ENDANGERED SPECIES ACT STATUS REVIEW OF THE STRIPED SMOOTHHOUND(*Mustelus fasciatus*)

(Fishbase)

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Acknowledgements

We would like to thank the following peer reviewers; Charles F. Cotton, Mauro Belleggia, and Melissa Giresi. Dwayne Meadows and Marta Nammack provided comments on an earlier version of this document

This document should be cited as:

Casselberry, G.A. and J.K. Carlson. 2015. Endangered Species Act Review of the Striped Smoothhound (*Mustelus fasciatus*). Report to the National Marine Fisheries Service, Office of Protected Resources. Contribution PCB-15-06

Executive Summary

This status review report was conducted in response to a petition received from WildEarth Guardians on July 8, 2013 to list 81 marine species as endangered or threatened under the Endangered Species Act (ESA). NMFS evaluated the petition to determine whether the petitioner provided substantial information indicating that the petitioned action may be warranted, as required by the ESA. In a *Federal Register* notice on November 19, 2013 (79 FR 69376), NMFS determined that the petition did present substantial scientific and commercial information, or cited such information in other sources, that the petitioned action may be warranted for 19 species and 3 subpopulations of sharks, and thus NMFS initiated a status review of those species. This status review report considers the biology, distribution and abundance of and threats to a shark species from the Southwestern Atlantic, *Mustelus fasciatus* (striped smoothhound).

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INTRODUCTION

Scope and Intent of the Present Document

On July 8, 2013, the National Marine Fisheries Service (NMFS) received a petition from WildEarth Guardians to list 81 species of marine organisms as endangered or threatened species under the Endangered Species Act (ESA) and to designate critical habitat. NMFS evaluated the information in the petition to determine whether the petitioner provided "substantial information" indicating that the petitioned action may be warranted, as required by the ESA.

Under the ESA, if a petition is found to present substantial scientific or commercial information that the petitioned action may be warranted, a status review shall be promptly commenced (16 U.S.C. §1533(b)(3)(A)). NMFS decided that the petition presented substantial scientific information indicating that listing may be warranted and that a status review was necessary for striped smoothhound, *Mustelus fasciatus* (79 FR 69376, 19 November 2013). Experts and members of the public were requested to submit information to NMFS to assist in the status review process from November 19 through January 21, 2014.

The ESA stipulates that listing determinations should be made on the basis of the best scientific and commercial information available. This document is a compilation of the best available scientific and commercial information on the biology, distribution, and abundance of and threats to the striped smoothhound in response to the petition and 90-day finding. Where available, we provide literature citations to review articles that provide even more extensive citations for each topic. Data and information were reviewed through 31-July 2014.

LIFE HISTORY AND ECOLOGY

Taxonomy and Anatomy

The striped smoothhound (*Mustelus fasciatus* (Garman, 1913)) is a member of the family Triakidae, and was first described based on a juvenile specimen (Compagno 1984, Lorenz et al. 2010). It is a senior synonym of *Mustelus striatus* (Devincenzi, 1920) (Menni et al. 1984, Compagno 1984, Compagno 1988). The striped smoothhound has several different common names in Spanish and Portuguese. Spanish speaking countries refer to it as *recorrecostas*, *gatuzo*, *gatuso*, and *tiburón* (Menni et al. 1984, Menni and Lucifora 2007, Domingo et al. 2008, Ruarte et al. 2009), and in Portuguese it is called *cola fina*, *cação sebastião*, *cação-malhado*, *cação-listrado*, and *cação-papa-sirí* (Mazzoleni and Schwingel 1999, Biedzicki de Marques et al. 2002, Vooren and Klippel 2005, Haimovici and Fischer 2007).

There are at least four other species of the genus *Mustelus* that occur in the southwestern Atlantic with ranges overlapping the striped smoothhound: *M. canis*, *M. higmani*, *M. norrisi*, and *M. schmitti* (Rosa and Gadig 2010). *Mustelus* species are often difficult to distinguish due to their conserved morphology and highly variable intraspecific meteristic characteristics. This problem is compounded in the southwestern Atlantic due to the presence of few scientific collection specimens, particularly of larger individuals, which leads to a lack of comparative ontogenetic observations that can be used for species diagnosis (Rosa and Gadig 2010). Our reviewers have stressed that more genetic and morphological work is need to distinguish the smoothhounds in this area. We have provided the distinguishing taxonomic characters that are currently accepted below.

