An Evaluation of the Status of the Largetooth Sawfish, *Pristis perotteti*, Based on Historic and Recent Distribution and Qualitative Observations of Abundance

George H. Burgess, Joana Fernandez de Carvalho and Johanna L. Imhoff
Florida Program for Shark Research
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611

Introduction

The largetooth sawfish, *Pristis perotteti,* is one of two species of the family Pristidae occurring in the Atlantic Ocean. Like its conger, the smalltooth sawfish, *P. pectinata*, it is found in tropical and subtropical waters in both the western and eastern Atlantic, with northern and southern extremes of ranges largely dictated by seasonal water temperature regimes. The western North Atlantic distributional termini of both species occurs in the United States with the largetooth historically having a more restricted range, occurring only as far north as the Gulf of Mexico and extreme southeast Florida (vs. New York for the smalltooth).

The largetooth sawfish also shares the same fate of the smalltooth and other members of the family worldwide: declining numbers and reduced distributional ranges, the results of overfishing, chiefly as bycatch, and habitat loss and alteration (Fowler et al 2005, CITES 2007a). Six species of sawfishes, including the largetooth (as *P. pristis*) have been listed by CITES as Appendix I species, thereby banning international trade, and *P. microdon* was placed on Appendix II, allowing for limited aquarium trade (CITES 2007). All sawfish species are regarded as Critically Endangered with population trends decreasing by the International Union for Conservation of Nature on its IUCN Red List (Fowler et al 2005, http://www.iucnredlist.org/). The American Fisheries Society (Musick et al 2000) regard North American populations of both the largetooth and smalltooth as Endangered and in the United States the smalltooth sawfish has received Endangered Species status for the U.S. DPS (distinct population segment) (NMFS 2003, 2005).

By contrast, the largetooth sawfish U.S. DPS is at this time not listed under the ESA. On 30 November 1999 the Center for Marine Conservation (now Ocean Conservancy) requested that the North American DPS's of both *P. pectinata* and *P. perotteti* be listed as Endangered (Center for Marine Conservation 1999). However, on 10 March 2000 the National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce found there was not substantial evidence to warrant a status review of the North American DPS of the largetooth sawfish inasmuch as the petition did not contain substantial scientific or commercial

information to indicate the present existence of such a population eligible for listing (NMFS 2000). WildEarth Guardians' 24 April 24 2009 petition requested the Secretary of Commerce list the largetooth sawfish as endangered or threatened throughout its range and designate critical habitat concurrent with listing and reverse the 10 March 2000, negative 90–day finding to list the North American population of largetooth sawfish as endangered (WildEarth Guardians 2009). The NMFS "will consider the petitioner's request as a request to consider a North American Distinct Population Segment (DPS), should we determine that a 90–day 'may be warranted' finding regarding the species throughout its range is not warranted" (NMFS 2009).

In response to the petitioner's request, the NMFS contracted the Florida Program for Shark Research at the Florida Museum of Natural History, University of Florida to document the historical and current distribution of the largetooth sawfish throughout the Atlantic Ocean and provide preliminary information on habitat utilization of the species. As there was only a three month time period contacted for the project and (1) the bulk of the species' range lies outside of U.S. waters requiring communication with foreign, non-English speaking workers, often in communication-poor countries; (2) most capture records are historical in nature, requiring considerable "detective" work to sort out literature- and museum-based specimens; and (3) identifications made in said literature and of museum-curated specimens cannot always be taken on face value owing to confusion with the smalltooth sawfish and a confused taxonomic history, requiring case-by-case ground-truthing of each record; we literally were in data gathering mode right up to the submittal deadline as we deemed augmenting the number and completeness of records more important than detailed analyses of a lesser and incomplete database. Therefore our observations on habitat use must be viewed as preliminary. Mining of life history information, not intended to be addressed in this exercise, also awaits analysis. We recommend a more detailed analysis of the newly acquired and synthesized data which will be added to the National Sawfish Encounter Database (NSED), curated and housed at the Florida Museum of Natural History, University of Florida.

Data Collection

To obtain primary literature records and distribution information for *P. perotteti*, a thorough search was made of hundreds of books and scientific papers in the Ichthyology library at the Florida Museum of Natural History and co-author Burgess' extensive personal library, which is organized in the bibliographic software Procite. The card catalogs of the key regional universities (University of Florida, University of Texas, Texas A&M University, University of South Alabama) within *P. perotteti's* historic range also were queried. Of the results obtained from these literature searches, only materials from the Atlantic were consulted as those outside the region refer to other sawfish species, most notably the two other largetoothed species, *P. microdon* and P. *zephyreus*. Citations of references consulted, including those which produced *P. perotteti* records as well as those that did not, are listed included in the reference list.

Newspaper and magazine articles are the most productive source of information about U.S. sawfish captures. Except in Florida waters where only large catches drew atten-

tion, historically almost any capture was regarded as a newsworthy event based on the relative rarity of both sawfish species, the very large sizes of the catches, the odd morphology of the snout, and the aggressive “fight” of the creature. However, most accounts are unaccompanied by photographs and lack sufficient verbal description of the sawfish to distinguish between the two native species.

Library databases and online search engines were used to identify print medium articles addressing sawfish. A search of seven newspapers (New York Daily News, Chicago Daily Tribune, New York Times, The Atlanta Constitution, The Washington Post, The Christian Science Monitor, Corpus Christi Times) was conducted via the Proquest Historical Newspapers database, using the term "sawfish" as a search criterion, yielding 319 articles. The online database www.NewspaperArchive.com produced 552 newspaper articles using the criterion “sawfish and Texas.” The latter proved to be the a more useful database because it searched regional and local newspapers, which provided more information about sawfish captures in their local areas. From these sources we were able to extract 207 *Pristis* spp. records. Fortunately, a small number of these articles contained photographs which allowed us to positively identify six *P. pectinata* and ten *P. perotteti* records. Similar searches performed for Alabama and Louisiana using this search engine provided no sawfish records. As these search engines continuously add new articles to their archives, we will continue to monitor them in the future. Internet searches using Google were also useful for finding photographs of or blogs pertaining to *P. perotteti* records.

Since all articles/photographs predate 1962 and many are pre-1940, generally the photos are available only as inferior library scans that present as poor photocopies or as scans of browned and tattered clippings of the old black dot-matrix inking of early 20th century publishing. It is frustrating to know there was a photo taken that may offer definitive information; we occasionally have been able to locate an alternative version of a published photo through sleuthing the internet and thus make a definitive identification. With more time we may find some others currently on bulletin boards of bait and tackle shops and in the personal archives of the relatives of individual fishers. For now many records from old sawfish newspaper accounts will necessarily be relegated to *Pristis* sp. identifications.

The aforementioned internet has been an invaluable source of non-scientific reports of sawfish captures and encounters. Many “new” historic records have come directly or indirectly through information or contacts found on the internet. We have uncovered many encounters from the recreational and commercial fishing communities and posted by fishing clubs, relatives, and local historic societies, chambers of commerce, and museums. As with newspaper stories, we anticipate that with additional time we will uncover a few more historic records via internet-facilitated “detective” work.

Twenty-seven museums were contacted in order to obtain records of archived *Pristis perotteti* specimens (Table 1). Additional specimen records from museums or private collections which we did not directly contact were obtained from the doctoral dissertation

TABLE 1. Institutions contacted for archived *Pristis perotteti* specimens.

ACRONYM	MUSEUM	NUMBER P. PEROTTETI	NUMBER CONFIRMED
AL	University of Alabama Museums Tuscaloosa, AL, U.S.	0	
AMNH	American Museum of Natural History New York, NY, U.S.	3	**3**
ANSP	Academy of Natural Sciences Philadelphia, PA, U.S.	3	**2**
BMNH	Natural History Museum London, U.K.	8	**4**
CAS	California Academy of Sciences San Francisco, CA, U.S.	1	**1**
CU	Vertebrate Collections, Cornell University Ithaca, NY, U.S.	0	
FMNH	Field Museum of Natural History Chicago, IL, U.S.	1	**1**
GCRL	Gulf Coast Research Laboratory, The University of Southern Mississippi Ocean Springs, MS, U.S.	0	
GMBL	Grice Marine Biological Laboratory, College of Charleston Charleston, SC, U.S.	0	
KU	Natural History Museum and Biodiversity Research Center, University of Kansas Lawrence, KS, U.S.	0	
LACM	Natural History Museum of Los Angeles County Los Angeles, CA, U.S.	0	
LSUMZ	Louisiana Museum of Natural History, Louisiana State University Baton Rouge, LA, U.S.	0	
MCZ	Museum of Comparative Zoology, Harvard University Cambridge, MA, U.S.	4	**4**
MMNS	Mississippi Museum of Natural Science Jackson, MS, U.S.	0	
MNHN	Musée National d'Histoire naturelle, Systématique et Évolution Paris, France	5	**5**
MNRJ	Museu Nacional, Universidade Federal do Rio de Janeiro Rio de Janeiro, Brazil	5	**5**
NCSM	North Carolina Museum of Natural Sciences Raleigh, NC, U.S.	1	**1**
NLU	Museum of Natural History, University of Louisiana at Monroe Monroe, LA, U.S.	1	**1**
SIU	University of Iowa Iowa City, IO, U.S.	1	**1**
TCWC	Texas Cooperative Wildlife Collection, Texas A&M University College Station, TX, U.S.	0	
TNHC	Texas Natural History Collections, University of Texas at Austin Austin, TX, U.S.	0	
TU	Riverside Research Laboratories, Tulane University Belle Chasse, LA, U.S.	1	
UAIC	Ichthyological Collection, University of Alabama Tuscaloosa, AL, U.S.	1	
UF	Florida Museum of Natural History, University of Florida Gainesville, FL, U.S.	2	**2**
USNM	Smithsonian Institution National Museum of Natural History Washington D.C., U.S.	13	**11**
YPM	Peabody Museum of Natural History, Yale University New Haven, CT, U.S.	0	

of Vicente Faria (2007), from the NSED, from colleagues Tonya Wiley and Matthew McDavitt, and from three online databases:

www.fishbase.org
http://www.fishnet2.net/index.html
https://fp.auburn.edu/cosam/fish_search/search.asp)

These institutions are listed in Table 2. The limited time frame allotted to this review precluded our visitation to all museums hosting sawfish specimens to confirm identifications, so herein we rely on many identifications made by museum curators and researchers who have critically examined the curated material. A large number (173 records from 20 collections) of museum specimens, primarily dried disarticulated rostra, were identified by Vicente Faria (2007) and smaller number by Matthew McDavitt, Tonya Wiley, and co-author Burgess. Most identified by the latter were made from photographs or illustrations of specimens, some kindly provided by hosting museums, and from provided rostral tooth counts. We follow Faria (2007) in assigning all Atlantic largetooth sawfishes to *P. perotteti* and do not address the Indo-Pacific largetooth species *P. microdon* and *P. zephyreus*; see **SYSTEMATICS** for further discussion. Our search produced five additional confirmed records from other museums. *Pristis perotteti* records are listed in Appendix I.

Unconfirmed *Pristis* sp. and *P. pristis* museum records from the western and north-central Gulf of Mexico waters of Mexico - Texas, Louisiana and Alabama (no such records were encountered from Mississippi or they too would have been included) - also were inserted into the database (as *Pristis* sp.) because it is possible they represent unidentified or misidentified *P. perotteti*. However, these specimens are tabulated separately from the *P. perotteti* records and are listed in Appendix II. Though dedicated efforts were made to complete a comprehensive search of museum records, many unidentified or possible misidentified sawfish specimens remain in the museums consulted. It is our intention to continue to seek and confirm the identifications of museum records of sawfishes as part of NSED activities.

The lack of recent local or regional studies addressing largetooth sawfish status, biology and ecology made it necessary to rely on personal communication to ascertain the current status of the species throughout much of its Atlantic range. To that end, local scientists and fisheries managers knowledgeable about the current situations in Mexico, Central and South America, and the west coast of Africa were contacted and requested to assist by providing any recent or historic sawfish records from their geographical regions and to provide their personal evaluations of the regional status of the species.

We were fortunate in having one co-author (Fernandez de Carvalho) fluent in Spanish and Portuguese, allowing us to communicate with biologists and fishery managers in their native languages, facilitating communication and speeding up the information gathering process. The list server of the Gulf and Caribbean Fisheries Institute (GCFI) was used to reach hundreds of researchers in the Gulf of Mexico and Caribbean region and requests (in English, Spanish and French) about the project were circulated through

TABLE 2. Institutions and individuals from which *Prists perotteti* records were obtained through indirect sources.

ACRONYM	COLLECTION	SOURCE	NUMBER *P. PEROTTETI*	NUMBER CONFIRMED
AUM	Natural History Museum, Auburn University Auburn, AL, U.S.	Online Database	0	
BS	Dr. Bernard Séret Paris, France	Faria 2007	0	
CCMSH	Corpus Christi Museum of Science and History Corpus Christi, TX, U.S.	Tonya Wiley	1	**1**
IFAN	Institute Fondamental d'Afrique noire Gorée, Senegal	Faria (2007)	1	**1**
INPA	Instituto Nacional de Pesquisas da Amazonia Manaus, Amazonas, Brazil	Faria (2007)	3	**3**
JS	Collection of Jason Seitz Gainesville, FL, U.S.	Jason Seitz; NSED; Faria (2007)	3	**3**
MR	Collection of Matthew McDavitt Charlottesville, VA, U.S.	Matthew McDavitt; NSED; Faria (2007)	5	**5**
MRAC	Musée Royal de l'Afrique Centrale Tervuren, Belgium	Faria (2007); Online Database	8	**8**
PCA	Collection of Patricia Charvet-Almeida Belém, Brazil	Faria (2007)	108	**108**
RMNH	Naturalis - National Natuurhistorisch Museum Leiden, Netherlands	Faria (2007)	4	**4**
TAMUCC	Texas A&M University Corpus Christi Corpus Christi, TX, U.S.	Tonya Wiley	1	**1**
ZMB	Humboldt-Universität, Museum für Naturkunde, Zoologisches Museum, Vertebraten (Wirbekltiere), Ichthyologie Berlin, Germany	Faria (2007)	2	**2**

the list in an effort to gather as much information as possible. Furthermore, 43 scientists and fishery managers were proactively contacted after an intense search for relevant contacts from the regions (Table 3). However, since there are no sawfish statistics or data keeping only recently has been initiated in virtually all of the countries within the species' range, several scientists replied that finding such rare data about the species would require far more time than the three months we had available for the completion of this project.

Sawfish records that were obtained during the collection process were entered into a Microsoft Access database. The database was set up using similar fields to those in the NSED to facilitate the integration of the two databases into one Access database in the near future. Filtering the database by year, collector and location allowed us to detect and remove duplicates originating from different sources (e.g. museum records that were also cited within the primary literature, multiple newspaper articles referring to a single specimen, etc.). Co-author Burgess reviewed photographs from more than 600 NSED encounter case files and verified, changed or added identifications to all cases bearing photographic documentation. While we attempted to verify the identifications of scientific records by examination of museum specimens, photographs, scientific notes, and/or interviews with relevant observers, the nature of records – many historic and published in regional or obscure journals lacking in photographs or illustrations, most often not documented with museum-curated specimens or, if so, those specimens now missing – dictates that some older accepted literature and museum records possibly could be based on misidentified smalltooth sawfishes.

A website (http://www.flmnh.ufl.edu/fish/sharks/sawfish/largetooth.html), linked to the Florida Museum of Natural History Ichthyology Department website has been constructed to facilitate outreach and education of our internet audience concerning the largetooth sawfish. This website contains links to information concerning the biology, distribution and conservation of largetooth sawfish, as well as images and media. Links to the listing documents and species of concern information can also be found here. This website will be updated upon completion of this report and as any new pertinent information concerning this species and its conservation become available.

