

SOUTHWEST FISHERIES SCIENCE CENTER
FIRST QUARTER REPORT - FY 2006
For the Period October 1 – December 31

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

Title of accomplishment or milestone: Common thresher shark, *Alopias vulpinus*, movements in the Southern California Bight as revealed by pop-off satellite archival tags.

Current status: Ongoing. David Holts, Suzanne Kohin, and Russ Vetter of FRD/SWFRD along with Andres Baquero, a Master's student at University of San Diego, are studying the movements, home ranges, and stock boundaries of the common thresher shark off the west coast of North America. Andres defended his thesis in December, 2006, and a manuscript is in preparation.

Background information: The common thresher shark, *Alopias vulpinus*, is an important element of California pelagic shark fisheries. Historically, a variety of gear types including set gillnets, drift gillnets, longlines, harpoons, and recreational gear have been used to catch large pelagic predators, primarily swordfish, shortfin mako, and thresher shark, off the US west coast. Gear type, season, and catch vary depending upon regulations and the species present. Since about 1990, observer coverage of the pelagic drift gillnet fishery has been generally good and has provided information about diet, fecundity, age, and some information on movements from conventional tagging studies. However, little is known about the vertical movements, diel activity patterns, and seasonal movements of thresher sharks along the US west coast, or the extent to which the exploited population straddles the EEZ's of Mexico and the US.

Purpose of Activity: FRD has been a pioneer in developing methods for the safe capture of sharks and methods for applying new technologies such as electronic satellite tags to track the movements of large pelagic species covered by the new HMS-FMP (Figure 1).

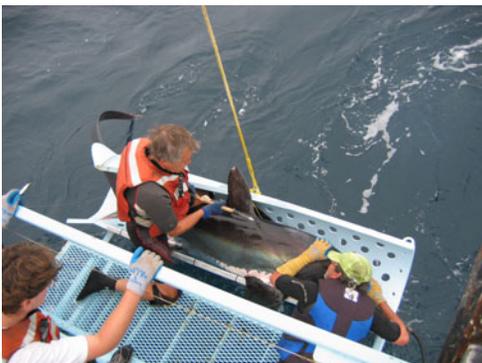


Figure 1. Application of Pop-off Archival Tag to a common thresher shark, *Alopias vulpinus*. The shark is resting in a specially designed cradle on the stern of the David Starr Jordan.

Description of accomplishment and significant results: The Pop-off Archival Tag (PAT) is a relatively new type of tag that can be attached to a fish. The tag records environmental data such as sunrise, sunset, temperature and depth.

Day length and time of midnight, along with sea surface temperature are used to calculate geographical position. The tag can be programmed to release at a specified time (e.g. 3 months). When released, the PAT tag floats to the surface and begins to transmit the archived data to the Argos satellite system.

This technique was tested using early generation tags in 1999, followed by deployment of improved tags in 2004 and 2005. Although the tagging program will continue to develop a greater understanding of the movements of common threshers in different ocean regimes, seasons, and size classes, it was considered prudent to fully analyze the existing data, particularly for the 2004 and 2005 field seasons as very little is currently known. The study was the basis for a recently completed Master's thesis by Andres Baquero.

Significance of accomplishment: The successful recovery of data from 12 tags has yielded important new insights into the seasonal movements and diving behavior of common thresher sharks as well as a better understanding of when and where they are susceptible to fishing pressure. Common threshers are more vertically active during the day confirming their role as visual predators. Although the animals were thought to be surface dwellers of the upper mixed layer, animals descended below the thermocline to cold waters where they presumably foraged on prey such as hake and squid that are common in diet studies (Figure 2). In terms of management it is clear that common threshers are very dependent on coastal areas and coastal pelagic species for food. They appear to be vulnerable to coastal fisheries throughout the months studied (May-December). For the most part, they remained in the Southern California Bight near the tagging locations. However several fish also crossed the border into Mexican waters off Baja California suggesting that management will be best addressed on a cooperative basis between the two countries. These fish demonstrated little or no movement outside the EEZ's of the two countries, however studies on larger animals and for longer tracking times may reveal greater habitat utilization.

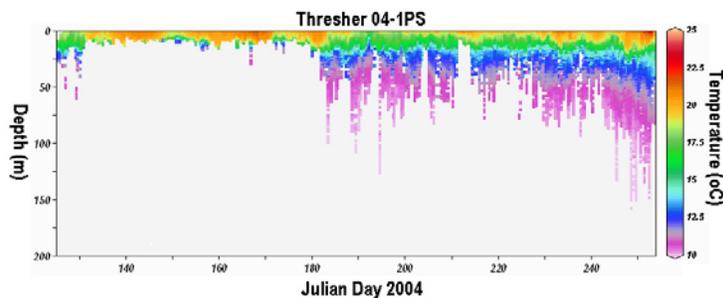


Figure 2. Temperature and depth profile from one of the tagged threshers showing extensive vertical movements to below the thermocline, and a shift from shallower diving during the first two months to deeper diving during the latter part of the track.

Problems: None.

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