The striped smoothhound's head is large with a pre-pectoral distance of 19.5-24.5% total length (TL) (Rosa and Gadig 2010). The snout has a pre-oral distance between 8.9 and 12.6% TL and is acutely pointed (Compagno 1984, Rosa and Gadig 2010). The eyes are very small, with an orbital diameter of 1.3-3.3% TL (Compagno 1984, Rosa and Gadig 2010). Labial folds are present. The labial folds on the upper jaw (1.6-2.3% TL) are longer than the labial folds on the lower jaw (1.3-1.8% TL) (Heemstra 1997, Rosa and Gadig 2010). The striped smoothhound's teeth are small and uniform in size and are similar in adults and juveniles (Heemstra 1997, Vooren and Klippel 2005, Rosa and Gadig 2010). The crowns of the teeth are very low, rounded, and asymmetric (Compagno 1984, Heemstra 1997, Rosa and Gadig 2010). The upper jaw has 64-66 teeth while the lower jaw has 55-58 teeth (Heemstra 1997, Rosa and Gadig 2010).

The first dorsal fin is short, broad, and triangular with a large base and is located closer to the pelvic fins than the pectoral fins (Compagno 1984, Rosa and Gadig 2010). The second dorsal fin base is generally slightly smaller than the first dorsal fin base, and a dermal ridge is present between the two fins (Vooren and Klippel 2005). The interdorsal space is 16-19% of the TL (Compagno 1984). The pectoral and pelvic fins have posterior margins that are nearly straight, and the caudal fin is not well developed, with a small and rounded ventral lobe (Rosa and Gadig 2010).

Like many sharks, the striped smoothhound is grey or grey-brown on its dorsal side and white on its ventral side (Compagno 1984). Newborns and juveniles have dark bars of irregular widths running across the dorsal surface of their head and body (Heemstra 1997). Typically, there are 15 bars present, with 3 on the head, 6 on the body, and 6 on the tail (Vooren and Klippel 2005). The distinguishing vertical bars are still present in adults, but are not nearly as defined as they are in juveniles (Sadowski 1977, Heemstra 1997, Lorenz et al. 2010, Rosa and Gadig 2010). The maximum observed size is 162 cm TL (17.5 kg) for males, and 177 cm TL (29.7 kg) for females (Lorenz et al. 2010).

The striped smoothhound is one of the most distinctive *Mustelus* species, but it does bear similarities to *M. mento*, however the latter species is only reported from the Pacific and any Atlantic records are likely misidentified *M. schmitti* (Romero et al. 2007). Striped smoothhound can be distinguished from *M. mento* by the number of precaudal vertebrae (58-63 in striped smoothhound) (Heemstra 1997). The striped smoothhound stands out from the other *Mustelus* species in the southwestern Atlantic because of its triangular dorsal and pectoral fins, underdeveloped caudal fin, unique tooth morphology, wide head, and small eyes (Rosa and Gadig 2010).

Range and Habitat Use

Striped smoothhound are demersal sharks and can be found at depths between 1 and 250 m along the continental shelf and slope of the Southwestern Atlantic in Brazil, Uruguay, and Argentina (Soto 2001). Their distribution is coastal and restricted between Santa Catarina in southern Brazil and Bahía Blanca, Buenos Aires Province, Argentina (Figure 1), covering about 15,000 km of coastline (Lopez Cazorla and Menni 1983, Vooren and Klippel 2005, Lorenz et al. 2010). Adult biomass is concentrated between Rio Grande and Chuí in Rio Grande do Sul, Brazil during the winter (Vooren 1997, Vooren and Klippel 2005). A portion of the population migrates from Brazil to Uruguayan and Argentine waters in summer, while the rest of the population remains as residents in Rio Grande do Sul year round (Vooren 1997, Vooren and Klippel 2005). They occur only occasionally in Mar del Plata, Argentina, near the southern boundary of their range (Lopez Cazorla and Menni 1983).

