



# Ecological Insights and Fish Population Trends from the California Collaborative Fisheries Research Program

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## Objectives

1. Conduct scientifically sound research to better inform resource managers
2. Collaborate with local fishing communities to collect data about nearshore fish assemblages
3. Provide rigorous baseline and monitoring data for the evaluation of marine protected area (MPA) performance
4. Better understand nearshore fish stocks and ecosystems
5. Educate the general public about marine fisheries, conservation, stewardship and research
6. Test data-poor fishery models that use differences between MPA and reference (REF) sites to set fisheries control rules

## Methods

From 2007 to 2013, CCFRP scientists worked with volunteer anglers to collect fisheries-independent data onboard charter boats off of central California (Photos 1 through 4). To gather information on species compositions, lengths, and catch rates of nearshore fishes in and around local MPAs, we have:

- Conducted **244 days** of standardized hook-and-line surveys
- Utilized over 6,813 volunteer hours from **717 different anglers**
- Worked aboard 12 fishing vessels with **20 different skippers**
- Caught and released **46,855 fishes**, of which 33,418 were tagged
- Collected data from **48 species**



**Photo 1.** Science crew and volunteer angler with a Vermilion Rockfish caught offshore from Año Nuevo.



**Photo 2.** Devices used to descend fish with barotrauma: 1. Weighted crate, 2. SeaQualizer - releases fish at a set depth.



**Photo 3.** Science crew tagging an Olive Rockfish and recording the species, length, physical condition, and the latitude and longitude of where the fish was caught. Inset: Tagged Canary Rockfish.



**Photo 4.** Volunteer angler using standardized fishing gear to catch nearshore species at Point Lobos.

## Acknowledgements

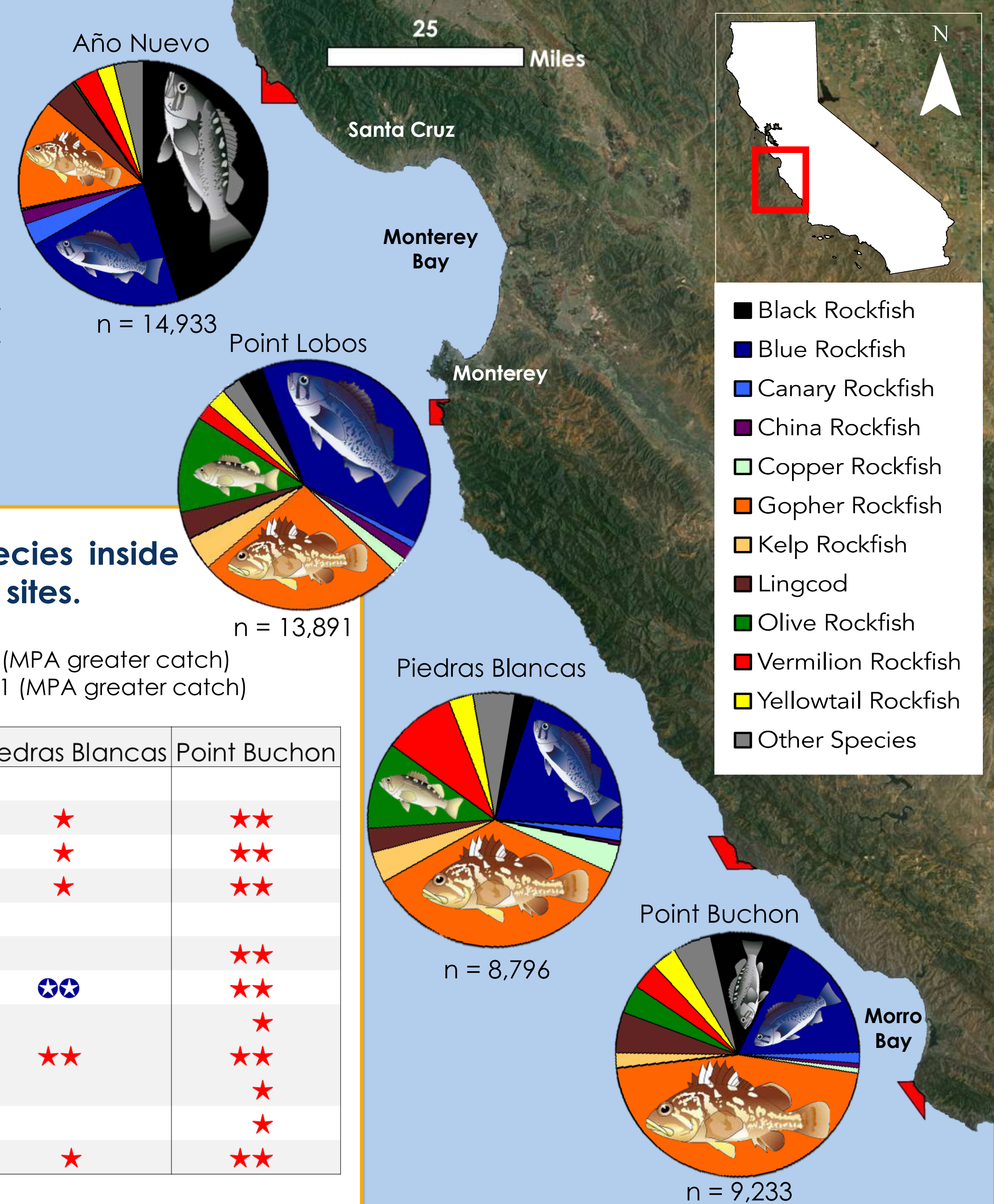
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## Results & Conclusions

