



Photo: private fishing boats, Trinidad, CA; DFW



MAPPING CATCH RATES FROM THE NORTH COAST CALIFORNIA RECREATIONAL FISHERIES SURVEY

The California Department of Fish and Wildlife's (DFW) [California Recreational Fisheries Survey](#) (CRFS)—private and rental boat survey data—are summarized by yearly catch per unit angler (CPUA) of common rocky reef associated bottom fishes (Table 1) within standard one minute of latitude by one minute of longitude reporting blocks. **These summaries are available as geographic information system (GIS) maps, which illustrate yearly recreational fishing catch rates between 2006 and 2015 at relatively high spatial resolution.** Statewide results of this mapping project are published on [MarineBIOS](#), a DFW hosted interactive web map with a variety of marine spatial planning map layers. In addition to private and rental boats, CRFS also collects data for three other modes of fishing, including commercial passenger fishing vessels (partyboats), beach and bank fishing, as well as fishing from artificial structures such as piers and jetties. While catch rates for those other modes of fishing are not presented in this map series, regional scale details of those fishing modes are found at www.RecFIN.org.

CRFS operates statewide, year-round to collect fishery-dependent data on California's marine recreational finfish fisheries in order to accurately estimate the total catch and effort in monthly intervals spatially

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distributed across six regional districts selected to meet management objectives. While the primary objective of the survey's sample design is intended for estimating the entire catch and effort for different modes over large geographic areas covering the entire state via a statistical expansion model, the raw sample data lend themselves to mapping sampled catch rates at much higher spatial resolution for years after 2005. This project presents mapping results for CPUA from private and rental boats from 2006–2015 within the North Coast MPA region, which encompasses California's jurisdictional ocean waters (0-3 nautical miles [nm] from shore, including offshore rocks) from the California-Oregon border south to Alder Creek near Point Arena in Mendocino County.



Photo: black rockfish; DFW

TABLE 1. North coast sportfish¹ species aggregates

SPECIES GROUP	INCLUDED SPECIES
CABEZON	Cabazon
GREENLING	Greenling genus, kelp greenling, painted greenling, rock greenling
LINGCOD	Lingcod
ROCKFISH	Black-and-yellow rockfish, black rockfish, blue rockfish, bocaccio, brown rockfish, calico rockfish, canary rockfish, chilipepper, China rockfish, copper rockfish, cowcod, flag rockfish, gopher rockfish, grass rockfish, greenspotted rockfish, olive rockfish, quillback rockfish, rosethorn rockfish, rosy rockfish, starry rockfish, stripetail rockfish, tiger rockfish, vermilion rockfish, widow rockfish, yelloweye rockfish, yellowtail rockfish



Photo: cabezon; DFW

¹ These species are a commonly encountered subset of the larger “bottomfish” group defined below

METHODS

For this report, all catch of these species (Table 1) are summed by year and attributed to the locations recorded during the CRFS dockside interview of anglers. CRFS effort data are categorized into predetermined “trip-types” by grouping certain angler reported targeted species together. All of the aggregated species in this analysis are classified as “bottomfish” trip-type so the number of anglers targeting bottomfish in each block by year is determined.

CPUA is a simple calculation of the number of fish caught divided by the number of anglers targeting bottomfish within a particular one minute of latitude by one minute of longitude block in a given period. Blocks where fewer than four anglers fished in that year are filtered from the map layers to remove outliers where catch rates would be calculated on small sample sizes at uncommon fishing locations.

