Tag and recapture data for blacktip shark, *Carcharhinus limbatus*, in the Gulf of Mexico: 1999-2010

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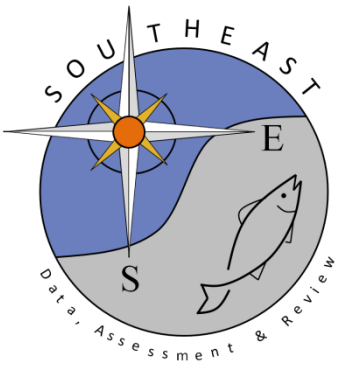

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Summary

Tag and recapture information for blacktip shark, *Carcharhinus limbatus*, is summarized from the NOAA Fisheries Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) survey at the Panama City Laboratory from 1999-2010 and the NOAA Fisheries Mississippi Laboratories bottom and pelagic longline cruises 2004-2010. Summary information includes number of males and females tagged by life stage, number of sharks recaptured, and overall recapture rate, time at liberty, and distance traveled per recaptured individual.

Background

The Panama City Laboratory and Mississippi Laboratories of the NOAA Southeast Fisheries Science Center (SEFSC) and the Cooperative Shark Tagging Program (CSTP) at the NOAA Northeast Fisheries Science Center (NEFSC) have tagged over eleven-thousand elasmobranchs in the Gulf of Mexico and US southeast Atlantic Ocean since 1994.

The creation of the Gulf of Mexico State Shark Pupping and Nursery (GULFSPAN) survey in 2003 greatly expanded the elasmobranch tagging effort in the northeast Gulf of Mexico. Because this survey was headed by the Shark Population Assessment Group at the NOAA Fisheries Panama City Laboratory, the contact information on tags was directed to the NOAA Fisheries Panama City Laboratory. That same year, NOAA Mississippi Laboratories ceased tagging sharks for the Northeast Fisheries Science Center and began cooperation with this program. Instead, scientists began tagging elasmobranchs with M- and roto-tags that pointed to the NOAA Fisheries Panama City Laboratory. By 2006, all GULFSPAN participants and the two NMFS observer programs housed at the Panama City Laboratory (Bottom Longline and

Gillnet) were supplied with tags whose contact information pointed to the NOAA Fisheries Panama City Laboratory. In 2009, a survey modeled after the Mississippi Laboratories bottom longline survey began in Texas (Texas Parks and Wildlife Department) and was supplied with tags. Tags are not supplied to recreational or commercial fisherman to avoid species identification and measurement errors. The primary goal of this ongoing tagging cooperative is to gain information on migration routes, growth rates, stock identity, and population dynamics of elasmobranch species in the Gulf of Mexico and southeast Atlantic Ocean.

Recognizing the need to standardize data collection, we developed an elasmobranch tagging management system for NOAA SEFSC. The ultimate goal of the database is to provide managers, researchers, and the public involved in elasmobranch research in the Gulf of Mexico and southeast Atlantic Ocean with a system to archive and recall elasmobranch tag and recapture data.

Materials and Methods

The purpose of this document is to summarize tag and recapture information for blacktip sharks collected from fishery-independent surveys at NOAA Fisheries Panama City and Mississippi Laboratories and covering the period 1999-2010. Data includes 1) numbers of sharks tagged by species, sex, and life stage, 2) numbers of sharks recaptured by species and sex, 3) overall recapture rate, 4) time at liberty, and 5) distance traveled for recaptured individuals.

Sharks were captured through gillnet surveys and longline surveys (e.g. Carlson and Brusher, 1999; Grace and Henwood, 1997) and summary information can be found in Bethea et al. (2011

and references therein) and cruise reports OT-04-04 (260), OT-05-02 (263), OT-05-05 (266), OT-05-06 (267), 0T-06-02 (269), 0T-06-04 (272), 0T-07-04 (277), 0T-08-05 (283), R2-09-04 (288), 09-05 (56), 72/0403, 72/0404, and R2-11-02 (291). Summary information for the Texas Parks & Wildlife Department can be found via personal communication with Fernando Martinez-Andrade (Coastal Fisheries Division, Texas Parks and Wildlife Department, Fernando.Martinez-Andrade@tpwd.state.tx.us) as this survey is in its infant stages and no formal cruise reports have been submitted.

