

Species Status Assessment

Common Name: Sand tiger shark

Date Updated: 1/12/2024

Scientific Name: *Carcharias taurus*

Updated by: Siobhan Keeling

Class: Chondrichthyes

Family: Odontaspidae

Species Synopsis (a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):

The sand tiger shark, *Carcharias taurus* is found in a wide range of inshore waters, excluding the eastern Pacific. They can occur in the surf zone, shallow bays, around rocky or coral reef structure, and have even been found at up to depths of 200 meters along the continental shelf (Pollard et al. 2009). On the east coast of the U.S., juvenile sand tigers move between northern habitats in the summer (e.g., southern New England, Cape Cod, Gulf of Maine) and overwintering habitats along the coast of North Carolina (NC) and Florida (FL) (Figure 1, Kneebone et al., 2014). Large numbers of juveniles from the Gulf of Maine south to southern New England in the summer months suggest this region serves as nursery habitat. The region, including Great South Bay, Long Island, has been listed as essential neonate/young and juvenile habitat (Kneebone et al., 2012). Compared to juveniles, adults exhibit shorter migrations within the continental shelf between Delaware bay and NC (Teter et al., 2015). In this species, migration is influenced by sex and life-stage.

Since the mid-1970s, the population of sand tigers in the western North Atlantic has declined. However, the severity of the decline is contended, with studies reporting declines of less than 6% to upwards of 90% (Musick et al., 1993, Ha et al., 2006, Carlson et al., 2009.). There is limited data and a high level of uncertainty surrounding the abundance trend estimates. Characteristics including slow growth rates, late maturity, and low fecundity make this species highly sensitive to exploitation (Rigby et al., 2021). Sand tigers are late-to-mature, mate biannually, and produce only one to two pups per litter (Gilmore et al. 2003). NOAA listed the sand tiger as a prohibited species in 1997, prohibiting the procession of the species in all US federal waters (NMFS, 1999). Further, in 2004, NOAA listed the sand tiger as species of concern. More recently, in 2008, the Atlantic States Marine Fisheries Commission (ASMFC) mandated the prohibition of sand tigers in all state waters from Maine to Florida (ASMFC, 2008). In NY, since 2010, the take or procession of sand tiger sharks has been illegal. According to New York's Environmental Conservation Law (Section 11-0103 (13)), a take includes pursuing, capturing, and killing sharks. This shark is fished for consumption in Japan, as well as for its oil and fins. It is often caught as bycatch in longline fishing and with various trawls and gillnets. Sand tiger sharks tend to aggregate for different events making them an easy target for fishermen (NMFS 2010). Although recent assessments show that this species is not in severe decline and is not experiencing severe exploitation, it remains on the NMFS Species of Concern list due to its extremely low productivity (Carlson et al. 2009). In order to assess the stock more accurately, better data is needed on the catch of this species along with a better understanding of their life history traits. The IUCN Red List status has changed from vulnerable in 2009 to critically endangered in the 2021 assessment (Rigby et al. 2021).

I. Status

a. Current legal protected Status

i. **Federal:** Not Listed **Candidate:** No

ii. **New York:** Not Listed

b. Natural Heritage Program

- i. **Global:** G3G4, Vulnerable/Apparently Secure, rounded to G3
- ii. **New York:** S2, Imperiled **Tracked by NYNHP?:** No

Other Ranks:

- New York 2025 SGCN status: High Priority Species of Greatest Conservation Need
- IUCN Red List: Critically Endangered
- Northeast Regional SGCN: RSGCN
- NMFS Species of Concern—throughout its range
- American Fisheries Society—Vulnerable

Status Discussion:

Sand tiger sharks are currently listed by the NMFS as a Species of Concern. Although stock assessments for sand tiger sharks are data poor, Carlson *et al.* (2009) states that the sand tiger shark population is not in as significant a state of decline as previously assessed. However, low to moderate decline is occurring. Conflicting information in the literature makes the status uncertain.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	1960s-2006		-
Northeastern US	Yes	Declining	Stable	1960s-2006 (Western Atlantic Ocean)		Yes
New York	Yes	Declining	Stable		Not Listed	Yes
Connecticut	No data	-	-		Not Listed	No
Massachusetts	No data	-	-		Not Listed	No
New Jersey	No data	-	-		Not Listed	No
Pennsylvania	No	-	-			-
Vermont	No	-	-			-
Ontario	No	-	-			-
Quebec	No	-	-			-

