CYPRESS ISLAND AQUATIC RESERVE SITE PROPOSAL APPLICATION

1. GENERAL SITE INFORMATION

A. Site location:

The Cypress Island Aquatic Reserve is located in northwest Skagit County in the San Juan Archipelago (figure 1). The site includes the state-owned tidelands and bedlands surrounding Cypress Island, including those adjacent to Strawberry Island and Cone Islands from the mean high tide line to a water depth of 70 feet below mean lower low tide or one half mile from the extreme low tide, which ever is further seaward. The site is bounded to the west by Rosario Strait, on the south and east by Bellingham Channel, and on the northeast by an unnamed channel.

B. Site Overview:

1. General site description

Cypress Island is the oldest and fifth largest (5500 acres) island in the San Juan Archipelago. The island is situated along the eastern rim of the San Juan group, between Rosario Straits and Bellingham Channel. Cypress Island is one of the last largely undeveloped islands in the San Juan Archipelago. Presently, DNR manages 4,700 of the 5,500 acres of the island including the 3,600-acre Natural Resources conservation Area. The site includes intertidal and subtidal rocky reef habitats, unconsolidated subtidal habitats, pocket beaches, mixed coarse and mixed fine beaches and protected embayment.

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

The tidelands and bedlands of navigable waters, owned by the State of Washington, Department of Natural Resources, lying in front of the surrounding Cypress Island, Strawberry Island and Cone Islands No. 1, No. 2 & No. 3. Said islands are located within Sections 4, 5, 6, and 8, Township 35 North, Range 1 East, W.M. and Sections 17-22, inclusively, and sections 27-34, inclusively, Township 36 North, Range 1 East: W.M., and extending waterward to a water depth of 70 feet below mean lower low water or one-half mile from the line of extreme low tide, whichever line is further seaward.

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

The state owns about 90% of the tidelands and about 85% of the adjacent uplands at the site. Uplands of the Cone Islands are owned and managed by Washington State Parks and Recreation Commission. Uplands associated with Towhead Island are in private ownership (see figure 2).

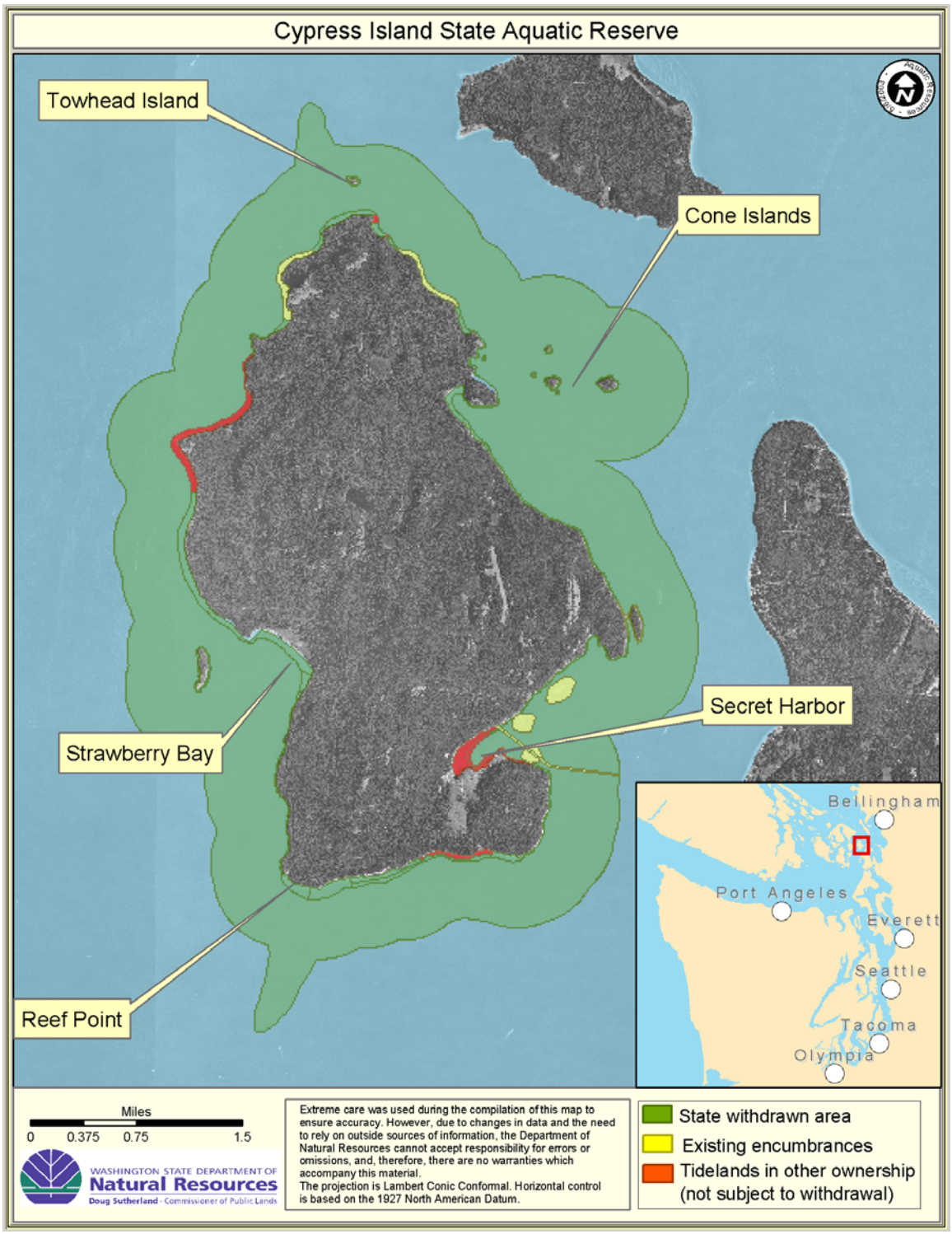


Figure 1: Overview of Cypress Island site.

