

Cordell Bank— A Haven For Rockfishes

by Tom Laidig

About 25 miles west of Point Reyes lies a jagged block of granite towering almost 250 feet above the seafloor. This is Cordell Bank, a spot favored by whalewatchers, birders, and fisherfolk, situated along the northwest corner of the Gulf of the Farallones. Its shoreward side faces the mud and silt bottom of the Gulf, while its ocean side is at the edge of the continental shelf. There the seafloor slopes steeply to depths exceeding 10,000 feet. The nearest major rocky area to the Bank is Fanny Shoals, over 15 miles to the southeast. For the sea creatures adapted to rocky habitats, the Bank is an oasis hanging on the edge of a cliff.

This concentration of appropriate habitat is one reason for the rich abundance of organisms at Cordell Bank. Another reason is the position of the Bank on the edge of the continental shelf. The cold California Current, which flows south along the California coast from Washington, hits the steep north side of the Bank and is diverted upward toward the surface. This produces mixing, which creates a nutrient-rich habitat for many planktonic creatures which form the base of the food web. Thus, the organisms on the Bank are supplied both with food and shelter, which every creature needs.

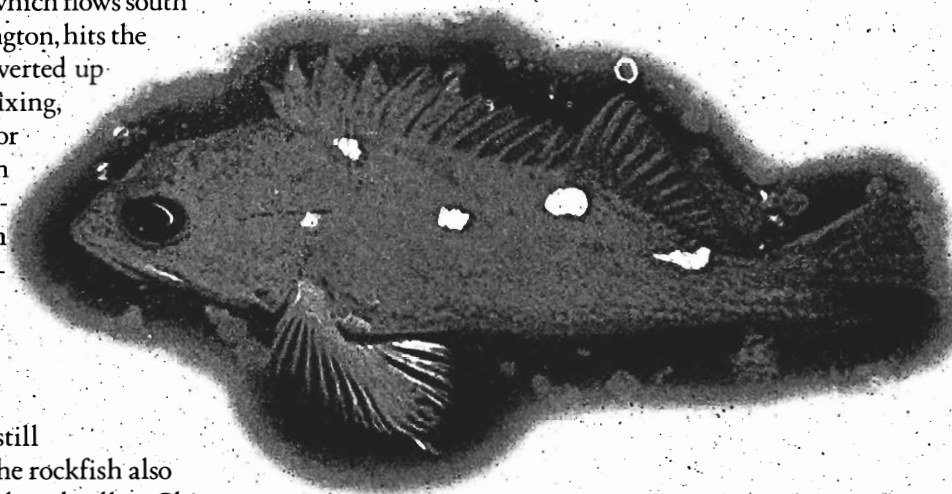
Many species of rockfish inhabit various areas around the Bank. Some live in crevices among the rocks, others rest on the open bottom, while still others hover well above the seafloor. The rockfish also differ in their coloration, from the black and yellow China rockfish, to the bronze widow rockfish, to the bright red rosy rockfish.

Besides being diverse in habitat and coloration, rockfish are distinctive from many other fish in their method of reproduction. All reproduce through internal fertilization, which means they don't release eggs and sperm into the water, or lay eggs. Instead, the eggs develop inside the mother. A female rockfish can have from 2,000 to 417,000 eggs at one time. These eggs develop and mature over the course of several weeks and the larvae hatch from the eggs inside the mother. A few days after hatching, the larvae are mature and strong enough to survive on their own and the mother releases them into the water column. Imagine giving birth to 400,000 babies!

The new rockfish larvae average only about 1/6 of an inch (4 mm) in length and face many problems. They are

born without any real fins and cannot swim very well, which limits their intake of food to small organisms that are within reach. Their limited mobility also makes them vulnerable to predators; including seabirds, whales, salmon, jellyfish, and even certain species of adult rockfish. Juveniles that survive these dangers eventually settle to the bottom, where they continue to grow. As they get larger, they move into the habitats of the adults, and the cycle repeats.

Since 1986, the National Marine Fisheries Service in Tiburon has sampled the waters around Cordell Bank for these baby rockfish. The purpose of this study is to determine the abundance of the young rockfish, since this knowledge can be used to help determine the number of adult rockfish that can be expected in the future. Of the thirteen years of data collected thus far, only two, 1988 and 1991, had high numbers of baby rockfish. Similarly, only two years had moderate numbers of rockfish (1987 and 1989). This leaves the remaining nine years as weak years for rockfish. In similar studies along the coast, there have been very few years when many rockfish have survived the larval stage. This means that there have been few fish maturing to replace the adults that have died.

