

**Tag and recapture data for smoothhound sharks, *Mustelus* spp., in the Gulf of Mexico and US  
South Atlantic: 1998-2012**

Dana M. Bethea\*

NOAA Fisheries  
Southeast Fisheries Science Center  
Panama City Laboratory  
3500 Delwood Beach Road  
Panama City Beach, FL 32408

And

William B. Driggers III  
Mark A. Grace  
Kristin M. Hannan  
Lisa M. Jones

NOAA Fisheries  
Southeast Fisheries Science Center  
Mississippi Laboratories  
3209 Frederic Street  
Pascagoula, MS 39567

\*Not to be cited without permission of corresponding author – [Dana.Bethea@noaa.gov](mailto:Dana.Bethea@noaa.gov)

SEDAR39-DW-01

## **Summary**

Tag and recapture information for smoothhound sharks, *Mustelus* spp., are summarized from the NOAA Fisheries Southeast Fisheries Science Center Elasmobranch Tagging Management System, 1998-2012.

Summary information includes numbers of sharks tagged and recaptured by sex and life stage, as well as time at liberty, distance traveled, and change in length for recaptured individuals.

## **Background**

Since 1995, the NOAA Fisheries Southeast Fisheries Science Center (SEFSC) Panama City Laboratory and Mississippi Laboratories (hereafter referred to as Panama City Laboratory and Mississippi Labs) and the NOAA Northeast Fisheries Science Center (NEFSC) Cooperative Shark Tagging Program (CSTP) (hereafter referred to as NEFSC-CSTP) have worked together to tag over fifteen-thousand elasmobranchs in the Gulf of Mexico and US southeast Atlantic Ocean. 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.

In 2003, the standardization of the Panama City Laboratory Gillnet Survey into the Gulf of Mexico State Shark Pupping and Nursery (GULFSPAN) Survey greatly expanded the elasmobranch tagging effort in the Gulf of Mexico. Recognizing this, Panama City Laboratory and Mississippi Labs began using M-, dart, and roto-tags on fishery-independent surveys in the Gulf of Mexico and US southeast Atlantic Ocean that directed to the Panama City Laboratory. Previously, all M-tags directed to NESFC-CSTP. Today, several universities and gulf coast state agencies are supplied with tags whose contact information is the Panama City Laboratory. Tags are not given to commercial or recreational fisherman to minimize species misidentification.

Recognizing the need to standardize tagging and recapture data collection, Panama City Laboratory developed the NOAA Fisheries Southeast Fisheries Science Center Elasmobranch Tagging Management System in 2006. 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 tagging and recapture data. Currently, the database holds tagging data on 14,269 elasmobranchs (updated 28 January 2014).

## Methods

Because there is very little tagging and recapture data available, all *Mustelus* spp. are grouped together. Data includes 1) numbers of sharks tagged by sex and life stage, 2) numbers of sharks recaptured, 3) overall recapture rate as well as 4) time at liberty, 5) distance traveled, and 6) change in length for recaptured individuals.

Smoothhound sharks are captured through fishery-independent gillnet and longline surveys (following Simpfendorfer and Wiley, 2005; Carlson and Brusher, 1999; Grace and Henwood, 1997). Survey information can be found in Bethea et al. (2011 and 2012 and references therein), Mississippi Labs cruise reports OT-04-04 (260), OT-05-02 (263), OT-05-05 (266), OT-05-06 (267), OT-06-02 (269), OT-06-04 (272), OT-07-04 (277), OT-08-05 (283), R2-09-04 (288), 09-05 (56), 72/0403, 72/0404, and R2-11-02 (291), R2-11-04 (296), and R2-12-03 (300), and Texas Parks and Wildlife Department SEMAP cruise reports 2008-2012 (Martinez-Andrade, 2008 2009 2010 2011 and 2012).

Prior to tagging, smoothhound sharks are measured (pre-caudal, PCL, fork, FL, total, TL, or stretched-total, STL in cm), sexed, and, if male, assigned a life stage (mature/immature). Life stage is not assessed for females. The tag number and location of the tagging event (latitude, longitude) is recorded. Three basic types of tags are usually applied to smoothhound sharks: 1) dart tag (plastic-tipped 7 and 10 cm; ©Floy Tag & Mfg., Inc.) placed in the cartilage at the base of the first dorsal fin, 2) roto-tag (4.5 cm long;

©Premier1Supplies) punched through the anterior cartilage of the first dorsal fin, or 3) M-tag (metal-tipped 18 cm long; ©Floy Tag & Mfg., Inc.) placed in the cartilage at the base of the first dorsal fin.