Results and Discussion

SYSTEMATICS

The taxonomy of the pristid sawfishes was comprehensively reviewed by Vicente Faria (2007). Using molecular phylogenetic techniques and morphological characters, Faria determined that the family Pristidae is comprised of seven extant species. Faria found *Pristis perotteti* Müller & Henle, 1841 to have significantly lower rostral tooth counts than *P. zephyreus* Jordan and Starks, 1895, which also had a significantly lower posterior lateral intertooth distance. *P. perotteti* differed from *P. microdon* Latham, 1794 in eye length and dorsal fin height, but the difference in dorsal fin height may be merely an

TABLE 3. Scientists contacted to request regional information on *Pristis perotteti*

NAME	COUNTRY	INSTITUTION
GCFI list server	Caribbean	Gulf and Caribbean Fisheries Institute
Monique G.G. Grol	Aruba	Radboud University Nijmegen
Carolus M. Voreen	Brazil	Fundação Universidade Federal do Rio Grande
Alberto F. Amorim	Brazil	Instituto de Pesca
M. Cristina Oddone	Brazil	Secretaria especial de Aqüicultura e Pesca da Presidência da Republica
Otto Bismarck Gadig	Brazil	Universidade Estadual Paulista (UNESP)
Jorge kotas	Brazil	IBAMA
Ning Labbish Chao	Brazil	Projecto Piabas
Patricia Charvet-Almeida	Brazil	Projecto Trygon and Museu Paranense Emílio Goeldi
Fabio H. V. Hazin	Brazil	Universidade Federal Rural de Pernambuco
Rosangela Lessa	Brazil	Universidade Federal Rural de Pernambuco
Jorge L. Silva Nunes	Brazil	Universidade Federal do Maranhão
Ricardo S. Rosa	Brazil	Universidade Federal da Paraiba
Jules M. R. Soto	Brazil	Museu Oceanográfico Univali
Rachel T. Graham	Belize	Wildlife Conservation Society
Sergio Martínez C.	Central America	FIINPESCA / FAO
Enriqueta Hawkins	Colombia	CORALINA
Andres Felipe Navia	Colombia	Squalus Fundacion
Paola Andrea Mejía Falla	Colombia	Squalus Fundacion
Juan Pablo Caldas	Colombia	ICA
Marcela Grijalba	Colombia	Universidad de Bogotá
Fabio Gomez	Colombia	Pontificia Universidad Javeriana
Arturo Acero	Colombia	Invemar-Instituto de Investigaciones Marinas y Costeras
Randall Arauz	Costa Rica	PRETOMA
William Bussing	Costa Rica	CIMAR, Universidad de Costa Rica
Mario Formoso	Cuba	CIP
F. Pina-Amargós	Cuba	CIEC
Adolphe O. Debrot	Curaçao	Carmabi Foundation
Jérémy Huet	Guinea-Bissau	Noé Conservation project
Luis Morales	Honduras	Directorate of Fisheries and Aquaculture
Oscar Sosa-Nishizaki	Mexico	IEMANYA
Lloyd Findley	Mexico	University California Institute for Mexico and the United States
José Leonardo Castillo-Geniz	Mexico	INAPESCA
Héctor Espinosa Pérez	Mexico	Universidad Nacional Autónoma de México
Fernando Marquez	Mexico	Instituto Nacional de la Pesca, SAGARPA
Juan Carlos Perez,	Mexico	ECOSUR
Manuel Mendonza Carranza	Mexico	ECOSUR
Cesar Rivera	Nicaragua	CIPA-Centro de Investigaciones Pesqueras y Acuicola
Renaldy Barnutti	Nicaragua	CIPA-Centro de Investigaciones Pesqueras y Acuicola
Hector Guzmàn	Panama	Smithsonian Tropical Research Institute
Daniel Matos-Caraballo	Puerto Rico	PR DNER Fish. Res. Lab
Áurea E. Rodríguez	Puerto Rico	University of Puerto Rico
Rafael Tavares	Venezuela	Instituto Nacional de Investigaciones Agrícolas.
Freddy Arocha	Venezuela	Universidad de Oriente

artifact of low sample size and neither of these characters can be considered diagnostic. *Pristis pristis* (Linnaeus, 1758) is the oldest name that has been applied to a largetoothed sawfish species. However, lack of a holotype and a nebulous description precludes this taxon from being assigned to a single species. Due to the confusion surrounding this name, Faria (2007) proposes suppression of the name and has submitted a formal proposal to do so to the International Commission of Zoological Nomenclature.

Though it is not possible to uniformly distinguish the three largetooth sawfish species solely on morphological characters, Faria was able to use molecular genetics techniques to determine geographical population structure of the largetooth species group and determined that there are three valid species, each restricted to a separate ocean basin: *P. microdon* in the Indo-West Pacific, *P. zephyreus* in the eastern Pacific and *P. perotteti* in the Atlantic. Based on results of his molecular genetics population structure study, Faria (2007) recommends that western and eastern Atlantic populations of *perotteti* as well as *pectinata* should be considered separately for conservation purposes.

DISTRIBUTION AND RELATIVE ABUNDANCE

The largetooth sawfish historically ranged from the Gulf of Mexico and southeastern Florida to south-central Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic (Figure 1). Over the last century this distribution has been considerably truncated and abundance levels, based on reduced encounter data and personal communication with scientific colleagues, have fallen. In this respect the pattern of range reduction and apparent decline mirrors that of smalltooth sawfish, likely reflective of the same underlying factors that deleteriously affected that species, overfishing and habitat loss.

UNITED STATES. The largetooth sawfish was never an abundant species in U.S. waters. The species was most common in Texas waters and was rarely encountered east of Port Arthur. There are only four or five U.S. records outside of Texas, including a single large (16 ft, 4.88 m TL = total length) specimen from “Louisiana” in the 1916-1919 period (rostrum archived in the University of Iowa Museum of Natural History, Cindy Opitz pers. comm.) and three or four individuals from Florida (Fig. 2, Table 4).

Boschung (1992) included the largetooth sawfish (as *P. pristis*) in his inclusive catalog of Alabama fishes, noting that a single unexamined specimen “presumably is from Alabama” but is missing from the UAIC collection, so neither identity nor location could be verified (Fig. 3, Table 5). Bernie Kuhajda (UAIC, pers. comm.) reports that there actually are two cataloged nominal *P. perotteti* (UAIC 4138.01-1 and UAIC 4138.01-2) in the collection, that both totally lack location data, and that the latter specimen could not be found. This likely is the specimen referred to by Boschung (1992). A digital photo

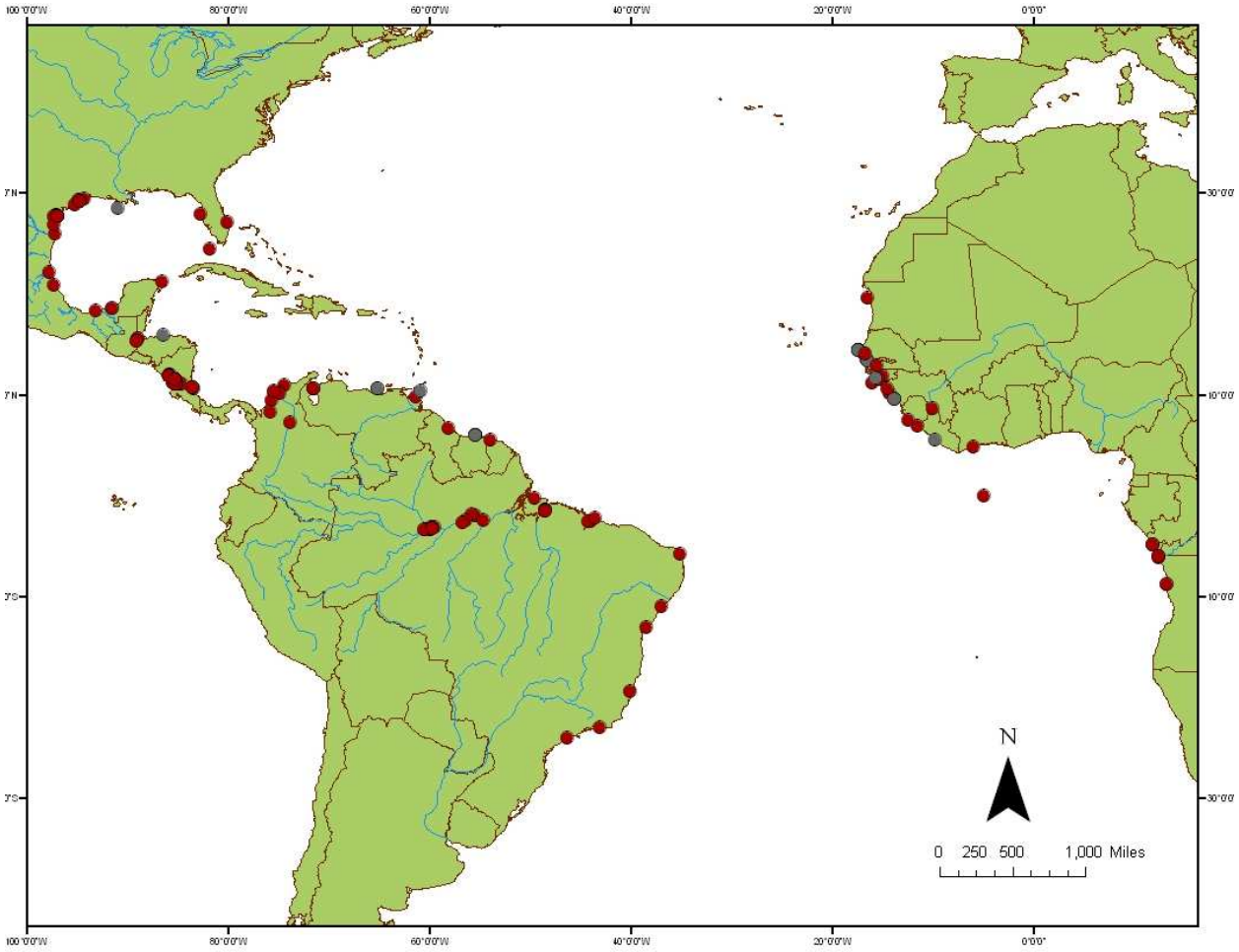


FIGURE 1. Range of *Pristis perotteti*. Red dots represent records for which specific locality is available and grey dots represent records for which only a general location (i.e. country or state) is available. West coast of Florida and offshore African records are questionable.

of UAIC 4138.01-1 reveals it is a misidentified *P. pectinata*. There are no Mississippi records.

Two of the Florida records emanated from and were identified by renowned elasmobranch researcher Stewart Springer: a 1941 Key West specimen (Baughman 1943) and Bigelow and Schroeder's (1953) report of one from off Port Salerno (located on the southeast coast of Florida near Port St. Lucie) captured during the 1943-1952 period, both included on personal communication with Springer who identified them using rostral tooth counts. The Port Salerno capture is the only U.S. record of largetooth sawfish outside the Gulf of Mexico. Another "southern Florida" specimen, presumably from Key West or the southeastern the Gulf of Mexico, was collected by J.T. Nichols of the American Museum of Natural History (AMNH 11) during the January-February 1910 Fabbri Tekla Expedition.

TABLE 4. Regional and temporal distribution of U.S. *Pristis perotteti* records. Records lacking state data are listed under "Gulf of Mexico." Florida 1960 record is questionable.

	REGION				
YEAR	TX	LA	FL	GULF OF MEXICO	TOTAL
1878				1	1
1910			1		1
1917	1				1
1918		1			1
1925	1				1
1929	1				1
1935	1				1
1938	3				3
1940	5				5
1941			1		1
1942	8				8
1943	6				6
1947	2				2
1948	1				1
1951	1				1
1957	1				1
1960			1		1
1961	1				1
1943-1953			1		1
YEAR ???	1			1	2
TOTAL	**33**	**1**	**4**	**2**	**40**

TABLE 5. Regional and temporal distribution of U.S. *Pristis* sp. records. Florida records are excluded because they most likely represent *Pristis pectinata.*

	STATE					STATE			
Year	**TX**	**LA**	**AL**	**Total**	**Year**	**TX**	**LA**	**AL**	**Total**
1852	1			**1**	**1938**	6			**6**
1859	2			**2**	**1939**	2			**2**
1879	2			**2**	**1940**	33			**33**
1881	1			**1**	**1941**	6			**6**
1885	2			**2**	**1943**	1			**1**
1886	1			**1**	**1945**	3			**3**
1888	1			**1**	**1946**	4			**4**
1890	1			**1**	**1947**	3			**3**
1892	2			**2**	**1948**	6			**6**
1894	7			**7**	**1949**	3			**3**
1896	1			**1**	**1950**	5			**5**
1897	1		1	**2**	**1951**	2			**2**
1900	1			**1**	**1952**	2			**2**
1904	1			**1**	**1953**	2			**2**
1906	1			**1**	**1955**	1			**1**
1909	1			**1**	**1956**	1			**1**
1912	1			**1**	**1957**	5			**5**
1920	3			**3**	**1959**	2			**2**
1922	1			**1**	**1961**	2			**2**
1924	1			**1**	**1962**	1			**1**
1926	1			**1**	**1963**	1			**1**
1929	18			**18**	**1964**	2			**2**
1930		1		**1**	**1965**	2			**2**
1931	2			**2**	**1966**	2			**2**
1933	4			**4**	**1972**	1			**1**
1934	3			**3**	**1979**	2			**2**
1935	3			**3**	**1984**	1			**1**
1936	2			**2**	**2003**	1			**1**
1937	2			**2**	**2008**	1			**1**
					Year???	5		1	**6**
					TOTAL	**175**	**1**	**2**	**178**

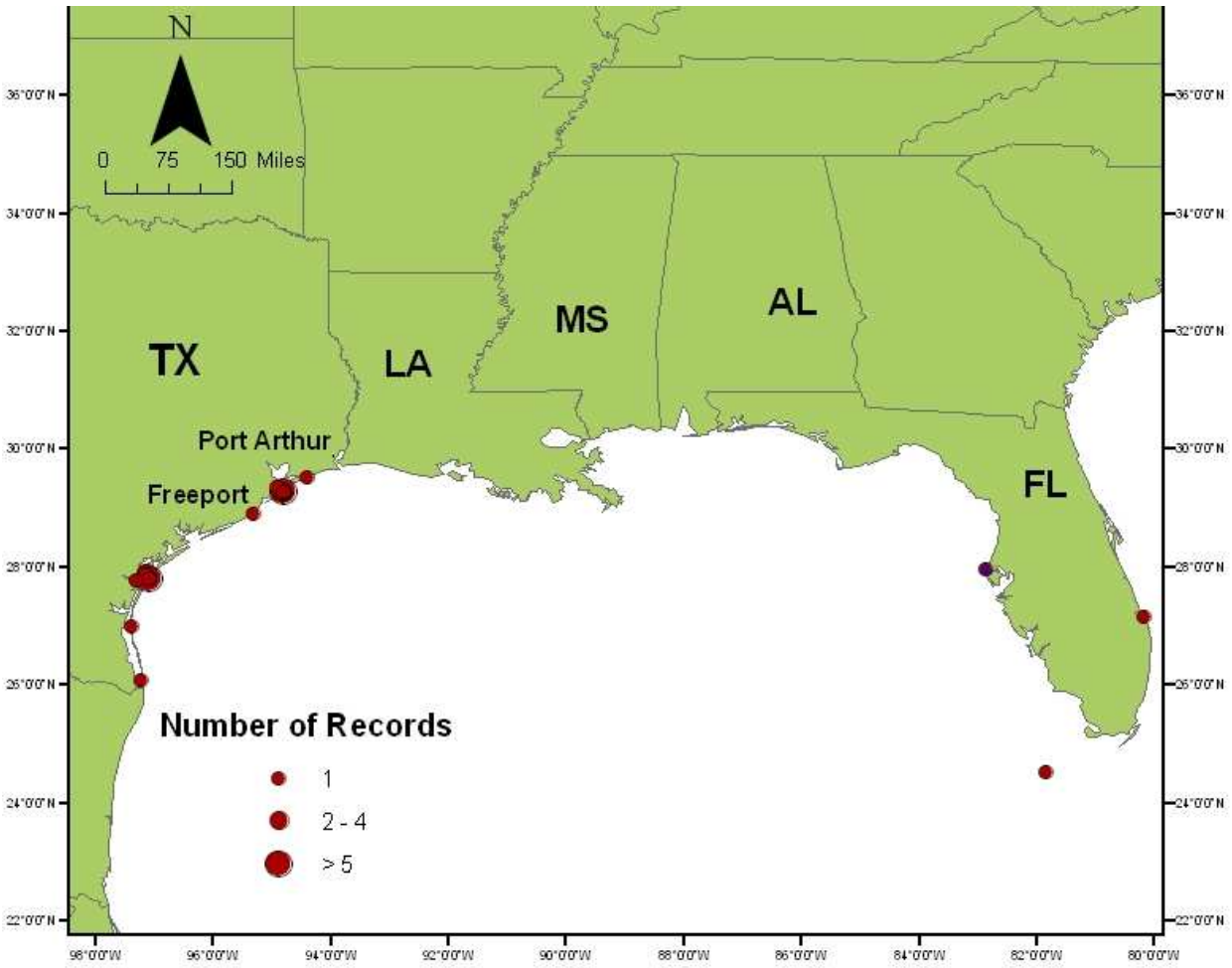


FIGURE 2. Distribution of *Pristis perotteti* in U.S. waters. Records from "Louisiana" and "Gulf of Mexico" not plotted; west coast of Florida record is questionable.

A questionable *Pristis perotteti* record is included by Springer and Woodburn (1960) in their seminal study of Tampa Bay fishes. Therein they note, "A small dried specimen taken near Clearwater is on display at the Sea-Orama on Clearwater Beach." The provenance of any specimen associated with a public aquarium is always in question as importation of live specimens from distant locations is normal operating procedure and retention of the rostra of aquarium-held sawfish mortalities as crowd-pleasing curios was *de rigueur* in the aquarium community of that era. In addition, the small size of the specimen differs significantly from the larger sizes recorded for this species in other U.S. catches, all measured individuals having been 14 ft (4.3 m) TL or larger. Alternatively, the specimen (not seen) could represent a uterine "pup" removed from an adult female.

Although partially an artifact of the developing maturity of local journalism and fishing pressure of the 1917-1963 era, Texas historically has had more documented largetooth sawfish encounters than any geographic region outside of Nicaragua and Brazil

(Fig.4a). Recreational fishing along the Texas coast began in earnest early in the twentieth century and from the late 1930's onwards there were individuals who specialized in targeting large elasmobranchs, notably sharks and sawfishes. In addition, a developing trawl fishery also resulted in increased encounters with sawfishes (Fig. 5a). As noted above, such catches were favored stories in the print media and photographs often were taken of the prized catches which have survived to this day. As a result we have 33 records of largetooth sawfish captures from Texas (plus two from "Gulf of Mexico" that likely were from Texas), but none since 1961.

