Species Status Assessment

Common Name: Barndoor skate **Date Updated:** 11/14/2023

Scientific Name: *Dipturus laevis* **Updated by:** Meaghan McCormack

Class: Chondrichthyes

Family: Rajidae

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

The barndoor skate is a marine cartilaginous fish that occurs on continental shelf habitat from the Grand Banks region off the coast of Newfoundland, Canada to Cape Hatteras, North Carolina. They are most common in Georges Bank, the Gulf of Maine and Southern New England (Kulka et al., 2020). It is the largest member of the Rajidae family residing in the Northwest Atlantic, occurring off the coast of New York from the shoreline to depths over 1000m, with highest concentrations from 61-140m (Cavanagh and Damon-Randall 2009). As a benthic fish, it prefers sand or gravel substrates in shallow waters and soft mud in deeper waters. Skates migrate seasonally in response to temperature changes, occurring in shallower water in the spring and autumn (Bigelow and Schroeder 1953). Its status as Special Concern in New York has largely been due to historical overfishing and continued issues with bycatch. The species experienced severe declines in the 1960s and remained a low biomass until the 2000s when the species began to rebound (Kulka et al., 2020). Possession of barndoor skate was prohibited between 2003 and 2017, which allowed the population to recover. In 2016, barndoor skates were considered rebuilt. As of 2018, barndoor skate is no longer over-fished and some harvest is permitted (NEFMC, 2022)

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G4G5

ii. **New York:** S3 **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Least Concern (global); northeast US (least concern)

-Northeast Regional SGCN: SGCN

Status Discussion:

The species experienced severe declines in the 1960s and at one point was listed as a species of concern with NOAA fish and remained a low biomass until the 2000s when the species began to rebound (Kulka et al., 2020). Possession of barndoor skate was prohibited between 2003 and 2018. As of 2018, barndoor skate is no longer overfished, the stock is considered rebuilt, and some harvest is permitted. The most recent IUCN assessment in 2019 lists Barndoor skates as least concern in Northeast US (Kulka et al., 2020).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Increasing	Increasing	Last 20 years		Choose an item.
Northeastern US	Yes	Increasing	Stable	Last 20 years		Yes
New York	Yes	Increasing	Increasing	Last 20 years		Yes
Connecticut	Yes	Increasing	Stable	Last 20 years	Not listed	No
Massachusetts	Yes	Increasing	Stable	Last 20 years	Not listed	No
New Jersey	No data	Unknown	Unknown		Not listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	Yes	Increasing	Increasing	Last 20 years	Not listed	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):*

NOAA's NEFSC conducts spring and autumn bottom trawl surveys annually from Cape Hatteras, NC to the Gulf of Maine, which encounter barndoor skates in the New York Bight. In recent years, barndoor skates have also been sampled in the NYSDEC/SOMAS Nearshore trawl survey.

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

Although barndoor skate survey data showed a drastic decline from its peak values in the 1950s and 1960s to several zero indices throughout the 1970s and 1980s, numbers have been on a consistent rise since the 2000s. The 2019 and 2021 average NEFSC fall survey biomass index was 1.52 kg/tow, which above the biomass threshold reference point (0.78 kg/tow). The 2019 and 2021 average biomass index is below the BMSY proxy (1.57 kg/tow) (NEFMC, 2022).

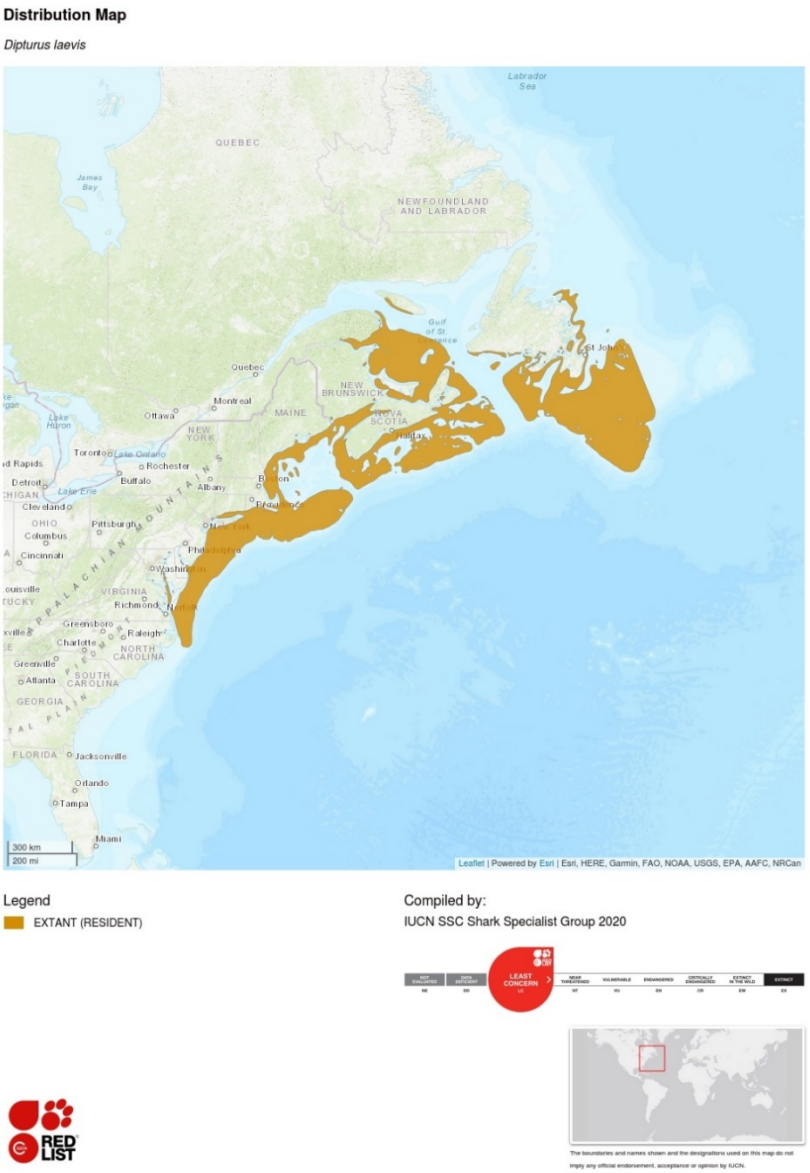

Figure 1. Barndoor skate range and status (IUCN Redlist; Kulka et al., 2020)

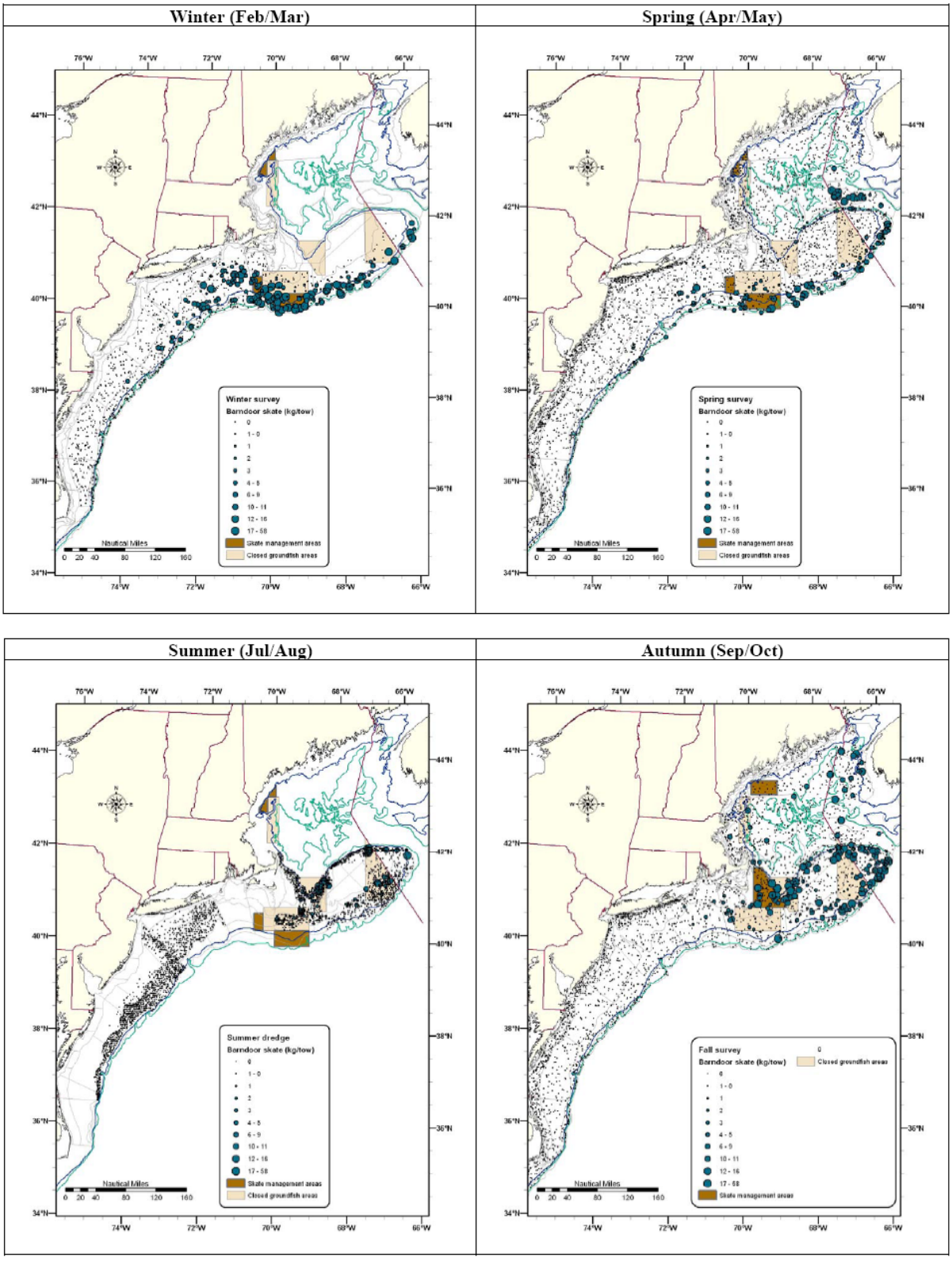

Figure 2. Barndoor skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys (NEFMC 2009).

Northeastern USA: Standardized CPUE (1970-2017), NOAA-NEFSC (USA), Survey kg/tow (Fall season).

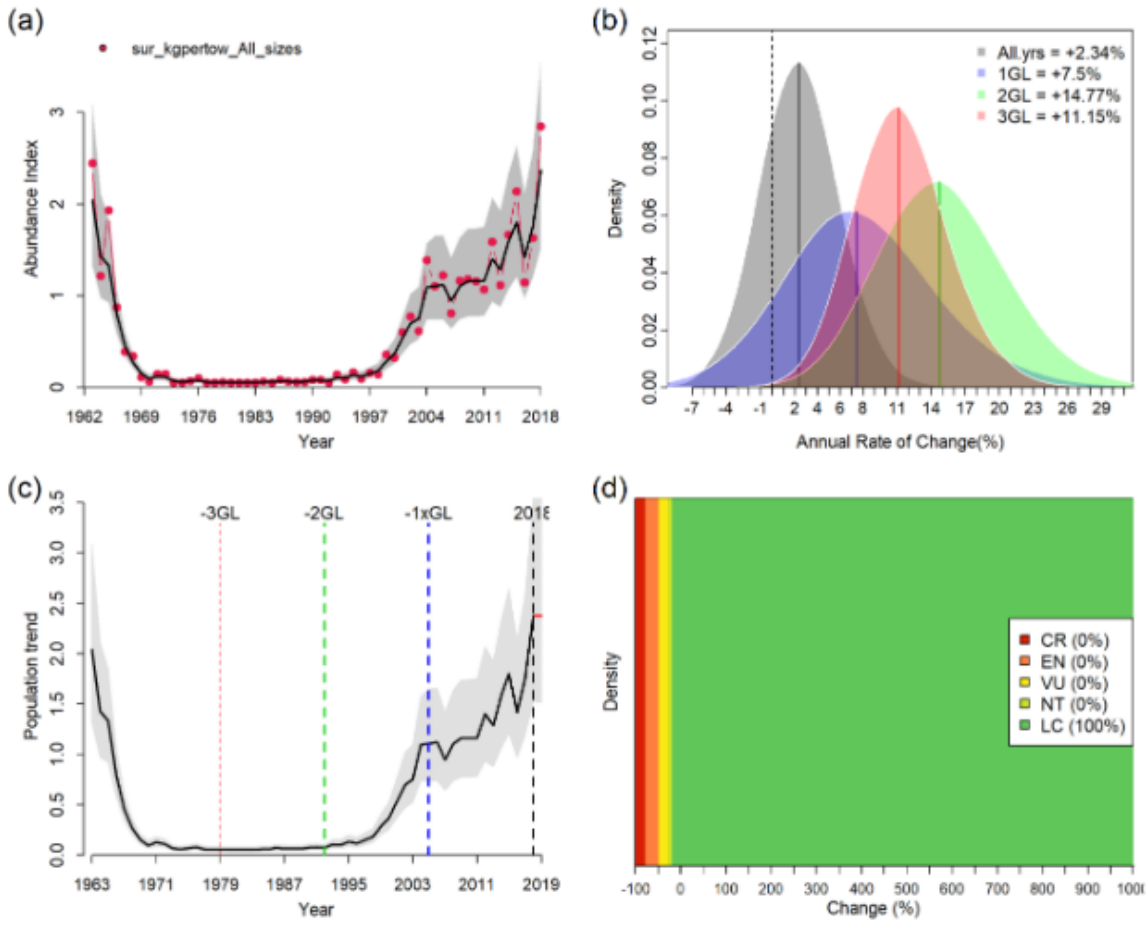

Figure 3. JARA results for *Dipturus laevis* in the NOAA-NEFSC (USA) showing (a) the JARA fit to the observed time-series, (b) the posterior probability for the percentage annual population change calculated from all the observed data (in grey), from the last 1 generation length of data (in blue), from the last 2 generation length of data (in green), from the last 3 generation length of data (in red), with the mean (solid lines) shown relative to a stable population (% change = 0, black dashed line), (c) the observed (black line) and predicted (red line) population trajectory over three generations (39 years, dashed grey lines), and (d) the median decline over three generation lengths (dashed line) and corresponding probabilities for rates of population decline falling within the IUCN Red List category.

Figure 3. Barndoor skate Northeast U.S. trends (NatureServe; Kulka et al, 2020)

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

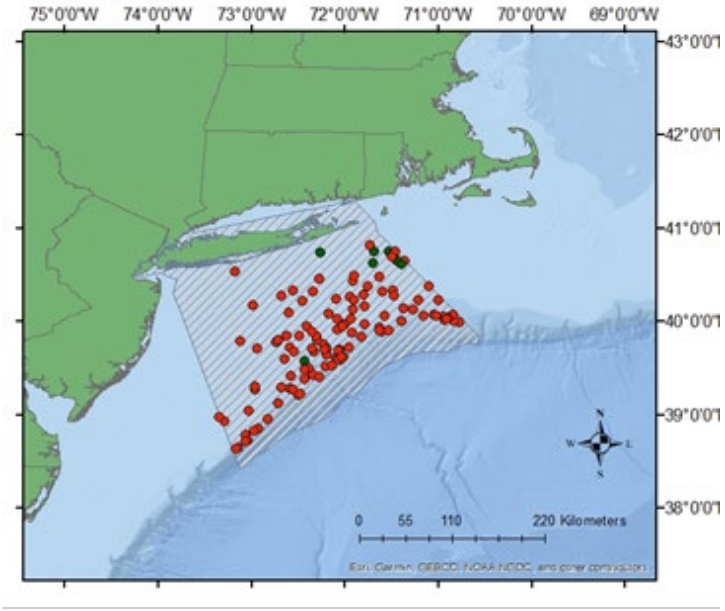

Figure 4. Records of barndoor skate in the New York Bight from the NEFSC bottom trawl survey and NYS DEC/SOMAS Nearshore Survey (spring = red and green = fall).

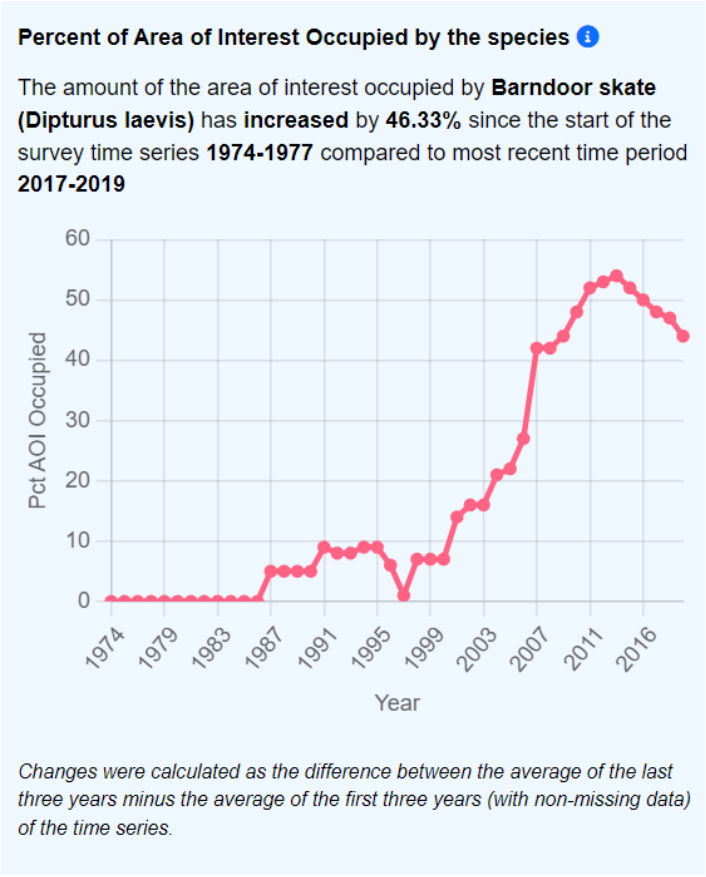

Figure 5. Barndoor Skate: Percent Area Occupied within the NY Bight based on NEFSC data (source: https://apps-st.fisheries.noaa.gov/dismap/DisMAP.html)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of barndoor skate in New York.

Details of historic and current occurrence:

After analyzing trawl catch rates between August 1943 and October 1944, Bigelow and Schroeder (1953) estimated 120 barndoor skate individuals per 1800m^2 in the eastern end of Long Island Sound. Off southern New England, 44 mid-winter hauls in 86 to 123m depth and 63 hauls in May at 40 to 430m depth yielded 441 barndoor skates from a total of 748 skates of all skate species (Cavanagh and Damon-Randall 2009). The areas of highest concentrations were Georges Bank, Gulf of Maine, the central Scotian Shelf and Southern New England. Individuals have been caught off the southern shore of Long Island in NEFSC trawl surveys as recently as 222, most commonly during spring months.

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, Deep Subtidal
b. Marine Shallow Subtidal
c. Marine Deep Subtidal, Benthic Geomorphology, Benthic Flat

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:

Barndoor skates occur near the shoreline in winter and spring and migrate out to the continental shelf during summer and autumn. They are found on mud bottoms as well as on sand and gravel

occurring from the shoreline to about 740m in the marine deep subtidal zone, although they are most abundant at depths less than 150m (Bigelow and Schroeder 2002, Packer et al. 2003). Their wide depth distribution may be because they are able to live in a wide range of temperatures (McEachran and Musick 1975, Scott and Scott 1988).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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):*

There has been some debate on the life history characteristics of the barndoor skate, with older estimates of age to maturity at 11-12 years and newer numbers suggesting 7 years (Gedamke et al. 2005). They are relatively large skates, with some specimens in the Gulf of Maine measuring up to 180 cm TL (Bigelow and Schroeder, 1953). Maximum egg production averages at 47 eggs/yr, while some studies suggest numbers up to 115 eggs/yr (Cavanagh et al. 2009, Packer et al. 2007). Females are oviparous and lay heavily armored eggs in sandy or muddy flats at 27 to 46m depths, with hatching occurring after about 1 year (Packer et al. 2007). Highest egg deposition occurs in the fall (10 to 12 eggs per month) and hatching rates are relatively high at 73% (Cavanagh et al. 2009). Barndoor skates are a long lived species, with an average life span of approximately 50 years (Cavanagh et al. 2009). Due to the broad temperature range of barndoor skates (about 1 to 20˚C) and wide salinity tolerance (21 to 60 ppt), they have the ability to disperse and colonize new waters. Due to its show growth, late maturity, and large size, barndoor skates are highly vulnerable to overfishing and often included in bycatch.

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

Barndoor skates were primarily harvested for use as lobster bait and sold in the skate wing export market for human consumption. Between 2003 and 2017, possession and landing of barndoor skate was prohibited and it is assumed that more vessels land skate wings as an incidental catch in mixed fisheries than as a target species (Cavanagh and Damon-Randall 2009; Kulka et al., 2020). The discard mortality rate of barndoor skate captured by commercial fishing gear is one of the biggest unknown factors in skate population dynamics. A common concern for marine populations is the effect of changing ocean conditions as a result of climate change, but because of their k-selected nature, barndoor skates may be more resilient to such changes in the environment. Despite being a cold water species, they have not shifted in range as expected (https://www.st.nmfs.noaa.gov/Assets/ecosystems/climate/images/species-results/pdfs/Barndoor_Skate.pdf0. Mobile fishing gear may have a negative impact on the bottom habitat of the barndoor skate, but there is no current evidence that bottom trawling is impacting skate populations. Since 2018, some possession of barndoor skates has been allowed.

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (illegal harvest)
3. Biological Recourse Use	Fishing & Harvesting Aquatic Resources (harvest)
4. Climate Change	Habitat shifting & alteration

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

Yes: ✓ **No:** _____ **Unknown:** _____

If yes, describe mechanism and whether adequate to protect species/habitat:
The Skate Fisheries Management Plan (implemented 9/18/2003 by New England Fishery Management Council) developed management measures to end overfishing and rebuild these resources in accordance with the Magnuson-Stevens Fishery Conservation and Management Act. Management measures apply to vessels fishing within the Skate Management Unit, which covers federal waters from 35˚ 15.3'N latitude, starting at Cape Hatteras, northward to the US-Canadian border, and extending eastward from shore to the outer boundary of the Exclusive Economic Zone. Management measures included a requirement to report skate landings by individual species and skate discard by general categories (large/small), and a prohibition on possession, retention, or landing of barndoor skate. The plan also includes a rebuilding program for overfished skate species, essential fish habitat designations, and a baseline of management measures in other fisheries that benefit skates (Cavanagh and Damon-Randall 2009). As of 2016, barndoor skate stocks were considered rebuilt and some possession has been allowed since 2018. There is now some possession allowed (e.g., 25% of overall skate catch is permitted on directed wing fishery trips only).

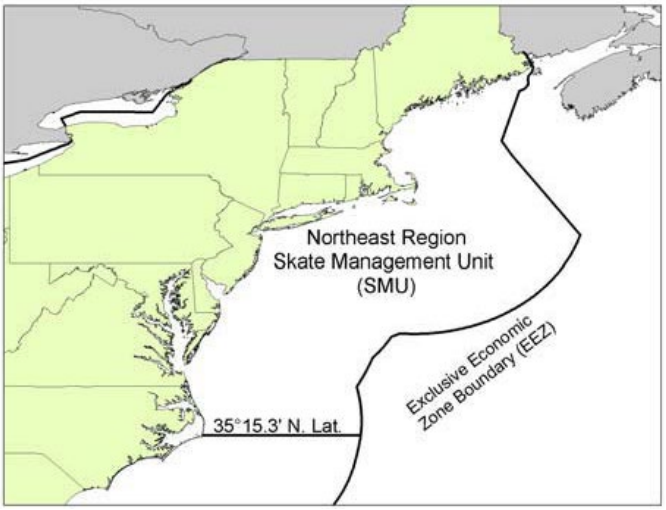

Figure 6. Map of Northeast Region Skate Management Unit (NOAA National Marine Fisheries Service)

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

Support the Skate Fisheries Management Plan and continue to implement restrictions on landings of barndoor skate.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
3. 1 Species management 3.1.1. Harvest management	Continue management of the fishery through the FMP
5. Law & policy 5.4 Compliance and enforcement 5.4.2. National level	Enforce regulations, and reduce bycatch and illegal fishing

Table 2: Recommended conservation actions for barndoor skate

VII. References

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the western North Atlantic. Sawfishes, guitarfishes, skates and rays. Mem. Sears Found. Mar. Res., Yale Univ., New Haven, 1(2): 588p.

Casey, J.M., and R.A. Myers. 1998. Near extinction of a large, widely distributed fish. Science, 281(5377):690-692.

Cavanagh, M.F., and K. Damon-Randall. 2009. Status of the barndoor skate (*Dipturus laevis*). National Marine Fisheries Service Report, Northeast Regional Office. 77p.

Bigelow, H.B. and W.C. Schroeder. 2002. Collette, B. B. and Klein-MacPhee, G. (eds.) *Fishes of the Gulf of Maine,* 3rd ed. Smithsonian Institution Press, Washington, DC, 748 pp.

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Gedamke, T., W. D. DuPaul, and J. A. Musick. 2005. Observations on the life history of the barndoor skate, *Dipturus laevis*, on Georges Bank (Western North Atlantic). J. NW Atl. Fish. Sci., 35: 67-78.

Kulka, D.W., Cotton, C.F., Anderson, B., Herman, K., Pacoureau, N. & Dulvy, N.K. 2020. Dipturus laevis. The IUCN Red List of Threatened Species 2020: e.T39771A124413280.

https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T39771A124413280.
McEachran, J.D. and J.A. Musick. 1975. Distribution and relative abundance of seven species of skates (Pisces: Rajidae)which co-occur between Nova Scotia and Cape Hatteras. Fish. Bull. 73:110-136.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: January 31, 2013).

New England Fishery Management Council (NEFMC). 2009. Final amendment 3 to the fishery management plan (FMP) for the northeast skate complex and final environmental impact statement (FEIS) with an initial regulatory flexibility act analysis. NMFS, NEFMC. Newburyport, MA. 459p.

New England Fishery Management Council (NEFMC). 2012. Annual monitoring report: northeast skate complex fishery management plan. NMFS, NEFMC. Newburyport, MA. 6p.

New England Fishery Management Council (NEFMC). 2022. Annual monitoring report: northeast skate complex fishery management plan.

Packer D.B., Zetlin C.A.,and J.J. Vitaliano. 2003. Essential fish habitat source document: Barndoor skate, *Dipturus laevis*. NOAA Tech Memo NMFS NE 173: 23p.

Scott, W.B. and M.G. Scott. 1988. Atlantic fishes of Canada. Can. Bull. Fish. Aquat. Sci. 219, 731 pp.

Originally prepared by	Samantha Hoff
Date first prepared	February 1, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Meaghan McCormick)

Species Status Assessment

Common Name: Basking shark **Date Updated:** 12/1/2023

Scientific Name: *Cetorhinus maximus* **Updated by:** Kyle Martin

Class: Chondrichthyes

Family: Cetorhidae

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

The basking shark (*Cetorhinus maximus*) is a very large planktivorous shark. Basking sharks are the only extant species of the in the family Cetorhinidae, and second largest fish species (Skomal et al. 2009). This species is highly migratory and has a wide distribution, occurring in coastal and oceanic, temperate and tropical regions of the Atlantic and Pacific Oceans. Basking Sharks exhibit seasonal variation in both horizontal and vertical space use, occurring at tropical latitudes below the thermocline at depths beyond 1000 meters in winter/early spring and migrating to temperate latitudes near the epipelagic zone in summer/fall (Doherty 2019). As ram-filter feeders, the Basking Shark swims forward with its mouth open to feed on plankton, particularly copepods (Crowe 2018). The Basking Shark is globally vulnerable as low fecundity and late maturity means this species has a very slow reproductive rate. Populations for this species have declined severely due to intense overexploitation for its meat, skin, and oil during the 20th century. The Basking Shark is susceptible to bycatch, vessel strikes, and entanglement in pot lines, additionally they are threatened by demand and illegal harvest of their fins (IUCN 2021).

I. Status

a. Current legal protected Status

1. **Federal:** Not Listed **Candidate:** No
2. **New York:** Not Listed; SGCN

b. Natural Heritage Program

1. **Global:** G2 imperiled
2. **New York:** SNR not ranked

Tracked by NYNHP?: No

Other Ranks:

-IUCN Red List: Endangered-CITES Appendix II (2002)

-NOAA National Marine Fisheries Service Species of Concern
-Canada: Pacific population protected under Species at Risk Act
-Convention on the Conservation of Migratory Species: Appendix I and II
-Northeast Regional SGCN:

Status Discussion:

Most basic demographic and life history data are poorly understood or unknown due to the great lack of data for this species. Limited information is available on bycatch rates of basking shark in international fisheries that often don't differentiate shark catch to species, if data are collected at all. The IUCN listing of endangered is primarily based on past records of declining local populations as a result of short-term fisheries exploitation and very slow population recovery rates (Fowler 2009). No data exists for total global population – while studies have assessed regional abundances for this species, these estimates are not reliable as the species has such a large

distribution and re-sightings are relatively low (Gore 2016). Currently, the global population is estimated to be approximately 30% of historical abundance (IUCN 2021).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	Moderate Decline in the Last 40 years		Choose an item.
Northeastern US	Yes	Declining	Declining	Moderate Decline of the Atlantic Population, Last 40 years		Choose an item.
New York	Yes	Declining	Declining			Choose an item.
Connecticut	No data	Unknown	Unknown		Not Listed	No
Massachusetts	No data	Unknown	Unknown		Not Listed	No
New Jersey	No data	Unknown	Unknown		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Unknown	Unknown		none	Choose an item.

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):*

There are currently no monitoring activities in New York.

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

The IUCN lists the population trend as declining due to past records of rapidly declining populations and lack of recent census data. Although basking sharks are widely distributed globally, they are only regularly seen at a few favored coastal locations along the western Atlantic Coast (Newfoundland, Canada to Florida, U.S.), and were probably never abundant (Kyne et al. 2012). Genetic analysis and photographic mark-recapture studies indicate that one global population exists rather than there being multiple subpopulations (Gore 2016). Assessments of

Basking Shark population abundance are uncertain due to their highly migratory nature, particularly their seasonal descending migrations to the bathypelagic zone, though recent assessments estimate that their populations are stable and possibly increasing in the Northeast Atlantic, but global populations are decreasing overall. Recovery of Basking Shark populations will likely take hundreds of years due to their very low productivity and growth rates (IUCN 2021).

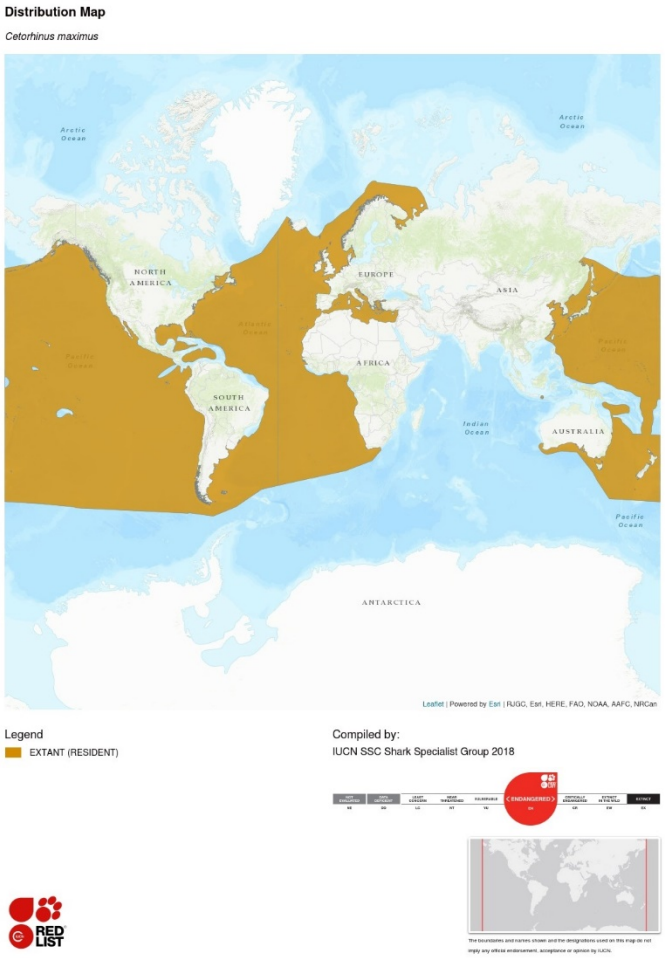

Figure 1: IUCN Red List distribution map of the basking shark

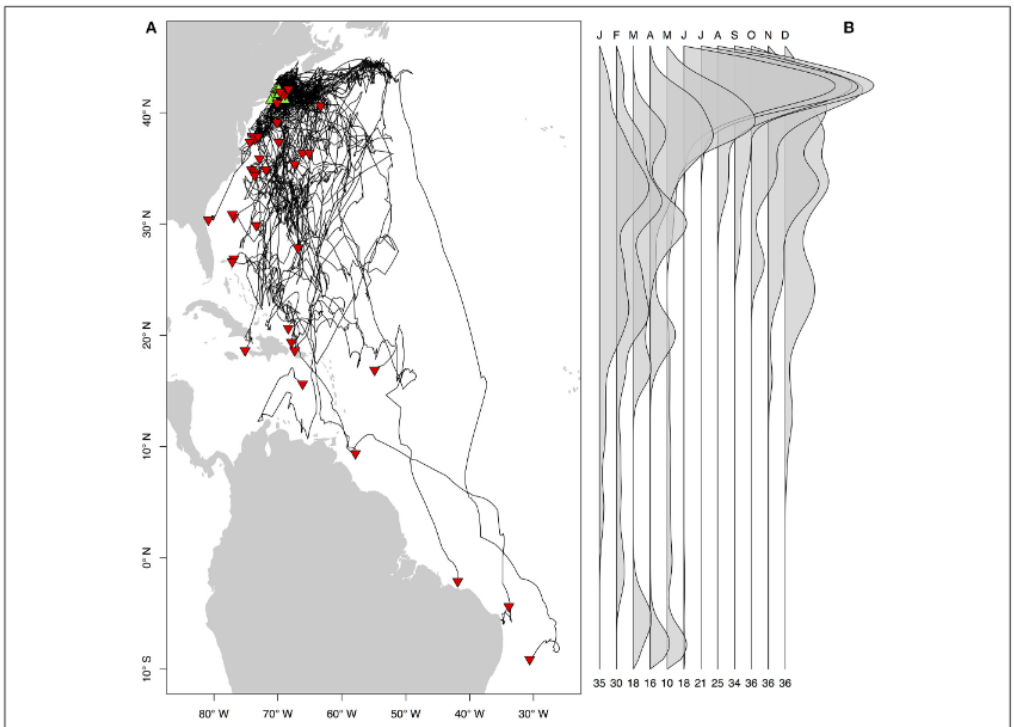

FIGURE 2 | Most probable tracks **(A)** and latitude density by month **(B)** for 37 basking sharks satellite-tagged off New England during June through October of 2004–2011. Tracks are plotted as black lines, and green and red triangles represent tag and pop-up locations, respectively. Letters above the density plot indicate month (e.g., *F* = February), and numbers below indicate the number of individuals with tag data during that month.

Figure 2: Probable tracks (A) and latitude density by month (B) of 37 basking sharks satellite-tagged off New England during June-October 2004-2011

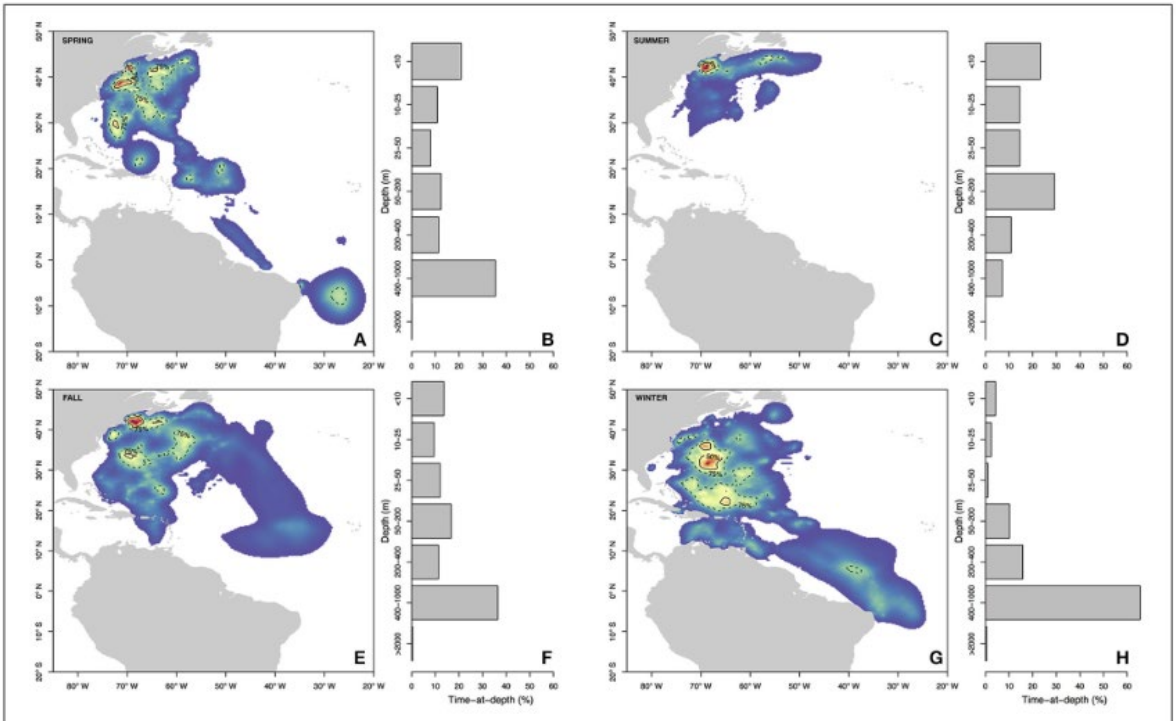

FIGURE 3 | Seasonal residency distributions **(A,C,E,G)** and cumulative time-at-depth **(B,D,F,H)** for spring **(A,B)**, summer **(C,D)**, fall **(E,F)**, and winter **(G,H)**. Residency distributions were calculated using the HMMoce package for R. Contour lines represent 50 and 75% of occupation for a given season as depicted by solid and dashed contours, respectively.

Figure 3: Seasonal residency distributions (A, C, E, G) and cumulative time-at-depth (B, D, F, H) for spring (A, B), summer (C, D), fall (E, F), and winter G, H).