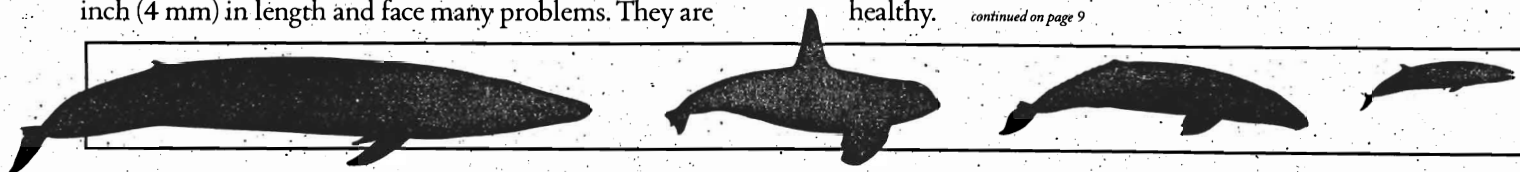


Rosy rockfish, photo by Cordell Bank Expeditions


The number and kind of rockfish captured has varied over the years. Among the species that have occurred most frequently and in the highest numbers have been shortbelly, widow, blue, canary, bocaccio, yellowtail, and chilipepper. These all reproduce during the winter, typically giving birth some time in January or February.

Scientists are investigating why more rockfish larvae survive some years than others. Many factors are involved, including food availability, predation, water temperatures, and ocean currents. The life expectancy of most rockfish is generally at least ten years with some living more than 100 years. Because rockfish live so long, adults have many opportunities to reproduce. Just a few good reproduction years during the adults' lifespan can keep a population healthy.

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the status of fish stocks at Cordell Bank. Even more importantly the status of the habitat will become visible and to what extent, if any, it may be damaged by heavy roller bottom trawl gear or other human activities. This information is expected to translate directly into regulations, if needed, to better protect this rich and diverse fishing grounds.

It has been unfortunate over the years that Cordell Bank National Marine Sanctuary has and continues to be given short shrift by the national offices of the Marine Sanctuary Program. But Cordell Bank will have use of the Sustainable Seas equipment, and we have every reason to believe that there will be direct conservation benefits from what is found and long-term economic benefits for those fishing men and women working for sustainable fisheries. 

Zeke Grader is the Executive Director of the Pacific Coast Federation of Fishermen's Associations.

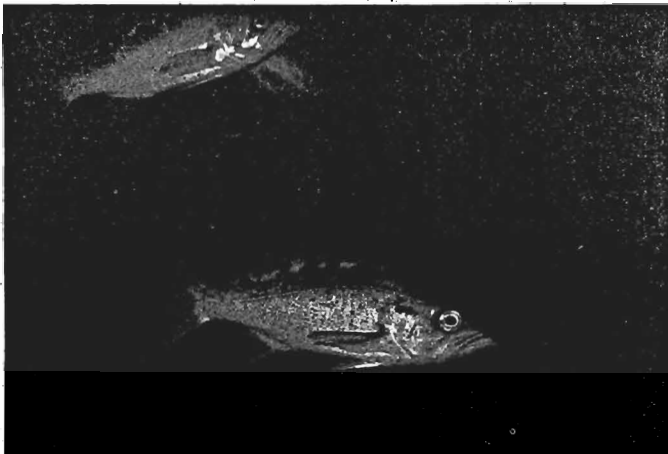



photo by Tony Chess

Yellowtail rockfish eye the photographer.

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By studying rockfishes, scientists are better able to manage populations on the Bank. These rockfish are an integral part of the food web, with the young being important prey for seabird and salmon. Both juveniles and adults are food for marine mammals as well as humans. Many commercial fisherfolk earn their living by fishing on Cordell Bank. Recreational sportfishers relax and take in the beauty of the area, when not seasick, while catching rockfish for dinner. With information gathered about rockfish, scientists can determine the effect of fishing pressure, pollution, El Niño, and other conditions that could destroy the fabric of life here. With a little effort from all parties involved, we can preserve this precious resource for future generations. 

