

# Changes in fish abundances in marine reserves in central California from 2007 - 2015

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## Objectives

1. Partner with resource agencies to provide relevant management data about California's nearshore groundfish species
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. In collaboration with local fishers and The Nature Conservancy, apply data poor fisheries models to test whether regional management is feasible using data collected at a regional scale

## Methods

From 2007 to 2015, 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 **392 days** of standardized hook-and-line surveys
- Utilized over 8500 volunteer hours from **833 different anglers**
- Worked aboard 13 fishing vessels with **25 different skippers**
- Caught and released **64,163 fishes**, of which 38,234 were tagged
- Collected data from **51 species**



**Photo 1.** Science crew and volunteer angler with a Lingcod caught offshore from Point Buchon.



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



**Photo 3.** Tagging fishes: A. science crew tagging an Olive Rockfish and recording the species, length, physical condition, and the latitude and longitude of where the fish was caught B. tagged Canary Rockfish.



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

## Acknowledgements

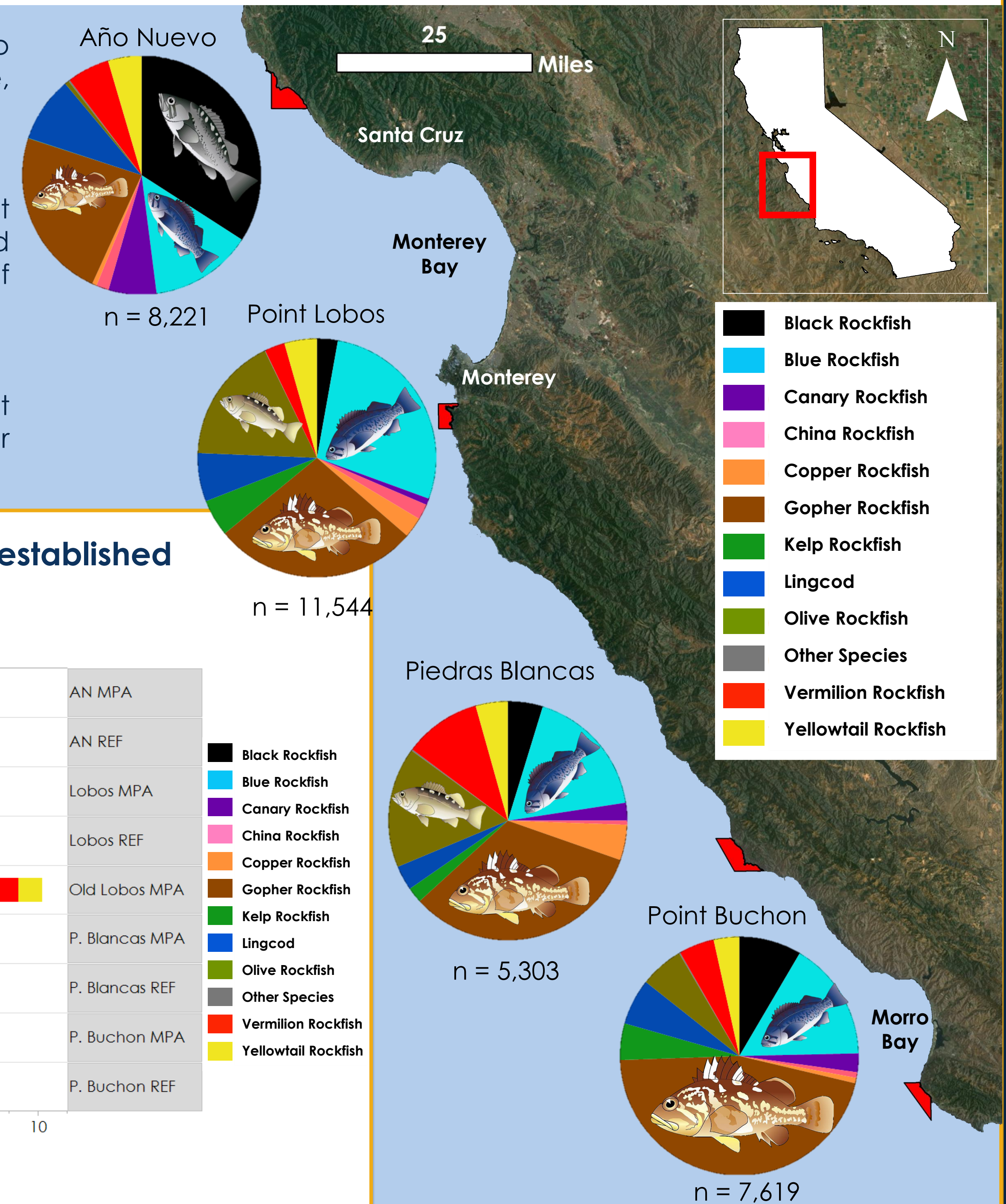
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## Results & Conclusions