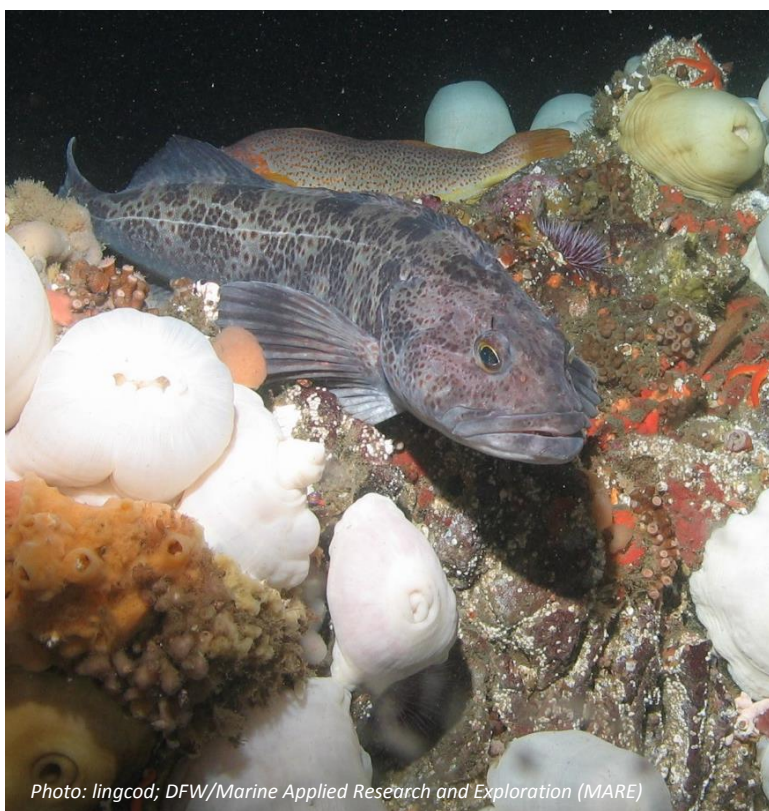


Photo: lingcod; DFW/Marine Applied Research and Exploration (MARE)

What are bottomfish?

- All species listed in the Pacific Fishery Management Council Pacific Coast [Groundfish Fishery Management Plan](#) except leopard shark, California skate, sand sole, and starry flounder;
- All species listed in the [California Nearshore Fishery Management Plan](#); and
- Unidentified bottomfish or groundfish, including blacksmith, black croaker, white seabass, other flounders, sea chubs, groupers, grunts, Pacific halibut, sea basses (except spotted sand bass), kelpfishes, sculpins, wrasses, ocean whitefish, some surfperches (black, kelp, pink, rainbow, reef, sharpnose, and striped,) and other flatfish and sharks found in the nearshore over hard bottoms and offshore.

RESULTS

In the North Coast, the geographic extent of effort is distributed among several distinct areas we might consider “hot spots.” These hot spots are generally near ports such as Crescent City (Figure 1), areas just north and south of Humboldt Bay, and the Mendocino County coastline from Ten Mile River to Mills Creek. The distribution of fishing locations along the Lost Coast (a rugged, mostly isolated stretch of coastline) and areas to the north appear to remain relatively consistent year to year, while in areas south of the Lost Coast the spatial distribution of fishing appears to shift more between the pre- and post-MPA implementation periods. Because North Coast MPAs were implemented December 19, 2012, years sampled for post MPA implementation are 2013–2015 whereas years sampled for pre-MPA implementation are 2006–2012. Within each of these differing areas, there is some year-to-year variability of catch rate at select sites. The overall North Coast region-wide median CUPA for all blocks across all years (2006–2015) is 4.7, with a range of 6.1 in 2006 to 4.5 in 2008 (Figure 2). This rate is comparatively high relative to catch rates in other

regions. For comparison, the South Coast median rate over the same period is 0.9, the Central Coast is 3.6, and the North Central Coast is 6.0.

These regional catch rate trends tell us about the fishing success in aggregate over a broad area and suggest that, **when compared to other regions, North Coast catch efficiency is rather high where fishing occurred.** Nonetheless, regional aggregate rates do not detail how areas within the region are changing over time with respect to MPAs or other local scale influences in a given area, or how fishing success may shift spatially within the broader area. Linking such cause and effect is beyond the scope of this work, but these maps do provide a good summary of where and when particular fishing “hot spots” might exist. Changes in these areas are visible in map data when comparing year to year.

