Silversides

There are three species of silversides (family Atherinopsidae) in California ocean waters, grunion, topsmelt (*Atherinops affinis*), and jacksmelt (*Atherinopsis californiensis*). Information on grunion is presented in a separate section. Even though "smelt" is included in the common names of these species, silversides differ in part from true smelts (family Osmeridae) in having two dorsal fins (one with spines), while the true smelts have one dorsal fin and an adipose fin near the tail.

History of the Fishery

Silversides are marketed fresh for human consumption or bait. The commercial fishery for silversides has been conducted with gillnets, lampara nets, and round haul nets. Historically, set lines have been used in San Francisco Bay for jacksmelt, and during the 1920s beach nets, pulled ashore by horses, were used at Newport Beach. Commercial catches of jacksmelt have varied sharply over the past 80 years. The high year for this fishery was 1945, when more than two million pounds were taken. During the 1990s, the catch varied between 40,765 pounds in 1997 and 2,530 pounds in 1998 and 1999, with most of the catch being landed in the Los Angeles area. This is an occasional or incidental fishery, and fluctuations observed in catch records reflect demand, not true abundance. Principal commercial fishing areas are usually in harbors and bays such as San Pedro, Monterey, San Francisco, Tomales, and Humboldt. Commercial catches of topsmelt are not as large as those of jacksmelt because of the smaller size and more scattered distribution of topsmelt. There are no commercial or sport bag and possession limits on these species.

Jacksmelt and topsmelt make up a significant portion of the pier and shore sport catch throughout California, and private boat anglers fishing nearshore catch them occasionally. From 1958 to 1961, these two species comprised about 10 percent of the total hook-and-line sport catch by numbers (272,000 jacksmelt and 43,000 topsmelt) in central and northern California. These are among the most abundant fishes available to pier and shore anglers and represent a very important recreational fishery, especially for children. When taken with light fishing gear, they are easy to catch and excellent fighters.

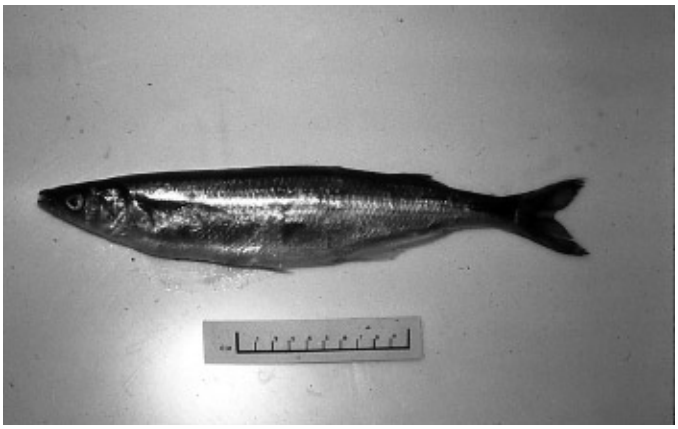
Jacksmelt are caught by a variety of sport fishing methods. A string of half-a-dozen bright red artificial flies or small hooks baited with shrimp or squid is the most successful terminal tackle used by pier anglers. Single baited hooks are also used from piers and by shore and skiff anglers. The larger jacksmelt is quite a game fish and will take a small spinner or lure cast out and retrieved with a series of quick jerks. Young jacksmelt and topsmelt are quickly attracted with breadcrumb chum thrown into the water. A rapid feeding activity takes place, making it easier to catch fish with hooks or hoop nets.

Status of Biological Knowledge

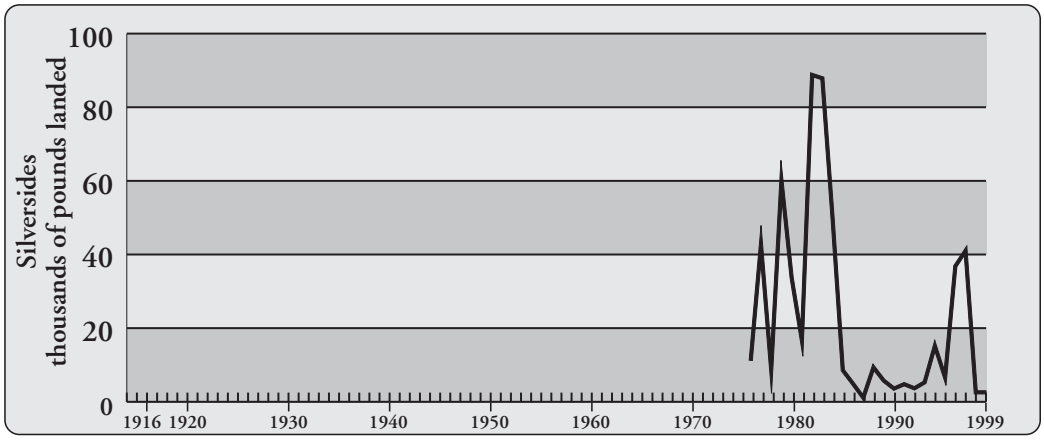
Topsmelt range from the Straits of Juan de Fuca, British Columbia, to the Gulf of California. They attain a total length of 14.5 inches, but individuals in sport catches are usually six to eight inches in length. There are seven subspecies of topsmelt, three of which are in California. These numerous subspecies demonstrate varied behavior and reflect the different environments occupied by this species: kelp beds, harbor areas, and sandy beach areas. They usually form loose schools but will congregate when feeding.