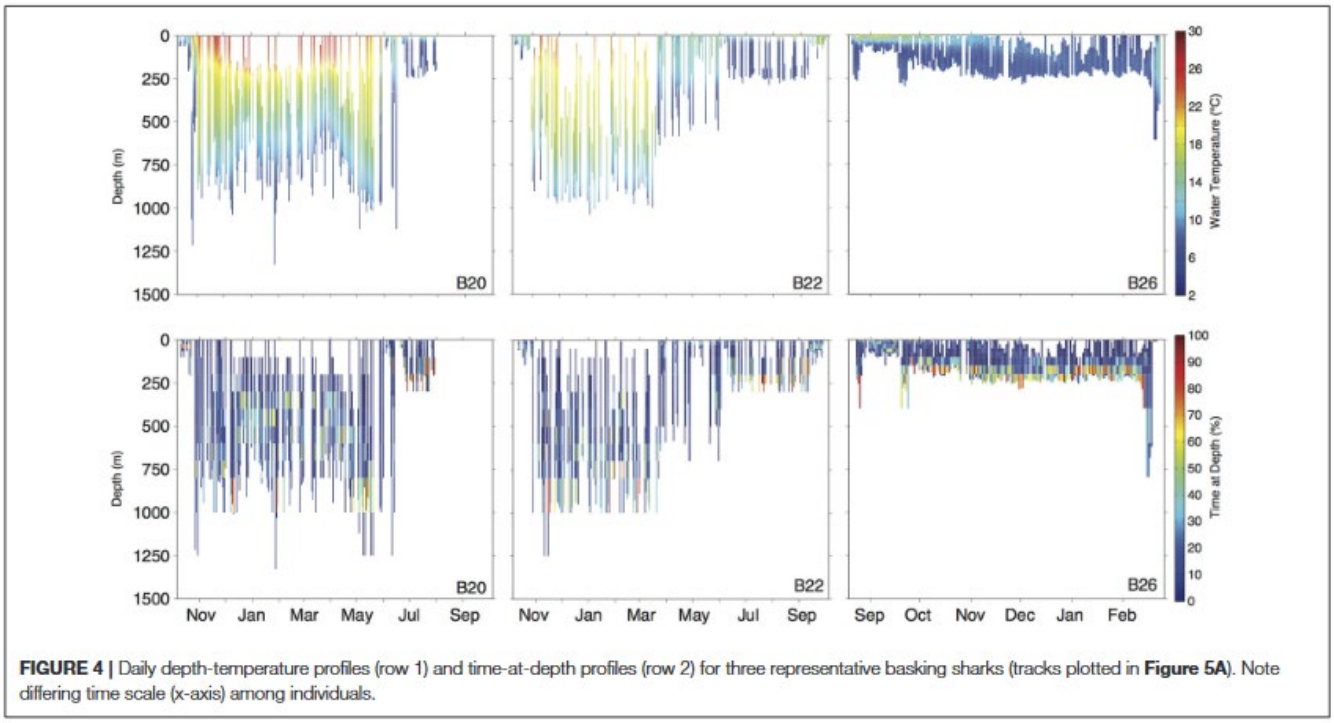

FIGURE 4 | Daily depth-temperature profiles (row 1) and time-at-depth profiles (row 2) for three representative basking sharks (tracks plotted in **Figure 5A**). Note differing time scale (x-axis) among individuals.

Figure 4: Daily depth-temperature profile (row 1) and time-at-depth profiles (row 2) for three representative basking sharks

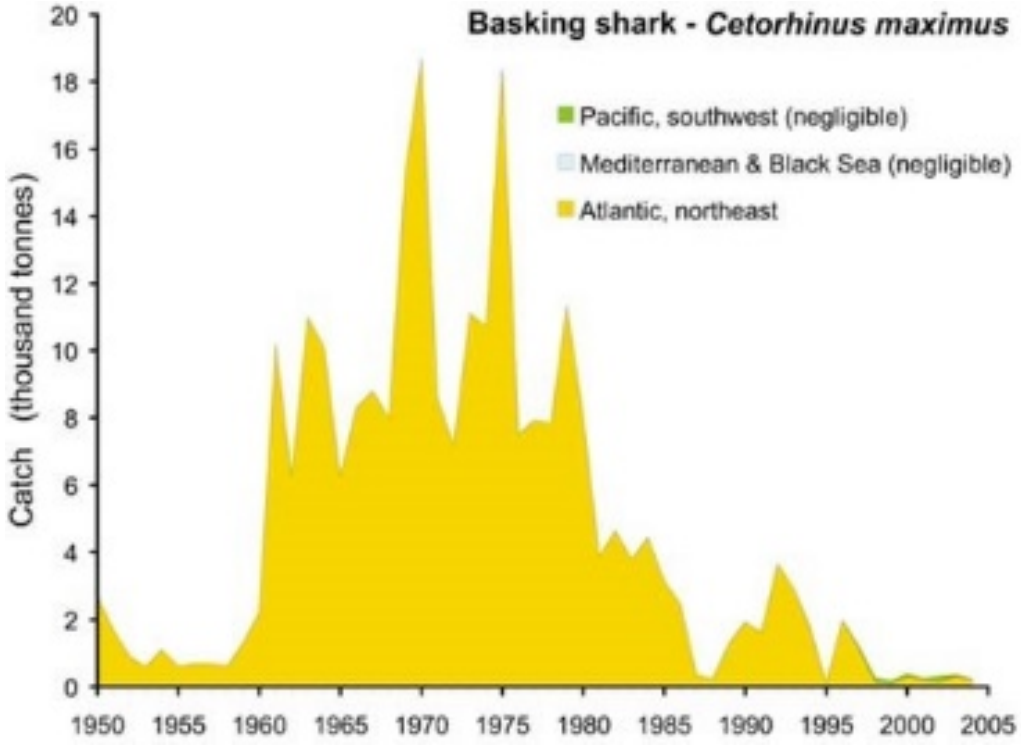

Figure 5: Catches of the basking shark reported to the Food and Agricultural Organization of the United Nations (FAO 2006).

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

The Food and Agriculture Organization of the United Nations (FAO) offers the most comprehensive fisheries database available for elasmobranches, but its quality is dependent on reporting efforts of the world fishing nations and lacks species-specific data. The most recent numbers for the Atlantic population of basking sharks are from 2007, with 82 total landings (Camhi et al. 2009).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			<1%

Table 1: Records of basking shark in New York.

Details of historic and current occurrence:

The only assessment of abundance in U.S. waters estimated basking shark numbers at 6,700-14,300 off the New England Coast and in the Gulf of Maine in the early 1980s.

Historic: Basking Sharks were historically targeted for meat, skin, oil, and fins, and intense exploitation occurred between the 1950s and 1990s, until their harvest was banned in 2006-2007. Current populations are estimated to be 30% of historic abundance (IUCN 2021).

Current: In the western North Atlantic Ocean, groups of 10 to 60+ individuals have been sighted between June and October from Nova Scotia to Long Island (Crowe 2018). Aggregations of up to 1,398 individuals have been recorded off the northeastern coast of the United States (IUCN 2021).

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, Deep Subtidal

b. Marine, Shallow Subtidal

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:

Although basking sharks have been reported globally from tropical to arctic waters between 11-24˚C, they are most commonly observed in coastal temperate waters where flow patterns create convergence zones that concentrate zooplankton (NOAA 2010). Off the Atlantic Coast of North America, they appear in the southern part of their range in the spring (North Carolina to New York) and shift northward in the summer (New England and Canada). Gore et al. (2008) provide the first evidence of a basking shark using the deep mid-ocean and making a trans-Atlantic migration from satellite tagging data, while Skomal et al. (2009) offer evidence of transequitorial migrations, tracking individuals from southern New England southward to coastal South America, showing occasional descent to mesopelagic depths. They are known to venture inshore to shallow bays or estuaries during the summer where they 'bask' at or near the surface, and are rarely seen during the winter.

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Unknown	Choose an item.	Choose an item.

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):*

Basking sharks are presumed to live approximately 50 years, with males reaching maturity between 12 and 16 years, and females between 16 and 20 years (Fowler 2005).. Information regarding the Basking Shark's life history is poorly understood as there is a general lack of data. Basking sharks exhibit ovoviparity, with estimated gestation period ranging between 18 and 36 months, producing one to six pups per litter, with a one-year resting period between litters. This species demonstrates strong sexual segregation, with a female-male ratio of 40:1 reported off the United Kingdom in the Northeast Atlantic (NOAA 2010). Pregnant females normally segregate to an area where no fishing takes place, most likely deep water, and sightings of individuals of the same size and sex suggest sexual and population segregation (Fowler 2005) This species is also known to gather in large aggregations along temperate coastal areas throughout their range. These aggregations are attributed to feeding, as they are associated with high zooplankton concentrations which follow chlorophyll blooms. These aggregation events may also be significant for courtship and mating opportunities for this species (Crowe 2018).

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

Historically, basking sharks were considered a nuisance to commercial fishing operations and were the target of a direct eradication program by Canada's Department of Fisheries and Oceans between 1955 and 1969. They also have been harvested worldwide for liver oil, fins, and fishmeal. Although basking sharks have not been targeted in the U.S. or Canada since the 1970s, they are still affected by human activities. Many of the basking shark fins found in Asian markets and sold for human consumption of shark fin soup, are not accounted for in the CITES export permits required under Appendix II. Basking sharks also are struck by vessels and caught incidentally in several fisheries (NOAA 2010). Despite decades of no directed fishing pressure, the population has not rebounded, raising concerns about their recovery rates despite low levels of mortality. The effect of

increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability. Changing ocean circulation, increasing sea temperatures, and increased storm frequency and severity may all negatively affect zooplankton abundance, thereby negatively affecting the basking shark due to their reliance on this prey species (ZSL 2010). Synergistic effects between climate and other present threats, particularly accidental mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Transportation & Service Corridors	Shipping Lanes (boat strikes)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)
4. Human Intrusions & Disturbance	Recreational Activities (recreational boat strikes)
5. Energy Production & Mining	Renewable Energy (offshore wind farms)

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:

Beginning in 1993, retention and possession of basking sharks has been prohibited for commercial and recreational fisheries and shark finning was banned as part of a 1993 Federal Fisheries Management Plan for Atlantic Sharks (Kyne et al. 2012). Under the Magnuson-Stevens Fishery Conservation and Management Act, fishery managers are required to rebuild overfished fisheries, minimize bycatch and bycatch mortality, and protect essential fish habitat. Atlantic sharks fall under this regulation and the Highly Migratory Species Management Division of the National Marine Fisheries Service has created a fishery management plan for all Atlantic sharks. The U.S. has also signed a memorandum of understanding for sharks under the Convention on Migratory Species (Camhi 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:

Beginning in 1993, retention and possession of basking sharks has been prohibited for commercial and recreational fisheries and shark finning was banned as part of a 1993 Federal Fisheries Management Plan for Atlantic Sharks (Kyne et al. 2012). Under the Magnuson-Stevens Fishery Conservation and Management Act, fishery managers are required to rebuild overfished fisheries, minimize bycatch and bycatch mortality, and protect essential fish habitat. Atlantic sharks fall under this regulation and the Highly Migratory Species Management Division of the National Marine Fisheries Service has created a fishery management plan for all Atlantic sharks. The U.S. has also signed a memorandum of understanding for sharks under the Convention on Migratory Species (Camhi et al. 2009). Effectiveness of these conservation regulations is dependent upon implementation and enforcement on a domestic level, and on international cooperation towards these ends (IUCN 2021).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1. Land/water protection	Site/area protection
2. Species management	Harvest management
3. Species management	Trade management
4. Species management	Species recovery

Table 2: Recommended conservation actions for basking shark.

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Originally prepared by	Samantha Hoff
Date first prepared	February 20, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Kyle Martin)

Species Status Assessment

Common Name: Bigeye thresher shark **Date Updated:** 1/12/2024

Scientific Name: *Alopias superciliosus* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Alopiidae

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

Distinctive because of its extremely long dorsal caudal lobe and large eyes, the bigeye thresher shark is a deep water species, occurring in warm temperate and tropical coastal and oceanic waters worldwide. The western Atlantic Ocean population includes waters from New York to Cuba, through the Gulf of Mexico, and along the coast of South America. This species is not abundant in New York waters and generally remains offshore; trends for New York are unknown. All members of the genus *Alopias*, the thresher sharks, are listed as vulnerable by the IUCN due to their declining populations. The downward population trends are a result of slow life history characteristics, low capacity to recover from exploitation, and high levels of unmanaged and unreported mortality in target and bycatch fisheries (Amorim et al. 2012).

I. Status

a. Current legal protected Status

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

ii. **New York:** SGCN

b. Natural Heritage Program

i. **Global:** G3, Vulnerable

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable

-Northeast Regional SGCN: NA

FAO: Category 3 (species with limited reproductive potential, and or other life history characteristics that make them especially vulnerable to overfishing)

Status Discussion:

It is difficult to assess the status of the bigeye thresher due to the lack of data, however, its slow growth, limited reproductive potential, and the fact that it is caught in large numbers in numerous fisheries warrant its vulnerable status (Maguire et al. 2006). IUCN lists this species as endangered in the Northwest Atlantic because of its intrinsic vulnerability and population decline estimates, although they are also considered data deficient (Amorim et al. 2012). Cortes et al. (2010) published a risk assessment for the bigeyed thresher using data from the International Commission for the Conservation of Atlantic Tunas (ICCAT), determining a susceptibility to pelagic longline gear of 0.82 for all country data combined, a productivity rate of 0.010, and a vulnerability rank of 1 out of 10 (lower number indicating higher vulnerability).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	Last 15 years		Choose an item.
Northeastern US	Yes	Declining	Declining	Last 15 Years (western Atlantic ocean population)		Choose an item.
New York	No data	Unknown	Unknown			Choose an item.
Connecticut	No data	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No data	Choose an item.	Choose an item.			Choose an item.
New Jersey	No data	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Choose an item.	Choose an item.			Choose an item.

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):*

A cooperative shark research project between the U.S. and Brazil began in 2007 with the goal of conducting simultaneous research on pelagic sharks in the North and South Atlantic Ocean, which includes sharks in the New York Bight. Analysis is ongoing and will be presented in the future with hopes of learning more about daily horizontal and vertical movement patterns, depth distribution, effects of oceanic conditions on vulnerability, preferential feeding times and life history characteristics (NOAA 2011).

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. 2019). Assessments for pelagic shark species are especially difficult because of their vast geographic distributions, complex population structures, highly migratory nature, and cross-jurisdictional and high seas fisheries issues (Simpfendorfer et al. 2002). Since fisheries-independent data are either unavailable or too expensive to collect for the above reasons, fisheries dependent data is usually used to assess shark stock, although most fisheries are inadequate at identifying individuals below the genus level, or choose not to record catches due to regulations. Baum et al. (2013) estimated that thresher sharks in the Northwest Atlantic have declined by more than 80% in the past 8 to 15 years. Sharks have been exploited since the 1960s, but logbook data from U.S. pelagic long line fisheries in the Northwest Atlantic was only available from 1986 to 2000 and lacking species-specific numbers. Estimates of trends in abundance from standardized catch rate indices of the

U.S. pelagic long line fishery suggest the species has undergone a decline in abundance for the Northwest Atlantic region (Amorim et al. 2012).

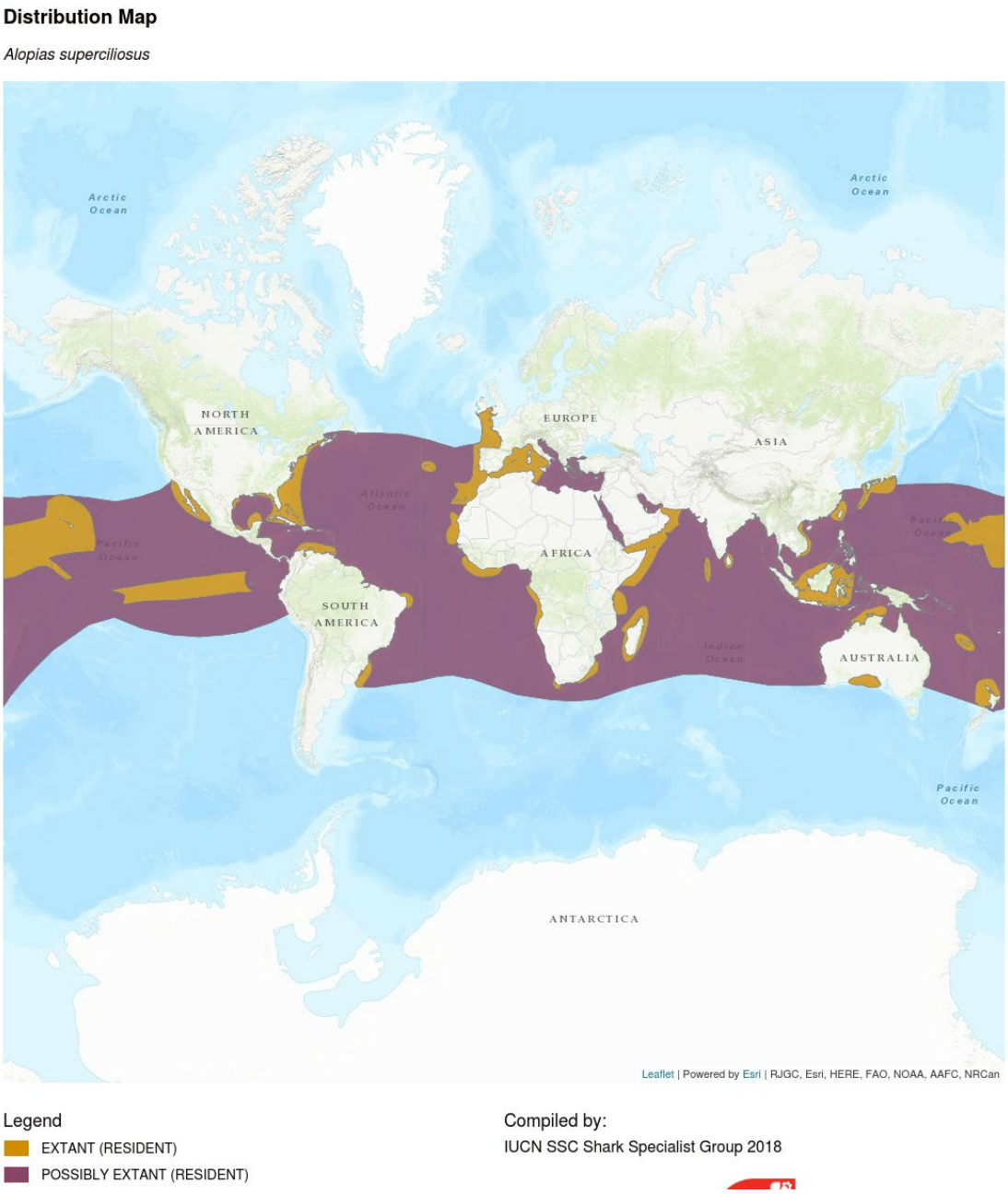

Figure 1: IUCN Red List Bigeye thresher shark distribution map (Rigby et al. 2019)

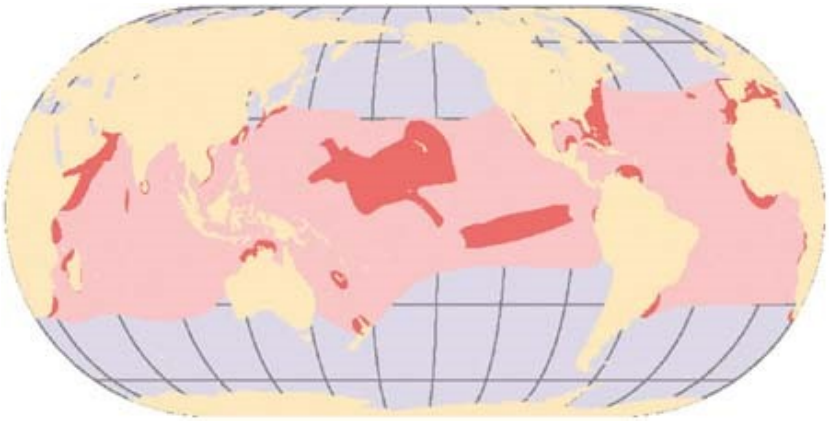

Figure 2: World distribution of bigeye thresher shark (pink = known distribution, red = uncertain distribution) FAO (2006).

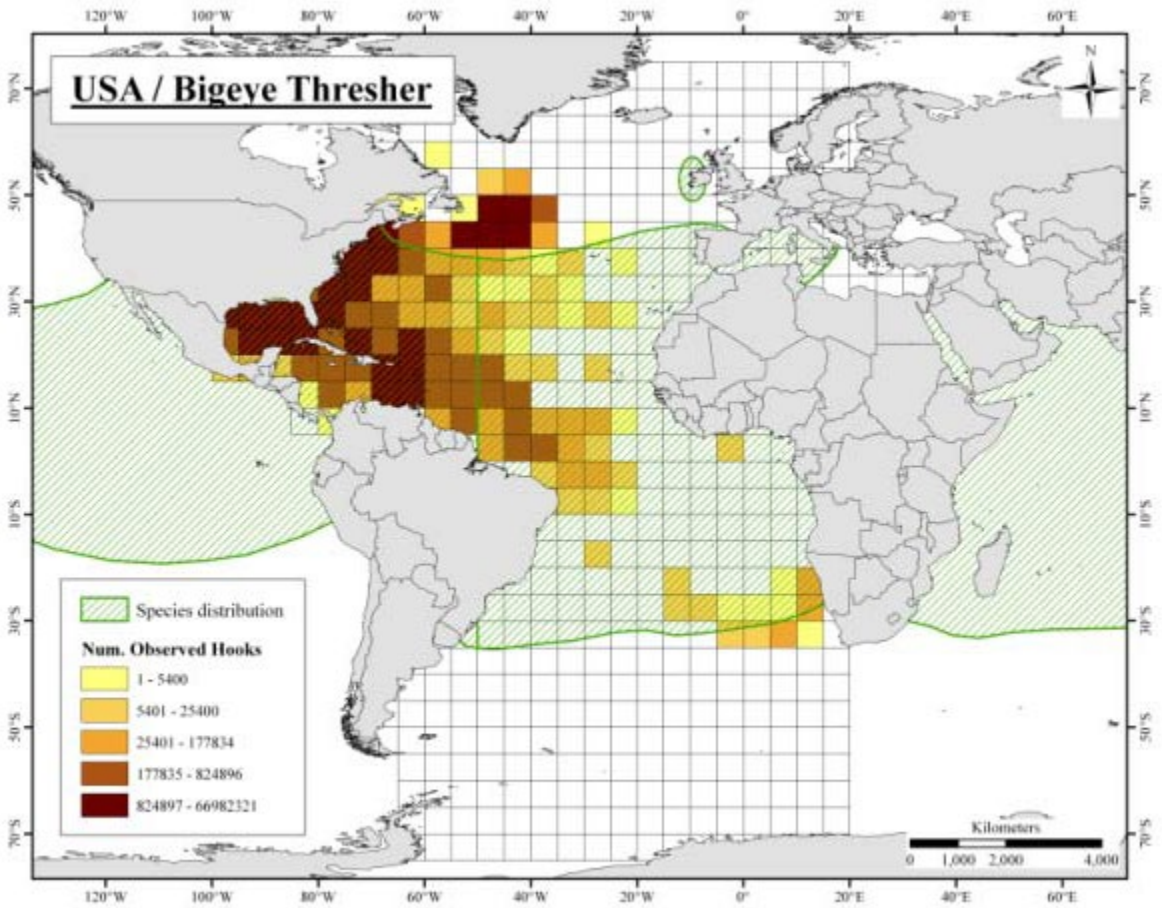

Figure 3. Spatial distribution of the bigeyed thresher superimposed on the effort distribution of the U.S. pelagic longline fleet (Cortes et al. 2008)

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

Bigeye threshers are highly migratory and found worldwide; they have never been abundant in New York waters and generally stay offshore (Amorim et al. 2012).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of bigeye thresher shark in New York.

Details of historic and current occurrence:

According to the U.S. Fishery Management Plan for Sharks of the Atlantic Ocean, 23,071 individuals were recorded in the thresher shark complex (consisting of *Alopias superciliousus* and *A. vulpinus*) from 1986-2000 (Baum et al. 2003). Only 17 individuals of Alopias spp. were caught in June-August of 1977-1994 in the western north Atlantic using longline gear targeting all pelagic sharks (Simpfendorfer et al. 2002).

Population data for the Western North Atlantic has not been officially assessed and is unknown.

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, Deep Subtidal

b. Marine, Shallow Subtidal

Habitat or Community Type Trend in New York

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

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:

Bigeye thresher sharks occur in coastal waters over the continental shelves from the surface to at least 500m deep. Occasionally they may be observed inshore in shallow waters or on the high seas in the epipelagic zone far from land, but they prefer the deep sea (Amorim et al. 2012, Rigby et al. 2019). The maximum depth recorded has been 955m. During the day bigeye threshers make deep dives and at night they are up by the surface (Rigby et al. 2019). Recent tagging studies have indicated strong diel vertical migration, with individuals spending most of the nighttime in shallow waters warmer than 20˚C and eight or more hours during the daytime in deeper waters cooler than 10˚C (Weng and Block, 2004). Although they are said to be highly migratory, little is

known about their movements and migration is inferred based on the behavior of other thresher sharks (IUCN 2007).

V. Species Demographics and Life History

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

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):*

This species maximum size is 484 cm total length (TL) and males reach maturity at 245 to 300 cm (TL). Females reach maturity at 282 to 355cm (TL and at 9 years. Reproduction is annual with a gestation period of 12 months. Litter sizes are 2 to 4 pups with a birth size of 64 to 140 cm (TL) (Rigby et al 2019). Bigeye thresher are ovoviviparous and feed on ovulated eggs inside the mother (oophagy) (Jensen 2018). The downward trend in bigeye thresher populations is attributed partly to their slow life history characteristics such as low fecundity and exceptionally low (0.002) potential annual rate of population increase (Kyne et al. 2012). Estimated age at maturity is9-10 years for males. (FAO 2006). Maximum age is 28 years and generation length is 18.5 years (Rigby et al. 2019). The longest straight movement of a tagged bigeye thresher shark is reported at 2,767 km, from waters off New York to the Eastern Gulf of Mexico (Weng and Block 2004, Kohler and Turner 2001). Combined with their slow life history characteristics, unmanaged and unreported mortality in target and bycatch fisheries is the major source of mortality for this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (overharvest)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (incidental catch)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)

In the U.S. Atlantic and Gulf of Mexico, longline fisheries targeting swordfish and tuna catch bigeye threshers incidentally despite regulations to prevent bycatch. This species is exceptionally vulnerable to fisheries exploitation as its epipelagic habitat occurs within the range of gillnet and longline fisheries (Kyne et al. 2012). This vulnerability is exacerbated by its slow life history, making recovery from overexploitation difficult. The effect of increased global ocean temperatures

on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

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:

All regulatory mechanisms described protect the species in the Atlantic Ocean region and not specifically New York State waters, though New York waters are included. Since 1997, retention and possession of bigeye thresher sharks has been prohibited for both commercial and recreational fisheries, and they have been listed as a prohibited species under the Fisheries Management Plan of the Atlantic tunas, swordfish and sharks since 2000 (Kyne et al. 2012). Shark finning has also been banned for all Atlantic shark species since 1993 as part of a federal Fisheries Management Plan. New York anglers are prohibited from possessing Sand Tiger sharks (NYSDEC 2021).

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

To ensure sustainable pelagic shark catches from directed and non-directed fisheries, it is necessary to implement management measures consistent with federal rules and regulations designed to protect shark stocks. Improvement of species-specific catch and landings data are needed to get a better understanding of abundance and population data. Creating state-level regulations requiring reporting of all sharks caught and landed in New York at all levels (commercial and recreational) would help improve and facilitate reporting of all species biological and trade data. To minimize incidental catches of sharks, educational programs and management measures are needed to prevent and reduce mortality of unwanted sharks (NYSDEC 2005). Collaborative management of target and bycatch fisheries is needed due to the vulnerability of this species and cooperation among international parties is important because of their migratory nature and worldwide distribution (Amorim et al. 2012).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	

Table 2: Recommended conservation actions for bigeye thresher (Rigby et al. 2019).

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Originally prepared by	Samantha Hoff
Date first prepared	April 2013
First revision	October 24, 2013
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Blue shark **Date Updated:** 12/1/2023

Scientific Name: *Prionace glauca* **Updated by:** Tajrian Sarwar (MISC)

Class: Chondrichthyes

Family: Carcharhinidae

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

Blue sharks are the most widely distributed shark species in the world, occurring circumglobally in tropical and warm temperate waters from the epipelagic zone down to the mesopelagic zone. Blue sharks have the highest known population growth rates of all pelagic sharks, as they mature young and produce large litters usually ranging between 25-50 pups (Viducic 2021). This species is one of the most abundant and most frequently taken shark species, both as a targeted species for the shark fin trade and as bycatch in longline and net fisheries. Blue sharks are one of the best studied shark species due to their abundance, but uncertainty in data and high catch rates for this species led the International Commission for the Conservation of Atlantic Tunas (ICCAT) to issue an annual catch limit of 39,102 tons (ICCAT 2019). Currently blue sharks are not considered overfished and are not subject to overfishing, but the possibility of overfishing has not been ruled out by the ICCAT. Commercial fishing is the main threat to the blue shark, and their population has declined about 60% between 1986 and 2000 (Baum 2003). Given this species' population decline and wide exploitation which includes unreported illegal harvest, the IUCN has listed the blue shark as Near Threatened in 2009 (da Silva 2021, Stevens 2009).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed, SGCN

b. Natural Heritage Program

i. **Global:** G5 Secure

ii. **New York:** SNR Not ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Near threatened (globally)

-Northeast Regional SGCN: Not Listed

Status Discussion:

The status of blue sharks in the Atlantic Ocean remainsuncertain, with some research indicating declines and some indicating a stable population. An estimated 20 million individuals are taken annually, mainly as bycatch, but there are no current population estimates and many unreported catches (Aires-da-Silva et al. 2008). The few assessments of fisheries-dependent data carried out suggest little population decline, although there is concern over the removal of such large numbers of this apex predator from the oceanic ecosystem (Stevens 2009). In a 2009 ecological risk assessment conducted on eleven species of pelagic elasmobranches, the blue shark was determined to have intermediate vulnerability to pelagic longline fisheries with a productivity of 0.286 and susceptibility to the fishery of 0.514, resulting in a vulnerability rank of 7 (higher number

indicates lower vulnerability) (Cortes et al. 2010). Blue shark populations in the North Atlantic are highly productive, but their abundance has been steadily declining since 1994 likely due to continued fishing pressure and mortality associated with fishing and bycatch (Campana 2015).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	Last 25 years		Choose an item.
Northeastern US	Yes	Declining	Stable	Last 25 years (NW Atlantic Ocean)		Choose an item.
New York	Yes	Declining	Stable	Last 25 years	Not Listed	No
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*
The National Marine Fisheries Services Cooperative Shark Tagging Program is an ongoing effort by recreational, commercial anglers, and NMFS to tag sharks throughout the Atlantic Ocean and Gulf Coast. Since 1962 over 295,000 sharks of 52 different species have been tagged. The tagging of sharks provides information on stock identity, movements and migration, abundance, age and growth, mortality and behavior (Kohler 2018).

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

Based on an analysis of US pelagic longline logbook information from fisheries of the Northwest Atlantic, it is suggested that the North Atlantic population of blue shark has declined by 60% over the period 1986-2000 (Baum et al. 2003). In contrast, a 2005 preliminary stock assessment carried out by the International Commission for the Conservation of Atlantic Tuna concluded that current exploitation levels of the North Atlantic stock are sustainable and current biomass levels are at

about the level capable of producing a maximum sustainable yield with only a 30% decline since the 1950s, although they expressed concern about the quality of the fishery data available (Campana 2015).

Landings peaked in the Northwest Atlantic in 1994 with 705 tons and decreased to 19 tons for 2003 (Campana et al. 2006). For the total North Atlantic population, the peak occurred in 1997 with 35,951 tons and dropped to 29, 583 tons in 2002. Canadian shark tournaments reported 4 tons landed in 1993 with an increase to 15 tons in recent years. In a study of the Canadian Atlantic, two indices of population abundance suggest a decline in the past decade of about 5-6% a year since 1995 (Campana et al. 2006). The median size of blue sharks has also declined since 1987, suggesting an increase in mortality rate (Campana et al. 2006). In conclusion, most estimates of abundance are conflicting, ranging from increasing to stable and decreasing, usually covering only the period from the mid 1980s to the present, making it difficult to assess population trends (Aires-da-Silva et al. 2008).

Populations were highest in the mid 1950s prior to the expansion of longline fisheries. Aires-da-Silva et al. (2008) combined longline catch and effort records from recent observer programs (1980-1990s) with longline survey records from historical archives and recent cruises (1950-1990s) to come up with a decline in blue shark catch-per-unit-effort (CPUE) of approximately 30% in the western North Atlantic from 1957 to 2000(Aires-da-silva 2008). According to the 2012 National Report of the U.S. to ICCAT, commercial landings of blue sharks in lbs from 2003-2011 are as follows: 2003-6,324, 2004-423, 2005-0, 2006-588, 2007-0, 2008-3,229, 2009-4,793, 2010-9,135, 2011-13,370. Total international reported catch to ICCAT for 2011 was 29,362 mt ww for the Atlantic Ocean, 11,548 mt ww for the North Atlantic specifically (Atlantic Highly Migratory Species Management Division 2012). According to the 2015 ICCAT stock assessment, the average total annual reported catch for North Atlantic Blue Sharks between 2011-2015 was 39,102 tons. Based on the high catch rates for this species, and because of uncertainty in data, this average was used to establish an annual Total Allowable Catch (TAC) of 39,102 tons which would serve as a conservation measure (ICCAT 2019).

Distribution Map

Prionace glauca

Figure 1. IUCN Red List distribution map of the blue shark (IUCN 2019)

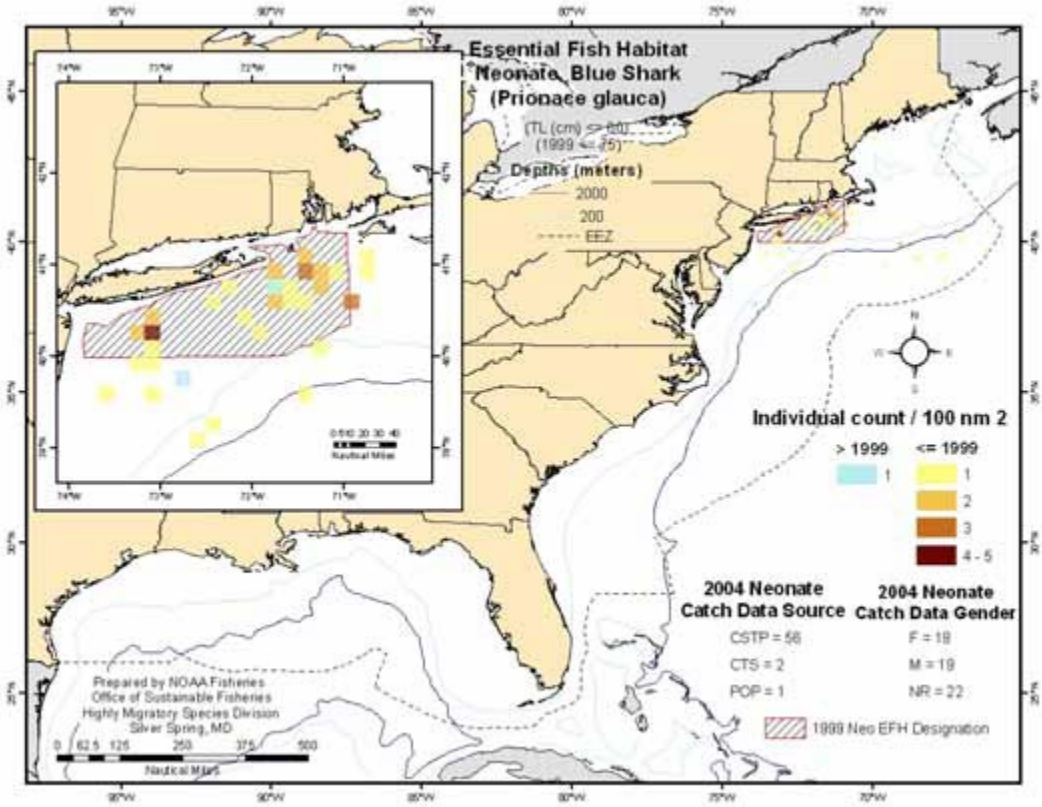

Figure 2. Essential habitat for blue shark neonates (ASMFC 2008)

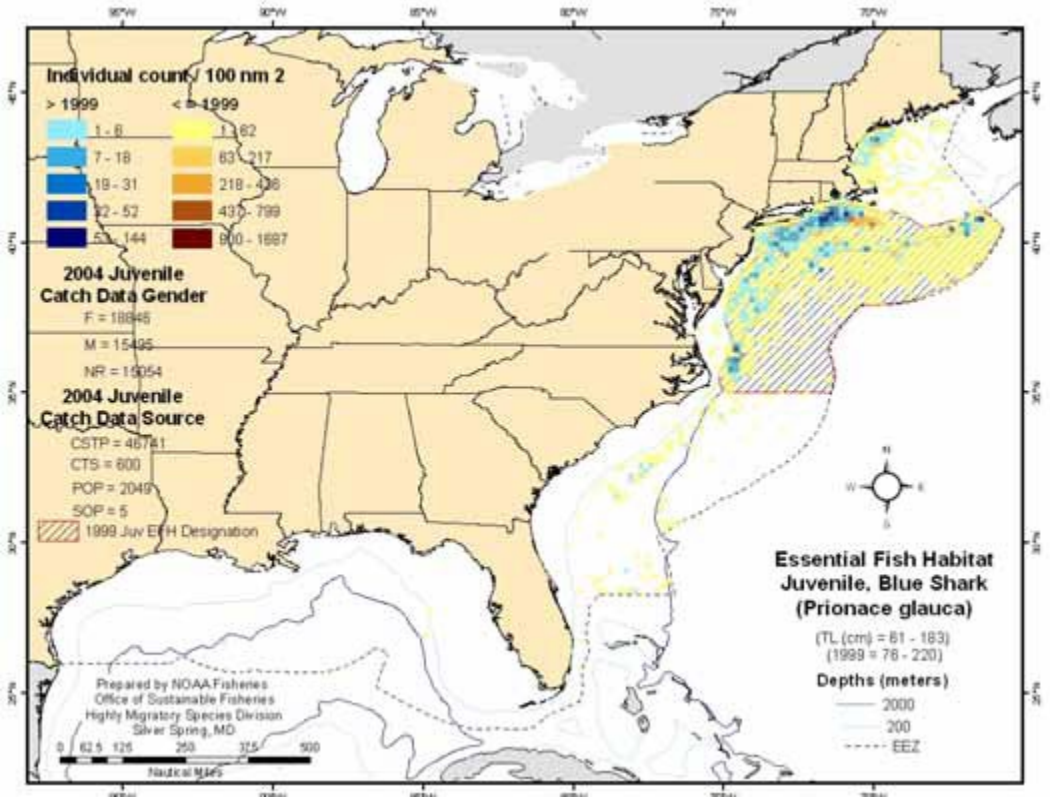

Figure 3. Essential habitat for blue shark juveniles (ASMFC 2008)

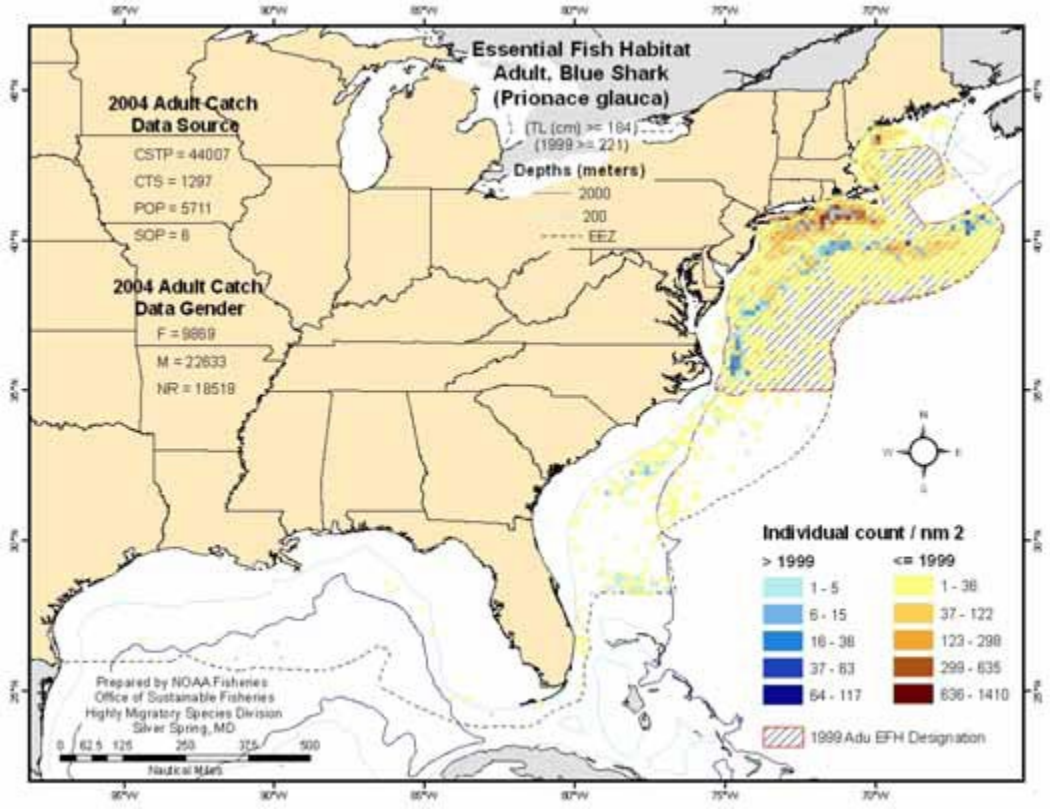

Figure 4. Essential habitat for adult blue sharks (ASMFC 2008)

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

Blue sharks have never been abundant in New York waters.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			<1%
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of blue shark in New York.

