

How far do fish move relative to MPA boundaries? Results from acoustic tagging of fish in the Channel Islands

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Why do we care about movements of fishes?

Understanding how coastal fishes move among California's Channel Islands and across the boundaries of marine reserves is critical for understanding how well the marine reserves are achieving their conservation and management goals.

How can we tell where fish go?

We use fixed acoustic receivers, or listening stations placed along the ocean bottom, to monitor fish movement at time scales ranging from minutes to years. Beginning in the year 2000, we surgically tagged 224 fish with coded acoustic transmitters, which each emit a unique code. We tracked tagged fish with 98 acoustic receivers placed on the seafloor around several Channel Islands and the mainland coast.

We studied three fish species: We tagged California sheephead (Labridae), a species that is known to stay in one area, and kelp bass (Serranidae), a species known to move greater distances, to investigate their movements relative to the boundaries of the Anacapa State Marine Reserve (SMR). We tagged giant sea bass (Polyprionidae), which is known for its long wanderings, prior to the designation of the reserves to investigate inter-island movement and movement between the islands and the mainland.



California sheephead



kelp bass



giant sea bass

How far did fish move?

- California sheephead: Sheephead remained in the reserve. Of the 29 sheephead tagged within the reserve, 93% of their time was spent within the reserve. Six of these fish (3 males and 3 females) crossed the eastern boundary of the reserve into areas open to fishing - forays outside the reserve that lasted less than 24 hours, in most cases.
- Kelp bass: Kelp Bass showed mixed results. A total of 27 fish were recorded either exclusively, or primarily, within the Anacapa SMR. However, a total of 8 fish made permanent departures from the reserve, and 27 fish were recorded only briefly at the Island before departing for the duration of the study. Our results indicate that kelp bass only spend part of their time where they are protected in a reserve.
- Giant sea bass: Giant sea bass tagged at Anacapa Island were regularly recorded from Santa Rosa Island in the north to Catalina Island in the south, as well as Point Dume on the mainland. Despite this large recorded range, 25% of giant sea bass detections were recorded within the reserves in the northern Channel Islands, indicating that the reserves protect areas frequented by giant sea bass.