease (PIT shipping pier).

B. Site Overview:

1. **General site description**

The site is distinctive for its bathymetry with water depths reaching more than 70 feet just offshore making it an appealing area for shipping interests. A spawning stock of herring and abundant offshore aquatic vegetation attract a wide variety of marine species. Other than the existing piers, the majority of the site is unaltered. The site is a high-energy beach with primarily large cobble and some sandy areas. The north section of the site includes high- vertical bluffs that diminish to the south. The southern section of the site is a popular recreational clamming beach.

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

That portion of the tidelands and bedlands of navigable waters owned by the state of Washington, fronting and abutting Sections 2, 11, 13, 14, and 24, Township 39 North, Range 1 West, Willamette Meridian and fronting and abutting Sections 19, 20, 29 and 32, Township 39 North, Range 1 East, Willamette Meridian described as follows:

Lying south of the south line of government lot 1, of said Section 2, Township 39 North, Range 1 West, W.M. being the south line of Birch Bay State Park; and lying north of the south line of Township 39 North, Range 1 East; and extending waterward to a line which is 70 feet below mean lower low water OR 0.5 mile beyond extreme low tide, whichever line is further waterward.

Excepting therefrom, the following Use Authorizations issued by the Department of Natural Resources: lease application numbers 20-A09122, 20-A11714, 20-A08488, 20-013265 and 20-010521;

Also excepting therefrom, any second-class tidelands previously sold by the State of Washington (figure 1).

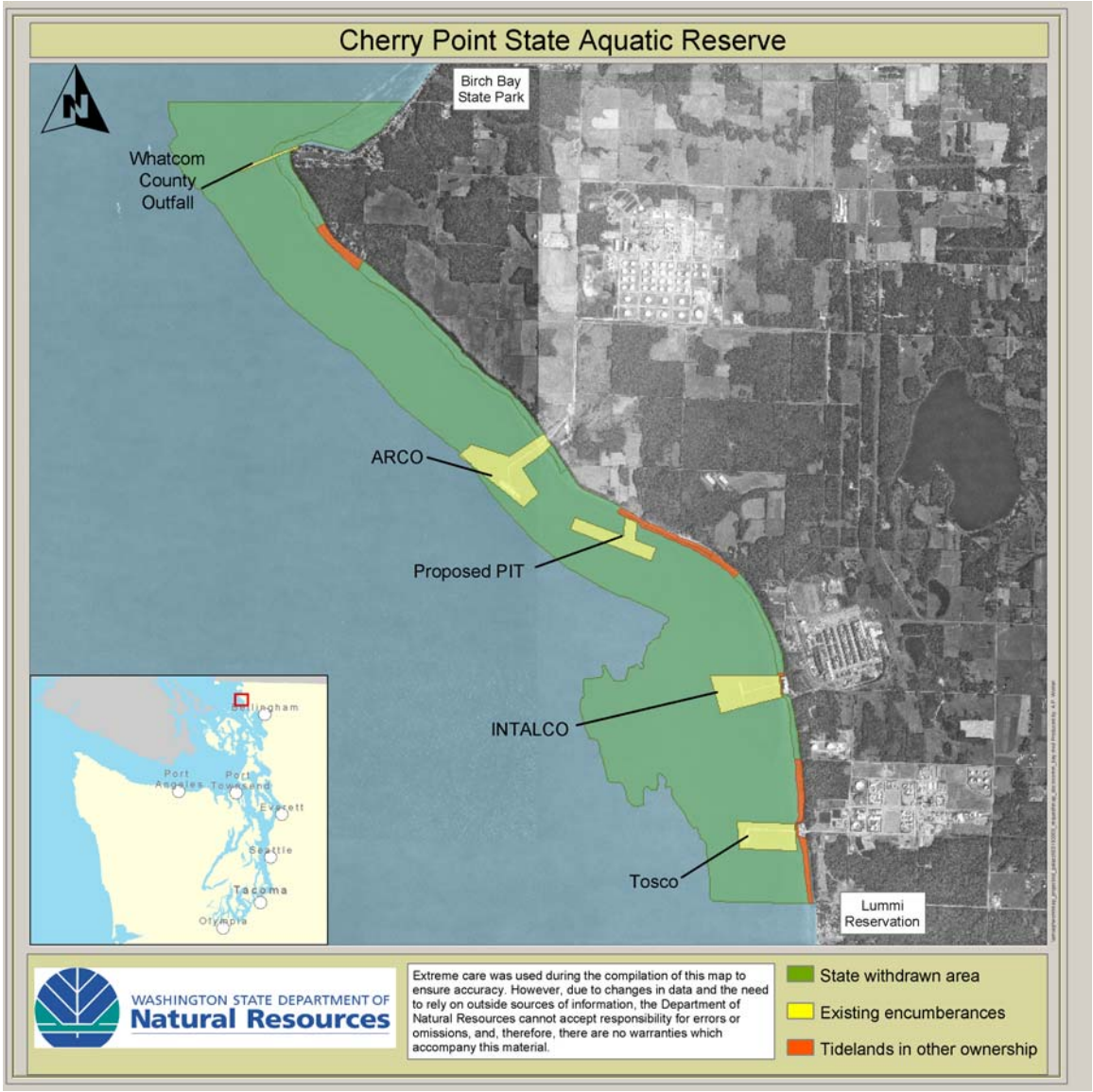

Figure 1: Proposed Cherry Point site.

3. **Current ownership (include detailed ownership map). Identify the intertidal & subtidal areas included in the site**

All the subtidal and the majority of the intertidal areas of the site are owned by the state (see figure 1).

4. **Current county shoreline designation and description**

The area from Birch Bay State Park around and including Point Whitehorn and south is designated by Whatcom County as Aquatic which requires the development in the shore zone be limited to uses that are compatible with conservation of area resources and water dependent. The adjacent upland area is zoned for urban residence, which allows four houses per acre.

The remainder, and the majority of the site are within the shoreline zone identified as the Cherry Point Management Unit. The shoreline is zoned for floating public and private marine cargo transfer terminal facilities. Dredging and filling not associated with construction activities is prohibited. The adjacent upland is zoned for heavy impact industrial uses.

C. Justification for proposal: (briefly summarize the reason for establishing the aquatic reserve)

The Cherry Point herring stock were one the largest stock in Washington. Monitoring efforts have documented a step decline in the health of this stock with the biomass declining from more than 14,000 tons in the 1970's to just more than 1,000 tons in recent years.