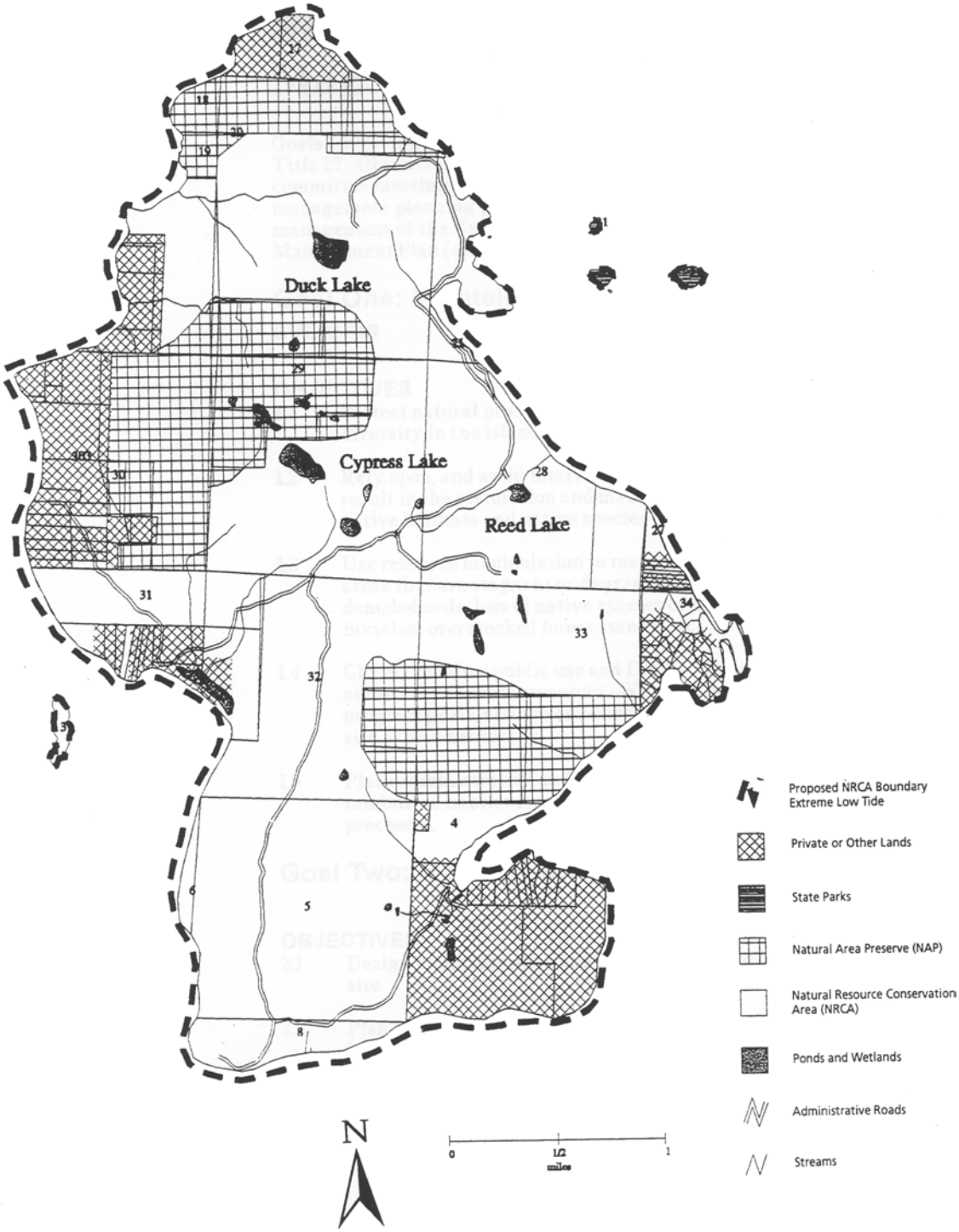


Figure 2: Land ownership and NRCA/NAP boundaries (DNR 1996).

4. Current county shoreline designation and description

The shoreline is zone conservancy in the Skagit County Shoreline Master Program. Ninety percent of the uplands are zoned open space and the remaining 10% is zoned 1 residential unit per 10 acres or 2 residential units per 10 acres if clustered. There are about 25 (primarily seasonal) residences on Cypress Island and a private school. Three commercial salmon aquaculture net pen facilities are operating in Secret Harbor on the southeast side of Cypress Island.

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

The purpose for establishing the site as an aquatic reserve is to protect the resource production values of the area, protect and perpetuate the unique aquatic features found there, provide ecosystem connectivity to the surrounding uplands, and to provide public education and recreation activities in the area. With little upland development, Cypress Island is nearly pristine with late successional forests covering much of the island. The waters surrounding the island are also relatively free of impacts and include several areas of complex rocky subtidal habitat. Existing protection of the island includes the 1923 designation by the State of Washington as a Marine Biological Preserve and the upland designation by DNR in 1987 as the Cypress Island Natural Resources Conservation Area.