In Rio Grande do Sul, Brazil, striped smoothhound display clear ontogenetic depth distributions. Neonates, which range between 35 and 48 cm TL, are common in inshore areas between Cassino Beach, just South of the city of Rio Grande, and Chuí in Rio Grande do Sul in depths less than 20 m, with the greatest frequencies between 2-5 meters depth from November to January (Vooren and Klippel 2005). These shallow areas may function as nurseries (Vasconcellos and Vooren 1991, Soto 2001, Vooren and Klippel 2005). Adults are found mainly in water depths between 50-100 m in autumn and winter but move to shallower depths (≤50 m) in spring and summer (Vooren and Klippel 2005). Males are only rarely caught in waters less than 20 m deep in the summer, and are much more common at depths between 20 and 50 m (Vooren and Klippel 2005). Females can be found in waters less than 20 m deep in the summer when they move into coastal waters for pupping (Vooren and Klippel 2005).

Striped smoothhound are generally found in cooler water temperatures. In Brazil, adult striped smoothhound occur in waters between 18-21^{o}C (Vooren and Klippel 2005) and in Argentina, at the southernmost point of its range, in temperatures around 15^{o}C (Lopez Cazorla and Menni 1983). Juveniles are found in temperatures of 11-15^{o}C during the Brazilian winter (Vooren and Klippel 2005). Adult striped smoothhound are rarely caught in waters less than 16^{o}C, and are much more common in waters greater than 18^{o}C (Vooren and Klippel 2005). The return migration to Brazilian waters from Argentina and Uruguay is related to temperature preferences of greater than 18^{o}C (Vooren and Klippel 2005). Striped smoothhound prefer water salinities between 33.3 and 33.6 ppt (Lopez Cazorla and Menni 1983).

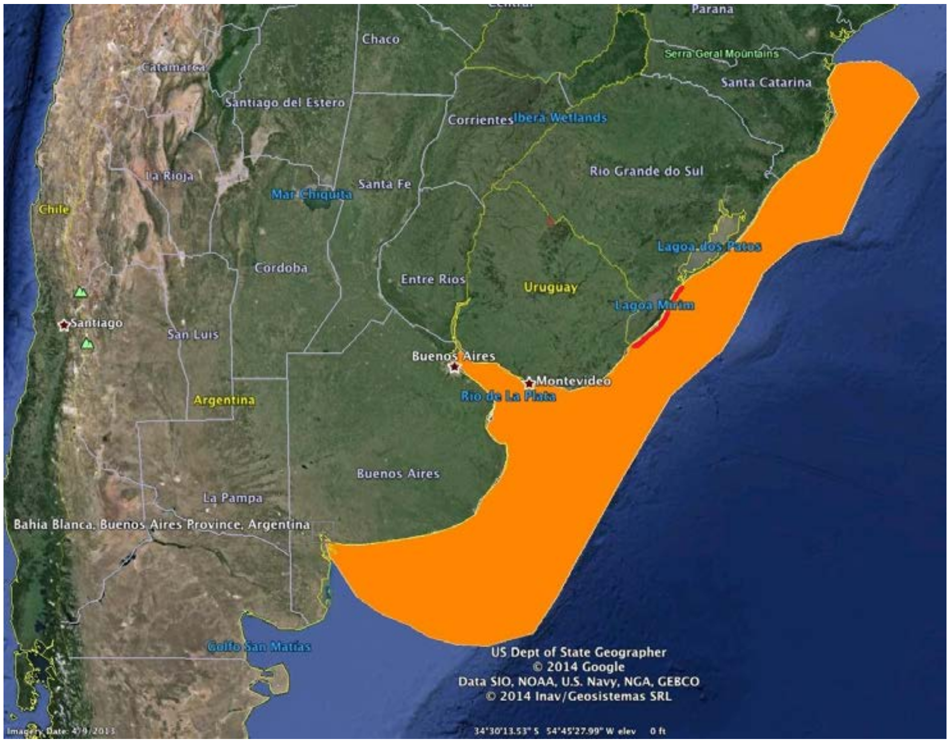

Figure 1. The range of the striped smoothhound based on information collected in this review. The coastline between Rio Grande and Chuí in Rio Grande do Sul, where species biomass is concentrated, is highlighted in red.

Diet and Feeding

Knowledge of the striped smoothhound's diet is limited. Soto (2001) studied the stomach contents of 17 specimens captured off Parcel da Solidão in Rio Grande do Sul, Brazil. Crustaceans were the most abundant prey group, making up 82.4% of the diet, while fishes and mollusks were present in lower numbers, 11.8% and 5.9%, respectively. Box crabs (*Heptus pudibundus*) were the most prevalent crustacean, occurring in 52.9% of the stomachs examined (Soto 2001).