2007-2013

### Species compositions differed among central California MPAs.

- Greater than 50% of the catch at Año Nuevo was comprised of Black and Blue Rockfish.
- Greater than 50% of the catch at Point Lobos, Piedras Blancas, and Point Buchon was comprised of Blue and Gopher Rockfish.

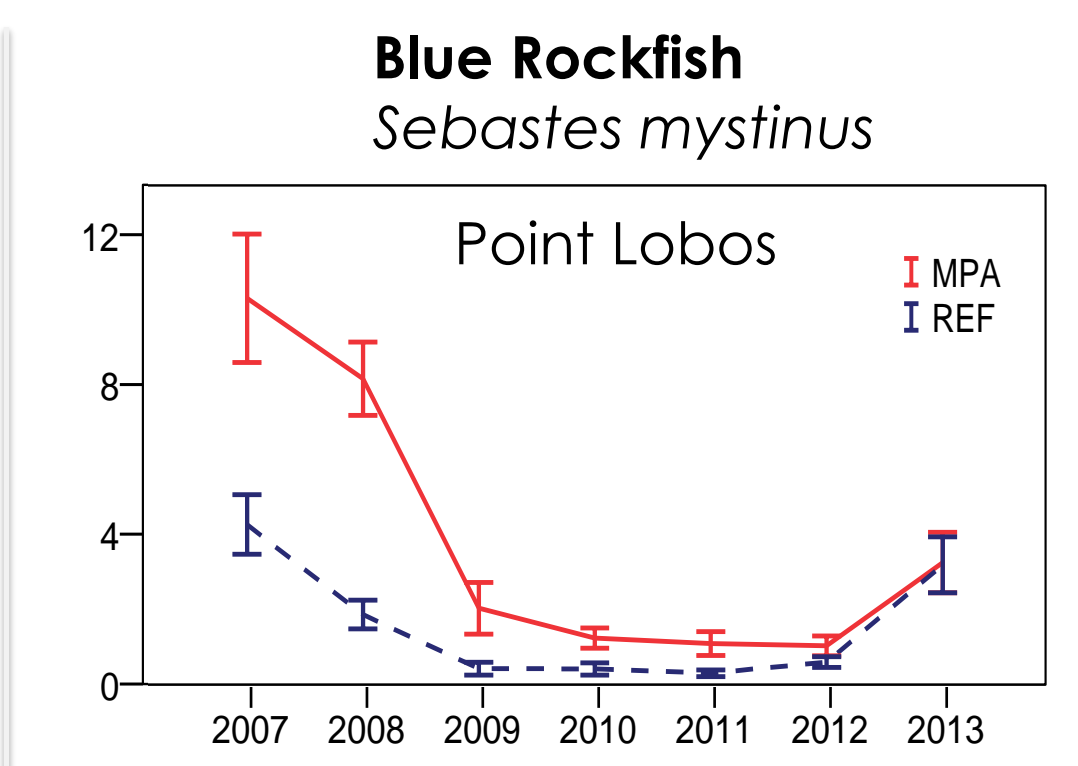
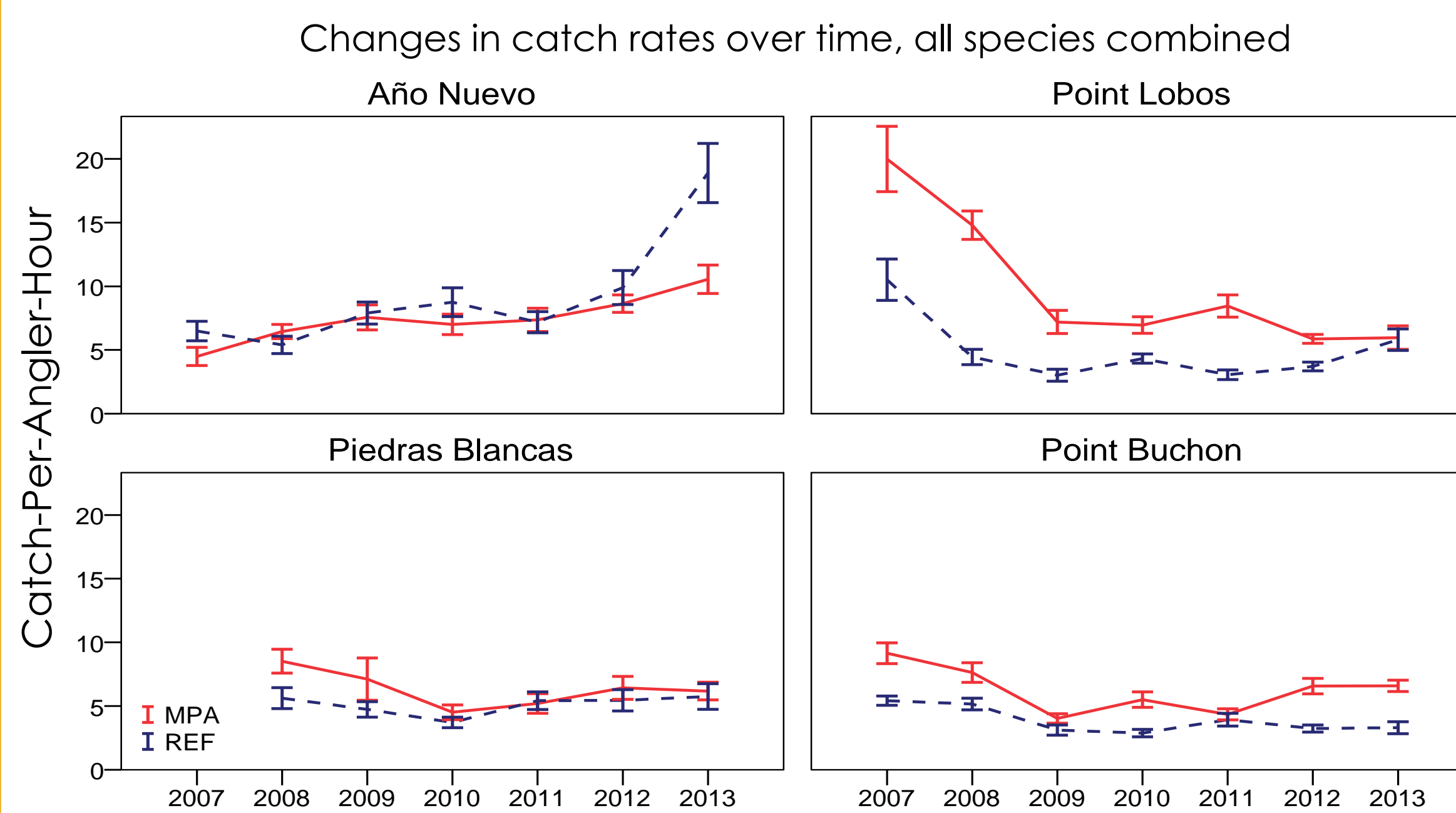