Kelp beds are found just offshore throughout the site and other aquatic vegetation, including eelgrass is locally abundant. The location of Cherry Point between Lummi and Birch Bays make this site an important area for many marine birds as well as an important migration corridor used by salmon.

Habitat values	Species
Forage fish spawning habitat	Chinook salmon
Eelgrass	Migratory waterfowl
Important bird foraging area	Bald eagle
Migratory waterfowl habitat	Herring
Salmon migration	

D. The ecological and cultural quality of the site

1. What is the current condition of the site?
    - Is the site degraded?

While the site is not in pristine condition, the majority of the adjacent shorelines are undeveloped and unarmored. Additionally, there are few persistent water quality concerns at the site. Degradation in the vicinity is limited to three commercial piers and associated vessel traffic and transport.

- Are non-native species found at the site?

Sargassum, a non-native subtidal kelp, is common and found throughout the nearshore along Cherry Point (Berry et al. 2001). Despite being non-native, Pacific herring spawn extensively on *Sargassum* (Penttila, personal communication).

- Are there water quality concerns associated with the site?

Washington Department of Ecology reports that sediments within and adjacent to the site at Cherry Point are impaired by Hexachlorobenzene, 1,2-Dichlorobenzene, 1,2,4-Trichlorobenzene, and Indeno(1,2,3-cd) pyrene (Aitchison, personal communication). Past studies have detected relatively high concentrations of PAHs in the sediment around the outfall associated with the Intalco facility (Tetra Tech 1993).

- Are there signs of habitat loss within the site?

A small amount of the intertidal (located on private tidelands adjacent to the site) has been filled to provide footings for the two southern piers. These footings extend into the intertidal and are heavily armored with rip-rap and likely intercept sediment within the drift cell during high tide cycles. Piers may also shade out nearshore vegetation (MacDonald et al. 1994) and introduce contaminants from pilings treated with antifouling agents (Hayes and Landis in press). Upland of the reserve, a saltmarsh in the vicinity of Gulf Road once continued further to the south of the road, but that portion of the wetland has been filled and disturbed (Whatcom County 1992)

- Are there signs of habitat loss within the biogeographic region?

Cherry Point is within the Strait of Georgia biogeographic sub-region. Levels of shoreline development in the Strait of Georgia are similar to the average for Puget Sound with 32.6% of the shoreline modified by structures (Berry et al. 2001). Like other parts of Puget Sound, protected bays and river mouths within the Strait of Georgia have been heavily modified by harbor development, flood protection, and commerce.

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

Most ecosystem processes appear to be intact in the vicinity of Cherry Point. Declines in Pacific herring may signal that ecosystem processes are degraded or damaged, but several authors have attributed declines in this stock of herring to broad oceanographic conditions including El Nino Seasonal Oscillations (ENSO) and Pacific Decadal Oscillations (PDO) (EVS 1999). An important consideration in this area is the role of interactions between freshwater from sources including the Fraser River with saltier oceanic water. Significant complex thermal variations were observed offshore which appear to be related to salinity variations near the surface. This indicates that the surface water is strongly influenced by freshwater sources and that mixing is slow (Battelle 1974).

2. Risks to the ecosystem or feature of interest (If applicable)
   - Can threats contributing directly to the area's decline be prevented through reserve establishment?

A regional risk analysis undertaken by Hayes and Landis (in press) partitioned anthropogenic stressors into eight categories: accidental spills, agricultural land use, ballast water, piers, point sources of pollution, recreational activities, urban land use, and vessel traffic. Of these the greatest contributors to risk in the region appear to be vessel traffic, upland urban and agricultural land use, and shoreline recreational activities. In the Cherry Point vicinity ballast water was identified as the most important source of risk. Furthermore, the biological endpoints most likely to be at risk are great blue herons and juvenile Dungeness crabs. Risks attributable to each of these anthropogenic stressors can be mitigated if not eliminated through best management practices, and the availability of regional risk characterizations will aid the development of effective management plans.

An analysis of reportable oil spills at the north Cherry Point refinery between 1972 and 1998 reveals that a cumulative total of approximately 23,649 gallons of oil or oil derived product have spilled at this facility (EVS 1999). These spill events range from sheens to 21,000 gallons of crude oil (June 4, 1972). A total of 57 reportable events are described with spills occurring in 18 of the 26 years in the reporting period. Because most of the oil spills are due to either equipment failure (i.e., cracked hulls or ripped lines) or human error (i.e., apparently overfilling storage tanks) it is likely that oil spills will continue to occur at both refineries. The Oil Pollution Act of 1990 and Washington State Department of Ecology regulations require regulated facilities, such as refineries, to conduct two equipment deployment exercises annually and hold one tabletop exercise annually.

A Geographic Response Plan (GRP) was developed for North Puget Sound that recognizes both refineries as potential spill origin locations (figure 2; Ecology 2003). Spill response priorities identify only two areas within the reserve area as booming priorities, and those only in cases of spills from the southern refinery. While the GRP includes reference to many of the fishery resources found in the vicinity of Cherry Point,

it does not examine marine bird concentrations found in the area that are known to be sensitive to spilled oil nor does it describe how seasonal changes might shift priorities.