Growth and Reproduction

Very little information is available on striped smoothhound life history. Age and growth studies are not available and conflicting data exist for size at birth and size at maturity in Rio Grande do Sul, Brazil. Vasconcellos and Vooren (1991) reported that size at birth is between 39 and 43 cm TL, and that sexual maturity is reached at 130 and 135 cm TL for males and females, respectively. Vooren and Klippel (2005) report size at birth between 35 and 38 cm TL and size at maturity of 119 cm TL for males (Soto 2001) and 121 cm TL for females. Our reviewers noted that this smaller size at maturity could be a compensatory response to fishing mortality.

Striped smoothhound have placental viviparous reproduction (Vooren 1997). Pregnant females migrate into shallow waters (<20 m) along the Rio Grande do Sul coast to give birth from October to December (Vasconcellos and Vooren 1991, Vooren 1997, Lorenz et al. 2010). Vooren and Klippel (2005) report that pupping takes place from November to January, however Soto (2001) reports that it occurs from September to November. Newborns are seen in high frequency in November, along with females with mature follicles of 2.2 cm and postpartum uteri, suggesting an annual reproductive cycle (Vasconcellos and Vooren 1991). After pupping, females move to deeper waters to mate (Soto 2001, Vooren and Klippel 2005, Lorenz et al. 2010).

Striped smoothhound have 4-14 pups per litter, with an average of 8 pups (Vasconcellos and Vooren 1991). Litter mass is about 11% of maternal body mass (Vooren 1997). One study found a positive relationship of litter size and maternal size (Soto 2001); however, two other studies found no correlation (Vasconcellos and Vooren 1991, Heemstra 1997). Size frequency distributions of embryos are generally normally distributed with a modal length of 18 cm in May and 36 cm in September (Vasconcellos and Vooren 1991). Gestation lasts 11-12 months (Soto 2001, Lorenz et al. 2010).

Demography

No information is available on natural mortality rates or the intrinsic rate of population increase (*r*) of the striped smoothhound.

DISTRIBUTION AND ABUNDANCE

To provide a better understanding of the striped smoothhound's current distribution and abundance, an extensive search of scientific publications, technical reports, fishery bulletins, and museum specimen records was conducted. We also searched the Global Biodiversity Information Facility Database for museum specimen records. However, there is question on the validity of some records and the website does not guarantee the accuracy of the biodiversity data. Thus, while we do provide a summary of these records the accuracy of the records is not completely reliable.

The striped smoothhound is distributed from Santa Catarina in southern Brazil to the Bahia Blanca in Buenos Aires Province, Argentina (Table 1). Striped smoothhound were once considered a dominant permanent resident in Rio Grande do Sul, Brazil, and displayed predictable abundance changes throughout the year (Vooren 1997). Though striped smoothhound were common in Brazil in the early 1970s and 1980s, they are currently rare within their range, and caught only sporadically in areas where they were once found (Soto 2001). On the southern Brazilian shelf in depths of 10-100 m, catch per unit effort (CPUE) varied between 2 kg/hr and 7 kg/hr from January 1982 to August 1983 in areas of low density, and 8 kg/hr to 33 kg/hr from January 1983 to August 1983 in concentrated areas (Vooren and Klippel 2005). It is thought that the striped smoothhound naturally occurred at low abundance before they were exploited in fisheries (Vooren and Klippel 2005). They occurred at a frequency of only 10% in research trawl surveys from 10-100 m deep between 1972 and 2005 and making up only 2-4% of the total elasmobranch CPUE from 1980-1984. In Rio Grande do Sul in the 1980s, neonates were relatively abundant in the summer along 10,688 km of coastline, but by the 2000s they were only abundant along 395 km of coastline (Vooren and Klippel 2005). This corresponds to an estimated 95% decline in neonate production between 1981 and 2005 (Vooren and Klippel 2005). Current catches by Uruguayan fishermen are infrequent, and trawl surveys in Argentina and Uruguay indicate a 96% decline in biomass between 1994 and 1999 (Lorenz et al. 2010). During the 1990s, striped smoothhound were absent from Argentine research surveys and are currently rarely caught by the commercial fleet, suggesting that the Argentine sea represents the periphery of its distribution (Massa 2013).

Table 1. Records of the striped smoothhound based on an extensive search of scientific publications, technical reports, museum specimen records, and the Global Biodiversity Information Facility Database (GBIF)..