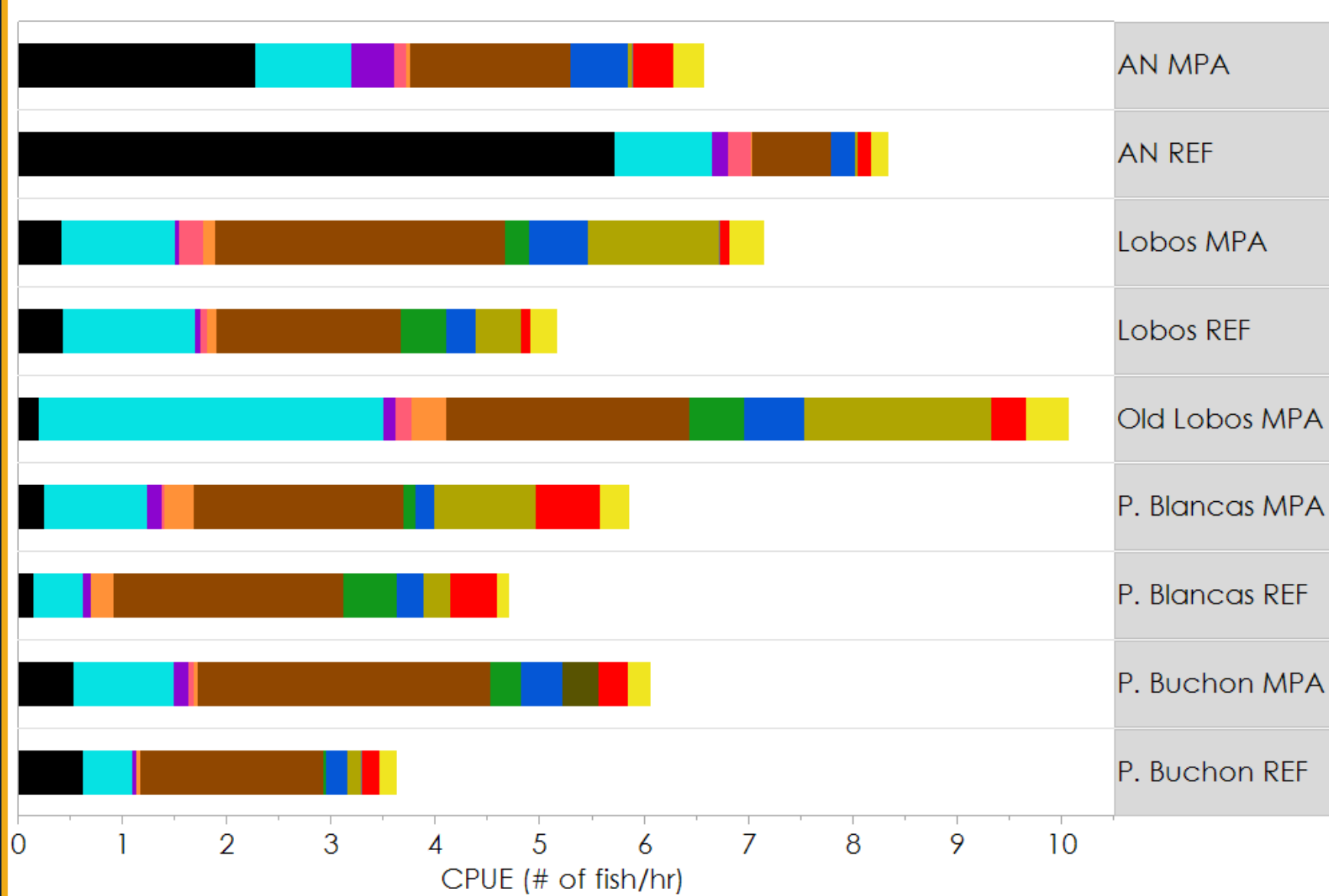
2007-2015

### Species compositions differed among central California MPAs.

- Greater than 70% of the catch at Año Nuevo was comprised of Black, Blue, and Gopher Rockfish.
- The majority of the catch at Point Lobos and Piedras Blancas (77% and 68%, respectively) was comprised of Gopher, Blue, and Olive Rockfish.
- Greater than 60% of the catch at Point Buchon was comprised of Gopher and Blue Rockfish.

