California's Living Marine Resources:
A Status Report

The Resources Agency
The California Department of Fish and Game

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Canary Rockfish

History of the Fishery

Prior to 1944, the primary gear used for the capture of rockfish was the hook-and-line (primarily vertical longline). Soon after World War II, the "balloon" trawl became the dominant gear used to capture rockfish. Canary rockfish (*Sebastes pinniger*) became the largest component in the trawl fishery landings in northern California. From the 1940s to the late 1960s, rockfish landings began to increase steadily, due in part to Asian market demands. Estimated canary rockfish landings for this time period indicate annual catches of 550 to 2,200 tons, the majority being landed in northern California with trawl gear. The exact amounts harvested during this time period are not known since rockfish landings were not recorded separately until 1981. During the 1970s, total landings of canary rockfish in California decreased slightly to between 440 and 990 tons. Trawl gear continued to dominate the total catch (60-70 percent), with recreational catches (15-30 percent) and commercial hook-and-line (5-15 percent) accounting for the rest.

In 1982, the trawl catch of canary rockfish in California accounted for 77 percent of the total canary rockfish catch (1,200 tons), with most of the fish being landed in Eureka and Fort Bragg. Recreational and commercial hook-and-line catches accounted for 21 percent and 2 percent of the total in 1982. During the 1980s, a new gear, the setnet or gillnet entered the fishery. Gillnet catches began to replace hook-and-line catches for a few years, but accounted for less landings compared to the recreational and trawl catches. The trawl remains the dominant gear type for harvesting canary rockfish to this day, but has experienced declines to levels nearly matching the hook-and-line catches. Since 1982, the total harvest of canary rockfish in California has declined dramatically to 250 tons in 1998. The trawl, commercial hook-and-line, recreational, and setnet catches account for 50 percent, 42 percent, 8 percent, and less than 1 percent of the total canary rockfish landings in 1998. Canary rockfish are currently being managed through bi-monthly trip limits.

Canary rockfish is an important component of the commercial passenger fishing vessel (CPFV) recreational catch from central and northern California. This species was consistently one of the top ten species landed by CPFV anglers fishing in the San Francisco area north to the Eureka area. Average length of canary rockfish caught by CPFV anglers is small and usually involves immature fish (less than 50 percent maturity).

Status of Biological Knowledge

Canary rockfish, referred to as orange rockfish in older reports, occur from Baja California to southeast Alaska. Their center of distribution is the Washington-British Columbia area, and in California they have commercial importance only as far south as Bodega Bay. Electrophoretic differences indicate that canary rockfish may have two separate subpopulations: one north, the other south of central Oregon. A recent assessment of these two portions of the canary rockfish resource suggests the southern area may be receiving population enhancements from the northern spawned fish. Canary rockfish have been caught at depths below 1,000 feet, but are taken in abundance only to 500 feet.

Canary rockfish grow rapidly until they reach maturity at about 17 inches, then more slowly to a maximum age of 70 years and a maximum length of 24.5 inches for females and 21 inches for males. For example, at one year, females average 5.4 inches and males 4.3 inches; at four years both females and males average about 11.7 inches; by age 12, females average 20.2 inches and males 19.1 inches. By age 50 they have added little length (females, 24.4 inches; males, 20.9 inches). Most populations have few individuals older than 20 years.

Females begin to mature sexually at 10.6 inches, reaching 50 percent maturity at 17.3 inches, and 100 percent maturity at 21.2 inches. Males begin to mature at 11 inches, reaching 50 percent maturity at 15.7 inches, and 100 percent maturity at 17.7 inches. A 10.6-inch female carries about 69,000 eggs; a 17.3-inch female about 489,000 eggs; and a 21.2-inch female about 1,113,000 eggs.

Canary rockfish are viviparous, meaning that the females bear free-living young and contribute some energy to their young while they are inside the mother. Males fertilize the females around December, and the females hold their young until December to March. Pelagic juveniles occur in the upper 100 feet of the surface waters from April to June. It is assumed that the juveniles descend to

Canary Rockfish, *Sebastes pinniger*
Credit: DFG

benthic habitats after mid-June. Juvenile canary rockfish, like most rockfishes, tend to settle in the shallower depths of their range and move to deeper waters as they grow older.

Adult canary rockfish feed primarily on euphausiids. Next in importance as prey are fish, mainly myctophids and adult shortbelly rockfish which are most abundant in the fall and winter diet. Gelatinous zooplanktors and associated hyperiid amphipods are common prey but are a minor part of the diet. Pelagic juvenile canary rockfish feed on copepods and euphausiid eggs and larvae.

Predation on canary rockfish is most severe during the pelagic larval and juvenile stages. Juveniles (one to three inches) are commonly found in the stomach contents of chinook salmon. Undoubtedly, other predators of juvenile fish (other fishes, mammals and birds, including the common murre) prey on juvenile canary rockfish. After the juveniles descend to the benthos and become adults they are much less vulnerable to predators.

Status of the Population

The canary rockfish population has declined since the early 1970s, particularly in the waters north of California. The population size of age three and older canary rockfish for California was estimated to be approximately 4,700 tons in 1973 and had decreased nearly 60 percent to 1,900 tons in 1998. The mean length of canary rockfish has declined 13 percent since 1980 in the trawl fishery, indicating the removal of larger, older fish from the population. Off the coast of Washington and Oregon age two and older fish were estimated at 73,700 tons in 1967; in 1999 the estimate was 12,100 tons. The spawning population of canary rockfish has seen even more dramatic declines, with estimates of 1999 spawning population sizes of 6-23 percent of historically unfished levels. In 1999, the canary rockfish resource off the entire U.S. West Coast was declared overfished. Recent predictions of population trends indicate the population may take many decades to recover to fishable levels. Attempts to decrease fishing pressure on canary rockfish are resulting in severe restrictions for many other West Coast fisheries.

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