

SOUTHWEST FISHERIES SCIENCE CENTER
FIRST QUARTER REPORT - FY 2005
For the Period October 1 – December 31

Submitted by: Roger Hewitt, Division Director, Fisheries Resources Division

Title of accomplishment or milestone: NOAA Ocean Explorations: Large Pelagic Sharks of the Eastern Tropical Pacific

Current status: The cruise was completed on October 14th, and analysis of the data collected is ongoing.

Background information: Despite an increasing dependency of Pacific Rim countries on shark fisheries, we know very little about pelagic sharks and the tropical ecosystems that support them. The recently documented collapse of shark populations in the North Atlantic, despite a Fisheries Management Plan for Sharks in place there since 1993 makes it imperative that we learn more about these predators and their associations in the Pacific.

Apex predators of the Eastern Tropical Pacific (ETP) have long been of national and international diplomatic interest due to the directed harvest of tunas and billfishes, and the incidental take of marine mammals, seabirds and turtles. Although ETP fisheries occur outside United States waters, U.S. fishers are bound by the provisions of the Marine Mammal Protection Act, and by the provisions of the Inter-American Tropical Tuna Commission (IATTC). NOAA Fisheries has expended enormous personnel resources and ship time in efforts to study the ecosystem of the ETP and the interactions of marine mammals and tunas. However, almost nothing is known about the biology of large pelagic sharks and their role as a third group of apex predators in the ETP.

Purpose of Activity: The objectives of the cruise were to investigate the role of pelagic sharks as apex predators of the ETP: their species composition, life-history, movement patterns, food habits, physical environment and biotic environment. This was accomplished primarily by catch-and-release longline sampling, and through electronic tagging studies to determine diel vertical movements and long-term horizontal movement patterns. Additional objectives were to correlate the movement patterns of the sharks with regard to large-scale oceanographic and bathymetric features, and to obtain and archive DNA and tissue samples.

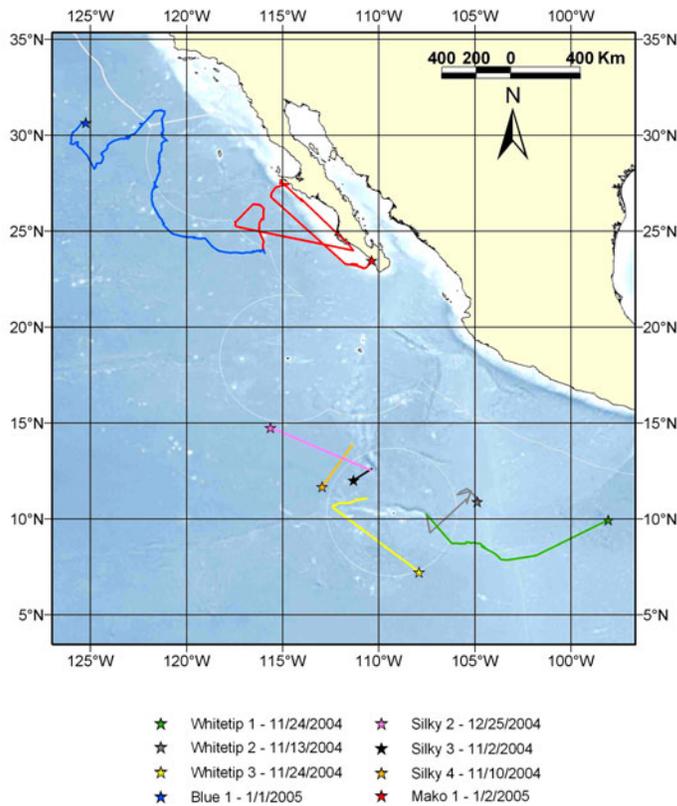


Figure 1. Map of the eastern tropical Pacific showing the satellite tracks of eight tagged sharks.

Description of accomplishment and significant results: The ETP shark cruise aboard the *R/V David Starr Jordan* returned to port after covering 4,100 miles. A total of 27 sharks of 5 species (silky, mako, blue, pelagic thresher, and ocean white-tip) were captured via longline during 18,214 hook hours. Nine sharks total were tagged with electronic tags: three sharks were equipped with Pop-off Archival Tags (PAT tags), two were equipped with Smart Position and Temperature Transmitting tags (SPOT tags), and four sharks were fitted with both tag types. Of the nine tagged sharks, eight successfully transmitted to the Argos satellites, and as of December 27th, three are still active (Fig 1). Off the EEZ of Baja there was a faunal shift from silky, ocean white-tips, and pelagic threshers to mako and blue sharks

at the transition zone between the tropics and the warm temperate zone.

In addition to the tagging work, 17 sharks were injected with oxytetracycline for ageing studies. Thirty-eight DNA samples were collected from sharks, billfish, tuna, and dorado. The dorado DNA samples were sent to colleagues in Mexico. Several Clipperton groupers and a pelagic thresher shark were brought back for colleagues at Scripps Institution of Oceanography (SIO), and other samples were donated to their fish collection. Live fish were collected for the Stephen Birch Aquarium, and shark tissue samples were collected for the frozen zoo at the Center for the Reproduction of Endangered Species (CRES).

Significance of accomplishment: In other regions oceanic white-tip shark populations have declined precipitously. The low encounter rates during this survey indicate that the same may be true in the ETP. Further surveys should be conducted in order to monitor these resources before it's too late. This is the first study in the ETP to deploy fin-mounted tags on ocean white-tips and we hope to gain vital information on their behaviors and migration patterns in this region over the coming months (Fig. 2a, b).

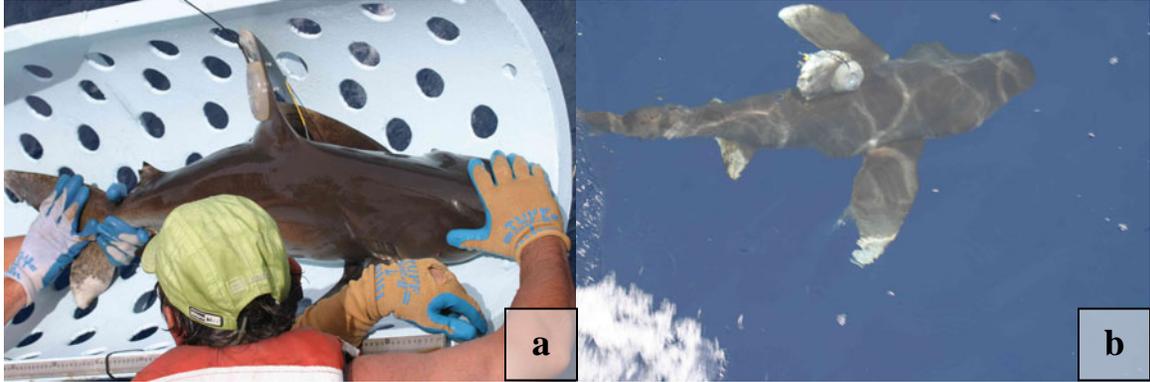


Figure 2. a) An oceanic white-tip shark being fitted with a SPOT tag by SWFSC researchers.
b) The same shark successfully released with the fin-mounted tag clearly visible.

Problems: None.

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