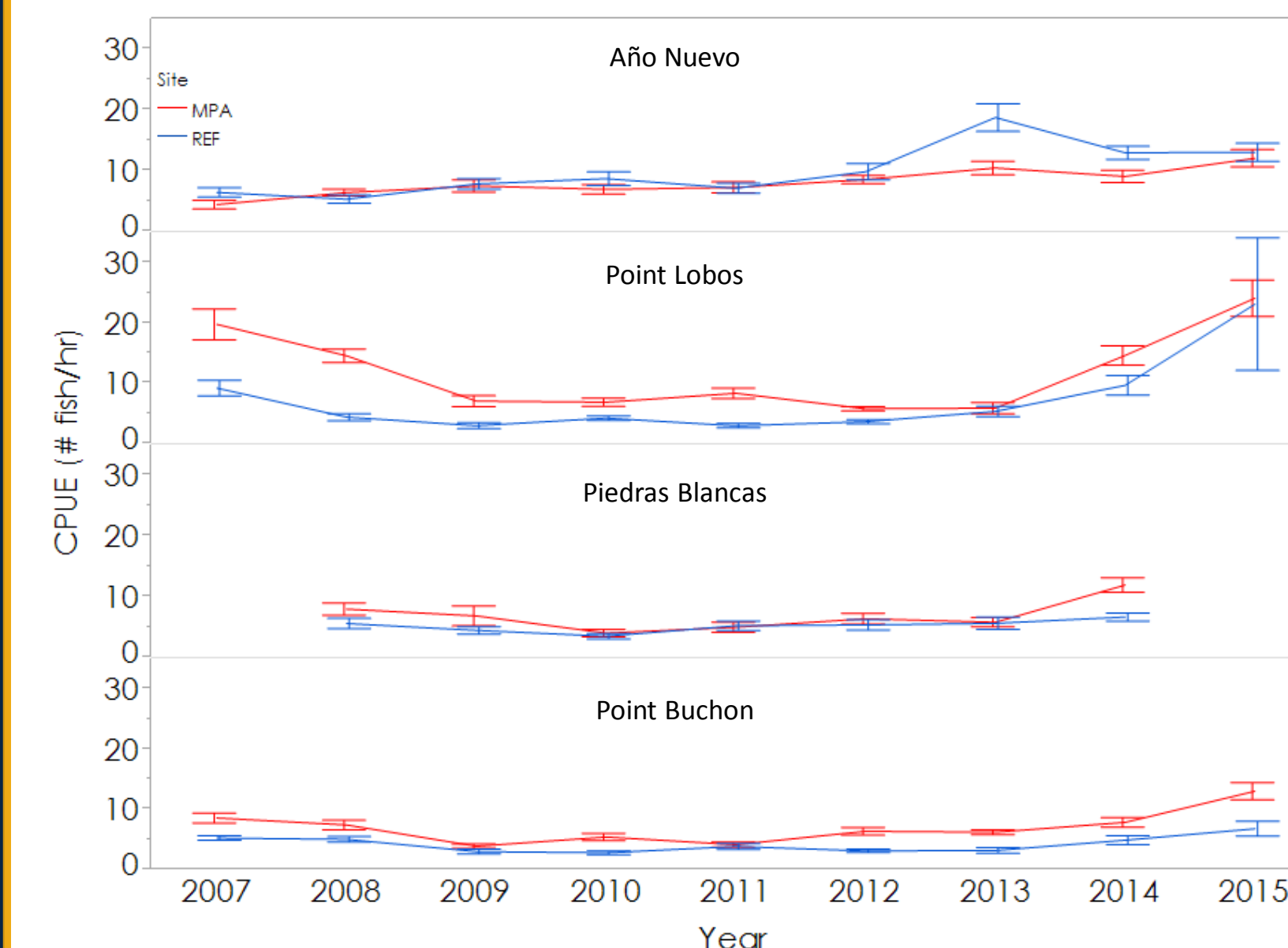


### Catch was greatest in a reserve established more than 40 years ago

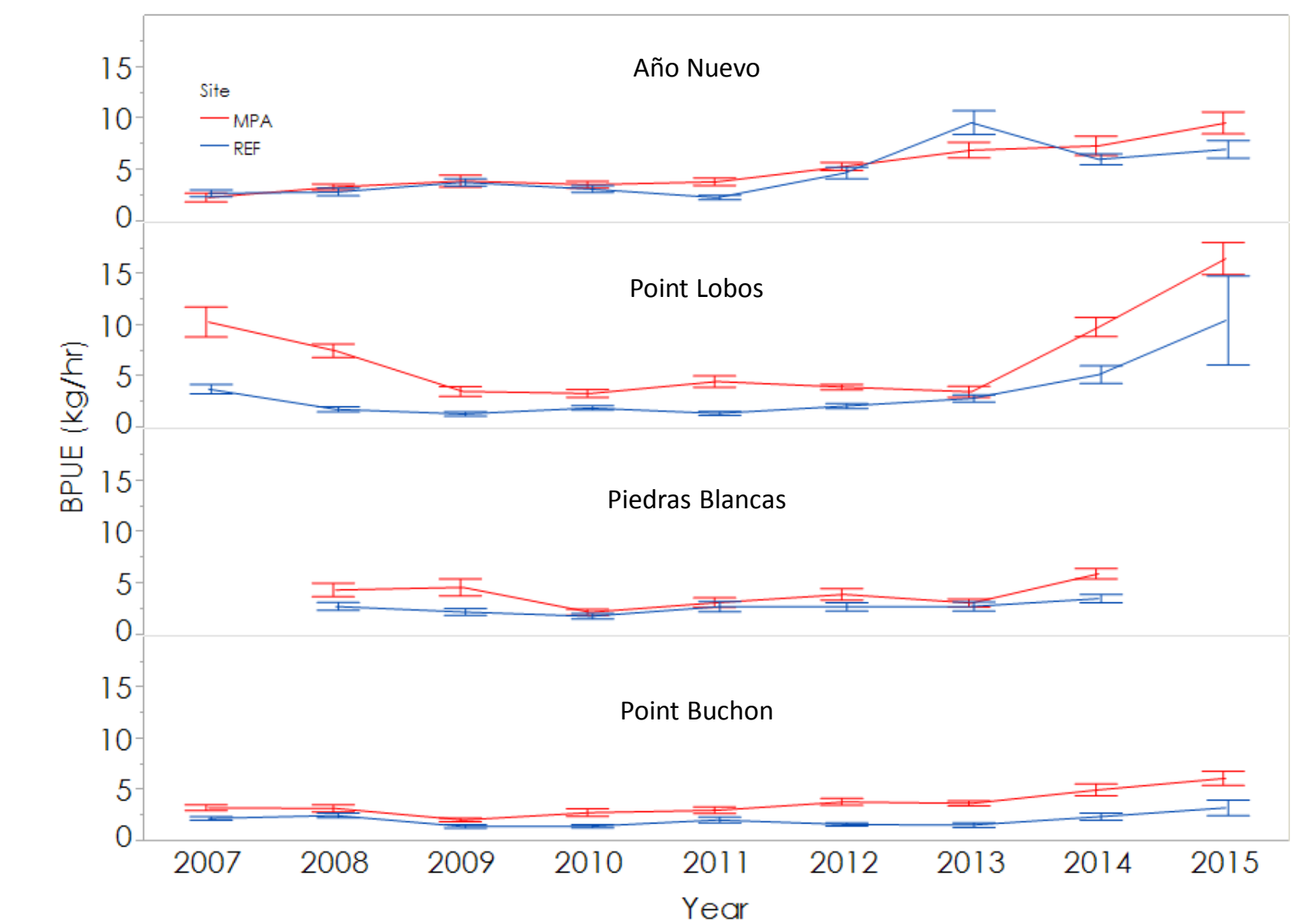


### Relationships of catch rates inside & outside MPAs are used to determine whether there are MPA effects as well as changes in oceanographic conditions in the region.

Changes in CPUE over time, all species combined



Changes in biomass per unit effort (BPUE) over time, all species



### Summary of Findings

1. Data from this collaborative project are robust enough to detect changes in CPUE and length
2. When implemented, most MPAs contained more and larger fishes than reference sites, particularly from an older reserve (est. 1973)
3. Differential responses between MPA and reference areas suggest that the performance of a single MPA should not be used as a proxy for other MPAs in the same region

### Next Steps – Regional Management

