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

Widow Rockfish

History of the Fishery

Widow rockfish (*Sebastes entomelas*) is one of the top three rockfish species in California commercial landings, although it is a minor constituent in the recreational fishery. During the 1970s, there were occasional reports of large trawl catches of "brownies" made incidental to the harvest of other rockfish, but commercial landings were small until markets improved in 1979 and the midwater trawl fishery exploded. At that time, fishermen began targeting widow rockfish and annual California landings exceeded 10,000 tons by 1982. Since 1983, however, strict regulations have limited the commercial harvest and recent landings in California have been in the vicinity of 1,000 tons. Along the entire U. S. Pacific Coast, annual landings are restrained by a quota imposed by the Pacific Fishery Management Council that applies to the fisheries of California, Oregon and Washington. Trip landings and frequency are adjusted in order to maintain a year-round fishing season.

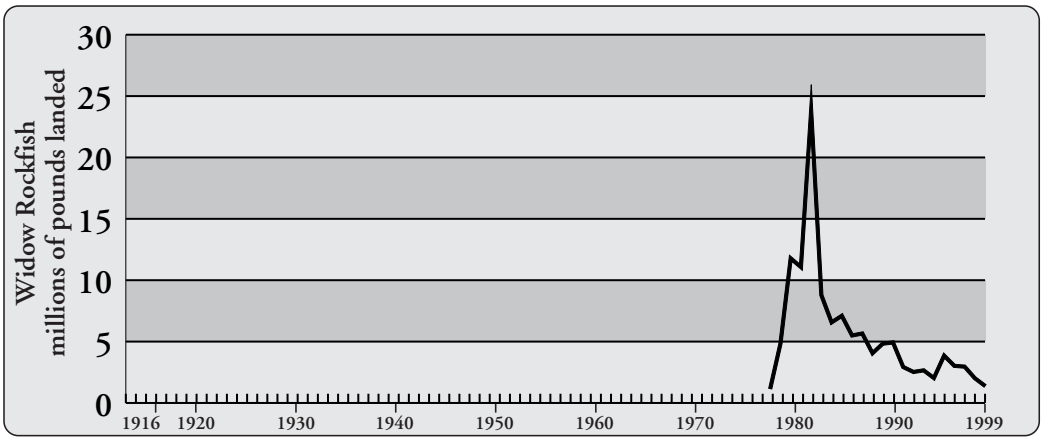
Over 50 percent of the widow rockfish commercial catch is landed in the most northern portion of the state (*i.e.*, Eureka and Crescent City), while San Francisco and Bodega Bay have also been historically important, accounting for about 30 percent of all landings. Although a small amount of catch is landed at Fort Bragg and Monterey, very little appears further south. When processed, widow rockfish are typically filleted and marketed as Pacific red snapper or rockcod, with the ex-vessel landed value generally in the vicinity of $1,000,000 annually. Widow rockfish are almost exclusively caught by trawlers, which have accounted for over 80 percent of the catch each year. Before the advent of restrictive trip landing limits, most of the fish were caught with very large midwater trawls, and during the early days of the fishery, it was often difficult to avoid capturing more widow rockfish in one tow with a midwater trawl than trip limits allowed. As a consequence, many vessels now use less efficient bottom trawls. Widow rockfish are also taken in the gill net and longline fisheries, although the gill net catch has declined from its peak in 1987, when it accounted for 21 percent of landings.

Widow Rockfish, *Sebastes entomelas*
Credit: DFG

Status of Biological Knowledge

Widow rockfish are found from Todos Santos Bay, Baja California, to Kodiak Island, Alaska. Peak abundance is off northern Oregon and southern Washington, with significant aggregations occurring south to central California. While many commercial catches occur at bottom depths between 450 and 750 feet, young fish occur near the surface in shallow waters, and adults have been caught over bottom depths to 1,200 feet. Widow rockfish often form midwater schools, usually at night, over bottom features such as ridges or large mounds near the shelf break. The schooling behavior of widow rockfish is quite dynamic and probably related to feeding and oceanographic conditions. There appears to be some seasonal movement of fish among adjacent grounds, and there is evidence that fish move from area to area as they age, with fish of the same size tending to stay together.

The maximum recorded age for widow rockfish is 59 years, but fish older than 20 years are now uncommon. Most are less than 21 inches long, corresponding to a weight of just under five pounds. The maximum size is 24 inches or about 7.3 pounds. At first, growth is fairly rapid and by age five widow rockfish average 13.5 inches. By age 15, growth slows greatly, when the average size is about 19 inches for females and 17.5 inches for males. Widow rockfish do not become reproductive until years after birth. For example, only 50 percent are mature by age five, but almost all are mature by age eight when they are 16.5 inches long. Off California, fecundity ranged from 55,600 eggs for a 12.8-inch female to 915,200 eggs for an 18.8-inch fish. The release of larvae by widow rockfish peaks in January-February and appears to occur in the same areas where they are caught during that season. The larvae are about 0.2 inch when released. The young fish lead a pelagic existence until they are about five months old. During the latter part of the pelagic stage, the two-inch fish feed mostly on copepods and small stages of euphausiids. Adult widow rockfish feed on midwater prey such as lantern fish, small Pacific whiting euphausiids, sergestid (deep-water) shrimp, and salps. Juvenile rockfish, including widow rockfish, are important prey items for sea birds and chinook salmon in May and June. Little is known about predation of adult widow rockfish.



Commercial Landings 1916-1999, Widow 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.

Status of the Population

The population was virtually unfished prior to 1979. By 1982, it became obvious that the population was being rapidly depleted and would soon be overfished, if catches were not restricted. The fishery was placed under stringent regulations in 1983. Even so, the stock was recently declared overfished by the Pacific Fishery Management Council because spawning potential was reduced to below 25 percent of the unfished condition. In response, a rebuilding plan for the stock will be implemented in 2002 that will reduce catches to less than 1,000 tons per year. With a harvest rate of less than three percent the stock should rebuild in about 35 to 40 years to the productive fishery it once was, with yields in excess of 3,000 tons per year.

Management Considerations

See the Management Considerations Appendix A for further information.

Stephen Ralston
National Marine Fisheries Service

William H. Lenarz
College of Marin, Kentfield

References

Boehlert, G. W., W. H. Barss, and P. B. Lamberson. 1982. Fecundity of the widow rockfish, *Sebastes entomelas*, off the coast of Oregon. Fish. Bull., U. S. 80:881-884.

Gunderson, D. R. 1984. The great widow rockfish hunt of 1980-82. N. Am. J. Fish. Manage. 4:465-468.

Lenarz, W. H., and D. R. Gunderson (editors). 1987. Widow rockfish: Proceedings of a workshop, Tiburon, California, December 10-11, 1980. U. S. Dept. Commer., NOAA Tech. Rep. NMFS 48.

Ralston, S., and D. Pearson. 1997. Status of the widow rockfish stock in 1997. In: Appendix to the Status of the Pacific Coast Groundfish Fishery Through 1997 and Recommended Acceptable Biological Catches for 1998; Stock Assessment and Fishery Evaluation. 54 p.

Williams, E., A.D. MacCall, S.V. Ralston, and D.E. Pearson. 2000. Status of the widow rockfish resource in Y2K. In: Appendix to the Status of the Pacific Coast Groundfish Fishery Through 2000 and Recommended Acceptable Biological Catches for 2001; Stock Assessment and Fishery Evaluation. 122 p.