Column options

Present?: Yes; No; Unknown; No data; (blank) or Choose an Item

Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item

SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York (*specify any monitoring activities or regular surveys that are conducted in New York*):

New York does not currently have any monitoring activities or regular surveys specific to the sand tiger shark. However, New York fishermen and researchers may participate in the National Marine Fisheries Service Cooperative Shark Tagging Program which tags a wide variety of shark species. Information on stock identity, movements and migration, abundance, age and growth, mortality, and behavior can be collected from tagged sharks (NMFS 2011). New York currently maintains a passive acoustic array in its waters as part of the Atlantic Cooperative Telemetry Network. This network was started in 2006 during the Atlantic States Marine Fisheries Commission's Atlantic Sturgeon Technical Committee Meeting. Researchers independently maintain their receivers, but coastwide data on a variety of species including sea turtles, skates, rays, sturgeon, and sharks is often collected and collaborated by the states. New York is currently trying to maintain their array at least for the next several years in order to continue collecting information on tagged species (L. Bonacci, pers. comm., ACT 2013).

Trends Discussion *(insert map of North American/regional distribution and status):*

The current population trend is decreasing according to the IUCN red list (Rigby et al. 2021). Sand tiger shark abundance is not in as significant a state of decline as previously suggested but is still experiencing low to moderate decline (see fig. 4; Carlson et al. 2009). Under the theory that a heavily exploited long-lived species, such as a sand tiger, would decrease in average size over the years, it would be expected that there would be a trend of decreasing size for this species. However, this has not been the case suggesting that they are not under severe exploitation. They remain a species of concern due to their life history traits, low productivity, and uncertainty in abundance data (Carlson et al. 2009). In the Northwest Atlantic, they are considered to be one of the less vulnerable species due to the low susceptibility to longline fisheries. However, recovery rate is slow due to a low productivity, so it is inferred that this population has been reduced by 30 to 49%. Due to exploitation, it is suspected that the sand tiger shark has had a global population reduction of >80% over the past three generations (74 years) (Rigby et al. 2021).

Distribution Map

Carcharias taurus



Legend

■ EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. IUCN Red List Sand Tiger Shark distribution map (Rigby 2021)

