

**SHORELINE AREA (Reach Code): Marine 4 - Marina**

**REACH NUMBER: 30**

Land Use	Current Land Use	Marina and associated uses (Ref # 8, 54, 71)
	Zoning	118.3 acres water, 53.0 acres commercial, 10.7 acres industrial (Ref # 54)
Potential Species Present	Wildlife species	Caspian tern, glaucous-winged gulls breeding on rooftops in harbor; 137.8 acres of mustelid and 116.1 acres of pinniped presence/habitat. Seal haul out areas on outer rock bulkhead of Marina. (Ref # 3, 70, 71, 105)
	Fish species	Surf smelt spawning (inner harbor east beach) (WF website map) (Ref # 3, 70, 71, 105)
	PHS species/habitat	Surf smelt (vulnerable aggregation) (Ref # 3, 92, 93, 70, 71 15)
	TSE species	Chinook in bay, federally threatened species (FT & SC) (Ref # 92, 93, 105)
	Invasive wildlife/fish species	No data
Physical Environment	Acres of land in reach	183.2 acres total with 60.8 acres of land and 122.4 acres of water (Ref #13)
	Aquatic vegetation	1.2 acres green algae (east side of inner harbor) and 7.5 mixed algae (outer rock bulkhead of marine breakwaters (Ref # 97, 98)
	Slope	0-5% slopes dominate (Ref # 47, 103)
	Buildings	48 buildings covering 8.96 total acres(Ref # 16)
	Culverts/stormwater utilities	Three stormwater outfall on north end of inner harbor of marina. Storm drains, sewer mains and outfalls present in reach. (Ref # 41, 42, 40)
	Geology	Glacial marine drift and continental glacial outwash. Artificial fill, modified land. Seismic hazard area (man-made fill) is indicated within the reach. (Ref #21, 51, 63)
	Tributary Creeks	None indicated (Ref # 8, 42, 71)
	Impervious surface	88% impervious, 8% semi-pervious, 4% pervious(Ref # 12)
	Invasive plant species	No data
	Roads/transportation	1.1 miles roads (2.0 acres cover) (Ref # 34, 44, 46)
	Soils	Infiltration rates: 26.8 acres very slow with high runoff potential (Hydrologic soil Group D), 0.5 acres moderate (Group B). Erosion potential: 182.7 acres severe risk, 0.5 acres slight risk. (Ref # 51, 63)
	Topography	0 to 25' range; mean 5' (Ref # 47)
	FEMA	62.8 acres in 100 year floodplain/ no floodway present in this reach (Ref # 19)
	Terrestrial Vegetation	Little vegetation cover. Vegetation cover limited to landscaped areas in parking areas, around buildings and lawns in Zuanich Pt. Park. (Ref # 8, 71)
Marine Aquatic Function	Aquatic substrate type	17.0 acres artificial, 0.5 acres mixed fines (Ref # 3, 99)
	Creosote structures	Creosote structures present (Ref # 71, 73, 74, 99)
	In-water structures	Marina docks, jetties, breakwaters, boat ramps, boat houses (Ref # 71, 73, 74, 99)
	Bulkheads	Entire reach has rock bulkheads (Ref # 71, 73, 74, 99)
	DOE 303(d)	Category 2 for 1,2,4-Trichlorobenzene (sediment samples exceeded limits in 97) and mercury (sediment samples exceeded limits in 96) (Ref # 81)
	Toxic sites/land fills	<b>Weldcraft steel and marine.</b> Sediment (confirmed) Tributyltin, phenol, base/neutral/acid organics, Halogenated organics, Petroleum products, non-halogenated solvents, PAH's, and areas that exceeds SQS and exceeds MCUL from WF futures website map, (suspected) metals and PCB's. Groundwater (confirmed) Halogenated organics, metals, petroleum products, and non-halogenated organic solvents. (suspected) EPA priority pollutants, PAH's, and base/neutral/acid organics. <b>Squalicum harbor site.</b> Sediment (confirmed) copper, Tributyltin, EPA priority pollutants, areas that exceeds SQS and exceeds MCUL from WF futures website map. <b>Harbor Marine fuel</b> (21 Squalicum). Sediments (confirmed) petroleum products. (Ref # 79, 80)