Habitat	**Species Found at the site**
Intertidal & subtidal rocky reef habitat	Bald eagle
Unconsolidated subtidal habitat	Peregrine falcon
Pocket beaches	Salmon
Mixed coarse & mixed fine beaches	Demersal, pelagic, and reef dwelling
Kelp	Groundfish
Eelgrass	Sea urchins

<u>D. The ecological and cultural quality of the site</u>

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

Euroamerican settlers first arrived on the island in 1866 and by the 1930's most of the island had been logged, however without consistent transportation or electricity, development on the island remained limited (White 1991). In response to development pressures a group of local residents created a group, *Friends of Cypress Island* (formerly *Save Cypress Island Association*), which ultimately helped scuttle a planned resort and encouraged Washington DNR to develop Natural Heritage and Natural Resource Conservation Areas on much of the uplands of the island through a combination of land purchases and changes in land use management (White 1991). Today the local upland

ecosystem is robust and has largely recovered from anthropogenic stresses with well-developed forests throughout the island. Although most of the upland habitat and portions of the intertidal and subtidal habitat have been disturbed by human activities to some degree in the past, they are in unusually good condition compared to similar areas in Puget Sound (Sheehan et al. 1992).

The upland and intertidal portions of Cypress Island are nearly in untouched condition. Only 2% (1,705 of 101,773 feet) of the shoreline has been 'modified' (Berry et al. 2001). Four permanent piers or docks, six small boat slips and 2 boat ramps were also observed around the shoreline. A number of recreational vessels moor on permanent buoys or using temporary anchorages in the four protected bays (Strawberry Bay, Eagle Harbor, Secret Harbor-Deepwater Bay, and Foss Cove).

- Are non-native species found at the site?

A variety of upland exotic species are noted at the site including Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), Scot's broom (*Cytisus scoparium*), tansy ragwort (*Sencio jacobea*), and oxeye daisy (*Chrysanthemum leucanthemum*). In addition yellow and white iris (*Iris pseudacorus*), soft rush (*Juncus effusus*), reed canarygrass (*Phlaris arundinacea*), and velvet grass (*Holcus lanatus*) are noted in wetlands throughout the island (Sheehan et al. 1992). These exotic plants are less common on the island than elsewhere and active control measures are being implemented in association with the NRCA and Natural Heritage management plans (DNR 1996).

Freshwater lakes on the island were stocked with 'desirable' species by WDFW, which included several non-native species. However, the most conspicuous non-native fauna on the island is the red fox (DNR 1996). Impacts of red foxes on other wildlife populations are unknown, however the island appears to support a viable populations (White 1991). In addition, raccoons are a recent introduction to the island and are primarily found near the communities at Strawberry Bay and Secret Harbor (White 1991).

Sargassum, a non-native subtidal kelp, is common and found along 49.2% of the island's shorelines (Berry et al. 2001). In addition three net-pens operated by Cypress Island Inc., a subsidiary of Pan Fish ASA, raise Atlantic salmon (*Salmo salar*) in Deepwater Bay. While as many as 106,000 fish have escaped from these net-pen operations in a single year (Mottram 1996), WDFW has not detected any adult salmon successfully spawning in Washington and believes smolts are unlikely to survive to adulthood (Amos and Appleby 1999). Hybridization experiments suggest that there is little risk that escaped Atlantic salmon will hybridize with native Pacific salmon (Waknitz et al. 2002).

- Are there water quality concerns associated with the site?

No sites in the vicinity of Cypress Island are listed as impaired on the most recent Clean Water Act 303(d) list distributed by Washington Department of Ecology. All three net-pen facilities have National Pollution Elimination System and State Wastewater Discharge permits which were renewed in 2002.

The salmon aquaculture industry in Washington State has suffered large losses due to *Heterosigma*. The golden-brown alga *Heterosigma akashiwo* (Raphidophyceae) is a bloom-forming organism that has been associated with massive finfish mortalities in temperate waters worldwide. A 1989 algal bloom of *Heterosigma* led to the loss of nearly all salmon within the Cypress Island net-pen facilities, a $4 million loss. Annual *H. akashiwo* blooms occur in the Strait of Georgia and coincide with a water temperature in excess of 15° C and salinity of 15 ppt (Taylor and Haigh 1991). Typically *H. akashiwo* blooms are first observed in the late spring and blooms can last as long as stable water stratification remains, often until September. Biotoxin blooms can lead to beach closures by Washington Department of Health.

- Are there signs of habitat loss within the site?

Two freshwater wetlands appear to have been cut off from their historic connection to the shoreline and marine water. The historic wetland at the terminus of Secret Harbor has largely been lost through efforts to dewater an area for athletic facilities associated with the Secret Harbor Boys Camp. The wetland along the southern shore of Strawberry Bay has been cut off from the shore through the construction of a berm, however the wetland appears to be continuing to function as a freshwater wetland with no estuarine component. The majority of the shoreline modification is a result of fill, however this constitutes less than 2% of the shoreline. Subtidal habitat loss has not been examined; however commercial trawlers have fished portions of the subtidal in the past.

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

Cypress Island straddles two biogeographic sub-regions with the western portion of the island more similar oceanographically to the San Juan Archipelago and the eastern portion more similar to the Strait of Georgia. The San Juan Archipelago has the lowest level of shoreline modification in Puget Sound with only 5.3% of the shoreline armored (Berry et al. 2001). This is largely a result of low-density rural development in the area and the shoreline substrate is largely rock or steep bank within the archipelago. Levels of shoreline development in the Strait of Georgia are much higher 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?

Nearshore and oceanographic ecosystem processes appear to be virtually uninterrupted by anthropogenic development. Several of the lakes on the island have been dammed to increase their water retention ability. Like other islands in the San Juan Archipelago, water withdrawl for human use and consumption is an area that must be monitored to ensure ecological processes are not interrupted. The NRCA management plan specifies

that DNR should work to prevent new withdrawls or diversions, apart from current water rights (DNR 1996).

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?