To investigate questions regarding change over larger local scales, access these maps at [MarineBIOS](#), and visualize the catch rates statewide. In the application, simply search the 'Add Data: BIOS' tool using the keyword "CRFS" to find this project.

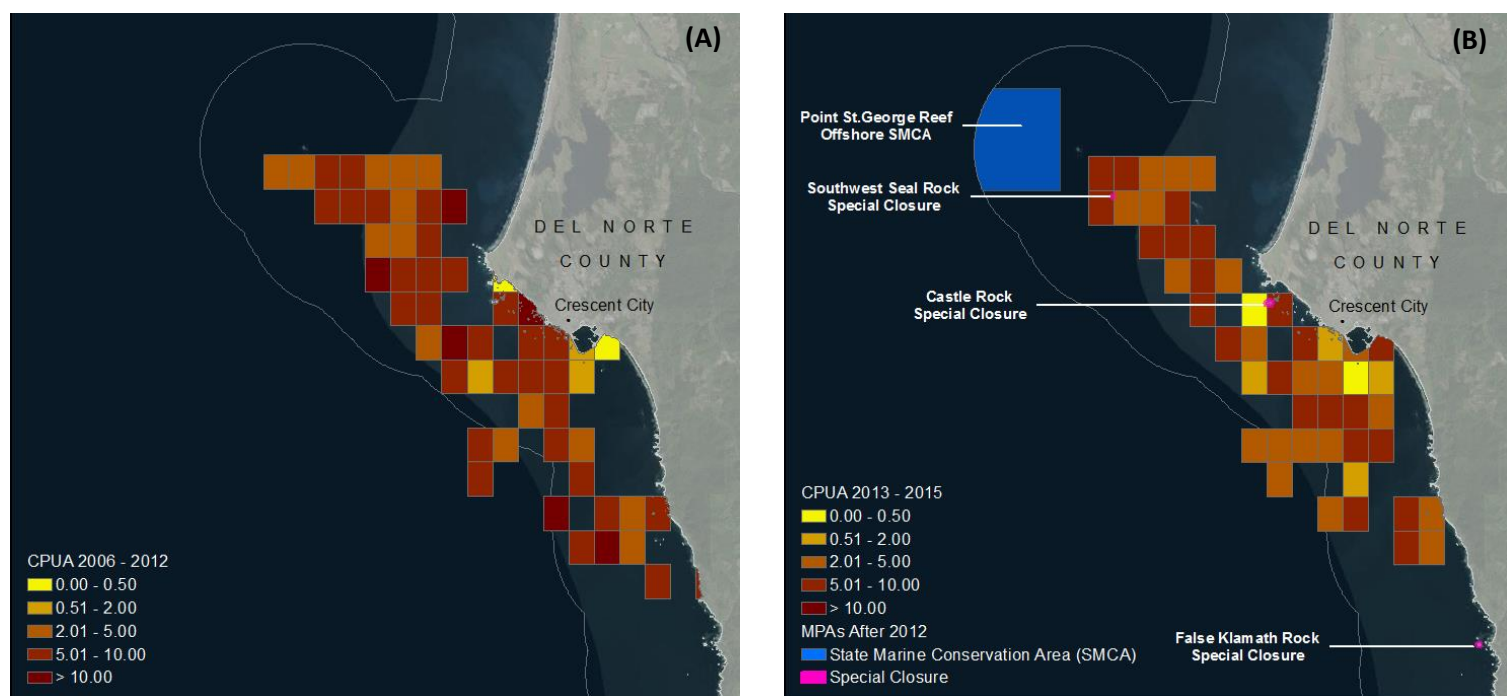


Figure 1. Recreational catch per unit angler (CPUA) rates for popular rocky reef associated bottom fishes in the Crescent City area for **A)** pre-marine protected area (MPA) implementation, 2006–2012; and **B)** post-MPA implementation, 2013–2015; North Coast MPAs were implemented on December 19, 2012.