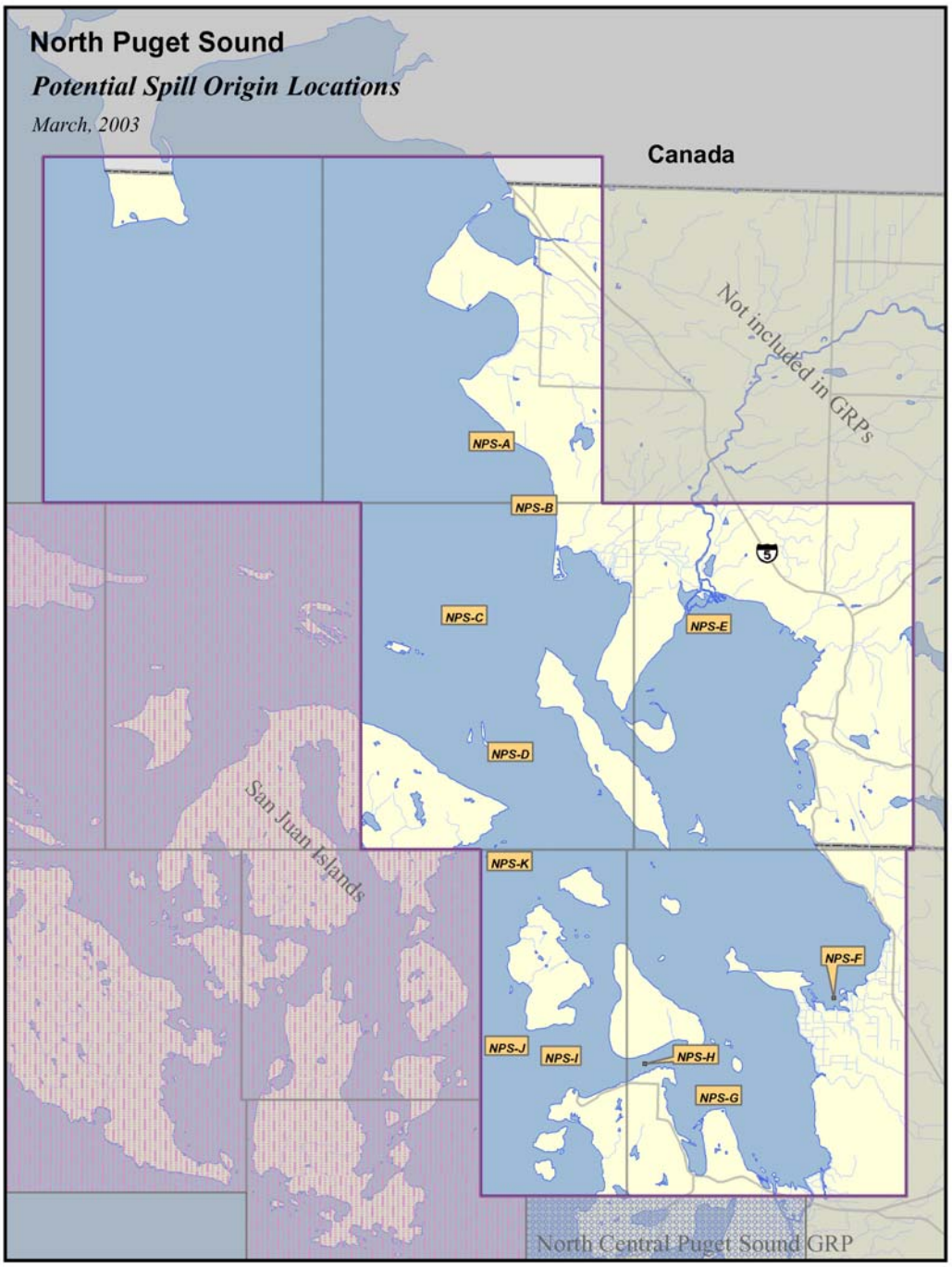

Figure 2: Potential spill sources identified in North Puget Sound GRP.

3. Restoration potential
    - Is there pending restoration at the site?

There are no proposed or pending restoration projects at the site. The primary known anthropogenic impacts associated with the site are associated with commercial activities and piers that are not included in the reserve. Potential restoration activities that could be undertaken at these sites might include the removal of fill associated with pier footings at the two southern piers, thereby making the piers pass across the intertidal as the northernmost pier does. Additional restoration could include the replacement of solid deck surfaces with grating to limit shading in areas where submerged aquatic vegetation would be expected to grow. Some have speculated the shoreline is beginning to show signs of sediment starvation and it may benefit from sediment nourishment (Kyte, personal communication).

    - Would restoration benefits extend beyond site boundaries?

No restoration projects have advanced beyond the stage of speculation.

4. Special value for biodiversity or species diversity
    - Does the proposed site capture habitat used regularly by species of special conservation interest?

The area of Cherry Point (i.e. Point Whitehorn south to Neptune Beach) is one of the most important Pacific herring areas in Washington State. It serves as the "core" area of spawn deposition for the largest single herring spawning stock in Washington waters, a stock that historically supported more than 10,000 tons of estimated spawning escapement biomass annually. This population has been declining since the late 1970's and although recent surveys suggest the population may have stabilized at approximately 1,000 tons of escapement, the stock status has been downgraded to 'critical' meaning that permanent damage to the stock is likely or has already occurred (Stick, personal communication). Despite continuing declines in the stock, spawn deposition intensity and frequency in the Cherry Point area has been maintained and spawn surveys encounter 'medium' or 'heavy' spawn deposits more commonly in the Cherry Point area than anywhere else in Puget Sound (Penttila 1994). Herring spawn is deposited on eelgrass and more than 25 species of rock-dwelling marine algae found between about +3 feet MLLW to the lower limit of algal growth at around –10 ft (Penttila 1994). Spawn is most frequently found on *Zostera marina* (native eelgrass), *Gracilaria*, *Laminaria*, *Sargassum*, and *Botryoglossum* (Penttila, personal communication).

Surf smelt spawn has been documented just north of the northern dock, and extending from Gulf Road south past Neptune Beach exclusive of the dock footings (Penttila 2001).

Eelgrass beds are found along the sand bars in southern Birch Bay and are then interspersed with a diverse algal community from Point Whitehorn to Neptune Beach. Bladed kelps such as *Laminaria saccarhina* and *Costaria costatum*, filamentous kelps

such as *Desmarestia*, and a variety of red foliose and filamentous algae dominate the algae community. Pacific herring that lay demersal eggs upon the vegetation during the winter and spring months have used these habitats extensively. Early studies by Battelle (1974) of offshore fish communities caught only one species in all sample periods – spiny dogfish, and staghorn sculpin, speckled sanddab, butter sole, sablefish, and starry flounder were caught in most sample periods (table 1). A WDFW bottom trawl conducted just offshore of Point Whitehorn in 2001 provides a more recent sampling of fish communities. The trawl found fish characteristic of sand and cobble habitats that persist in the shallow nearshore habitats of the Strait of Georgia. Flatfish dominated the catch and included sand, Dover, English, and rock soles, starry flounder, and Pacific and speckled sanddabs (Palsson, personal communication).

This is consistent with earlier trawls performed by Kyte (1990) who also found that the majority (more than 90%) of flatfish taken in samples were juveniles less than 100 mm in length. Almost all the flatfish taken in earlier surveys were English sole (*Parophrys vetulus*), with a small number of rock sole (*Lepidopsetta bilineata*). Occasionally, adult butter sole (*Isopsetta isolepsis*) and starry flounder (*Platychythys stellatus*) have been seen along the diving transects or caught in the trawls. Archaelogical studies found that salmon and flatfishese were the most common vertebrates identified from the site (Hanson, D.K. and H.A. van Gaalen 1993).

