

Blue Rockfish

History of the Fishery

The blue rockfish (*Sebastes mystinus*), also known as bluefish, blue perch, blue bass, priestfish, and reef bass, is most commonly caught from the northern Channel Islands (in the Southern California Bight) to the Oregon border. Although only a small portion of blue rockfish landings is from the commercial fishery, those landings have increased in the past decade. During the 1987-1989 period, landings in the "blue rockfish" market category (which may include other morphologically similar rockfishes) averaged 25,670 pounds; in 1998 landings were approximately 92,000 pounds. Based on market sampling in the Morro Bay area, total landings of the species blue rockfish are significantly greater than those of the market category "blue rockfish." For example, in 1998 in this port area, estimated total landings for the species were 19,300 pounds, yet total reported landings for the market category were only 2,100 pounds. The former estimate is based on the percentage of blue rockfish in various sampled market categories and the total landed weight of all market categories. Blue rockfish are often landed as "unspecified rockfish" or "group small rockfish," both frequently used market categories.

Blue rockfish have become a minor component of the live fish fishery, which developed during the 1990s in California. For example, in the Morro Bay area during the 1996-1998 period, less than one percent of the live fish landings were blue rockfish, and about four times as many blue rockfish were landed dead than alive. In 1998, the ex-vessel value of all fish landed statewide in the "blue rockfish" market category was \$57,700.

The blue rockfish is one of the most important recreational species in California. It is usually the most frequently caught rockfish north of Point Conception for anglers fishing from skiffs and Commercial Passenger Fishing Vessels (CPFVs). It is also an important species for skin and scuba divers using spears, and is occasionally caught by shore anglers fishing in rocky subtidal areas. In a 1981-1986 survey of sport fish taken between the southern boundary of San Luis Obispo County and Oregon, an estimated 800,000 blue rockfish were harvested annually - more than any other species. This represents a doubling of the estimated annual harvest from a similar survey conducted in 1957-1961.

In every complete year sampled by the department, from 1988 through 1998, blue rockfish has been among the three most frequently observed species caught on CPFVs in every major port area from Morro Bay to Fort Bragg. Based on the Department of Fish and Game's (DFG) onboard observations and log book summaries, estimated annual take of blue rockfish by CPFV anglers ranged from 199,000 to 546,000 fish for the period 1988 to 1995 and

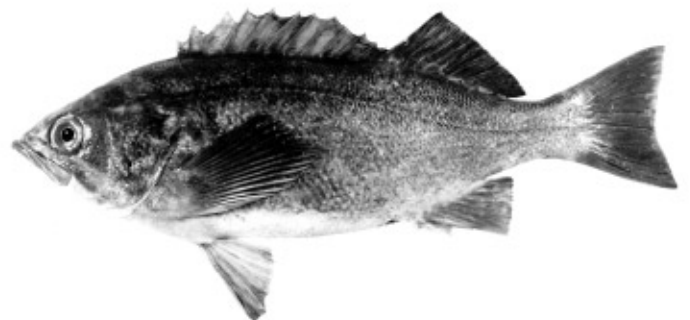
averaged 335,000 fish. This species truly has been the bread and butter of the nearshore recreational angler in northern and central California.

In a survey of divers conducted in 1972 in northern and central California, blue rockfish ranked second in importance to lingcod with 10.5 percent of all fish landed and was the most common rockfish taken, comprising 29.6 percent of all rockfishes. Preliminary data from a 1999 survey of Monterey Bay area divers revealed that blue rockfish was the fourth most abundant species harvested, after California halibut, kelp rockfish, and lingcod.

For more than 25 years, the recreational harvest of rockfish was limited to 15 fish per day, with 15 blue rockfish allowed within that limit. Effective January 1, 2000, the bag limit was reduced to 10 rockfish overall, with 10 blue rockfish allowed within that limit. The National Marine Fisheries Service considers the blue rockfish a "nearshore species." Effective January 1, 2000, very restrictive limits on the commercial harvest of nearshore rockfishes have been imposed by the National Marine Fisheries Service upon recommendation of the Pacific Fishery Management Council. In addition, the DFG now requires a special permit for the commercial harvest of nearshore fishes, and it is likely that a restricted access program will be developed for the nearshore commercial finfish fishery in California.