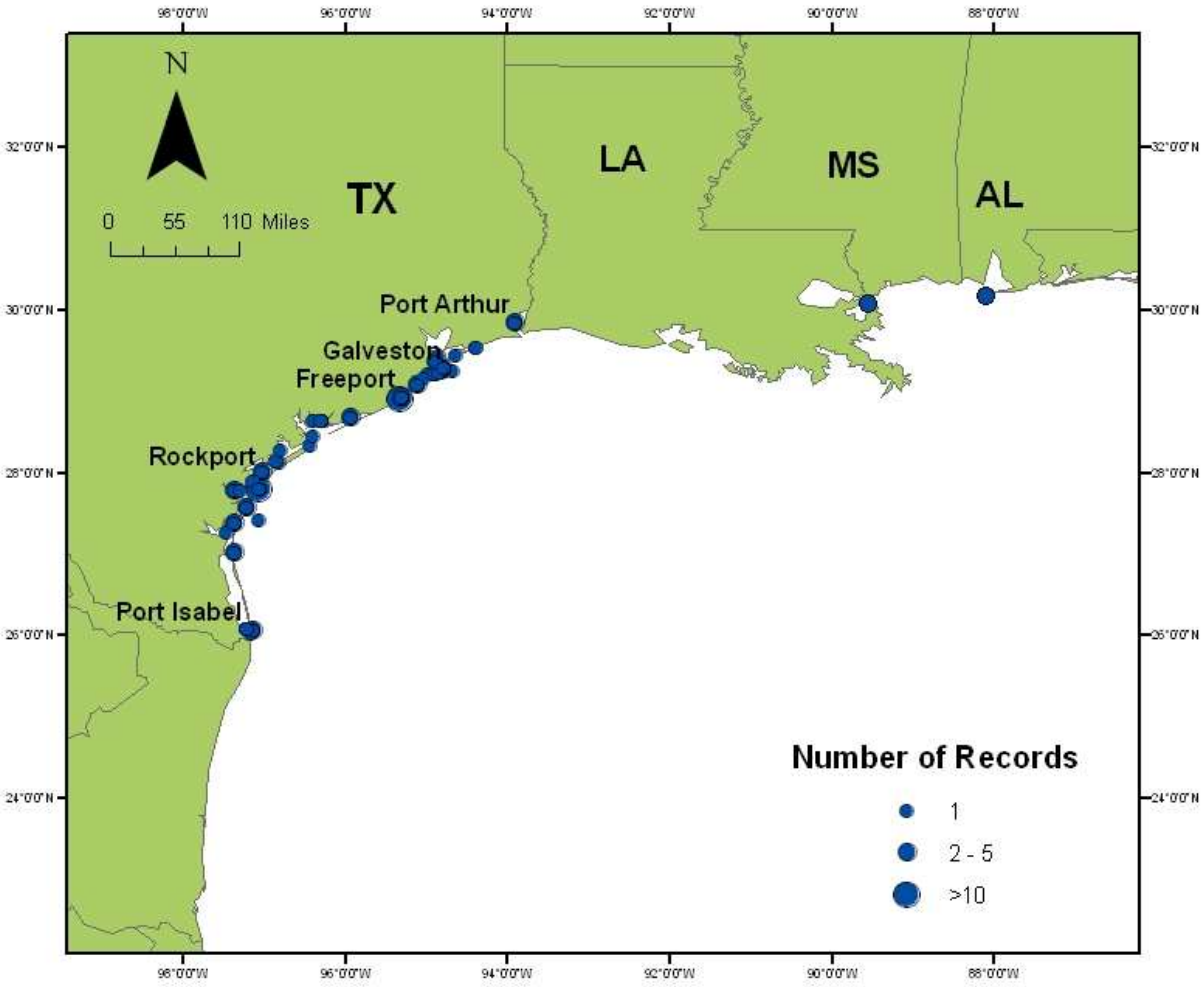
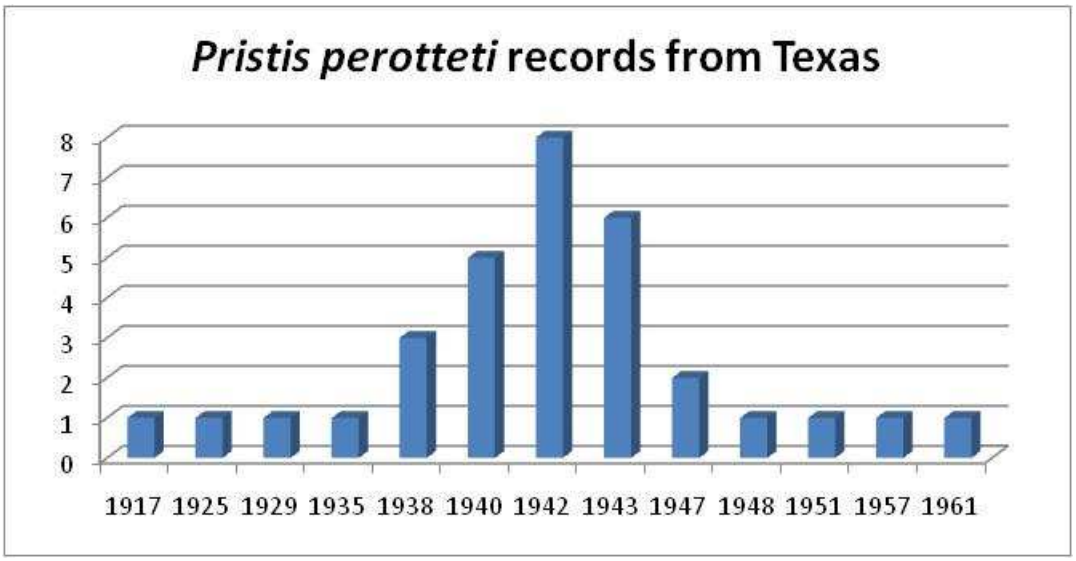


FIGURE 3. Distribution of *Pristis* sp. in U.S. Gulf of Mexico waters of Texas, Louisiana, Mississippi and Alabama.

Largetooth sawfishes undoubtedly were present in and captured by humans in Texas prior to our earliest record from 1917, a Port Aransas specimen popularly reported at 18ft in length but calculated at 5.59 m TL based on the extant 112 cm rostrum archived by the Denver Museum of Nature and Science (Hoover 2008). Despite a number of early literature reports describing sawfish encounters in the circum-Gulf of

Mexico region, the lack of discrimination between the two sawfish species does not allow us to document largetooth distribution in the critical pre-twentieth century period prior to the onset of intense anthropogenic pressure on these animals and their preferred habitat (Fig. 4b, 5b).

(a)



(b)

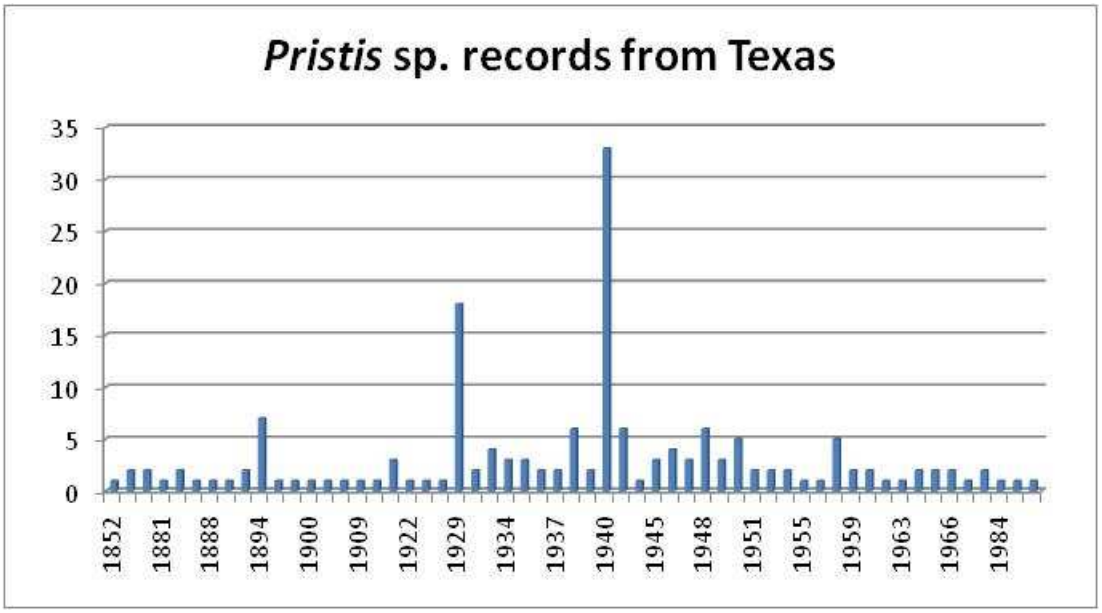
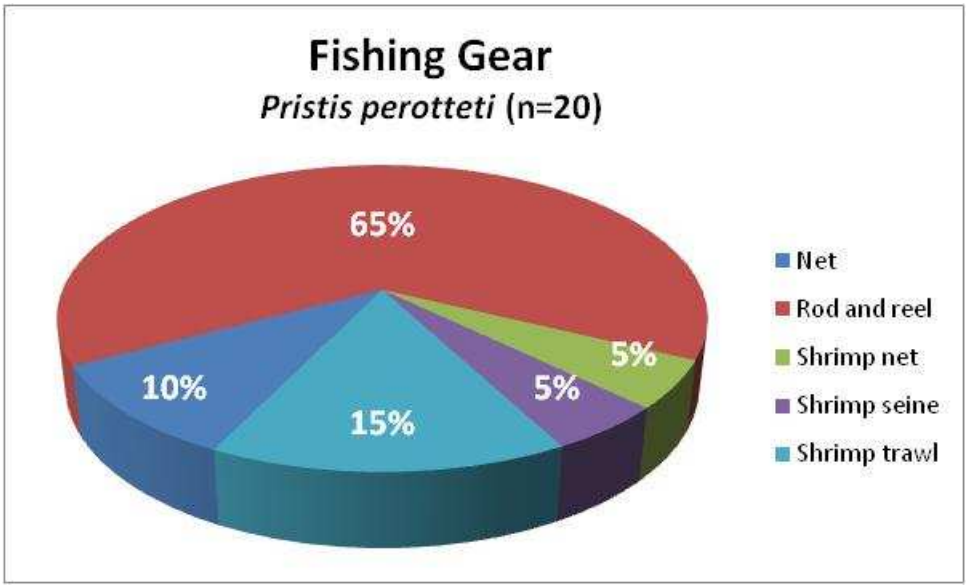


FIGURE 4. Temporal distribution of records of **(a)** *Pristis perotteti* and **(b)** *Pristis* sp. from Texas waters.

(a)



(b)

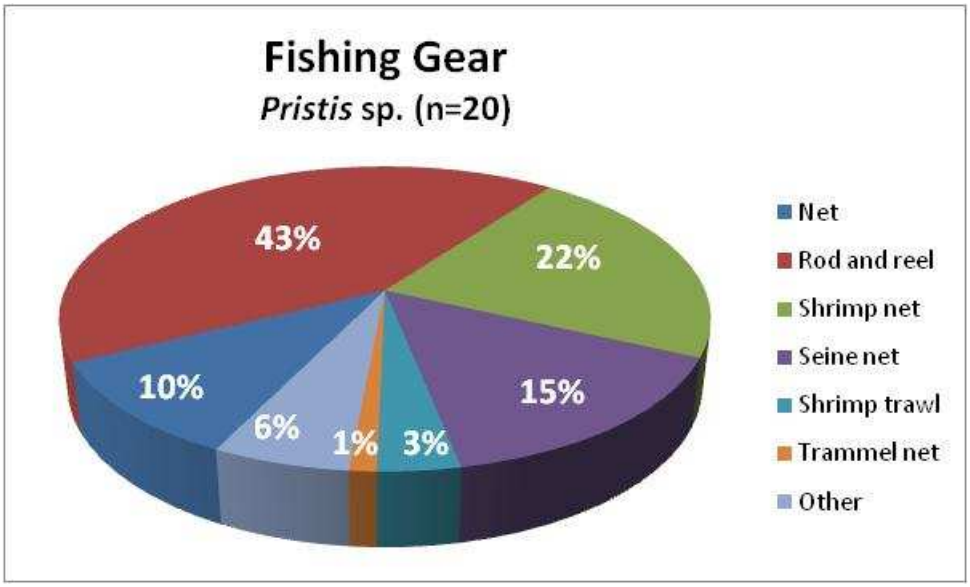


FIGURE 5. Fishing gear associated with captures of **(a)** *Pristis perotteti* and **(b)** *Pristis* sp.

For example, John James Audubon visited Galveston Bay in 1837 and, between shooting birds, shot and captured a 12 ft sawfish in its shallows (Audubon 1843), but details he provided are too scanty for a species identification. We are pursuing the possibility that a BMNH specimen may correspond to this capture.

At time of this writing the ratio of smalltooth to largetooth records from Texas in the NSED is roughly 1:1, so it is likely that scientific literature and print media reports from

the region currently unattributed to species represents both species in approximately equal numbers. This is consistent with the observations of fishermen who told Baughman (1943) that the two species were present in equal proportions. For that reason, we are including herein (Appendix II) all Texas records we are unable to allocate beyond *Pristis* sp. identification because perhaps half of the records could represent largetooth sawfish. With further study, some of these seventy-odd reports may eventually be identified to species. However, our characterizations noted above and below are based solely on confirmed largetooth encounters.

In Texas, largetooth sawfishes were primarily found in three almost equidistant regions, from southwest to northeast: Padre Island-Laguna Madre, Corpus Christi-Port Aransas, and Galveston-Texas City-Freeport (Table 6, Table 7, Fig. 6a,b). Interestingly, considering that inoculation of this population segment undoubtedly was from the south (Mexico and Central America), the highest number of records were from the northeast Texas coast, followed by the central section, with few records from the region adjacent to the Mexican border. This corresponds with the historic freshwater inflow pattern of the region, which has a gradient from highest inflows in the northeast to lowest along the southwest coasts (Longley 1994). The importance of freshwater inflow to productivity of the region is well understood (TDWR 1982) and the influence of lower salinity water is especially important to the largetooth sawfish, a species that favors such waters more than its relative the smalltooth sawfish (Thorson 1974). Thus the presence of higher-flow riverine estuaries may have played a role in attracting larger numbers of largetooth sawfishes to the Galveston-Texas City-Freeport and Corpus Christi-Aransas regions than areas to the southwest. However, in the absence of catch-per-unit-effort data, the encounter records may simply be reflective of higher fishing efforts associated with higher human density areas.

TABLE 6. Temporal distribution of Texas county records of *Pristis perotteti*.

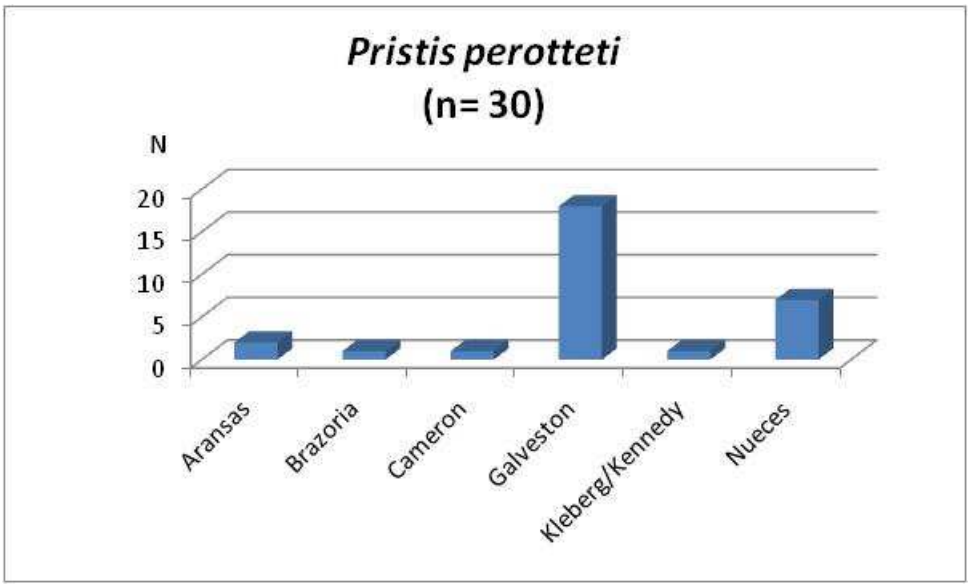
Year	Aransas	Brazoria	Cameron	Galveston	Kleberg/Kennedy	Nueces
1917						1
1925			1			
1929				1		
1935						1
1938				2		1
1940	1			3		
1942		1		7		
1943	1			3		2
1947					1	1
1948						
1951				1		
1957				1		
1961						1
Total	2	1	1	18	1	7

TABLE 7. Temporal distribution of county records of *Pristis* sp. from Texas.