Other benthic species included sturgeon poacher, buffalo, roughback, staghorn, and ribbed sculpins, whitespotted greenlings, and big skate. Semi-pelagic species consisted of spiny dogfish, walleye pollock, Pacific cod, Pacific tomcod, and Pacific herring. Dungeness crabs were the primary invertebrates caught in the trawl, but other small crabs and sea stars were also collected. These species are expected to dominate the edges of the entire reserve (Palsson, personal communication).

Kyte (1994) speculates that crab populations at cherry point may to be cyclic. Low catches in the fall and winter suggest an offshore movement by crabs and a low use of inshore habitats. Crabs move back inshore in the spring and summer. Crabs sampled are believed to be primarily in the 2+ and 3+ age classes. A migration event of young crabs was noted and may be a regular occurrence. Commercial catch estimates observe that "an estimated 80% of the Puget Sound Dungeness crab catch occurs between Hales Passage and Birch Bay, which includes Cherry Point" (Whatcom County 1994).

Table 1: Summary of fish caught in the vicinity of northern pier (Battelle 1974)

Species	Observation period					
	February-72	July-72	September-72	February-73	April-73	July-73
Spiny dogfish	X	X	X	X	X	X
Staghorn sculpin	X	X	X		X	X
Speckled sanddab	X	X	X		X	X
Butter sole	X	X	X	X		X
Sablefish	X	X		X	X	X
Starry flounder	X	X	X		X	X
Lemon sole		X	X		X	X
Sturgeon poacher	X	X			X	X
Pacific tomcod	X			X	X	X
Pacific herring	X			X	X	X
Whitespotted greenling		X	X			X
Rock sole	X	X				X
Arrowtooth flounder				X	X	X
Lingcod	X				X	
Dover sole		X				X
Sand sole	X	X				
Great sculpin		X		X		
Flathead sole		X				
English sole	X					
Walleye pollock	X					
Mottled sanddab		X				
Ratfish		X				
Pile sea perch			X			
Pacific cod					X	
Pipefish						X
Whitebarred prickleback						X

- Does the proposed site capture 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 (feeding or breeding), or fish spawning aggregations)

Descriptions elsewhere in this proposal of the local herring stock and related vegetation apply to this response. In addition, Wahl (1996) reports census counts for a variety of species as observed using systematic census techniques from shore-based observation stations. Cherry Point, Point Whitehorn and Birch Bay are distinct reporting areas in these surveys. Due to the boundaries of the reserve area, observations for Point Whitehorn and Cherry Point are reported here (table 2). These observations suggest that large aggregations of loons, harlequin ducks, oldsquaw, scoters, and gulls occur in the vicinity of Cherry Point and Point Whitehorn. While populations of many of these species have declined soundwide since these observations (PSWQAT 2002), it is likely that these sites still attract aggregations that exceed those observed in other parts of Puget Sound. Wahl (2002) speculates that populations of some marine birds may have shifted away from Cherry Point as the area has become a "recently impoverished feeding area."

Table 2: Peak abundance observations for aggregations in the vicinity of Cherry Point

Species	Location	Number Observed	Maximum observed (Location)
Red-throated Loon	Cherry Point	53	651 (Drayton Harbor)
Pacific Loon	Cherry Point	1,620	3,240 (Active Pass)
Harlequin Duck	Cherry Point	60	205 (Point Whitehorn)
Harlequin Duck	Point Whitehorn	205	205 (Point Whitehorn)
Oldsquaw	Point Whitehorn	335	1,134 (Drayton Harbor)
Black Scoter	Point Whitehorn	500	500 (Point Whitehorn)
Surf Scoter	Point Whitehorn	2,500	2,500 (Point Whitehorn)
Scoter sp. (in addition to birds observed to species)	Point Whitehorn	8,825	8,825 (Point Whitehorn)
Bonaparte's Gull	Cherry Point	1,640	1,640 (Cherry Point)
Mew Gull	Cherry Point	1,300	2,007 (Deep Creek)
Mew Gull	Point Whitehorn	300	2,007 (Deep Creek)
Thayer's Gull	Cherry Point	15	148 (Bellingham)

Marine mammals are regular visitors to the area. Groups of less than 100 harbor seals are occasional found hauled out in the vicinity of Point Whitehorn (Jeffries et al. 2000). Penttila (1994) reports gray whales and stellar sea lions are infrequently observed within the reserve area.

5. Ecological processes that sustain the aquatic landscape
    - Would protection of the site protect/maintain ecological processes?

At present most ecological processes appear to be intact at Cherry Point. Protection would facilitate the recovery of resources that have been historically associated with the site if environmental conditions are favorable.

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 Wa. Register of Historic Places, RCW27.34.220 or the National Register of Historic Places? Evaluate the value of those described in the proposal from a regional or statewide basis (ex. sites listed on the state or national historical register or significant historical indigenous use areas would have high values.)

Preliminary archaeological analysis indicates at least 3,000 years of Native American occupation at Cherry Point. Additionally, Cherry Point is noted as a reef-netting location that was used by a group of Coast Salish Indians known by the post-reservation name of Lummi. The site was apparently abandoned in the 1800's possibly due to declines in native populations due to disease (Markham 1993).

The following archeological sites within the site are recorded with the Washington State Office of Archeological and Historic Preservation:

a. 45-WH-1: Eight different archeological excavations at this site have yielded 93 features including
    - Fish drying racks
    - Remains of a plank house
    - Fish trap
    - Smoking pit
    - Human burial
    - Artifact manufacturing areas
    - Domestic hearths
    - Rock pavements
    - Over 2,500 artifacts
b. 45-WH-1, 66, 83, 84 & 523: These four separate sites contain cobble and pebble tools, flake tools, projectile points and fire altered rock between 4,000 and 8,000 years old.
c. 45-WH-97: The site is a 25 X 20 meter shell midden about 30 centimeters deep. The site contains crystalline silicate knives, fire altered rock, animal bones and clams and mussel shells.

Markham (1993) advances an argument that Euroamerican fish trap camps in the vicinity of Cherry Point represent a distinctive part of the region's cultural history. Of 18 fish traps that were registered with Whatcom County between 1905 and 1931, 7 were located in the vicinity of Cherry Point.

E. Habitats and features represented within the site

1. Is the site a good example (relatively undisturbed) of representative habitat as compared with the overall reserve program goal?

    - Does the proposed site capture species or habitats that are much less common within the biogeographic region than they were historically?