Status of Biological Knowledge

Blue rockfish range from the Bering Sea to Punta Baja, Baja California, and from surface waters to a maximum depth of 300 feet. They are less common south of the northern Channel Islands and north of Eureka, California. They are a medium-sized species among all rockfishes; the largest known specimen was 21 inches, although individuals exceeding 15 inches are uncommon in central and southern California. Average size in California recreational fisheries today is 11 to 13 inches. In central and southern California, larger blue rockfish are now common only in areas distant from fishing ports or in larger kelp beds which are practical to fish only from the edges.



Blue Rockfish, *Sebastes mystinus*
Credit: DFG

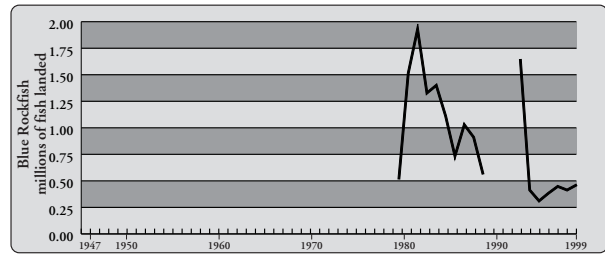
Rockfishes in general are considered to be slow-growing fishes. However, blue rockfish are among the faster growing rockfishes. First year growth may vary from 3.0 to 4.5 inches (central California average about 4.25 inches), and after two years blues may reach six inches. An occasional two- or three-year old blue rockfish may be caught by anglers, but most do not recruit to the sport and commercial fisheries until four to seven years of age when they range from eight to 10 inches. Females grow at a slightly faster rate than males. Maximum age is about 24 years.

Age at first spawning is protracted for both sexes. Only about 10 percent spawn for the first time at three years of age. At five years, or about 10 to 10.5 inches, half of all males are sexually mature. At six years, or about 11 inches, half of all females have spawned.

In males, the gonads increase in size from May to July, but in females the eggs begin maturing from July to October. Males transfer sperm to the females in October, but the embryos do not begin to develop until December when the eggs are fertilized by the stored sperm. Embryos develop within the female and hatch immediately upon being released into the water; larval release usually peaks in mid-January. Larvae live in the surface waters for four to five months, where they may be carried many miles by ocean currents. Young-of-the-year (YOY) blue rockfish begin to appear in the kelp canopy and shallow rocky areas by late April or early May when they are about 1.2 to 1.4 inches in length. However, they are not considered fully recruited each year until July due to the variability in the planktonic period. As YOY, they are mottled reddish-blue in color upon settlement and may appear in massive swarms in certain years in inshore areas, especially in kelp beds.

After more than two decades of estimating relative abundance of blue rockfish in central California, DFG biologists have shown a positive statistical correlation with blue rockfish recruitment and annual upwelling index. Continuing research is directed towards the mechanisms by which YOY rockfish recruit to nearshore areas, and the relationship between spawning areas and recruitment areas, as influenced by current patterns and oceanographic events.

Feeding habits vary considerably depending upon life history stage, depth, and locality. Larval and YOY blue rockfish consume primarily planktonic crustacea. Adult fishes in deeper water feed almost entirely on macroplankton consisting of tunicates (salps), scyphozoids (gonadal material of jellyfish), and crustaceans. In shallow areas and kelp beds, blue rockfish feed on the same types of macroplankton as those in deeper water, but they also feed on algae, small fishes, hydroids, and crustaceans, including amphipods and crab larvae.