YEAR	ARANSAS	BRAZORIA	CALHOUN	CAMERON	GALVESTON	JEFFERSON	KENEDY	KLEBERG/KENNEDY	MATAGORDA	NUECES
1852										
1859										
1879					2					
1881					1					
1885					2					
1886					1					
1888					1					
1890					1					
1892					2					
1894		7								
1896					1					
1897										1
1900					1					
1904	1									
1906					1					
1909		1								
1912										1
1920					2				1	
1922										
1924										
1926					1					
1929	2				1	1			14	
1931					2					
1933				2	2					
1934	1			2						
1935		1			2					
1936					2					
1937					1	1				
1938			1		5					
1939					2					
1940					23	1				
1941					3	3				
1943										
1945		1		1	1					
1946		1		2						1
1947					1					2
1948					5					
1949					2					1
1950		1		1				2		1
1951				1	1					
1952										2
1953				1	1					
1955										1
1956		1								
1957					1			1		3
1959					1					1
1961								1	1	
1962					1					
1963				1						
1964			1							1
1965			1							
1966				1	1					
1972	1									
1979			1		1					
1984	1									
2003							1			
2008				1						

YEAR??										
?					3			2		
TOTAL	**6**	**13**	**4**	**13**	**78**	**6**	**1**	**6**	**16**	**15**

(a)



(b)

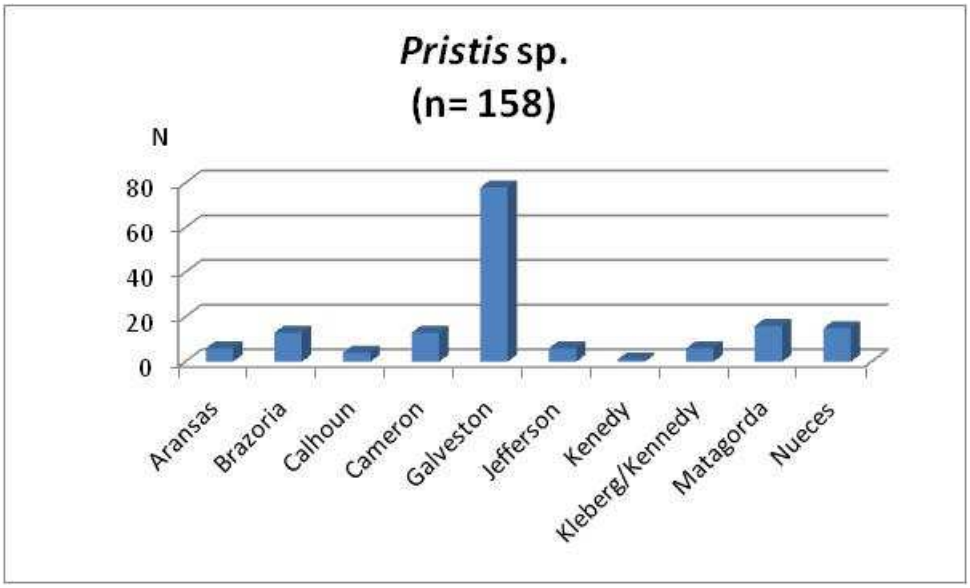


FIGURE 6. County records of **(a)** *Pristis perotteti* and **(b)** *Pristis* sp. from Texas.

The Galveston-Texas City-Freeport area hosted almost two-thirds (20 of 32) of Texas records bearing usable location data and but for one pre-1942 Freeport capture, all were taken from the environs of Galveston. All were large animals ranging in measured total lengths from 14-19.5 ft (4.27-5.94 m); an unmeasured Galveston Beach specimen documented in a 1951 home movie is estimated at 7 m TL. Captures occurred only in

warm water months from 14 May to 4 September. While some captures occurred in trawls pulled by commercial fishing vessels, the bulk of the captures were made by recreational anglers.

Since most of the recreational fishing was shore-based and trawling often occurred near shore, even within Galveston Bay (the single Texas City record from August-September 1957 is from a trawl catch made near the shipping channel turning basin), areas of capture were primarily shallow inshore waters directly off the coastline and occasionally within the bay. Captures in this region were recorded from 1929–1957 with most occurring in the 1938-1943 period, as reported upon by Baughman (1943). It is possible that there is some duplication of records as Baughman (1943) did not document all his records, thus some many refer to earlier records we have uncovered from independent sources. Baughman (1952) and Bigelow and Schroeder (1953) did not add any regional records from the 1944-1952 period and the aforementioned 1951 Galveston Beach and 1957 Texas City reports are the last from the region.

The Corpus Christi-Aransas region, including Port Aransas and Aransas Pass, are represented by ten largetooth sawfish encounters. For the same reasons noted above, there also may be duplications involving Baughman's (1943) reports and our independently derived reports from this area. The earliest (1917) and the last (24 June 1961) fully-documented (location) Texas largetooth records are from the Corpus Christi-Aransas region. All but one of the other encounters - that documented by a ca. 1947 postcard that could represent an earlier capture - are from the 1935-1943 period.

All encounters involved large animals of 16-18.5 ft (4.88-5.7 m) TL. A largetooth sawfish landed *sans* rostrum and measuring 15 ft (4.57 m) probably exceeded 18 ft in TL. As in the Galveston area, the 16 June to 8 September dates of capture were only from warm water months. Depths of encounters rarely were given but several were from shallow nearshore waters based on fishing methodology (recreational fishing), location (Corpus Christi Bay), and lack of specimen morbidity (one landed sawfish was lively enough to slash a fisher, knocking him off the dock).

Only two largetooth sawfishes have been reported from the Padre Island-Laguna Madre area, a 17 ft 2 in (5.2 m) TL Port Isabel specimen appearing on a 1925-postmarked postcard and a 20 ft (6.1 m) TL, 800 lb largetooth taken in a shrimp trawl off South Padre Island ca. 3 August 1947. The length and weight of the second specimen are not in sync so one or the other certainly is a poor estimation. The large sizes of these two records are consistent with other U.S. largetooth sawfish encounters, both were apparently taken in nearshore waters, and the date of capture of the South Padre Island is again a summer capture.

A newspaper article entitled *"Among the missing. What happened to all those giant coastal sawfish?"* written by Houston, TX outdoors writer Shannon Tompkins (18 May 1995) nicely summarizes the public perception of loss of the two sawfish species in Texas waters:

"Even during the 1950s and 60's, folks flying small airplanes along the coast reported regularly spotting big sawfish in the shallow bays along the Texas coast. But by the 1970s, sawfish sightings and catches had shriveled to nothing."

"Although rod and reel anglers took a lot of sawfish and some were even harpooned, nets seem to have accounted for most of the sawfish caught. Almost all of the huge sawfish in historical records were taken in nets. Gill nets and trammel nets in the bays caught a lot of them. And shrimp trawls scooped up the slow-moving fish in the bays and near-shore Gulf."

"Bay pollution reached crisis levels in the 60's, the same decade sawfish went off the screen. And that's the same decade intense reservoir construction dramatically changed fresh water inflows to Texas bays, altering the fragile hydrology of inshore waters."

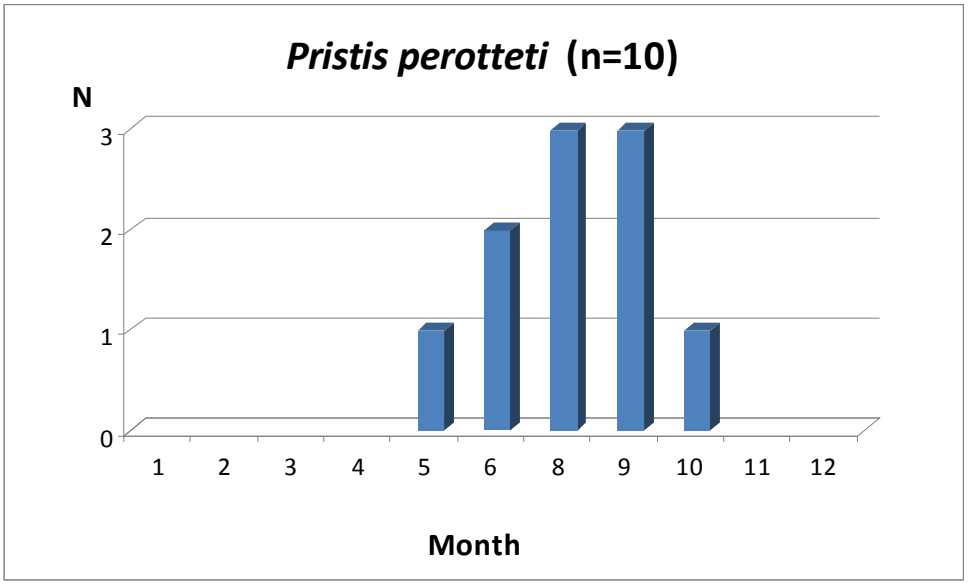
The largetooth sawfish is at the northern periphery of its natural range in U.S. waters. Unlike the smalltooth sawfish, which has a refugium in the waters of southern Florida, the largetooth apparently is extinct in U.S. waters. The last confirmed documented record of the species in the U.S. was recorded in Port Aransas, Texas on 24 June 1961; another taken in 1963 by a shrimp trawler off Texas and identified in a newspaper article as a "broadbill sawfish" likely refers to this species.

The decline of the largetooth sawfish in the U.S. follows the same pattern exhibited by the smalltooth sawfish (Burgess and Curtis 2003; NMFS 2009). In both cases the extremes of their distributional ranges sequentially shrunk in the face of increased fishing pressure and alterations of environment. For the smalltooth sawfish, which once ranged as far north as New York and now is largely confined to southern peninsular Florida waters, the last Atlantic coast record north of Florida occurred in 1963 (until one was captured off Georgia in 2002), with the last reports recorded from NY in 1782, NJ in 1900, MD in 1911, VA in 1927, NC in 1963 (until one was captured in 2002), SC in 1958, and GA in 1950. In the Gulf of Mexico, where smalltooths ranged from the Florida Keys to Brownsville, Texas and waters to the south, the restriction occurred from northeast to southwest, the last records occurring in Alabama in 1968 (until one was sighted in 2005), Mississippi in 1966, Louisiana in 1971 (until one was sighted in 2005), and Texas in 1984 (until one was sighted in 2003). The largetooth sawfish's Gulf of Mexico distributional decline pattern includes last records in Florida in 1941, Louisiana in 1917, and Texas in 1963. Until the recent non-Florida sightings/captures of a few smalltooth waifs, the last smalltooth and largetooth sawfish records in the northern portions of their respective ranges were recorded in 1963.

All largetooth sawfishes captured in U.S. waters were large, motile individuals occurring at the northern terminus of its distributional range only during warm water time periods (Fig. 7a, b). It is apparent that this species historically was represented in the Gulf of Mexico by seasonal transients that took advantage of Texas waters, only occasionally wandering eastward to Louisiana and Florida, barely "turning the corner" to southeastern Florida. However, the abundance of historical records from Texas – equal to those of smalltooth sawfishes and only surpassed by encounters in population hubs Nicaragua-Costa Rica and Brazil – is intriguing. When considered in conjunction with

its regularity of occurrence prior to its marked reduction in abundance, coincident with that of its congener, it appears that at one time the western Gulf of Mexico was an important area for a species that probably was never was abundant throughout much of its range.

(a)



(b)

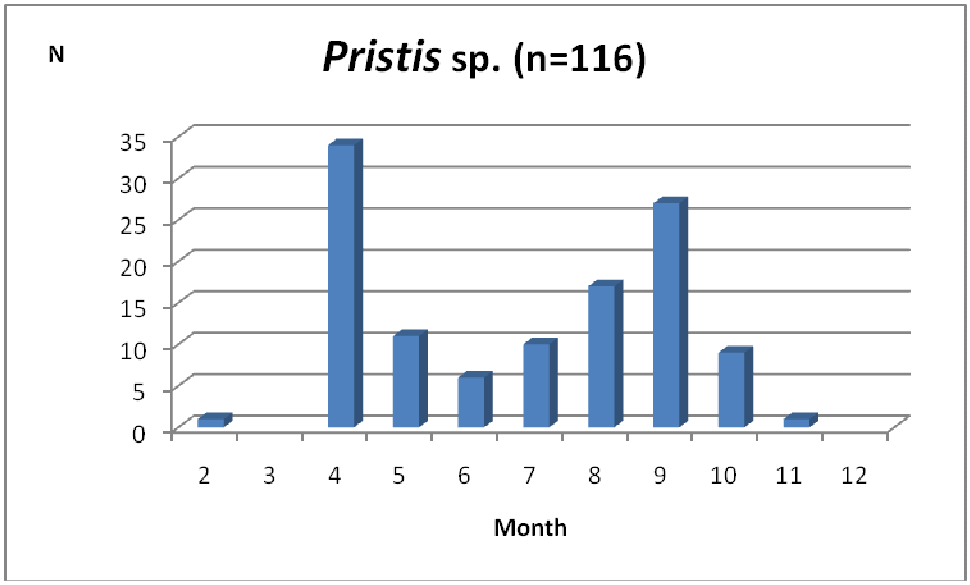


FIGURE 7. Monthly records of **(a)** *Pristis perotteti* and **(b)** *Pristis* sp. in the Gulf of Mexico.

THE CIRCUM-CARIBBEAN AND NORTHERN SOUTH AMERICA REGION. Records from this region, save Nicaragua and Costa Rica, are remarkably sparse, perhaps in part because of taxonomic confusion with the smalltooth sawfish, but more likely because of insufficient scientific collecting and popular reporting during times of former relative abundance, and the current decline in abundance observed throughout the region. A unifying theme developed during recent communication with regional biologists is "no information available." While some of this simply may be attributable to lack of regional data on largetooth sawfish, even those with good knowledge of local fauna and fisheries indicate that the species is seldom if ever encountered. Unfortunately this trend mirrors that seen for the species in the United States, Brazil and the west coast of Africa and, in the broader view, of sawfishes as a group globally.

Outside of Costa Rica and Nicaragua, there are a total of only 33 documented records (plus two old museum and two old literature records attributable only to "West Indies" or "Caribbean Sea," these possibly duplicate records actually only representing two specimens) of the largetooth sawfish in the area from Mexico to Guyane, a length of coastline more than three times the U.S. Gulf Coast (Fig. 8, Table 8). These include Mexico (5 records), Guatemala (5), Honduras (1), Nicaragua (483), Costa Rica (37), Colombia (7), Venezuela (6), Guyana (1), Suriname (5), Guyane (1), and Trinidad (1). Given that virtually all records are based on rostra, some extant and others missing, we cannot at this time offer total lengths for many of these specimens but should be able to do so in the future. Carvalho and McEachran (2003) recently provide an overview of the freshwater distribution of the species from Mexico to Brazil.

Castro-Aguirre (1978, 1999) lists four historic records of the species from Tampico (Tamaulipas), Tuxpan (Veracruz), Chiltepec (Tabasco), and Laguna de Terminos (Campeche), all locations in the southwestern Gulf of Mexico. The Laguna de Terminos catch was documented by Zarur Ménez (1962). One Mexican record that is quite interesting is the 5.4 m TL, 800 kg specimen landed at Isla Mujeres, Quinta Roo on 14 August 1997, offering some hope the species may still be around the periphery of the United States. Near time of capture, Dr. José Leonardo Castillo-Geniz (INAPESCA, pers. comm. 1998) wrote:

"The capture of one of this fishes is a very rare event in both coasts of Mexico, the sawfishes almost disappeared from our coastal waters, in my 15 years working with artisanal fisheries it is the first time I saw one, although, most of the artisanal fishermen said that sawfishes and probably sawsharks, were very abundant in coastal waters 30 years ago (1970's)."

More recently (Castillo-Geniz, INAPESCA pers. comm. 2009), he adds:

"In our country sawfishes have practically disappeared due to overfishing and degradation of their natural habitat, caused basically by the touristic activity and the growth of the coastal cities of Mexico."