Details of historic and current occurrence:

Historic abundance and population numbers of blue shark are unknown for New York State waters.

Current abundance and population numbers for blue sharks in New York State waters are unknown.

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, Deep Subtidal

b. Pelagic

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:

Blue sharks inhabit deep waters, usually in temperatures between 10-20˚C at depths ranging from the surface to 350m, although they occasionally dive deep with a maximum observed depth of 1160m (Stevens 2009, Queiroz et al. 2012). Their migratory patterns are complex and encompass great distances with spatial structure related to reproduction and distribution of prey, involving major ocean migrations (Fowler et al. 2005). In the Northwest Atlantic, essential habitat for neonates is primarily north of 40˚N from Manasquan Inlet, NJ to Buzzards Bay, MA in waters 25m to the exclusive economic zone boundary. Juveniles prefer habitat around 45˚N (off of Cape Hatteras, NC) in waters 25m to the EEZ boundary (ASMFC 2008). The space-use patterns of blue sharks indicate that they spend much of their time in areas where pelagic longline activities are the

highest, which could account for the high levels of by-catch and declining populations (Queiroz et al. 2012). Some tagged individuals have shown patterns consistent with reverse diel vertical migration, possibly related to changes in the thermal structure of the water column or changes in prey type and density (Queiroz et al. 2012). Sexual segregation at the spatial and temporal scale has also been observed, with males dominating early in the year and females outnumbering males in July-September (Tavares et al. 2012).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
No	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

Blue sharks are viviparous, giving birth to litters averaging 25 to 50 individuals, with gestation periods range from 9 to 12 months and birth usually occurring in spring and summer (ASMFC). Males are believed to mature at 4-5 years of age with lengths of 6 feet while females mature at slightly older ages, between 5-6 years, with longer lengths from 7-10 feet, both sexes living for approximately 20 years (Stevens 2012). Blue sharks are taken in large numbers, mainly as by-catch, and many catches go unreported (Kyne et al. 2012). The Blue Shark has the highest known population growth rates for pelagic sharks; that is, 0.287–0.314 in the North Atlantic, 0.299 in the South Atlantic, and 0.264–0.331 in the Indian Ocean (Dulvy *et al.* 2008, Cortes *et al.* 2015, Murua *et al.* 2018).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fishing)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial fishing)
4. Energy Production & Mining	Renewable Energy (offshore wind farms)

Large numbers of blue sharks are caught and discarded yearly in commercial pelagic fisheries and they are increasingly being targeted by recreational shark fishers through fishing tournaments in some portions of their Atlantic Ocean range (Campana et al. 2006). Due to their low commercial value, most blue sharks have historically been finned and discarded at sea with no record of being caught (ASMFC). Blue sharks are particularly susceptible to capture as bycatch of pelagic longline

fisheries which target tuna and swordfish, as there is substantial overlap in spatial and temporal habitats. A major cause of mortality is hooking and post-release mortality (Campana 2015). Blue sharks are also subject to bioaccumulation of pollutants, particularly mercury, due to their top position in the food web and long life span (Hazin et al. 1994). The number of blue sharks landed at recreational shark tournaments has increased in recent years and is another threat, although these numbers are relatively small compared to overall catch mortality (Campana et al. 2006). The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

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:

Blue sharks are regulated in the commercial longline fishery of the Atlantic Ocean by the National Marine Fisheries Service and have been managed by the Fishery Management Plan (FMP) for Sharks of the Atlantic Ocean since 1993. The FMP set commercial quotas for 10 pelagic species at 580 tons dressed weight annually, with recreational bag limits also applied. Commercial fishers require an annual shark permit, and finning is prohibited. In New York state waters specifically, sharks are managed by the Atlantic States Marine Fisheries Commission FMP for Atlantic Coastal Sharks adopted in 2008. Any blue shark caught in a recreational fishery must have a fork length of at least 4.5 feet (ASMFC). Each recreational shore-angler is allowed a maximum of one shark (of the permitted species) per day, and recreational fishing vessels are allowed one shark per trip, regardless of the number of people aboard the vessel. There is no commercial quota for blue sharks (grouped with all allowed pelagic species), but the fishery may close if NOAA Fisheries close the fishery in federal waters and commercial fishermen must hold a state commercial license or permit to catch and sell sharks in state waters (ASMFC). Based on the high catch rates for this species, and because of uncertainty in data, this average was used to establish an annual Total Allowable Catch (TAC) of 39,102 tons which would serve as a conservation measure (ICCAT 2019).

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

To ensure sustainable pelagic shark catches from directed and non-directed fisheries, it is necessary to implement management measures consistent with federal rules and regulations designed to protect shark stocks. Improvement of species-specific catch and landings data are needed to get a better understanding of abundance and population data. Creating state-level regulations requiring reporting of all sharks caught and landed in New York at all levels (commercial and recreational) would help improve and facilitate reporting of all species biological and trade data. To minimize incidental catches of sharks, educational programs and management measures are needed to prevent and reduce unwanted mortality of unwanted sharks (NYSDEC 2005). Due to the highly migratory nature of blue sharks, international cooperation is needed to develop effective management and conservation.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1. Species management	Harvest management
2. Species management	Trade management

Table 2: Recommended conservation actions for blue shark.

VII. References

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Originally prepared by	Samantha Hoff
Date first prepared	February 15, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Bonnethead shark **Date Updated:** 12/1/2023

Scientific Name: *Sphyrna tiburo* **Updated by:** Tajrian Sarwar (MISC)

Class: Chondrichthyes

Family: Sphyrnidae

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

Well known for their characteristic semicircular head, the bonnethead shark (also known as shovelheads) is a very abundant small hammerhead species, occurring in shallow estuaries and bays on the Atlantic and Pacific coasts of the Americas. Bonnetheads occur solely off the coast of the American continent, ranging from southern Brazil to North Carolina in the western Atlantic Ocean, rarely occurring northward into New England. In the eastern Pacific Ocean, they occur from southern California southward to Ecuador (Fowler et al. 2005). They reside on continental and insular shelves, over reefs, estuaries and shallow bays from depths of 10-80 m. The hammer-shaped head is thought to have evolved to maximize the area of sensory organs and allow scanning of significantly large areas of the sea bottom during hunting, with studies showing that bonnetheads possess 360 degree vision and incredible depth perception (McComb et al. 2009). Bonnetheads are caught as target and bycatch in coastal gillnet and longline fisheries and as bycatch in shrimp fisheries.. Due to their abundance, early age at maturity, short lifespan and generation time, high litter size and population growth rates, bonnetheads are capable of enduring higher removal levels than many other species of shark (Cortes 2005). Despite its high productivity, drastic inferred declines have been reported throughout its range. The Northwest and Western Central Atlantic (USA, Bahamas, and Mexico) is stable due to management and in that region is assessed as Near Threatened. The Caribbean Sea and Southwest Atlantic portion of the population has been reduced substantially in size (Pollom 2021). Based on the current literature, this species is found in warmer waters south of New York. It is possible it could be found on rare occasion in the New York Bight. However, New York specific conservation efforts would likely have no significant impact on this species. It is therefore, recommended that this species be removed from the list of Species of Greatest Conservation Need.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** Not Ranked

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered A2bcd

-Northeast Regional SGCN:

Status Discussion:

Despite pressure from both commercial and recreational fisheries, the bonnethead shark is an abundant species with some of the highest population growth rates estimated for sharks, making it

much less susceptible to removal than most other shark species (Kyne et al. 2012). Regardless, this species has experienced significant population declines largely attributed to commercial fishing in coastal Central and South America – total declines for this species are estimated to be 50%-79% in the past 36 years (Pollom 2021).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	Last 40 years		Choose an item.
Northeastern US	Yes	Stable	Stable	Last 40 years (Atlantic Ocean)		Choose an item.
New York	Choose an item.	Unknown	Unknown			Choose an item.
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

There are currently no monitoring activities in New York.

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

The IUCN has reported this species' population trend as decreasing and the most recent assessment lists its status as Endangered (globally) due to substantial declines in the Southwest Atlantic and Caribbean populations. Bonnetheads were also once abundant along the Gulf of California and the Pacific coast of Mexico, but intense targeted fishing for sharks including this species has resulted in their depletion; the bonnethead shark is no longer present in the Gulf of California. Throughout the US, however this species has relatively low fishing mortality (Pollom 2021).

Global trend: South US Atlantic and Gulf of Mexico; North Carolina and eastern Florida waters; St. Andrews Bay to Apalachicola Bay, Florida; South Carolina waters; Georgia waters.

Median (95% CI) change = +9.5% (-22.8;57.5%).

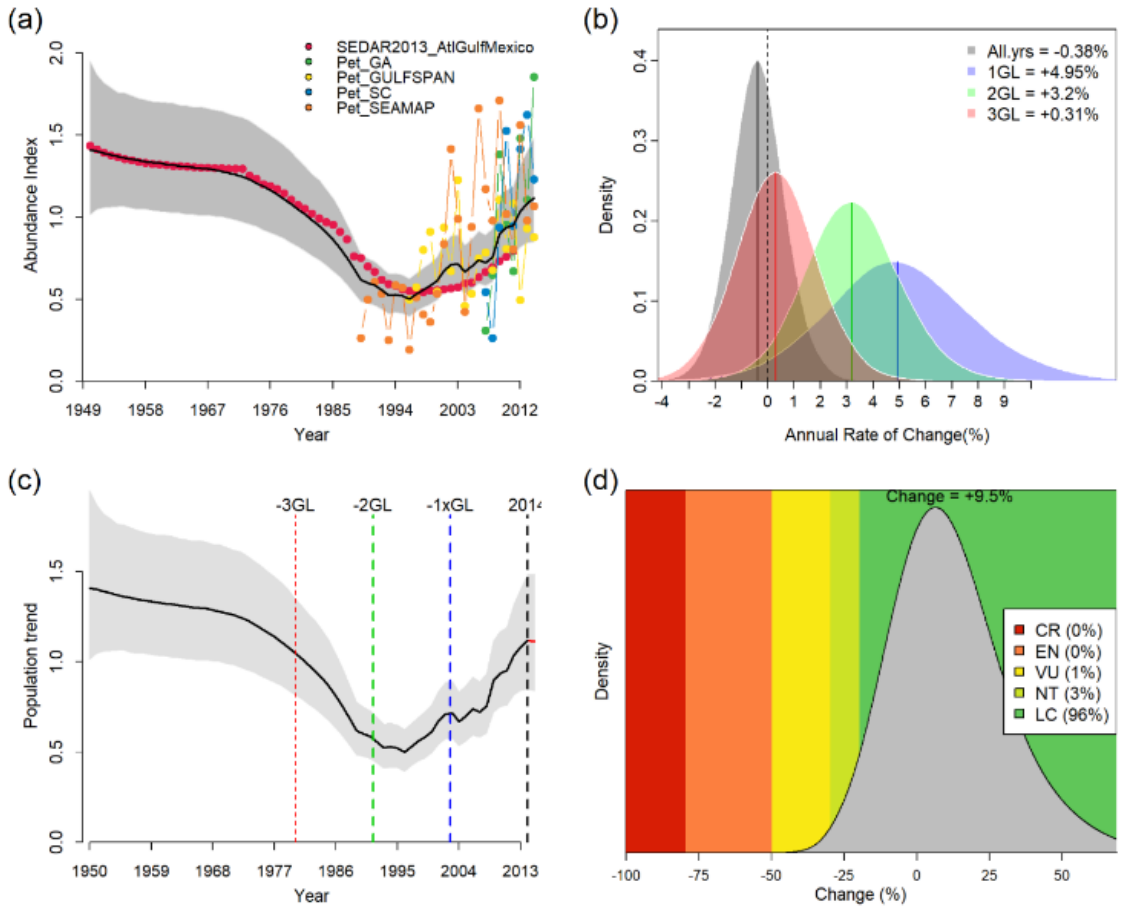

Figure 1. Global trend for Sphyrna tiburo based on the rate of change using the South US Atlantic and Gulf of Mexico, SEAMAP-SA Trawl, GULFSPAN GN, SC LL, GA LL time-series, as index ©, at the same time in a same modelisation run. It shows (a) the JARA fit to the observed time-series, (b) the posterior probability for the percentage annual population change calculated from all the observed data (in grey), from the last 1 generation length of data (in blue), from the last 2 generation length of data (in green), from the last 3 generation length of data (in red), with the mean (solid lines) shown relative to a stable population (% change = 0, black dashed line), © the observed (black line) and predicted (red line) population trajectory over three generations (34 years, dashed grey lines), and (d) the median decline over three generation lengths (dashed line) and corresponding probabilities for rates of population decline falling within the IUCN Red List category.

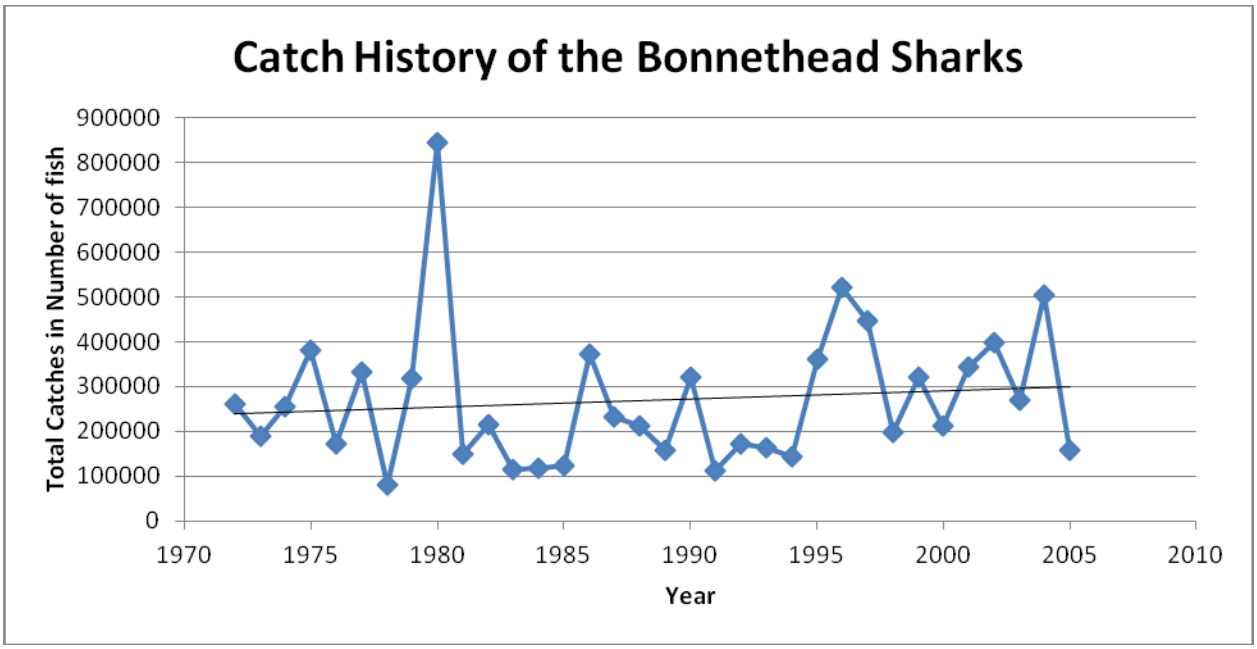

Figure 2: Catches of bonnethead sharks in the Atlantic Ocean and Gulf of Mexico (NMFS 2007).

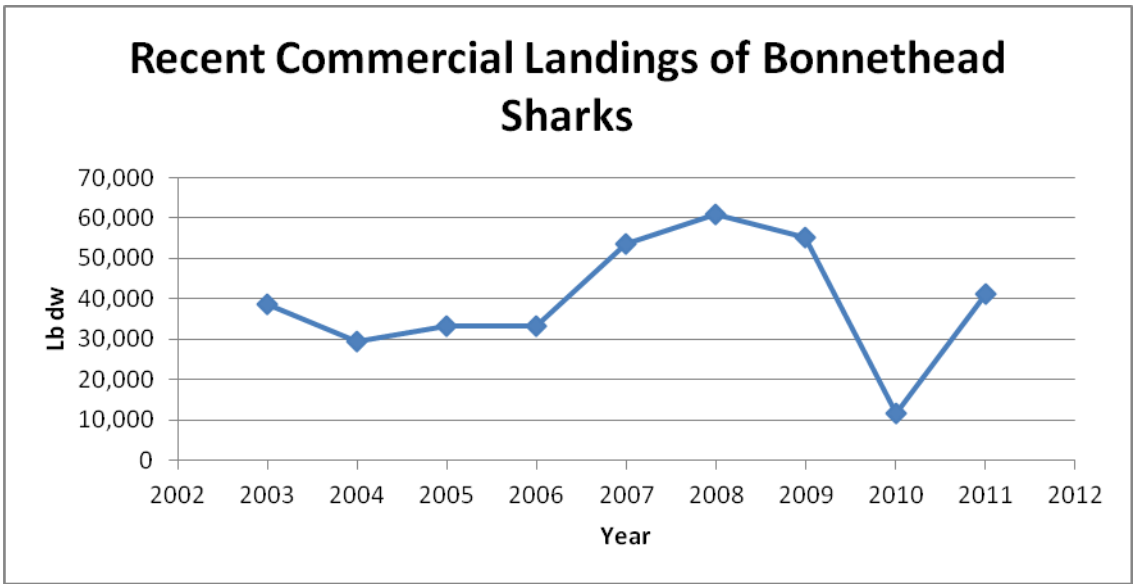

Figure 3: Commercial landings of bonnetheads in Altantic Ocean presented in the 2012 National Report of the United States to ICCAT (NMFS 2012).

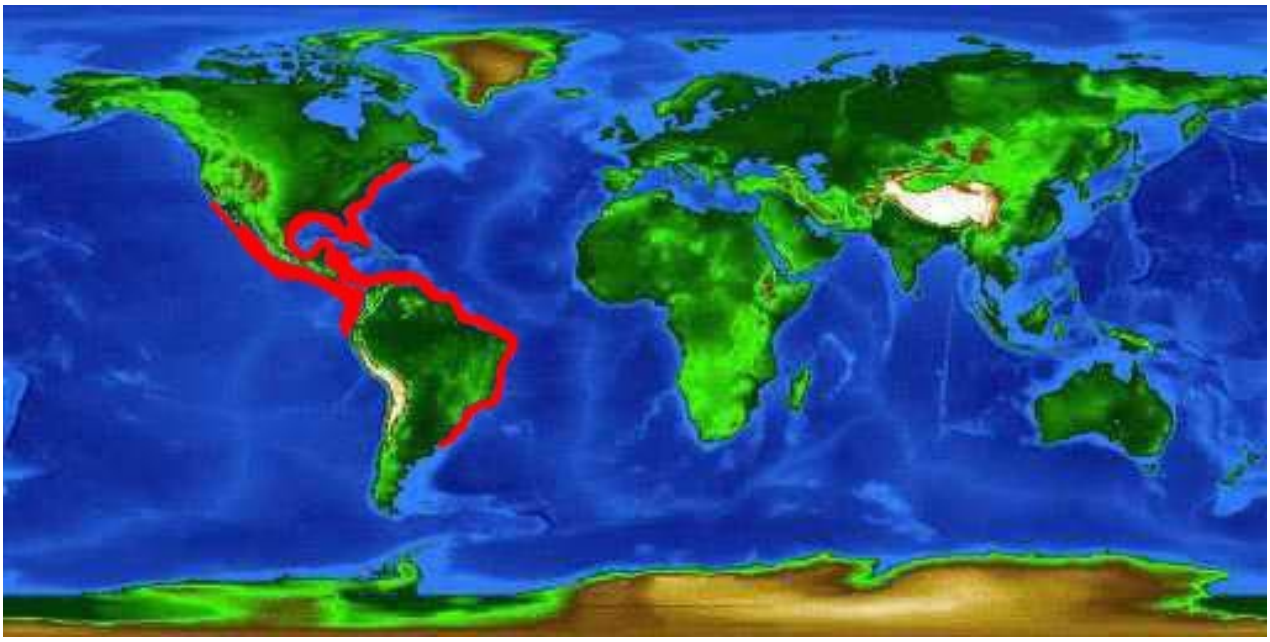

Figure 3. Global distribution of the bonnethead shark (FMNH)

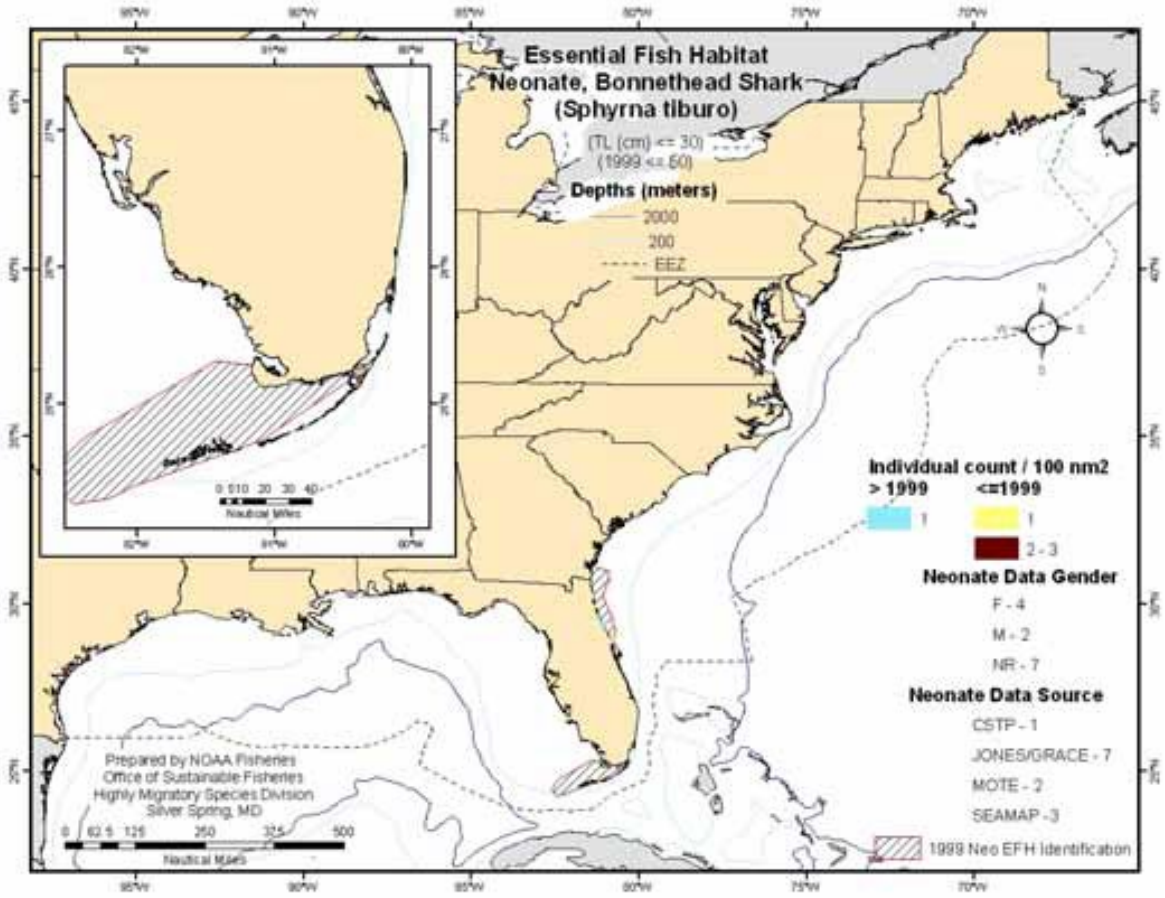

Figure 4. Essential Habitat for neonate bonnethead sharks (ASMFC 2008)

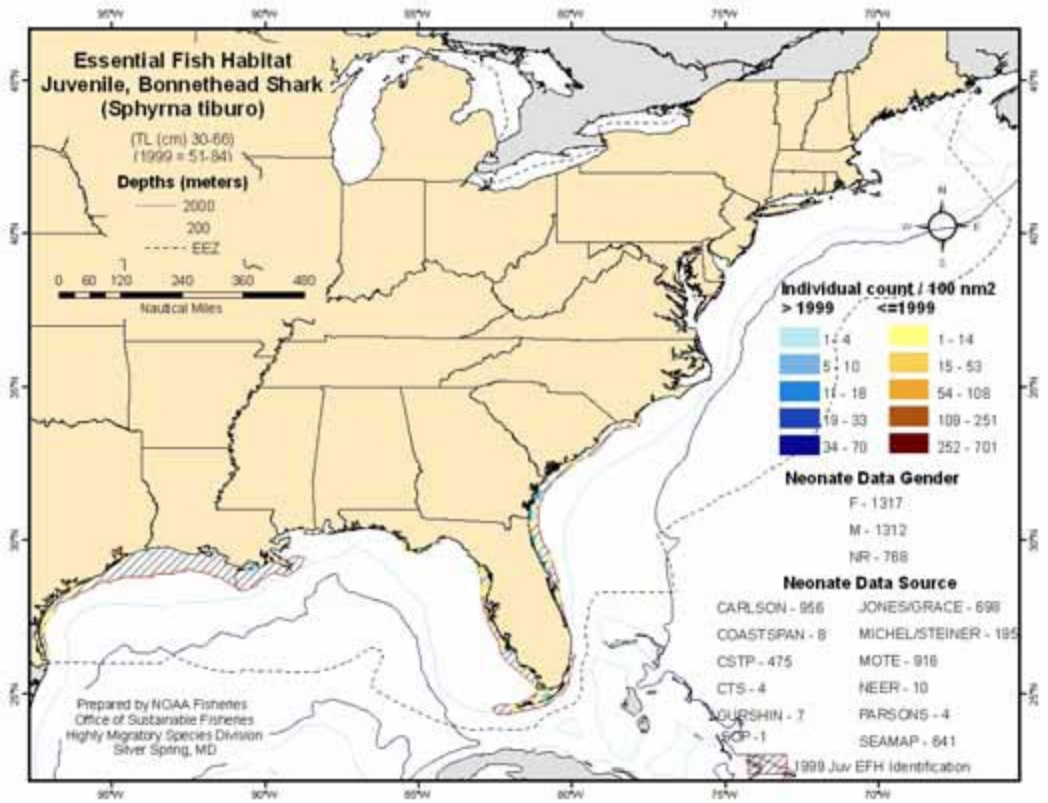

Figure 5. Essential habitat for juvenile bonnethead sharks (ASMFC 2008).

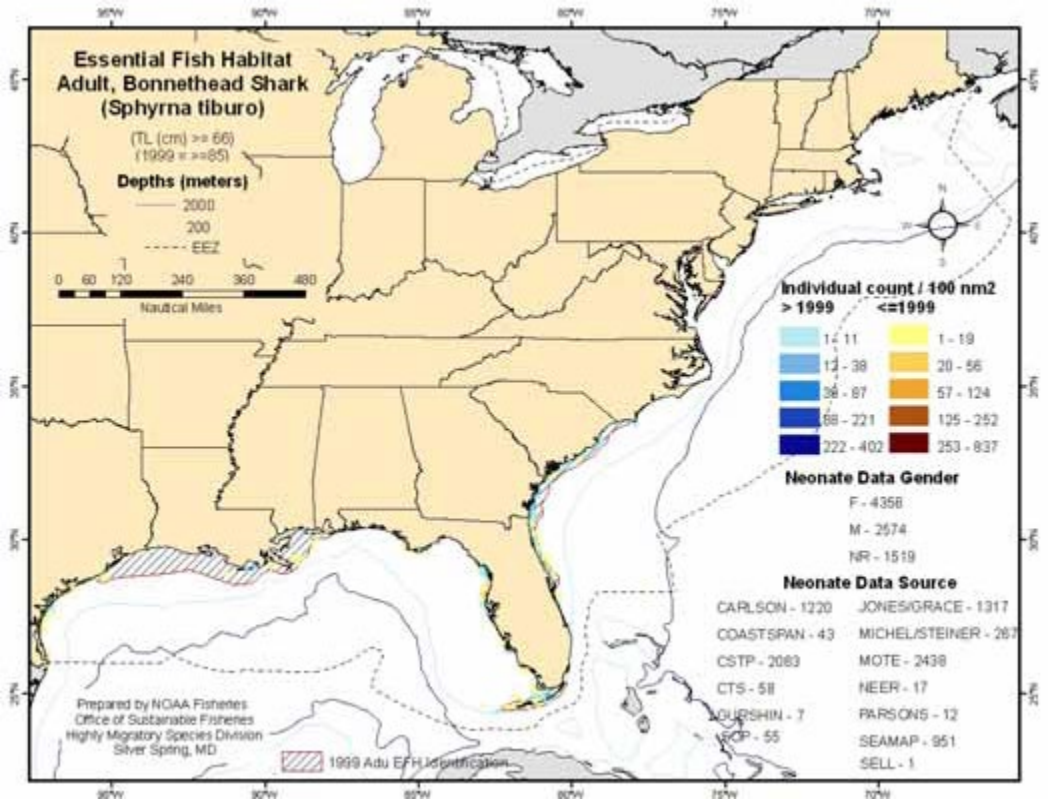

Figure 6. Essential habitat for adult bonnethead sharks (ASMFC 2008).

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

Because bonnethead sharks prefer temperatures around 70˚F, they are only occasionally found in the waters of New York, but they are abundant and common from North Carolina southward to Florida and throughout the Gulf of Mexico (Cortes 2005).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			<1%
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of bonnethead shark in New York.

Details of historic and current occurrence:

Historical and current occurrence in New York State waters is unknown. Probably very rare.

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. Pelagic

d. Estuarine, Brackish Shallow Subtidal

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:

The bonnethead is confined to the warn waters of the western hemisphere, preferring a temperature of at least 70˚F and inhabiting coastal waters where it frequents shallow estuaries and bays over grass, mud and sandy bottoms. Off Florida's west coast it is very abundant in shallow,

cool waters during summer months and moves in large schools of typically 5-15 individuals to warmer waters in the winter (Fowler et al. 2005). As a result, bonnetheads are found close to the equator during the winter and move back to higher latitudes in the summer. During spawning time, bonnetheads tend to group by gender and females will predominate in shallow waters where they give birth. Neonates and juveniles prefer shallow coastal waters, inlets and estuaries less than 25m deep, while adults many travel out to the continental shelf at depths of 80m (ASMFC 2008). Movement and resident patterns from tag recapture studies have shown that individuals are resident within an estuary, but do not show site fidelity to specific areas within the estuary and do not appear to undertake long coastal migrations (Heupel et al. 2006).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.	Choose an item.

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):*

Parsons (1993) estimated the gestation period of bonnethead sharks at 4.5 to 5 months, one of the shortest gestation periods known for sharks. The reproductive cycle is annual, with litters consisting of 8-12 pups. Age at maturity is 2-3 years for females and 2 years for males. Observed maximum ages of bonnetheads are 6-7 years for females and 5-6 years for males, but longevity is estimated at 5-6 years for males and 10-12 years for females (Cortes 2005). Evidence suggests that the bonnethead shark is highly site-attached to one region, exhibiting little or no long distance migratory behavior and probably no mixing of populations (Heupel et al. 2006). Recent demographic studies of bonnetheads indicate very high population growth rates, with a 30.4% (mean) annual rate of population increase, and survivorship values ranging from 55-81% (Fowler et al. 2005). Despite catches in commercial and recreational fisheries and accidental mortality from by-catch, bonnetheads are capable of withstanding higher removal rates than many other species of sharks due to their 'fast' life history characteristics (Fowler et al. 2005).

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

Results from a study by Gelsleichter et al. (2008) on the reproductive endocrinology of bonnetheads off Florida's west coast show high levels of organochlorine contaminants present in tissues of the sampled individuals. Because nursery areas for this species are located inshore and adults frequent inshore waters and estuaries, individuals are vulnerable to exploitation, human induced habitat degradation, and pollution (Cortes 2005). High fidelity to specific regions or estuaries means that individuals may not disperse, and localized depletion of a population could have long term effects within that region. Pollution or loss of habitat could affect the reproductive potential of a population, causing long-term decline in abundance within that region (Heupel et al. 2006). The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006). Increasing temperatures, UV radiation, storm disturbance, and coastal upwelling will affect the sustainability, productivity, and

biodiversity of coastal zone and marine ecosystems, particularly for coral reefs and primary producers, which bonnetheads rely on for critical habitat and food supply (Harley et al. 2006, UNEP and CMS 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (overfishing)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
3. Pollution	Industrial & Military Effluents (organochlorine contaminants)
4. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)

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:

Bonnethead sharks are part of the small coastal shark management unit regulated by the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks through the National Marine Fisheries Service (NMFS) Highly Migratory Species Management Division. Fishing regulations are in effect for the small coastal shark complex, but the unit is not currently considered to be overfished. In 2004, annual quotas were set at 454 mt dw for the small coastal shark unit, with a regional quota for North America of 3% (Maine through Virginia) due to the stability of the small coastal shark (SCS) group. Recreational limitations allow for harvest of one shark from the federal recreationally permitted species and one additional bonnethead shark per person per trip, with no minimum size requirement (ASMFC 2008).

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

To ensure sustainable small coastal shark catches from directed and non-directed fisheries, it is necessary to implement management measures consistent with federal rules and regulations designed to protect shark stocks. Improvement of species-specific catch and landings data are needed to get a better understanding of abundance and population data in New York waters. Creating state-level regulations requiring reporting of all sharks caught and landed in New York at all levels (commercial and recreational) would help improve and facilitate reporting of all species biological and trade data. To minimize incidental catches of sharks, educational programs and management measures are needed to prevent and reduce mortality of unwanted sharks (NYSDEC 2005).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2: (need recommended conservation actions for bonnethead shark).

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Originally prepared by	Samantha Hoff
Date first prepared	February 22, 2013
First revision	July 8, 2013
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Clearnose skate **Date Updated:** 12/4/2023

Scientific Name: *Raja eglanteria* **Updated by:** Tajrian Sarwar (MISC)

Class: Chondrichthyes

Family: Rajidae

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

The Clearnose skate (*Raja eglanteria*) is a medium-sized skate endemic to the Western Atlantic Ocean. Its range is limited to North America, occurring in waters up to 330 m throughout the northern and eastern Gulf of Mexico and along the eastern coast of the U.S. from Cape Cod, Massachusetts, to Florida. They occur across a wide temperate range (9-30º C) at depths between 0 and 33m. However, most occurrences of this species occur north of Cape Hatteras, NC in depths < 110 m, at temperatures between 9-20 ºC (Packer et al., 2003, NYS DEC, 2015, Anderson et al., 2020). Evidence suggests strong genetic differentiation between the Gulf of Mexico and the east coast populations and smaller but still significant differences between populations north and south of Cape Hatteras (Nelson et al., 2022). Because of its relatively small size, this species is not targeted in the skate wing fishery (Curtis and Sosebee 2015). However, they are caught as bycatch in scallop dredge and otter trawl fisheries (Anderson et al., 2020). Most bycatch is discarded, although some are retained in the Gulf of Mexico for bait (Anderson et al., 2020). Seasonal inshore-offshore migrations have been documented for adults of this species related to temperature and depth (Packer et al., 2003; Nelson et al., 2022). In the New York Bight, clearnose skates are abundant inshore in the summer and fall. In winter and spring, clearnose skates are occur further offshore. In the Mid-Atlantic and Northeast region of the U.S., Clearnose skates are managed by The New England Fishery Management Council, which manages clearnose skates as a “stock complex” along with the other six species of skate found in the region. Based on NEFSC biomass indices, the Clearnose stock is not considered to be overfished by the NEFMC (New England Fishery Management Council, 2021).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** Not Ranked

ii. **New York:** SNR **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Least Concern

-Northeast Regional SGCN:

Status Discussion:

Northeast Fisheries Science Center (NEFSC) spring and autumn survey indices for clearnose skate have increased since the mid-1980s through 2000 and have since declined to about average

values (NEFMC 2009). The biomass index is currently above the threshold and the maximum sustainable yield point, therefore the clearnose skate is not considered to be overfished (NEFMC 2009). Overfishing is not occurring because the three-year moving average of the biomass indices did not exceed the maximum threshold (NEFMC 2009). Overall, based on long-term increase in CPUE in northeast fisheries, the Clearnose skate's minimal presence in landings, medium size and likely moderately productive life history, and its high survivorship upon being discarded, the population is inferred to be increasing. There is no evidence of population decline and the species is not suspected to be close to reaching the population reduction threshold, and this species is assessed as Least Concern (Anderson 2020).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	Last 12 years		Choose an item.
Northeastern US	Yes	Declining	Stable	Last 12 years (Southern New England)		Choose an item.
New York	Yes	Declining	Stable	Last 12 years		Choose an item.
Connecticut	Yes	Declining	Stable		S4 – apparently secure	Yes
Massachusetts	Yes	Declining	Stable		Not Listed	No
New Jersey	Yes	Declining	Stable		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

The Northeast Area Monitoring and Assessment Program (NEAMAP), a cooperative state-federal program, conducted a trawl survey in the coastal zone (between 6.1 m and 27.4 m) of the Mid-Atlantic Bight (Montauk, NY to Cape Hatteras, NC). Surveys were conducted from 2008-2011 each fall and spring and collaboration is expected to continue in the future (NEAMAP 2012). The National Marine Fisheries Service also conducts bottom trawl surveys every winter, spring, and autumn from Cape Hatteras, NC to the Scotian shelf off Nova Scotia. Stock assessments are generally estimated for the whole skate complex, which includes little skate, barndoor skate, winter

skate, rosette skate, smooth skate, thorny skate and clearnose skate, by the NEFSC (NEFSC 2006).