This supplemental report focuses on the Northern California coast while the statewide mapping project covers the entire California coast. For map data in the central coast to the U.S./Mexico border, species groupings for California sheephead, scorpionfish, and kelp bass are included in the aggregate summary of “common rocky reef associated bottom fishes”. Species listed on Table 1 are only those sampled and found within the RecFIN database for the north coast from 2006 to 2015.

Access these maps at [MarineBIOS](#), and visualize the catch rates statewide.

1. Click on the “Select from List” bar at the top of the page.
2. Select the “Add Data: BIOS” tool from the list
3. In the search bar type the keyword “CRFS”
4. Double click to add the search results to the map (single click for metadata)
5. Use the “Layers” tab on the left side of the screen to add additional information

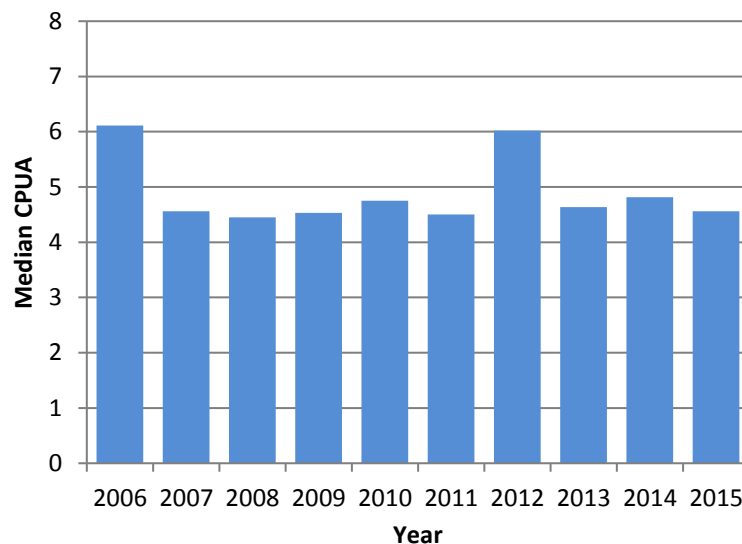
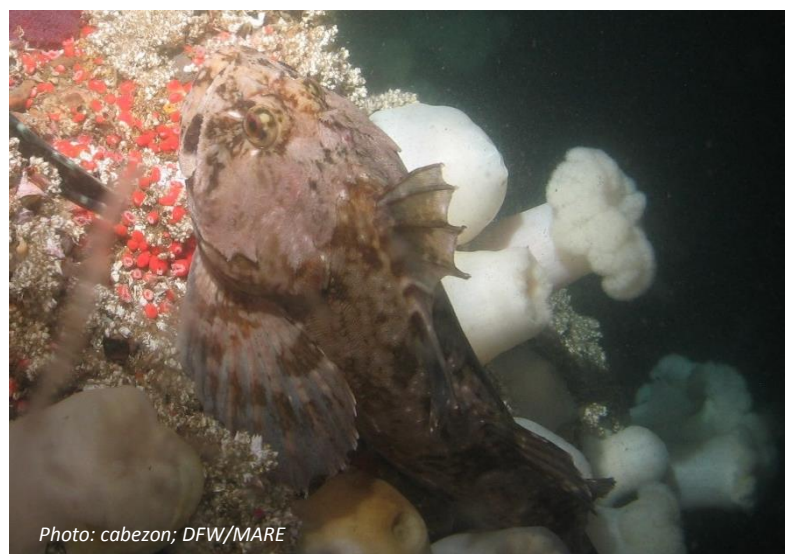


Figure 2. North Coast- yearly, median catch per unit angler (CPUA) rates.



Acknowledgements

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About this Document

This document provides supplemental information to the North Coast State of the Region report. The State of the Region report provides a synopsis of the ecological, biological, oceanographic, and socioeconomic conditions in the North Coast MPA region near the time of MPA implementation in December 2012.

Explore California's MPAs at CDFW's MPA webpage
<https://www.wildlife.ca.gov/Conservation/Marine/MPAs>