Manuel Mendoza Carranza (El Colegio de la Frontera Sur, ECOSUR Unidad Villaher-mosa Sistemas de producción Alternativos, Pesquerías Artesanales, pers. com. (2009)

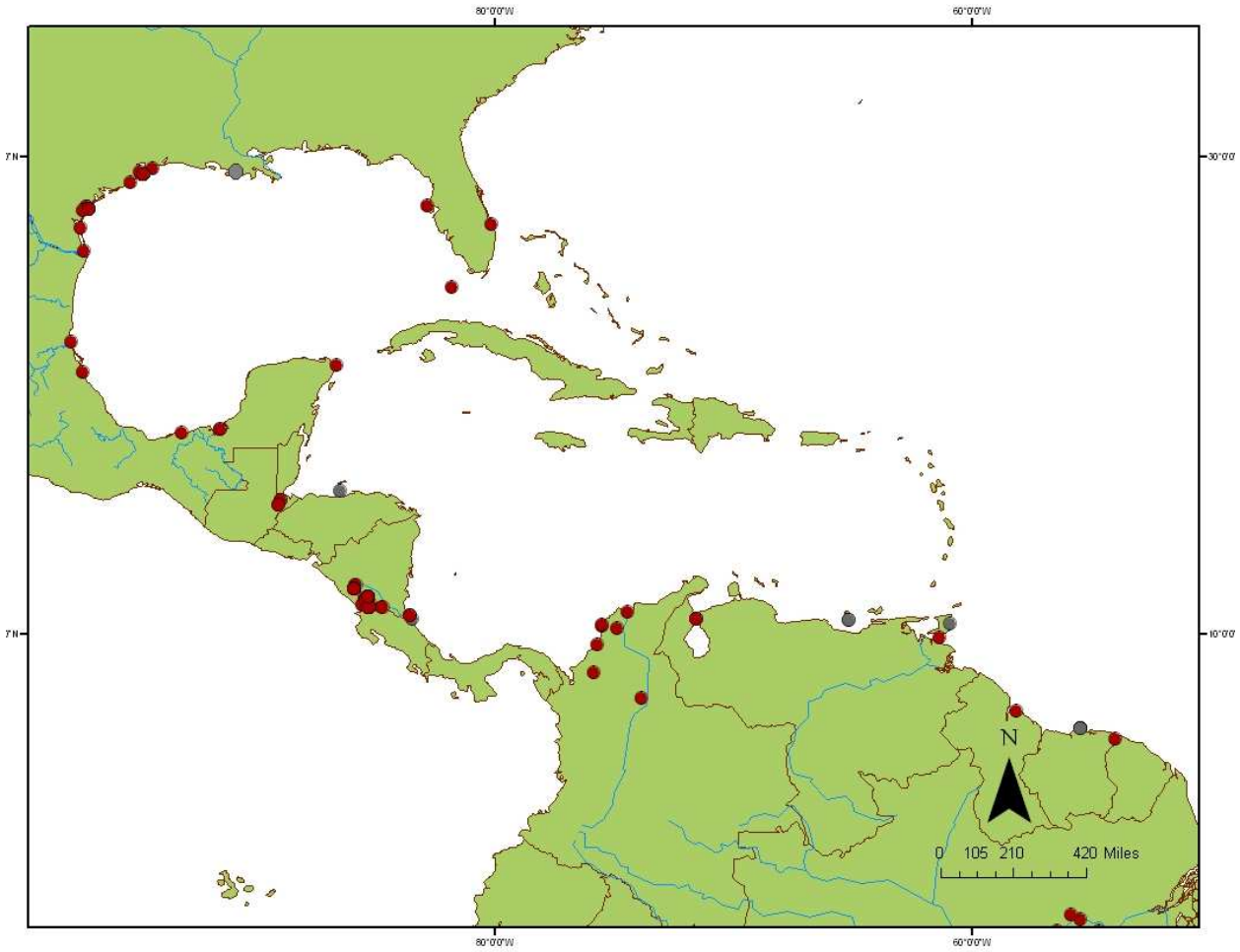


FIGURE 8. Distribution of *Pristis perotteti* in the U.S., Central America and northern South America. Red dots represent records for which specific locality is available and grey dots represent records for which only a general location (i.e. country or state) is available. West coast of Florida record is questionable.

also provides more recent information on sawfishes in the region, although it does not specifically address *P. perotteti*:

"Recently I asked about pristids here in Tabasco and the only information I got was that a bar has one sawfish saw, but I don't know the species. Also, a fisherman commented to me that about two years ago two sawfishes (about 30 cm long) were caught in a shrimp trawl. No pictures or were taken and no other testimonies, so we can't confirm the record."

Additional pessimistic words about sawfishes were shared with us by Juan Carlos Pérez Jiménez (El Colegio de la Frontera Sur (ECOSUR):

"What I can tell you is that, apparently the last records in the Gulf of Mexico, particularly in the Banco de Campeche, are from the 1950's. In the literature (technical reports and Ramon Bonfil papers) from the 70's and 80's sawfishes are no longer registered. In the Caribbean, the last

record was obtained by Leonardo Castillo in 1997. In conclusion, in Mexican waters of the Gulf of Mexico there is no longer sawfish, and I doubt that there's any left in the Caribbean."

Given the length of Mexican Gulf of Mexico and Caribbean coastline, one would have expected more historic records, but the paucity of flowing rivers in some areas of the region (especially the Yucatan) may have limited available habitat for the species. However, it is clear that the decline observed north of the Rio Grande River have also occurred to the south.

Faria (2007) includes Belize in his listed species range but cites no specimens and we have been unsuccessful in our attempt to reach out for more information from that country. All Guatemalan records are the result of Robert Rush Miller's scientific collecting in Lake Izabal in 1946-1947, with specimens cataloged and curated at the National Museum of Natural History. Saunders (1950) noted that the only Guatemalan lake where *Pristis* sp. was present was Lago Izabal and that sawfishes were among the more important inland fishes of the country. Although Thorson, Watson and C.M. Cowan (1966) took no largetooth sawfish during field work in Lake Izabal and environs, dried rostra were in seen and he concluded they were common throughout the system. One fisherman stated that sawfish were more common than the bull sharks. Recent communication with those knowledgeable of the region suggests that sawfish are no longer encountered in this estuarine riverine lake. A historic largetooth rostrum recently acquired by the Florida Museum of Natural History originating from Honduras is the only record from that country; unfortunately the specimen lacks date and location information. Lack of recent records from the Lake Yzabal region is disturbing as this certainly was a historic regional "hotspot" for sawfishes.

We located but a single Costa Rica museum record of *P. perotteti*, documented by a large 1960's rostrum from Tortuguero housed in the Florida Museum of Natural History, but Bussing (2002) indicates that, *"In fresh waters, P. pristis (= perotteti) is much commoner in the large rivers of the Atlantic floodplain. It is known in Costa Rica from the Rio Tempisque and tributaries of the San Juan basin."* We have found internet references to three recent occurrences, one a recreational catch of a 200 lb specimen and a photograph of two recently caught rosta, one quite small and likely representing a yearling. This species was at one time far more abundant than this would indicate as Thorson (1976, 1982) reported on 34 specimens taken by commercial longline fishers in the lower reaches of Rio Colorado near Barra del Colorado during the June 1966-February 1977 period. Two of these measured at 127 and 130 cm TL. During the same time period he also studied 384 caught by commercial longliners near the source of Rio San Juan at Lake Nicaragua, Nicaragua. Lengths for 19 of these individuals were listed (Thorson 1982) and ranged from 324 to 395 cm TL. Of the total 418 *Pristis perotteti* records from Thorson's decade of research in the Lake Nicaragua-Rio San Juan-Rio Colorado system, we have length and tagging location information for only 21. Lengths for 78 of Thorson's study specimens were available in Thorson (1976), but

TABLE 8. Temporal distribution of records of *Pristis perotteti* from the circum-Carbbean and northern South American region. Records listed under "Caribbean" are only known from the "Caribbean Sea," but the country is unavailable.

	COUNTRY												
YEAR	MEXICO	GUATEMALA	HONDURAS	NICARAGUA	COSTA RICA	COLOMBIA	VENEZUELA	TRINIDAD	GUYANA	SURINAME	GUYANE	BRAZIL	CARIBBEAN
1830										1	1		
1856										1			
1865												3	
1873												1	
1877				1									
1878										1		1	
1894							1						
1900							1						
1903							2						
1909													
1913												1	
1929												1	
1942				1									
1943				3									
1946		2											
1947		3											
1951													
1955												1	
1960				2	1								
1962							1			1			
1964												1	
1965												1	
1966												1	
1967												1	
1968													

TABLE 8. (CONT.) Temporal distribution of records of *Pristis perotteti* from the circum-Carbbean and northern South American region. Records listed under "Caribbean" are only known from the "Caribbean Sea," but the country is unavailable.

	COUNTRY												
YEAR	MEXICO	GUATEMALA	HONDURAS	NICARAGUA	COSTA RICA	COLOMBIA	VENEZUELA	TRINIDAD	GUYANA	SURINAME	GUYANE	BRAZIL	CARIBBEAN
1969				1									
1971												1	
1978												1	
1980				9									
1985				1									
1991				1									
1997	1												
1998				4								1	
1999												48	
2000												40	
2002												2	
2009												1	
PRE- 1934												1	
PRE-1940								1					
PER-1945						3							
PRE-1962	1												
PRE-1964						2							
1966-1977				384	34								
PRE-1974												3	
PRE-1976						1							
PRE-1978	3												
1983-1986												1	
PRE-1985						1							
PRE-1998												1	
YEAR ???			1	5	2		1		1	1		27	4
TOTAL	**5**	**5**	**1**	**483**	**37**	**7**	**6**	**1**	**1**	**5**	**1**	**139**	**4**

TABLE 9. Temporal distribution of records of *Pristis perotteti* from Costa Rica and Nicaragua.

YEAR	COSTA RICA	NICARAGUA
1877		1
1942		1
1943		3
1960	1	2
1968		71
1969		1
1980		9
1985		1
1991		1
1998		4
1966-1977	34	384
YEAR ?	2	5
TOTAL	**37**	**483**

specific tagging location information was not provided. Because of limited information supplied in those papers, it was impossible to allocate 397 of Thorson's specimens to an exact locality. However, we can say with certainty that Thorson documented taking 34 specimens in Costa Rica and 384 in Nicaragua (Table 9).

There is a long and rich history of this species in Nicaragua, both in museums and the scientific literature (we have 99 reports in addition to those noted above). The earliest reference to this species in Lake Nicaragua may have been from Spanish chronicleer Oviedo, quoted by Gill and Bransford (1877): *"…in the year 1529 I found on the coast of this lake, lying on the beach, in the Province of Nicaragua, a dead fish that the waters must have thrown out, and which no man ever saw or caught but in the sea; it is called the sword fish, the one that carries a high snout at the extremity of the upper jaw; that ferocious sword full of sharp-edged teeth (on both edges) closely spaced"* [this may also have been a *P. pectinata*, but given the predominance of *P. perotteti* at that locale (Thorson 1974) it most likely was the latter]. Gill and Bransford (1877) positively recorded the species and Meek (1907), Regan (1908), Marden (1944), Bigelow and Schroeder (1953), Hagberg (1968), and Baez (1980a, b) later reported it from Nicaragua. There are no known historical or modern records from the Atlantic coast or drainages (Montoya and Thorson 1982**,** Hector Guzmàn Smithsonian Tropical Research Institute pers. comm. 2009)**.**

While it is beyond the scope of this document, the publications on sawfishes from the Costa Rica and Nicaragua by Thorson (Gerzeli et al 1976; Montoya and Thorson 1982; Thorson 1970, 1973, 1974, 1976, 1978, 1982a, 1982b, 1987; Thorson, Cowan and Watson 1966; Watson and Thorson 1976) are essentially the only life history and movement studies addressing the species and they will serve as the basis of any future listing or recovery process. These studies establish the historical movement patterns to and from Lake Nicaragua using the San Juan River and provide important information

on reproductive biology. They are even more valuable given the largely undocumented (scientifically) decline of sawfishes and bull sharks, which shared the same habitat regionally, over the past three decades. Popular media[1,2,3,4] reports on the decline and subsequent ban on fishing by the Nicaragua government in the San Juan River that forms part of the border with Costa Rica. Web reports include observations such as, *"The giant fresh water Bull Sharks and Saw Fish are all but gone…"* on a recreational fishing site[3] and, *"To counter the troubling downward population trend, Nicaragua has recently banned freshwater fishing of the Nicaragua shark and sawfish"*[1] on a tourism site. Photos and text posted on another local fishing site[4] documents the recent capture of a neonate largetooth in the San Carlos region, offering tangible evidence that at least some reproduction is still occurring in the region, but as the poster notes, *"Nodaway* [*sic* = Now a day] *the only Sawfish I saw was is the little one of the pictures below caught in a net by a local professional Fisherman."* Bussing (2002) further notes than *"The sawfish population has been decimated by excessive fishing pressure in recent years."*

In a 2006 article entitled *"Prohíben pesca de tiburón y pez sierra"* in the Nicaraguan newspaper *La Prensa*, Mario José Moncada reports on the Nicaraguan governmental ban on fishing:

"Nicaragua will be closed indefinitely to the commercial fishery of both shark and sawfish in Lake Nicaragua, due to the slow recovery of both species populations as a result of obstacles obstructing the emigration of the species from the sea to the lake imposed by Costa Rica. The authorities of the Fishing and Aquaculture Administration (Adpesca) have confirmed that both species currently are not able to enter in the Río San Juan in order to get to the lake. Río Colorado (Costa Rica) is where currently most of Río San Juan flows to the sea. Several fishing entrapments (e.g. gillnets) are placed which capture the specis before they get to the lake."

"Miguel Marenco, Titular of Adpesca, explained that bull sharks and sawfishes used to migrate from the Caribbean sea entering by the mouth of the Nicaraguan Río San Juan, but now most of its flow flows into the sea through the Río Colorado, due to dredging."

"Danilo Rosales, Adpesca director of the monitoring, explained that some small specimens of sawfish (30 to 60 cm long) have been encountered during the investigations in the western part of the lake, however no big sawfish have been observed."

However, McDavitt (2002) argues the governmental ban on fishing has been ineffective, observing that while no longer subject to directed harvest, sawfishes continue to be killed in gillnets set for other species. In 1998 interview, an artisanal fisher indicated that

[1] http://www.geckogo.com/Guide/Nicaragua/Natural-Environment/Plants-Animals/
[2] http://www.explorecostarica.com/newsmanager/publish/Nicargua_sharks_central_america.shtml
[3] http://www.cubatravelexperts.com/nicaragua_hunting.html
[4] http://www.nicaraguafishing.com/other_fish.htm
All above active links 29 September 2009

he accidently took four to six sawfishes per year. When asked if he thought the ban on sawfish fishing has helped, he replied*, "The population has not recovered from the over-kill of the 1980's."*

The historical importance of the rivers of Costa Rica and Nicaragua to largetooth sawfish cannot be overestimated. Clearly this was and potentially still is an area that provides both nursery and adult habitat critical to largetooth sawfishes. It also may very well have served as an inoculation source for adult movements to the north and southeast, much as south Florida has served that function for U.S. East Coast (and likely northeastern Gulf of Mexico) movements.

The decline in this region has occurred as a direct result of overfishing and, while it has not been well documented scientifically, it has been as dramatic a drop as that observed in other areas. While it is unlikely that direct scientific evidence will be found to link the events, it is safe to say that intensified fishing pressure throughout the western Caribbean and northwestern Gulf of Mexico, in tandem with concurrent habitat alteration and loss, has resulted in a catastrophic decline in largetooth sawfish numbers in areas that historically, at least, were probably linked by directed movements and/or wanderings of adults and large subadults.

The occurrence of the largetooth in Colombia is documented by Miles' (1945, 1947) listings of *P. microdon* from the Magdalena River estuary. He notes (1945) that the rostra of both largetooth and smalltooth sawfishes *"were obtained from trustworthy sources at Calamar, at the juncture of the Dique with the Magdalena River. These Selachians are also reported by fishermen as far up the river as Puerto Wilches (some 600 kilometers from the mouth), though no specimens were seen there by me. I had the opportunity of examining a number of large specimens at Cartagena. Although there are several differences, including the position of the dorsal fin and the number of teeth on the rostral blade, senor E. D. Lemaitre, of Cartagena, who has studied these fishes, has come to the conclusion that the two forms found together of the Caribbean coast are sexually dimorphous."* The reference to dorsal fin placement and rostral tooth count differences clearly indicates both species were present. Miles (1947) referred to the Puerto Wilches record as *P. pectinata*, but a record this far upriver surely refers to *P. perotteti*.

Dahl (1971) reiterates Miles' Magdalena distributional records and notes, *"Big specimens are rarely captured."* Acero P. (1986), Florez Gonzales (1986), and Mejia and Acero P. (2002) also list the largetooth as members of the Caribbean Colombia ichthyofauna. There also are marine records from the Bahía de Cartagena and Isla de Salamanca (Frank and Rodriguez 1976, Alvarez and Blanco 1985) and Bahía de Cispatá (Dahl 1964) and one from fresh water (Dahl 1964, 1971 Río Sinú upstream to Betanci). Mejia and Acero P. (2002) note, *"In Colombia the status of the species is critical, since no specimens have been observed in the last 10 years."* Arturo Acero P. (Invemar-Instituto de Investigaciones Marinas y Costeras, pers. comm. 2009) further adds:

"I must say that in my opinion this species (Pristis perotteti) has been eradicated from Colombian waters. Since 1975 I have been studying Colombian marine and estuarine fishes. In these 34 years I have not seen any of these animals either in the environment or in fisherman captures. Therefore, I hope that my opinion supports the possibility of placing the species in the highest level of protection possible."

Fabio Gomez (Departamento de Biologia Ponteficia Universidad Javerina, Bogota 2009 pers. comm.) agrees:

"After evaluating my databases I see and confirm with concern what we have been discussing in the Coordinating Committee of the Action Plan for the Conservation of Sharks, Rays and Chimeras: there have been no sightings of Pristis perotteti in the last 10 years (or more) in the south Colombian Caribbean (south side of Río Magdalena to Cabo Tiburón, border with Panama)."

From Venezuela there are four confirmed records, an unverified literature record (Röhl 1942), and one questionable report, the latter based upon a large, privately-held rostrum (estimated TL = 6.1 m) believed to be from Venezuela and said to be in possession of the U.S. family for 110 years (making its acquisition date 1894 date, if accurate). Three 1900-1903 specimens confirmed or thought to be from the Maracaibo region are archived in the National Museum of Natural History and formed the basis of Schultz's (1949) inclusion of the species in his review of the region's ichthyofauna. Apparently largetooth sawfish at one time were more abundant than records indicate, for Cervignón (1966) noted that while both *P. pectinata* and *P. perotteti* were very rare in the Margarita region and were only captured occasionally, in the Lago de Maracaibo, Golfo de Venezuela, Golfo de Paria and the area south of Trinidad it was abundant and frequently taken. The last documented record we have of a largetooth sawfish in Venezuela is a 2.5 m TL captured on 16 December 1962 (Cervignón 1966). More recently, Cervignón (1993) noted that in Venezuela the main threat to the species is shrimp trawling.

