

Duxbury Reef Tagging Study

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Background

The main goal of this project was to measure relative abundance, size and movement of nearshore fishes caught by anglers in a heavily fished area located north of San Francisco called Duxbury reef.

This study is unique in the level of participation of about 200 anglers, all of whom volunteered to help catch, tag and release fish. The participation of these anglers was essential for data collection; and as importantly, it also gave scientists an opportunity to demonstrate fisheries science directly to this key "stakeholder" group.

Project

In 2005-06, skippers of commercial passenger vessels from San Francisco Bay took scientists and anglers to Duxbury reef 39 times. Boats left the Clipper Yacht Harbor in Sausalito at 6 a.m., steamed to the study site about two hours away and then drifted across different fish habitats – kelp, rock, sand – while anglers fished. On any given boat trip, there were about 15 anglers, who were typically directed to fish for six hours each trip. Most of the anglers were highly experienced with rod-and-reel fishing, the technique used throughout the study to catch fish.

For every fish caught, the protocol was to identify its species, measure its length and (when possible) record its gender. For certain target species – all rockfishes, lingcod, greenling and cabezon – fish were also tagged with an external T-bar anchor before being released.

Fishers have since been enlisted to provide information on when and where tagged fish have been recaptured. This component of the project is ongoing.

Catch Statistics

In 2005, anglers went on 31 trips and caught 5,573 fish, representing 21 species. The most commonly caught species was black rockfish (accounting for 65.6 percent of the total); followed by lingcod (7.5 percent), brown rockfish (6.9 percent), blue rockfish (4.6 percent) and canary rockfish (3.7 percent).

In 2006, anglers went on 8 trips and caught 2,253 fish, representing 18 species. The most commonly caught species were black rockfish (21.4 percent); followed by canary rockfish (14.9 percent), brown rockfish (8.7 percent) and lingcod (5.0 percent).

A surprisingly high number of canary rockfish, representing one or two strong year-classes, were observed both years of the study. This is noteworthy because the canary rockfish is one of the species that has led to groundfish closures in federally managed shelf waters. Its presence at the reef is indicative of the reef's productivity.

Tagging & Recapture Data

During the two-year study, 6,925 fish were tagged and released. To date, 236 fish (3.4 percent) have been recaptured and reported. These data suggest that the vast majority of fish show strong site fidelity. Eighty-one percent of fish were recaptured less than 1 nautical mile from where they were released. Ninety-five percent were recaptured within 5 nautical miles of their release. Lingcod showed particularly strong site fidelity, as fully 90 percent of this species was recaptured within a half nautical mile of release.

Length data

Measurements of fish length, grouped according to species, suggest that most of the fish caught were immature. Except for gopher rockfish and cabezon, average fish lengths were no more than 3 centimeters greater than "the length at 50 percent maturity" – the length at which half of all fish of a given species reach sexual maturity.

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For black rockfish, the most commonly caught species, 97 percent were determined to be sexually immature, based on their small size and also on inspections of gonadal development.

Conclusions

- Based on catch statistics, Duxbury reef appears to be a very productive area for nearshore rockfishes and other species of management concern such as lingcod.
- Based on tagging studies, fishes caught at Duxbury reef show strong site fidelity. That is, they do not appear to move great distances from “home.”
- Based on length data and gonadal inspections, most fishes caught at Duxbury reef are sexually immature.
- Fishes caught at Duxbury reef are smaller today than they were in the 1980s. This decline in average size occurred between the 1980s and 1995 and was likely due to heavy fishing. Fish sizes have been relatively unchanged since 1995. These statements are based on comparisons of current length data with skipper logbook records and published fishery data.
- Charter boat skippers report that catch rates have been relatively unchanged since 1995. The length and catch data together suggest that fishing levels now may be in equilibrium with population sizes and age structures of fished species.

Collaborators

Pacific States Marine Fisheries Commission, which provided \$100,000 to charter party boats.

Kate Wing of the Natural Resources Defense Council for valuable feedback on the study.

Ben Sleeter and Dan Wolford of the Coastside Fishing Club. Most of the anglers who participated in the project were recruited through the club's Website.

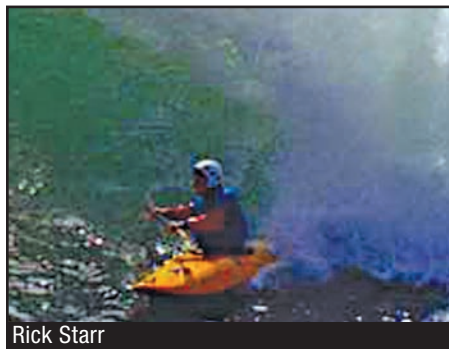
Bill Shelton provided an experimental device known as the Shelton Fish Descender, which helps relieve barotraumas in fish brought up from depth. The device was used to help fish re-descend after release.

Students

Kristen Green, Moss Landing Marine Laboratories

For More Information

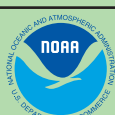
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