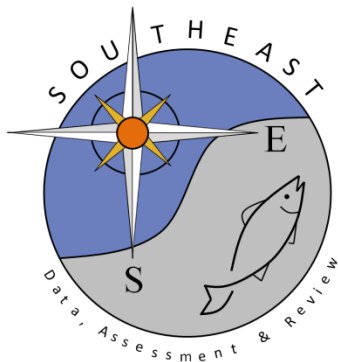


Mark/Recapture data for blacktip sharks, *Carcharhinus limbatus*, in the U.S. Atlantic from the NOAA Cooperative Shark Tagging Program

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Summary

Mark/recapture information from the NOAA Cooperative Shark Tagging Program (CSTP) covering the period from 1965 through 2018 are summarized for blacktip sharks, *Carcharhinus limbatus*, tagged in the U.S. Atlantic. Seasonal distribution of combined tagging and recapture events for all life stages (young of the year, juvenile, adult) of blacktip sharks included waters off Florida and the U.S. Virgin Islands in all seasons. Shark tagging and recapture events for all life stages remained in these waters in the winter, extended north up to New Jersey in the spring and summer, and reduced back down to North Carolina in the fall. Out of 12,912 tagging events along the U.S. Atlantic (60%) and Gulf of Mexico (40%), there was no movement between the two regions and limited exchange (2 fish) between the Atlantic and the Caribbean.

Introduction

The NOAA Cooperative Shark Tagging Program (CSTP) was initiated in 1962. This program is a collaborative effort between NOAA biologists and recreational anglers, the commercial fishing industry, other biologists, and fisheries observers. The tagging methods used in the CSTP have been essentially unchanged since the program began. The two principal tags that are in use are fin tags (Rototag and Jumbotag) and dart tags (M tag). The fin tags are two piece, plastic cattle ear tags which are inserted through the first dorsal fin. The Rototags and Jumbotags are primarily used by biologists on small sharks and were the first tags used by the CSTP. As the program expanded, the dart tag was developed to be easily and safely applied to sharks in the water. The M tag is composed of a stainless steel dart head, monofilament line, and a plastic capsule containing a waterproof legend with return instructions printed in English, Spanish, French, Japanese and Norwegian. These dart tags are implanted in the back musculature near the base of the first dorsal fin. CSTP tagging consists primarily of single release events in which recoveries are made opportunistically, primarily by recreational and commercial fishermen. For more information, the history and methods of the CSTP are detailed in Kohler et al. 1998. This working paper summarizes the CSTP mark/recapture information for the blacktip shark in the U.S. Atlantic from 1965 through 2018.

Methods

Information provided for tagging events include size, sex, condition, location, and date of capture. When a marked shark is recaptured, information similar to that obtained at release is requested, allowing for the calculation of time at large, displacement, and speed. Distance traveled in nautical miles (nm) between tagging and recapture sites is a minimum straight-line distance. Length and weight for CSTP tag and recapture data are reported with varying units of measure. For this working paper, fork length (FL) was used whenever provided and converted to cm when necessary. Equations from SEDAR 11 were used for conversions from total length or weight to fork length. For purposes of SEDAR 65, blacktip sharks less than or equal to 66 cm FL were considered young-of-the-year. Males and females were considered mature when FL was greater than the median length at maturity, 115 cm and 123 cm, respectively (Natanson et al. 2019). Sharks of unknown sex were considered mature when greater than 117 cm FL (median FL at maturity for sexes combined, Natanson et al. 2019).

Results

A total of 12,912 blacktip sharks were released with tags along the U.S. Atlantic (60%) and the Gulf of Mexico (40%) between 1965 and 2018. There were 449 recaptures (54% Atlantic, 46% Gulf of Mexico) from these tagging events through 2018 and there was no exchange between the Atlantic and Gulf of Mexico. The remaining results will focus on Atlantic waters excluding the Gulf of Mexico.

Seasonal distribution of combined tagging and recapture events for blacktip sharks included waters off Florida and the U.S. Virgin Islands in all seasons (Figure 1). Shark tagging and recapture events remained in these waters in the winter, extended north up to New Jersey in the spring and summer, and reduced back down to North Carolina in the fall (Figure 1). All life stages (young of the year, juvenile, and adult) exhibited the same seasonal patterns. The northern part of the range for young-of-the-year

sized fish for the spring, summer, and fall consisted of sharks >60 cm FL and may have been one-year old fish.

Mark-recapture data (n= 241) for sharks tagged and recaptured in U.S. Atlantic waters showed movements up and down the U.S. coast with the seasons without leaving the U.S. Exclusive Economic Zone, with three exceptions (Figure 2). A mature female blacktip shark tagged off Florida in September 2007 was recaptured in August the following year off the northern coast of Cuba (Figure 2). Two fish tagged in 2004 as young of the year during the summer in Fish Bay, St John, U.S. Virgin Islands were recaptured two and seven years later off Cape Canaveral, FL during July and off Jekyll Island, GA during April, respectively (Figure 2). These two fish also traveled the longest distances, 1050 nm and 1180 nm. The longest time at liberty was 3391 days (9.3 years) for a shark tagged off Charleston, SC as a one-year old during November 2003 and recaptured in February off Cape Canaveral, FL in 2013.