We contacted Rafael Tavares (IINIA-Instituto Nacional de Investigaciones Agrícolas, pers. comm. 2009) about the current situation in Venezuela, who writes:

"Lamentably, we don't have in Venezuela recent information about both species from the Pristis genus. Apparently, these species stopped being captured in the artisanal fisheries, where they used to be observed. Recently a Mexican colleague told me that in the Caribbean coast in Central America these species also stopped being observed, and probably disappeared, as well as in Colombia."

"We don't have exact information, but we believe that the species stopped being captured in the in the early 1990's. We don't have exact information about when was the last captured sawfish, only references from the fisherman."

"Before the decline, sawfishes were mostly caught in the mouth of the Delta del Orinoco and nearby waters. They were also captured in the coast of the Falcon state and probably in the

Golfo de Venezuela (west region), where I have personally talked with the fisherman, which still have sawfish saws."

There is a single nineteenth century British Museum of Natural History record (BMNH 1889.11.15.1) of this species from Demerara, Guyana and an 1830 Guyane specimen in the National Museum of Natural History (USNM 00111169) from the Marowijne (= Maroni) River, which forms the border between Guyane and Suriname. In addition to these, we are aware of three Academy of Sciences and Leiden Nationaal Natuurhistorische Museum specimens of *P. perotteti* (ANSP 17390, RMNH D3079, RMNH D2574) from Suriname, the former two representing 1878 and 1962 collections, respectively. Fowler (1910) recorded the species from Suriname and later noted (1919) an additional Suriname *Pristis perotteti* specimen donated deposited at the Academy of Natural Sciences of Philadelphia in about 1830 that apparently is not represented by ANSP 17390. Later (Fowler 1936) he reiterated its presence in the region.

Ramjohn (1999), citing Mendes (1940), listed the species (as *P. microdon*) without comment from Trinidad. Monique G.G. Grol (Department of Animal Ecology and Ecophysiology, Radboud University, Nijmegen pers. comm. 2009), provides some recent information from the islands of Aruba and Curacao:

"I have been diving extensively in the waters around Aruba and Curacao for the last 5 years, but I have never seen a sawfish. I also went to other Caribbean Islands (Grand Cayman, Little Cayman, Jamaica, Bermuda, Bimini, Bonaire) where I dove at a lot of reefs as a marine fisheries biologist, but never seen one either…I think no one in the department has ever seen a sawfish around the Dutch Antilles and Aruba."

From Curacao, Adolphe O. Debrot (Director Carmabi Foundation, pers. comm. 2009) reports on *Pristis* spp.:

"I know of one published record of Pristis for the turn of the century in Curacao which was collected during scientific sampling from the largest mangrove bay of Curacao (Schottegat Bay) and have heard of one sighting account for the early 1970s for another bay (St. Joris Bay). The species was probably never abundant but should now be considered extirpated in Curacao because of habitat destruction (industrialization and oil pollution) and overfishing. From our perspective, we fully support a protected status for the species."

The largetooth sawfish does not occur in the Greater or Lesser Antilles as there are no historical or recent records. Daniel Matos-Caraballo (Puerto Rico DNER Fishery Research Laboratory pers. comm. 2009) succinctly writes, *"This species is not in Puerto Rico,"* and Fabian Pina Amargos (CIEC, Cuba pers. comm. 2009) confirms that the only species in Cuban waters is *P. pectinata*. Parenthetically, he does note that there have been smalltooth sawfish encounters from the southern coast south of Sancti Spiritus and Tunas.

In summary, there is little indication that largetooth sawfish currently are found in anything other than low and declining numbers across the northern rim of South

America from Colombia to the Guyanas and in the zoogeographically continental islands of Aruba, Curacao and Trinidad. The lack of recent records may be partial artifact of limited reporting, but given the declines of this species observed in Colombia, throughout the remainder of its Atlantic range, and the patterns exhibited by other pristid species worldwide, it seems safe to assign significance to an occurrence pattern lacking in recent observations.

BRAZIL. The status of the largetooth sawfish recently was reviewed by Charvet and Faria 2008 and is listed as critically endangered in Brazil. Its status also was addressed by Lessa 1986, Rosa et al 1996, Lessa et al 1999, Rosa, R. S. 2003, and Charvet and Faria 2008. We have 139 reports of the species from Brazil generated from both museum and literature sources (Fig. 9, Table 10). Many records were gathered from material acquired by Faria (2007) for his unpublished PhD study, but at time of this writing we have been unable to document most of these with definitive locality data. Records bearing location data, both historic and recent, come from, north to south, the Brazilian states of Pará (7), Amazonas (12), Maranhão (3), Rio Grande do Norte (1), Sergipe (1), Bahia (1), Espirito Santo (1), Rio de Janeiro (1), and São Paulo (1).

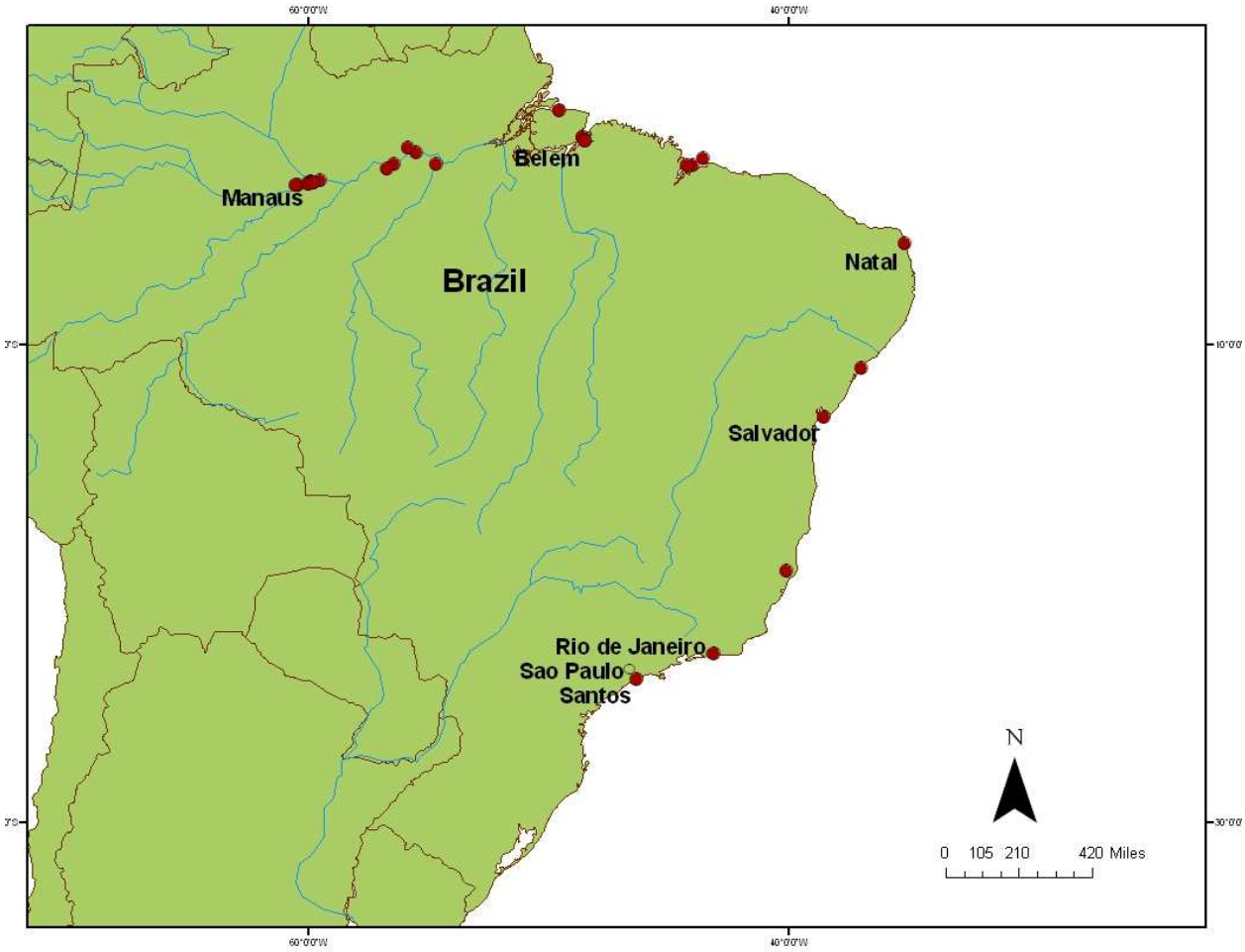


FIGURE 9. Distribution of *Pristis perotteti* in Brazil.

TABLE 10. Temporal and geographical distribution of records of *Pristis perotteti*. Records for which the state was unavailable are listed under "Unknown State."

YEAR	PARÁ	AMAZONAS	MARANHÃO	RIO GRANDE DO NORTE	SERGIPE	BAHIA	ESPIRITO SANTO	RIO DE JANEIRO	SÃO PAULO	UNKNOWN STATE	TOTAL
1865	2						1				**3**
1873	1										**1**
1878	1										**1**
1913				1							**1**
1929										1	**1**
1955		1									**1**
1964		1									**1**
1965		1									**1**
1966		1									**1**
1967		1									**1**
1971		1									**1**
1978										1	**1**
1998			1								**1**
1999										48	**48**
2000										40	**40**
2002	2										**2**
2009			1								**1**
PRE-1934		1									**1**
PRE-1974		3									**3**
1983-1986				1							**1**
PRE-1998	1										**1**
YEAR ???		2			1	1		1	1	21	**27**
TOTAL	**7**	**12**	**3**	**1**	**1**	**1**	**1**	**1**	**1**	**111**	**139**

Northeastern Brazil, specifically the Amazon River basin and adjacent waters forming its massive estuarine mouth, traditionally have been recognized as an area occupied by the sawfishes (Bates, 1964; Marlier, 1967; Furneau, 1969). Thorson (1974) produced a comprehensive review of Amazonian largetooth occurrences, citing earlier records from Engelhardt 1912, Garman 1913, Woodland 1934, Myers 1952, Bigelow and Schroeder 1953, Herre 1955, Roberts 1972, and Wilgus 1972. The Amazonian states of Pará and Amazonas host much of the basin. The earliest records from Brazil come from Pará, which contains the estuary and lower reaches of the river. Four of the seven records are from museum specimens taken in the 1865-1878 period from Marajo Island, the Belém region, and Obidos. Ferreira et al (1998) recorded this species near Santarém and more recently Lucia Py-Daniel (pers. comm. 2009) notes the capture of two individuals at Ver-o-Peso, Belém in 2002, perhaps the same record referred to by Charvet-Almeida (2002).

The paucity of records is not totally reflective of the distribution and abundance in the region, either historically or today, as scientific collecting and fishery data gathering in the area has been and continues to be extremely poor owing to severe logistical difficulties, the nature of artisanal fishing, and the vast expanse of land-water subjected to highly variable seasonal flow regimes. Presumably most if not all of Faria's (2007) recently acquired study material lacking in locality information came from Pará and Amazonas or adjacent states. Charvet and Faria (2008) comment on commercial fishery catches the northern region including Amapá, the northernmost state of Brazil and one from which we have no documented historic records. Sawfishes predominantly are captured as bycatch in both artisanal and commercial fisheries. The rostra of neonates and juveniles are sold as souvenirs and most less than 100cm have their teeth removed to be sold for use as spurs in cock fights, often exported outside the country. Rostra larger than 120cm are sold to Asian markets, yielding more than $800 apiece. In the Vigia, Pará region alone, approximately 1000-1500 small- and medium-sized rostra and 90-180 large rostra are traded each year. They note that this species historically was more abundant in the more northerly, tropical distribution of its range, where neonates and juveniles were found in large numbers. The number of captures and the trade of its products in the north region have significantly decreased over the past 10-15 years.

The middle section of the Amazon basin, including the confluence of the Rio Negro and the Rio Solimões at Manaus, occur in the state of Amazonas. Largetooth sawfish have been taken as far inland as Manacapuru, located 80 km upstream of Manaus or 1340 km from the coast (a 1.9m TL specimen cited in Thorson 1974) and numerous locations downstream from there to the Amazonas-Para state border. We have records from 1280 km (2.55m TL), 1270 km (1.75 and 2.35 m TL), 1259 km (1.6m TL), 1260 km (at Manaus), 1255 km (at Parana' do Careiro, 2.25m TL), 1240 km (1.6m TL), 782 km (at Parintins), 750 km (1.54m TL), and 620 km (Rio Trombetas at Oriximina', 1.16m TL). Many of these records were first reported in the aforementioned publications addressing Amazonian biota and capture dates all predate 1974 except for a recent Manaus record from INPA (Faria 2007). A 627 mm rostrum from Amazonas and cataloged in the

(NUPEC 018) is illustrated in Gonzalez (2005). There are no records from the Rio Negro.

Jorge Nunes (pers. com. 2009) has kindly shared information on two recent records of largetooth sawfishes from the Maranhão. An estimated 7m, 800 kg adult female specimen was caught by gillnet in 1998 at Ilha do Maranhão (Nunes *et al* 2005) and in 2009 another adult female estimated at 7m TL was captured at Praia do Araçagy, aborting 20-25 "pups." He notes that there still is a targeted shark fishery in the region involving finning (Almeida et al 2006) and indicates that sawfish rostra are landed as curios. Lessa earlier (1986) reported *P. perotteti* in elasmobranch catches made between Ilha de Santana and Barra de Lençóis (1º20'S - 2º30'S) during 1983-1986. Martins-Juras *et al* (1987), Stride *et al* (1992), Menni and Lessa (1998), Lessa *et al* 1999) also recorded it from the region.

To the south, documented reports are far more limited (one per state) and, repeating the pattern demonstrated in the northwest Atlantic, historic in nature. Charvet and Faria (2008) state that declines have made the species practically extinct in most of these regions and the current distribution in Brazil is possibly restricted to the states of Amapá, Pará, Maranhão and Amazonas. A four-foot rostrum in the California Academy of Sciences (SU 34468) from Natal serves to document the largetooth's presence in Rio Grande do Norte (Starks 1913). The Sergipe record is based upon an undated Aracaju specimen housed at the Museum für Naturkunde in Berlin (ZMB 32533). The only Bahia specimen, from São Salvador, is housed at the Academy of Natural Sciences of Philadelphia (ANSP 17389) and was reported on by Fowler (1910) and later Bigelow and Schroeder (1953).

An 1865 specimen from the Rio Doce between Linhares and Aimores, is catalogued in the Museum of Comparative Zoology at Harvard University (MCZ-667) and represents the sole record from Espirito Santo. Schreiner and Ribeiro (1903) reported upon a largetooth captured in Bahia de Botafogo near Rio de Janeiro, a record subsequently repeated by Ribeiro (1907, 1923) and a host of others. The supporting rostrum was said by Bigelow and Schroeder (1953) to have been deposited in the National Museum of Brazil in Rio de Janeiro. Ribeiro (1918) also reported on the southernmost record, a Santos, São Paulo specimen also subsequently referred to by Bigelow and Schroeder 1953 and Gadig 1998). An archeological site in this state have yielded tooled *P. perotteti* rostral teeth, fueling discussion whether they were from a locally captured specimen or the object of trade (Gonzalez 2005), presumably from the north. No sawfish were observed in the rich elasmobranch fisheries of the southerly states of Para and Santa Catarina (Costa and Chavez 2006).

Although information about historic and current levels of largetooth sawfish abundance in Brazil is relatively sparse, based on historical accounts, Charvet and Faria (2008) and personal communication with both these colleagues (Faria, pers. comm. 2008-2009, Charvet pers. comm. 2008-2009), and the smalltooth sawfish experience in the United States, it appears that the Amazon River basin and estuary currently serves as a regional refugium for the species. The reported declines in abundance and, seemingly,

distribution to the south (little information, historic or recent, is available for the Brazilian coastline north of the Amazon mouth) parallels decline largetooth patterns in the Gulf of Mexico and Caribbean, of that along the west coast of Africa, and that of the smalltooth sawfish in U.S. waters. The marked decline in the U.S. DPS of smalltooth sawfish has been buffered by having a refugium, the Everglades and to a lesser degree, Florida Keys, protected by remoteness and sheer size and, at some point in the recent past, protection offered by federal and state regulation and, significantly, enforcement. While recovery is a long way off, there is a reasonable chance of smalltooth sawfish recovery if this refugium is fully protected and critical habitat outside the area is protected and maintained. The vastness and inaccessibility of the Amazon basin similarly offers a layer of protection for eastern South American largetooth sawfish, but enforcement of enacted national regulations is essential and destruction of coastal estuaries and mangroves must be curbed if this area is to serve as re-inoculation point for recovery of the species in the region.

WEST COAST OF AFRICA. Bigelow and Schroeder (1953) review early reports from this region and we are aware of historic museum specimens and literature records from Senegal (1841-1902), Gambia (1885-1909), Guinea-Bissau (1912), Republic of Guinea (1965), Sierra Leone, Liberia (1927), Côte d'Ivoire (1881-1923), Congo (1951-1958), Democratic Republic of the Congo (1951-1959), and Angola (1951). As virtually all these of records are lacking in definitive locality and date data, specimens from this period often have been lost, considerable taxonomic confusion existed centering around the taxon *P. pristis* (an undefinable species *fide* Faria 2007), and repetition of records characterizes this early literature, no attempt is made here to sort out the complex history of matching museum specimens with historic scientific literature reports. That said, the largetooth sawfish was at one time relatively common along the west coast of Africa, particularly in areas with riverine estuaries (Fig. 10, Table 11).

