Appendix A
Ecosystems Characteristics

Ecosystem	Region/ Class	Habitat	Characteristics
Freshwater Lacustrine			• Standing body of water located in a topographic depression that is not directly connected to the sea • Distinguished by relatively still waters, no ocean derived salts, and an absence of perennial emergent vegetation • Includes lacustrine wetlands
	Oligotrophic		• Low rates of primary productivity • Trophic State Index less than 40
	Mesotrophic		• Moderate rates of primary productivity • Trophic State Index between 40 and 50
	Eutrophic		• High rates of primary productivity • Trophic State Index greater than 50
		Littoral	• Extends waterward from ordinary high water to a depth of 2 meters below low water or the extent of annual emergent vegetation
		Profundal	• Deep water benthic habitat with no vegetation
Freshwater Riverine			• Long, linear interconnected networks, comprised of patterns and processes that occur in longitudinal, lateral, and vertical dimensions • Unidirectional flows terminating at the confluence of a larger stream or river, marine ecosystem, or lake • Gradient typically decreases with longitudinal distance downstream • Structure and variability of in-channel habitat determined by topography • Energy sources, community composition, and behavioral adaptations vary with increasing distance downstream • Includes riverine wetlands
		Low-gradient valley	• Slopes less than 0.1 percent with sand and gravel substrates • Channels commonly have multiple threads • Sediment supply is generally greater than the river's transport capacity.

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		Riffle-pool	• Alternating sequences of pools, bars, and riffles with gradients of 0.1 to 2 percent • Sinuous channels with a high ratio of reach to valley length • Pools typically created by scour; deposition occurs between pools in riffles, or adjacent to pools on bars • Substrate particle size comprised of gravel or cobble
Freshwater – Riverine, continued		Plane bed	• Gradients between 2 and 4 percent • Substrate particle size comprised of gravel or cobble
		Step-pool	• Gradients between 4 and 8 percent • Alternating sequences of relatively deep stream sections with flat, non-turbulent flow, and shallow, steep sections with turbulent flow • Pools formed by large boulders that restrict the flow of water, resulting in a backwater upstream of the restriction and a substantial drop in elevation downstream of the restriction
		Cascade	• Gradients greater than 8 percent • Beds comprised of large boulders with channels typically confined by valley walls • Movement of bed material is rare due to the large size of the dominant substrate and relatively shallow water depths
Saltwater Nearshore			• Depth less than 20 meters • Energy primarily derived from benthic vegetation and terrestrial sources • Benthic habitats within the photic zone • Vegetation has significant influence on species assemblages
	Coastal		• Unconsolidated habitat dominates; consolidated substrates found in scattered locations along the northern coast and rocky headlands in estuaries
	Inland		• Unconsolidated habitat dominates; consolidated habitat most common among the San Juan Islands and on rocky headlands in Puget Sound

Ecosystem	Region/ Class	Habitat	Characteristics
		Consolidated	• Intertidal and shallow subtidal areas dominated by bedrock or boulder • Biota includes macroscopic red, green, and brown algae; kelp beds used by sea otters; a variety of fish and invertebrate species; and benthic diatoms • Riparian area vegetated with overhanging shrubs and trees and adjacent herbaceous plants
		Unconsolidated	• Eelgrass meadows (approximately +0.3 meters to -10 meters—Mean Lower Low Water) used by a variety of fish and invertebrates for rearing, feeding and refuge • Flat areas of fine to coarse unconsolidated sediments near river and stream deltas and embayments not associated with freshwater systems • Biota includes drift seaweeds; infauna (worms, small crustaceans, and bivalves); shorebirds; abundant juvenile and adult fish; and recreationally and commercially important stocks of clams • Sub-estuaries characterized by variable salinity concentrations, riparian habitat, dune habitat, tidal marshes, seaweed assemblages, eelgrass meadows, and limited rocky shore habitat • Riparian area vegetated with overhanging shrubs and trees and adjacent herbaceous plants
		Water Column	• Greater than 10 meters above the bottom • Biota includes plankton (eggs, larvae, phytoplankton, and zooplankton), fish (herring, salmonids, smelt, spiny dogfish, sand lance, and rockfish), birds, and marine mammals
Saltwater Offshore			• Depth greater than 20 meters • Benthic habitat below the photic zone • Energy production derived from communities of water column phytoplankton • Dominated by unconsolidated sediments

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	Coastal		• Dominated by unconsolidated habitats; consolidated habitats are concentrated off the Olympic Peninsula coast, west and southwest of Willapa Bay, and off Cape Flattery
	Inland		• Unconsolidated habitats dominate; consolidated habitats are concentrated off the San Juan Islands the west coast of Whidbey Island and Admiralty Inlet, and the Tacoma Narrows
		Consolidated	• Substrate is comprised of rocks larger than cobble (265 millimeters in diameter), bedrock, and consolidated clays • In high- to moderate-energy regimes, biota includes encrusting invertebrates and plants, urchins, rockfish, gobies, lingcod, and sculpins; in low-energy regimes, biota includes glass sponges, serpulid polychaetes, planktivorous invertebrates, cup coral, rockfish, longfin sculpin, and gobies
		Unconsolidated	• Substrate consists of cobble, gravel, sand, mud and organic materials • In high-energy systems comprised of cobble and mixed-coarse substrates, biota includes mussels, barnacles, urchins, rock scallops, small bivalves, amphipods, and polychaetes; in low-energy systems with mud substrates, biota includes sea pens and whips, polychaetes, bivalves, amphipods, anemones, sea stars, urchins, and sea cucumbers
		Water Column	• Greater than 10 meters above the bottom • Biota includes plankton (eggs, larvae, phytoplankton, and zooplankton), fish (herring, salmonids, smelt, lamprey, spiny dogfish, cods, sand lance, and rockfish), birds, and marine mammals