When a shark is recaptured, the fisherman is asked information similar to that taken at time of tagging (e.g., date, location, animal length, method of fishing). For this report, time at liberty is calculated as the number of days between initial tagging and recapture, including the day of recapture. Distance traveled is measured in kilometers and calculated as a straight line between tagging and recapture sites if over open water or straight line following the coastline (assuming the earth is a perfect sphere with a radius of 6378.0 km).

## Results

### *Tagging Data*

A total of 591 smoothhound sharks are in the database, 1998-2012. Individual species counts are as follows: 223 *M. canis*, 2 *M. mustelus*, 46 *M. norrisi*, 232 *M. sinusmexicanis*, and 88 *Mustelus* sp. Of those, 147 (24.9%) are male, 434 (73.4%) are female, and 10 (1.7%) have no recorded sex. For males (Table 1a), 0 are neonate or young-of-the-year, 4 (2.7%) are juvenile, 20 (13.6%) are mature, and 123 (83.7%) have no recorded life stage. For females (Table 1b), 0 are neonate, 2 (0.5%) are young-of-the-year, 2 (0.5%) are juvenile, 0 are mature, and 430 (99.1%) have no recorded life stage.

### *Recapture Data*

The overall recapture rate is 1.2% (Table 1). There are 7 smoothhound shark recaptures (1 male, 6 female) in the database through December 31, 2012. Data is reported by recreational anglers using hook and line (n=1), fishery-independent survey (n=1), and commercial fishermen using bottom longline (n=2) or trawl (n=3) (Table 2). While majority of recaptures occurred >100 km from point of capture, no smoothhound shark travelled from the Gulf of Mexico to the Atlantic Ocean or vice versa (Fig. 1).

Additionally, all recaptured smoothhound sharks were both tagged and recaptured in the western Gulf of Mexico.

The smoothhound shark at liberty the longest is a female *M. sinusmexicanus* (Fish# 6225) tagged 9-23-2009 by the Mississippi Labs Bottom Longline Survey (Coastal Sharks – Red Snapper) and recaptured 692 days later on 8-15-2011 by the University of South Florida Fish Disease Survey (Table 2; Fig. 1). The shark was 122.5 cm TL when tagged and 120 cm TL (measured) at recapture. The shark was tagged and recaptured approximately 32.6 km apart in the Mississippi River Delta.

The smoothhound shark that travelled the farthest distance was a female *M. sinusmexicanus* (Fish# 5327) tagged in the Mississippi River Delta by the Mississippi Labs Bottom Longline Survey (Coastal Sharks – Red Snapper) and recaptured approximately 830.3 km west in Texas waters by a commercial trawler (Table 2; Fig. 1). The shark was at liberty 263 days (9-15-2007 to 6-15-2008) and grew from 92.0 cm to 103.0 cm FL (recapture measurement estimated).

### **Acknowledgements**

The authors wish to thank: K. Siprell for constructing the database framework. L. Hollensead and K. Smith worked long hours entering archived tagging data. Tagging collaborators include: M.J. Ajemian, G. Burgess, J. K. Carlson, R. del Rio, R.D. Grubs, S.J.B. Gulak, T. Neahr, F. Martinez-Andrade, A. Mathers, and J. Imhoff.

### **Literature Cited**

- Bethea, D.M., K. Smith, J.K. Carlson, M.J. Ajemian, R.D. Grubbs, and J. Imhoff (2011) Shark nursery grounds and essential fish habitat studies. GULFSPAN Gulf of Mexico-FY10. An Internal Report to NOAA's Highly Migratory Species Division. Sustainable Fisheries Division Contribution No. PCB-11/01.
- Bethea, D.M., K. Smith, and J.K. Carlson (2012) NOAA NMFS SMALLTOOTH SAWFISH MONITORING REPORT-FY12: Relative Abundance and Essential Fish Habitat Studies for Smalltooth Sawfish, *Prisits pectinata*, in Southwest Florida, USA. Sustainable Fisheries Division Contribution No. PCB-12/08.

Carlson J.K., J.H. Brusher (1999) An index of abundance for juvenile coastal species of sharks from the northeast Gulf of Mexico. *Mar. Fish. Rev.* 61(3): 37-45.