Ballouard, Robillard and Yvon (2006) and Robillard and Seret (2006) have reviewed the recent status of sawfishes in west Africa from Mauritania to Republic of Guinea. They found that sawfishes, *P. pectinata* and *P. perotteti* (referred to as *P. microdon*) were relatively common in the past but are now rarely caught or observed. They identify a marked contraction in distributional ranges such that these species are essentially now limited to the Bissagos Archipelago (Guinea Bissau). The last years of capture identified in interviews with fishers were Mauritania (1995), northern Senegal (1970), southern Senegal (1992), Gambia (1995), Guinea-Bissau (2004), and Republic of Guinea (1999). Fishers indicated that sawfishes were common in the past (a few decades ago) and that catches of one or two specimens per net were made regularly. On occasion, up to ten individuals were taken in a single net haul. Certain geographic areas yielded higher catches, especially Tidra, Mauritania; Casamance, Senegal; the Bissago archipelago, Guinea Bissau; and Kamsar, Republic of Guinea. The decline began about 30 years ago, from northern Senegal southwards.

Bernard Seret (in Robillard and Seret 2006) provides valuable access to the historical information gathered by Jean Cadenat, founder of the Musée de la Mer in Gorée, Senegal in the 1950's and author of many seminal regional studies. From unpublished

notes shared with Seret, we learn that Cadenat had measured 108 specimens of *P. pectinata* from Mauritania, Senegal (mainly from Joal and Casamance), Guinea, the Ivory Coast and Nigeria, ranging in size from 158-463 cm TL, and 12 specimens of *P. perotteti* ranging in size from 89-700 cm TL from the same areas. By contrast, Ballouard, Robillard and Yvon (2006) and Robillard and Seret (2006) examined 13 largetooth rostra said to be from the 1965-2005 period found at various locales along the coast: Senegal (3: 1983, 1990, one year unknown), Gambia (1, year unknown), Guinee-Bissau (5: 1980, 2003, 2004, 2006, one year unknown), Republic of Guinea (3: 1965, 1983, 1989), and Sierre Leone (1: 2003). The last documented regional capture was in Nord de Caravela, Guinea-Bissou in 2005. However, Jérémy Huet (Chargé de programme "Poisson-Scie", Noé Conservation/FIBA, pers. comm. 2009) reports a possibly more recent record:

"…we did enquiries all over the coast of western Africa in 2005 and 2006. This species seems to have disappeared everywhere. The most recent sawfish catches were in Guinea-Bissau in 2006

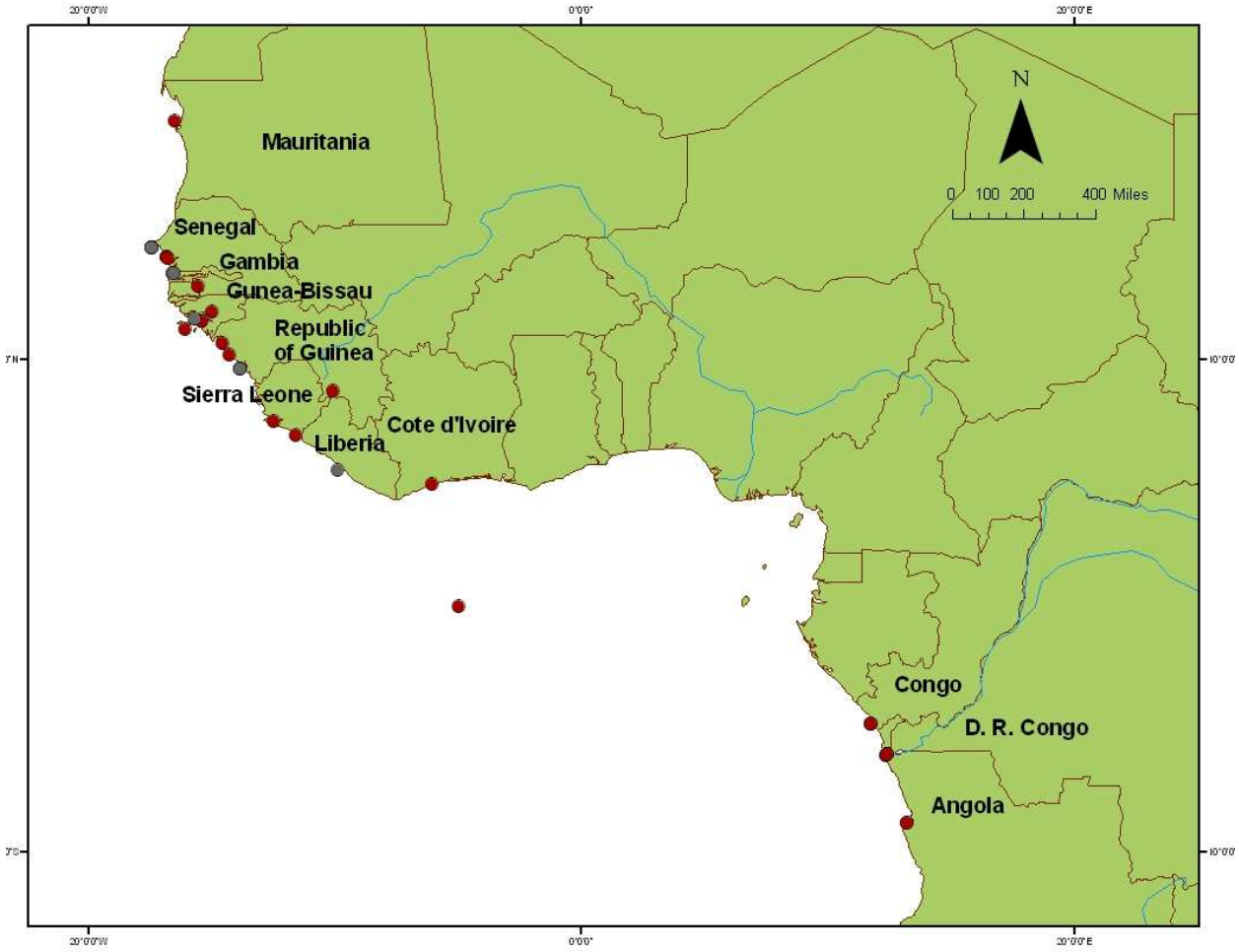


FIG. 10. Distribution of *Pristis perotteti* in Africa. Red dots represent records for which specific locality is available and grey dots represent records for which only a general location (i.e. country) is available. The offshore record is accurately plotted using what likely is questionable location data associated with a museum specimen.

TABLE 11. Temporal distribution and geographical of records of *Pristis perotteti* from Africa. Records for which the country was not available are listed under "Africa."

YEAR	MAURITANIA	SENEGAL	SENEGAMBIA	GAMBIA	GUINEA-BISSAU	REPUBLIC OF GUINEA	SIERRA LEONE	LIBERIA	CÔTE D'IVOIRE	DEMOCRATIC REPUBLIC OF THE CONGO	ANGOLA	AFRICA	TOTAL
1881									1				1
1882			2										2
1902									1				1
1927								1					1
1951										3	1		4
1958										3			3
1959										1			1
1965						2							2
1980'S	1	1			1	1							4
1980					1								1
1983					3	1							4
1989						1							1
1990		1											1
2003					2		1						3
2004					2								2
2005					1								1
PRE-1909				1									1
PRE-1930									1			2	3
PRE-2005		1		1	1								3
YEAR?		8		1	2	1	1			1	1		15
TOTAL	**1**	**11**	**2**	**3**	**13**	**6**	**2**	**1**	**3**	**8**	**2**	**2**	**54**

the reason why we have chosen this country to work in. For two years, I have never seen one sawfish although we are actually working with fishermen. However, in October 2008, people informed me about two catches of sawfish: one in Orango, one in Formosa (two islands in Guinea-Bissau). But I didn't see any pictures or any evidence..."

There is no recent information about the largetooth sawfish in the area south of Guinea-Bissou. However, in the early 1990's, Kofron (1992), in his report on the status of Liberia crocodiles, which occupy habitat similar to sawfishes, bemoaned local habitat degredation, noting that *"Although 40% of Liberia is forested, deforestation is occurring rapidly by foreign timber companies and slash-and-burn agriculture practised by the largely rural population. Hunting with firearms, although illegal, is widespread, both for subsistence and commercially, without concern for depletion. Mangrove ecosystems near human population centres are being destroyed. The combination of the above factors has apparently depleted the crocodile populations in Liberia."* He may as well have been writing about sawfishes. The value of mangrove habitat to fishes is well documented (Faunce and Serafy 2006). Robillard and Seret's (2006) summarization of the status of both species of sawfishes in the region echoes the theme developed in our reviews of Gulf of Mexico, Caribbean Sea, and southwestern Atlantic largetooth populations, *"Sawfishes have been disappearing dramatically in west Africa and their distribution has shrunken to very limited and remote areas within the three last decades. The reasons are diverse but the most probable are the unregulated fisheries, and the degradation and destruction of their habitats. Sawfishes are very vulnerable because of their large size and their littoral habitats; they also penetrate far upstream into rivers where they are easily caught. Once common in the rivers Senegal and Gambia, they are no longer reported from these rivers, areas where human populations have greatly increased in the last decades."*

SUMMARY. The native range of the largetooth sawfish has markedly declined in both the eastern and western Atlantic over the last 100 years under the weight of mushrooming fishing mortality and growing habitat alteration and loss. Similar patterns of reductions in range and abundance have occurred in both the eastern and western Atlantic, with restrictions primarily occurring from north to south in the northern hemisphere and south to north in the southern hemisphere. Historical centers of abundance were generally equatorial in location and influenced by water temperatures, but the presence of large rivers and riverine and lacustrine estuaries appears to have been even more essential. The largetooth sawfish is more drawn to freshwater and brackish water habitats than its relative the smalltooth sawfish, but adults frequently occur in higher salinity, nearshore waters. As is the case with the smalltooth sawfish, the presence of mangroves often is an indicator of good habitat.

In the western Atlantic, local centers of abundance were the Lake Izabal region of Guatemala, the Rio Colorado-Rio San Juan region in Nicaragua and Costa Rica, and the Amazon River and estuary. One would expect that the Rio Orinoco also would have been an important area, but occurrence records fail to pinpoint to this area equal in importance to higher abundance areas to the west and south. In the eastern Atlantic, the Guinea-Bissau area and possibly Congo River basin may have or do serve in similar

roles, but the paucity of data from those regions precludes more definite characterization. Areas with historically high densities of encounters likely serve as refugia for the species and will be integral to recovery of the species. Individuals encountered on the edges of their ranges primarily were large adults, apparently vagrants capable of making larger scale seasonal movements into and out of thermally marginal (on a year-round basis) waters than those at the core of their ranges. The western Gulf of Mexico, which historically hosted the bulk of the U.S. DPS of largetooth sawfish, was a locally important area for adults and subadults, but the species is now extinct from that region. If recovery efforts are productive in western Caribbean areas of abundance and appropriate inshore habitat is maintained and/or recovered in U.S. waters, we may expect the return of largetooth sawfish to waters of the western Gulf of Mexico.

