

Seabirds Indicate Fish Abundance In California's Marine Protected Areas

Dan Robinette
drobinette@pointblue.org

Adaptive management is vital for the success of marine protected areas (MPAs) as a fish conservation tool. Effective management requires that managers establish realistic expectations for how quickly fish populations will increase within MPAs. Setting realistic timelines for population change requires an understanding of how many juvenile fish enter the populations each year.

Because seabirds consume juvenile fish, they are a potential tool for measuring juvenile fish abundance. The goal of our study was to determine what foraging seabirds could tell managers about juvenile fish abundance within MPAs. We compared seabird foraging data to independent measures of juvenile fish abundance.

Our study was developed as part of a multi-disciplinary investigation of newly established MPAs in southern California. The project included observations of seabird foraging made by Point Blue as well as kelp forest fish abundance as

measured by SCUBA divers. We made comparisons inside and outside seven MPAs within three distinct regions of southern California.

Seabird and fish distributions were similar within the three broad regions, but less similar within individual sites. Site-specific differences reflected a broader use of habitats by seabirds than what was sampled by SCUBA divers. SCUBA surveys were specific to the kelp forest habitat while seabirds sampled multiple habitats within a given MPA.

Our results show that combining studies of juvenile fish abundance with studies of seabird foraging can produce a more complete measure of juvenile fish abundance than the individual studies alone. In other words, seabird studies can provide additional information not captured by more conventional fish surveys and help resource managers better understand local patterns for communities of multiple fish species as well as individual fish species.

Main Points

- We compared an independent measure of juvenile fish abundance with a measure derived from seabird foraging.
- We found that seabird-based estimates were similar to SCUBA-based estimates at larger scales.
- Seabirds sample juvenile fish from multiple habitats within a given MPA whereas kelp forest fish surveys sample a single habitat.
- Seabird studies can provide additional information not captured by conventional fish surveys.

Robinette, D.R., J. Howar, J.T. Claisse, and J.E. Caselle. 2018. Can Nearshore Seabirds Detect Variability In Juvenile Fish Distribution At Scales Relevant to Managing Marine Protected Areas? *Marine Ecology XXX*: XXX-XXX.
doi:10.1111/maec.12485