

Bay and Estuarine Finfish Resources: Overview

Finfish species utilizing California's bays and estuaries include the sturgeons, gobies, cow sharks, smelts, striped bass, Pacific herring, and California halibut. Many of these fish move between bays and estuaries and open Pacific waters. Several are dependent on bay and estuarine systems for their entire life histories. While numerous fishery resources, such as salmonids, Dungeness crab, and many of the marine mammals also occur in or utilize the state's bay and estuarine habitats, only the species that are principally dependant on this ecosystem for reproduction, or life stage development are discussed in this chapter. Surf and night smelts, which are not dependent on bay and estuarine habitats are included in this chapter due to the layout of the document which combined true smelts into a single paper. Coastal finfish species which utilize bays and estuaries as nursery grounds or for other purposes, but are discussed elsewhere in this document, include the salmonids, leopard shark, bat rays, some of the croakers, many of the surfperches, brown rockfish, and several flatfishes.

Bay and estuarine species support important commercial and/or sport fisheries. It is estimated that California's striped bass sport fishery has an annual economic value of more than \$45 million. Add to this, the commercial value of fisheries for Pacific herring and the commercial passenger fishing vessel fleet targeting shark and other bay and estuarine species, and the overall annual value of fisheries specific to California's bays and estuaries range into the hundreds of millions of dollars. On the basis of economics alone, California's bay and estuary finfish species are very important resources.

In addition to being a food source and financial resource for human populations, many of the finfish species included here are an important food source for a diverse group of foraging marine fish, birds and mammals. Herring spawning, in particular, provides a highly utilized opportunity for feeding by other marine organisms. As herring move into shallow bay waters to spawn, a feeding frenzy often occurs which can last for several days. Gulls, cormorants, pelicans and other marine birds, California sea lions and harbor seals, a variety of fish, including sturgeon, and invertebrates feast on the adult herring and the developing embryos. Fish species such as Pacific herring and many of the smelt are a principal food source for marine organisms at the higher trophic levels. Fluctuation in the health and abundance of these higher trophic level species often can be traced to the population fluctuations of plankton feeders such as herring and smelt.

The finfish species found in the state's bays and estuaries serve as an index of the overall health of these important ecosystems. California's estuaries are heavily influenced by urbanization. While the more severe human impacts of such urbanization (filling of wetlands, for example) can be seen throughout the bay and estuarine ecosystems, the more subtle impacts tend to be chronic. Some of the chronic impacts are identified though long-term studies of specific indicator species. For example, while some impacts of increased diversions of water from the San Francisco Bay Delta to the state and federal water projects during the 1970s, could be determined through a decrease in freshwater outflow through the estuary, the impacts on fish were not immediately known. However, studies by the California Department of Fish and Game noted a decline in annual striped bass sports catch rates from over 750,000 in the early 1960s to approximately 52,000 fish in 1994. The DFG determined that the reduction in adult striped bass population was due to reduced recruitment of young fish and a decline in adult survival rates. This decline also correlated directly with the increase in Delta pumping. By 1998, catch rates had rebounded to approximately 295,000 fish, most likely as a result of increased fish abundance and renewed interest in the fishery. In recent years, recruitment has continued to increase as a result of improved survival of striped bass between the ages of zero and three.

Other measures of bay and estuarine health can be inferred through analysis of bioaccumulation of chemicals in fish species such as white sturgeon. Although this chapter does not directly address contaminant concerns, it remains that the overall health and abundance of bay and estuarine finfish species can serve as a looking glass into this often troubled environment.

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Sportfishing at Golden Gate Bridge for striped bass.
Credit: Chris Dewees, California Sea Grant Extension Program