Cypress Island is used by a great diversity of species, and most appear to be unaffected by current or historic land use patterns. Bald eagle nesting areas on the island will continue to require protection to ensure development and recreation do not disturb or displace nesting eagles. Similar preventative measures should be undertaken for peregrine falcons found on the island. Similar management objectives are specified in the management plan for the upland NRCA (DNR 1996).

Additional management objectives not outlined in the NRCA plan could include the development of suitable marbled murrelet nesting habitat through forestry practices, protection of probable forage fish spawning habitats, restoration of bottomfish stocks within the site. Marbled murrelets nest in old growth forests, and while much of the island is currently forested, only two small patches are old growth. Developing and maintaining large stands of mature and old growth forest may provide suitable habitat for marbled murrelet nesting. Marbled murrelets are often observed in the vicinity of the island and are likely nesting on the island where suitable habitat is available.

Within the proposed site there are nearly twenty miles of undeveloped shoreline. Although they have not been surveyed, numerous sites appear to have suitable habitat for surf smelt or sand lance spawning (Pentilla, personal communication) and should be protected. Survey efforts could enhance and focus any efforts to heighten awareness of spawning beaches and their importance. Development on the island is concentrated adjacent to areas that are likely to provide forage fish spawning habitat.

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

There are no proposed or pending restoration projects within the site. Future efforts may examine re-connecting freshwater wetlands located adjacent to Strawberry Bay and Secret Harbor. The freshwater wetland in Secret Harbor has been adversely affected by efforts to dewater the site for alternative uses. Additionally, in 1992, Menzies reported cutthroat trout in the wetland area in Strawberry Bay, suggesting that Cypress Creek may once have been a spawning area. It is reported that the last cutthroat trout was taken from Cypress Creek in 1953 (Sheehan et al. 1992). Restoration of this run "seems infeasible now" (Sheehan et al. 1992), however may be worth re-examining as conservation efforts advance on the island.

In addition, the use of fire in management of the uplands may prove important to offshore biological communities. The last major fire on the island was likely in 1933 (Agee and Dunwiddie 1984). Many upland features have been shaped in the past by (and are

dependent today on) a greater frequency of fires. While DNR is committed to protect lives and property from fires on NRCA land (DNR 1996), it appears likely that controlled fires will be allowed to burn. Because of the very low capacity of burned soil to absorb water, the rain precipitation will flow directly (or indirectly through the streams) to coastal areas. This water will carry a great quantity of sediments and detritus (i.e. non-combusted wood) into the marine waters. This phenomenon will lead to an increasing rate of sedimentation along the coast and will affect nutrient levels and cycling in the nearshore environment. Affects are likely to be greatest in sheltered areas, and least in areas where tidal flushing and oceanographic currents are high.

- Would restoration benefits extend beyond site boundaries?

Potential restoration activities described here are unlikely to create detectable benefits or impacts beyond the site boundaries.

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

Endangered and Threatened species found nesting on Cypress Island include bald eagles (9 nest sites, 4-5 active), and peregrine falcon (1 active nest site) (Sheehan et al. 1992). A complete listing of marine and shore associated birds that are regularly observed on Cypress island is included as an appendix to this report. Marbled murrelets are frequently observed feeding in the vicinity of Cypress Island and the Cone Islands, with regular concentrations found on the east side of the island (Nyeswander, personal communication). The highest abundances of murrelets are observed in the fall with abundances in this area exceeding other parts of the San Juan Archipelago and Strait of Georgia (Ralph et al. 1996). Data from 2000 suggest that approximately 6400 marbled murrelets are found in Washington with 90% of those birds found within the Puget Sound biogeographic region (Bentivoglio et al. 2002). Additionally, limited evidence suggests that some murrelets breeding in B.C. may winter in the San Juan Archipelago (Beauchamp et al. 1999).

Rosario Strait on the west side of the island is a frequently used movement corridor for minke whales and harbor porpoises (Sheehan et al. 1992). Additionally, small eelgrass beds are found in Eagle Harbor, Secret Harbor and Strawberry Bay (Berry et al. 2001, Sheehan et al. 1992).

The strong currents, steep subtidal slopes, and rocky outcroppings around Cypress Island provide for a diverse and rich habitat that is similar to those found in the western portions of the San Juan Archipelago. WDFW diver and video surveys have found that much of the rocky outcroppings are covered by encrusting organisms and inhabited by fishes such as copper, brown, and Puget Sound rockfishes, kelp and painted greenlings, and red Irish lords and buffalo sculpins. The deeper subtidal habitats support fish and invertebrates typical of pebble, cobble, and boulder habitats. A WDFW bottom trawl was conducted in the northeastern portion of the site. The fishes captured included great, buffalo, and

ribbed sculpins, northern and southern rock soles, and Puget Sound rockfish. Semi-demersal fishes were also captured including walleye Pollock, Pacific tomcod, spiny dogfish, and shiner and pile perches. Large macroinvertebrates were also captured including Dungeness crab, red rock crab, red sea urchins and cucumbers, and two species of seastars (Palsson, personal communication).

Waters off the western shore of Cypress Island have supported commercial and recreational harvest of salmon with intense recreational fishing for King salmon off the northwest shore. Halibut and cod were fished in Secret Harbor until the 1950's when fish populations apparently became unfishable (White 1991).

- 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)

The waters offshore of Cypress Island and surrounding the Cone Islands are known to be seasonal aggregation areas for wintering and feeding marbled murrelets. It is likely that this aggregation is associated with seasonal movements of forage fish, a primary prey item for marbled murrelets. The area has been historically reported as important fall, winter and spring habitat for common murre (Uria aalge), Pacific loon (Gavia pacifica) and various surfbirds (DOE 1978).