Year	Total Number	Area	Country	Source
1859	1	Rio Grande	Brazil	GBIF Database
1865	1	Rio Grande do Sul	Brazil	GBIF Database
1887	1	Montevideo	Uruguay	GBIF Database
1944	2	Barra, Rio Grande do Sul	Brazil	GBIF Database
1978	2	--	Argentina	GBIF Database
1980s	11	Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1980	1	Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1980	1	Rio Grande do Sul	Brazil	GBIF Database
1980-1984	215	Rio Grande do Sul	Brazil	Vasconcellos and Vooren 1991
1981-1999	6	Mar del Plata	Argentina	Massa 2013
1986	1	Rio Grande do Sul	Brazil	GBIF Database
1986	1	Torres, Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1986	2	Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1988-1992	109	Imbe Harbor	Brazil	Soto 2001
1990	2	Mostardas, Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1992	1	Tramandi, Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1995	1	Cassino, Rio Grande do Sul	Brazil	GBIF Database
1995	7	Santa Vitoria do Palmar, Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1995	1	Santa Vitoria do Palmar	Brazil	GBIF Database

1996	2	Tavares, Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1996	1	Farol de Conceiao	Brazil	GBIF Database
1997	1	Rio Grande do Sul	Brazil	Soto and Mincarone 2004
1997	1	--	Brazil	GBIF Database
2007	1	SE Punta del Diablo, Rocha	Uruguay	Lorenz et al. 2010
2009	1	Pozo de Fango off La Paloma, Rocha	Uruguay	Lorenz et al. 2011
N/A	9	Rio Grande do Sul	Brazil	GBIF Database
N/A	1	Tramandai	Brazil	GBIF Database
N/A	1	Montevideo	Uruguay	GBIF Database
N/A	1	Torres	Brazil	GBIF Database
N/A	1	Santa Vitoria do Palmar	Brazil	GBIF Database
N/A	1	Tramandai	Brazil	GBIF Database
N/A	1	--	--	GBIF Database
N/A	1	Montevideo	Uruguay	GBIF Database
N/A	1	Montevideo	Uruguay	GBIF Database
N/A	1	Rio Grande do Sul	Brazil	Compagno 1984
N/A	1	Rio Grande do Sul	Brazil	Compagno 1988
N/A	2	Montevideo	Uruguay	Compagno 1988
N/A	1	Montevideo	Uruguay	Heemstra 1997
N/A	2	--	Uruguay	Sadowski 1977
N/A	1	Bahía Blanca	Argentina	Cazola and Menni 1983

ANALYSIS OF THE ESA SECTION 4(A)(1) FACTORS

NMFS is required to assess whether this candidate species is threatened or endangered because of one or a combination of the following five threats listed under section 4(a)(1) of the ESA: (A) destruction, modification or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; or (E) other natural or human factors affecting its continued existence. Below we consider the best available information on each of the threat factors in turn.

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Various trawl fisheries occur throughout the striped smoothhound's range. Studies show that the interaction of bottom trawling gears with bottom substrate can have negative effects on benthic fish habitat (Valdemarsen at al. 2007). These impacts are often the most serious on hard substrates with organisms that grow up from the bottom such as corals and sponges, but alterations to soft substrates have also been seen (Valdemarsen et al. 2007). The trawl doors on bottom otter trawls often cause the most damage to the ocean bottom, but other parts of trawling gear, such as weights, sweeps, and bridles that contact the bottom can also be damaging (Vademarsen et al. 2007).

Intense fishing disturbance from trawling has reduced the abundance of several benthic species (Valdemarsen et al. 2007). Though there is no specific information available on how trawling has affected the striped smoothhound's habitat, the existence of trawl fisheries within its range makes it likely that damage to bottom substrate has occurred.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization in commercial fisheries poses the greatest threat to striped smoothhound. Because of their (presumed) natural low abundance, directed fisheries for striped smoothhound alone were never viable but striped smoothhound are caught as part multispecies smoothhound fisheries within their range and as bycatch in fisheries for other species such as drums, flounders, and mullets (Haimovici and Mendonça 1996; Vooren and Klippel 2005). As mentioned by a reviewer, since there has been no formal stock assessment for this species, the claims of naturally low abundance could be because portions of the population reside in waters that have been unsampled or undersampled over the years.