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

The IUCN has reported the population of clearnose skate as increasing, inferred by this species' moderately productive life history, low fishing mortality, and lack of market demand despite an increased CPUE which suggest that the population is stable, and likely increasing (Anderson 2020). NEFSC spring and autumn survey biomass indices increased from the mid 1980s through 2000, but have since declined to about average values (Sosebee 2006, NEFMC 2009). Figure 7 shows the NEFSC bottom trawl survey results indicating that clearnose skates are most abundant in the mid-Atlantic offshore and inshore regions (off the coast of NJ, DE, MD, VA, and NC) (NEFMC 2003). Recreational landings are relatively insignificant when compared to commercial landings, although clearnose skate is one of the most frequently caught species of the skate complex with landings varying between 2,000 and 145,000 fish during 1981-1998 in recreational fisheries throughout the Atlantic Ocean (NEFMC 2003). Spawning stock biomass has increased in the 1990s and 2000s (NEFSC 2006).

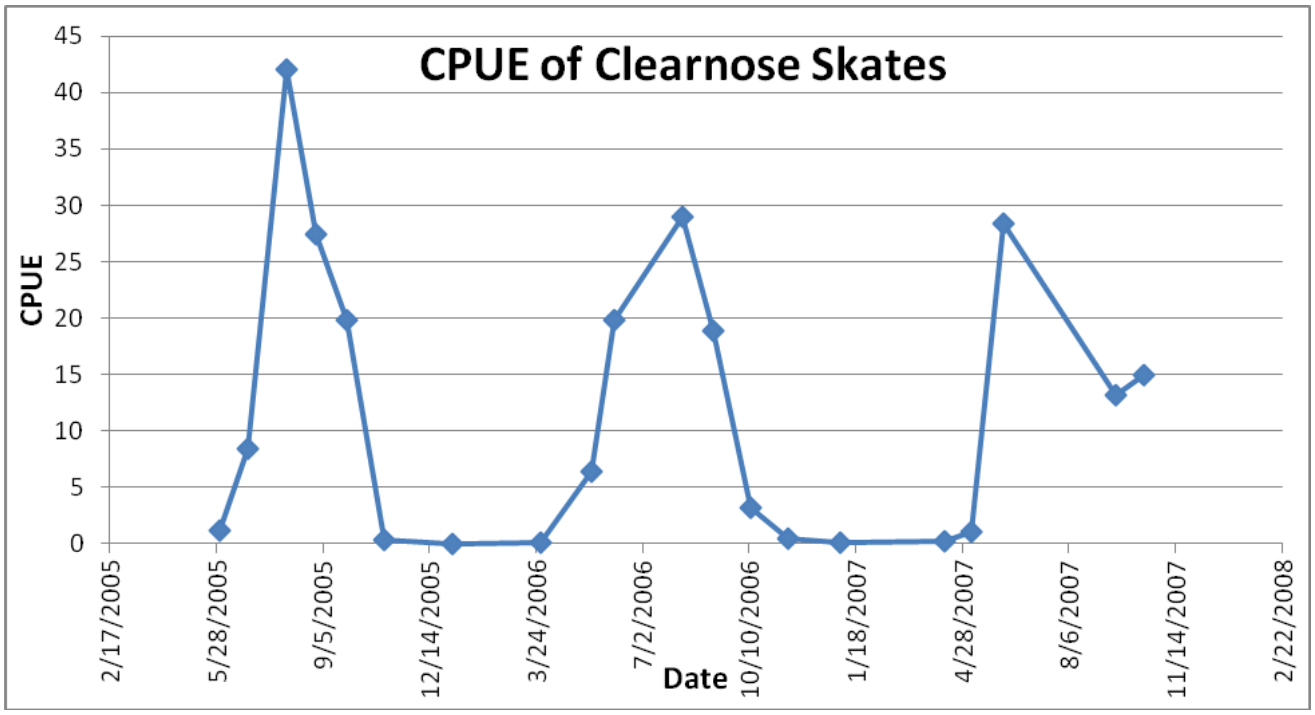

Figure 1. Catch per unit effort of clearnose skate off the south shore of Long Island, 2005-2008 (NYSDEC 2012)

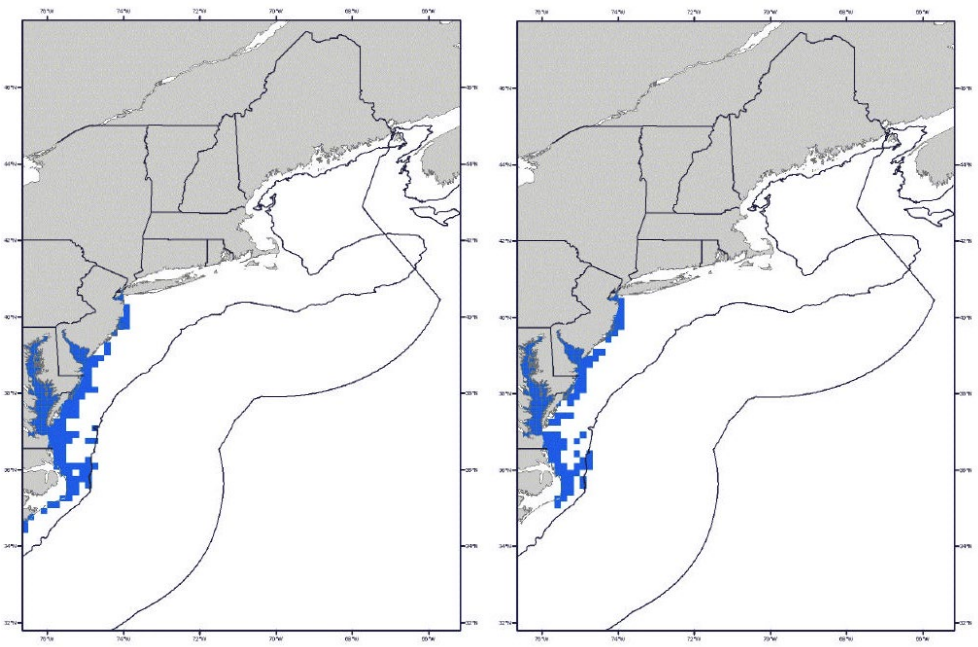

Figure 2. Designation of Essential Fish Habitat for juveniles (left) and adults (right) based on areas of highest relative abundance for clearnose skates from the NMFS trawl survey (1963-1999) (NEFMC 2003).

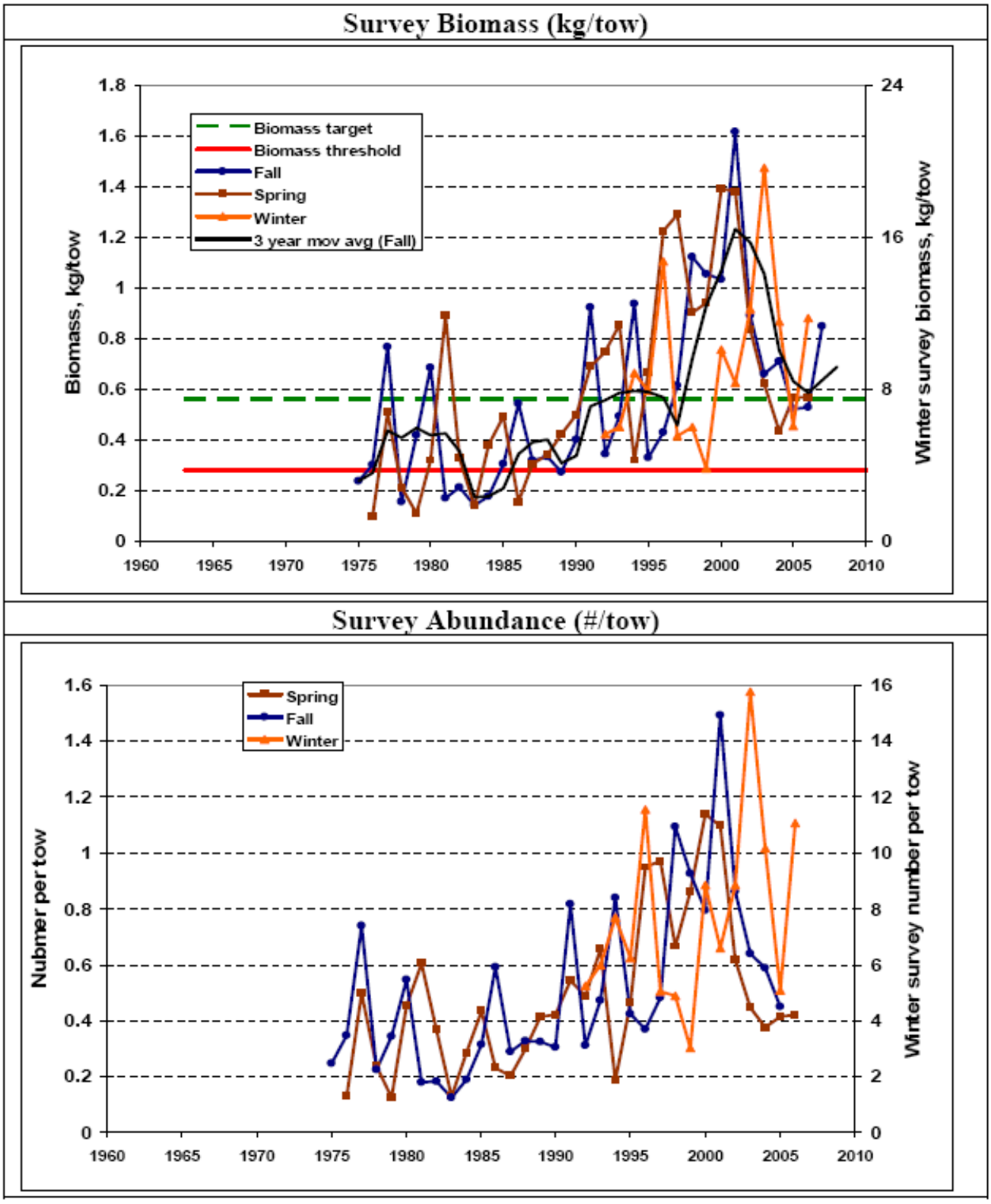

Figure 3. Clearnose skate stratified mean weight and number per tow for the winter, spring and fall NEFSC trawl surveys, Cape Hatteras, NC to the Gulf of Maine (NEFMC 2009).

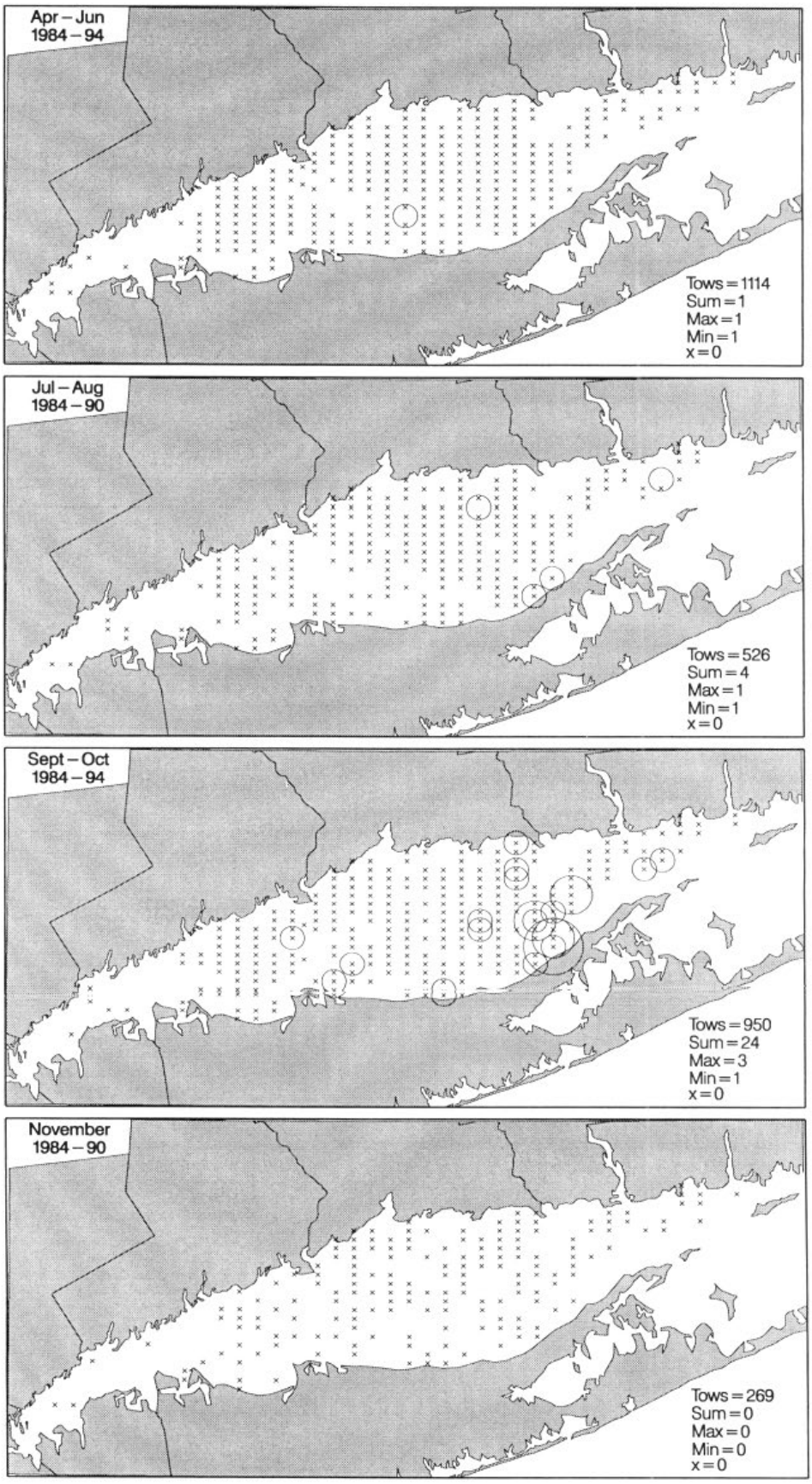

Figure 4. Distribution and abundance of juvenile and adult clearnose skate collected in Long Island Sound from 1984-1994 (Packer et al. 2003)

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

Clearnose skate is a southern species that is considered rare in the northern part of its range, with highest abundance in the inshore middle Atlantic and southern New England area (Packer et al. 2003, Sosebee 2006).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of clearnose skate in New York.

Details of historic and current occurrence:

Skates have been reported in New England fishery landings since the late 1800s, but landings were not reported by species. NEFSC trawl surveys go back to 1963 and the Hudson-Raritan estuary survey to 1992, both finding clearnose skates in New York waters mostly in autumn and rarely during winter and spring (Packer et al. 2003)

Clearnose skates are relatively rare in the Long Island Sound but frequently caught off the south shore in NEFSC trawl surveys during spring and autumn (Packer et al. 2003, NEFMC 2009).

Clearnose skates are increasingly being caught in LIS and the Peconic bay trawl. Percentage of area occupied within the bight is also increasing.

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. Estuarine, Brackish Shallow Subtidal

c. Marine, Deep Subtidal

Habitat or Community Type Trend in New York

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

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:

The clearnose skate is found on soft bottoms along the continental shelf, but also occur on rocky or gravely bottoms from inshore to depths up to 330m (Ha et al. 2009). The 1992-1997 Hudson-Raritan estuary trawl survey showed that the highest densities occurred at depths of 5-8 m for both adults and juveniles during all seasons, at salinities of 20-36 ppt. The Hudson-Raritan survey also found most juveniles occurred at temperatures of 13-24˚C and adults between 9-24˚C (Packer et al. 2003). The highest abundance of clearnose skates in New York waters can be found in the sublittoral zone out to depths of 55 m, frequenting shallow inshore areas and estuaries (Packer et al. 2003). Seagrass is critical habitat for many important prey species of the clearnose skate, including shrimps, crabs, bivalves and many small teleost fish species (Sagarese et al. 2011).

V.Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.

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):*

Like all skates, clearnose skates are oviparous, laying eggs in capsules (also known as mermaid purses) that are then deposited in sandy or muddy flats at intervals ranging from 1–13 days. A single female may lay up to 66 eggs in one season. Eggs laid initially in the season have been found to hatch in about 88-94 days while those laid later in the season may decrease to 77-80 days. Age data suggests that females mature at 4-6 years and males between 2-4 years with a lifespan of 5-8 years (Ha et al. 2009). Maximum size and size at maturity varies with latitude, with larger individuals occurring at higher latitudes (Packer et al. 2003).

Large carnivorous fish, such as the sand tiger shark, are potential predators of the clearnose skate. Mortality rates are also attributed to by-catch during groundfish trawling in otter trawls and scallop dredge operations as skates are frequently caught and discarded, although no directed fishery exists for this species (Sosebee 2006). Discarded recreational landings are deemed insignificant to population stability, at less than 1% of the total fishery landings (Packer et al. 2003).

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

No direct fishery exists for this species, but they are commonly taken as by-catch in groundfish trawling and scallop dredging. Otter trawling is the principal commercial fishing method that affects clearnose skates. The effect of increased global ocean temperatures on elasmobranches including the clearnose skate is unknown but is likely to result in changes in distribution, migratory movements, and prey availability. Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006). Coastal development and degraded water quality have decreased the productivity and sustainability of New York's coastal ecosystems, which the clearnose skate heavily relies on. Seagrass acreage in New York has heavily declined since the 1930s, resulting in declining

water quality and habitat for many important prey species of the clearnose skate, including the rock crab and sand shrimp (NYS Seagrass Taskforce 2009).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial harvest)
3. Energy Production & Mining	Renewable Energy (Offshore Wind)

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:

Skates are currently managed under the New England Fishery Management Council's Skate Fishery Management Plan, implemented in 2003. This plan includes mandatory reporting by species for both dealers and vessels and many other measures to aid in the recovery of skate species deemed overfished, such as development of biomass and mortality reference points (NEFMC 2003). Essential fish habitat is designated for the clearnose skate by the NEFMC through the Magnuson-Stevens Fishery Conservation and Management Act (Packer et al. 2003).

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

Life history studies (age, growth, maturity, and fecundity studies) are needed to better understand the demographics of the clearnose skate in New York waters. Studies of stock structure are also needed to understand individual abundance of the clearnose skate and distribution. Investigating the influence of annual changes in water temperature or other environmental factors on shifts in the range and distribution of this species will be important for anticipating climate change affects on the species. Protection and restoration of critical habitat for prey species of the clearnose skate is another measure needed to support New York populations.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2: (need recommended conservation actions for clearnose skate).

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Originally prepared by	Samantha Hoff
Date first prepared	February 28, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Cownose ray **Date Updated:** 12/1/2023

Scientific Name: *Rhinoptera bonasus* **Updated by:** Tajrian Sarwar (MISC)

Class: Chondrichthyes

Family: Rhinopteridae

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

Cownose rays are one of the most readily identifiable ray species due to their indented snout and specialized bi-lobed fin beneath the head, appearing bovine-like. The cownose ray is a large batoid of the family Rhinopteridae, characterized by its flat body and venomous spine present on the whip-like tail. Cownose rays occur from New England (southern Massachusetts) to Brazil, including the Gulf of Mexico and Cuba. A study utilizing acoustic telemetry to track locations of individual cownose rays revealed that this species migrates repeatedly between the same summer nurseries and overwintering sites each year (Ogburn 2018).This is a benthic to epipelagic species, occurring along the continental and insular shelves in shallow marine and brackish waters (Barker 2006). Cownose rays were targeted as it was believed that a population increase of this species, driven by a reduction of coastal sharks which predate upon rays, would lead to a collapse in shellfisheries in a trophic cascade effect (Grubbs 2016). Perceived competition between rays and humans for shellfish consumption led to the culling of cownose rays, which were blamed for bivalve stock collapses – although these collapses were more likely driven by overharvesting and disease, not increased abundance of rays (Grubbs 2016).The schooling nature and inshore habitat of this species coupled with their low productivity and late maturity make cownose rays susceptible to overexploitation and recovery from population declines would be limited (Kyne et al. 2012). Steep population declines are suspected in the Southern Caribbean and Southwest Atlantic, with the Northwest Atlantic and Gulf of Mexico populations increasing – resulting in this species being listed as globally Vulnerable by the IUCN (Carlson 2020).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** Not Ranked

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable A2bd

-Northeast Regional SGCN: Not listed

Status Discussion:

Cownose rays are susceptible to overexploitation and may have limited ability to recover from population declines due to their schooling behavior in inshore habitats and inherently slow reproductive rate due to late maturity, long gestation periods, and small litters(Barker 2006). Heavy fishing pressure in the inshore environment, especially throughout Central and South America, have contributed to a substantial decline of Cownose rays in that region. In the Northwest Atlantic

population, targeted fisheries and culling of rays potentially threatens this species – it is estimated that this species has experienced an overall population reduction of 30-49% in the past 43 years, and it is listed as Vulnerable by the IUCN (Carlson 2020).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown	(NW Atlantic Ocean)		Choose an item.
New York	Yes	Unknown	Unknown		Not Listed	No
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

There are currently no monitoring activities specifically for this species in New York waters, though it has been caught on independent surveys such as the SoMAS Nearshore trawl.

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

There are no existing population size estimates for the cownose ray, but they are common in parts of their range at certain times of the year (Barker 2006). During suspected migration periods, they often occur in groups of thousands of individuals. The IUCN acknowledges that there is an urgent need for research to determine population status and catch levels. The IUCN designated the Cownose ray as Near Threatened in 2006 and assessed the species as Vulnerable in 2019. Significant genetic differences between the Gulf of Mexico and Northwest Atlantic populations have been revealed in a study analyzing mitochondrial markers of Cownose rays (Carney 2017). In the Gulf of Mexico population, a fishery-independent demersal trawl survey running from 1987 to 2018 indicates that overall abundance has increased at an annual rate of 2.5%. The IUCN suggests that while the probability of Least Concern in this population is 83%, there is a 14%

probability of this population being threatened (Carlson 2020). Data in the Caribbean and Southwest Atlantic is sparse, but this species has been targeted intensely by unmanaged gillnet fisheries which exist in Colombia, Venezuela, and Brazil which are likely causing population declines in those regions (Tagliafico 2012). Population abundance in the Northwest Atlantic population are suspected to be increasing, but this species' very low reproductive rate makes them susceptible to overfishing – the development of fisheries targeting this species in the United States represents a potential threat to their population (Carlson 2020).

Figure 1. IUCN Red List distribution of Cownose Ray (Carlson 2020)

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

They are common in parts of their range at certain times of the year, especially in the Chesapeake Bay during summer (Barker 2006).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of cownose ray in New York.

Details of historic and current occurrence:

Historical: This species uses coastal and estuarine waters south of Long Island as nursery habitat (Ogburn 2018).

Current: Cownose rays have been captured on the SoMAS Near Shore trawl along the south shore of Long Island.

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, Deep Subtidal

b. Marine, Shallow Subtidal

c. Estuarine, Brackish Shallow Subtidal

d. Estuarine, Brackish Shallow Subtidal, Benthic Geomorphology, Benthic Flat

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:

Cownose rays occur in marine and brackish waters up to 60ppt, often swimming into estuaries and bays (Kittle 2013). They are pelagic swimmers and benthic feeders, found at depths of 0-22m (Barker 2006). Cownose rays are a gregarious species, forming large schools that can number in the thousands. They are presumed to make long migrations with their school, moving northward in late spring and southward in late fall (Barker 2006). The onset of migration may be influenced by changes in water temperature for some populations and possibly due to other factors such as food availability or predator avoidance in the estuaries. Chesapeake Bay is an important location for pupping and mating, where large schools of cownose rays are abundant from late spring to late fall (Fisher 2010). A study monitoring the movements of tagged individuals along the Atlantic coast of the United States revealed that this species exhibits philopatry, migrating between the same nursery sites and overwintering sites annually (Ogburn 2018).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

Age to maturity is estimated at 5-6 years for males and 7-8 years for females, with an average lifespan of 13 years (Smith and Merriner 1987). Gestation appears to be 11-12 months long, resulting in only one pup per reproductive cycle. Cownose rays reproduce by aplacental viviparity in which eggs hatch and young develop inside the female without a placenta for nourishment. Females will ovulate immediately after parturition, so reproduction is likely annual or biannual depending on the exact gestation period (Barker 2006). A study monitoring the movements of tagged individuals along the Atlantic coast of the United States revealed that this species exhibits philopatry, migrating between the same nursery sites and overwintering sites annually. In the Northwest Atlantic, Cownose rays utilize coastal estuaries south of Long Island, NY as mating and pupping habitat, and will overwinter near Cape Canaveral, FL (Ogburn 2018).

Cownose rays feed on bottom-dwelling invertebrates, particularly mollusks and crustaceans, by crushing the shells with their dental plates, separating the meat from the indigestible parts, and spitting out the shells. They are common prey of large predatory sharks including sandbar and bull sharks (Kittle 2013). Cownose ray life history parameters suggest that intrinsic rates of increase are low and they may be susceptible to overexploitation.

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

Cownose rays are not directly targeted by fisheries but they are frequently caught in tropical waters where fishing is intense and generally unregulated (Barker 2006). Creation of a commercial fishery has been suggested due to their reputation as a pest species to the shellfish industry, which may have negative consequences if not regulated carefully due to their late maturity and low productivity. Commercial fisheries for other species pose a threat to cownose rays, which are caught as by-catch with pound nets, haul seines, and shrimp trawls (Barker 2006). Heavy fishing

pressure on the inshore environment combined with their schooling behavior will have an effect on populations. There are no species-specific protections or management measures in place in the southern Caribbean or South America. Further research is needed on taxonomy, life history, population size and trend, and threats. All fisheries should be managed for bycatch at the species level.Direct effects of climate change on rays are unknown, but changes in behavior, distribution, prey availability and migratory patterns are likely to be affected (ZSL 2010).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)

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

Yes:_____ **No:** __X__ **Unknown:**_____

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

There is no existing legislation protecting this species.

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

Coordination with Central and South American regions would greatly improve conservation of the cownose ray since their fisheries are largely unregulated. Monitoring (include species-specific catch details) landings and by-catch are needed throughout the whole distribution of cownose ray habitat to provide valuable information on the biology and population status of the species. Fishery-independent surveys should be performed to provide estimates of abundance and biomass, especially in New York waters. Coordinated national and international efforts are needed to assess migratory movements, abundance, and fishery impacts due to the transient nature of the species. Further research, including tracking studies, would give managers a better understanding of movement patterns, improve life history data, and characterize habitat use and identify potential nursery areas (Barker 2006). If a commercial fishery is instated for the Chesapeake Bay, regulations and a management plan will be needed at a regional level.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1. Land/water protection	Site/area protection
2. Species management	Harvest management

3. Species management	Trade management
4. Law & policy	Compliance and enforcement

Table 2: Recommended conservation actions for cownose ray.

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Originally prepared by	Samantha Hoff
Date first prepared	March 14, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Dusky shark **Date Updated:** 12/1/2023

Scientific Name: *Carcharhinus obscurus* **Updated by:** Tajrian Sarwar (MISC)

Class: Chondrichthyes

Family: Carcharhinidae

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

Dusky sharks are a coastal-pelagic species which occurs at tropical and warm temperate waters along continental shelves, ranging from the surf zone to pelagic waters up to 400 meters deep (McCandless 2014). This species can be found from Nova Scotia to Cuba, including the northern Gulf of Mexico; from Nicaragua to southern Brazil in the western Atlantic and from southern California to the Gulf of California in the eastern Pacific (NOAA 2011, NatureServe 2012). It is also found in the Mediterranean, Indian, and western Pacific, including Madagascar and Australia (Knickle no date, Musick et al. 2007, NatureServe 2012). This species is especially vulnerable to overfishing because of its large size, late maturity, and low fecundity (NOAA 2011, NRDC 2013). In the Northwest Atlantic population, steep declines from overfishing occurred in the 1980s and 1990s; based on the trends between 1960 and 2015, there was approximately a 74% decline in relative abundance (McClandess et al., 2014). Though commercial harvest has been prohibited since 2000, dusky sharks are still susceptible to on-vessel and post-release mortality following incidental capture (bycatch) by pelagic and bottom longline fisheries, especially as essential habitat for this species overlaps with longline fishery operations along the eastern coast of the United States (Kroetz 2021). The most recent stock assessment for the dusky shark concluded that this species is overfished and is experiencing overfishing (SEDAR 2016).

I. Status

a. Current legal protected Status

i. **Federal:** Not Listed **Candidate:** Yes

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** G3 Vulnerable

ii. **New York:** S2S3 Imperiled **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered A2bd

-Implied Status under the U.S. Endangered Species Act (USESA): Species of Concern

-Northeast Regional SGCN: RSGCN, High conservation concern

-CITES: Appendix II

Status Discussion:

Overfishing combined with low fecundity and late maturation has resulted in a large decrease in population size of the dusky shark. Dusky shark populations in the Northwest Atlantic and Eastern Indian Ocean have experienced sharp declines; populations in the Eastern Atlantic and Western Indian Ocean have also declined to a lesser extent. Global population is estimated to have experienced a reduction of 72% in the last 90-115 years. Management actions in the Northwest

Atlantic and Eastern Indian Ocean have resulted in the stabilization of Dusky Shark populations in these regions. Recovery is expected to be slow and requires international cooperation given the highly migratory nature and inherent vulnerabilities associated with this species' life history (Rigby 2019).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	Last 20 years (NRDC 2013)		Choose an item.
Northeastern US	Yes	Declining	Declining	Past 20 years (NRDC 2013) (Northeast U.S.)		Yes
New York	Yes	Declining	Declining		Not Listed	Yes
Connecticut	No data	Unknown	Unknown		Not Listed	No
Massachusetts	No data	Unknown	Unknown		Not Listed	No
New Jersey	No data	Unknown	Unknown		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

The National Marine Fisheries Services Cooperative Shark Tagging Program is an ongoing effort by recreational, commercial anglers, and NMFS to tag sharks throughout the Atlantic Ocean and Gulf Coast. Since 1962 over 295,000 sharks of 52 different species have been tagged. The tagging of sharks provides information on stock identity, movements and migration, abundance, age and growth, mortality and behavior (Kohler 2018).

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

According to the 2016 Southeast Data, Assessment, and Review for the Northwest Atlantic Dusky Shark population, the stock is overfished, with overfishing occurring since the mid-1980s. In the Northwest Atlantic population, dusky sharks have been experiencing a decline since the mid-19th century, with trend analysis of this population's biomass between 1960-2015 indicating annual

reduction rate of 2.6%, with an estimated reduction of 89.9% over three generation lengths, or 89.4 years (SEDAR 2016).

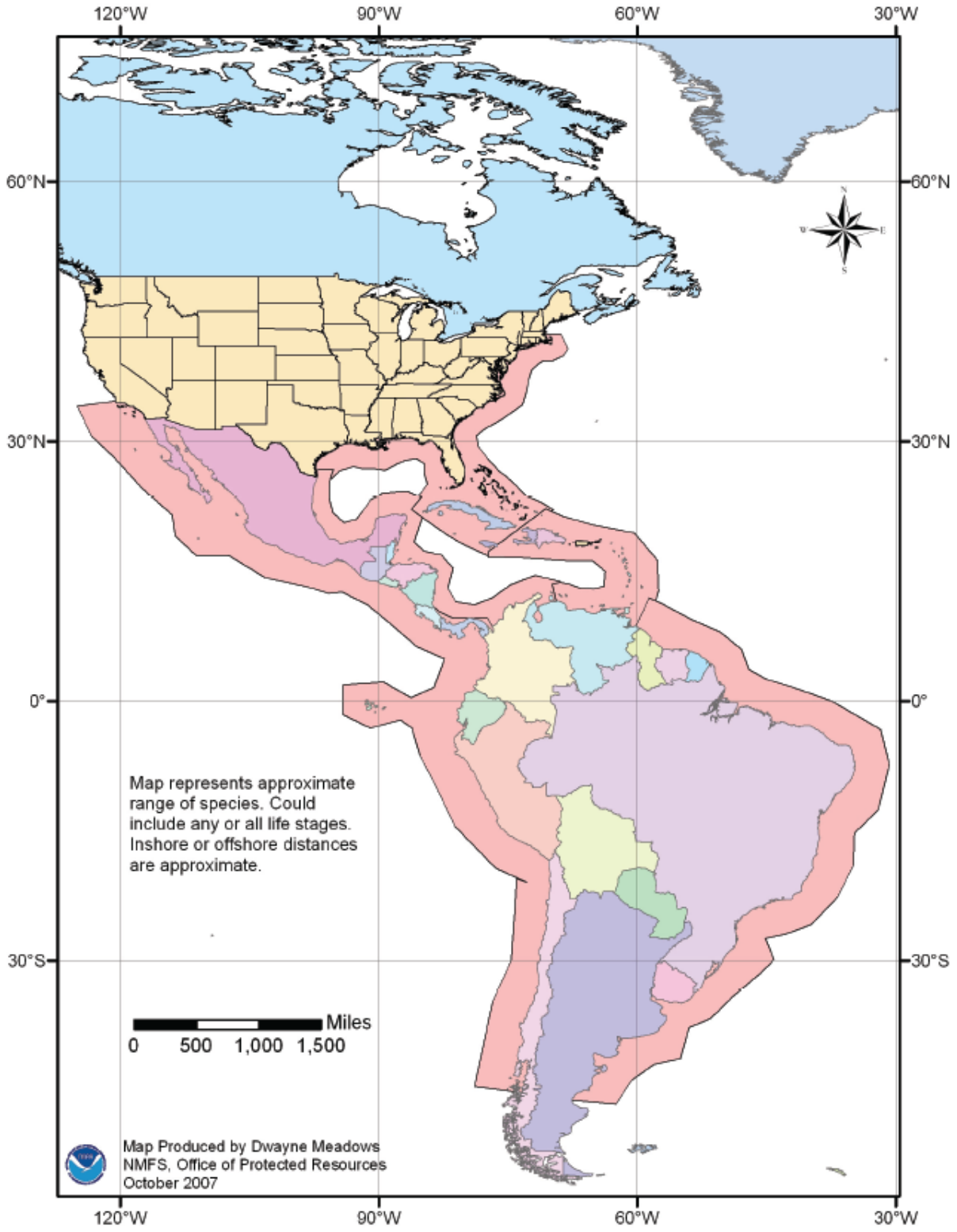

Figure 1. Distribution of the dusky shark in the western hemisphere (NOAA 2011)

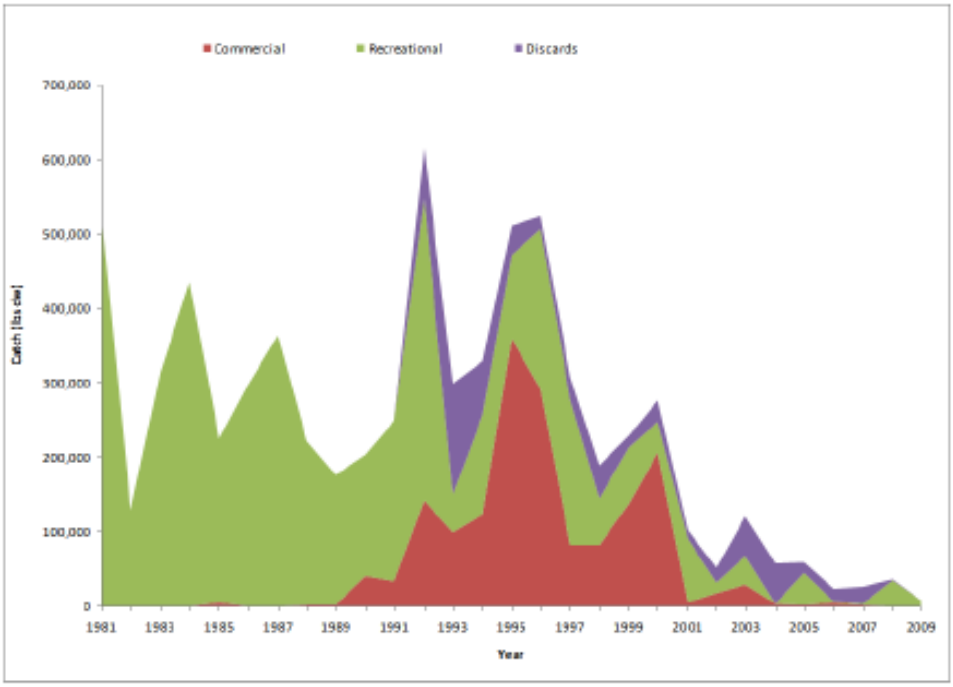

Figure 2. Total catches of dusky shark (in pounds dressed weight), 1981-2009 in the western Atlantic Ocean including the Gulf of Mexico (SEDAR 2011).

North Atlantic: Stock assessment (1960–2015), Northwest Atlantic, biomass (proportion B/B0)

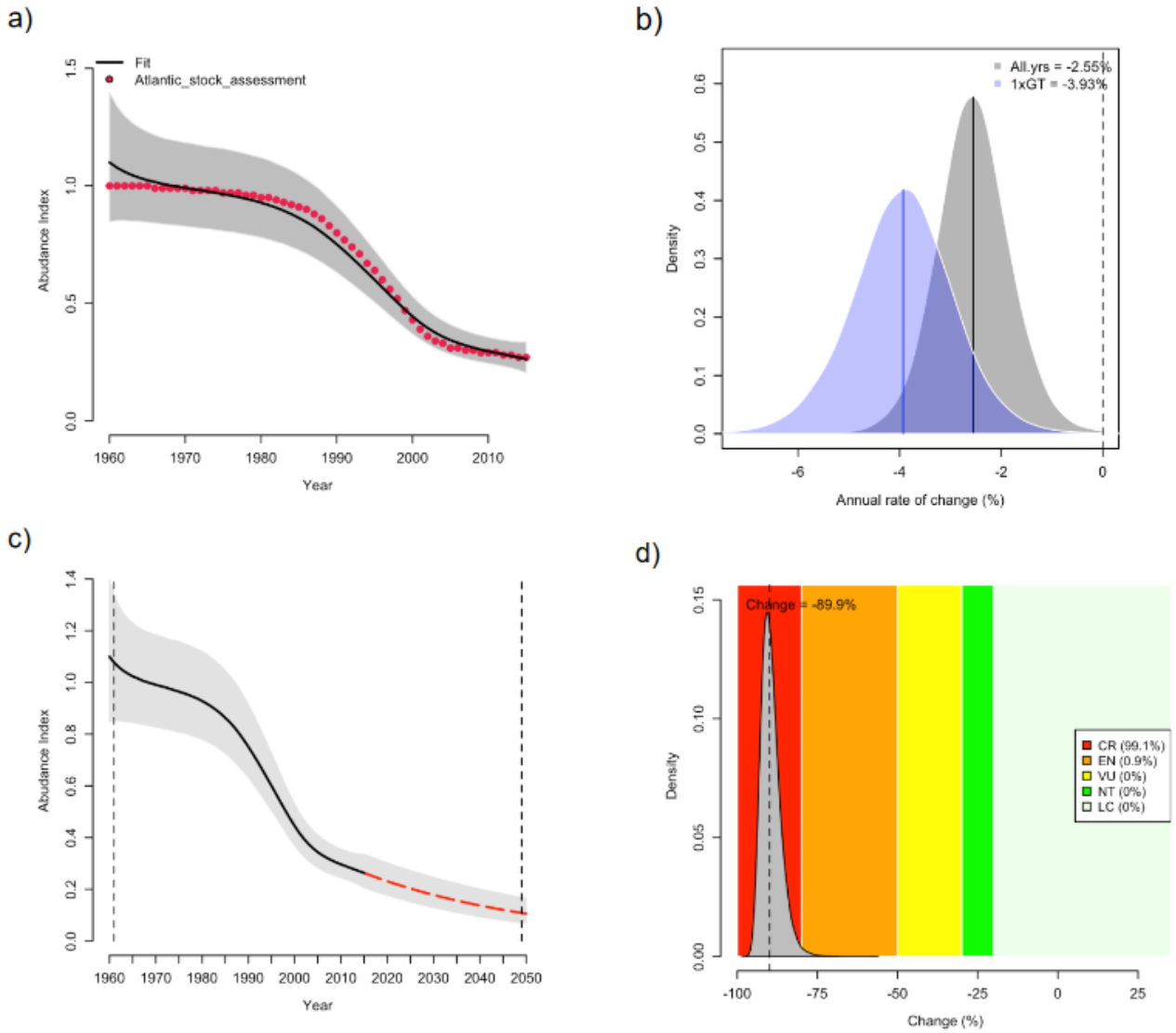

Figure 3. JARA results for Dusky Shark (Carcharhinus obscurus) in the Northwest Atlantic showing: (a) the JARA fit to the observed time-series; (b) the posterior probability for the percentage annual population change calculated from all the observed data (in black) and the last 1 generation length (in blue) with the mean (solid lines) shown relative to a stable population (% change = 0, black dashed line); (c) the observed (black line) and predicted (red line) population trajectory over three generations (89.4 years, dashed grey lines), and; (d) the median reduction over three generation lengths (dashed line) and corresponding probabilities for rates of population reduction falling within the IUCN Red List categories (Rigby 2019)

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

This species is much rarer than in previous decades as a result of overfishing.

