

Focus on the Bay:

Estimating Sizes of Fish Populations: Collaboration between Fishermen, Resource Managers, and University Scientists

Rick Starr, Marine Advisor

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The California Department of Fish and Game (CDFG) develops management plans and sets catch quotas for commercial and recreational fisheries that are based on scientific information about population sizes of nearshore species. CDFG collects information from commercial and recreational fisheries (fishery dependent data), and also conducts SCUBA surveys to estimate the numbers of different species in nearshore habitats (fishery independent data). As these two different types of information are collected, however, it is important to understand what the data represent – especially how the different sampling techniques relate to one another, how they are affected by environmental variation, and how they vary in time and space.

In collaboration with commercial fishermen and UC Santa Cruz scientists, we have been conducting standardized fishing and SCUBA surveys for the past few years to get better estimates of the abundance of nearshore fish species, and to compare results of these two ways to estimate sizes of fish populations. We have also been tagging fish to study movements into and out of kelp beds to determine how migration influences population estimates.

Last July and August, we worked with commercial fishermen to catch, tag, and release more than 2000 fish in Carmel Bay. Fish were tagged with external dart tags placed near their dorsal fins. A few weeks after tagging, we worked with the fishermen to recapture tagged fish. We recaptured almost 10% of the fish we tagged. The ratio of tagged to un-tagged fish caught will allow us to estimate the number of fish in our study areas. Similarly, SCUBA surveys we completed in the study sites will also enable us to generate abundance estimates in the study areas, by applying mathematical models to diver counts of tagged and untagged fish.

In addition to estimating abundance of nearshore species, we surgically implanted a total of 37 sonic transmitters in cabezon, grass rockfish, and lingcod. We placed an array of receivers in Carmel Bay that will monitor the movements of these three important fish species to determine how much time each spends in our study area. The results of our sonic tagging will help interpret the population estimates generated from our fishing and diving studies, and help fishermen and resource managers develop management plans that provide for sustainable use of marine resources.