Striped smoothhound were once commonly caught as bycatch, although in low numbers, in the 1970s and 1980s in Brazil (Soto 2001, Vooren and Klippel 2005). Adult striped smoothhound are currently rare in commercial catches in Brazil (Vooren and Klippel 2005). According to the IUCN Red List assessment, the current threat to striped smoothhound is intensive fishing by pair trawl, shrimp trawl, gillnet and beach seine in the habitat of this shark (Hozbor et al. 2004). Striped smoothhound landings, although numbers are not available, have also been reported in double rig trawls, pair trawls, bottom longlines, and bottom gillnets in Itajaí Harbor, Santa Catarina (Mazzoleni and Schwingel 1999). An analysis of fisheries discards in shrimp trawls and flounder fisheries found striped smoothhound were occasionally caught and some were retained, while some were discarded (Haimovici and Mendonça 1996). Generally, large striped smoothhound weighing more than 4 kg are retained, while those less than 4 kg are discarded (Haimovici and Maceira 1981). The rate of discard mortality is unknown.

Intense coastal commercial fishing in Brazil affects the recruitment of juvenile sharks into the population (Vooren 1997). Gillnet and trawl fisheries operate along the Brazilian coast, close to shore, where striped smoothhound neonates and juveniles are found year round (Soto 2001, Vooren and Klippel 2005). This puts constant fishing pressure on the species before they reach maturity (Vooren and Klippel 2005). The female spring migration also interacts with these fisheries, affecting the reproductive capacity of the population (Vooren and Klippel 2005). According to the IUCN Red List assessment, gillnets set in inshore areas used to capture neonate striped smoothhound in large numbers (10-100 per set) in the 1980s, but in 2003, they were caught only sporadically and in much smaller numbers (Hozbor et al. 2004). Neonates were also common in waters off Rio Grande do Sul in the early 1980s, but sampling in 2005 yielded only one neonate (Vooren and Klippel 2005). A 95% decline in neonate abundance has been seen since 1981 in the Rio Grande do Sul nursery area based on similar research trawl surveys from the 1980s and early 2000s (Vooren and Klippel 2005).

Striped smoothhound are caught sporadically as bycatch in gillnets, bottom longlines, and trawls in fisheries off Uruguay and Argentina (Domingo et al. 2008, Lorenz et al. 2010). Striped smoothhound are caught in fisheries for Brazilian flathead (*Percophis brasiliensis*), Argentinian sandperch (*Pseudopercis semifasciata*), and apron rays (*Discopyge tschudii*), at depths between 14 and 48 m (Chiaramonte 1998; Lasta et al. 1998). Striped smoothhound are also found in trawls targeting striped weakfish (*Cynoscion guatucupa*) and whitemouth croaker (*Micropogonias funieri*) (Domingo et al. 2008). Landings of smoothhounds (primarily *M. schmitti*, but also *M. fasciatus* and *M. canis*) in Uruguay increased dramatically in the early 2000s (Figure 2; Domingo et al. 2008). No explanation was provided for the cause of the increase in landings. Bycatch in these fisheries has resulted in marked declines. According to unpublished data cited in the IUCN Red List assessment, in the coastal region of the Bonaerensean District of northern Argentina and Uruguay the biomass of striped smoothhound decreased by 96% between 1994 and 1999 in trawl surveys (Hozbor et al. 2004). No further information on survey design was provided in the Red List assessment. As emphasized by one of our reviewers, currently, striped smoothhound occur only rarely in Argentina.

Based on the information gathered for this review, fisheries data available for the striped smoothhound are inconsistent and sporadic at best. Numbers quantifying catch of striped smoothhound are rarely reported in papers and many of those papers only mention qualitative information, such as the presence or absence of smoothhound within the catch. Research on catch composition in Cassino Beach, Rio Grande do Sul, Brazil, shows that the number of neonates caught has declined from 1980-1983 to 2002-2003 (Figure 3; Vooren and Klippel 2005). Data compiled from separate Brazilian research surveys from the 1980s and early 2000s show declines in CPUE over time (Table 2 and 3; Vooren and Klippel 2005). Since striped smoothhound are not a target species in fisheries, no information was available on the distribution or potential changes in fishing effort and fishing grounds over time.

