

APPENDIX "P"

Estuaries

An estuary is a transition zone between freshwater or riverine and marine ecosystems. It is that zone where the two different water bodies mix. Toward the mouth of Northwest estuaries, wetlands exist as salt marsh expanses of relatively low herbaceous vegetation subject to twice-daily tidal flooding. The structure of the Northwest salt marsh usually includes extensive, apparently unvegetated, tidal flats which grade into the marsh. The "apparently unvegetated" tidal flat actually supports an important mat of vegetation consisting of attached algae.

Saltwater marshes show strong vegetation zonation. Low marsh plants, like pickleweed and seaside arrow grass, rapidly give way to bentgrass and rush before leading to an herbaceous meadow marked by Pacific silver weed and tufted hairgrass. Lacing the wetlands are a system of tidal channels. As sediment is tidally deposited at the base of the plants, the marsh slowly develops upward and outward, extending into the estuary.

Salt water marshes provide some of the most productive ecosystems in the world. The reasons for this include: a mild microclimate; vascular plants adapted to a fluctuating saline and inundation regime; twice-daily nutrient doses; and removal of suffocating litter.

On an annual basis, most Northwest salt marsh plants die back, the leaves and stems, in part, decay in place. Organic materials are flushed into the estuary at ebb as decomposed particulates, dissolved organic forms and whole pieces of blade and stem. Decomposition in the marsh is a complex process and depends on aeration.

Submerged Estuarine Wetlands

When referring to different types of wetland habitats, a submerged habitat is one that is not vulnerable to the stresses of tidal exposure. It is always underwater yet shallow enough to allow vegetative growth. Common vegetation includes eelgrass and macroalgae beds. Important ecological functions of eelgrass habitats include high production and growth, food and feeding pathways, shelter, habitat stabilization, and nutrient recycling. Both the diversity and abundance of fishes and motile macro invertebrates (crab, shrimp, etc.) in these areas are characteristically higher than in adjacent, similar, but unvegetated habitats.

Fish, crab, and shrimp populations are more complex and abundant in vegetated habitats. Many fish and motile macro invertebrates which are not uniquely associated with these habitats still feed upon the creatures which are produced from within this habitat by foraging or by eating those organisms which are somehow carried into the surrounding less vegetated habitats. The optimum carrying capacity of the estuary is often limited by the spatial extent of submerged habitat.

Submerged habitat also provides food and protection for juvenile chum, chinook, and pink salmon which migrate into the estuarine wetland and reside for weeks at a time. This is an important growth stage for salmon as they feed on the rich estuarine environment and adapt to the salt water environment.

Tidally-exposed Habitats

Tidally-exposed wetlands must survive the stresses of periodic exposure and inundation. Although resident fauna are not common, there are many unique examples of fish, crabs, and shrimp which have evolved to utilize particular habitat structures such as tidal channels, flat pools, and salt marsh pans. The fish are usually restricted to heartier species, such as three-spine sticklebacks and Pacific staghorn sculpin. Sand shrimp build elaborate, branching, multichambered burrows. These habitats retain enough water for the shrimp, pea crabs, and some fish to survive tidal exposure.

Mudflats provide nesting, nursery, and feeding habitat for invertebrates and fish, resting habitat for birds and mammals, shoreline protection from erosion, and dissipation of storm surge runoff.

WETLAND FUNCTIONS AND VALUES

Wetlands are hydrologically linked to rivers and streams, making any pollutant entering a wetland a possible source of contamination to an associated stream. Wetlands perform a number of valuable functions which, if lost, can also impact surface water quality. Contained in this appendix is an excerpt from the PIERCE COUNTY WETLANDS MANAGEMENT STUDY: PHASE 1 REPORT which was used as a source document for the preparation of the PIERCE COUNTY WETLAND MANAGEMENT POLICIES adopted by the Pierce County Council in November 1989. The excerpt is titled "Chapter 2: Wetland, Functions, Values, and Trends".