Grace, M., and T. Henwood (1997) Assessment of the distribution and abundance of coastal sharks in the U.S. Gulf of Mexico and eastern seaboard, 1995 and 1996. *Mar. Fish. Rev.* 59(4):23-32.

Martinez-Andrade, F. 2008. SEAMAP 2008 Inshore Longline Survey Cruise Report to the Gulf States Marine Fisheries Commission, Ocean Springs, MS.

--2009. SEAMAP 2009 Inshore Longline Survey Cruise Report to the Gulf States Marine Fisheries Commission, Ocean Springs, MS.

--2010. SEAMAP 2010 Inshore Longline Survey Cruise Report to the Gulf States Marine Fisheries Commission, Ocean Springs, MS.

--2011. SEAMAP 2011 Inshore Longline Survey Cruise Report to the Gulf States Marine Fisheries Commission, Ocean Springs, MS.

--2012. SEAMAP 2012 Inshore Longline Survey Cruise Report to the Gulf States Marine Fisheries Commission, Ocean Springs, MS.

Simpfendorfer, C.A. and T. Wiley (2005) Identification of priority areas for smalltooth sawfish conservation. Mote Marine Technical Report 1021.

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

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

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

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

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

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

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

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

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

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

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

-- 08/07/2010 – 09/29/2010 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise R2-10-02 (291)

-- 07/25/2011 – 09/29/2011 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise R2-11-04 (296)

--07/26/2012 – 09/29/2012 Bottom Longline Survey Coastal Sharks – Red Snapper NOAA Ship OREGON II, Cruise R2-12-03 (300)



Table 1. Recapture rates for smoothhound sharks, *Mustelus* spp., using the NOAA Southeast Fisheries Elasmobranch Tagging Management System, 1998-2012.

<b>Sex</b>	<b>Life Stage</b>	<b>Number Tagged</b>	<b>Number Recaptured</b>	<b>Recapture Rate</b>
(a) Male	Neonate	0		
	Young-of-the-year	0		
	Juvenile	4		
	Adult	20		
	Unknown	123		
	<i>n</i>	147	1	0.7%
(b) Female	Neonate	0		
	Young-of-the-year	2		
	Juvenile	2		
	Adult	0		
	Unknown	430		
	<i>n</i>	434	6	1.4%
<b>Total</b>		<b>591</b>	<b>7</b>	<b>1.2%</b>



Table 2. Recapture information for smoothhound sharks, *Mustelus* spp., using the NOAA Southeast Fisheries Elasmobranch Tagging Management System, 1998-2012 (n=7). Animals are listed chronologically by Fish#. \*Indicates measurement estimated.

<b>Fish #</b>	<b>Species</b>	<b>Sex</b>	<b>Mode of Recapture</b>	<b>Days at Liberty</b>	<b>Δ TL (cm)</b>	<b>Distance Moved (km), Direction</b>	<b>Location Tagged</b>	<b>Location Recaptured</b>
5026	<i>M. canis</i>	F	Commercial Trawl	299	-90*	255.7, NW	Offshore LA	Inshore LA
5092	<i>M. canis</i>	M	Commercial Trawl	357	47*	NA	Offshore AL	Inshore AL
5325	<i>M. sinusmexicanus</i>	F	Recreational Hook and Line	309	11	9.7, SE	MS Delta	MS Delta
5327	<i>M. sinusmexicanus</i>	F	Commercial Trawl	263	13.5*	830.3, W	MS Delta	Inshore TX
6222	<i>M. sinusmexicanus</i>	F	USF Fish Disease Survey	692	1.5	32.6, NW	MS Delta	MS Delta
6225	<i>M. sinusmexicanus</i>	F	Commercial Longline	146	2.5*	242.2, W	MS Delta	Offshore LA
10622	<i>M. sinusmexicanus</i>	F	Commercial Longline	75	-15*	NA	Offshore AL	Offshore LA

Figure 1. Timeline showing tagging collaborators and years of tagging data available in the NOAA Southeast Fisheries Elasmobranch Tagging Management System for elasmobranchs tagged in the Gulf of Mexico and US southeast Atlantic Ocean. Unless otherwise stated, collaborators are currently tagging using Panama City Laboratory tags.