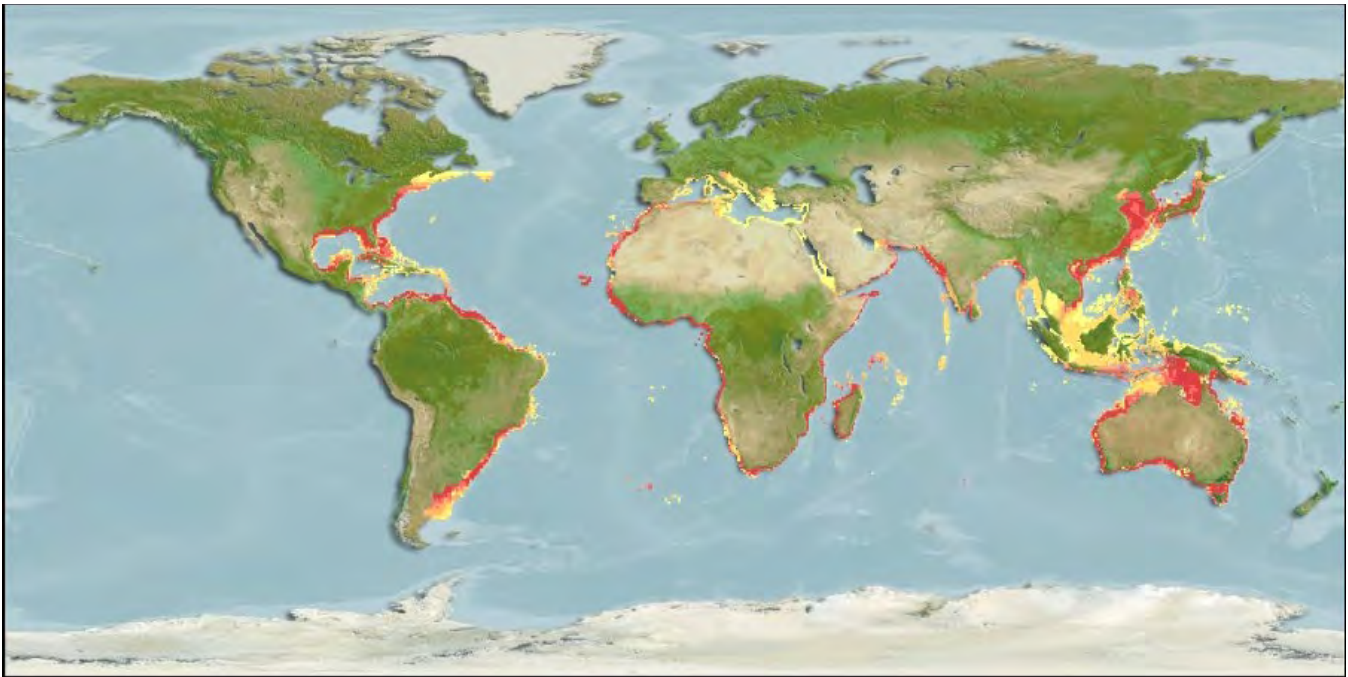


Figure 2. Global distribution of the Sand tiger shark, *C. taurus*. (Aquamaps 2010)



Figure 3. Distribution of sand tiger shark in the western Atlantic Ocean (NMFS 2010).