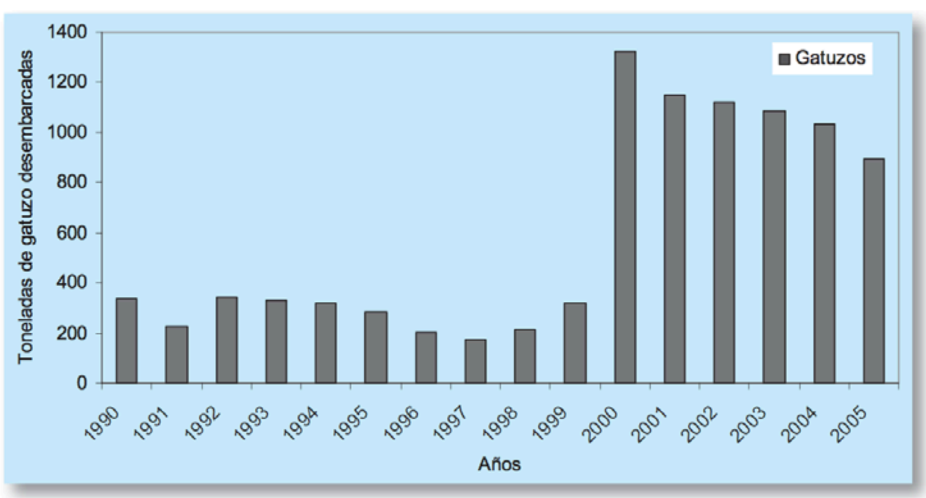

Figure 2. Landings of smoothhounds (*M. schmitti, M. fasciatus,* and *M. canis*) in Uruguay from 1990 to 2005 (Domingo et al. 2008).

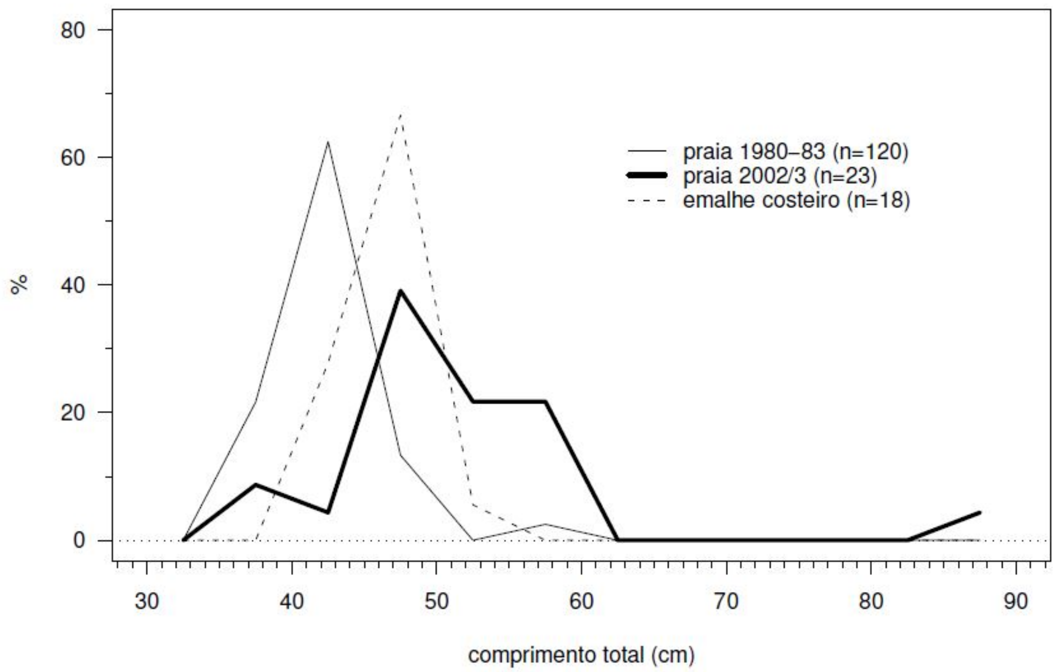

Figure 3. The length frequency of the catch of neonates (35-48 cm TL) and juvenile striped smoothhound from artisanal fishing in Cassino Beach, Rio Grande do Sul, Brazil in 1980-1983 (“praia 1980-83 (n=120)”; November-February) and in 2002-2003 (“praia 2002/3 (n=23)”; December to February), and from industrial gillnet fishing on the continental shelf between 15 and 20 m deep in December 2002 (“emalhe costeiro (n=18)”) (Vooren and Klippel 2005).

