

**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Estuarine

Kent Smith

General Description

Structure-- Estuarine habitats occur on periodically and permanently flooded substrates and open water portions of semi-enclosed coastal waters where tidal seawater is diluted by flowing fresh water (Ellison 1983). This mix of fresh and ocean waters usually forms a horizontal salinity gradient that varies by area and location with seasonal variations in fresh water inflow and tidal action. In California, estuarine habitats include coastal lagoons containing waters of more uniform salinity than true estuaries, or waters with vertical rather than horizontal salinity gradients. Estuarine habitats differ greatly in size, shape, and volume of water flow, based on local topography.

Aquatic Environment

Composition-- The various physiological stresses exerted in the estuarine environment, especially those related to changing salinities, result in natural communities that are low in species richness but high in density. The largest number of estuarine organisms are benthic and include hydrozoans, anthozoans, and annelid worms. Such organisms attach to the bottom substrate, bury in the mud, or live in crevices (Smith 1974). Mollusks, including gastropods and bivalves, also occur in this zone.

The open water is a medium for suspended organisms, such as plankton. Phytoplankton, tiny plants that photosynthesize in open water, are densest near the surface and in low salinity areas in summer. In winter, they are distributed more uniformly throughout the estuarine system. Zooplankton, including many small crustaceans, such as amphipods, decapods, and copepods, are the primary trophic level on which fishes and other vertebrates depend. Aquatic plants other than phytoplankton include green and red algae. In addition, eel grass (a common flowering plant) grows in dense stands in many subtidal estuarine habitats.

Salinity determines species distribution in estuarine habitats. Organisms are primarily marine in origin, except for anadromous fish or wildlife species that can migrate easily to fresh water. Very few purely fresh water organisms are found in estuarine systems.

Other Classifications-- Other names for the estuarine habitat include Bays and Harbors -1.11, Coastal Estero - 0-1.12, Tidal Flats -1.21 (Cheatham and Haller 1975);

Drowned River Mouth Estuary (Pritchard 1967); Blind Estuary, Estuarine (Cowardin et al. 1979), Estuaries (Ellison 1983).

Aquatic Zones and Substrates

Estuarine habitats exist in the structural classes 1,24:0-B. This habitat extends shoreward to the shallower subtidal zone where light easily penetrates under normal conditions. In the intertidal zone, the substrate is periodically exposed and flooded by tidal action or at times by storm runoff. Shoreline is defined by a water border with less than 2 percent existing as Saline Emergent Wetland (SEW).

Estuarine systems tend to be fairly stable and long lasting. Human impacts such as water diversion (flow reduction) and sedimentation can however, significantly alter or eliminate the estuarine condition. In southern California, diversion, channelization and other developments in the Los Angeles and San Diego drainages have destroyed once viable estuarine systems (Ellison 1983).

Biological Setting

Habitat-- Estuarine habitats may occur in association with Riverine (RIV), Marine (MAR), Saline Emergent Wetland (SEW), and Urban (URB).

Wildlife Considerations-- Estuarine habitats provide for reproduction, feeding, resting, and cover for many species of mammals and birds. These habitats provide shelter for large numbers of water birds, especially during heavy winter storms when open coastal waters become rough. Of great importance are the eel grass beds supported by estuarine subtidal habitats. These areas are critical to the black brant which feeds almost exclusively on eel grass.

Physical Setting

In general, California's estuarine systems do not conform to the classic description. Exceptions are the Sacramento/San Joaquin River estuary and possibly a few north coast rivers like the Klamath (Ellison 1983). California estuaries are highly variable due to a restricted coastal plain and stream flow regimes characterized by summer drought.

On a seasonal basis the marine influence of many California estuaries is interrupted by the formation of sand bars. When this occurs, considerable movement of water between the estuarine and marine environments may be maintained by infusion. Although marine waters may continue to influence estuary salinities, the movement of most aquatic organisms is severely restricted (Ellison 1983). Permanent blockages, creating lagoon-like situations may drastically change the structure and composition of associated plant and wildlife species.

Distribution

Estuarine habitats commonly occur along coastal California at the drowned mouths of perennial rivers tributary to the Pacific Ocean.

Literature Cited

- Cheatham, N. H., and J. R. Haller. 1975. An annotated list of California habitat types. Univ. of California Natural Land and Water Reserve System, unpubl. manuscript
- Cowardin, L. M. V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Dep. Interior, Fish and Wildl. Serv. FWS/OBS - 79/31.
- Ellison, J. 1983. Estuaries, California aquatic community abstract. California Dep. Fish and Game, Sacramento.
- Pritchard, D. W. 1967. What is an estuary? Physical viewpoint. pp 3-5 in G. H. Lauff, ed. Estuaries. Amer. Assoc. Advance. Sci. Publ. 83.
- Smith, R. L. 1974. Ecology and field biology. Harper and Row, New York.