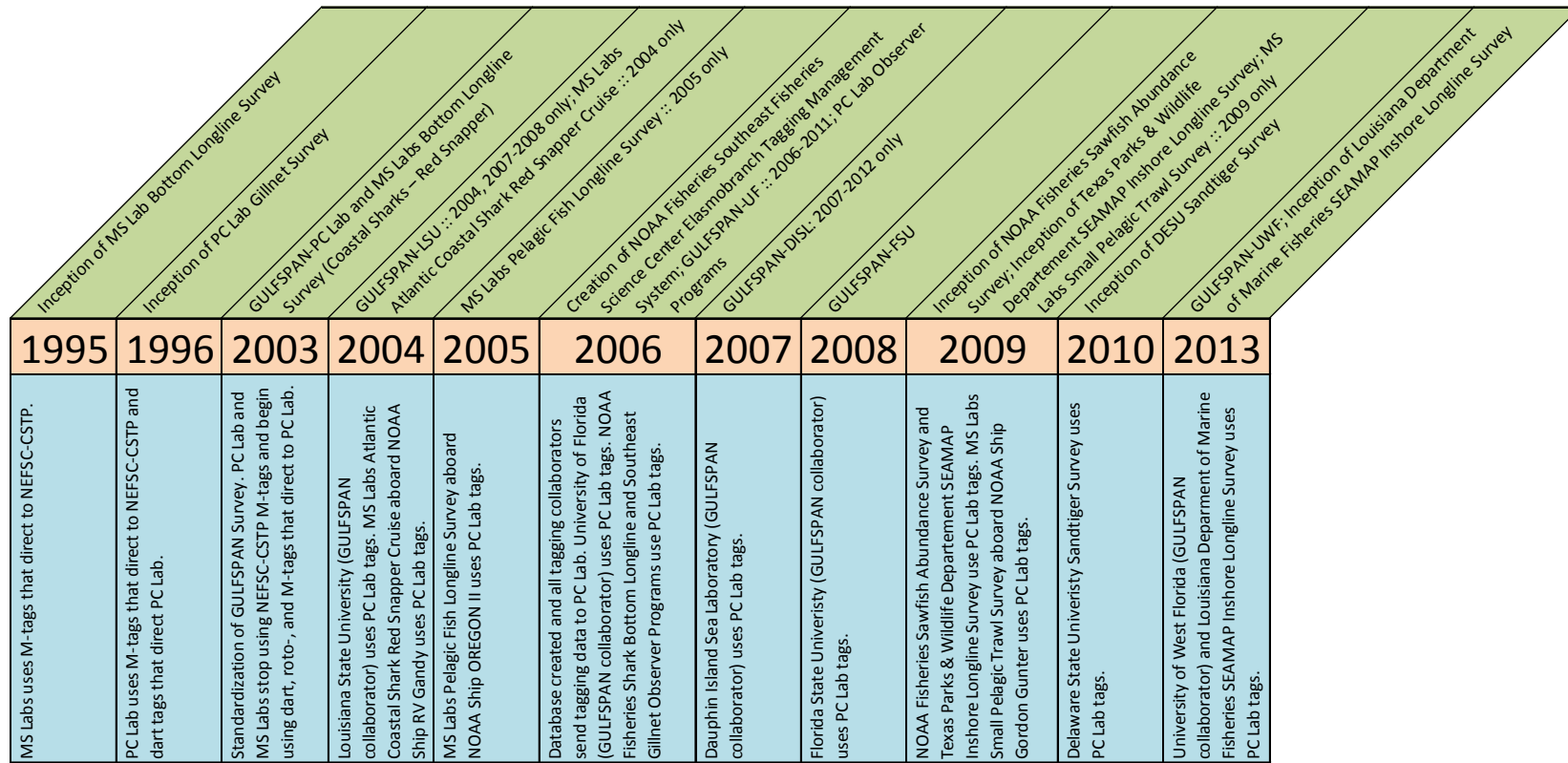


Figure 2. Tagging (yellow) and recapture (red) locations for 7 smoothhound shark, *Mustelus* spp., recaptures in the NOAA Southeast Fisheries Elasmobranch Tagging Management System, 1998-2012. Data is returned by recreational anglers using hook and line (n=1), fishery-independent survey (n=1), and commercial fisherman using bottom longline (n=2) or trawl (n=3). Fish# 5092 and 16555 are not shown due to lack of reported recapture location.