The site is adjacent to one, and includes two areas with average group sizes of less than 100 animals are occasionally used as harbor seal haulouts (Jeffries et al. 2000). The areas within the reserve include Cypress Reef and the Cone Islands (Figure 3)

A large commercial fish trap operation in Strawberry Harbor once capture large numbers of sockeye salmon which travel along the east shore of the Cypress Island (White 1991). Continuing commercial and recreational harvest in this area suggest that fish populations still use the area.

The nearhore subtidal habitat consists of bedrock and boulder fields, especially on the western, northern, southern, and northeastern sides of the island (Palsson, personal communication). Habitats in the vicinities of Strawberry Island and North Cypress Island, Towhead Island and Cypress Reef have been identified as good to excellent rockfish habitat and are being examined for possible voluntary fishing closure areas (McConnell et al. 2001). Bottom topography, substrate, and other physical features have been shown to influence the distribution and abundance of rockfish, lingcod, and kelp greenling on a large (i.e., meso-habitat) scale (Pacunski and Palsson 2001). Rockfish are a vulnerable class of harvested species because of their high site fidelity and long life-history patterns.

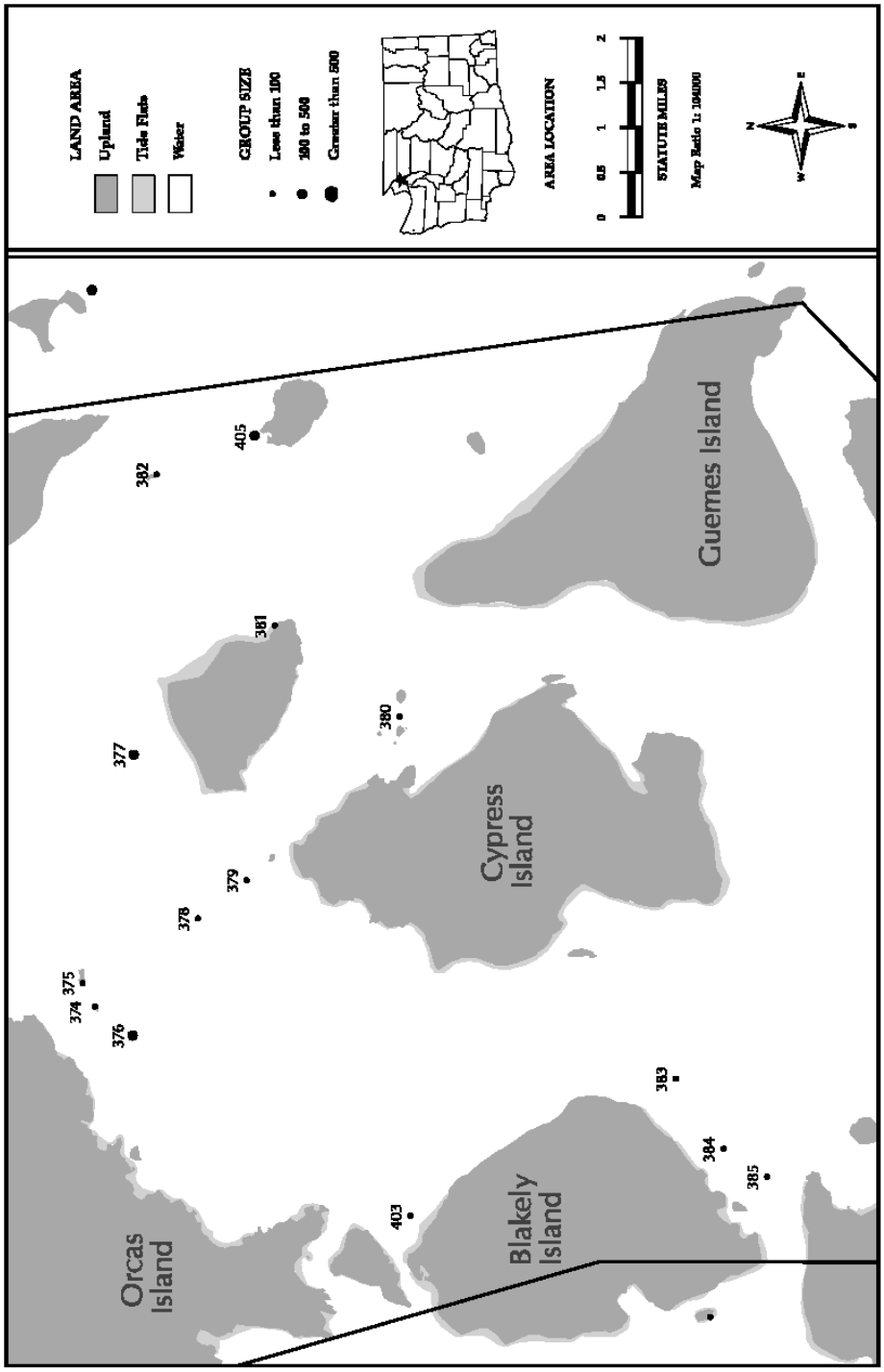


Figure 3: Marine mammal haulout areas in the vicinity of Cypress Island (Jefferies et al. 2000)

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

Nearshore and subtidal areas associated with this site are dominated by oceanographic influences that are unlikely to be affected by aquatic reserve status. Aquatic reserve status may influence the management of fire on the upland NRCA, however the impacts of fire on nearshore nutrient cycles are presently a matter of speculation and would benefit from more scientific inquiry.

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.)

The Washington Office of Archaeology and Historic Preservation identified eight archaeological and historical sites on Cypress Island. The sites include the following features:

Eight shellfish midden deposits within and adjacent to the reserve have been located and registered: Cypress Head tombolo (45SK3), east shore of Secret Harbor (45SK4), beach east of Reef Point (45SK5), Strawberry Bay (45SK6 and 45SK89), Tide Point (45SK212), Smugglers Cove (45SK213) and Eagle Harbor (45SK214). While many of these sites are eroding through natural processes, some of these areas have been adversely impacted by public use including roads and Washington DNR recreational facilities (Barsh 2003).

