Point Blue Publication Brief

Killer whale presence leads to white shark desertion of Farallon Island feeding grounds

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Along the California Coast, white sharks and killer whales are top marine predators. These two species occasionally come into contact with one another, but these interactions mostly go unnoticed by humans.

On 4 October 1997, Point Blue Farallon Island biologists documented a pair of killer whale females that attacked and consumed a white shark, the first time this had been documented. Only two shark predations on pinnipeds were noted for the remainder of the season, a decline of 95% compared to previous years. It was a mystery, though, where the sharks went.

From 2006-2013, Point Blue collaborators at Stanford University and Monterey Bay Aquarium tagged 165 white sharks with acoustic tags at Tomales Point, Año Nuevo, and the Farallon Islands to monitor their movements along the California Coast. Combining the shark tagging data with Point Blue's long-term monitoring of wildlife at Farallon Islands National Wildlife Refuge, we were able to show that white sharks escape the islands when killer whales show up.

We found that the number of predation events by white sharks correlated with the number of northern elephant seals counted, with an average of 40 pinnipeds killed by sharks per year. However, when killer whales were within 3 km of the island, which occurred in 2009, 2011, and 2013, the number of pinnipeds killed by sharks declined by 62% compared to previous years. The tagging data confirmed that the white sharks deserted the Farallon Islands within a day of their close encounters with killer whales and redistributed themselves to other locations along the California Coast, such as Año Nuevo and Tomales Point.

The redistribution of white sharks from the Farallon Islands to other locations could increase competition with other white sharks already present at those coastal sites. Reduced food availability for white sharks may lead to poorer body condition making their annual winter migration to the central Pacific more perilous. On the other hand, the reduction of white sharks at the Farallon Islands resulted in fewer pinnipeds being depredated.

Main Points

White sharks leave the Farallon Islands when killer whales come within 3 km during the fall.

The predation rate on pinnipeds drops to near zero after killer whales occur near the islands.

White sharks redistribute themselves to mainland sites along the California Coast.

Jorgensen, S.J., S. Anderson, F. Ferretti, J.R. Tietz, T. Chapple, P. Kanive, R.W. Bradley, J. Moxley, and B.A. Block. 2019. Killer whales redistribute white shark foraging pressure on seals. Scientific Reports.

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