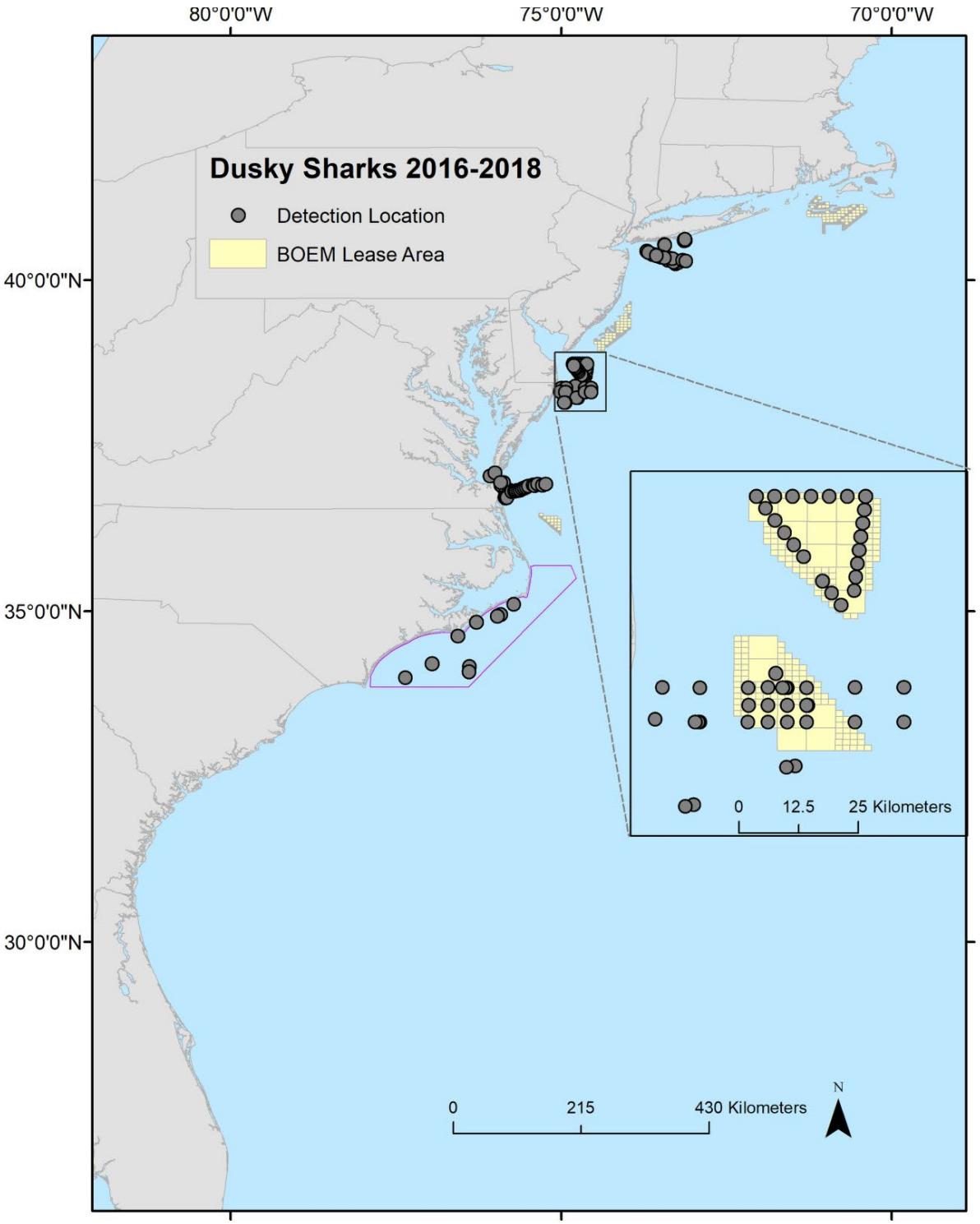

Figure 4: Locations of acoustic transmitter detections of tagged juvenile Dusky Sharks between September 2017 and October 2018. The Mid- Atlantic Shark Closed Area is outlined in purple. (Bangley 2020)

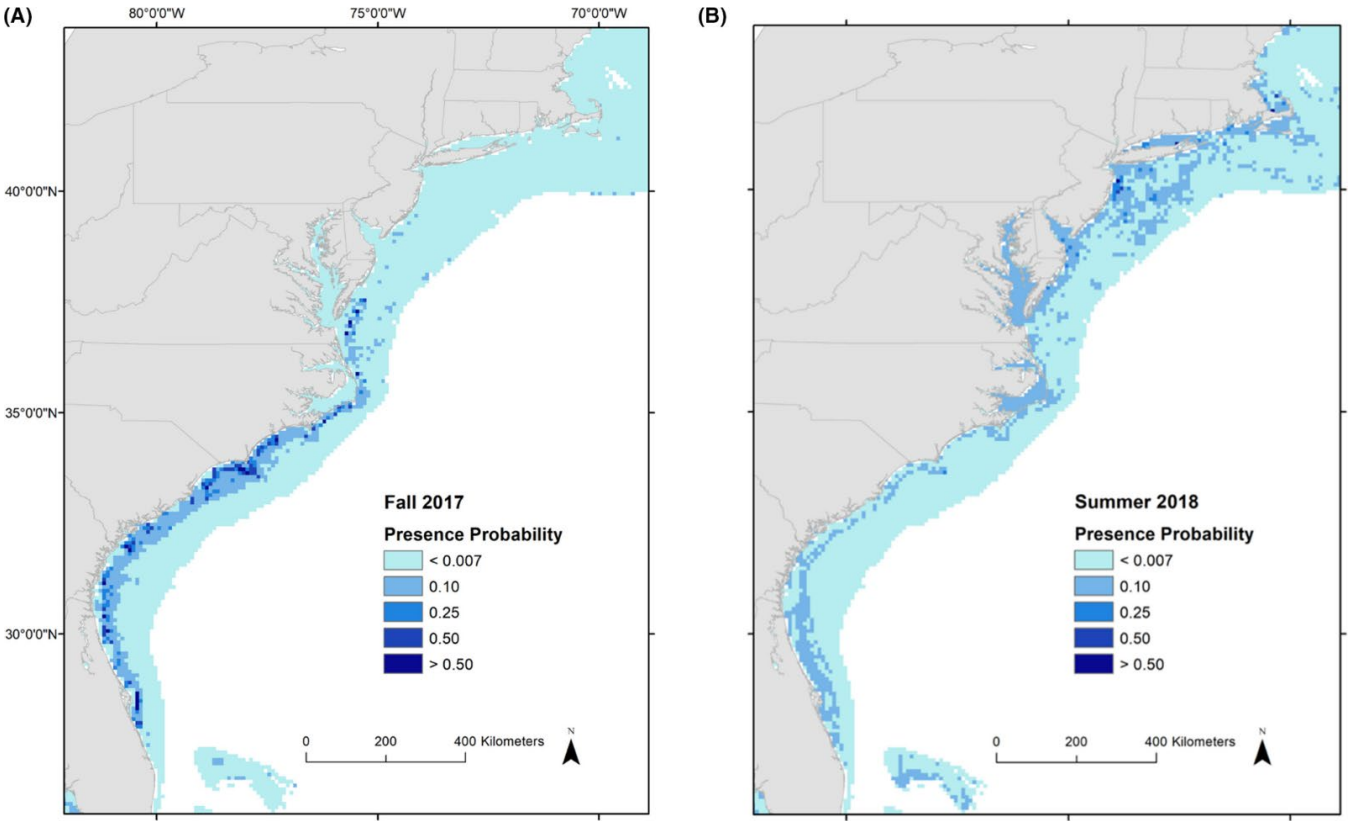

Figure 5: Mapped presence probability based on boosted regression tree modeling of juvenile Dusky Shark tag detections and satellite-recorded environmental data during (A) fall 2017 (aggregated data from September to November 2017) and (B) summer 2018 (aggregated data from June to August 2018. (Bangley 2020)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of dusky shark in New York.

Details of historic and current occurrence:

Historic: Dusky sharks have occurred in NY waters, and have been targeted heavily for their meat, fins, and liver oil since the mid-19th century. After this period of intense overexploitation, Dusky Shark populations have declined significantly, and have been designated a prohibited species since 2000 following the 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks.

Current: Following the ban on commercial harvest of Dusky Sharks, overfishing has been reduced but still continues due to incidental capture/bycatch of this species.

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. Estuarine, Brackish Shallow Subtidal

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:

This is a coastal-pelagic species that occupies mostly continental shorelines from shallow waters to the outer reaches of the continental shelf and adjacent waterways to 400 meters (1,300 feet) in depth (NOAA 2011, NRDC 2013). Adults avoid areas of low salinity, but juveniles may use shallow coastal estuaries and bays as nurseries (NRDC 2013). In the Northwest Atlantic, small juveniles are known to use nearshore coastal waters as nursery habitat from off New Jersey to South Carolina during the summer months (McCandless 2014, Bangley 2020)

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

This is a long-lived, slow growing species that can have a lifespan of 40 years if not more (Natanson et al. 1995, SEDAR 2011, NRDC 2013). The average size dusky shark is about 11.8 feet and 400 pounds (NOAA 2011). Males attain reproductive maturity at about 19 years while females are mature at 21 years (Musick et al. 2009, NOAA 2011). Mating occurs in the spring and

the reproductive cycle takes 3 years, 2 years of gestation and 1 resting year (NRDC 2013). Females can produce a litter of 2-12 pups (NRDC 2013). The dusky shark relies on the survival of a few pups to ensure population growth (Musick et al. 2009). This species is inherently vulnerable to overexploitation due to its low rate of population increase (NRDC 2011). Dusky sharks species undertake seasonal migrations in response to changing water temperature (NOAA 2011). On both coasts of the U.S. this species migrates north in summer when waters warm then returns south in fall (NOAA 2011, NRDC 2013). Food items include herring, eels, mullet, groupers, grunts, croakers, bluefish, mackerel, tunas, various flatfish, a variety of sharks, skates and rays, crabs, octopuses, squid, starfish and sometimes human refuse (Gelsleichter et al. 1999).

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

Threats to NY Population	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (illegal harvest)
4. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fishing)
5. Energy Production & Mining	Renewable Energy (offshore wind energy)

Although this species is prohibited in United States and Canadian fisheries, there is still high bycatch mortality (Musick et al. 2009). The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate change and other present threats, particularly bycatch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

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:

Dusky sharks have been designated as a prohibited species, meaning there is a ban on commercial and recreational harvest for this species, since 2000 with the implementation of the 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks.

In 2017, the Dusky Shark was listed on Appendix II of the Convention on Migratory Species.

This species is listed on Appendix II of CITES, which regulates its harvest and trade.

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

The New York State Wildlife Action Plan (NYSDEC 2005) identifies recommendations for conservation/management actions for pelagic shark species:

- Develop fact sheets for distribution to commercial and recreational fisherman regarding the well being of the pelagic shark stocks.

- Conduct literature review to determine the pupping and juvenile habitat requirements for pelagic coastal sharks in the Middle Atlantic bight.

- Modify New York's regulations as necessary to conform to the federal protection of sharks.

- Initiate a volunteer shark data collection program which would collect additional catch and biological information from New York's recreational anglers.

- Develop appropriate webpage information relative to the shark species found in the Mid-Atlantic bight and their status.

To allow recovery, it is recommended that Dusky Shark retention and landings be prohibited as long as the global population is classified as Endangered (or above). Short of that, regional and national limits on catch based on scientific advice and/or the precautionary approach, improved reporting of catch and discard data, efforts to minimize bycatch mortality, and promotion of safe release protocols are urgently needed, as is full implementation of commitments agreed through international treaties (Rigby 2019).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1. Land/water protection	Site/area protection
2. Species management	Harvest management

Table 2: Recommended conservation actions for dusky shark.

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Originally prepared by	Jim Katz
Date first prepared	April 25, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Giant Oceanic Manta Ray **Date Updated:** 12/4/2023

Scientific Name: *Mobula birostris* **Updated by:** Tajrian Sarwar (MISC)

Class: Chondrichthyes

Family: Mobulidae

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

This species has recently undergone several taxonomic changes. Previously *Manta bistrosis* was believed to be a singular species, but reevaluation supported by genetic analysis identified two separate species – the Giant Oceanic Manta Ray (*Mobula birostris*) and the Reef Manta Ray (*Mobula alfredi*) (Fricke 2020). The Giant Oceanic Manta Ray is the largest species of ray, it is a highly migratory species, and has a circumpolar distribution in tropical and temperate waters throughout the Atlantic, Indian, and Pacific Oceans, from the surface to a depth of 1,000 meters (Marshall et al. 2022, Couturier et al. 2012). They are a filter feeding species that use modified gill rakers to filter plankton and small fish from the water (Dewar et al. 2006, Couturier et al. 2012). In the western Atlantic the Giant Oceanic Manta Ray ranges from South Carolina southward to Brazil and Bermuda; occasionally the giant manta ray will be seen as far north along the Atlantic Coast as New Jersey (Marshall et al. 2011). This species is commonly seen along productive coastlines with regular upwelling, oceanic island groups, offshore pinnacles, and seamounts (Marshall et al. 2022). There are no records of this species off the coast of New York. There are little data available regarding this species globally, let alone in the Northwestern Atlantic making it difficult to determine trends; however, it is likely in decline as most local populations are experiencing a decline from overexploitation (Marshall et al. 2011, CITES 2013). This species has an extremely low rate of reproduction, producing an average of one pup every 4-5 years. Very rapid declines have been reported in parts of the world where the Giant Oceanic Manta Ray is targeted (especially for its valuable gill plates) or taken as bycatch in artisanal small-scale fisheries, but populations appear stable in nations where protections for this species are in place (Marshall 2022). This species was listed as threatened under the Endangered Species Act in 2018 and was listed as Endangered by the IUCN in 2020 (Marshall 2022).

I. Status

a. Current legal protected Status

i. **Federal:** ESA Threatened **Candidate:** No

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** G3 Vulnerable

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered

-Northeast Regional SGCN:

Status Discussion:

The Giant Oceanic Manta Ray is protected under CITES Appendix II, the ESA has listed this species as federally threatened, and the IUCN has listed this species as endangered as it has

experienced drastic declines due to its inherent vulnerabilities to overexploitation. Aggregations of this species are highly separated, and this species is known to undertake large-scale migrations, which makes population estimates difficult. Furthermore, due to the recent taxonomic changes, both present day and historical reports can often be unclear and without adequate descriptions, photographs or geographic locations, it can be difficult to conclusively attribute fisheries data to a single species (Marshall 2022). Generally, populations are stable in areas where this species is protected, like in Hawai'i and Ecuador, while populations are declining significantly in areas the Giant Oceanic Manta Ray is targeted or taken as bycatch (Marshall 2022).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown	Last 10 years (Marshall et al. 2011)		Choose an item.
Northeastern US	No data	Unknown	Unknown	Last 10 years (U.S. Atlantic Coast)		Choose an item.
New York	No data	Unknown	Unknown	Never documented in NY waters		No
Connecticut	No data	Unknown	Unknown			No
Massachusetts	No data	Unknown	Unknown			No
New Jersey	No data	Unknown	Unknown			No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

There are no surveys or monitoring activities for this species in New York. Few dedicated surveys for manta rays exist in the Eastern US; however, due to their large size and distinct appearance, they are often observed and recorded during visual aerial surveys that target marine mammals and sea turtles (Farmer 2022).

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

Although sparse, the available data suggest that localized populations of the Oceanic Manta Ray have been rapidly depleted by target fisheries in some regions and that local extinction is suspected to have occurred in many parts of their historical range. Population trends appear to be stable in other regions where this species is protected. Abundance trends vary greatly as Oceanic

Manta Ray aggregation sites are widely separated, and the recent taxonomic changes for this species further complicates estimates of abundance, especially in regards to historical data (Marshall 2022).

Figure 1. Global distribution of the Giant Oceanic Manta Ray (IUCN 2018)

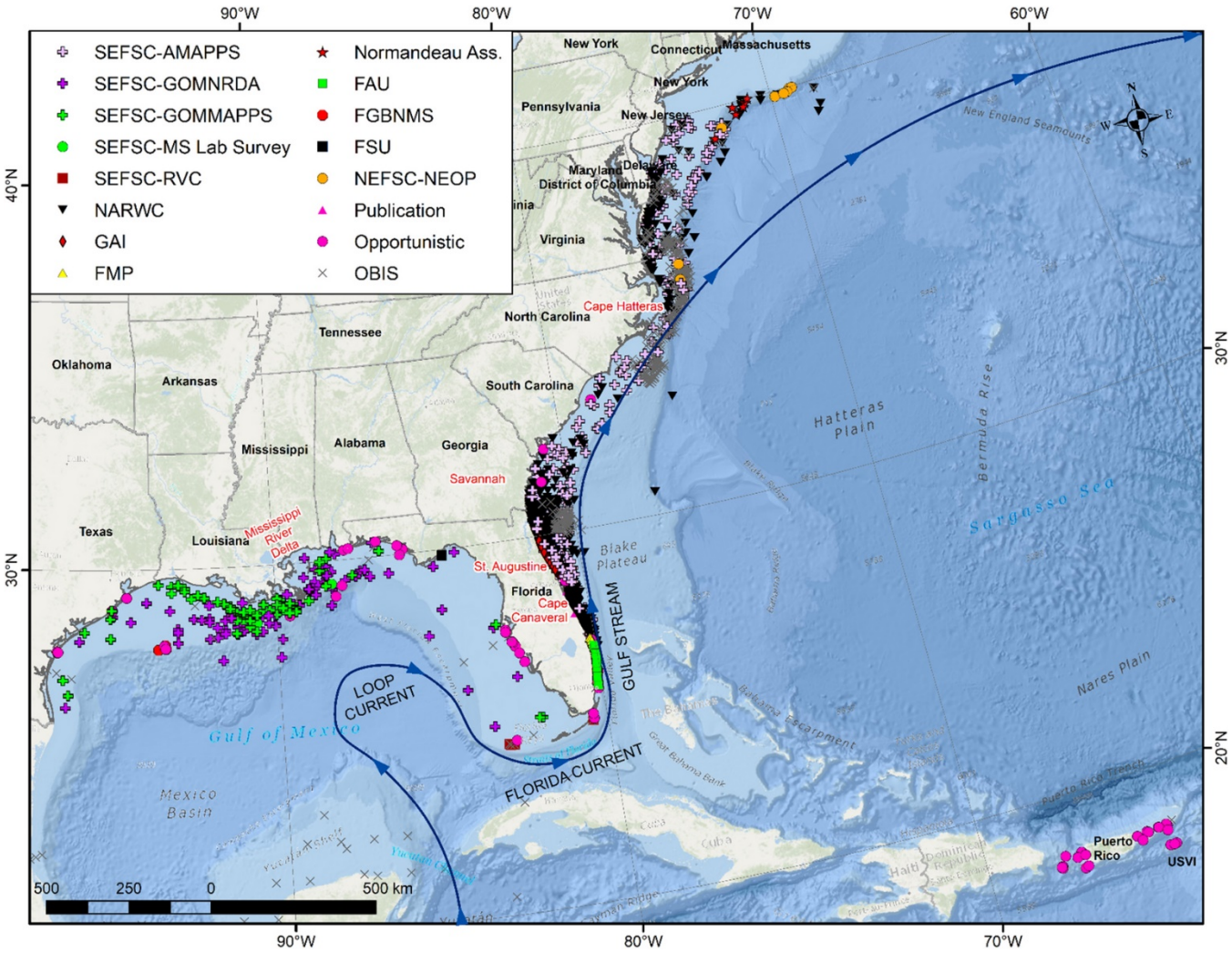

Figure 2. Reported sightings of manta rays (1925–2020) relative to regional landmarks and ocean currents (Farmer 2022)

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

This species is rare throughout its range. There are individual subpopulations globally that are centered on suitable habitat where individuals return (Marshall et al. 2011). Subpopulations are estimated to consist of 100 to 1,000 individuals, but congregations of greater than 30 individuals rarely occur (Marshall et al. 2011) and global population numbers are unknown (CITES 2013). Coastal New York is the northern range limit for the Giant Oceanic Manta Ray in the Northwest Atlantic, and there has been one recorded individual off Jones Beach in summer of 2023.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of giant oceanic manta ray in New York.

Details of historic and current occurrence:

There is no historic occurrence information available for this species.

One giant oceanic manta ray has been observed in the Atlantic Ocean off of Jones Beach, Long Island in summer of 2023.

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	~1000 miles

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

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:

The Oceanic Manta Ray occurs in tropical, sub-tropical and temperate waters of the Atlantic, Pacific, and Indian oceans, where it is associated with places which experience regular upwelling along coastlines, oceanic island groups, offshore pinnacles, and seamounts (Marshall et al. 2022). The Oceanic Manta Ray can exhibit diel patterns in habitat use, moving inshore during the day to clean and socialize in shallow waters, and then moving offshore at night to feed to depths of 1,000 meters (Hearn *et al*. 2014, Burgess 2017).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

Little information is available describing the life history and demographics for the Giant Oceanic Manta Ray. This species is suspected to make significant migrations that are associated with seasonal food availability, but they rarely move across ocean basins (Marshall et al. 2011, Couturier et al. 2012). They also undertake diurnal migrations, moving to coastal waters during the day (Dewar et al. 2008, Couturier et al. 2012). Giant Oceanic Manta Rays can reach a disc width of 23 feet, with anecdotal records of individuals reaching 29.5 feet (Marshall et al. 2011, White et al. 2006). Reproduction in this species is aplacental viviparous where embryos develop in the uterus feeding on yolk then are nourished by uterine milk secreted by the mother (Marshall et al. 2011, Couturier et al. 2012). Females give birth to one pup and are thought to mature at 8 to 10 years of age, though first pregnancy may be delayed depending on food availability (Marshall et al. 2022, Couturier et al. 2012). This species may live to at least 40 years, as individuals have been seen 20 years after initial identification (Marshall et al. 2022, Couturier et al. 2012). Giant manta rays often breach the surface, but it is uncertain why (Dewar et al. 2006, Marshall et al. 2011). The species is among the longest-living rays and has an extremely conservative life history; the average Oceanic Manta Ray may produce only 4–7 pups during its estimated lifespan, which would contribute to its slow recovery from population reductions due to over-exploitation or other threats (Marshall 2022).

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

This species faces no threats in New York, as it has never been documented in New York waters.

Where it occurs, the giant manta ray is exceptionally vulnerable to fisheries exploitation, as it is a valuable commodity in Asian markets (Marshall et al. 2011, Couturier et al. 2012). This vulnerability is exacerbated by its slow life history and occasional presence as bycatch in other fisheries, likely making recovery from overexploitation difficult (Marshall et al. 2011). Other threats such as mooring line entanglement and boat strikes can wound manta rays, decreasing fitness or causing non-natural mortality (Deakos et al. 2011). Many other threats have been suggested and identified including habitat degradation, climate change, pollution, ingestion of micro plastics, and irresponsible tourism practices (Marshall et al. 2011).

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:

This species is listed on Appendix II of CITES which regulates its harvest and trade.

This species is listed as Threatened under the Endangered Species.

This species is listed as Endangered by the IUCN.

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

Management and conservation actions for this species are not described in the literature. The New York State Wildlife Action Plan (NYSDEC 2005) identifies general conservation/management actions for rays including:
- Develop fact sheets for all species of skates and rays found in or near to New York's Territorial waters.
- Participate in programs to obtain new biological information relative to this species complex for those species found in harvested or landed in New York.

- Implement new rules and regulations as necessary and appropriate consistent with rules and regulations implemented by National Marine Fisheries Service.
- Support existing monitoring and develop as necessary new biological monitoring for this species.
- Develop webpage information about the species in this complex.

Efforts should be put in place to reduce the unintentional capture of these rays and when they are caught, protocols should be in place for their safe release, to reduce the chances of post-release mortality (Marshall 2022).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2: Recommended conservation actions for giant oceanic manta ray.

VII. References

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Originally prepared by	Jim Katz
Date first prepared	April 18, 2013
First revision	
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Little skate **Date Updated:** 12/4/2023

Scientific Name: *Leucoraja erinacea* **Updated by:** Tajrian Sarwar, MISC

Class: Chondrichthyes

Family: Rajidae

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

The little skate has a relatively narrow distribution, occurring only in the Northwest Atlantic from Grand Banks, Canada to Cape Hatteras, NC. It is considered a shallow water species, occurring inshore to depths of 90 meters (Kyne et al. 2009). Its center of distribution lies in the northern section of the Mid-Atlantic Bight and in Georges Bank, where individuals are found year-round at almost the entire temperature range recorded for this region (Packer et al. 2003). Little skate are most abundant in the Long Island Sound and Hudson-Raritan Estuary during fall and spring, with lowest numbers of occurrence during summer months (Packer et al. 2003). This species is commercially targeted for lobster bait and landed as by-catch. In the U.S., this species is managed by the New England Fishery Management Council (NEFMC) under the Northeast Skate Complex Fishery Management Plan (FMP). Overall, survey data covering most of this species' range indicate that the population is stable and likely to be increasing (Kulka 2020).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed, SGCN

b. Natural Heritage Program

i. **Global:** G5

ii. **New York:** Not ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Least Concern

-Northeast Regional SGCN:

Status Discussion:

The lack of information on sexual maturity coupled with recent declines in biomass warranted a precautionary assessment of Near Threatened by the IUCN in 2009 (Kyne et al. 2009). However, reevaluation of this species in 2019 suggests that there have been increases in CPUE and relative abundance, and recent assessments by the IUCN indicates that the Little Skate is not experiencing population decline nor is it suspected to be close to reaching the population reduction threshold. Therefore, the Little Skate has been listed as Least Concern by the IUCN (Kulka 2020).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Increasing	Stable	2000-present		Choose an item.
Northeastern US	Yes	Increasing	Stable	2000-present (Mid-Atlantic Bight)		Choose an item.
New York	Choose an item.	Stable	Stable	2000-present		Choose an item.
Connecticut	Choose an item.	Declining	Unknown	2000-present	Not Listed	Yes
Massachusetts	Choose an item.	Declining	Unknown	2000-present	Not Listed	No
New Jersey	Choose an item.	Declining	Unknown	2000-present	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	Yes	Declining	Unknown	2000-present	Not Listed	Choose an item.

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):*

Northeast Fishery Science Center (NEFSC) trawl surveys are conducted from the Gulf of Maine southward to Cape Hatteras, NC, recording catch of little skate in New York waters. The Connecticut Department of Energy and Environmental Protection (CTDEEP) conducts a yearly trawl survey in September throughout the Long Island Sound.

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

Indices of little skate abundance and biomass from the NEFSC spring survey reached a peak in 1999 and have since declined (NEFMC 2009). Autumn survey indices have been relatively stable over the duration of the time series, with a slight increase in recent years (NEFMC 2009). The 2004-2006 average biomass index of 4.59 kg/tow was above the threshold reference point (3.27 kg/tow), but 19% lower than the 2003-2005 index of 5.65 (Sosebee 2006). An increase in biomass in 2007 produced an increase in the three-year moving average, resulting in the little skate not being listed as overfished in the latest NEFMC assessment. The most recent NEFSC survey trend analysis of data spanning 36 years (1982-2018) indicates an overall yearly rate of increase of 0.9% (Kulka 2020).

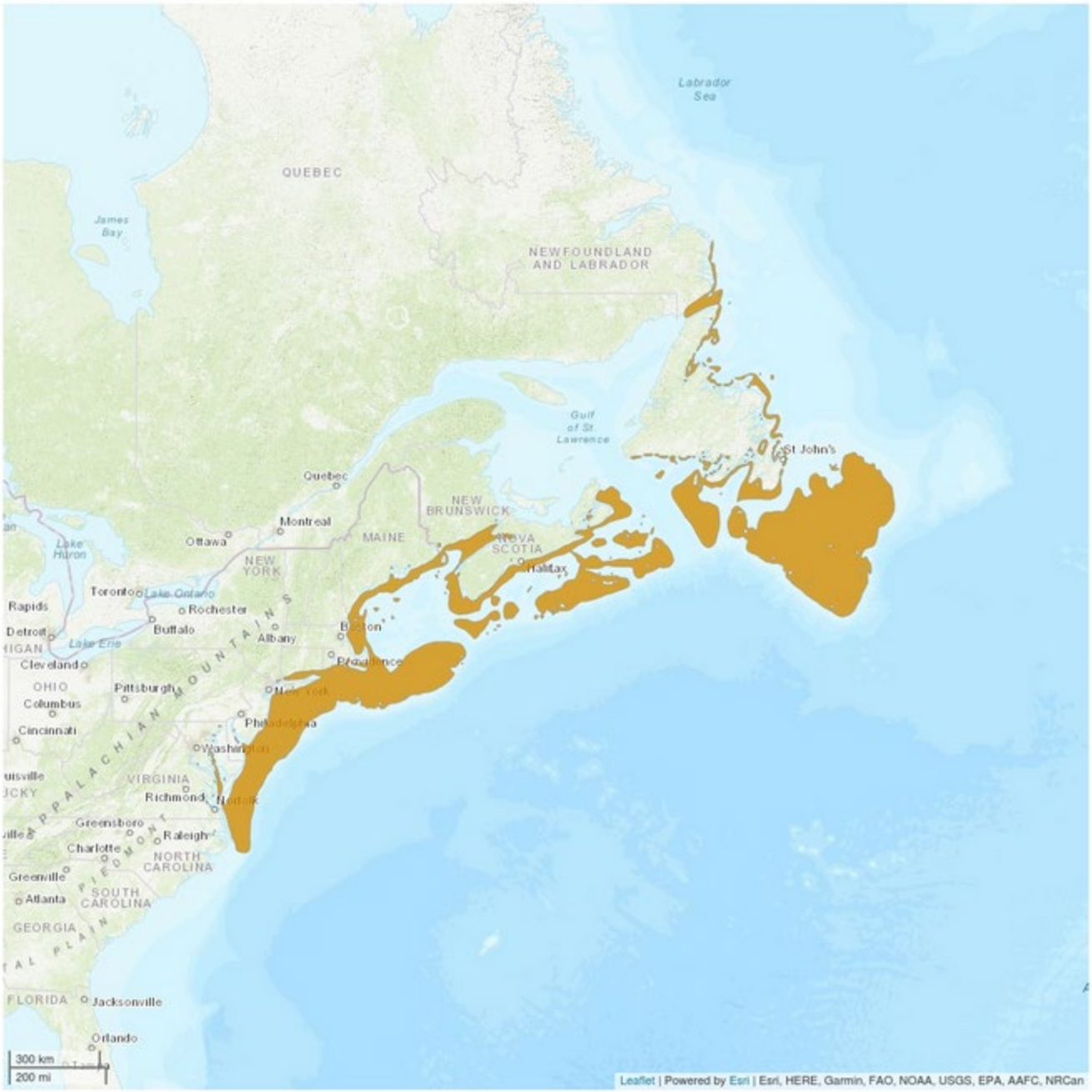

Figure 1. IUCN Red List distribution map of little skate (Kulka 2020)

Northeastern USA: Standardized CPUE (1982-2018), NOAA-NEFSC (USA), Survey kg/tow (Spring and Fall seasons).

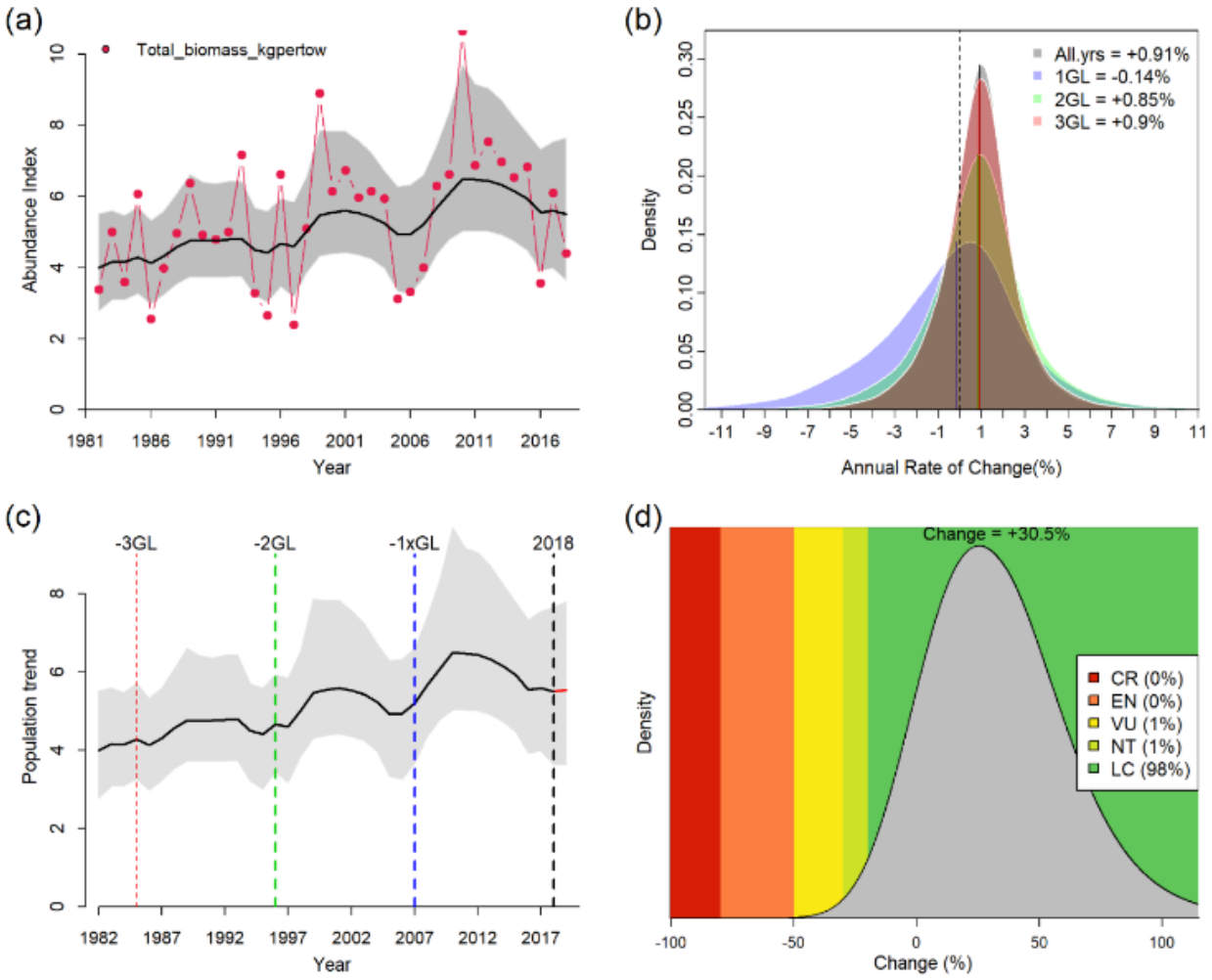

Figure 2. IUCN Red List Assessment of little skate population trends in the Northeastern USA (Kulka 2020)

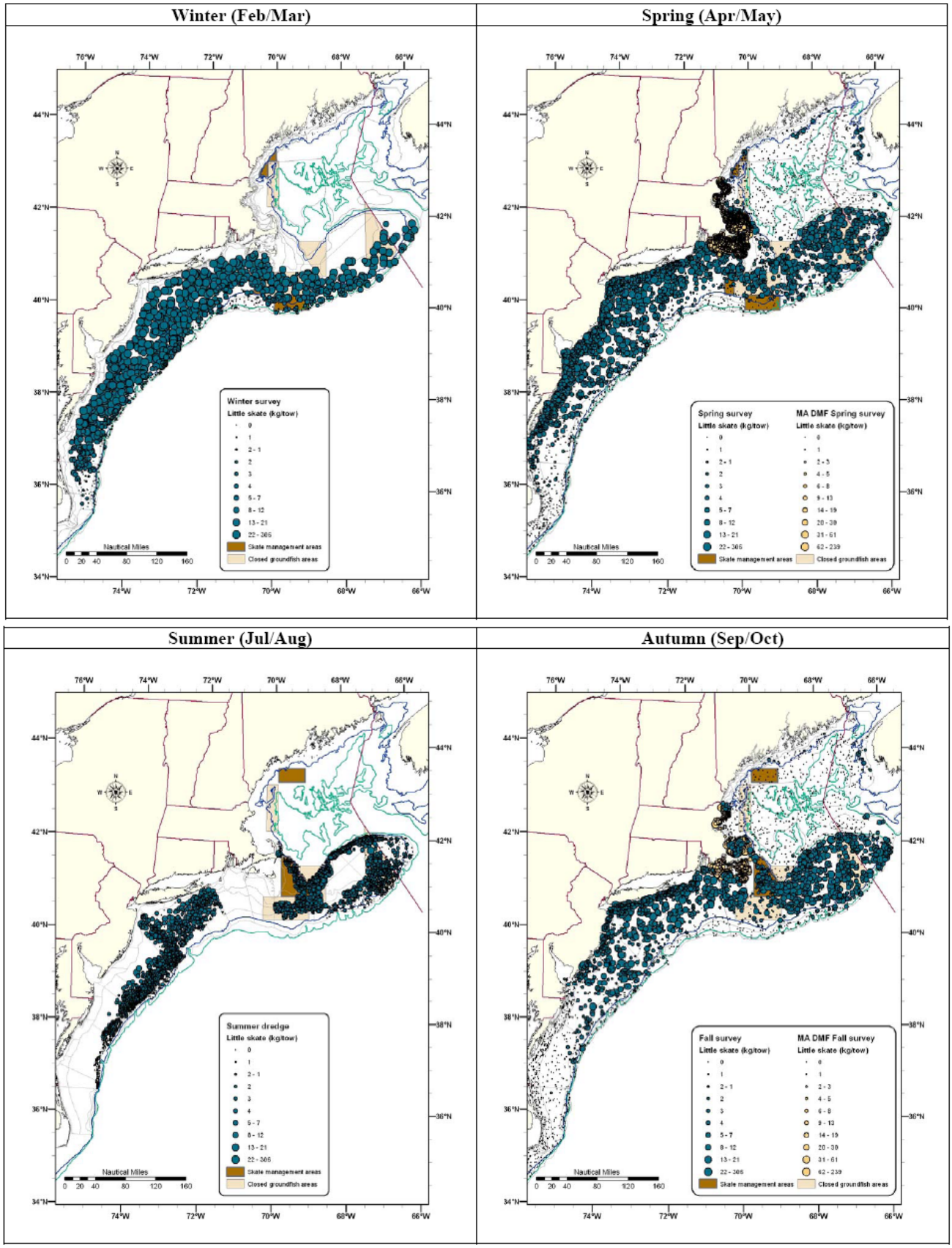

Figure 3. Little skate distribution in the Mid-Atlantic Bight during the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys (NEFMC 2009)