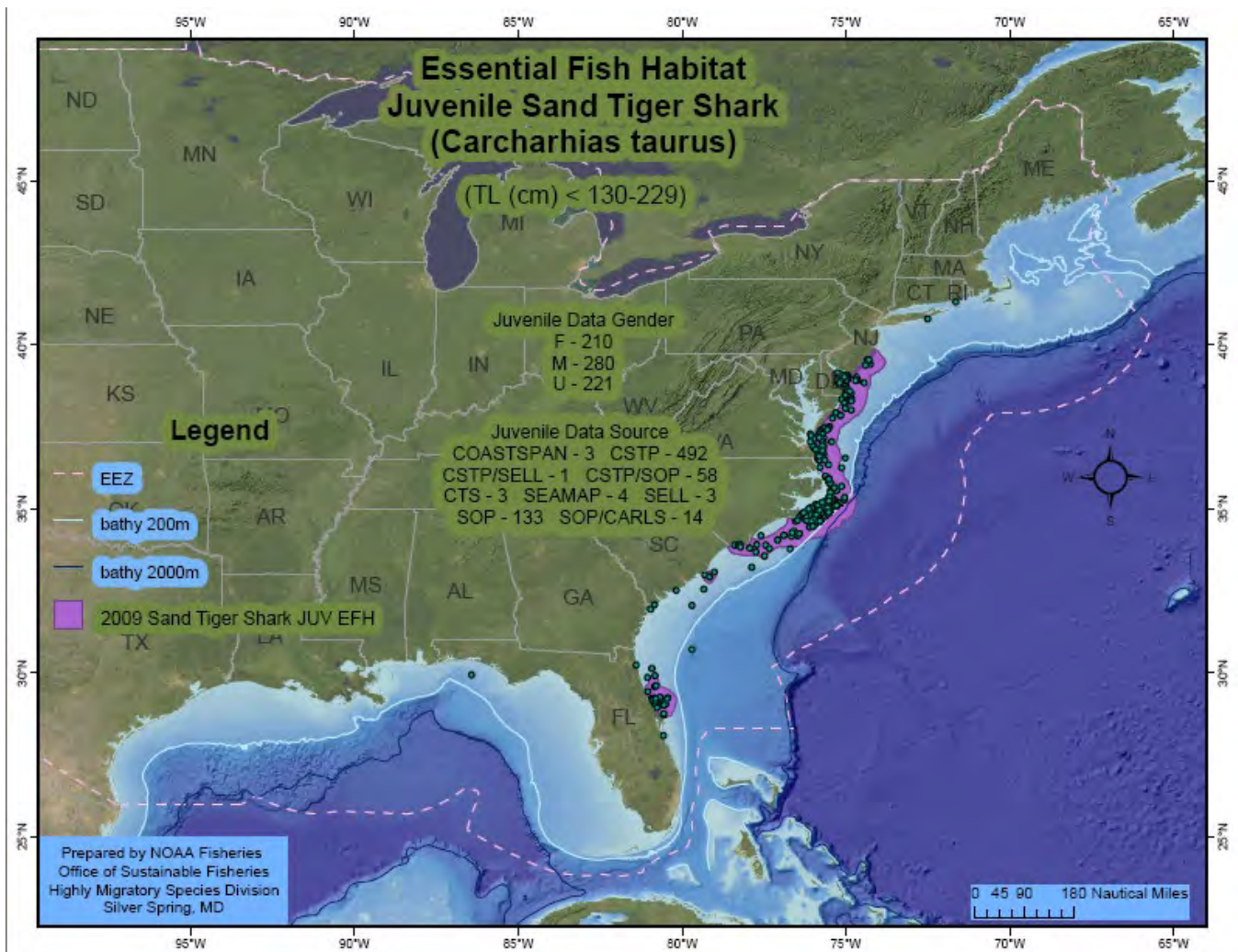


Figure 4. Essential Fish Habitat for the Juvenile Sand Tiger Shark (NMFS 2009)