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APPENDIX I. Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
US	N/A	1878				MUS	ANSP 17388	Y
US	FL	1910				MUS	AMNH 11	Y
US	FL	1941				LIT		
US	FL	1960				MUS	JS 06 - JSJC1 - GN 4060	Y
US	FL	1943-1953				LIT		
US	LA	1918	487.68			MUS/MED	SUI 17512	Y
US	TX	1917	548.64			MED		Y
US	TX	1925	520			MED		Y
US	TX	1929	528.32			MED		
US	TX	1935				MED		Y
US	TX	1938	450		F	MED		Y
US	TX	1938	594.36			MED		Y
US	TX	1938	500			MED		Y
US	TX	1940	570			LIT		
US	TX	1940	518.16			MED		Y
US	TX	1940	449.58			MED		Y
US	TX	1940	426.72		M	MED		Y
US	TX	1940				MUS	TAMUCC UNCAT	Y
US	TX	1942	470			LIT		
US	TX	1942	470			LIT		
US	TX	1942	470			LIT		
US	TX	1942	470			LIT		
US	TX	1942	470			LIT		
US	TX	1942	470			LIT		
US	TX	1942	530	102	F	LIT		
US	TX	1942				LIT		
US	TX	1943	500			LIT		
US	TX	1943	430			LIT		
US	TX	1943	450			LIT		
US	TX	1943	460			LIT		
US	TX	1943	457.2			LIT		Y
US	TX	1943				LIT		Y
US	TX	1947	497.84		F	MED		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
US	TX	1947	609.6			MED		Y
US	TX	1948	380	80		OTH		Y
US	TX	1951	700			MED		Y
US	TX	1957	519	122	F	MED		Y
US	TX	1961	530.86			MED		Y
US	TX?		457.2			MED		Y
US	N/A					LIT		
Mexico		1997	540		F	ENC		Y
Mexico		Pre-1962				LIT		
Mexico		Pre-1978				LIT		
Mexico		Pre-1978				LIT		
Mexico		Pre-1978				LIT		
Mexico		Pre-1978				LIT		
Caribbean						LIT		
Caribbean						LIT		
Caribbean					F	MUS	BMNH 1923.11.13.1	Y
Caribbean					F	MUS	BMNH 1843.2.1.8	Y
Trinidad		Pre-1940				LIT		
Guatemala		1946	137.6			MUS	USNM 00111423a	Y
Guatemala		1946				MUS	USNM 00111423b	Y
Guatemala		1947				MUS	USNM 00111443	Y
Guatemala		1947	140		F	MUS	USNM 00393616	
Guatemala		1947				MUS	USNM 00146543	Y
Honduras						MUS	UF UNCAT	Y
Nicaragua	Rivas	1960				MUS	TU 22989	
Nicaragua		1877				LIT		
Nicaragua		1942	732			LIT		
Nicaragua		1943				MUS	USNM 00111367	Y
Nicaragua		1943				MUS	USNM 00111369	Y
Nicaragua		1943	137.6		M	MUS	USNM 00120468	
Nicaragua		1960				MUS	JS 07 - JSLTNIC - GN 4072	Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			M	LIT		Y
Nicaragua		1968			F	LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua		1968			F	LIT		Y
Nicaragua		1968			F	LIT		Y
Nicaragua		1968				LIT		Y
Nicaragua		1969			M	MUS	AMNH 55624A	Y
Nicaragua		1980	254.5		M	LIT		Y
Nicaragua		1980	254.5		M	LIT		Y
Nicaragua		1980	254.5		M	LIT		Y
Nicaragua		1980	254.5		M	LIT		Y
Nicaragua		1980	254.5		M	LIT		Y
Nicaragua		1980	254.5		M	LIT		Y
Nicaragua		1980	254.5		F	LIT		Y
Nicaragua		1980	254.5		F	LIT		Y
Nicaragua		1980	254.5		F	LIT		Y
Nicaragua		1985				MED		
Nicaragua		1991				MUS	MR 0011- GN 3320	Y
Nicaragua		1998				MUS	MR 0009- GN3318	Y
Nicaragua		1998				MUS	MR 0010- GN 3319	Y
Nicaragua		1998				MUS	MR 0012- GN 3321	Y
Nicaragua		1998				MUS	MR 0013- GN 3322	Y
Nicaragua		"Nowdays"	100			MED		
Nicaragua		"years ago"				MED		
Nicaragua		1966 - 1977	394.5		F	LIT		Y
Nicaragua		1966 - 1977	377		F	LIT		Y
Nicaragua		1966 - 1977	361		F	LIT		Y
Nicaragua		1966 - 1977	362		F	LIT		Y
Nicaragua		1966 - 1977	357		F	LIT		Y
Nicaragua		1966 - 1977	343		F	LIT		Y
Nicaragua		1966 - 1977	373		F	LIT		Y
Nicaragua		1966 - 1977	375		F	LIT		Y
Nicaragua		1966 - 1977	373		F	LIT		Y
Nicaragua		1966 - 1977	324		F	LIT		Y
Nicaragua		1966 - 1977	389		F	LIT		Y
Nicaragua		1966 - 1977	356		F	LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua		1966 - 1977	386		F	LIT		Y
Nicaragua		1966 - 1977	361		F	LIT		Y
Nicaragua		1966 - 1977	344		F	LIT		Y
Nicaragua		1966 - 1977	375		F	LIT		Y
Nicaragua		1966 - 1977	380		F	LIT		Y
Nicaragua		1966 - 1977	384		M	LIT		Y
Nicaragua		1966 - 1977	372		F	LIT		Y
Nicaragua						LIT		
Nicaragua						LIT		
Nicaragua						LIT		
Nicaragua or Costa Rica		1966 - 1977	305		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	344.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	344.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	364.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	404.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	404.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	404.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	424.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	305		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	314.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	324.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	324.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	354.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	374.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	384.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	384.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	384.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	384.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	384.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	394.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	394.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	404.5		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	73		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	137		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	195		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	232		F	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	195		M	LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977	240		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	240		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	275		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	275		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977	335		M	LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Nicaragua or Costa Rica		1966 - 1977				LIT		Y
Costa Rica		1960				MUS	UF UNCAT	Y
Costa Rica		1966 - 1977	127		M	LIT		Y
Costa Rica		1966 - 1977	130		F	LIT		Y
Costa Rica						MED		
Costa Rica						MED		
Colombia		Pre-1945				LIT		
Colombia		Pre-1945				LIT		
Colombia		Pre-1945				LIT		
Colombia		Pre-1964				LIT		
Colombia		Pre-1964				LIT		
Colombia		Pre-1976				LIT		
Colombia		Pre-1985				LIT		
Venezuela		1894	610	120		ENC		Y
Venezuela		1900				MUS	USNM 00232690	Y
Venezuela		1903				MUS	USNM 00232688	Y
Venezuela		1903				MUS	USNM 00232689	Y
Venezuela		1962	250			LIT		Y
Venezuela						LIT		
Guyana						MUS	BMNH 1889.11.15.1	
Suriname		1830				LIT		
Suriname		1856				LIT		
Suriname		1878				MUS	ANSP 17390	Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Suriname		1962				MUS	RMNH D3079	Y
Suriname						MUS	RMNH D2674	Y
Guyane		1830				MUS	USNM 00111169	Y
Brazil	Amazonas	1955	255	54		LIT		Y
Brazil	Amazonas	1964	175	37		LIT		Y
Brazil	Amazonas	1965	235	50		LIT		Y
Brazil	Amazonas	1966	160	34		LIT		
Brazil	Amazonas	1967	116	25		LIT		
Brazil	Amazonas	1971	225	48		LIT		Y
Brazil	Amazonas	Pre-1934	154			LIT		
Brazil	Amazonas	Pre-1974	190	40		LIT		
Brazil	Amazonas	Pre-1974				LIT		
Brazil	Amazonas	Pre-1974				LIT		
Brazil	Amazonas					LIT		
Brazil	Amazonas				F	MUS	INPA uncat 3	Y
Brazil	Bahia					MUS/LIT	ANSP 17389	
Brazil	Espirito Santo	1865			F	MUS	MCZ-667	Y
Brazil	Maranhão	1998	700		F	ENC/LIT		Y
Brazil	Maranhão	2009	700		F	ENC		Y
Brazil	Maranhão	1983-1986				LIT		
Brazil	Pará	1865	86.2		M	MUS	MCZ-302A	Y
Brazil	Pará	1865	95.6		M	MUS	MCZ-302B	Y
Brazil	Pará	1873	81		F	MUS	MCZ -668	Y
Brazil	Pará	1878				MUS	USNM 00110174	Y
Brazil	Pará	2002				MUS	INPA uncat 2	Y
Brazil	Pará	2002				MUS	INPA uncat 1	Y
Brazil	Pará	Pre-1998				LIT		
Brazil	Rio de Janeiro?					LIT		
Brazil	Rio Grande do Norte	1913		122		MUS/LIT	SU 34468	Y
Brazil	São Paulo					LIT		
Brazil	Sergipe					MUS	ZMB 32533	Y
Brazil		1929				MUS	AMNH 49528	Y
Brazil		1978		51		MUS	NCSM 46131	Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Brazil		1999				MUS	PCA 001	Y
Brazil		1999				MUS	PCA 002	Y
Brazil		1999				MUS	PCA 003	Y
Brazil		1999				MUS	PCA 004	Y
Brazil		1999				MUS	PCA 005	Y
Brazil		1999				MUS	PCA 006	Y
Brazil		1999				MUS	PCA 007	Y
Brazil		1999				MUS	PCA 008	Y
Brazil		1999				MUS	PCA 009	Y
Brazil		1999				MUS	PCA 010	Y
Brazil		1999				MUS	PCA 011	Y
Brazil		1999				MUS	PCA 012	Y
Brazil		1999				MUS	PCA 013	Y
Brazil		1999				MUS	PCA 014	Y
Brazil		1999				MUS	PCA 015	Y
Brazil		1999				MUS	PCA 016	Y
Brazil		1999				MUS	PCA 017	Y
Brazil		1999				MUS	PCA 018	Y
Brazil		1999				MUS	PCA 019	Y
Brazil		1999				MUS	PCA 020	Y
Brazil		1999				MUS	PCA 021	Y
Brazil		1999				MUS	PCA 022	Y
Brazil		1999				MUS	PCA 023	Y
Brazil		1999				MUS	PCA 024	Y
Brazil		1999				MUS	PCA 025	Y
Brazil		1999				MUS	PCA 026	Y
Brazil		1999				MUS	PCA 027	Y
Brazil		1999				MUS	PCA 028	Y
Brazil		1999				MUS	PCA 029	Y
Brazil		1999				MUS	PCA 030	Y
Brazil		1999				MUS	PCA 031	Y
Brazil		1999				MUS	PCA 032	Y
Brazil		1999				MUS	PCA 033	Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Brazil		1999				MUS	PCA 034	Y
Brazil		1999				MUS	PCA 035	Y
Brazil		1999				MUS	PCA 036	Y
Brazil		1999				MUS	PCA 037	Y
Brazil		1999				MUS	PCA 038	Y
Brazil		1999				MUS	PCA 039	Y
Brazil		1999				MUS	PCA 040	Y
Brazil		1999				MUS	PCA 041	Y
Brazil		1999				MUS	PCA 042	Y
Brazil		1999				MUS	PCA 043	Y
Brazil		1999				MUS	PCA 044	Y
Brazil		1999				MUS	PCA 045	Y
Brazil		1999				MUS	PCA 046	Y
Brazil		1999				MUS	PCA 047	Y
Brazil		1999				MUS	PCA 048	Y
Brazil		2000				MUS	PCA 049	Y
Brazil		2000				MUS	PCA 050	Y
Brazil		2000				MUS	PCA 051	Y
Brazil		2000				MUS	PCA 052	Y
Brazil		2000				MUS	PCA 053	Y
Brazil		2000				MUS	PCA 054	Y
Brazil		2000				MUS	PCA 055	Y
Brazil		2000				MUS	PCA 056	Y
Brazil		2000				MUS	PCA 057	Y
Brazil		2000				MUS	PCA 058	Y
Brazil		2000				MUS	PCA 059	Y
Brazil		2000				MUS	PCA 060	Y
Brazil		2000				MUS	PCA 061	Y
Brazil		2000				MUS	PCA 062	Y
Brazil		2000				MUS	PCA 063	Y
Brazil		2000				MUS	PCA 064	Y
Brazil		2000				MUS	PCA 065	Y
Brazil		2000				MUS	PCA 066	Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Brazil		2000				MUS	PCA 067	Y
Brazil		2000				MUS	PCA 068	Y
Brazil		2000				MUS	PCA 069	Y
Brazil		2000				MUS	PCA 070	Y
Brazil		2000				MUS	PCA 071	Y
Brazil		2000				MUS	PCA 072	Y
Brazil		2000				MUS	PCA 073	Y
Brazil		2000				MUS	PCA 074	Y
Brazil		2000				MUS	PCA 075	Y
Brazil		2000				MUS	PCA 076	Y
Brazil		2000				MUS	PCA 077	Y
Brazil		2000				MUS	PCA 078	Y
Brazil		2000				MUS	PCA 079	Y
Brazil		2000				MUS	PCA 080	Y
Brazil		2000				MUS	PCA 081	Y
Brazil		2000				MUS	PCA 082	Y
Brazil		2000				MUS	PCA 083	Y
Brazil		2000				MUS	PCA 084	Y
Brazil		2000				MUS	PCA 085	Y
Brazil		2000				MUS	PCA 086	Y
Brazil		2000				MUS	PCA 087	Y
Brazil		2000				MUS	PCA 088	Y
Brazil						MUS	PCA 089	Y
Brazil						MUS	PCA 090	Y
Brazil						MUS	PCA 091	Y
Brazil						MUS	PCA 092	Y
Brazil						MUS	PCA 093	Y
Brazil						MUS	PCA 094	Y
Brazil						MUS	PCA 095	Y
Brazil						MUS	PCA 096	Y
Brazil						MUS	PCA 097	Y
Brazil						MUS	PCA 098	Y
Brazil						MUS	PCA 099	Y

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Brazil						MUS	PCA 100	Y
Brazil						MUS	PCA 101	Y
Brazil						MUS	PCA PV JK	Y
Brazil						MUS	PCA PV ITUQ	Y
Brazil						MUS	PCA PV STM1	Y
Brazil						MUS	PCA PV STM2	Y
Brazil						MUS	PCA PV STM3	Y
Brazil						MUS	PCA MCP1	Y
Brazil						MUS	PCA MCP2	Y
Brazil						MUS	UNCAT ES	Y
Africa						LIT		
Africa						LIT		
Mauritania		1980's				LIT		
Senegal		1990		19		LIT		
Senegal		1980's				LIT		
Senegal		Pre-2005		106		LIT		Y
Senegal						LIT		
Senegal						LIT		
Senegal						LIT		
Senegal						LIT		
Senegal						LIT		
Senegal						LIT		
Senegal					F	MUS	MNHN A-9699	Y
Senegal						MUS	IFAN R977 (UB0065)	Y
Senegambia						LIT		
Senegambia						LIT		
Gambia		Pre-2005		105		LIT		Y
Gambia						LIT		
Gambia						MUS	BMNH 1885.1.31.30	
Guinea-Bissau	Quiniara					MUS	BMNH 1912.4.1.1	
Guinea-Bissau		1980		11		LIT		
Guinea-Bissau		1983		117		LIT		Y
Guinea-Bissau		1983		117		LIT		

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
Guinea-Bissau		1983				MUS	BS UNCAT	Y
Guinea-Bissau		2003		92		LIT		Y
Guinea-Bissau		2003				MUS	BS UNCAT	Y
Guinea-Bissau		2004		92		LIT		Y
Guinea-Bissau		2004				MUS	BS UNCAT	Y
Guinea-Bissau		2005		9		LIT		
Guinea-Bissau		1980´s				LIT		
Guinea-Bissau		Pre-2005		86		LIT		Y
Guinea-Bissau						MUS	BS UNCAT	Y
Republic of Guinea		1965		108		LIT		Y
Republic of Guinea		1965				MUS	BS UNCAT	Y
Republic of Guinea		1983		89		LIT		Y
Republic of Guinea		1989		74		LIT		Y
Republic of Guinea		1980´s				LIT		
Republic of Guinea						MUS	BS UNCAT	Y
Sierra Leone		2003		8		LIT		
Sierra Leone						MUS	BMNH 2004.11.27.51	Y
Liberia		1927				MUS	RMNH D3078	Y
Côte d'Ivoire	Sassandra	1902			F	MUS	MNHN 1902-255	Y
Côte d'Ivoire	Sassandra					LIT		
Côte d'Ivoire		1881				MUS	RMNH D3075	Y
Democratic Republic of the Congo	Kongo Central	1951				MUS	MRAC 68038	Y
Democratic Republic of the Congo	Kongo Central	1951				MUS	MRAC 68039	Y
Democratic Republic of the Congo	Kongo Central	1959				MUS	MRAC A4-45-P-12	Y
Democratic Republic of the Congo	Pointe-Noire	1958		103		MUS	MNHN 2003-2612	Y
Democratic Republic of the Congo	Pointe-Noire	1958		85		MUS	MNHN 2003-2611	Y
Democratic Republic of the Congo	Pointe-Noire	1958		80		MUS	MNHN 2003-2613	Y
Democratic Republic of the Congo		1951				MUS	MRAC 66639	Y
Democratic Republic of the Congo						MUS	MRAC-A4-45-P-2	Y
Angola	Luanda	1951				MUS	MRAC 74723	Y
Angola	Luanda					MUS	ZMB 16109	Y
		1878				MUS	ANSP 17388	Y
		1909	656	145		LIT		

APPENDIX I. (CONT.) Complete list of records of *Pristis perotteti.*

Country	State	Year	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number	Validated
		1909	561	130		LIT		
		1951				MUS	MRAC A4-45-P-18	Y
		1951				MUS	MRAC A4-45-P-18	Y
						LIT		
						LIT		
					M	MED		Y
						MUS	CCMSH 2003MB-0116	Y
						MUS	BMNH 1867.10.16.7	
						MUS	UAIC 4138.01-2	
				123		MUS	MNRJ 25212	
				124		MUS	MNRJ 25213	
				82		MUS	MNRJ 25216	
				82		MUS	MNRJ 25217	
				38		MUS	MNRJ 25219	
						MUS	JS 03 - GN 3351	Y
						MUS	BMNH 1982.9.13.4	Y
						MUS	NLU UNCAT	Y
						MUS	FMNH 83732	Y

ENC – Encounter records
LIT – Literature records
MED – Media records
MUS – specimens from museums or other collections

APPENDIX II. Records of *Pristis sp.* in Texas.

State	Year_GIS	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number
TX	1852				MUS	BMNH 1852.9.20.3
TX	1859				MUS	MCZ 1208
TX	1859				MUS	MCZ 1209
TX	1879	305		F	MED	
TX	1879	427			MED	
TX	1881	396			MED	
TX	1885	366			MED	
TX	1885	610	152		MED	
TX	1886	457			MED	
TX	1888				MED	
TX	1890	488	152		MED	
TX	1892	411			MED	
TX	1892	549	114		MED	
TX	1894				MED	
TX	1894				MED	
TX	1894				MED	
TX	1894				MED	
TX	1894				MED	
TX	1894				MED	
TX	1894				MED	
TX	1896	549			MED	
TX	1897	549	122		MED	
TX	1900	396	84		MED	
TX	1904	550			MED	
TX	1906	457			MED	
TX	1909	457			MED	
TX	1912	518			MED	
TX	1920	457	102		MED	
TX	1920	414			MED	
TX	1920	457	102		MED	
TX	1922	427			MED	
TX	1924	305			MED	
TX	1926		91		MED	
TX	1929	549	122		MED	
TX	1929	455	91		MED	
TX	1929	457	84		MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	

APPENDIX II. (CONT.) Records of *Pristis sp.* in Texas.

State	Year_GIS	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929				MED	
TX	1929	518	168		MED	
TX	1929	549			MED	
TX	1931				MED	
TX	1931				MED	
TX	1933				MED	
TX	1933	168			MED	
TX	1933	168			MED	
TX	1933				MED	
TX	1934				MED	
TX	1934	488			MED	
TX	1934	488			MED	
TX	1935	173	56		MED	
TX	1935	366			MED	
TX	1935	437			MED	
TX	1936	122			MED	
TX	1936	244			MED	
TX	1937	427			MED/LIT	
TX	1937		107		MED	
TX	1938	594	91		MED	
TX	1938	417			MED	
TX	1938	335			MED	
TX	1938	427			MED	
TX	1938	457			MED	
TX	1938				MED	
TX	1939	157			MED	
TX	1939				MED	
TX	1940	433			MED	
TX	1940				MED	
TX	1940				MED	
TX	1940	528			MED	
TX	1940	434			MED	
TX	1940	444			MED	
TX	1940	10			MED	
TX	1940	549			MED	
TX	1940	30			MED	
TX	1940	30			MED	
TX	1940	30			MED	
TX	1940	30			MED	
TX	1940	610			MED	

APPENDIX II. (CONT.) Records of *Pristis sp.* in Texas.

State	Year_GIS	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	91			MED	
TX	1940	427			MED	
TX	1941	853			MED	
TX	1941	427			MED	
TX	1941	366			MED	
TX	1941	122			MED	
TX	1941	381			MED	
TX	1941	122			MED	
TX	1943	488			MED	
TX	1945	401			MED	
TX	1945	437			MED	
TX	1945	732	137		MED	
TX	1946	366	91		MED	
TX	1946	183			MED	
TX	1946	430			MED	
TX	1946	549			MED	
TX	1947	396			MED	
TX	1947	328	76		MED	
TX	1947	91			MED	
TX	1948	549			MED	
TX	1948	381			MED	
TX	1948	544			MED	
TX	1948	287	76		MED	
TX	1948	549			MED	
TX	1948				MED	
TX	1949	145			MED	
TX	1949	145			MED	
TX	1949	122			MED	
TX	1950				MED	
TX	1950	190			MED	

APPENDIX II. (CONT.) Records of *Pristis sp.* in Texas.

State	Year_GIS	TL (cm)	RTL (cm)	Sex	Source	Museum Catalog Number
TX	1950	122			MED	
TX	1950				MED	
TX	1950				MED	
TX	1951				MED	
TX	1951	259			MED	
TX	1952	549			MED	
TX	1952				MED	
TX	1953	427			MED	
TX	1953	671			MED	
TX	1955	122			MED	
TX	1956	488			MED	
TX	1957	366	76		MED	
TX	1957	452			MED	
TX	1957	450			MED	
TX	1957	335			MED	
TX	1957	564		M	MED	
TX	1959	462	91		MED	
TX	1959				MED	
TX	1961	112	38		MED	
TX	1961				MED	
TX	1962	305			MED	
TX	1963	366			MED	
TX	1964	427			MED	
TX	1964				MED	
TX	1965	488			MED	
TX	1965		46		MED	
TX	1966	137			MED	
TX	1966	671			MED	
TX	1972		36		MED	
TX	1979	170			ENC	
TX	1979	152			MED	
TX	1984	150		F	ENC	
TX	2003	275			ENC	
TX	2008	113			ENC	
TX					MED	
TX					MED	
TX					MED	
TX					MED	
TX					MED	
TX?	1905	457			MED	
TX?	1932				MED	
TX?	1958				MED	
TX?					MED	

ENC – Encounter records
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MUS – specimens from museums or other collections