The SEFSC uses 3 basic types of tags of sharks: 1) dart tags (plastic-tipped 7 and 10 cm, and metal-tipped 18 cm long; ©Floy Tag & Mfg., Inc.), placed in the cartilage at the base of the first dorsal fin of sharks, 2) roto-tags (4.5 cm long; ©Premier1Supplies), punched through the cartilage of the first dorsal fin of sharks, and 3) electronic tags (PIT tags, ©Digital Angel; satellite tags, ©Wildlife Computers; and acoustic tags, ©VEMCO). Some animals are tagged with more than one type of tag.

Prior to tagging, captured sharks are measured (pre-caudal, PCL, total, TL, and fork length, FL, in cm), sexed, life stage assessed (young-of-the-year, juvenile, or adult based on published life history information), and location (latitude, longitude) recorded. Similar information is recorded when a tagged shark is recaptured. For this report, time at liberty is calculated as the number of days between release and recapture. Distance traveled is measured in kilometers and calculated as a straight line between release and recapture sites (assuming the earth is a perfect sphere with a radius of 6378.0 km). Herein, lengths are reported as FL.

Results

Tagging Data

A total of 1203 tagged blacktip sharks were tagged 1999-2010. Of those, 524 (43.5 %) are male, 668 (55.5 %) are female, and 10 (1 %) have no recorded sex. In the case where FL was not recorded upon the tagging event, length was reconstructed using regression analysis (n = 893 males, 29.3-136.3 FL, FL = 0.8293*TL – 0.5655, R^2 = 0.984; n= 1089 females, 40.5-164.1 FL, FL = 0.8209*TL – 0.0397, R^2 = 0.989). Maturity states are based on Carlson et al. (2006). For males, 268 (51 %) are young-of-the-year, 159 (30.3 %) are juvenile, 98 (18.7 %) are mature. For females, 291 (43.5 %) are young-of-the-year, 254 (38.1 %) are juvenile, and 123 (18.4 %) are mature (Table 1).

Recapture Data

Eleven blacktip sharks were recaptured from 1999-2010 for an overall recapture rate of 0.91 % (Table 1). Data was returned by recreational anglers using hook and line and GULFSPAN collaborators using gillnets (Table 2). The shark at liberty the longest was a female blacktip (Fish#3652) tagged 19 September 2001 on the gulf-side of St. Vincent Island, FL, and recaptured 2861 days later on 19 July 2009 in Mississippi sound, traveling 394 km. The shark was 74 cm FL when tagged and 78 cm FL at recapture (length data estimated by recreational fisherman). One other female blacktip (Fish#8329) also traveled over 300 km, being tagged on 23 June 2010 in Waccasassa Bay, FL, and recaptured on 23 September 2011 off Sanibel Island, FL. The remaining animals were either recaptured within the same bay or inlet or in the adjacent bay or inlet to where they were tagged.

Acknowledgements

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U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service Southeast Fisheries Science Center Mississippi Laboratories Pascagoula Facility P.O. Drawer 1207 Pascagoula, MS 39568-1207

--CRUISE RESULTS 07/19/2004 - 09/22/2004 Atlantic Coastal Shark Red Snapper Cruise NOAA Ship RV GANDY, Cruise 72/0403

--CRUISE RESULTS 07/27/2004 - 09/29/2004 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise OT-05-02 (263)

--CRUISE RESULTS 10/06/2004 - 10/23/2004 Atlantic Coastal Shark Red Snapper Cruise NOAA Ship RV GANDY, Cruise 72/0404

--CRUISE RESULTS 03/08/2005 - 04/06/2005 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise OT-05-02 (263)