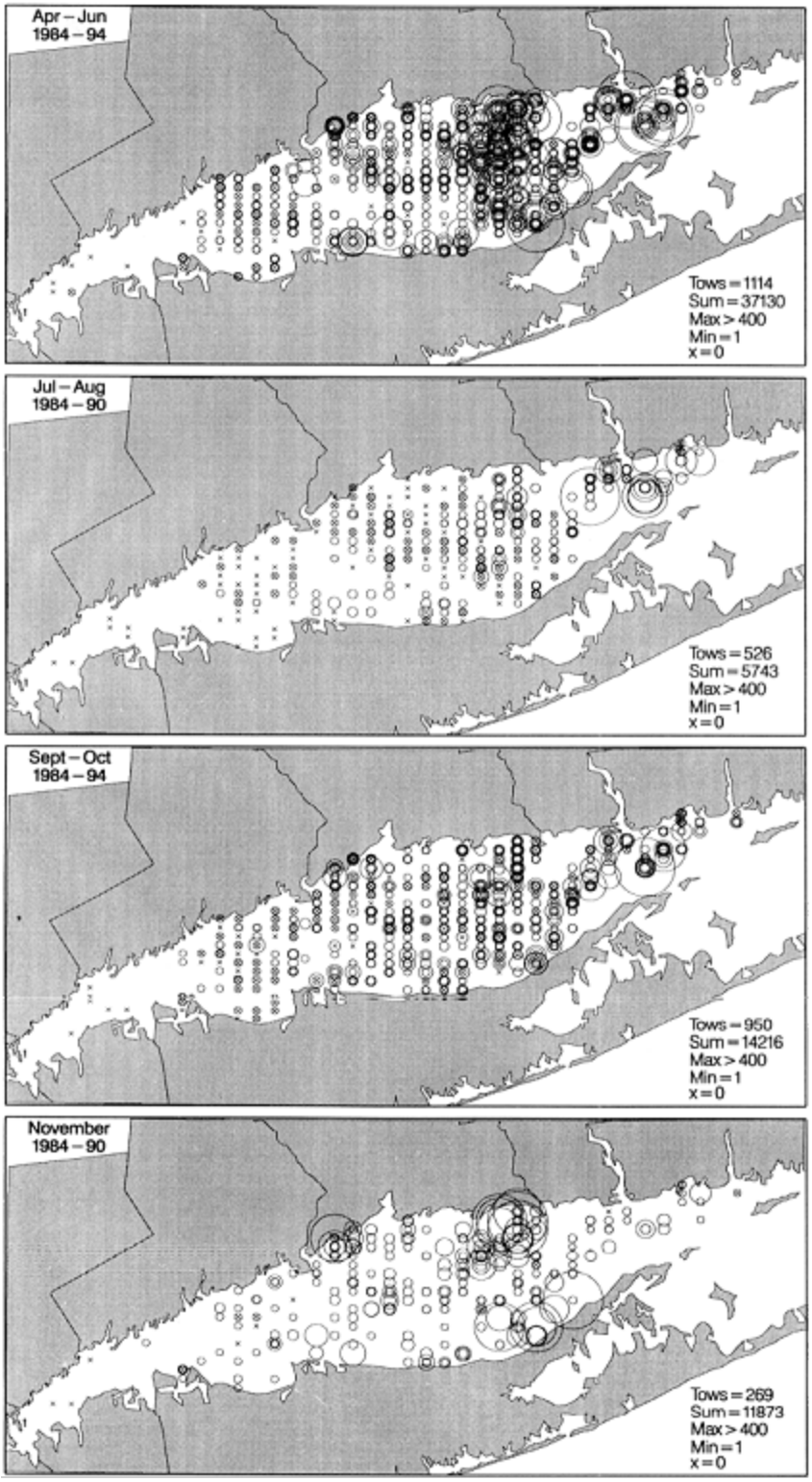

Figure 4. Distribution and abundance of juvenile and adult little skates collected in Long Island Sound, based on the finfish surveys of the Connecticut Fisheries Division, 1984-1994 (Gottschall et al. 2000)

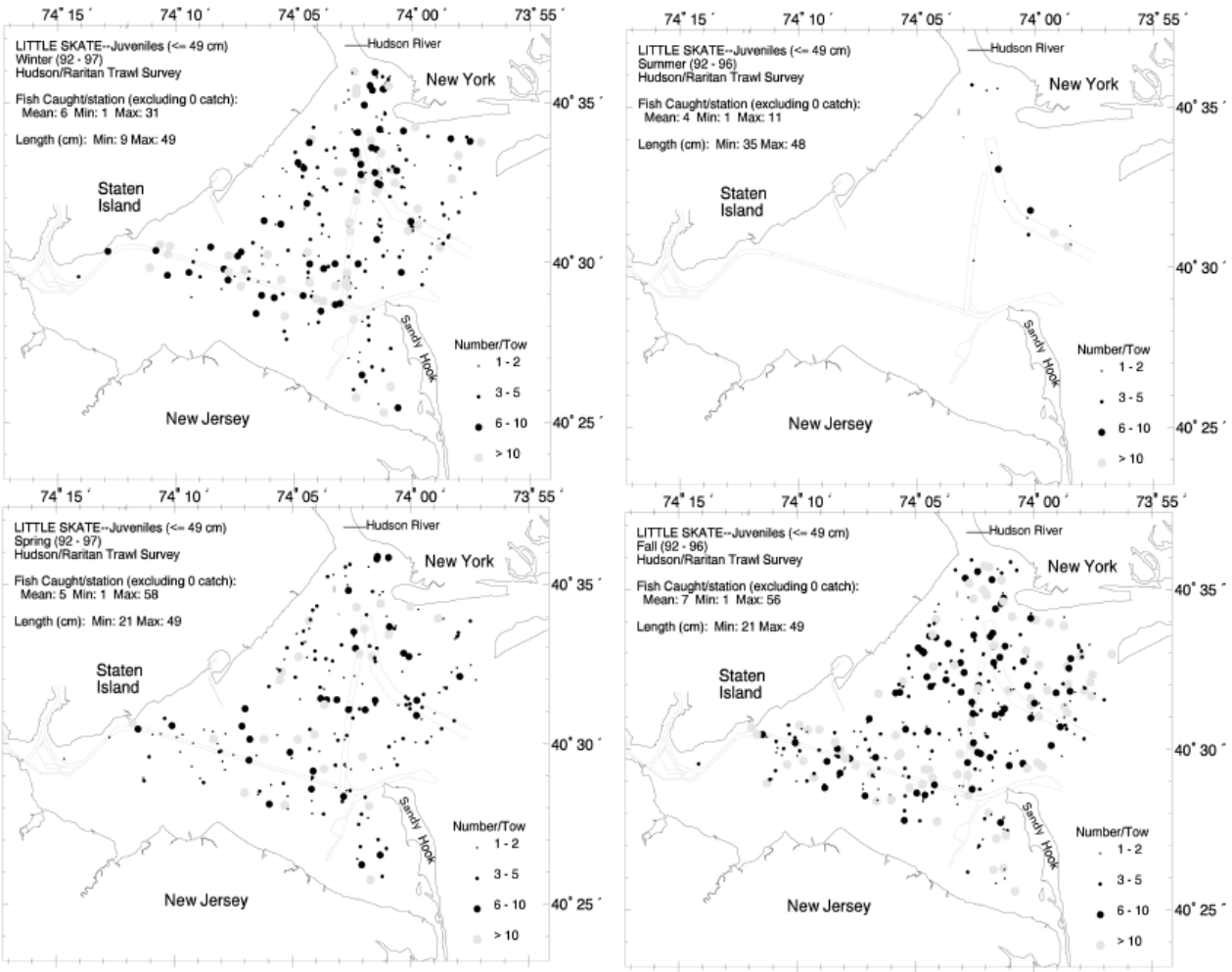

Figure 5. Seasonal distribution and abundance of juvenile winter skate in the Hudson-Raritan estuary, based on Hudson-Raritan trawl surveys, 1992-1997 during summer (top left), winter (top right), spring (bottom left), and fall (bottom right) (Packer et al. 2003)

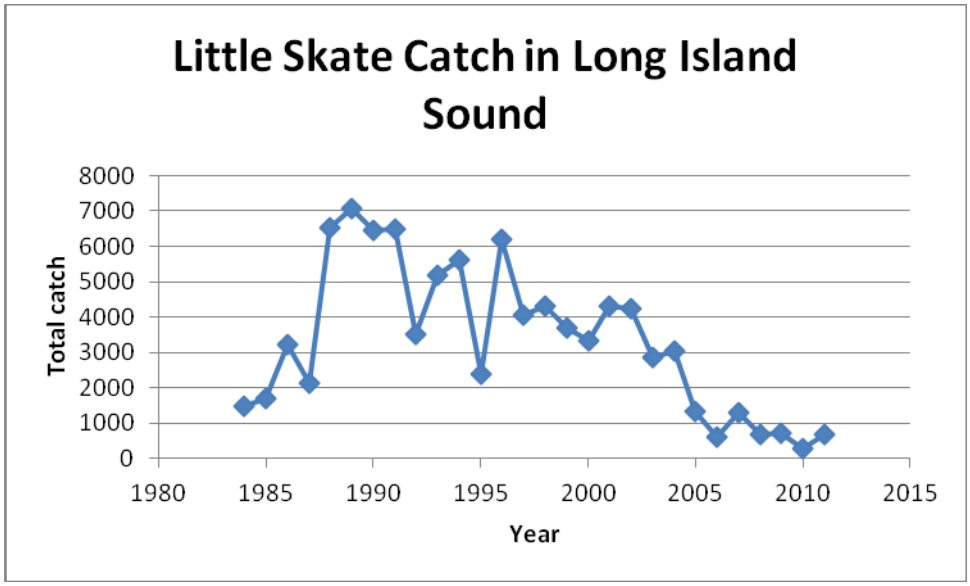

Figure 6. Total catch of little skate in Long Island Sound, 1984-2011, from the CTDEEP trawl surveys (CTDEEP 2012)

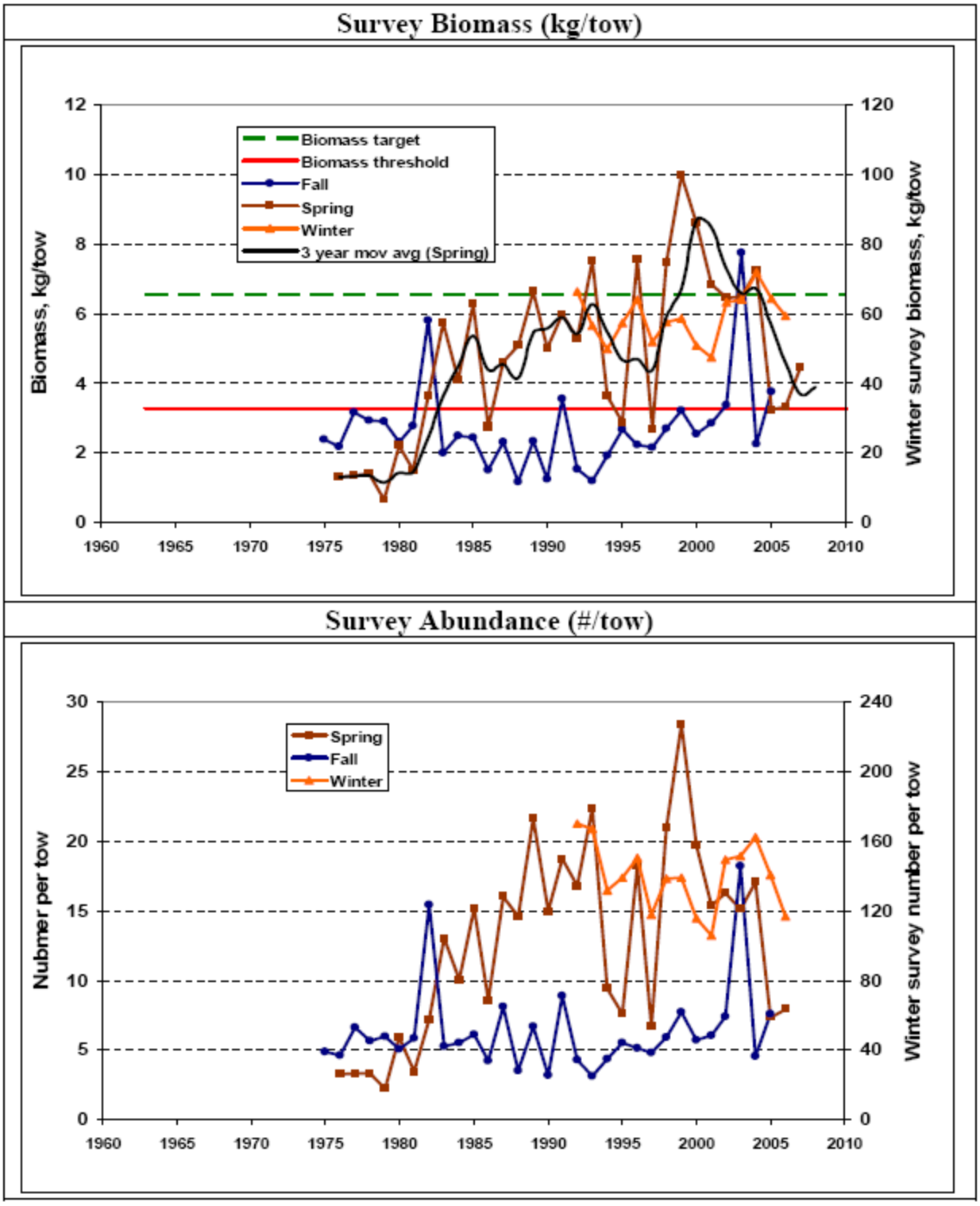

Figure 7. Little skate stratified mean weight (top) and number per tow (bottom) for the winter, spring and fall Northeast Fishery Science Center (NEFSC) trawl surveys, Gulf of Maine to Cape Hatteras (NEFMC 2009)

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

Little skate are one of the dominant members of the demersal fish community in the Northwestern Atlantic Ocean with its center of abundance in the Mid-Atlantic Bight and on Georges Bank (Packer et al. 2003). They are most abundant in the Long Island Sound and Hudson-Raritan estuary during fall, winter, and spring months.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of little skate in New York.

Details of historic and current occurrence:

Historic: McEachran and Musick (1975) reported little skate presence in the Hudson-Raritan estuary in waters < 16-18˚C and Richards (1963) noted little skate at two stations in the Long Island Sound. Schaefer (1967) collected little skate in the surf waters of Long Island during spring and summer while more recent surveys of the Long Island Sound (Gottschall et al. 2000) showed the little skate was most abundant in spring and fall on transitional and sand bottoms with lowest abundance in July-September.

Current: Little skate are currently present throughout the Long Island Sound and Hudson-Raritan estuary, with highest abundance occurring in fall and spring (Packer et al. 2003, CTDEEP 2012).

Little skates are distributed in state ocean waters and federal waters of the NY Bight as evidenced by the DEC nearshore survey and NEFSC bottom trawl. Catches of little skate appear to be declining in the CT DEEP trawl.

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%	Core	

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, Deep, Subtidal

b. Marine, Shallow Subtidal

c. Estuarine, Brackish Deep Subtidal Pelagic

d. Marine, Deep Subtidal, Benthic Geomorphology, Benthic Flat

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:

Little skate are one of the dominant members of the demersal fish community in the Northwest Atlantic Ocean, occurring from shallow inshore waters out to depths of 350 meters with highest abundance at < 90 meters (Packer et al. 2003). Its center of abundance is the northern section of the Mid-Atlantic Bight and on Georges Bank, where it occurs year round (Packer et al. 2003). Little skate prefer substrates of sand or gravelly bottoms, but may also be found on mud bottoms. Little skate do not undertake large-scale migrations, although they do move onshore and offshore with seasonal temperatures along the inshore fringe of its range, generally moving offshore during summer months in the Mid-Atlantic Bight (McEachran and Musick 1975). Most individuals in the Hudson-Raritan estuary are found in waters < 16-18˚C and at salinities of 20-35 ppt, and more juveniles are present in the estuary than adults (Packer et al. 2003). Invertebrates are the most important prey items for little skate, including decapods crustaceans and amphipods (Packer et al. 2003)

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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):*

Little skate produce a single fertilized egg for every capsule (mermaid's purse) and capsules are generally laid in pairs. Reproduction occurs year round with two spawning peaks, one in June and one in October (Gottschall 2000). The gestation period is at least six months and thought to be dependent upon the month of egg deposition or possibly temperature (Packer et al. 2003). The rate of egg laying in a study by Johnson (1979) varied from 0.20-0.67 eggs per day with an average rate of 0.39 eggs per day (Gottschall 2000). This species follows a latitudinal gradient of increased size and longevity and decreased growth rate with increasing latitude, meaning little skate from northern regions are larger but grow more slowly than individuals from southern regions (Frisk and Miller 2006). Age at maturity is estimated to be 6-7 years and longevity at 12 years (Frisk and Miller 2006). The most common source of mortality of little skate is from incidental by-catch and direct catch for the lobster bait fishery (Sulikowski et al. 2009).

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

Over-exploitation from commercial fishing and by-catch is the foremost threat to little skate. Bait landings in the skate complex are primarily from little skate (>90%), based on areas fished and known species distribution patterns (Sosebee 2006). Otter trawling is the primary method causing

direct and indirect little skate catch, while recreational and foreign landings are considered insignificant at <1% of the total U.S. fishery landings (Sulikowski et al. 2009). Potential effects of climate change on skate species are unknown, however changing temperatures or shifting of habitats may lead to negative effects on the little skate.

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial harvest)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)
4. Energy Production and Mining	Renewable Energy (offshore wind)

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:

Little skate have been managed in the U.S. since 2003 under the Northeast Skate Complex Fishery Management Plan (FMP), implemented by the Northeast Fishery Management Council. The FMP included catch reporting requirements, a total allowable catch (TAC) for the skate complex, and possession limits. About 2/3 of the TAC is allotted to the skate wing fishery and the remaining third is allocated for skates caught for use as bait (Kyne 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:

Enforcement of species-specific landing reporting requirements is necessary to get accurate catch data for all skate species. Implementing new rules and regulations as necessary and appropriate consistent with rules and regulations implemented by the National Marine Fishery Service will support little skate protection throughout their range. Monitoring of little skate and collection of biological data would help us better understand little skate utilization of New York waters.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.	

Table 2: (need recommended conservation actions for little skate).

VII. References

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Sulikowski, J., D.W. Kulka, and T. Gedamke. 2009. Leucoraja erinacea. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2.

Kulka, D.W., Anderson, B., Herman, K., Derrick, D., Pacoureau, N. & Dulvy, N.K. 2020. *Leucoraja erinacea*. *The IUCN Red List of Threatened Species* 2020: e.T161418A124481430. https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T161418A124481430.en. Accessed on 12 January 2024.

National Oceanic and Atmospheric Administration. 2015. Little Skate – *Leucoraja erinacea* Overall Vulnerability. *NOAA Fisheries.* Accessed on 12 January 2024. https://www.st.nmfs.noaa.gov/Assets/ecosystems/climate/images/species-results/pdfs/Little_Skate.pdf

Originally prepared by	Samantha Hoff
Date first prepared	April 24, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Longfin mako shark **Date Updated:** 12/4/2023

Scientific Name: *Isurus paucus* **Updated by:** Tajrian Sarwar, MISC

Class: Chondrichthyes

Family: Lamnidae

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

Globally, there is a lack of information regarding the abundance, distribution, and life history of the longfin mako. The longfin mako is a pelagic oceanic shark species which has a wide distribution, inhabiting tropical and warm temperate waters at depths of 760 – 1,750 meters. The longfin mako likely occurs globally, but distribution data is lacking (Rigby 2019). Locally, there is no information pertaining to their presence in New York waters. Although historical catch records of longfin mako along the U.S. Atlantic coast do exist (Dodrill and Gilmore 1979), this species is rare leading to vast uncertainty in, or a general lack of abundance estimates (Camhi et al. 2009). Additionally, the Longfin Mako is commonly misidentified as the Shortfin Mako which further complicates the assessment of this species. This species is large, reaching over four meters in length and is classified as being oceanic pelagic with low fecundity (two to eight pups per litter) (Reardon et al. 2006). However, it is known to be caught as bycatch in longline tropical pelagic fisheries, particularly offshore longlining (Queiroz et al. 2006). Further, most records of catch come from Portugal, Spain, and South Africa (Camhi et al. 2009). Based on the current information in the literature, this species is found in warmer waters far south of New York. It is possible it could be found on rare occasion in the New York Bight. However, New York specific conservation efforts would likely have no significant impact on this species. It is therefore, recommended that this species be removed from the list of Species of Greatest Conservation Need.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed

b. Natural Heritage Program

i. **Global:** G2G3 imperiled

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered A2d

-Northeast Regional SGCN:

-Convention on the Conservation of Migratory Species of Wild Animals (CMS): Appendix II

-NOAA, Fisheries: Protected under the Consolidate Highly Migratory Species Fisheries Management Plan (FMP)

Status Discussion:

The Longfin Mako is a widely distributed but apparently rare species as it is infrequently encountered. This species likely occurs circumglobally, however studies on this species' distribution are sparse. This species is very susceptible to decline due to its global rarity and low

fecundity. Deficiency of data regarding this species' distribution, abundance, and poor documentation of landings further raises serious conservation concerns, especially given that it is caught globally in targeted fisheries and as bycatch in pelagic longline, purse seine, and gillnet fisheries (Rigby 2019). The limited data available indicates that the longfin mako is experiencing strong declines, like its counterpart the shortfin mako. The longfin mako has been listed as Endangered by the IUCN for these reasons (Rigby 2019).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Choose an item.	Unknown	Unknown			Choose an item.
Northeastern US	Choose an item.	Unknown	Unknown			Choose an item.
New York	No data	Choose an item.	Choose an item.		Not Listed	No
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No data	Choose an item.	Choose an item.		Not Listed	No
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Choose an item.	Choose an item.		Not Listed	No
Quebec	No data	Choose an item.	Choose an item.		Not Listed	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 longfin mako shark or any other shark species.

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

The longfin mako is listed as vulnerable globally due to its low fecundity and global rarity. Since it is caught as bycatch in the same fisheries as the shortfin mako, it is assumed to be experiencing a similar decline in abundance as the shortfin mako. Confusion between the two species often occurs and is most likely contributing to severe underreporting of longfin mako catch (Rigby 2019, Camhi et al. 2009). There are no data for the total abundance, population size, or population structure for the Longfin Mako. The only population data that is available for this species is standardized CPUE observer data in the Western Atlantic Ocean from the United States pelagic

longline fishery. Based on this data, trend analyses estimate that Longfin Mako populations in the Northwestern Atlantic have experienced significant declines of 93.5% over 75 years (Rigby 2019).

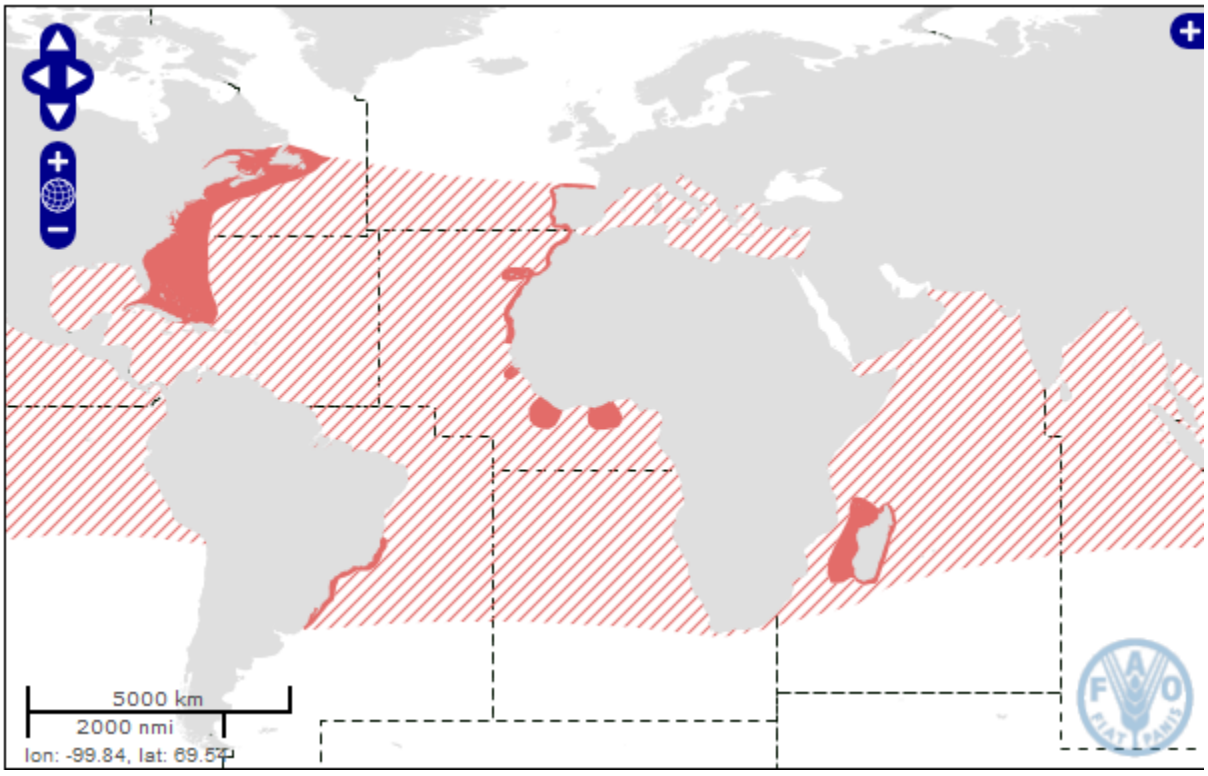

Figure 1. Global distribution of the longfin mako shark, *Isurus paucus* (FAO 2013)

North Atlantic: CPUE (1992–2015), Northwest Atlantic, USA longline fishery, Delta GLM.

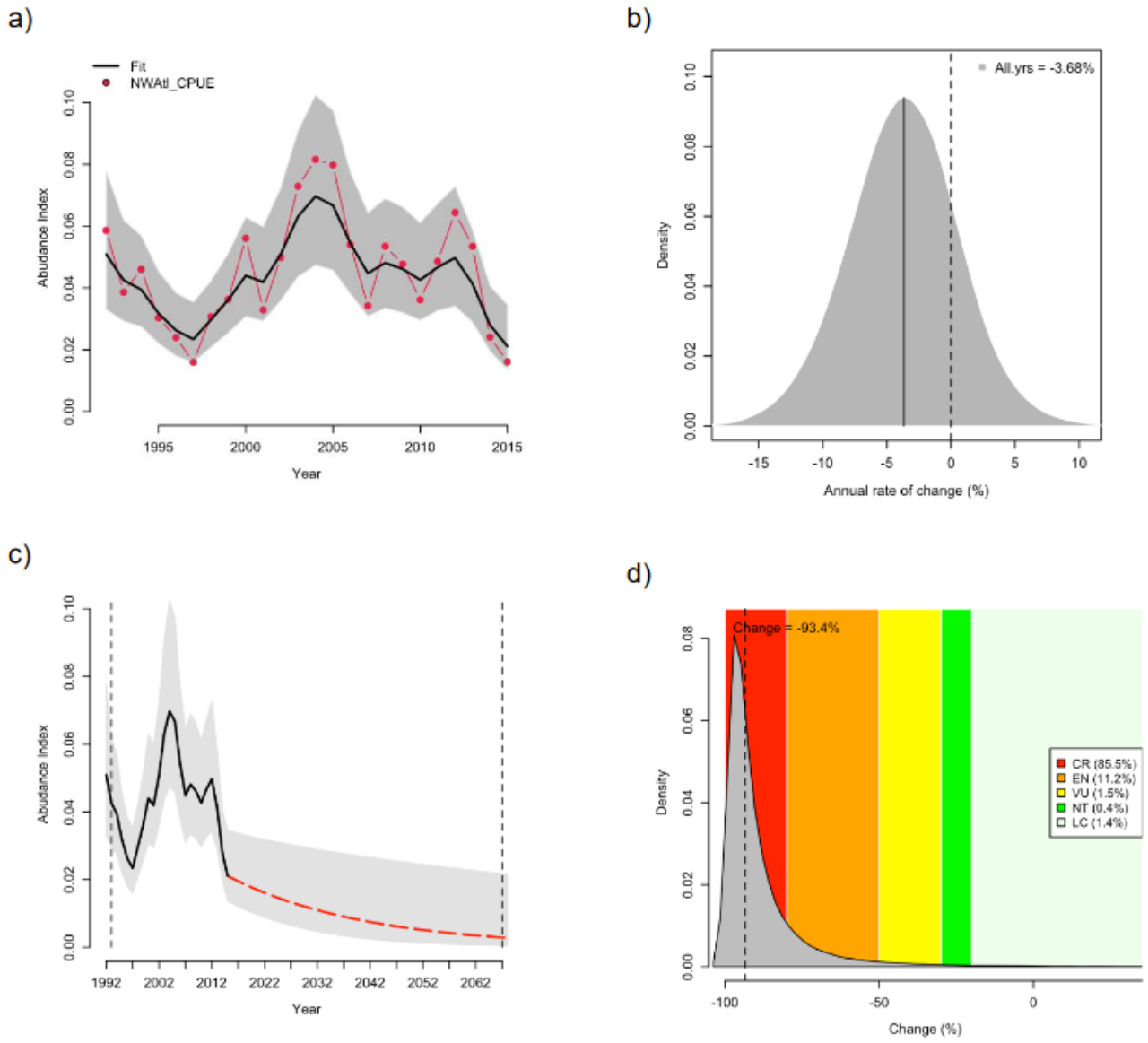

Figure 2: IUCN Red List Assessment of Longfin Mako population trends in the Northwest Atlantic (Rigby 2019)

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

Longfin makos are considered globally rare (Reardon et al. 2006).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			

2015-2023			

Table 1: Records of longfin mako shark in New York.

Details of historic and current occurrence:

The historic occurrence of longfin mako sharks in New York waters is unknown. However, there are no confirmed sightings or records of catches of this species in New York waters.

The current occurrence of longfin mako sharks in New York waters is unknown. Based on life history and global catch records, it is believed to be found further south and generally not in New York waters.

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, Deep Subtidal

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Choose an item.	Choose an item.	Unknown	

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:

Longfin mako sharks are a pelagic oceanic species, and occur in tropical, subtropical and warm-temperate waters. They possibly occur circumglobally, and they are known to occupy deep water; their range of depth has been recorded to be between 760 – 1750 meters.(Rigby 2019, Camhi 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	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

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):*

Little is known about this species' life history. They are ovoviviparous and exhibit oophagy, meaning they feed on unfertilized eggs supplied by the mother while inside the womb. Generally, two to eight pups per litter are born, suggesting low fecundity. These are large sharks reaching a length of four meters (Reardon et al. 2012).

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

Longfin mako sharks are caught as bycatch in tropical pelagic longline and hook and line fisheries. Although their meat is not of high quality, their fins are used in the shark fin trade. Oil from their livers is also valuable due to its high concentration of Vitamin A. Since longfin makos are rare and caught as bycatch in a similar fashion to shortfin makos, and since shortfin makos are experiencing declines in abundance, it is assumed that longfin makos are experiencing a decline in abundance as well. More and better data is needed to assess the status of this species with any level of certainty. Confusion between shortfin and longfin makos may be leading to gross underreporting of the longfin mako catch (Camhi et al. 2009). Shortfin mako harvest is permitted in U.S. waters, and confusion with the species may potentially be leading to the unintentional harvest and landings of longfin mako sharks.

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing and Harvesting Aquatic Resources (bycatch)
2. Biological Resource Use	Fishing and Harvesting Aquatic Resources (illegal harvest)
3. Climate Change and Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)

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:

Since the late 1990s, commercial and recreational fishing of longfin mako sharks has been prohibited in the U.S. Atlantic and Gulf of Mexico (Camhi et al. 2009). Possession of longfin mako sharks is prohibited in New York State (NYSDEC 2013). They are also protected federally by NOAA, Fisheries through their listing as a prohibited species under the Consolidated Highly Migratory Species Fisheries Management Plan. In 2008, the Longfin Mako was listed on Appendix II of the Convention on Migratory Species (CMS). The United States adopted a precautionary ban on retention of Atlantic Longfin Mako in 1999. There are no other known species-specific Longfin Mako catch limits.

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

The IUCN recommends that Longfin Mako are prohibited for commercial harvest so long as they are categorized as endangered. Improved data collection methods, a better understanding of life

history traits and global/regional distribution trends, along with accurate abundance estimates are also needed in order to properly conserve this species. International cooperation is essential for implementation of protections of this species, as it is so widely distributed.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.	

Table 2: (need recommended conservation actions for longfin mako shark).

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Originally prepared by	Caitlin Craig
Date first prepared	May 21, 2013
First revision	May 21, 2013
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Porbeagle shark **Date Updated:** 12/4/2023

Scientific Name: *Lamna nasus* **Updated by:** Tajrian Sarwar, MISC

Class: Chondrichthyes

Family: Lamnidae

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

The porbeagle (*Lamna nasus*) is a large cold-temperate pelagic shark species with a disjointed distribution, occurring in the North Atlantic and in the South Atlantic, South Indian and South Pacific Oceans; genetic analysis indicates that the North Atlantic and Southern Hemisphere populations are distinct subpopulations. In the western Atlantic this species can be found from Newfoundland, Canada to North Carolina and from Iceland and the western Barents Sea to Morocco and the Mediterranean in the eastern North Atlantic (Natanson et al. 2002, Campana and Joyce 2004). The Atlantic population is further divided into the following stocks by the International Commission for the Conservation of Atlantic Tunas: NE, NW, SE, and SW Atlantic (ICCAT 2022). This species is in decline due to decades of overexploitation and low biological productivity, and it has been listed as vulnerable by the IUCN, (Rigby 2019). The porbeagle is likely rare in New York waters, as the state is close to the southern limit of the range for the northern Atlantic population (NYSDEC 2005).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed, SGCN

b. Natural Heritage Program

i. **Global:** Not Ranked

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable A2bd

-Northeast Regional SGCN:

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Endangered (01May2004)

- CITES Appendix II

- CMS Appendix II

Status Discussion:

This species is protected by CITES as of March 2013 because its life history characteristics, especially late maturity and low fecundity, which render this species particularly vulnerable to overexploitation. This wide-ranging oceanic shark is the only representative of its genus in the North Atlantic. It is absent in the North Pacific, which the Salmon Shark occupies. The Porbeagle has experienced large reductions across both the North Atlantic and the Southern Hemisphere subpopulations, but the North Atlantic population has declined to a far greater degree than the Southern Hemisphere population (Rigby 2019). As of 2009, the Northwest Atlantic Porbeagle population has been estimated to be 22-

27% of the 1961 population, but assessment of biomass indicates that this population is experiencing continued population growth (Curtis 2016).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	Past 20 years		Choose an item.
Northeastern US	Yes	Declining	Stable	Past 20 years (NW Atlantic)		Choose an item.
New York	Yes	Declining	Stable	Past 20 years		Choose an item.
Connecticut	Yes	Declining	Declining	Past 20 years	Not Listed	No
Massachusetts	Yes	Declining	Declining	Past 20 years	Not Listed	No
New Jersey	Yes	Declining	Declining	Past 20 years	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	Yes	Declining	Declining	Past 20 years	Not Listed	Choose an item.
Quebec	Yes	Declining	Declining	Past 20 years	Not Listed	Choose an item.

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):*

Currently no survey or monitoring activities for this species exist in New York, but this species is monitored by ICCAT.

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

This species is in decline, but declines are most severe in the northern Atlantic population. The species underwent massive declines during the 1960s, crashing in 1967 from overharvesting (Campana et al. 2002, Stevens et al. 2006). Canada reduced its quotas to 350 metric tons in an attempt to allow the population to recover (Campana et al. 2002). After a slight rebound in the 1970s and 1980s, unsustainable targeted fisheries during the 1990s reduced the population to well below baseline levels (Stevens et al. 2006). It is estimated that 90% of the sexually mature population has been lost (Campana et al. 2002). In 2004, the porbeagle was designated an endangered species by COSEWIC and in March 2013 it was listed in Appendix II of CITES. As of 2009, the North Atlantic Porbeagle population was estimated to be at 37% of the biomass of this species in 1961, and that with the current low fishing mortality, the stock is slowly recovering (ICCAT 2010). A 2020 stock assessment for the porbeagle by ICCAT indicates that neither the

North Atlantic and South Atlantic stocks are experiencing overfishing and suggest that the NW Atlantic stock has been rebuilding since 2001 (ICCAT 2022).