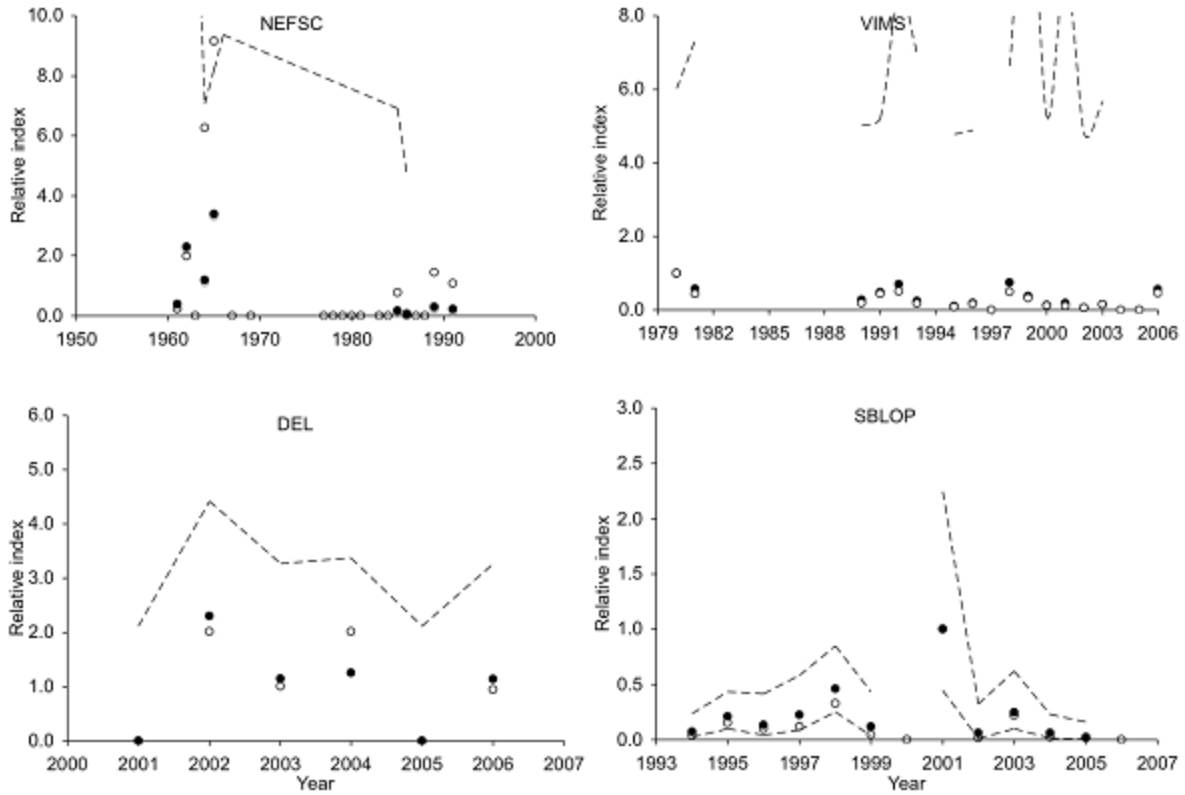


Figure 5. Standardized relative index (mean/maximum of index) of abundance (solid circles) for sand tigers from three scientific surveys (Northeast Fisheries Science Center exploratory longline surveys (NEFSC); Delaware Bay Survey (DE), and Virginia Institute of Marine Science (VIMS) survey) and the Commercial Shark Bottom Longline Observer Program (SBLOP) based on the final model. Nominal data (circles) are plotted for comparison. Confidence limits (95%) for the standardized index are dotted lines. Some points are not visible because the nominal and standardized values overlap whereas in others cases because there was no standardized estimate due to a zero observed value (Carlson et al. 2009).

III. New York Rarity *(provide map, numbers, and percent of state occupied)*

Although sand tiger sharks are widely distributed across the globe they have probably never been greatly abundant in New York waters.

Details of historic and current occurrence:

Historic:

Sand tiger sharks have historically been found in New York waters, including the Atlantic Ocean and the Long Island Sound.

Current:

Sand tigers are currently found in New York waters, including the Atlantic Ocean and the Long Island Sound.

New York's Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	

Column options

Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item

Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type (from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):

- a. Marine, Shallow Subtidal
- b. Marine, Deep Subtidal
- c. Marine, Shallow Subtidal, Artificial Structure, Reef

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/Community Trend	Time frame of Decline/Increase
No	No	Stable	

Column options

Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item

Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

Sand tiger sharks have been shown to be in a range of habitats. They typically remain coastal and are found in the surf zone out to 25 meters depth, often hovering over the sea bed. Although not as common, they can also be found in shallow bays, around coral or rocky reefs, and at the edge of the continental shelf at depths up to 200 meters (Rigby et al. 2021, NMFS 2010; Pollard et al. 2009). They have a wide distribution range, and are primarily found in subtropical and warm temperate waters. Along the eastern U.S. they are found from the Gulf of Maine to Florida and in the northern Gulf of Mexico. They are not found in the eastern Pacific off of North and South America (Pollard et al. 2009). In warmer months there is high abundance of sand tiger sharks in the Delaware Bay, and off of North and South Carolina. They are also found year-round off of Florida's eastern coast (Carlson et al. 2009).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Unknown	-	-	-	-	-

Column options

First 5 fields: Yes; No; Unknown; (blank) or Choose an item

Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion (include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):

Sand tiger sharks reach a maximum size of 325 cm total length (TL) and size at birth is 85 to 105 cm (TL). In the Northwest Atlantic, females reach maturity at 9 to 10 years and at a length of 220 to 235 cm (TL), while males reach maturity at 190 to 200 cm (TL). The maximum age of this species is at least 40 years and generation length is estimated at 24.8 years (Rigby et al. 2021).

North American populations are thought to mate biannually and generally from March to April. During mating season sand tiger sharks aggregate in large numbers in coastal waters (NMFS 2010). This species is ovoviviparous and the embryos have been shown to exhibit intra-uterine cannibalism. During the early stages of gestation several encapsulated embryos can be found inside of a pregnant female. Once the largest encapsulated embryo hatches it consumes both non-hatched and smaller hatched embryos. The embryos also exhibit oophagy, a process in which they feed on highly nutritious, yet unfertilized eggs produced by the mother (Cooper et al. 2018, Gilmore et al. 1983). Gestation for sand tiger sharks can be from eight to nine months long and generally, one to two pups are born per litter. Sand tigers have been shown to aggregate not only for mating, but also during feeding, courtship, and birth events (NMFS 2010).