Populations of groundfish and marine birds have declined substantially. Stocks of spiny dogfish, Pacific cod, lingcod, sablefish, surfperch, and Dover sole are currently below their long-term averages in North Puget Sound (PSWQAT 2002). Populations of many marine birds have declined substantially between 1978 and 1999 in North Puget Sound (table 3).

Table 3: Change in North Puget Sound marine bird densities between 1978 and 1999 (PSWQAT 2002)

Species	Change (1978 vs 1999)	
Marbled Murrelet	-96%	Decreasing Densities
Western Grebe	-95%	
Long-tailed Duck	-91%	
Red-necked Grebe	-89%	
Horned Grebe	-82%	
Total Loon Densities (3 sp.)	-79%	
Scaup	-72%	
Black Brant	-66%	
Common Loon	-64%	
Double-crested cormorant	-62%	
Scoter sp.	-57%	
Pigeon Guillemot	-55%	
Gull Densities	-43%	
Goldeneye	-23%	
Bufflehead	20%	Increasing Densities
Merganser	55%	
Harlequin Duck	189%	

Dramatic declines in the Cherry Point stock of Pacific Herring have attracted considerable attention. Escapements that once exceeded 10,000 tons annually now hover near 1,000 (figure 3). While declines at Cherry Point are reflected in total spawning biomass found in North Puget Sound, increasing populations in stocks in South Puget Sound have offset this trend when all Washington Stocks are aggregated as spawning biomass between 1977 and 2002 is little changed at 18,248 tons and 18,312 tons respectively.

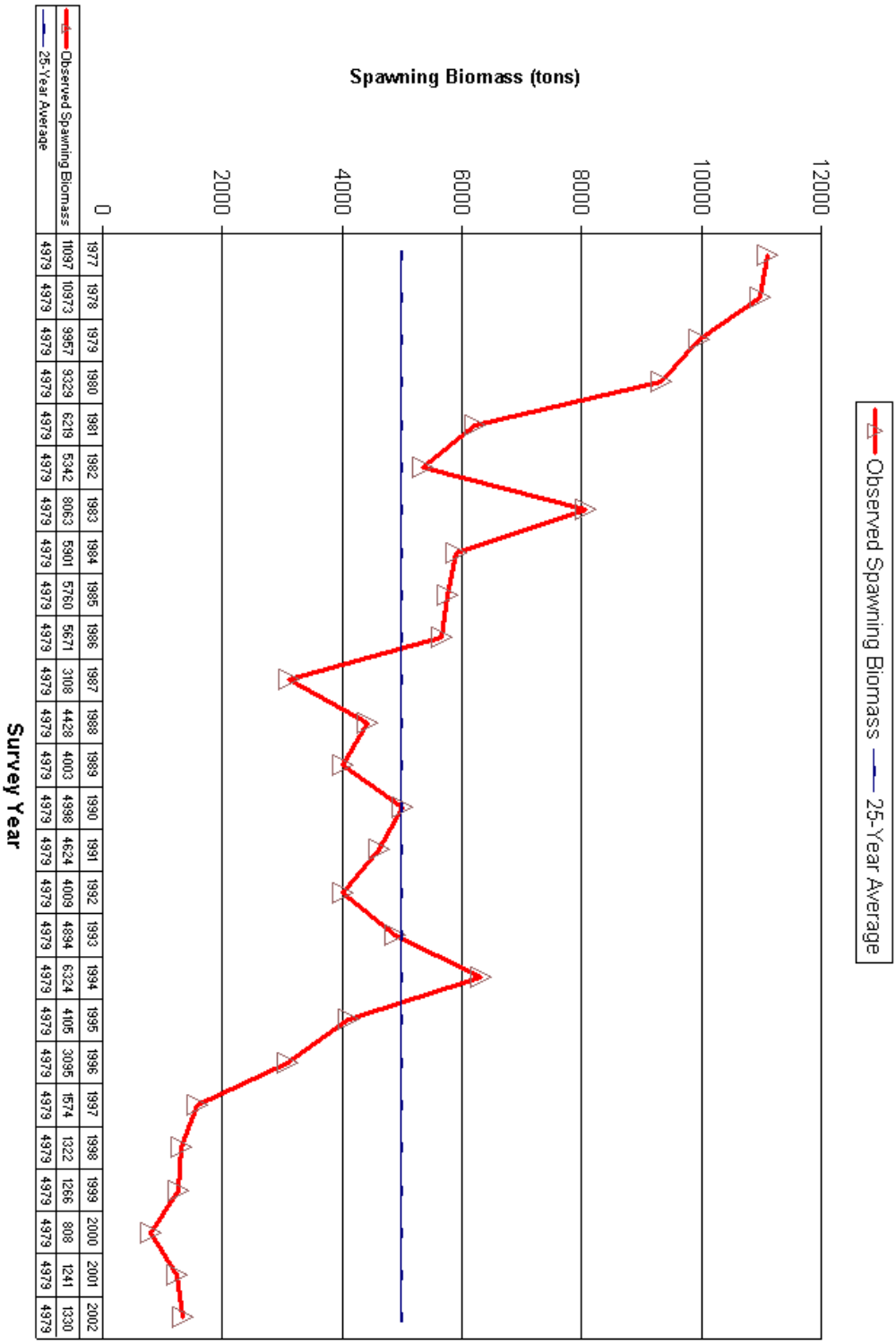

Figure 3: Cherry Point Herring spawning biomass (Stick, personal communication; Lemberg et al. 1997).

2. Does the site include habitat types that are under-represented in the aquatic reserves program or marine protected area network?

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

At present no reserves include significant portions of any herring spawning, however two other Aquatic Reserve proposals – Maury Island and Fidalgo Bay – do include significant portions of herring spawning stocks. Most existing protected areas in Puget Sound have focused either on embayments or areas with rockfish populations. Protection of this stock would help conserve a feeding area that is used extensively by a wide variety of migratory birds that winter in Puget Sound. The Cherry Point herring stock spawns later in the year than other stocks (Lemberg et al. 1997) and therefore provides a unique and later feeding opportunity for many of these birds (Nyeswander, personal communication).

3. Does the site include a biogeographical location that is under-represented in the aquatic reserves program or marine protected area network?

    - Is the site located in a biogeographic region or sub-region that is underrepresented in the existing reserve network?

