Session III: Estuary

Estuary

Columbia River Estuary – overview of physical features and habitats

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Formed in a drowned river valley, the Columbia River estuary is one of the largest estuaries on the northeast Pacific. At present, tides influence water levels up to 235 km from the mouth to Bonneville. The area of the portion influenced by surface salinity (the lower estuary) has been estimated at 373 km^2. Less is known about the estuarine reaches further upstream but the area of this region is probably at least equivalent to that of the lower estuary. In recent times ocean water has been detected under the fresh water of the river (the salt wedge) up to about 50 km upstream but this distance is highly variable and depends on tides and river flow. About 71% of the lower estuary is < 6 m deep. Temperatures in the estuary vary with depth, distance from the ocean, season, and year. Median surface temperature at Warrendale, well upstream from the salt wedge, varied seasonally from about 5 to 20 ° C. In the lower estuary, mean temperature at mid-depth ranged seasonally from approximately 11 to 17 ° C. Estimation of flow through the estuary is complicated by tidal effects and addition from tributaries. As in the main stem river, discharge through the estuary is now higher in winter and lower in summer relative to historical conditions. River channels, intertidal sand and mud flats, and herbaceous wetland (marshes and swamps) are the prominent habitat types in the lower estuary. Forested/ shrubs scrub wetlands are the dominant vegetation types in the upper estuary but there are fewer data from this reach. Detritus (the complex of decomposing plant material and microbes) from the wetland plants is the basis for the food web in the estuary, supplemented by algal production from upstream and local sources. There have been significant changes to the distribution and abundance of estuarine habitats owing to dredging, industrial development and urbanization. In the lower estuary, development has resulted in a loss of 77 % of the tidal swamps, 62 % of the tidal marshes, and 7 % of the tidal flats.

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