### Catch was higher for many species inside MPAs as compared to reference sites.

- ⊕ p < 0.05 (REF greater catch)    ★ p < 0.05 (MPA greater catch)
- ⊕⊕ p < 0.001 (REF greater catch)    ★★ p < 0.001 (MPA greater catch)

Species	Año Nuevo	Point Lobos	Piedras Blancas	Point Buchon
Black Rockfish	⊕⊕			
Blue Rockfish		★★	★	★★
Canary Rockfish			★	★★
China Rockfish	★	★★	★	★★
Copper Rockfish	★★	★★		★★
Gopher Rockfish	★★	★★		★★
Kelp Rockfish			⊕⊕	★★
Lingcod	★★	★		★
Olive Rockfish		★★	★★	★★
Vermilion Rockfish	★★	★★		★
Yellowtail Rockfish	★			★
All Species	⊕	★★	★	★★

### Relationships of catch rates inside & outside MPAs are used to determine whether there are MPA effects as well as changes in oceanographic conditions in the region.



Because the decrease in relative abundance inside and outside the MPA track each other, we can hypothesize that overall environmental conditions (e.g. food availability) influenced Blue Rockfish in the region of Point Lobos.

### A larger proportion of mature Blue, Copper, Olive, & Vermilion Rockfish as well as Lingcod were caught inside MPAs



A wooden v-board is used to measure all fishes to the nearest centimeter.