Including all Aquatic Reserves presently under review only 2.9% of Puget Sound is protected in Marine Protected Areas recognized by the Federal MPA Center (DNR, unpublished data). Two additional areas within the sub-region, Fidalgo Bay and Cypress, are being reviewed for Aquatic Reserve status. The largest existing MPA in the region is the 11,000 acre Padilla Bay National Estuarine Research Reserve. Many of the other protected areas in these regions are either: a) extensions of upland protected areas and provide limited protection to marine waters or b) close harvest for a small number of species.

F. Viability of the occurrences of interest

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

Herring stock has been monitored and has consistently used this site for more than thirty years. Additionally, intertidal surveys begun in 1954 and continuing through the present indicate that species currently associated with the site have occurred at the site in the past and are therefore likely to occur in the future. Although some species have declined during the observation periods, no significant changes in habitat use or species diversity have been reported at this site.

2. Number of conservation targets
   (SEE "Special value for biodiversity or species diversity")
3. Number of ecological processes
   - Does the site contain unique or distinctive physical habitat features (e.g., oceanographic gyre, oceanographic sill, natural beach spit, etc)?

The site is a natural high-energy cobble beach with migrating sand patches in the intertidal. Water movement at and near the surface is influenced by tides, land configuration, wind and the freshwater discharges of the Fraser and Nooksack Rivers. These influences may be very profound and result, periodically, in a surface water movement that will differ greatly from normal (Kincaid et al. 1954).

- Does the site contain unique or distinctive biological processes (larval rearing zooplankton concentrations, aggregation sites, etc.)?

Herring spawning on aquatic vegetation found throughout the site attracts, at times large aggregations of, a wide variety of species including seabirds, marine mammals and other fish. The size of aggregations and variety of species represented are described elsewhere.

G. Defensibility of the site

1. Complementary protection within a reserve or protected area network.
   (See: *Habitat types that are under-represented in the aquatic reserves program or marine protected area network)*
2. Connectivity to a reserve or protected area network and/or for species and/or habitats
   - Is site adjacent to existing marine or freshwater protected areas administered for conservation or restoration purposes?

The site is not immediately adjacent to any marine protected areas. A 9 acre category I saltmarsh is adjacent (shoreward) to the site in the vicinity of Gulf Road (Whatcom County 1992). The wetland is 80% tidally saturated and 10-20% tidally inundated. While the site lies entirely on private property it is identified in county planning documents as a critical area.

- 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.

The area is an important feeding area for bird populations that winter in Puget Sound and has historically supported the single largest herring spawning stock in Puget Sound. The shoreline along this reach is an important migratory corridor for a wide variety of species including salmonids.

3. Appropriate size to be sustainable
   - Is area large enough to be self-sustaining?

While the proposed area is relatively large, many of the species found at the site are ambulatory and are likely to spend only a portion of their lives within the reserve.

4. Ability to persist over time
   - Can site be successfully managed to maintain the features of interest?

   - Are there known anthropogenic or natural threats to the continued viability of the site?

The site is likely affected by outfalls associated with commercial facilities and a residential outfall near Point Whitehorn. Additionally, risk analyses have drawn attention to the impacts associated with overwater structures and vessel traffic. With two refineries adjacent to the site, minor oil spills can be expected to occur and there will be a continuing threat of a major oil spill incident.

5. Known or anticipated activities that endanger the site or habitat
    - Are proposed land uses or modifications compatible with reserve designation? (Modifications of interest are described in Appendix A)?

Since 1976 Cherry Point has been the proposed location of several different industrial developments. At present DNR is aware of two proposed land uses or modifications that may affect the reserve. A potential lease with Pacific International Terminals (PIT) has been discussed, but as of December 2002 negotiations are on hold at PIT's discretion. Negotiations for this project were initiated in 1992 and involve the potential construction of Gateway Pacific Terminal pier along the Cherry Point reach (between the northern most and middle existing piers). While this project is currently on-hold, extensive discussions, settlement agreements, and permitting steps have been undertaken and it seems likely this project will be reactivated at some point in the future.

The second proposed land use involves the Washington landfall of the Georgia Strait Crossing Project (GSX). This project involves the development of an 83-mile international pipeline project (figure 4) that is part of a strategy by BC Hydro to serve the growing energy needs of British Columbia. The natural gas transported on the GSX pipeline will fuel electric generation facilities on Vancouver Island. The Cherry Point landfall location is in the vicinity of Gulf Road and the GSX proposed alignment would cross the aquatic reserve for the first 0.6 mile of the offshore portion of its route (FERC 2001). GSX proposes using construction methods that would install the pipeline at the Cherry Point landfall by drilling using a directional bore below the intertidal for the first 4000 feet of the pipeline would be installed under the Cherry Point site. The pipeline is expected to exit the bore hole at approximately –130 feet MLLW. It is anticipated that the proposed construction techniques will have limited if any impact on resources found within the reserve (FERC 2001). Because the pipeline will be buried below the sediment it is anticipated that impacts to the reserve site will be limited during the operation of the pipeline. Gas leaks could create symptoms consistent with acute poisoning in marine wildlife; however GSX claims monitoring equipment would shutoff the pipeline if leaks are detected (FERC 2001).

Figure 4: Proposed GSX Natural Gas Pipeline Route.

6. 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?

Since 1976 DNR has received numerous inquiries regarding potential projects along the Cherry Point reach. Aquatic Reserve status would provide DNR with clear guidance regarding the management of this area and may help guide monitoring and oil spill response efforts within the area.

H. Manageability of the site

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

   - 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))*

Cherry Point, identified as the "Cobblestone beach, Sandy Point to Point Whitehorn," is identified by Dyrness et al. (1975) as an excellent and high priority for conservation and research "in spite of several oil refineries in the area." Wahl et al. (1981) identified Cherry Point as one of eighteen "Significantly Important" sites for marine birds in

Washington's inland waters. The importance and priority for protecting the area was further emphasized by Long (1983) in a synthesis of research in North Puget Sound who identifies the site as an area of importance and notes that "at the Cherry Point site, annual spawning of Pacific herring attracts … large numbers of birds [and] fish are also attracted to the large volume of food." These references are duplicated by Dethier (1989) who recommends it as a site for consideration as a marine preserve. Communications suggest that WDFW or WDNR considered designating the area as a Reserve in 1994 (Penttila 1994). Whatcom County (1994) identified Cherry Point as a significant wildlife area noting its "valuable habitat and significantly high numbers of diving birds, sea birds, and most notably the harlequin duck" in addition to commercial quantities of fish, crab and herring spawn. Recently, the site has also been identified through ecoregional planning efforts led by The Nature Conservancy as a potential conservation area.