Tom Laidig is a fisheries biologist for the National Marine Fisheries Service in Tiburon who has studied rockfish for 15 years. As a pilot of Deep Worker he will be looking at the distribution and abundance of the adult and juvenile rockfish in both the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries.

Outdoor Adventures in Cordell Bank National Marine Sanctuary

If you are interested in marine mammals, sportfishing, or seabirds, a trip to Cordell Bank National Marine Sanctuary is the thing for you. Most trips are ten hours in duration, range in price from \$60-\$90, and may be very bumpy. The rewards are tremendous, especially if you enjoy sightings of rare albatross and breaching humpbacks, or catching fish. Fall is the best time of year to visit the Sanctuary—seas are calm (at least calmer) and wild-life abounds. Here are a few organizations that can lead you on a Cordell Bank adventure:

- *Shearwater Journeys*
Bodega Bay
(831)637-8527
- *Mollymawk Offshore Adventures*
Bodega Bay
(707)762-5167
- *New Sea Angler*
Bodega Bay
(707)875-3495
- *Wil's Fishing Adventures*
Bodega Bay
(707)875-2323
- *Superfish Sportfishing Adventures*
Emeryville
(415)898-6989
- *Emeryville City Marina*
Emeryville
(800)575-9944
- *Huck Finn Sportfishing*
Half Moon Bay
(650) 726-7133
- *Salty Lady Sportfishing*
Sausalito
(650)348-2107



HYDROSPHERE

Newsletter of the Farallones Marine Sanctuary Association
about the Gulf of the Farallones and Cordell Bank
National Marine Sanctuaries



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Aquanauts Pilot a New Age of Exploration on Cordell Bank

by Dan Howard
introduction by Karina Racz

Sixty miles northwest of San Francisco lies a mysterious underwater island awaiting our exploration and delayed appreciation for the wonders it holds. Spanning 9 miles in length and 4.5 miles across, this unique piece of the ocean floor rises from a plain of sand and mud. Its pinnacles stretch to within 115 feet of the surface as sunlight streams down through the cobalt water, giving light and life to the millions of organisms that vie for space on its rocky spires. Like a bejeweled crown perched on the edge of the abyss, a secret spot for congregating whales...this anomaly of the Pacific has long been beyond our range of observation and study. Designated as a National Marine Sanctuary in 1989, Cordell Bank celebrates its tenth anniversary this year, while few people even know it exists.

When the DeepWorker 2000 submarine is launched over the side of the NOAA research vessel McARTHUR this April, we will enter a new phase of exploration and discovery on Cordell Bank. Armed with sonar, voice recorders, video and still cameras to characterize the Bank, a new team of explorers will descend to document and reveal territory



photo by Cordell Bank Expeditions

Rockfish hover above an invertebrate-covered pinnacle on Cordell Bank.

first discovered by George Davidson 146 years ago.

In October of 1853, armed with only a leadline and a seaman's knowledge, Davidson, of the US Coastal Survey, discovered this rocky outcrop when he was returning from a mapping expedition to the north. Figuring he was somewhere near the outer edge of the continental shelf, he dropped the leadline overboard to check his depth. Expecting to pay out nearly 400 feet of line, the line went slack at 180 feet, and Davidson correctly assumed he had located some kind of a rise or offshore bank. This information sat dormant for 16 years until new reports of a shoal west of Point Reyes started to roll into the Coastal Survey office. These reports instigated the first organized effort to characterize the bank. In 1869 Edward Cordell, under the direction of Davidson, was sent to investigate the reports. After several attempts, Cordell located the high spot and surveyed the four by nine mile underwater island. The rocky bank was named after Cordell, with Davidson's grudging concession, after Cordell's accidental death in San Francisco.

For decades after its initial discovery, Cordell Bank served as a navigational aid for mariners entering San Francisco Bay from the north. Remote surveys and other activities at Cordell Bank continued intermittently through the late 1800s and 1900s providing pieces to this ecological puzzle. Commercial fishing activity beginning in the late 1800s provided a glimpse of the biological richness at Cordell Bank. Additional mapping of the seafloor continued to improve the resolution imaging of the Bank's rugged bottom, and geologic samples of the granitic bedrock in the 1940s allowed scientists to characterize and describe the Bank's geologic history. In spite of these investigations through the years, the spectacular beauty and productivity of the Bank have remained essentially unknown, mysterious and hidden from view by its

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