The site was used, possibly for year-round residence, by pre-historical settlements at least a portion of whom were likely ancestors of the Samish Tribe (Barsh 2003). Other significant cultural resources reported in the area include:

- One site containing cedar house posts. The house area measures 32’ X 24’.
- Other sites containing burials, projectile points, scrapers, barbed bone points, net weights, sinkers, and a mortar.
- Other historic Tribal fishing areas at the site.

During June 1792, Vancouver and his expedition spent five days at Strawberry Bay on Cypress Island where his crew brewed spruce beer to ward off scurvy, filled water casks, and fished. No signs of their encampment remain (White 1991).

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 1).

Table 1: 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-neced 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%	

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?

See response below.

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). There are several protected areas in the San Juan and Strait of Georgia biogeographic regions. Two additional areas, Fidalgo Bay and Cherry Point, 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. At present there are no other large protected areas that protect rocky nearshore and subtidal similar to what is found at the Cypress Island site.

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?

Resources described previously have been consistently associated with 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)?

Rocky outcroppings, unmodified shorelines, and protected embayments are not unusual in Puget Sound, however most have been heavily modified and are found in heavily developed and used areas. Cypress Island is largely unique for its low levels of manipulation, access and use of the resources found here.

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

The site is one of a few areas in Puget Sound that is consistently used by marbled murrelet concentrations (Nyeswander, personal communication).

G. Defensibility of the site

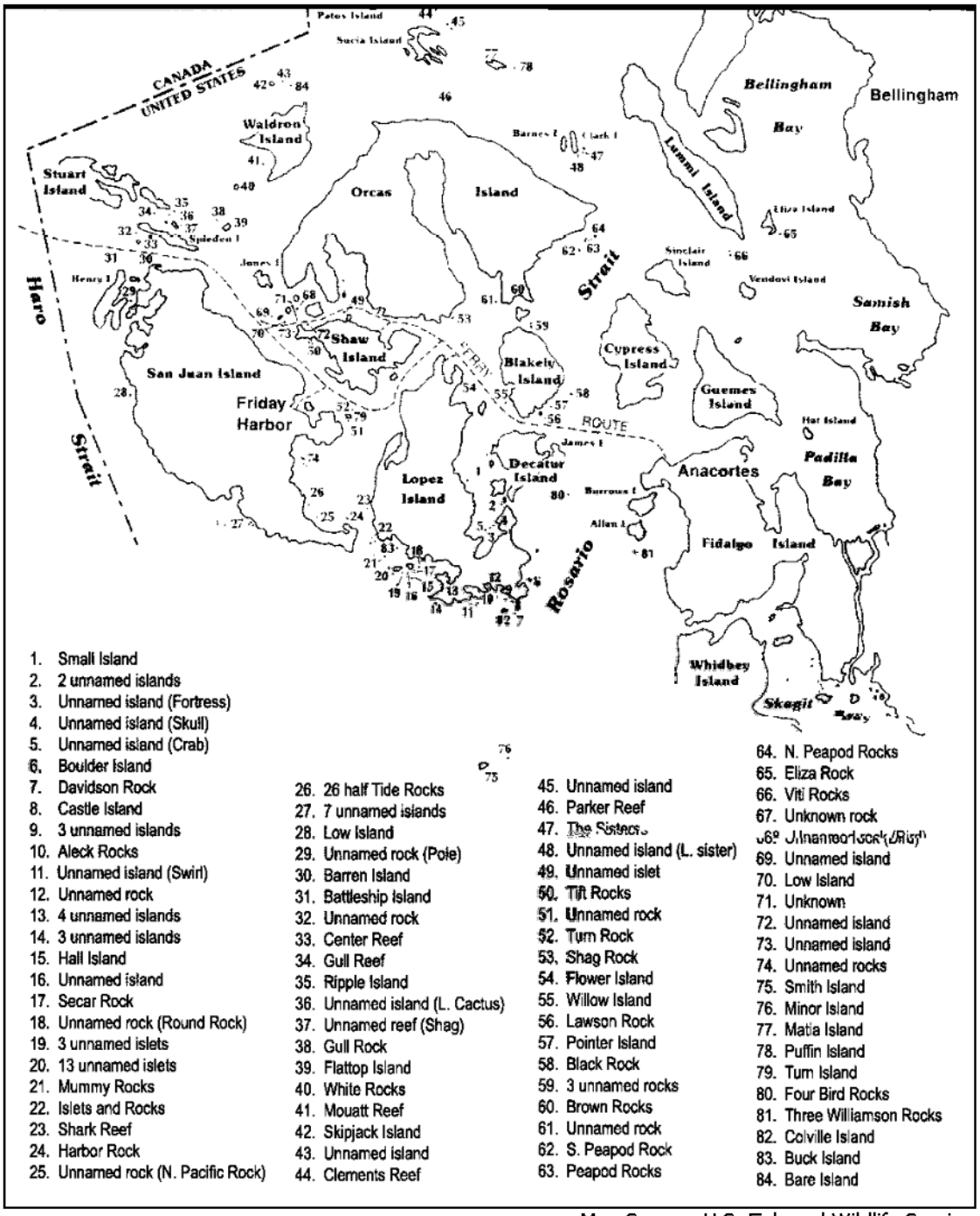
1. Complementary protection within a reserve or protected area network. (See: *Habitat types that are under-represented in the aquatic reserves program or marine protected area network)*
2. Connectivity to a reserve or protected area network and/or for species and/or habitats
    - Is site adjacent to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