2. Potential cooperative partners for management, monitoring, or enforcement
   - Have potential cooperative management partners been identified? [1]

- The Whatcom County Marine Resources Committee representing conservation and Environmental Interest, Economic Interest, Recreational Interest, Relevant Scientific Expertise, and Citizen-at-Large. In addition, the MRC has representation from elected officials, local tribes, and local government staff.
- Cherry Point Technical Work Group – Includes representatives from regulatory agencies, DNR, Western Washington University, and industry in the area of Cherry Point.
- Tribes with U&A rights within the aquatic reserve – The tribes are committed to preserving and enhancing all fish, crab and shellfish habitat to ensure Tribal ceremonial, subsistence and commercial fishing opportunities.
- Washington Department of Fish and Wildlife (WDFW). WDFW staff has authority over the management of commercial fisheries at the site.
- Washington Department of Ecology (DOE). The DOE Bellingham field office has permitting authority over activities that impact air and water quality at the site.
- Commercial facilities with piers located adjacent to the site.

3. Adjacent natural areas or public lands
   - Is site adjacent to terrestrial protected areas managed for conservation or restoration purposes?

- The Birch Bay State Park borders the site at its northern boundary.

[1] This criterion is intended to gauge the amount of planning and effort that has already been invested in the development of a protection plan for the area of interest. These criteria represent best management principles that the Aquatic Reserve program will seek to employ, and will be used to give preference to proposals that are in more advanced stages of development.

- The Whatcom County Shoreline management plan has established a special management zone (accretion shoreform) within the Cherry Point Management Unit to protect a category I estuarine emergent saltmarsh adjacent and shoreward to the site in the vicinity of Gulf Road.

4. Provide a description of how to measure success (i.e., monitoring).
   - *See 'Kinds of monitoring needed'*

5. Describe kinds of monitoring needed
   - Does reserve proposal include a monitoring plan that measures reserve progress towards goals and provides for adaptive management?[2]

A management plan for this site has not been developed yet and therefore concepts of adaptive management have yet to be developed. If this site is selected for Aquatic Reserve status it is anticipated that a management plan would be developed during the autumn/winter 2003. A large number of monitoring and natural resource inventory programs have been or continue to study this area. Herring spawning activity and escapement is monitored annually for the Cherry Point spawning stock. Annual surveys are also undertaken to monitor juvenile chum and juvenile pink salmon are tallied in even years along Cherry Point. The area has been included in recent bottomfish trawls performed by WDFW, and nearshore vegetation inventories were completed by DNR using remote sensing in 1996 and using the ShoreZone methodology in 2001. Marine bird abundance was measured from the shore during MESA studies in the 1970's, and has been monitored by WDFW using aerial surveys since 1991. Commercial industries adjacent to the reserve have commissioned annual shoreline natural history reports in addition to various detailed studies since their inception 1954.

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

Both DNR land management and the Whatcom County Shoreline master program need to be consistent in supporting the conservation of the aquatic habitat and species of the site.

[2] This criterion is intended to gauge the amount of planning and effort that has already been invested in the development of a protection plan for the area of interest. These criteria represent best management principles that the Aquatic Reserve program will seek to employ, and will be used to give preference to proposals that are in more advanced stages of development.

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

- Does reserve status represent the greatest public benefit?

- Is reserve status compatible with existing or proposed adjacent uses?

Although commercial harvests of herring in the vicinity of Cherry Point have been eliminated, commercial vessels harvest many other species in the vicinity of the reserve. Commercial traffic is intense in the vicinity of the reserve with an estimated 330 large commercial vessels visiting the northern refinery pier. Vessel impacts may include shading, uptake of larvae or fish along with ballast water, release of non-native organisms or pollutants with ballast water, or noise impacts (EVS 1999). Additionally, the majority of the vessels visiting piers adjacent to the reserve are laden with oil or oil derived products that are loaded and unloaded from the piers. Gulf Road provides access to a public beach that is used for recreational clam harvesting (Penttila 1994). Schwartz et al. (1972) note that because nearshore currents move parallel to the shoreline, "one outfall may merge with the outfall of the neighboring industry."

- Assess the direct use, indirect use, option, and non-use values associated with the site.

Three existing and one proposed commercial pier are surrounded by the reserve. These sites are excluded from the Aquatic Reserve site, however their presence and associated industries are noteworthy direct uses of the site. Two of the piers are associated with refinery operations. The refinery operated by BP has a refining capacity of 225,000 barrels per day and the refinery operated by ConocoPhillips has a capacity of 92,000 barrels per day (DOE 2003). Oil refinery operations in the United States consistently operate at or near their capacity, and West Coast refineries have the highest margins of refinery operations for both BP and ConocoPhillips (BP 2002, ConocoPhillips 2002). The third pier is associated with the Intalco Works aluminum smelter owned by Alcoa, Mitsui and Co. Ltd., and Yoshida Kogyo Co. Ltd. This smelter operation has a full production capacity of approximately 270,000 metric tons per year, however the smelter has been either closed or operating well below capacity since energy shortages in 2001. At present there is speculation the smelter may once again close in September 2003 due to energy price increases implemented by Bonneville Power. A fourth site is being investigated for a potential commercial pier. The present proposal would involve bulk cargo operations offloading from vessels to a distribution center (Whatcom County 1996).

Offshore areas have historically been used for commercial and recreational harvest of salmon (purse seine), herring (purse seine), Dungeness crab (crab pot), and bottomfish (trawl) (Granger 1979). As a result of declines in market prices and fishery resources numbers have likely declined significantly since the last review of economic aspects of Whatcom County's commercial fishing industry that was published in 1979, however those numbers are reported here for completeness. At that time approximately $34 million in processed fish were landed in Whatcom County and the industry supported an estimated 2,514 employees in boat, harvest, processing, sales and support positions. Surveys indicated an additional $49.6 million in assets, including vessels, gear, processing plants, and fishery facilities, was associated with the commercial fishing industry in 1977 (Granger 1979).

References:

Atichison, K. Personal Communication. Washington Department of Ecology, Olympia, WA.

Battelle. 1974. Field and laboratory studies to obtain a comparative baseline for assign the impact of refinery discharge and potential oil spillage on the Cherry Point Environs. Volumes I through IV. Final report. Atlantic Richfield Company, Cherry Point Refinery, Ferndale, WA. Contract 212B00913, Revision 2. Battelle Pacific Northwest Laboratories.