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	Bathymetry	-23.0 to 0.00' range; -6.1 mean (Ref # 25, 31)
	Wave energy	10.7 acres lagoon (inner harbor), 6.8 acres partially enclosed (Ref # 3, 99)
	Point source pollution	No data
	Waterways/dredge beds	Inner and outer harbor and I/J Waterway (Ref # 3, 99)
	Drift cells	At break over between two drift cells (Ref # 3, 99)
Marine Foreshore	Beach characterization	None; rock bulkheads (Ref # 8, 71)
	High-Low tide lines	Pocket beach immediately south of south entrance to harbor
	Erosion/accretion zones	No data
Historic & Cultural	Historic aerials	See Waterfront Futures website (Ref # 99)
	Archeological sites	No data
	Historic sites	None indicated (Ref # 77)
	Parks & public access	Zuanich Pt. Park, Marina docks have public access (Ref # 33, 34, 36, 48)
Function Analysis	<b>Reach Function</b>	
	<ul style="list-style-type: none"> <li>Hydrologic</li> <li>Shoreline Vegetation</li> <li>Habitat</li> </ul>	<p>Impaired – breakwater and shoreline rip rap (Ref # 1,2,5,71)</p> <p>Impaired – absent in most areas (Ref # 1,2,5,69, 70,71)</p> <ul style="list-style-type: none"> <li>Terrestrial habitat – impaired by shoreline alteration, lack of vegetation cover and lack of connectivity (Ref # 1,2,5,69, 70,71)</li> <li>Intertidal habitat- impaired by rip rap and shoreline armoring (Ref # 1,2,5,69, 70,71)</li> <li>Shallow and deepwater habitat – moderate to high function (Ref # 1,2,5,69, 70,71)</li> </ul>
	<b>Limiting Factors</b>	<ul style="list-style-type: none"> <li>Breakwaters(Ref # 1,2,5,69, 70,71)</li> <li>Dredging of waterways (Ref # 1,2,5,69, 70,71)</li> <li>Water quality – contaminated sediments, petroleum inputs from marina (Ref # 79, 80, 81)</li> <li>Limited intertidal area from shoreline armoring (Ref # 1,2,5,69, 70,71)</li> <li>Lack of habitat to out-migrating salmonids (Ref # 1,2,5,69, 70,71)</li> </ul>
	<b>Functions</b>	
	<ul style="list-style-type: none"> <li>Sustainable</li> </ul>	<ul style="list-style-type: none"> <li>Shallow and deepwater habitats – Could be enhanced for juvenile salmonid migration.</li> <li>Shoreline vegetation- significant areas for establishment of shoreline vegetation exist, however this function will always be impaired by existing land use.</li> </ul>
	<ul style="list-style-type: none"> <li>Not Sustainable</li> </ul>	<ul style="list-style-type: none"> <li>Hydrology – existing use</li> <li>Terrestrial habitat – existing land use prohibits significant improvement for terrestrial habitat</li> <li>Intertidal habitat – limited opportunity exists for significant improvement of this function.</li> </ul>
	<b>Priority Enhancement Actions</b>	See preservation/ enhancement section. Action # 8 was rated as a high priority action and Action #9 was medium. (Ref # 73)
<b>Current Enhancement Projects</b>	None identified	
<b>Preservation/Enhancement Opportunities</b>	<ul style="list-style-type: none"> <li>Elevations off portions of breakwater could be raised to provide additional shallow water habitat for juvenile salmonids (BBDP action # 8) (Ref # 73)</li> <li>Beach nourishment of marina margins to increase intertidal and shallow water habitat. (BBDP action # 9) (Ref # 73)</li> </ul>	

