

Starry Flounder

History of the Fishery

Prior to the late 1980s, the starry flounder (*Platichthys stellatus*) was a common species in both the commercial and recreational fisheries of northern and central California. Though seldom targeted, it was often taken by commercial fishers seeking more valuable species such as petrale sole or California halibut. Historically, most of the commercial catch was made by bottom trawl. During the 1980s, many starry flounders were also taken by gill and trammel nets in central California. During the late 1980s, commercial landings declined sharply and remained at relatively low levels through the 1990s. From 1992 through 1999, landings averaged only 62,225 pounds, ranging from a low of 25,353 pounds in 1995 to a high of 100,309 pounds in 1999. This is in contrast to annual landings of more than a million pounds during the 1970s and half a million pounds in the 1980s.

The recreational catch of starry flounders is from piers, boats, and shore, usually in estuarine and adjacent coastal waters. The estimated annual recreational catch for this species in California from 1981 to 1989 averaged 40,000 fish and ranged from less than 12,000 in 1985 to 63,000 fish in 1987. Estimated recreational catches, like commercial landings, declined dramatically during the 1990s. Catch estimates from 1993 through 1999 averaged 6,000 fish per year, and ranged from a high in 1998 of 15,000 fish to lows in 1994 and 1996 of 3,000 fish.

Status of Biological Knowledge

The starry flounder is probably the most easily recognizable of California's flatfishes. The dorsal and anal fins are prominently marked with alternating yellow or orange and dark bars. The body surface is rough owing to modified star-shaped scales that give rise to the names "starry" and "roughjacket," as this fish is often called by fishermen. It is very good at assuming the coloration of the substrate upon which it finds itself. Starry flounders in California are about equally divided between left-eyed and right-eyed fish, while those of Japan are nearly all left-eyed.

Starry flounders range from Korea and Japan, north to the Bering and Chukchi Seas and the Arctic coasts of Alaska and Canada, and southward down the coast of North America to southern California, although they are uncommon south of Point Conception. It is primarily a coastal species, living on sand and mud bottoms, and avoiding rocky areas. Though found to depths of 900 feet, they are much more common in shallower waters. They are frequently found in bays and estuaries, often one of the commonest fishes in these settings. They are tolerant of brackish and even fresh water.

Tagging studies have not demonstrated extensive migrations, although there is some movement along the shore. There are also thought to be seasonal inshore-offshore movements of these fish, possibly related to spawning.

Most spawning occurs in shallow waters near the mouths of rivers and estuaries during the winter. In central California, December and January are the peak months of spawning. The number of eggs produced by each female depends upon her size. A 27-inch fish may produce about 11 million eggs. Fertilization is external.

Eggs of the starry flounder are pelagic, floating near the ocean's surface. Under laboratory conditions, eggs held at 51° F hatched in 4.5 days, while those held at 54.5° F hatched in 2.8 days. Newly hatched larvae are less than one-tenth inch long. Metamorphosis occurs 39 to 75 days after hatching. Newly settled juveniles less than one-half inch long are common in low-salinity estuarine waters, although settling also occurs along the open coast.

Females grow faster and reach larger sizes than do males. In central California, most males are sexually mature at two years averaging 14.5 inches, most females at three years and 16 inches. The maximum size reported is 36 inches.

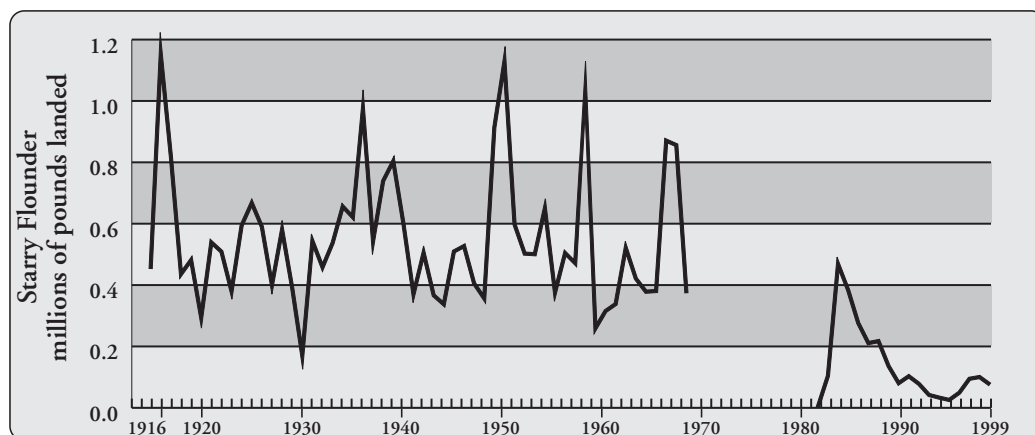
Larval starry flounders feed on planktonic organisms. Newly metamorphosed fish feed largely on copepods and amphipods. As they grow, their diet changes. Five-inch fish have developed jaws and teeth that allow them to crush small clams and pull worms from their burrows. At 10 to 12 inches, they tend to graze on tips of siphons of clams too large to be ingested whole. Crabs and polychaete worms are also taken. Sand dollars, brittle stars, and fish are included in the diets of larger starry flounders.

Wading and diving seabirds such as herons and cormorants, as well as marine mammals such as harbor seals, feed on juvenile starry flounders in estuaries. However, sea lions and harbor seals feeding on fish caught in gillnets will pass up a dozen starry flounders to eat a more



Starry Flounder, *Platichthys stellatus*
Credit: DFG

**Commercial Landings
1916-1999,
Starry Flounder**
Starry flounder were aggregated under the landing classification "unspecified flounders" between 1970 and 1982. Data Source: DFG Catch Bulletins and commercial landing receipts.



valuable California halibut, much to the consternation of the fisherman.

On occasion, a fish is caught that displays physical characteristics intermediate between a starry flounder and an English sole and may be a hybrid of those species.

Status of the Population

No studies have been conducted to determine population size of the starry flounder; however, the commercial landing and the recreational catch trends suggest the California population is now at extremely low levels. The circumstance could arise from either a relocation of adult fish associated with the 1976-1977 oceanic regime shift or a rapid decline in the abundance of spawning adults due to fishing pressure. The large population decline suggested by fishery trends is substantiated by a fishery-independent trawl survey conducted by the California Department of Fish and Game within the San Francisco estuary from 1980 through 1995. Their results show age-zero and age-one-plus starry flounder abundance and catch-per-unit-effort dropping dramatically during the late 1980s and remaining at low levels through the 1990s.

There is very little or no yearly lag between the precipitous drop in the fishery harvest and the drop in abundance of age-zero fish in the San Francisco estuary survey,

which suggests that adult fish were no longer present in the areas where fisheries normally operate, and were no longer spawning in areas that had previously resulted in higher levels of young-of-the-year within the San Francisco estuary. Recruitment is largely determined by survival of larval and juvenile fish. Given the importance of bays and estuaries to the young of this species, the continued environmental health of these areas may be the most important factor in maintaining healthy populations of starry flounder.

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References

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