SMM Small Grant Research Report

Predator-prey interactions between northern elephant seals and white sharks at Isla Guadalupe, Mexico

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The objectives of this project were to 1) examine individual adult female northern elephant seal and white shark interactions around Isla Guadalupe, 2) compare the movement and dive patterns of adult female northern elephant seals arriving and departing from Isla Guadalupe to seals at other breeding colonies, and 3) document the prevalence and characteristics of white shark attacks on northern elephant seals of all age classes and sexes at Isla Guadalupe.

During the elephant seal molt season in May 2017 we instrumented six female elephant seals at Playa Norte, Isla Guadalupe. Females were sedated and tagged with Jumbo Rototags. SPLASH tags, VHF radio tags and ultrasonic acoustic tags (VEMCO Ltd.). White sharks at Isla Guadalupe have previously been tagged with VEMCO tags as part of another study. These tags transmit a subaquatic acoustical signal that is received by several moored buoys that have been previously installed in the northeastern coastal areas of the island. The tags gave us information on the presence of sharks at the time the elephant seal females arrived or departed at/from Isla Guadalupe, indicating possible interactions between both species.

During the elephant seal breeding season in January 2018, we recovered instruments from three of the six females tagged in May 2017. Two females were located at beaches where it was not possible to disembark, and another female probably died at sea. Of the three recovered satellite tags, we redeployed two of the instruments on new female seals to get information about their post-breeding foraging trip and study their arrival and departure strategies during this season.

Female northern elephant seals from Isla Guadalupe traveled to the same foraging locations as northern elephant seal females from different breeding colonies along the Baja California and California coasts. The seals exhibited similar dive types as other elephant seal females tagged at different rookeries. During their foraging trips, the seals from Isla Guadalupe initially stayed close to the California Bight and then moved to the mesopelagic zone of the Northeast Pacific Ocean where they spend months foraging before returning to Isla Guadalupe.

The two females tagged during the 2018 breeding season, traveled north to feed off the coasts of California, Oregon and Washington for a shorter duration.

We documented the first diving records of female northern elephant seals at Isla Guadalupe. Preliminary dive analyses show an interesting pattern, the island departure on the post-molt foraging trip, is characterized by extremely deep (~500-700 m) and long (~20-30 min) dives, allowing the seal to stay far from the surface and head out to open ocean. These dives likely represent a behavioral response to the presence of patrolling white sharks on the continental shelf and slope around the island. Subsequent dives are shallower and of shorter duration, performed when the female is probably out of danger, and are more characteristic of other female northern elephant seals when transiting. The return to Isla Guadalupe, after the post-molt foraging trip, is characterized by the same diving pattern (deep and long dives) exhibited on the last dives near the coast of the island. This again possibly represents a behavioral response to the presence of patrolling white sharks.

The VEMCO ultrasonic tags data recovered from the buoy station located at the northeast of the bay detected three seals in a short time window (May 8, 19 and 22, 2017), but no white sharks were detected during that month. A white shark was detected on April 14th and September 2017. Other seals were detected departing the island on May 4, 5, 11 and 13 by buoy stations located at other north central beaches of the bay and none were detected at the southern beach. No white sharks were detected in the area.

At Playa Sur, 4.6 % of all females censused (n= 174) and no other age/sex class individuals presented white shark wounds. At Playa Norte, 0.62 % of females (n= 161) and 12.5% of all adult males (n=8) presented white shark wounds.

The results of this research represent a part of the doctoral dissertation of a student from the University of California Santa Cruz and a master's thesis of a student from Centro Interdisciplinario de Alimentacion y Desarrollo (CIAD), Guaymas, Mexico. Research findings will also be published in scientific journals and presented at the Society for Marine Mammals Biennial Conference.

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