Topsmelt grow about 2.5 to four inches the first year, gain another two inches the next year, and grow proportionally less each year until they reach maximum size of about 14 inches. The largest topsmelt that has been aged was seven or eight years old. Some topsmelt spawn by their second year but most reach maturity during their third year. The spawning period is from April through October with a peak in May and June. This species attaches its eggs in a mass on eelgrass and low growing algae in harbors and bays, and possibly on kelp. The egg mass from each female is intertwined to the substrate by fine string-like filaments attached to each egg. Eggs may be deposited more than once in a spawning season. Topsmelt larvae are particularly abundant in tidal basins and the shallow edges of coastal bays. Juvenile topsmelt generally move into the open water of estuaries, bays, and coastal kelp beds.

The food of topsmelt consists primarily of plankton species including crustaceans. Intertidal inhabitants eat algae and fly larvae, as well as crustaceans. Bay forms have been observed working along muddy bottoms for food items. Topsmelt have the ability to withstand a wide range



Jacksmelt, *Atherinopsis californiensis*
Credit: DFG



Commercial Landings 1916-1999, Silversides
Data Source: DFG Catch Bulletins and commercial landing receipts. No commercial landing are reported for silversides prior to 1976.

of salinity concentrations. They are found in mesohaline waters and have been known to live in salt ponds with salinities as great as 72 parts per thousand – twice that of open ocean water.

Topsmelt are a very important species in bay and near-shore ecosystems in southern California. Collections of fishes by beach seine in bays are almost always numerically predominated by young topsmelt. Young-of-the-year topsmelt were found to contribute 85 percent of the total annual fish production in the shallow water areas of Upper Newport Bay. Topsmelt have been shown to be the most ubiquitous and numerically abundant fish species in submarine meadows of surfgrasses on the open coast. They are one of the five primary species brought to the breeding colonies of the least tern, an endangered seabird.

Jacksmelt form dense and larger schools than topsmelt and range over much of the inshore area of California. The geographic range is from Yaquina Bay, Oregon to Santa Maria Bay, Baja California. They are usually found in bays and within a few miles of shore in a salinity range from seawater to mesohaline. This species attains a length of 22 inches, with 17-inch fish commonly taken. Jacksmelt are relatively fast growing, reaching 4.5 to five inches in the first year and up to eight inches during the second year. Jacksmelt mature at two to three years or about eight inches. The oldest jacksmelt aged, a 16-inch male, was 11 years old. The spawning season is during winter, from October to April. Large masses of eggs, about the size of small BBs, are attached to eelgrass and algae by means of long filaments. Pinkish egg masses have been observed along with herring eggs during winter months in Elkhorn Slough and attached to eelgrass in Tomales Bay. Jacksmelt eggs have been observed to hatch in salinity as low as five parts per thousand. Jacksmelt can spawn several times during a spawning season.

The larvae and young are distributed near the surface in harbors, along sandy beaches, and in the kelp canopy, often mixed with the young of topsmelt. Their food habits are not well known, but it can be assumed that fish as fast as jacksmelt, that readily take a moving lure, are predatory animals. Small fish as well as crustaceans make up part of their diet.

The species is not desired by some sport anglers because of the presence of relatively large sized worms in the flesh. These are an intermediate stage of a spiny-head worm that is thought to be a parasite in sharks and pelicans. It probably is harmless to man, and definitely is harmless when the flesh is cooked.

Status of the Populations

Stock sizes of these two species have not been determined. At present, there are no indications that topsmelt or jacksmelt are being overfished in California. However, as these species occur in inshore waters, they are at risk of being affected by pollutants and loss of habitat through development.

Management Considerations

See the Management Considerations Appendix A for further information.

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