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White Sharks as a Novel Threat to Sea Otter Populations in California

An evolving relationship between white sharks and sea otters off the California coast has created a threat to sea otter populations that has not been witnessed historically.

SOURCE: Ecology and Evolution

By *Kimmy Schmutz* 6 April 2020

Ever since the release of *Jaws* in 1975, there has been a negative stigma surrounding sharks. Today, there are thousands of movies, books, and even entire weeks of television dedicated to sharks – many of them that still depict sharks as menacing predators. What is often overlooked in the Hollywood version of man-hunting sharks is that their diet changes through their life history. In their early life stages, sharks mainly rely on fish for food, moving towards large marine mammals when they reach maturity. During their lifespan, sharks rarely attack species outside of their age-dependent dietary tendencies. Recently, however, there has been an increase in victims of shark attacks in one particularly unlucky species: sea otters.

[*Moxley et al.*](#) report that white sharks have not historically served as a threat to sea otter populations off the California coast. Recently, however, they have become more frequent targets for shark attacks. The scientists who conducted this study wanted to determine the reason for the increasing number of attacks. Dietary need was ruled out due to sea otters lacking energy rich blubber, thus making them an ineffective prey item for consumers with such a high metabolic need. So why have shark attacks on sea otter populations begun to spike?

The researchers used various types of data in order to assess the changing relationship between sea otters and white sharks. A relationship that used to be two species coexisting in the same environment with minimal interactions had evolved into one that is aiding in the decline of the other. Long-term population and tagging studies, weekly census surveys, as well as stranding data were integrated to paint a picture of modern-day interactions between these two species. Long-term population and tagging studies were essential to understanding shark behavior because it allowed the researchers to see how their population was changing through time. These long-term perspectives also allowed the researchers to assess changes in shark migratory behavior and, ultimately, how changes in shark populations and behavior could be correlated to the recent increase in sea otter attacks.

Synthesis and analysis of the data revealed that there was a peak in incidental shark attacks on otters during their migratory period. This peak occurred when the sharks were returning from offshore habitats in late summer. The scientists also saw a correlation of incidental attacks on humans peaking in late summer using shark bite incidents (only in California) extracted from the Global Shark Attack file. It was determined that young male otters were the most impacted group demographically. This finding was attributed to males being more explorative foragers while females remain protected in kelp forests where they raise the young.

The increase in shark attacks on otters was most likely due to the growth seen in white shark populations over recent years, and in particular an increase in juvenile sharks. Juvenile sharks are still in the process of making the transition in their diet from fish to marine mammals. As they migrated inshore and encountered the otters during this transition, they appeared as a potential prey item.

This study exposes the need for improved conservation tactics for sea otters. Otters recovered from near extinction previously at the hands of humans eager for their fur. They are important to controlling sea

urchin populations which in turn protects kelp forests from being depleted. Without drastic changes, white sharks will continue to diminish otter populations to extinction which could eventually lead to an even greater trophic collapse in the California coastline ecosystem.

Citation: Moxley, JH. Nicholson, TE. Van Houtan, KS. Jorgensen, SJ. (2019), Non-trophic impacts from white sharks complicate population recovery for sea otters. *Ecology and Evolution*, 9, <https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.5209>. Published on 30 April 2019.