Much, if not all, of the area included in the Cypress Island site was designated as a Marine Biological Reserve by the state legislature in 1923 (RCW 28B.20.320). The Marine Biological Preserve was established to create an area that protected and preserved marine biological materials useful for scientific purposes. Under the Marine Biological Preserve's statute (RCW 28B.20.320), the collection of any marine biological materials other than that taken for food, and also excepting kelp, is prohibited unless written permission is obtained from the Director of Friday Harbor Laboratories (RCW 28B.20.322). Violations of this statute's harvest restriction carry a potential misdemeanor charge (RCW 28B.20.324). Unfortunately, the effectiveness of this large biological preserve area is largely unmeasurable, as is the extent of violations associated with the harvest restrictions. Despite these limitations, FHL has become a chief proponent of more protective designations within this area including co-designations with WDFW for five sites (Murray 1998).

In addition, the site is in the vicinity of numerous small islands included within the San Juan Islands National Wildlife Refuge administered by the U.S. Fish and Wildlife Service (figure 4). Refuge units closest to Cypress Island include units 57 (Pointer Island), 58 (Black Rock), 59 (3 unnamed rocks), 62 (S. Peapod Rocks), 63 (Peapod Rocks), 64 (N. Peapod Rocks), and 66 (Viti Rocks). The primary purpose of the San Juan NWR is to "facilitate the management of migratory birds for which the United States has a responsibility under international treaties and to further effectuate the purposes of the

Migratory Bird Conservation Act" (DOI 1973). At present USFWS guidelines suggest a 200-yard 'no entry' area surrounding each refuge site to provide a marine buffer for protecting seabirds, shorebirds, marine mammals and endangered species on land. However, this management provision is voluntary since USFWS jurisdiction does not extend into the water past the high tide line and therefore holds no legal authority (Don 2002).

The management plan for the Cypress Island NRCA calls for the inclusion of tidelands in the NRCA, and the evaluation of adjacent bedlands for consideration (DNR 1996). The proposed mechanism for achieving this management is to designate public lands in the area as an Aquatic Reserve (Hulsey and Partridge 1995).



Map Source: U.S. Fish and Wildlife Service

Figure 4: Overview of management units within San Juan National Wildlife Refuge.

- 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 site is a wintering area for some populations of marine birds. Bald eagles and peregrine falcons have been observed nesting along the shorelines of the island and harbor seals haul-out and bask in several areas within the reserve. Undeveloped shorelines and bays likely provide refuge for populations of marine fish.

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

The site is large and includes nearly twenty miles of shoreline and more than 6000 acres of nearshore and subtidal habitats. Despite this considerable size, many of the species found at this site spend only a portion of their life within or adjacent to the site for feeding, breeding or migration.

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

Management of Cypress Island's resources is primarily restricted to protecting existing resources and preventing disturbance to the local ecosystem.

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

Known anthropogenic stresses to the site do not appear to provide significant threats to the viability of the ecosystem, species or ecological processes associated with this site.

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)?

There are no known land use proposals. It is anticipated that existing net-pen operations will apply for lease renewal at the end of their lease term if market conditions for aquaculture products are favorable. As noted elsewhere, sufficient information on potential compatibility of these operations with Aquatic Reserve Status has not been collected to date.

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?

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))*

In 1967, at the request of island residents Mr. and Mrs. George Fahey, a group of scientists inventoried plants, reptiles, birds and mammals on the island during a three-day visit. These scientists produced a report describing their reconnaissance, which "suggest[s] that a large part of the island be set aside as a wilderness, for education and research in population biology and ecology (Kruckeberg et al. 1967)." In addition, the Puget Sound Basin Task Force (1970) identified Cypress Island as a "potential outstanding natural area."
The management plan for the Cypress Island NRCA calls for the inclusion of tidelands in the NRCA, and the evaluation of adjacent bedlands for consideration (DNR 1996). The proposed mechanism for achieving this management is to designate public lands in the area as an Aquatic Reserve (Hulsey and Partridge 1995). At present neither the tidelands nor the bedlands adjacent to the NRCA are included in an Aquatic Reserve.

As part of the Northwest Straits Commission efforts to develop a network of marine protected areas, the Skagit MRC identified three areas within the Cypress Island site as having medium to high quality rockfish habitat that may be appropriate areas for rockfish recovery zones (McConnell et al. 2001). The areas identified include waters surrounding: Strawberry Island, North Cypress Island, Towhead Island & Cypress Reef, and the Cone Islands.

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

     - Skagit County Marine Resources Committee (MRC): The focus of the MRC is to deal with marine related issues in Skagit County. A specific area of focus for the MRC is to "establish scientifically-based regional system of marine Protected Areas." The MRC membership includes all government, Tribal, business interests, commercial and recreational fishing interests, citizens and interest groups that manage and/or are users of the marine waters of Skagit County.

[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.

- Samish Indian Nation: Has specifically expressed a commitment to work with DNR in the management of the aquatic and cultural resources of the reserve.
- There are several Tribes that exercise their adjudicated historic fishing rights in and adjacent to the Cypress Island site. These Tribal governments will have an interest in the proposed management of the site, particularly if it pertains to fishery recovery and management.
- Residents of Cypress Island
- DNR Natural Resource Conservation Program
- State Parks

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

DNR manages 4,700 of the 5,500 acres of the island including the 3,600-acre Natural Resources conservation Area.