--CRUISE RESULTS 08/02/2005 – 11/16/2005 Pelagic Fish Longline Survey NOAA Ship OREGON II, Cruise OT-05-05 (266) and OT-05-06 (267)

--CRUISE RESULTS 02/01/2006 – 03/21/2006 Longline Survey Pelagic Sharks and Finfish NOAA Ship OREGON II Cruise OT-06-02 (269)

--CRUISE RESULTS 07/29 – 09/25/2006 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, cruise 0T-06-04 (272)

--CRUISE RESULTS 08/10 – 09/27/2007 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise 0T-07-04 (277)

--CRUISE RESULTS 07/29 – 09/30/2008 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise 0T-08-05 (283)

--CRUISE RESULTS 07/27 – 09/30/2009 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise R2-09-04 (288)

--CRUISE RESULTS 10/12 – 11/23/2009 Small Pelagics Cruise NOAA Ship GORDON GUNTER, Cruise 09-05 (56)

--CRUISE RESULTS 08/07 – 09/29/2010 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise R2-11-02 (291)

Table 1. Recapture rates for blacktip sharks, *Carcharhinus limbatus*, using the NOAA Southeast Fisheries Elasmobranch Tagging Management System, 1999-2010.

Sex	**Life Stage**	**Number Tagged**	**Number Recaptured**	**Recapture Rate**
Male	Young-of-the-year	268	1	0.37
	Juvenile	159	1	0.63
	Adult	98	0	0.0
	n	*524*	*2*	*0.38%*
Female	Young-of-the-year	291	5	1.72
	Juvenile	254	4	1.57
	Adult	123	0	0.0
	n	*668*	*9*	*1.35%*
Unknown	***n***	*10*	--	--
	Total	***1203***	***11***	***0.91%***

Table 2. Recapture information for blacktip sharks, *Carcharhinus limbatus*, using the NOAA Southeast Fisheries Elasmobranch Tagging Management System, 1999-2010. Animals are listed in descending number of days at liberty. *Indicates measurement estimated.

Fish #	Sex	Mode of Recapture	Days at Liberty	FL at Capture (cm)	FL at Recapture (cm)	Distance Moved (km), Direction	Location Tagged	Location Recaptured
3652	F	Recreational Fisherman	2861	74.0	78.0*	394, E	Gulf-side St. Vincent Island, FL	Cat Island, MS
8329	F	Recreational Fisherman	458	49.0	74.7	321, S	Waccasassa Bay, FL	Sanibel Island, FL
7030	F	GULFSPAN Gillnet	440	63.5	70.5	9.2	Apalachicola Bay, FL	Apalachicola Bay, FL
3472	F	GULFSPAN Gillnet	360	62.0	69.0	53.3, E	Gulf-side St. Vincent Island, FL	Crooked Island Sound, FL
765	M	Recreational Fisherman	350	79.0	79.0*	32.0, W	Crooked Island Sound, FL	St. Joseph Bay, FL
101	F	GULFSPAN Gillnet	107	74.0	77.0	32.0, W	Crooked Island Sound, FL	St. Joseph Bay, FL
1777	F	Recreational Fisherman	72	90.0	99.3	--	Gulf-side St. Vincent Island, FL	Gulf-side St. Vincent Island, FL
1857	F	Recreational Fisherman	61	74	--	18.0, W	Crooked Island Sound, FL	Cape San Blas, FL
1727	M	Recreational Fisherman	35	42.5	43.2	7.6	Apalachicola Bay, FL	Apalachicola Bay, FL
1404	F	Recreational Fisherman	19	60	52*	30.5	Gulf-side St. Vincent Island, FL	Apalachicola Bay, FL
334	F	Recreational Fisherman	3	44.5	45.8	--	Apalachicola Bay, FL	Apalachicola Bay, FL

Figure 1. Tag and recapture location information for Fish#3652.

Figure . Tag and recapture location information for Fish#8329.