Berry, H. D., J. R. Harper, T. F. Mumford, B. E. Bookheim, A. T. Sewell and L. J. Tamayo. 2001. The Washington State ShoreZone Inventory User's Manual. Olympia, WA, Nearshore Habitat Program, Washington State Dept. of Natural Res.**:** 29.

Dethier, M.1989. Sites in Washington State Suggested for Consideration for Marine Preserves. Draft dated May 15, 1989 submitted to Washington DNR.

Dyrness, C.T., J.F. Franklin, C. Maser, S.A. Cook, J.D. Hall, and G. Faxon. 1975. Research Natural Area needs in the Pacific Northwest: A Contribution to land-use planning. USDA Forest Service General Technical Report PNW-38.

EVS Environment Consultants, Inc. 1999. Cherry Point Screening Level Ecological Risk Assessment. Prepared for the Washington Department of Natural Resources, Aquatic Resources Division. January 1999.

Federal Energy Regulatory Commission (FERC). 2001. Georgia Strait Crossing Project Draft Environmental Impact Statement. Washington, D.C.

Granger, P. 1979. The Commercial Fishing Industry of Whatcom County: Some Economic Aspects – 1977. Washington Sea Grant. Seattle, WA. 16pp.

Hanson, D.K. and H.A. van Gaalen. 1993. Subsistence at Cherry Point, Washington (45 WH 1).

Harrison, P.J. et al. 1994. An assessment of nutrients, plankton and some pollutants in the water column of Juan de Fuca Strait, Strait of Georgia and Puget Sound, and thier transboundary transport. In: Wilson, R.C.H., et al. editors 1994. Review of the marine environment and biota of Strait of Georgia, Puget Sound and Juan de Fuca Strait: Proceedings of the B.C./Washington Symposium on the Marine Environment, January 13 and 14, 1994. Canadian Technical Report of Fisheries and Aquatic Sciences 1948: 398p.

Hayes, E.H. and W.G. Landis. In press. Regional Ecological Risk Assessment of a Near Shore Marine Environment: Cherry Point, WA. Human and Ecological Risk Assessment.

Jeffries, S.J., P.J. Gearin, H.R. Huber, D.L. Saul, and D.A. Pruett. 2000. Atlas of Seal and Sea Lion Haulout Sites in Washington. Washington Department of Fish and Wildlife, Wildlife Science Division, 600 Capitol Way North, Olympia WA. pp. 150.

Kincaid, T., M.P. Wennekens, R.O. Sylvester. 1954. A study of the oceanographical and biological characteristics of Southeast Georgia Strait prior to operation of the General Petroleum Refinery at Ferndale Washington. Report prepared for the Ferndale Refinery.

Kyte, M.A. Personal Communication. Golder and Associates, Redmond, WA.

Kyte, M.A. 1990. Results of 1990 Biological and Chemical Monitoring in the Southeast Strait of Georgia for the BP Oil Company - Ferndale Refinery. Prepared by Ardea Enterprises.

Kyte, M. 1994. The Use by Flatfish and Dungeness Crab of the Atlantic Richfield Company Cherry Point Refinery Facility. Project Final Report. Project # 138-002. Submitted by Pentec Environmental, Inc.

Lemberg, N.A. 1997. 1996 Forage Fish Stock Status Report. Washington Department of Fish and Wildlife, Fish Management Program. Report No. 98-1.

Long, E.R. (Editor). A synthesis of biological data from the Strait of Juan de Fuca and Northern Puget Sound. EPA 600/7-82-004. Office of Engineering and Technology Office of Research and Development, U.S. EPA, Washington D.C.

Markham, M.V. 1993. A Historic Euroamerican Fish Trap Camp at Cherry Point (45WH1). Thesis presented to the faculty of Western Washington University in partial fulfillment of the requirements for the degree Master of Arts. February 1993.

Nyeswander, D. Personal Communication. Washington Department of Fish and Wildlife, Olympia, WA.

Palsson, W.E. Personal Communication. Washington Department of Fish and Wildlife, Mill Creek, WA.

Penttila, D.E. 1994. Memo titled "Cherry Point marine resource review" dated June 29, 1994 sent to Morris Barker, WDFW as background for "possible designation of this area as a DNR Reserve."

Penttila, D.E. Personal Communication. Washington Department of Fish and Wildlife, LaConner, WA.

Penttila, D.E. 2001. Documented Spawning Areas of the Pacific Herring, *Clupea*, the Surf Smelt, *Hypomesus*, and the Pacific Sand Lance, *Ammodytes*, In Whatcom County, Washington. Washington Department of Fish and Wildlife, LaConner, WA.

Schwartz, M.L., R.C. Fackler, E.A. Hoerauf, C.E. Larsen, K.L. Lingbloom, and M.A. Short. 1972. Nearshore currents in southeastern Strait of Georgia. Syesis 5: 117-130.

Stick, K. Personal Communication. Washington Department of Fish and Wildlife, LaConner, WA.

Tetra Tech. 1993. 193 WDNR Sediment Impact Zone study of a wastewater outfall diffuser in the vicinity of the Intalco pier – Summary report Volume 1. Final report prepared for Washington Department of Natural Resources, Olympia, WA. Tetra Tech, Inc.

Wahl, T., S. Speich, D. Manuwal and K. Hirsch. 1981. The seasonal distribution and abundance of marine bird populations in the Strait of Juan de fuca and northern Puget Sound in 1978 and 1979. U.S. Dept. Commerce, N.O.A.A., and U.S. Environ. Protection Agency, Interagency/Environment R & D Program Report, EPA-600/7-81-156

Wahl, T.R. 1996. Waterbirds in Washington's inland marine waters: some high counts from systematic censusing. Washington Birds 5: 29-50.

Wahl, T.R. 2002. Trends in Numbers of Marine Birds Wintering on Bellingham Bay. Washington Birds 8: 29-40.

Washington State Department of Ecology (Ecology). 2003. Northwest Area Committee – San Juan Islands/Northwest Puget Sound Geographic Response Plan. Washington State Department of Ecology Publication No. 94-201 (Rev. 3/03)

Whatcom County. 1992. Whatcom County Environmental Resources Report Series: Category I Wetlands. Whatcom County Planning Department, Bellingham, WA.

Whatcom County. 1996. Gateway Pacific Terminal Draft Environmental Impact Statement, Volumes I and II. Whatcom County Planning and Development Services, Bellingham, WA.