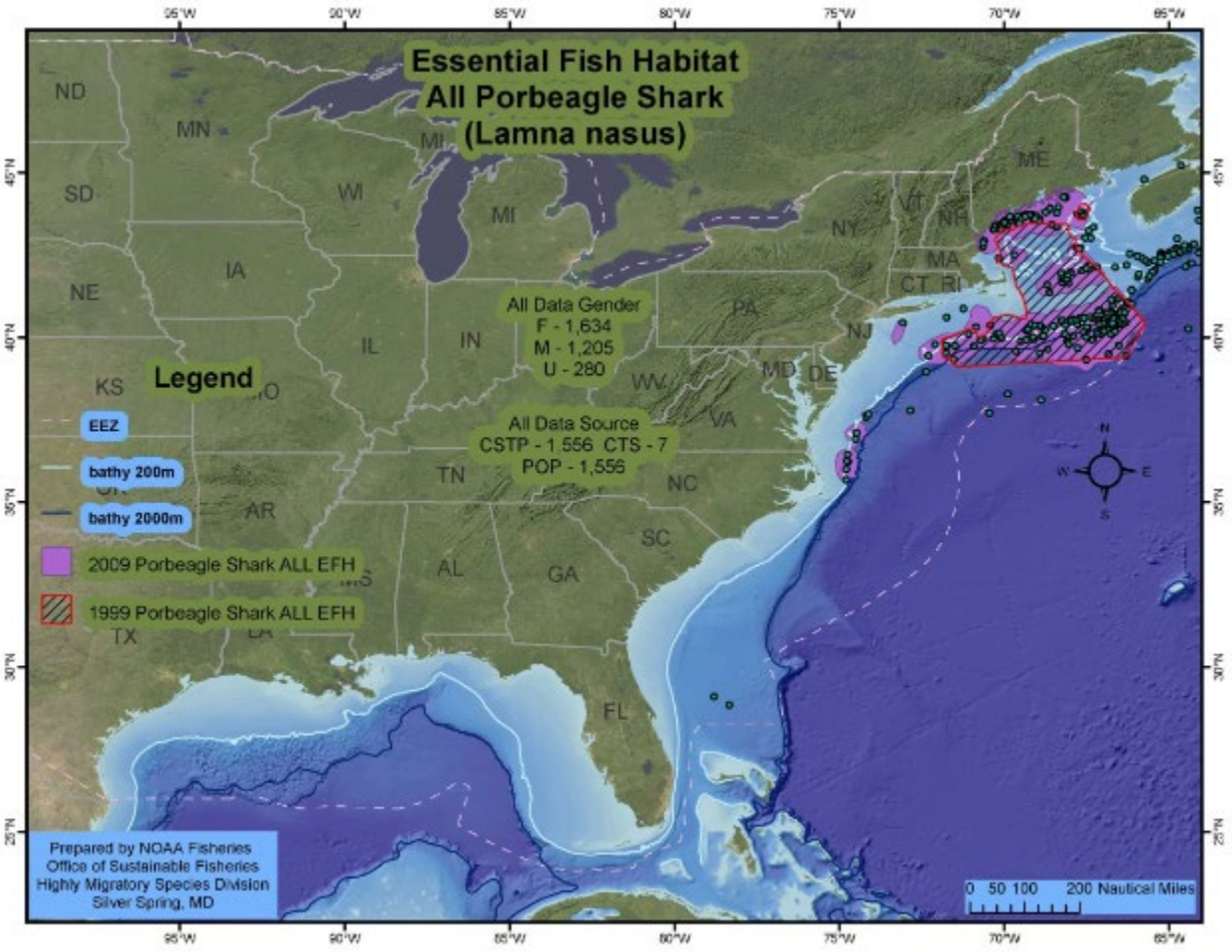

Figure 1. Essential Fish Habitat (light purple area) for the Porbeagle within the US EEZ (Source: NMFS 2009)

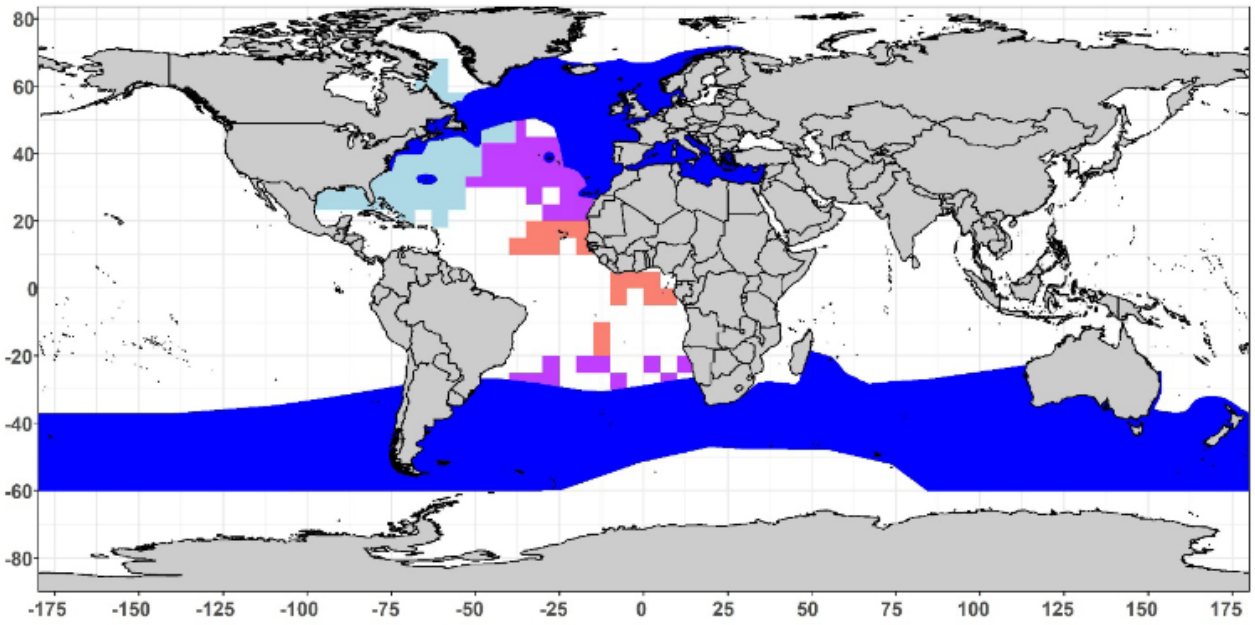

Figure 2. Map of porbeagle distribution (*Lamna nasus*). Taken and modified from the International Union for Conservation of Nature (IUCN) (IUCN SSC Shark Specialist Group 2018. *Lamna nasus*. The IUCN Red List of Threatened Species. Version 2021-1). The data taken from Bowlby *et al*. (2020a) are in light blue, and those from Mejuto *et al*. (2020) are shown in violet and salmon pink. To distinguish, the data from intertropical areas of the East Atlantic between 20°N and 20°S are indicated in salmon pink.

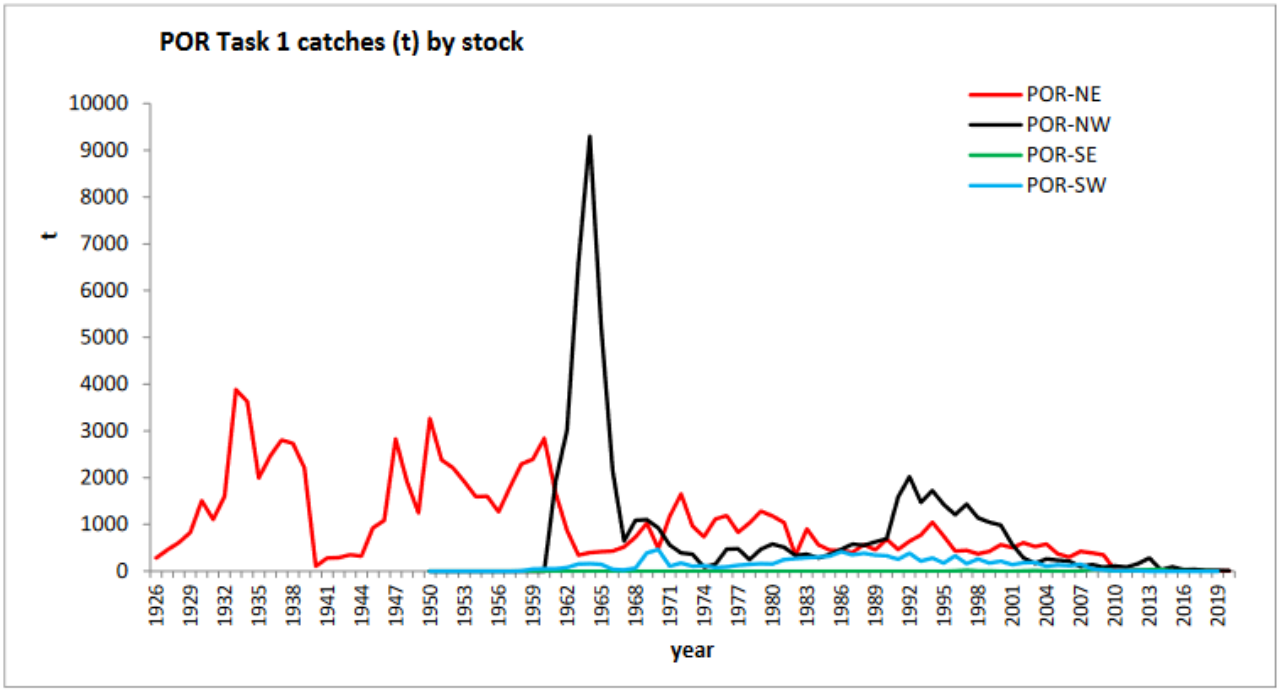

Figure 3. Nominal catch of porbeagle (t) in each of the 4 stocks considered in the Atlantic Ocean, reported to ICCAT in Task 1 for the period 1950-2020 (Anon., 2022).

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

This species is rare throughout its range.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of porbeagle shark in New York.

Details of historic and current occurrence:

There is no historical occurrence information available.

There is no current occurrence information available.

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%	Core	

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, Deep Subtidal

b. Marine, Shallow Subtidal

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:

The porbeagle shark's anti-tropical distribution is hypothesized to have originated during glacial periods, when tropical regions were narrower, and this species was able to cross between hemispheres (ICCAT 2022). This species is commonly found in littoral and epipelagic waters, inhabiting continental shelves and the open ocean (Compagno 2001, ICCAT 2022). It is most abundant on continental offshore banks but can be found far from land in ocean basins and

occasionally close inshore (Compagno 2001, COSEWIC 2004). This shark typically occurs in cold water, less than 18°C down to 1°C (Compagno 2001), but an analysis of a Canadian commercial fishery found that more than half of the porbeagle were caught between 5°C and 10°C with a mean temperature of 7.4°C, suggesting a preference for temperatures within that range (Campana et al. 2004, COSEWIC 2004, ICCAT 2022). The porbeagle ranges in depth from the surface and inshore waters less than 1 meter deep down to at least 700 m (Compagno 2001, Campana et al. 2004, COSEWIC 2004, ICCAT 2022).

V. Species Demographics and Life History

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

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):*

The biology of the porbeagle is poorly understood, as much remains unknown about this species' age and growth (Compagno 2001). The porbeagle is a very active and strong-swimming shark that can be found singly, in schools, or in feeding aggregations (Compagno 2001). Like other sharks belonging to the Lamnidae family, the porbeagle maintains an internal body temperature up to 11 °C higher than surrounding temperatures (ICCAT 2022). This species is slow growing, late to mature, and produces low numbers of offspring (COSEWIC 2004). Mating in the Northwest Atlantic occurs in winter to late-spring (Compagno 2001, COSEWIC 2004). It is thought that mating occurs on the Grand Banks, off southern Newfoundland, and at the mouth of the Gulf of St. Lawrence because pregnant females were found in these areas during the fall (COSEWIC 2004). Sexual segregation is common in pregnant females, which move into remote areas during gestation and birth and remain segregated from males in breeding grounds (ICCAT 2022). The porbeagle is ovoviviparous and exhibits oophagy - embryos feed on the yolk of their own egg, and on unfertilized eggs produced by the mother (Compagno 2001, COSEWIC 2004). Average litter size of this species is 4 pups, and no parental care is given after birth (COSEWIC 2004). The porbeagle can grow to 145 inches, but most are smaller (Compagno 2001).

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

In the Northwestern Atlantic, longline fisheries targeting swordfish and tuna result in porbeagle bycatch (Stevens et al. 2006). This species is exceptionally vulnerable to fisheries exploitation as its epipelagic habitat occurs within the range of gillnet and longline fisheries (Campana and Joyce 2004, Stevens et al. 2006). While at-vessel mortality rates for this species have been reported to be relatively low, with average mortality (between multiple studies) being 20%, there is considerable variability in survival which is dependent upon several factors including temperature, handling, shark size, and degree of injury (Curtis 2016). The slow biological productivity and inherent life history characteristics of this species makes recovery from overexploitation difficult (Compagno 2001). The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010).

Synergistic effects between climate change and other present threats, particularly bycatch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial catch)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch/discard)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational catch)

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:

This species is listed on Appendix II of CITES, which regulates its harvest and trade.

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

The New York State Wildlife Action Plan (2005) provides recommendations for conservation/management actions for pelagic shark species:

- Develop fact sheets for distribution to commercial and recreational fisherman regarding the wellbeing of the pelagic shark stocks.

- Conduct literature review to determine the pupping and juvenile habitat requirements for pelagic coastal sharks in the Middle Atlantic bight.

- Modify New York's regulations as necessary to conform to the federal protection of sharks.

- Initiate a volunteer shark data collection program which would collect additional catch and biological information from New York's recreational anglers.

- Develop appropriate webpage information relative to the shark species found in the Mid-Atlantic bight and their status.

To prevent overfishing and allow recovery, it is recommended that Porbeagles be subject to regional and national catch limits based on scientific advice and/or the precautionary approach, as well as improved reporting of catch data (including discards), efforts to minimize bycatch mortality, and full implementation of all commitments agreed through international treaties (Rigby 2019).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions

Action Category	Action
1. Species management	Harvest management
2.	

Table 2: Recommended conservation actions for porbeagle shark.

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Originally prepared by	Jim Katz
Date first prepared	April 16, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Tajrian Sarwar)

Species Status Assessment

Common Name: Rosette skate **Date Updated:** 1/12/2024

Scientific Name: *Leucoraja garmani virginica* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Rajiformes

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

The Rosette skate (*Leucoraja garmani virginica*) ranges from Nantucket Shoals, MA to the Dry Tortugas National Park, FL. Rosette skates are more abundant in the Mid-Atlantic offshore waters compared to southern New England and the George's Bank (Hogan et al., 2013). Rosette skates are a relatively small (< 60 cm total length) species and occurs over continental shelf and shelf break waters (Packer et al., 2003). North of Cape Hatteras populations are considered to be the subspecies L. garmani virginica, whereas southern populations are considered L. g. garmani (NYS DEC, 2015, Kulka et al., 2020). Rosette skate are most abundance in the Mid-Atlantic offshore region, with few fish caught in Southern New England and Georges Bank. Individuals are caught in Northeast Fishery Science Center (NEFSC) trawl surveys off the southern shore of Long Island, most abundant in autumn and spring surveys (NEFMC 2009). There is no directed fishery for Rosette skate, but it is taken as bycatch in the groundfish and scallop dredge fishery (Curtis and Sosebee, 2015). Along with the six other skates in the region, Rosette skates are managed under the Northeast Skate Complex Fishery Management Plan (FMP) by the New England Fishery Management Council (NEFMC). Based on NEFSC biomass indices, the Rosette skate stock is not considered to be overfished by the NEFMC (New England Fishery Management Council, 2021).

I. Status

a. Current legal protected Status

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

ii. New York: Not Listed; SGCN

b. Natural Heritage Program

i. Global: Not Ranked

ii. New York: Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Least Concern

-Northeast Regional SGCN: Watchlist [Assessment Priority]

Status Discussion:

Rosette skate biomass index is currently above the threshold reference point and therefore the stock is not considered to be overfished by the NEFMC (NEFMC 2009). The IUCN states that there is no reason to believe there is any current threat to rosette skate although catch indices are not available for the southern range of the species, leading to the assessment status of Least Concern (Kyne et al. 2012).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	1990-Present		Choose an item.
Northeastern US	Yes	Stable	Stable	1990- Present (Mid-Atl Bight)		Choose an item.
New York	Yes	Stable	Stable	1990-Present		Yes
Connecticut	Yes	Stable	Stable	1990-Present	Not Listed	No
Massachusetts	Yes	Stable	Stable	1990-Present	Not Listed	No
New Jersey	Yes	Stable	Stable	1990-Present	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*
Northeast Fishery Science Center (NEFSC) trawl surveys sample in the Mid-Atlantic Bight and record catch of rosette skate.

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

The current population trend is increasing according to the IUCN red list (Kulka et al. 2020). Indices of rosette skate abundance and biomass from the NEFSC surveys were at a peak during 1975-1980, later declining through 1986. Survey indices have increased in 1986 through 2001 then declined slightly before increasing to near the peak values of the late 1970s (see Figure 2). Rosette skate biomass index is currently above the biomass threshold reference point and the maximum sustainable yield target, therefore the stock is not considered to be overfished (NEFMC 2009). Overfishing is not occurring because the three-year moving average of the biomass indices did not exceed the maximum threshold, which defines when overfishing is occurring according to the FMP (NEFMC 2009). The median length of this species in the survey catch data has been stable over the spring and autumn time series.

Distribution Map

Leucoraja garmani

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. IUCN Red List rosette skate distribution map (Kulka et al. 2020)

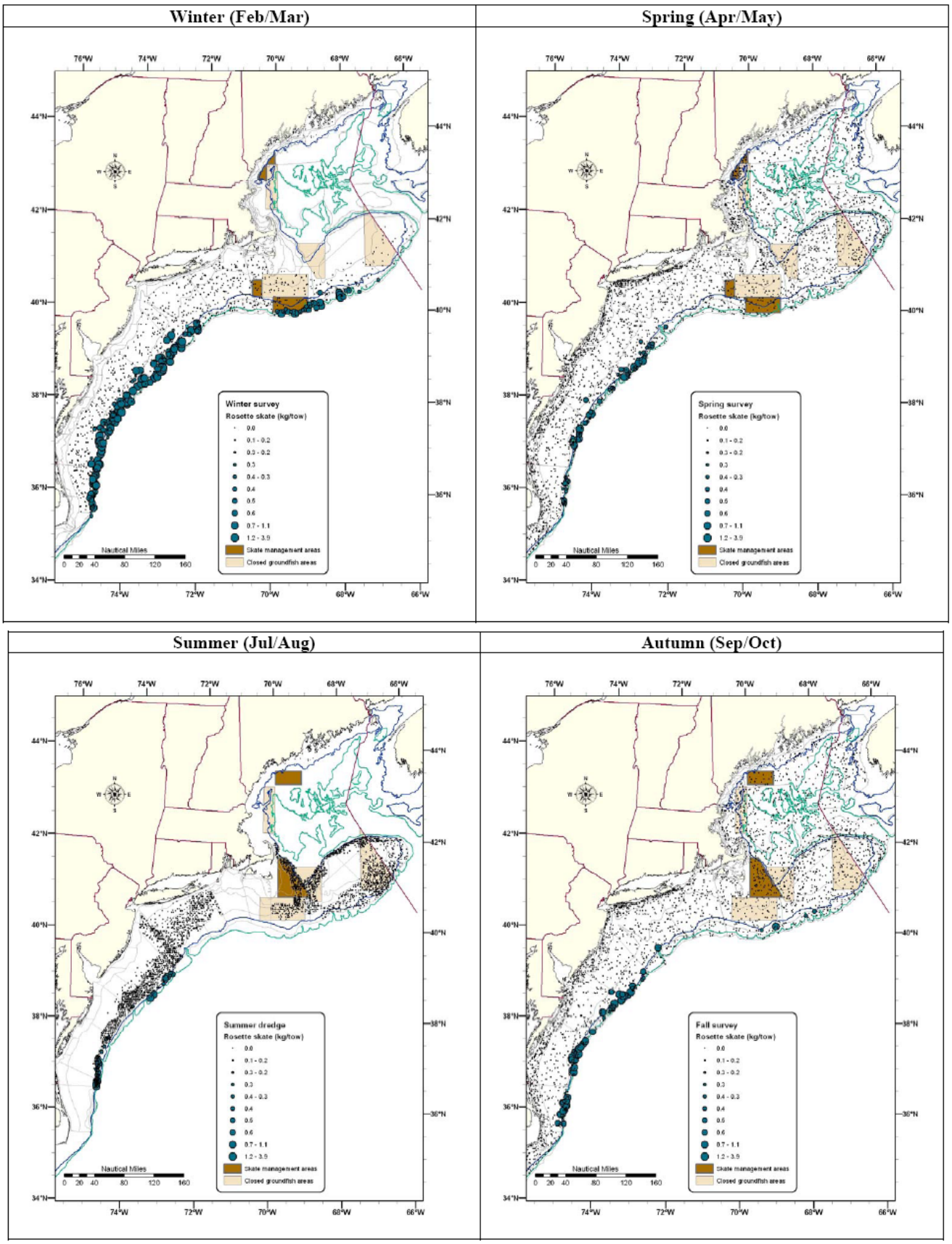

Figure 2. Rosette skate biomass distribution in winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys (NEFMC 2009).

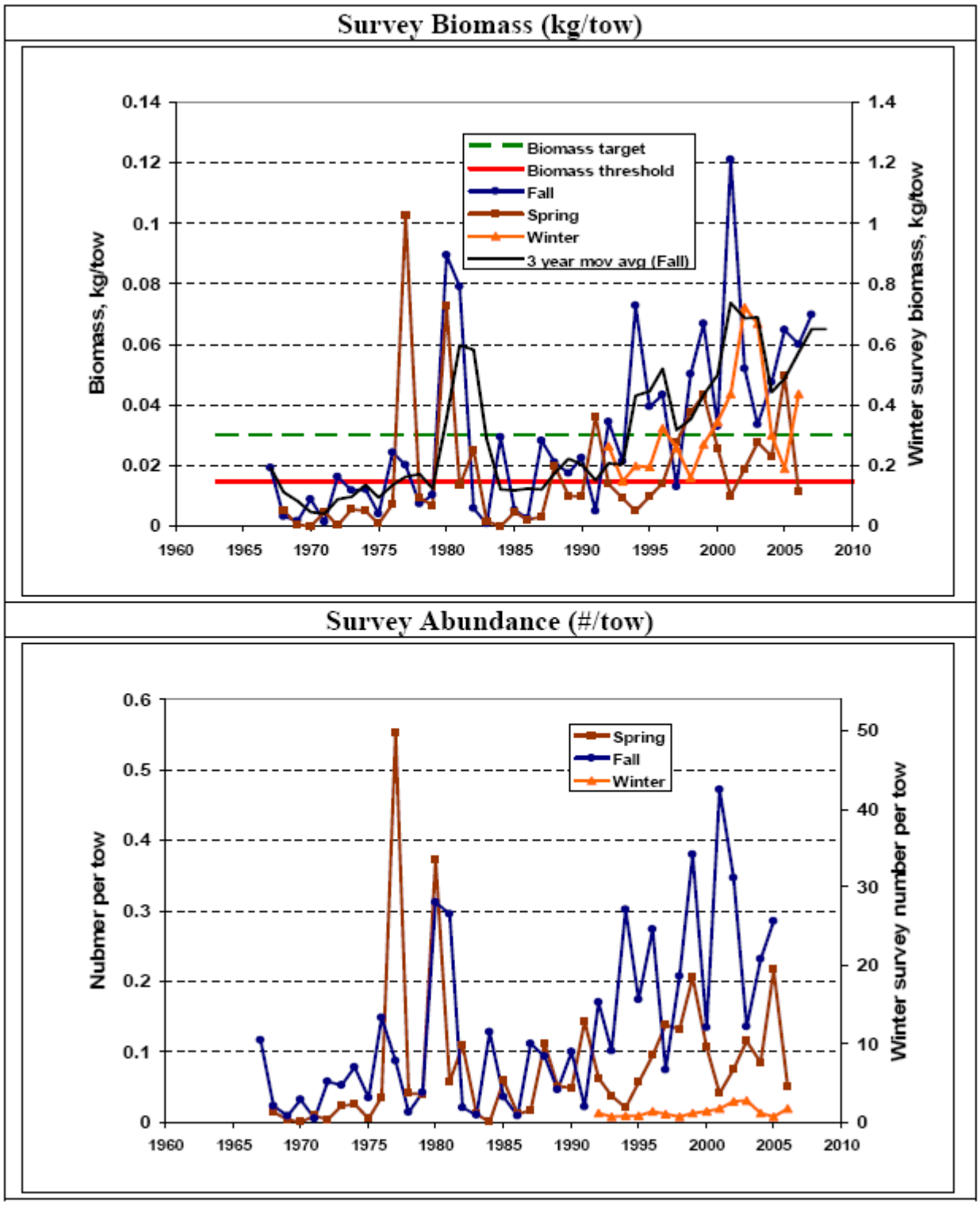

Figure 3. Rosette skate stratified mean weight (top) and number per tow for the winter, spring, and fall (bottom) Northeast Fishery Science Center (NEFSC) trawl surveys from Cape Hatteras to the Gulf of Maine (NEFMC 2009).

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

Rosette skate are fairly abundant on the outer continental shelf from Georges Bank to Virginia.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of roseatte skate in New York.

Details of historic and current occurrence:

McEachran (1977) noted rosette skate were moderately abundant in shallow waters, but rare in deeper waters off Montauk Point, Long Island.

Rosette skate have been caught off the south shore of Long Island in recent NEFSC trawl surveys.

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%	Core	

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, Deep Subtidal
b. Estuarine, Brackish Deep Subtidal
c. Marine, Deep Subtidal, Benthic Geomorphology, Benthic Flat

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:

Rosette skate are a benthic, deepwater species found on soft bottoms of sand or mud. It occurs at depths of 33 - 530 meters but is most common between 74 - 274 meters and at water temperatures of 5 – 15 ˚C (Packer et al. 2003). They are found along continental shelves and slopes (Kulka et al. 2020). Although skates do not undertake large-scale migrations, they do move seasonally in response to changing temperatures, generally offshore during summer and early autumn, returning inshore during winter and spring. Rosette skate feed mostly on decapods,

crustaceans, and to a lesser extent on amphipods, polychaetes, squids and small fishes (Gedamke 2009).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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):*

Rosette skates have a maximum size of 57cm total length (TL). Males reach maturity at 33 cm (TL) and females reach maturity at 33 to 35 cm (TL). Rosette skates are oviparous with offspring hatching at 8 to 9 cm (TL). Little is known about the reproduction and life history of the rosette skate. At northern latitudes, rosette skate reproduce year round with a peak during the summer months. Maximum size and size at maturity have been observed to increase with latitude (Packer et al. 2003). Age at maturity is estimated to be 4 years for both sexes (Packer et al. 2003). Generation length is assumed to be 11 years based on data from a similar sized Little Skate *(Leucoraja erinacea*) (Kulka et al. 2020).

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

Rosette skate are commonly taken as by-catch in groundfish trawling and scallop dredging operations and discarded. Recreational and foreign landings are considered insignificant, accounting for <1% of the total fishery landings (Gedamke 2009). Potential effects of climate change on rosette skate are unknown; however, temperature fluctuations and shifting habitats may negatively affect this species or its required habitat (Harley et al. 2006).

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:

The rosette skate is part of the northeast skate complex, managed by the Northeast Fishery Management Council Skate Complex Fishery Management Plan (FMP). The FMP includes catch reporting requirements, a total allowable catch (TAC), and possession limits for all managed skate species. Landings are not yet reported by species although this is a requirement under the skate FMP, resulting in over 99% of landings reported as unclassified skates.

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

Species-specific fishery independent data are needed to better understand the status of rosette skate in New York. Compliance with the requirements of the FMP and implementation of new rules

and regulations consistent with those developed by the National Marine Fisheries Service would sustain populations of this species throughout its range. Programs are needed to obtain biological information for the rosette skate to better understand life history characteristics and identify potential nursery areas in New York waters.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.2 Population Size, distribution & trends	
1.3 Life history & ecology	
3.1 Population trends	
3.2 Harvest level trends	

Table 2: Recommended conservation actions for rosette skate (Kulka et al.2020).

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Originally prepared by	Samantha Hoff
Date first prepared	April 19, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Roughtail stingray **Date Updated:** 1/12/2024

Scientific Name: *Dasyatis centroura* **Updated by:** Siobhan Keeling

Class: Chrondrichthyes

Family: Dasyatidae

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

This is one of the largest marine and brackish water stingrays, occurring in three separate populations: the northwest Atlantic, the southwest Atlantic and the eastern Atlantic oceans (Bullis and Struhsaker 1961, Struhsaker 1969, Rosa et al. 2007). New York is included in the northwest Atlantic population. Despite the limited amount of data available on the biology of this species, its large size and low fecundity make it inherently vulnerable to overexploitation (Rosa et al. 2007). In United States waters of the northwest Atlantic this species is not targeted, and the data suggests that populations off the East Coast are stable (Rosa et al. 2007). In the southwest Atlantic and Mediterranean, it is taken by fisheries operating throughout much of its habitat (Eagle no date, Rosa et al. 2007). This species has been captured occasionally off Long Island (M. Richards, personal communication), but because there are so few records experts feel that conservation actions are best approached at a level higher than species (expert marine fish meeting). The IUCN Red List status has changed from least concern to vulnerable (Carlson et al. 2020). The World Register of Marine Species has the scientific name listed as *Dasyatis centroura* but an accepted name is *Bathytoshia centroura* (Froese 2023).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; High Priority SGCN

b. Natural Heritage Program

i. **Global:** GNR, Unranked

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable

-Northeast Regional SGCN: Watchlist [Assessment Priority]

Status Discussion:

The eastern Atlantic and southwest Atlantic populations are in decline from overfishing, the northwestern Atlantic population apparently is stable (Rosa et al. 2007).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Choose an item.	Choose an item.	Past 20 years (Rosa et al.2007)		Choose an item.
Northeastern US	Yes	Choose an item.	Choose an item.	Northeastern U.S. Past 20 years (Rosa et al.2007)		Choose an item.
New York	Choose an item.	Unknown	Unknown			Yes
Connecticut	Choose an item.	Unknown	Unknown	Unknown	Not Listed	Yes
Massachusetts	No data	Unknown	Unknown	Unknown	Not Listed	No
New Jersey	Yes	Stable	Stable	Not specified	Not listed-considered common (NJDEP)	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

There are no surveys or monitoring activities for this species; however it is occasionally captured in trawl and seine surveys off Long Island.

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

The current population trend is decreasing according to the IUCN red list (Carlson et al. 2020). Populations in the northwest Atlantic are stable (Rosa et al. 2007). The Mediterranean population is becoming increasingly smaller and there is little information available on the southwest Atlantic population (Rosa et al. 2007). Over the last three generations (64.5 years), the roughtail stingray has had an overall population reduction of 30 to 49% (Carlson 2020).

Distribution Map

Bathytoshia centroura

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. IUCN Red List Roughtail Stingray distribution map (Carlson 2020)

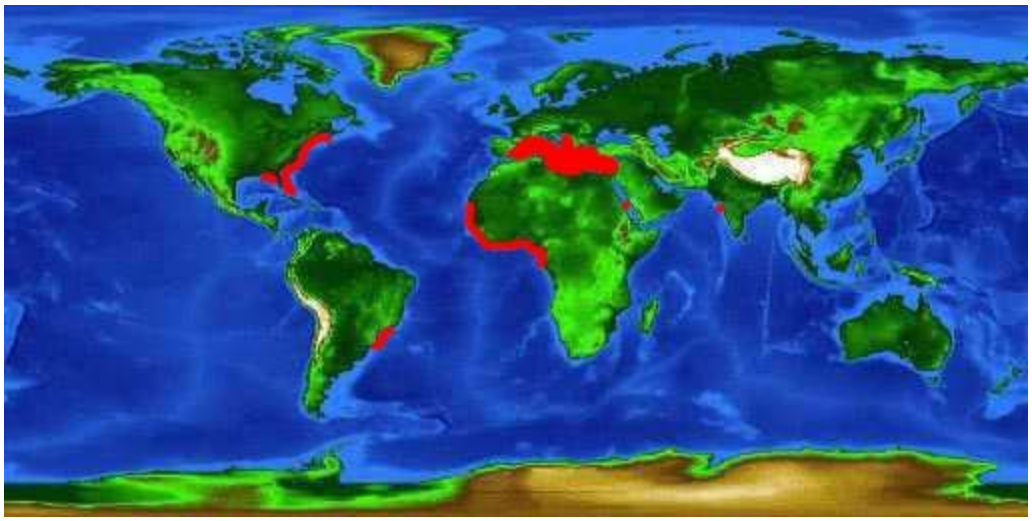

Figure 2. Global distribution of the roughtail stingray (Eagle no date).

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

In the northwest Atlantic this species is fairly common but there are very few records in New York (Struhsaker 1969).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of roughtail stingray in New York.

Details of historic and current occurrence:

Historic:

There is no historic occurrence information available.

Current:

There little catch data available for this species in New York. The NYSDEC has records of two individuals being captured during trawl surveys from 2009 in Noyack Bay, Suffolk County (M. Richards, personal communication).

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	~300 miles

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, Benthic Geomorphology

b. Marine, Deep Subtidal, Benthic Geomorphology

c. Estuarine, Brackish Deep Subtidal

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:

Roughtail stingrays are usually found at 100 to 275m depth in soft bottom areas (Carlson et al. 2020) This species is found in coastal waters over sandy and muddy bottoms, sometimes in brackish water, normally less than 328 feet in depth (Rosa et al. 2007). It has been recorded in waters up to 900 feet in depth in the Bahamas (McEachran and Fechhem 1998).

V. Species Demographics and Life History

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

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):*

The most discernible feature of this species is its tail, which has numerous rows of small thorns (Eagle no date, Parsons 2006). This species has a poisonous spine (Eagle no date). Roughtail stingray reach a maximum size of 220cm disc width (DW) and males mature at 130 to 150cm (DW). Females mature at 140 to 160cm (DW) (Carlson et al. 2020). This species is ovoviviparous and can have 2-6 pups per clutch (Struhsaker 1969, Rosa et al. 2007, Eagle 2018). Their diet consists of fishes and invertebrates including crabs, bivalves, gastropods and cephalopods (Struhsaker 1969, Rosa et al. 2007). This species is seasonally migratory (Struhsaker 1969). From December to March the main population of roughtail stingray winters off the southeastern coast of the United States in the open shelf, live bottom and shelf-edge habitats of the Continental Shelf (Struhsaker 1969). When waters warm in the spring there is an inshore movement into coastal habitat and a northerly movement along the coast (Struhsaker

1969). Sharks and other large fish are among the only species which prey on rays (Eagle no date).

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

There is some bycatch in shrimp and groundfish trawl and bottom longline fisheries which may threaten populations (Rosa et al. 2007).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)

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

Yes: _____ **No:** _X_ **Unknown:** _____

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

There is no existing legislation protecting this species.

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

Because there are very few records of this species in New York, experts feel that conservation actions are best approached at level higher than species.
Management/conservation actions for this species are not described in the literature. The New York State Wildlife Action Plan (NYSDEC 2005) identifies general conservation/management actions for rays including:

- Develop fact sheets for all species of skates and rays found in or near to New York's Territorial waters.

- Participate in programs to obtain new biological information relative to this species complex for those species found in harvested or landed in New York.

- Implement new rules and regulations as necessary and appropriate consistent with rules and regulations implemented by National Marine Fisheries Service.

- Support existing monitoring and develop as necessary new biological monitoring for this species.

- Develop webpage information about the species in this complex.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
3.1 Species management 3.1.1 Harvest management	
3.2 Species recovery	

Table 2: Recommended conservation actions for roughtail stingray (Carlson et al. 2020).

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Originally prepared by	Jim Katz
Date first prepared	April 23, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Sand tiger shark **Date Updated:** 1/12/2024

Scientific Name: *Carcharias taurus* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Odontaspididae

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, High Priority SGCN

b. Natural Heritage Program

i. **Global:** G3G4, Vulnerable/Apparently Secure, rounded to G3

ii. **New York:** S2, Imperiled **Tracked by NYNHP?:** No

Other Ranks:

-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		Choose an item.
Northeastern US	Yes	Declining	Stable	1960s-2006 (Western Atlantic Ocean)		Yes
New York	Yes	Declining	Stable		Not Listed	Yes
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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

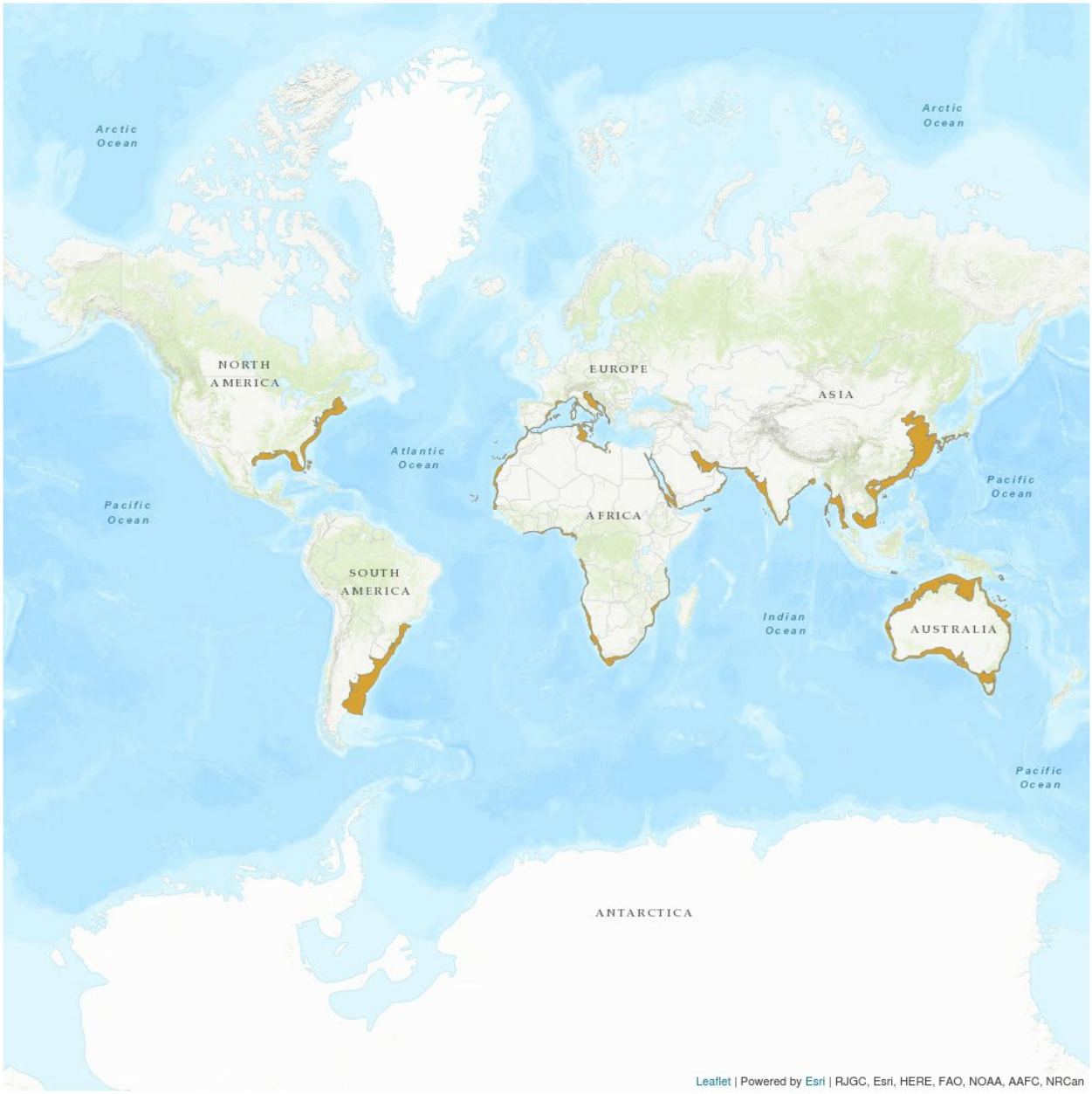
Fisheries Service Cooperative Shark Tagging Program which tags a wide variety of shark species. Information on stock identity, movements and migration, abundance, age and growth, mortality, and behavior can be collected from tagged sharks (NMFS 2011). New York currently maintains a passive acoustic array 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)

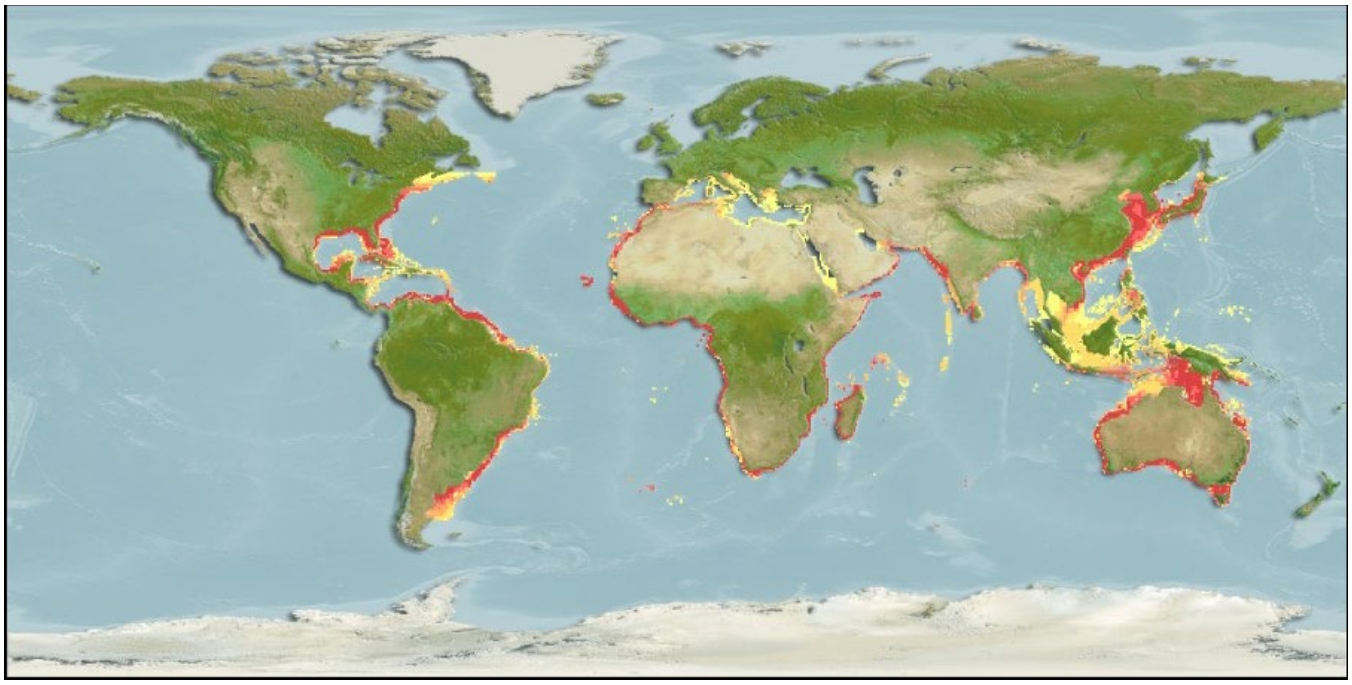


Figure 2. Global distribution of the Sand tiger shark, *C. taurus*. (Aquamaps 2010)

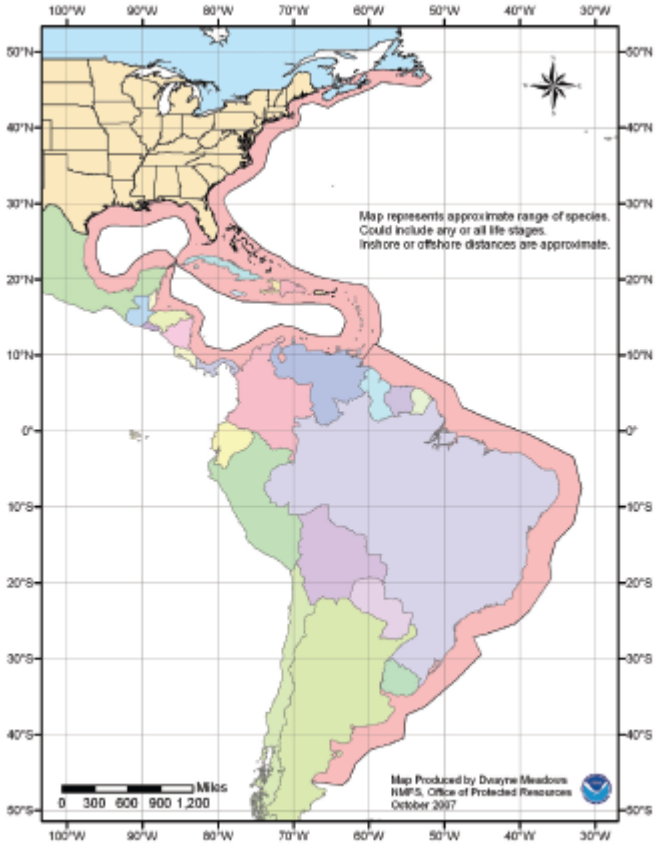


Figure 3. Distribution of sand tiger shark in the western Atlantic Ocean (NMFS 2010).

