California's Living Marine Resources:
A Status Report

The Resources Agency
The California Department of Fish and Game

California Governor Gray Davis

Resources Secretary Mary D. Nichols

Department of Fish and Game Director Robert C. Hight

Marine Region Manager Patricia Wolf

Editors

William S. Leet

Christopher M. Dewees

Richard Klingbeil

Eric J. Larson

Acknowledgements

The editors wish to acknowledge important contributions from many colleagues. In DFG, Joann Eres and her staff compiled a huge amount of landings data for the tables and graphs, while Nancy Wright and Chad King created the maps. Chamois Andersen and the Conservation Education staff assisted with the editing. Carrie Wilson and Paul Gregory searched out and supplied many of the photographs. Bernice Hammer and Susan Ashcraft aided in organizing and producing tables and graphs. Kristen Sortais from the California Sea Grant Program compiled the glossary and organized the photographs in the document. The ever-enthusiastic Tom Jurach of the UC Davis Repro Graphics Department was the lead person for publication design and layout.

This publication fulfills the Marine Life Management Act of 1998 requirement for a status of the fisheries report. Primary funding for this project was provided by the State of California to the Marine Region of the California Department of Fish and Game. Additional support was supplied by the California Marine Life Management Project with funding from the David and Lucile Packard Foundation and the National Sea Grant College Program of the Department of Commerce, National Oceanic and Atmospheric Administration, under grant number NA06RG0142, project AE/1 through the California Sea Grant College Program.

This publication contains a compilation of information from numerous individuals and highly regarded sources. All efforts have been made to publish the best available data and information.

This report is not copyrighted. If sections are reproduced elsewhere, the authors and the California Department of Fish and Game would appreciate receiving appropriate acknowledgment.

Library of Congress Control Number: 2001098707

ISBN 1-879906-57-0

University of California

Agriculture and Natural Resources

Publication SG01-11

For information about ordering copies of this publication, call (800) 994-8849 or visit www.anrcatalog.ucdavis.edu.

To view or download via the Internet, visit www.dfg.ca.gov/mrd

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 fishing 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 midwater 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. Some 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 on numerous research cruises 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 of this species and/or depletion of forage do not occur.

Shortbelly Rockfish, *Sebastes jordani*
Credit: David Ono, DFG

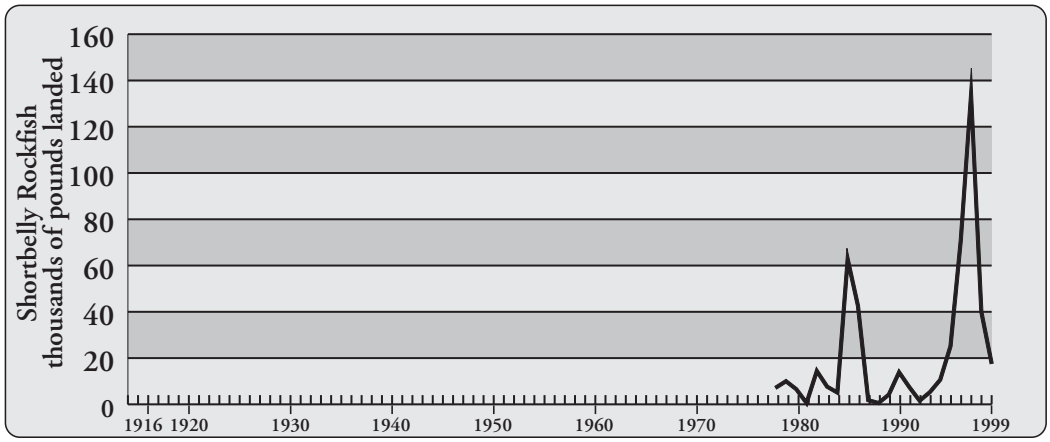
The quota for catches off California, Oregon and Washington in 2000 is 13,900 tons. Applications by joint venture companies to fish for shortbelly rockfish submitted in the early 1990's were not approved. Those companies intended to use the catch for surimi (artificial crab). There has been little current interest in development of a fishery. Bocaccio is one of the most common bycatch species. Since bocaccio has been declared an overfished species, it is unlikely that a commercial fishery for shortbelly rockfish will be allowed to develop in the foreseeable future.

Status of Biological Knowledge

Shortbelly rockfish are found from Punta Baja, Baja California, to La Perouse Bank, British Columbia. Largest numbers are found 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 at night. The size of shortbelly rockfish tends to increase with bottom depth.

The maximum reported age for shortbelly rockfish is 32 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 largest measured specimen was 13.4 inches, 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 slows by age eight, when 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. 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 late winter because aggregations of adults have been difficult to locate then. Larvae are about 0.2 inch when released. The young fish lead a pelagic existence until June, when they are about five months old, after which they settle out to lead a semi-pelagic existence. In June, the young shortbelly rockfish begin to take on the behavior of adults. Divers have occasionally observed 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



Commercial Landings 1916-1999, Shortbelly Rockfish
Data Source: CalCom, a cooperative survey with input from Pacific Fisheries Information Network (PacFin), National Marine Fishery Service (NMFS), and California Department of Fish and Game (DFG). Data are derived from DFG commercial landing receipts with expansions based on port samples collected by PacFin samplers. Expansion data not available for years prior to 1978.

them into shallow waters. These fish did not appear 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 juvenile pelagic stage, the two to three-inch shortbelly rockfish feed mostly on copepods and young stages of euphausiids. Adults feed primarily on euphausiids but also consume some copepods. Young-of-the-year shortbelly rockfish are important prey for salmon and sea birds. They have also been found in the diet of lingcod and northern fur seals. Adult shortbelly rockfish are occasionally found in the diet of large fish such as lingcod.

Status of the Population

The population is at the unfished level. Biomass estimates have been attempted on four hydroacoustic surveys from Santa Cruz to the Farallon Islands in 1977, 1983, 1986, and 1989. Large aggregations needed for the hydroacoustic technique were found only on two of the four surveys. The two estimates of biomass 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. Recent larval abundance surveys have suggested that recruitment is low which may be related to unfavorable oceanographic conditions.

William H. Lenarz
College of Marin

Revised by:
Donald E. Pearson
National Marine Fisheries Service

References

Chess, J. R., S. E. Smith, and P. C. Fisher. 1988. Trophic relationships of the shortbelly rockfish, *Sebastes jordani*, off central California. CalCOFI Rep. 29:129-136.

Kato, S. 1981. Checking out shortbelly rockfish - Colintino Rose II's mission accomplished. Pacific Fishing (November, 1981):96-100.

Lenarz, W. H. 1980. Shortbelly rockfish, *Sebastes jordani*: a large unfished resource in waters off California. Mar. Fish. Rev. (March-April):34-40.

Pearson, D. E., J. E. Hightower, and J. T. H. Chan. 1991. Age, growth, and potential yield for shortbelly rockfish (*Sebastes jordani*). Fish. Bull. 89:403-409.