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]

At the present time, aquaculture operations must mount a phytoplankton monitoring program that may include expensive aerial surveys during the summer months that look for tell-tale patches indicating a bloom is approaching. These monitoring programs are necessary because fish in net-pens are susceptible to whatever is in the water column. In wild conditions fish may simply avoid an algal bloom. The NRCA does not appear to include monitoring or inventory efforts associated with any marine resources. Most of the marine resources of the Cypress Island site have not been systematically inventoried nor are monitoring plans developed for any resources. Due to the low level of development Cypress Island is not included in some historic data sources including shoreline aerial photographs taken for most of Puget Sound by Washington Department of Ecology in 1977. The site is included in some Puget Sound Ambient Monitoring Program efforts, including the submerged aquatic vegetation, groundfish, and aerial bird monitoring programs.

[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.

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?

DNR has the management authority over nearly 90% of the intertidal, all the subtidal and over 85% of the uplands (Cypress Island, Strawberry Island and the Cone Islands). Presently there is a Cypress Island Natural Resources Conservation Area Management Plan developed for the uplands.

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?

Reserve status appears to be broadly compatible with the majority of the uses on the island. Much of the upland of the island is managed for the protection of its outstanding terrestrial and marine ecological systems, scenic value, cultural resources and habitat for threatened, endangered, and sensitive species (DNR 1996). With no ferry service to the island, the primary mode of access for landowners is from the water and there may be conservation benefits to further concentrating or alternatively dispersing moorage in some areas.

At present insufficient information is available to assess the compatibility of net-pen facilities with reserve status. Concerns associated with these facilities include water pollution/algal blooms, fish escapement, and hunting/harvest of wildlife found within net-pen facilities (e.g., dogfish, harbor seals, etc.).

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

Cypress Island Inc., a subsidiary of PanFish ASA, raises Atlantic salmon (*Salmo salar*) in three net-pens located in Deepwater Bay. Cypress Island Inc. is the only commercial salmon aquaculture operating in Washington and operates a total of eight salmon aquaculture net-pens. Combined these operations produced approximately 11,000 and harvested 6,200 metric tons of salmon (PanFish ASA 2003). Aquaculture operations are facing difficult economic periods due to excess supply of fish on the market. As a result, full production costs of Atlantic salmon to the PanFish group is current greater than the price received at market. It is noteworthy that PanFish's Board of Directors declared itself "satisfied with the operation of its U.S. subsidiaries and notes costs have decreased (PanFish ASA 2003)."

Waters off the western shore of Cypress Island have supported commercial and recreational harvest of salmon with intense recreational fishing for King salmon off the northwest shore. Halibut and cod were fished in Secret Harbor until the 1950's when fish populations apparently became unfishable (White 1991).

Another major use of the area is recreation associated with the NRCA. Recreational use appears to be highest in the vicinity of Eagle Harbor, Pelican Beach and Cypress Head, with occasional intense use associated with Elephant Rock and Strawberry Island. Recreational use appears to consistent throughout the summer months with a peak in overnight visits in July (Table 1).

Table 1: 1995 Recreational Use of Cypress Island NRCA (source: Gunther 1995). Numbers represent vessel use nights.

	May	June	July	August	September
Boats – Moored	115	123	266	152	159
Boats – Camped	58	72	168	183	90

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Appendix I: Marine and Shore-associated and Marine Birds of Cypress Island (Richardson 1976, Sheehan et al. 1992).

Common Name	Scientific Name	Status	Season			
			Spring	Summer	Fall	Winter
Actitis macularia	Spotted sandpiper	U	X		X	X
Aechmophorus occidentalis	Western grebe	C	X	X	X	X
Anas platyrhynchos	Mallard	U	X	X	X	X
Ardea herodias	Great blue heron	C	X	X	X	X
Aythya marila	Greater scaup	C	X		X	X
Brachyramphus marmoratus	Marbled murrelet	C	X	X	X	X
Bucephala albeola	Bufflehead	C	X		X	X
Bucephala clangula	Common goldeneye	C	X		X	X
Calidris alba	Sanderling	U	X		X	X
Calidris mauri	Western sandpiper	U	X		X	
Cepphus columba	Pigeon guillemot	C	X	X	X	X
Charadrius vociferis	Killdeer	C	X		X	X
Clangula hyemalis	Oldsquaw	U	X		X	X
Gavia arctica	Arctic loon	C	X		X	X
Gavia immer	Common loon	C	X		X	X
Gavia stellata	Red-throated loon	C	X		X	X
Haematopus bachmani	Black oystercatcher	U	X		X	X
Haliaeetus leucocephalus	Bald eagle	C	X	X	X	X
Histrionicus histrionicus	Harlequin duck	U	X		X	X
Larus argentatus	Herring gull	U			X	
Larus californicus	California gull	U	X		X	X
Larus canus	Mew gull	U	X		X	X
Larus glaucescens	Glaucous-winged gull	C	X	X	X	X
Larus heermanni	Heerman's gull	C			X	
Larus philadelphius	Bonapartes gull	C	X		X	X
Melanitta fusca	White-winged scoter	C	X	X	X	X
Melanitta perspicillata	Surf scoter	C	X	X	X	X
Merganser serrator	Red-breasted merganser	C	X	X	X	X
Pandion haliaetus	Osprey	R		X		
Phalacrocorax auritus	Double-crested cormorant	C	X	X	X	X
Phalacrocorax pelagicus	Pelagic cormorant	C	X	X	X	X
Phalacrocorax penicillatus	Brandt's cormorant	C	X	X	X	X
Podiceps auritus	Horned grebe	C	X		X	X
Podiceps grisegena	Red-necked grebe	C	X	X	X	X
Tringa melanoleuca	Greater yellowlegs	U	X		X	X
Uria aalge	Common murre	C	X		X	

Status Code: C – Common; U – Uncommon; R - Rare