As documented by several researchers it has been noted that the population along the eastern U.S. coast undertakes complex size and sex migrations. It is believed that other populations behave similarly (Rigby et al, 2021, Pollard et al. 2009). The North American population migrates poleward in the summer and equatorially during the fall and winter months (NMFS 2010).

VI. Threats *(from NY 2015 SWAP or newly described)*

Sand tiger sharks are vulnerable to overexploitation due to their life history characteristics. They are slow to mature, have long gestation periods, and breed biannually. Although they are illegal to possess and harvest in U.S. waters, sand tiger sharks are caught as bycatch in longline fishing, bottom-set gillnets, and bottom and pelagic trawls (NMFS 2010); their susceptibility to longline fishing, however, is low relative to that of other shark species (Carlson et al. 2009).

In Japan, sand tiger sharks are highly sought after for their meat. In other areas they are fished for their fins, as well as for fish meal and oil from their large livers (NMFS 2010). Their propensity to form large aggregations has made them easy targets for fishermen in the past (NMFS 2010), and presumably for people who currently harvest them.

Results of a feeding study on sand tiger sharks suggest that the simple release of sand tigers caught in recreational fishing may not be significant enough to conserve the species. Sand tigers were shown to mainly consume their prey whole. Many of their prey items are targeted for recreational fishing and if a sand tiger is hooked there is often damage to vital internal organs (Lucifora et al. 2009).

For juveniles that reside in near-shore estuaries, non-point source pollution may be a potential threat (NMFS 2010). Scuba divers frequently dive with sand tiger sharks because of their tendency to hover motionlessly above the sea floor. There has been some concern that these recreational activities could drive sand tigers away from their critical habitat or perhaps disturb other natural behaviors (Pollard et al. 2009).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
3. Energy Production & Mining	3.3 Renewable Energy	3.3.2 Wind farms (offshore)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.1 Recreational or subsistence fishing	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.2 Commercial fishing (bycatch)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.3 Poaching/persecution of aquatic species	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.3 Gradual temperature change (increasing ocean temperatures)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to sand tiger shark

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: X

No: _____

Unknown: _____

If yes, describe mechanism and whether adequate to protect species/habitat:

Sand tiger sharks are currently managed under the federal Highly Migratory Species Fishery Management Plan (FMP). Under this FMP, since 1997 it has been illegal to land sand tiger sharks (whole or part), either recreationally or commercially, on the Atlantic coast of the United States. The Shark Interstate Fisheries Management Plan has banned the retention or possession of sand tiger sharks from Maine to Florida since its development in 2010 (NMFS 2010). New York State prohibits the possession of sand tiger sharks in accordance with the federal and interstate FMPs (NYSDEC 2021). Despite the landing of sand tiger sharks in U.S. waters being prohibited, commercial landings still occur (Carlson et al. 2009).

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Although the most recent stock assessment has shown that sand tiger shark abundance may not be in as significant a state of decline as previous studies have suggested, the species' extremely low productivity, along with the uncertainty in the data with which they were assessed, has prompted NMFS to keep the sand tiger shark on the Species of Concern list as a precautionary approach (Carlson et al. 2009). Increased research on the life history traits of this species is important for accurately assessing the stock status. Additional data collection on commercial bycatch and landings, along with recreational discard information is an important tool for generating greater certainty within the stock assessment.

Action Category	Action	Description
A.1 Direct Habitat Management	C.6.5.0.0 Conservation planning	Site/Area Protection
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Harvest management
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Trade management
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Species recovery
C.7 Legislative and Regulatory Framework or Tools	C.7.0.0.0 Legislative and Regulatory Framework or Tools	Legislation/National level
B.4 Law Enforcement and Prosecution	B.4.0.0.0 Law enforcement and Prosecution	Compliance and enforcement/National level

Table 2. Recommended conservation actions for sand tiger shark (Rigby et al. 2021)

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