Table 2. Catches of neonate striped dogfish in summer (December to February) in artisanal fisheries in Cassino Beach, Rio Grande do Sul, Brazil (Vooren and Klippel 2005).

	Beach Seine		Driftnet	
Years	1981-1985	2002-2003	1981-1985	2002-2003
Number of Sets	14	20	4	15
Frequency of occurrence	36%	40%	75%	13%
Number caught	27	23	74	3
CPUE (number per set)	1.9	1.2	18.5	0.2

Table 3. Catches of juvenile striped dogfish in trawl surveys at depths less than 20 m on the Rio Grande do Sul coast. Data from 1981 and 1982 were from depths of 10-20 m between Solidão and Chuí, and data from 2005 were from depths of 7-20 m between Torres and Chuí.

Date	Number of Sets	Frequency of Occurrence (%)	CPUE (kg/hr)
Feb. 1981	7	86	2.55
Jan. 1982	13	54	3.95
Feb. 2005	62	2	0.02

Competition, Disease, or Predation

Currently, no information is available regarding threats to the striped smoothhound population via competition, disease, or predation.

Adequacy of Existing Regulatory Mechanisms

In December, 2014, the Brazilian Ministry of the Environment approved a new version of the Brazilian Endangered Species List, which listed the striped smoothhound as critically endangered in Annex I (Directive N^{o} 445). An Annex I Listing forbids the capture, transport, storage, and handling of striped smoothhounds, except for conservation research purposes that are authorized by the Instituto Chico Mendes de Conservação da Biodiversidade.

Additionally, in December, 2014 the Instituto Chico Mendes de Conservação da Biodiversidade approved the National Action Plan for the Conservation and Management of the Elasmobranchs of Brazil (N^{o} 125, Lessa et al. 2005). The striped smoothhound is not listed as one of the twelve species of concern, but the plan does call for fishing closures in coastal waters, up to 20 m deep, in Rio Grande do Sul, to protect striped smoothhound nursery areas (Lessa et al. 2005). This suggestion is similar to that made by Vooren and Klippel (2005), which suggested that the coastal nursery between Cassino Beach and Chuí in Rio Grande do Sul be closed to fishing at depths less than 20 m. They also proposed a closure between 32 and 34^{o}S, where adults now seem to be found in greatest abundance (Vooren and Klippel 2005). The plan also includes general short term, mid-term, and long term goals for elasmobranch conservation. The plan sets short term goals for improved data collection on landings and discards, improved compliance and monitoring by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), supervision of elasmobranch landings to ensure fins are landed with carcasses, the creation of a national port sampler program, and intensified on board observer monitoring programs. Mid-term goals include increased monitoring and enforcement within protected areas as well as the creation of new protected areas based on essential fish habitat for the 12 species of concern. They also call for improved monitoring of fishing from beaches in coastal and estuarine environments. Long term goals call for improved ecological data and stock assessments for key species as well as mapping of elasmobranch spatiotemporal distributions. This data will be used to better inform the creation of protected areas and seasonal fishing closures (Lessa et al. 2005).

Uruguay's FAO National Plan of Action for the conservation of chondrichthyans lists the striped smoothhound as a species of high priority (Domingo et al. 2008). It sets short-term goals of 12-18 months to investigate distribution and habitat use, mid-term goals of 24-30 months to generate time series of effort and catch, and long-term goals of 36-48 months to research reproduction, age and growth, and diet, and conduct an abundance assessment. They made it a priority to review current fishing licenses that allow for the catch of striped smoothhound and possibly modify them, grant no new fishing licenses, forbid processing and marketing of striped smoothhound, and promote public awareness to release captured individuals. The results gleaned from the goals and priorities of this plan could not be found. Argentina's FAO National Plan of Action for the conservation of chondrichthyans does not consider the striped smoothhound to be a species of high priority (NPOA-Argentina 2009).

Some general fishing regulations could also help protect the striped smoothhound throughout its range. In Brazil, trawling in waters less than 10 m deep is banned, but enforcement is poor (Hozbor et al. 2004). An area fishing ban for whitemouth croaker (*Micropogonias furnieri*) within the Argentine and Uruguayan Common Fishing Zone became effective August 31, 2014. This area is part of the striped smoothhound's range during the spring and summer, and a fishing ban for other species could help prevent their capture as bycatch.

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