

References

shortbelly rockfish for surimi, but they have not submitted a permit request.



Shortbelly rockfish, *Sebastes jordani*.

SHORTBELLY ROCKFISH

History of the Fishery

The shortbelly rockfish (*Sebastes jordani*) is the most abundant rockfish off California but has been fished very little. A directed fishery occurred in 1982, when a joint venture with the USSR caught 700 tons off central California. Otherwise, a few shortbelly rockfish occasionally appear with other rockfish landed in California ports. There is no domestic market for shortbelly rockfish at present. If a market develops, special permits will be required, because fishing with legal mesh sizes is not practical for this small species. Large catches of shortbelly rockfish can be made using midwater or bottom trawls with fine mesh cod ends. Research has shown, however, that while directed fishing for shortbelly rockfish results in low incidental catches of other species when mid-water trawls are used, high incidental catches can occur when bottom trawls are used. Because of the concern that bottom trawls would take unacceptably high numbers of small fish of other important species, scientists have recommended against the use of bottom trawls for shortbelly rockfish.

The potential fishery for shortbelly rockfish is controversial. Fishermen express concern that significant amounts of salmon may be caught incidentally to fishing for shortbelly rockfish, but scientists have not observed incidental salmon catches and believe that a fishery for shortbelly rockfish is likely to be offshore from concentrations of salmon. Fishermen and environmental groups also express concern because young-of-the-year shortbelly rockfish are forage for salmon, sea birds and marine mammals. Scientists have recommended quotas that are thought to be sufficiently low so as not to impact either the recruitment or the availability of young-of-the-year shortbelly rockfish for forage. Scientists have also recommended close monitoring of fishing for shortbelly rockfish to verify that high incidental catches and/or depletion of forage do not occur.

The 1991 quota for catches off California, Oregon and Washington is 14,300 tons. Recent applications by joint venture companies to fish for shortbelly rockfish were not approved. These companies intended to use the catch for surimi. There has also been some interest expressed by domestic firms to utilize

Status of Biological Knowledge

Shortbelly rockfish are found from Punta Baja, Baja California, to La Perouse Bank, British Columbia. Peak abundances are between the Farallon Islands and Santa Cruz, and off the Channel Islands. Young-of-the-year shortbelly rockfish have been observed in the surf line, and adults have been reported as deep as 930 feet. The peak abundance of adults is over bottom depths of 400 to 700 feet. Adults commonly form very large schools over smooth bottom near the shelf break. Schools are often near or on the bottom during the day and tend to be less dense and higher in the water column during the night. The size of shortbelly rockfish tends to increase with bottom depth.

The maximum recorded age for shortbelly rockfish is 22 years, but fish older than 10 years are uncommon. Most are less than 11.5 inches in length, which corresponds to a weight of 0.5 pound. The maximum size is 12.8 inches, or about 0.7 pound. Early growth is fairly rapid, and by age three the average size is 7.8 inches for males and 8.3 inches for females. Growth has slowed by age eight, and the average size is 9.7 inches for males and 10.3 inches for females. About 50 percent of female shortbelly rockfish are mature by age three, and almost all are mature by age four. The fecundity ranges from 6,200 eggs for a 6.8-inch fish to 50,000 eggs for a 12.0-inch fish.

Plankton surveys during the January-April parturition season indicate that larvae are released in the same areas inhabited in the summer and fall by large aggregations of adults. However, the fish may be more dispersed during the late winter season because aggregations of adults have been difficult to locate then. The larvae are about 0.2 inch when released. The young fish lead a pelagic existence until June, when they are about five months old. In June, the young shortbelly rockfish begin to take on the behavior of adults. Divers occasionally observe them in large, compact, schools in fairly shallow water. Large numbers of moribund young-of-the-year shortbelly rockfish are sometimes found on beaches after periods of wind patterns that are thought to cause currents which carry them into shallow waters. These fish have not appeared to be either starved or diseased. They appear to be maladapted to contact with the abrasive bottom when in the nearshore environment.

During the latter part of the pelagic stage, the two to three-inch shortbelly rockfish feed mostly on copepods and small stages of euphausiids. Adults feed primarily on euphausiids, but also consume some copepods. Young-of-the-year shortbelly rockfish are important prey items for salmon and sea birds

during the latter part of the pelagic stage. They have also be found in the diet of lingcod and northern fur seals. Adult shortbelly rockfish are occasionally found in the diet of larger predators such as lingcod.

Status of Population

The population is at the unfished level. Biomass estimates have been attempted on four hydroacoustic surveys from Santa Cruz to the Farallon Islands. Large aggregations needed for the hydroacoustic technique were found only for two of the four surveys. The two biomass estimates were 168,000 tons and 325,000 tons. It was estimated that the biomass in this area could support annual catches of at least 14,800 tons without reducing the spawning stock below levels thought to be needed to maintain good recruitment.

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