Recreational Catch 1947-1999, Blue Rockfish

Data Source: RecFin data base for all gear types; data not available for 1990-1992

During their first few months on nearshore reefs, larval and YOY blue rockfish are preyed upon by most large piscivorous fishes. As adults, their predators include lingcod, harbor seals, sea lions, and, occasionally, larger rockfishes, especially bocaccio.

Adult blue rockfish are common in kelp beds, where food is plentiful and the kelp provides protection from predators, but they also occur on deeper rocky reefs between 100 and 300 feet deep. In kelp beds they form loose to compact aggregations. Under dense kelp canopies, they will sometimes form columns at least 30 wide and 80 feet deep and may be extremely compact. In deeper waters, they form aggregations that may extend from the surface to the bottom, but they are usually at or below mid-depth.

Blue rockfish are commonly associated with other nearshore fish species, particularly other rockfishes. A statistical technique, cluster analysis, was used to partition CPFV catch data from 1987 to 1992 in the Monterey area based on the frequency of occurrence of species in the sampled catch. In a broad area along the entire Monterey Peninsula extending out to 240 feet deep, blue rockfish were the predominant species and were in close association with olive, yellowtail, starry, and rosy rockfishes. This statistical relationship has been supported with observations using scuba and submersibles.

The DFG has conducted marking studies on all size ranges of blue rockfish from 1.8 to 18 inches. A population study using freeze branding as a marking technique resulted in more than 80,000 recently-settled blue rockfish being marked in a five-week period. These fish showed very little movement from an isolated reef 100 x 150 feet and, in fact, showed very little movement from one part of the reef to another.

Tagging studies of adult blue rockfish indicate they do not migrate laterally along the coast. Between 1978 and 1985, over 1500 blue rockfish were tagged and released in central California waters by DFG biologists. Eighteen tags were subsequently returned, with the fish being at liberty from 11 to 502 days; all were recaptured in the same locations where they were tagged. The longest recorded movement of a blue rockfish from any tagging study was 15 miles. While these studies show adult blue rockfish

populations are more or less discrete at each fishing port, it is not known how much larval drift occurs between fishing areas.

Status of the Population

Although no fishery-independent population estimates have ever been made of blue rockfish stocks, it appears that they have withstood considerable fishing pressure over the last four decades and continue to be healthy, at least north of Point Conception. There is evidence of a decline in blue rockfish stocks off southern California since the 1970s. There is a well-documented difference in the population structure between northern and central California stocks. Northern stocks are generally characterized by a wider size range of adults, a higher proportion of adults greater than 15 inches and a correspondingly greater mean length, less variability in annual recruitment, and most likely a higher growth rate. These attributes are likely a result of a combination of greater fishing pressure and a greater influence of anomalous oceanic conditions such as El Niño events in central California. Greater variability in annual recruitment results in occasional strong year classes which cause strong length-frequency modes in the sampled catch; this occurred four times in recreational fishery samples obtained from 1959 to 1983 in central California. It is believed that the last exceptionally strong year class of blue rockfish in central California occurred in 1988, which is cause for concern. However, a relatively strong year class also was observed in 1999. In 1993, when the majority of the 1988 year class had become available to recreational anglers, mean lengths in the sampled catch declined substantially in central California. For example, mean length of blue rockfish sampled from Monterey area CPFVs declined from 11.9 inches in 1992 to 11.0 inches in 1993. In heavily fished and well-sampled populations of rockfishes, changes in annual mean length from one year to the next are commonly less than 0.5 inches.

The total number of blue rockfish caught in recreational fisheries increased substantially from the late 1950s to the mid-1980s, concurrent with increased effort. However in the past 15 years recreational fishing effort has been variable but has not shown a consistent increase; the recreational catch of blue rockfish has shown the same pattern. However, increased commercial fishing in the nearshore area during the same period has put additional stress on blue rockfish populations. Fishery managers have increased monitoring efforts for this keystone species of nearshore ecosystems.

Paul Reilly
California Department of Fish and Game

References

See black rockfish reference list.