References

Kohler, NE, JG Casey and PA Turner. 1998. NMFS Cooperative Shark Tagging Program, 1962 - 1993: An atlas of shark tag and recapture data. *Marine Fisheries Review* 60:1-87.

Natanson, LJ, BM Deacy, HE Moncrief-Cox, WB Driggers III. 2019. Reproductive parameters for blacktip sharks (*Carcharhinus limbatus*) from the western North Atlantic Ocean. SEDAR65-DW01. SEDAR, North Charleston, SC. 10 pp.

Figure 1. Seasonal distribution of combined tagging and recapture events between 1965 and 2018 for blacktip sharks from the NOAA Cooperative Shark Tagging Program.

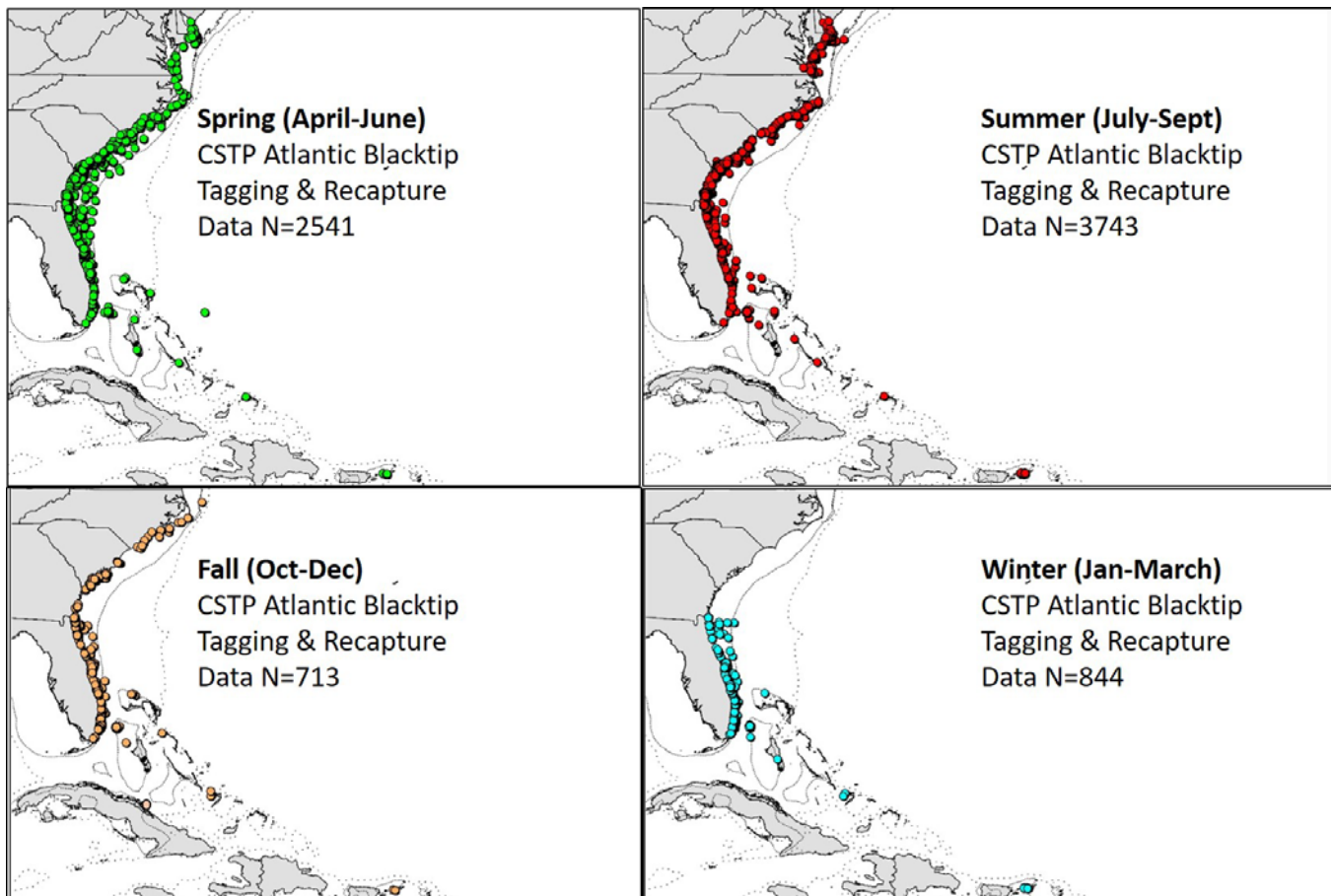


Figure 2. Blacktip shark mark-recapture data from the NOAA Cooperative Shark Tagging Program.