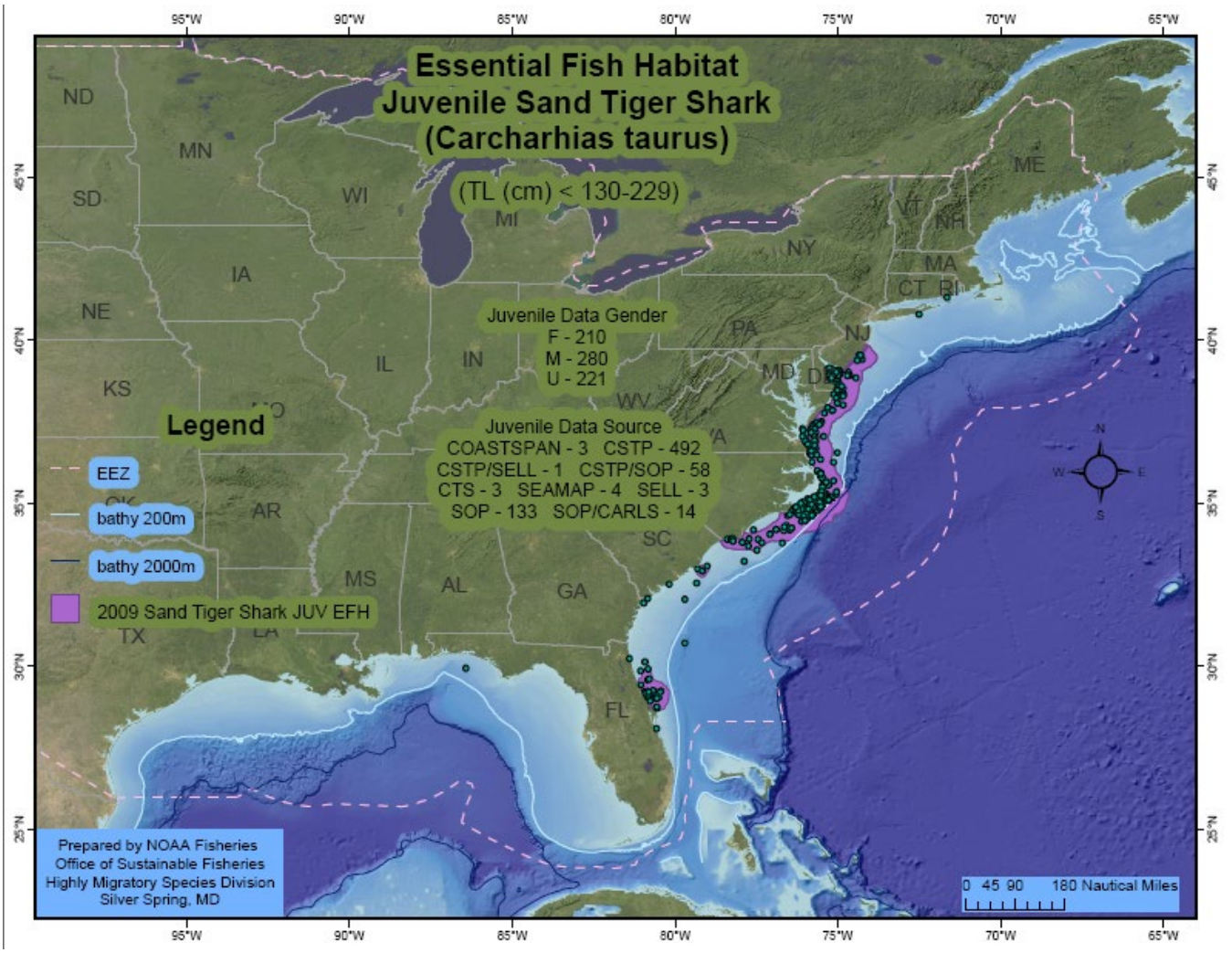


Figure 4. Essential Fish Habitat for the Juvenile Sand Tiger Shark (NMFS 2009)

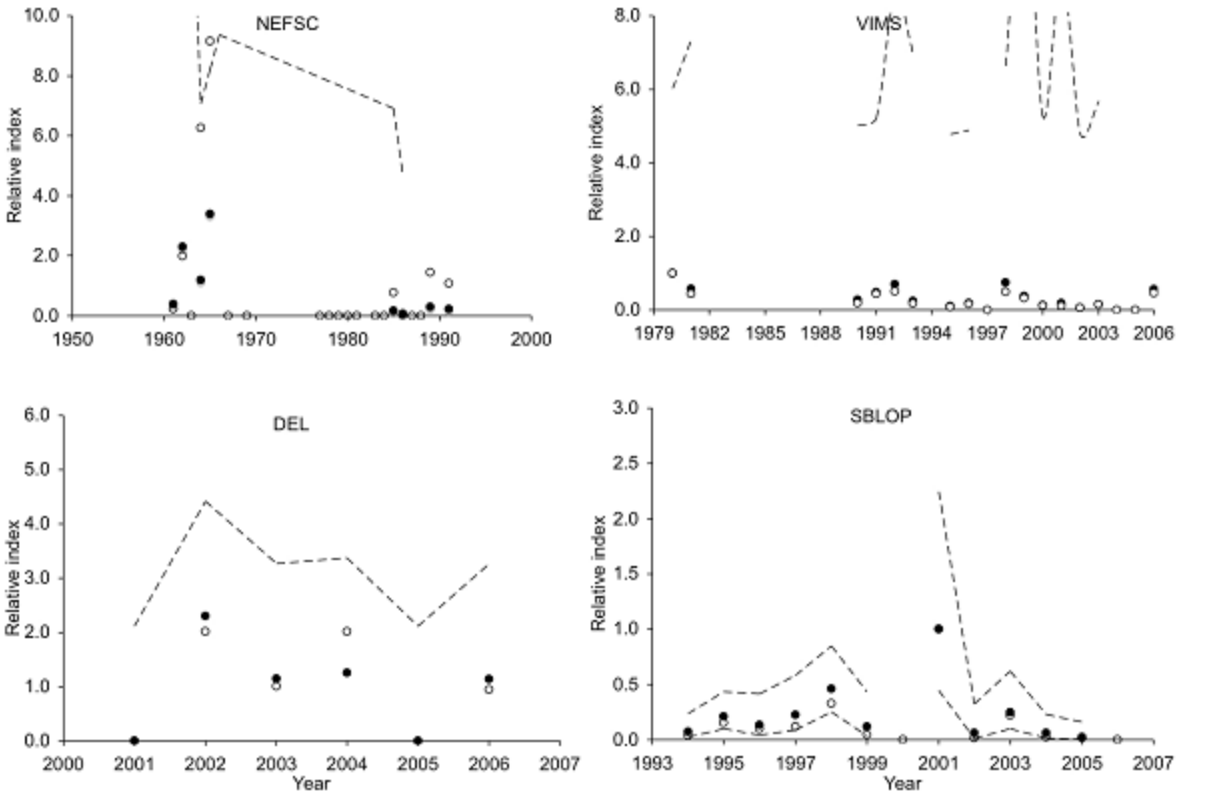


Figure 5. Standardized relative index (mean/maximum of index) of abundance (solid circles) for sand tigers from three scientific surveys (Northeast Fisheries Science Center exploratory longline surveys (NEFSC); Delaware Bay Survey (DE), and Virginia Institute of Marine Science (VIMS) survey) and the 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.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of sand tiger shark in New York.

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	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

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).

Threats to NY Population	
Threat Category	**Threat**
1. Climate Change & Severe Weather	Habitat Shifting & Alteration (effects of warming ocean temperature)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (illegal harvest)
4. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fishing)
5. Energy Production & Mining	Renewable Energy (wind farms)

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.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	
5.1 Legislation 5.1.2 National level	
5.4 Compliance and enforcement 5.4.2 National level	

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

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Originally prepared by	Caitlin Craig
Date first prepared	May 16, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Sandbar shark **Date Updated:** 1/12/2024

Scientific Name: *Carcharhinus plumbeus* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Carcharhinidae

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

The sandbar shark is a large coastal species widespread in subtropical and warm temperate waters around the world. In the Western Atlantic Ocean, it occurs from southern Massachusetts southward to Brazil. Sandbar sharks are long lived with low fecundity and consequently very vulnerable to overfishing. The sandbar shark was historically taken in commercial and recreational fisheries along the Southern Atlantic Coast of the U.S. and in the Gulf of Mexico, which expanded rapidly in the last 20 years and led to significant population declines (Musick et al. 2009). Genetic data indicates no differentiation between Atlantic and Gulf individuals and tagging data shows a high frequency of movement between the basins (NMFS 2011). Individuals have historically been observed along the south shore of Long Island during spring and summer, indicating this is an important pupping area for this species (Spring 1960). Outside the shark research fishery, sandbar sharks are a prohibited species in Atlantic waters (Musick et al. 2009). The IUCN Red List status has changed from vulnerable in 2009 to endangered in the 2021 assessment.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** G4, Apparently Secure

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered

-Northeast Regional SGCN: RSGCN

-UNCLOS: Annex I

-CITES: II

Status Discussion:

The IUCN has assessed the sandbar shark as globally Vulnerable due to the high intrinsic vulnerability of this species and given significant population declines throughout its Northwest and Western Central Atlantic range as a result of target and by-catch exploitation by fisheries (Kyne et al. 2009).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Unknown	1988 - present		Choose an item.
Northeastern US	Yes	Declining	Unknown	1988 – present (Mid-Atlantic Bight)		Yes
New York	Yes	Declining	Unknown	1988 - present		Yes
Connecticut	Yes	Declining	Unknown	1988 - present	Not Listed	Yes
Massachusetts	Yes	Declining	Unknown	1988 - present	Not Listed	No
New Jersey	Yes	Declining	Unknown	1988 - present	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

The National Marine Fisheries Services (NMFS) Cooperative Shark Tagging Program is an ongoing effort from recreational anglers, commercial anglers and the NMFS to tag sharks throughout the Atlantic Ocean and Gulf Coast. Since 1962 over 221,000 sharks of 52 different species have been tagged. The tagging of sharks provides information on stock identity, movements and migration, abundance, age and growth, mortality and behavior (NMFS 2011)

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). At the 1998 Shark Evaluation Workshop a modeling approach was used to assess sandbar sharks, determining that the 1998 stock was 58-70% of the stock size at maximum sustainable yield (NMFS 2011). The 2006 assessment concluded that the stock was overfished with overfishing occurring. The commercial landings of sandbar sharks increased overall from 1981 to a peak in 1994 (126,300 sharks) and steadily declined thereafter (NMFS 2011). The majority of landings occurred in the Gulf of Mexico (53%) with only 15% occurring in the Mid-Atlantic region (NMFS 2011). Stock abundance and biomass trends show little depletion from 1960 to 1982, corresponding with low catch numbers, and a resulting decline up until 2007 due to increased catches (NMFS 2011). Fishing mortality was low from 1960-1981 in accordance with reduced catches and effort, but widely escalated after 1982 and has dropped below the fishing maximum sustainable yield reference point in 2009 due to reduced catches imposed by management. Studies have calculated that sandbar shark stocks are being fished above their ability to replace

themselves and that stricter management action is needed to reduce mortality rates of juvenile and sub-adults to aid in the recovery of this species (Brewster-Geisz and Miller 2000).

Distribution Map

Carcharhinus plumbeus

Figure 1. ICUN Red List Sandbar Shark distribution map (Rigby 2021)

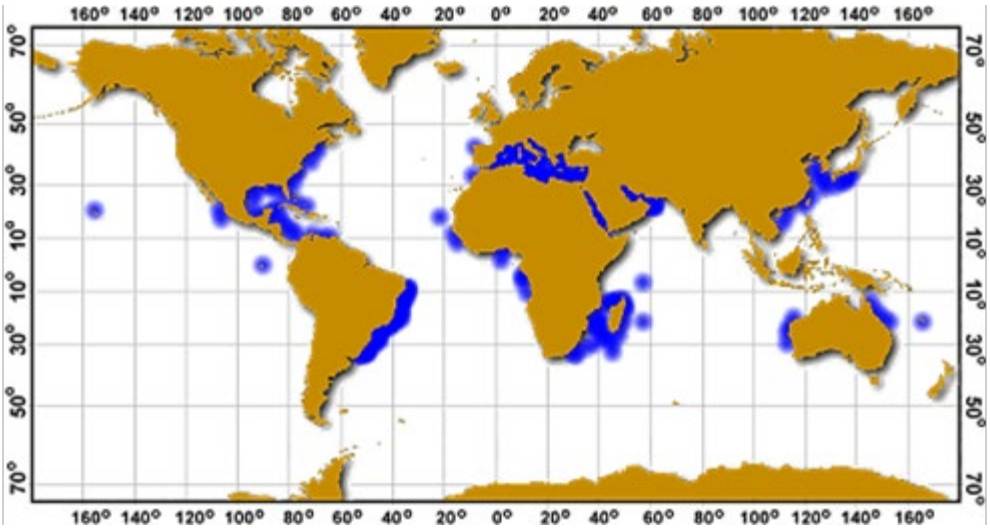

Figure 2. Global distribution of the sandbar shark (Compagno 1984).

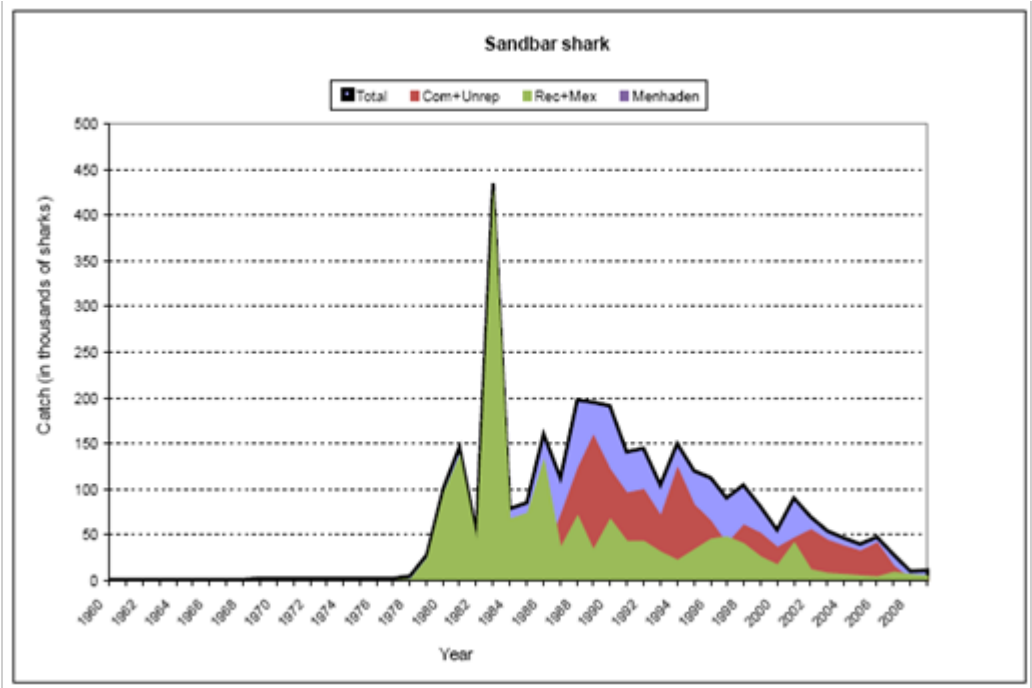

Figure 3. Catch of sandbar sharks (in thousands of individuals), 1960-2009 (NMFS 2011).

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

Sandbar sharks are a fairly abundant coastal species and a significant component of coastal shark fisheries worldwide (Musick et al. 2009).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			

1995-2004			
2005-2014			
2015-2023			

Table 1: Records of sandbar shark in New York.

Details of historic and current occurrence:

Historic:

Nursery grounds were identified in the shallow water along the southern shore of Long Island, particularly Great South Bay, in 1916 (Springer 1960). It was also noted that adults of the two sexes were almost never taken together near Long Island, and females will enter the nursery area to give birth, not remaining for long or actively feeding while there (Springer 1960). Other records indicate that sandbar sharks are common in bays along the ocean side of Long Island from mid-June to mid-September (Nicholas and Breder Jr. 1927).

Current:

There are no observations of current occurrence; however its likely sandbar sharks are still using the south shore of Long Island as nursery grounds.

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, Deep Subtidal

b. Marine, Shallow Subtidal

c. Estuarine, Deep Subtidal

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:

Sandbar sharks are found in tropical and temperate waters where they are demersal and pelagic. They occur on continental and insular shelves, in adjacent deep water, and oceanic banks (Compagno 1984, Rigby et al. 2021). This species occurs in shallow watrs such as bays, estuaries, and harbors (Rigby et al. 2021). They are common at bay and river mouths, in harbors, and inside shallow muddy and sandy bays, avoiding the surf zone, coral reefs, and rough bottoms

(Compagno 1984). Sandbar sharks are found nearshore and at depths of 280m (Rigby et al. 2021).

Stocks migrate seasonally along the western North Atlantic seaboard, heading south for the winter and north in the summer (Compagno 1984). Migrations are likely influenced by water temperature, changes in areas of upwelling, and ocean currents. Young form mixed-sex schools on shallow coastal nursing grounds, moving into deeper, warmer water in winter (Compagno 1984). Adults are usually segregated except during southward migration when individuals often travel in large schools. This species is a primarily a predator on small fishes, mollusks and crustaceans (Compagno 1984).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.

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):*

Sandbar sharks reach a maximum size of around 240 to potentially 300cm total length (TL). Females reach maturity at 129 to 190 cm (TL) and are around 8 to 16 years with a maximum age of 21 to 27 years. Males reach maturity at 123 to 180 cm (TL) and at birth sandbar sharks are 40 to 76 cm (TL) (Rigby et al. 2021). Sandbar sharks are viviparous, producing litters of 1-14 with an average of 9 pups (Rigby et al. 2021, Springer 1960, NMFS 2006) and have a yolk-sac placenta (Rigby et al. 2021, Knickle 2018). Mating occurs in the spring and summer. Gestation period ranges from 8-12 months depending upon the geographical location and reproduction occurs every 2 to 3 years, with a resting year occurring after each birthing event (Compagno 1984). Young pups inhabit shallow coastal nursery grounds during the summer and move offshore into deeper, warmer waters for the winter; females leave pupping grounds soon after giving birth (Compagno 1984). Adult sandbar sharks are rarely eaten by predators, but juveniles fall prey to larger shark species, particularly bull and tiger sharks, which feed on young in inshore areas (Compagno 1984).

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

Due to its moderate size, high fin-to-carcass ratio, and desirable meat, sandbar shark have been the primary targeted species along the eastern U.S. in the commercial shark fishery (Musick et al. 2009). Their slow growth rate, late sexual maturity, and low reproductive output are all factors that make this species vulnerable to over-exploitation from fishing. Inshore habitats, which are important nursery grounds for sandbar shark, may be impacted by human activities altering and degrading the coastal environment (Kyne et al. 2009). Marine migratory species like the sandbar shark are potentially vulnerable to climate change impacts from changes in food distribution and abundance, changing ocean circulation, and exacerbation of present threats (ZSL 2010

Threats to NY Population	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial fishing)
2. Climate Change	Habitat Shifting & Alteration (effects of warming ocean temperature)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
4. Biological Resource Use	Fishing & Harvesting Aquatic Resources (illegal harvest)
5. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fishing)
6. Energy Production & Mining	Renewable Energy (wind farms)

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:

The National Marine Fishery Service first implemented a Fishery Management Plan for Sharks of the Atlantic Ocean in 1993, when sandbar sharks (part of the large coastal shark (LCS) complex) were identified as overfished and commercial quotas were established for the whole complex. Sandbar sharks were assessed individually in 1998 and later in 2002 and 2006. In 2006, the assessment concluded the stock was still overfished with overfishing occurring (NMFS 2011). Shark finning has been banned in the U.S. since 1993 as part of the Atlantic shark FMP and all commercial shark fisheries must have a permit and report landings by species. Amendment 2 to the FMP removed sandbar sharks from the LCS complex and a quota of 87.9 mt dw annually was established based on the most recent stock assessment (NMFS 2011). Only commercial vessels participating in the shark research fishery and carrying an observer are authorized to land sandbar sharks (NMFS 2011). Amendment 2 also prohibited recreational anglers from possession of sandbar sharks. New York anglers are prohibited from possessing sandbar sharks (NYSDEC 2021).

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

New York's inshore habitat should be evaluated to determine if sandbar sharks as well as other demersal sharks are still using the southern shore of Long Island as pupping and nursery grounds. New York should continue to implement regulations consistent with the National Marine Fisheries Service regulations to support recovery of all demersal sharks.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated

subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	
5.1 Legislation 5.1.2 National level	
5.4 Compliance and enforcement 5.4.2 National level	

Table 2: Recommended conservation actions for sandbar shark (Rigby et al. 2021)

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Originally prepared by	Samantha Hoff
Date first prepared	April 26, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Shiobhan Keeling)

Species Status Assessment

Common Name: Scalloped hammerhead shark **Date Updated:** 1/12/2024

Scientific Name: *Sphyrna lewini* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Sphyrnidae

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

The scalloped hammerhead shark is a coastal pelagic species, found worldwide in warm temperate and tropical waters (Compagno 1984, Miller et al. 2013). It inhabits continental and insular shelves, ranging from intertidal and surface waters, to depths up to 450 m (Compago 1984, Klimley 1993). Scalloped hammerhead sharks are targeted and taken as bycatch in many global fisheries. Their fins are the primary product for international trade (Miller et al. 2013). Stock assessments of the northwest Atlantic population found the population to have decreased from 155,500 individuals in 1981 to 26,500 in 2005 (Hayes et al. 2009). Since 2005, numbers have remained relatively stable, with the current population estimated to be between 25,000-28,000 individuals (Hayes et al. 2009).

I. Status

a. Current legal protected Status

i. **Federal:** Not Listed **Candidate:** Yes

ii. **New York:** Not Listed, Non-SGCN (Potential CN)

b. Natural Heritage Program

i. **Global:** G4, Apparently Secure

ii. **New York:** S2?, Imperiled **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Critically Endangered

-Northeast Regional SGCN: Watchlist [Assessment Priority]

-CITES: II

Status Discussion:

All life-stages of scalloped hammerhead are highly vulnerable to overharvest throughout its range. This species is taken both as a target and as bycatch. The fins of this species are the primary product for international trade (Miller et al. 2013). Where catch data is available, declines up to 50-90% have occurred over the last 30 years in areas throughout its range. Given the population declines, increased targeting for its high value fins, and continuing fishing pressure, the scalloped hammerhead is considered globally endangered by the IUCN (Baum et al. 2007). The extinction risk assessment team concluded that the Northwestern Atlantic and Gulf of Mexico distinct population segment (DPS) is at a “low” risk of extinction throughout its range, now and in the foreseeable future. Although there are some concerns about the decline in absolute abundance, the Northwestern Atlantic and Gulf of Mexico DPS has a high likelihood of rebuilding (NOAA 2013).

On 5 April 2013, the Eastern Atlantic and Eastern Pacific DPS of scalloped hammerhead sharks were warranted to be listed as federally endangered. The Central and Southwest Atlantic and Indo-

West Pacific were warranted to be listed as threatened under the Endangered Species Act (ESA). The Central Pacific and North West Atlantic & Gulf of Mexico DPS were not warranted listing on the ESA due to a low risk of extinction. The public comment period closed on 4 June 2013 (NOAA 2013)

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	1980s-present		Choose an item.
Northeastern US	Yes	Declining	Stable	1980s-present (West North Atlantic)		Choose an item.
New York	Choose an item.	Unknown	Unknown	Not Specified		Choose an item.
Connecticut	Choose an item.	Unknown	Unknown	Not Specified	Not Listed	No
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	Choose an item.	Unknown	Unknown	Not Specified	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*
There are no known monitoring activities in New York.

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. 2019). The Atlantic population of scalloped hammerhead has experience severe declines since 1983 (Jiao et al. 2011). Additional studies have shown that populations have declined 89% since 1986 (Baum et al. 2003). In a recent assessment, Hayes et al. (2009) found that the stock of scalloped hammerhead sharks in the northwestern Atlantic and Gulf of Mexico had been depleted by 83%. It was estimated that the 2005 population was only 45% of the size required to produce a maximum sustainable yield and that fishing mortality was estimated to be 129% of fishing mortality associated with maximum sustainable yield. Hayes et al. (2009) estimated that a total allowable catch of 2,583 individuals per year would allow a 70% probability of recovery within 10 years, 86% within 20 years, and 91% within 30 years.

Distribution Map

Sphyrna lewini

Legend

EXTANT (RESIDENT)

POSSIBLY EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2018

Figure 1. IUCN Red List Scalloped Hammerhead distribution map (Rigby et al. 2019)

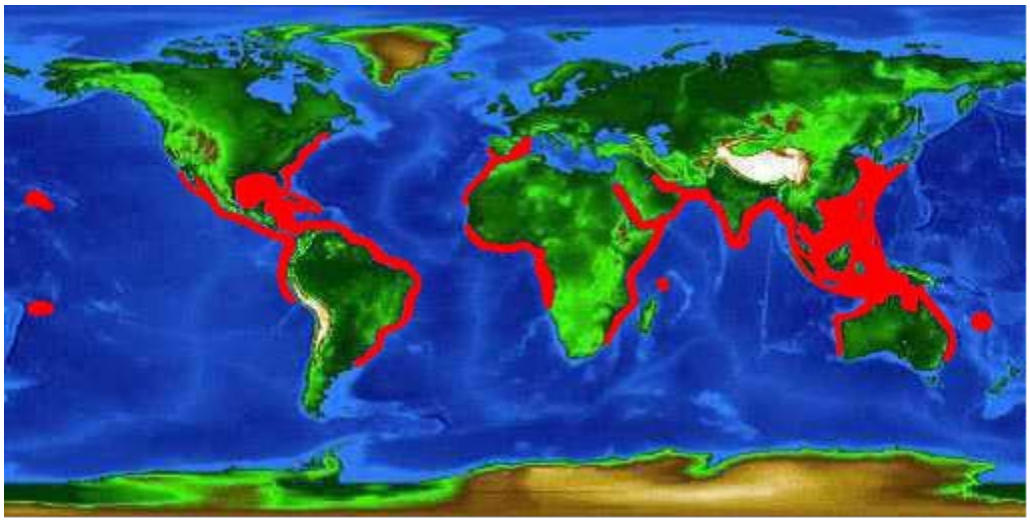

Figure 2 Worldwide distribution map of the scalloped hammerhead shark (Bester 2011).

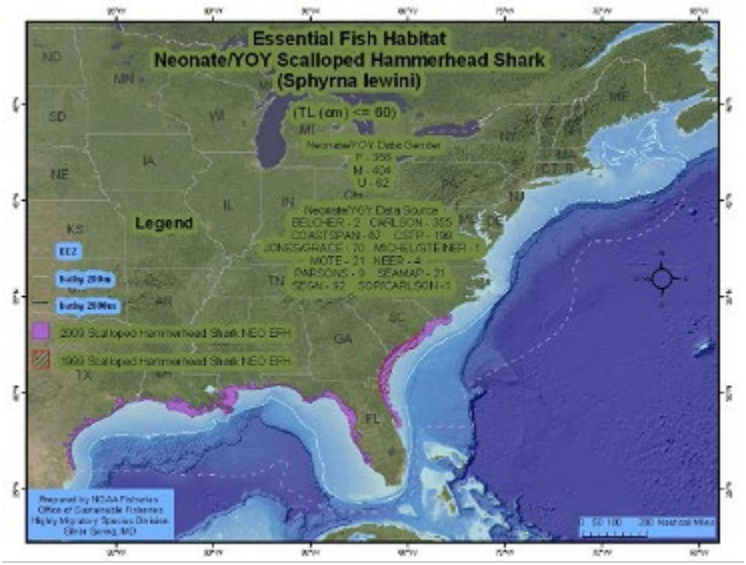

Figure 3. Essential habitat required by young-of-the year scalloped hammerhead sharks (NMFS 2009).

Figure 4. Essential habitat required by juvenile scalloped hammerhead sharks (NMFS 2009).

Figure 5. Essential habitat for adult scalloped hammerhead sharks (NMFS 2009).

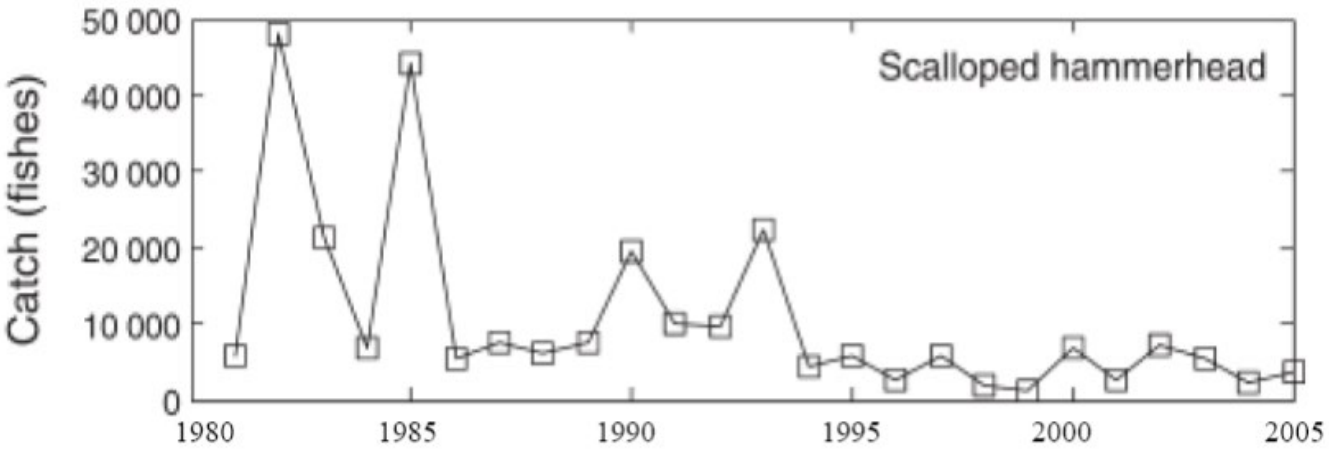

Figure 6. Catches of scalloped hammerhead shark in the northwestern Atlantic and Gulf of Mexico, including recreational, commercial landing, and pelagic long lines from 1980-2005 (Jiao et al. 2011).

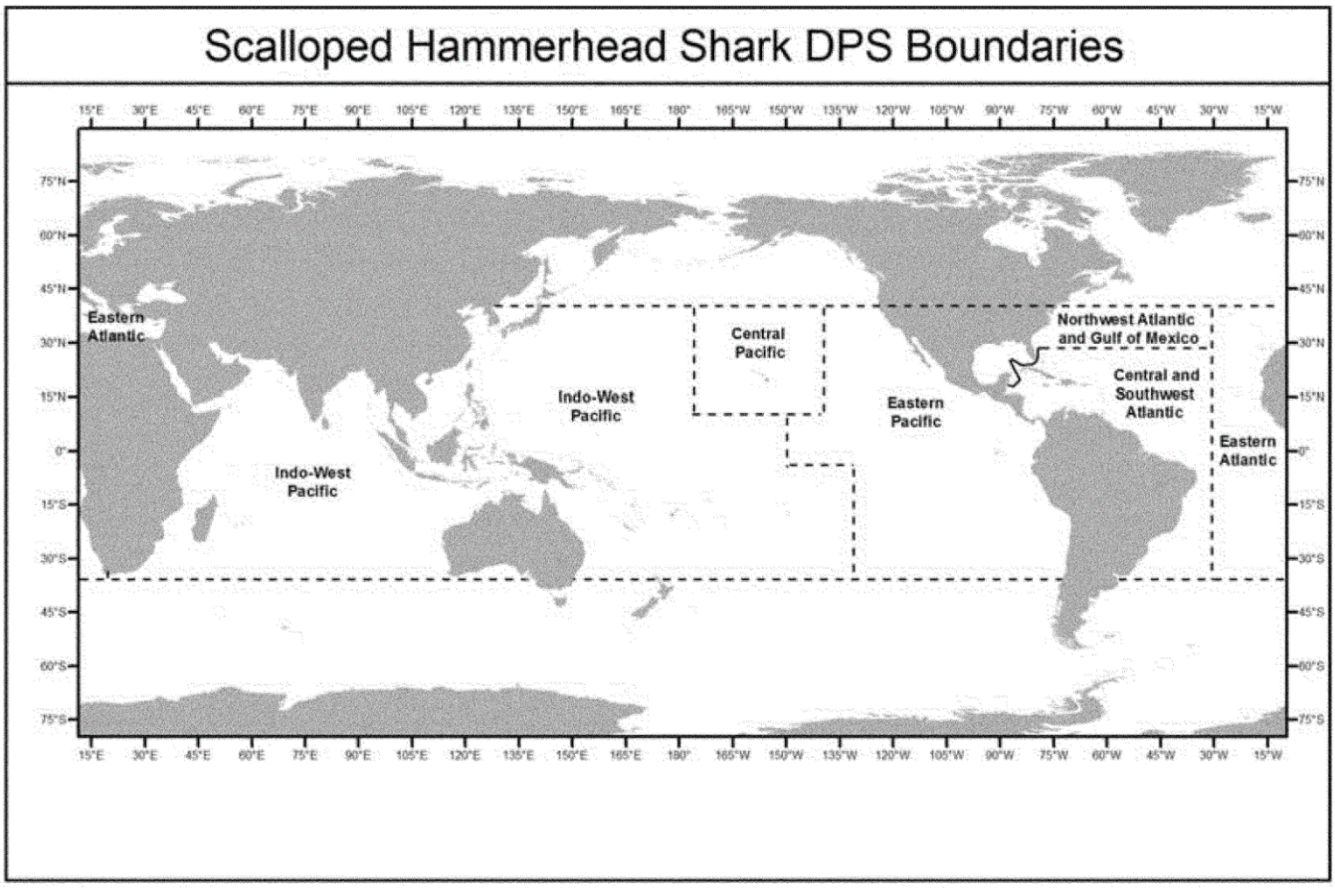

Figure 7. Map of scallop hammerhead shark DPS boundaries (NOAA 2013).

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

Juvenile and adult scalloped hammerhead sharks can occur as solitary individuals, pairs or in schools. Schools are often seen during summer migrations (Compagno 1984). This species is considered the most abundant hammerhead species (Maquire et al. 2006). Analysis of scalloped hammerhead shark genetics from West Africa and the East Coast of the United States revealed genetic isolation between the two discrete populations (Miller et al. 2013). A tagging study by Kohler and Turner (2001) found that scalloped hammerhead sharks along the eastern U.S. coast and Gulf of Mexico moved less than 100 km. The limited dispersal indicates a separation of the northwest Atlantic and Gulf of Mexico population from the Central South American population.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of scalloped hammerhead shark in New York.

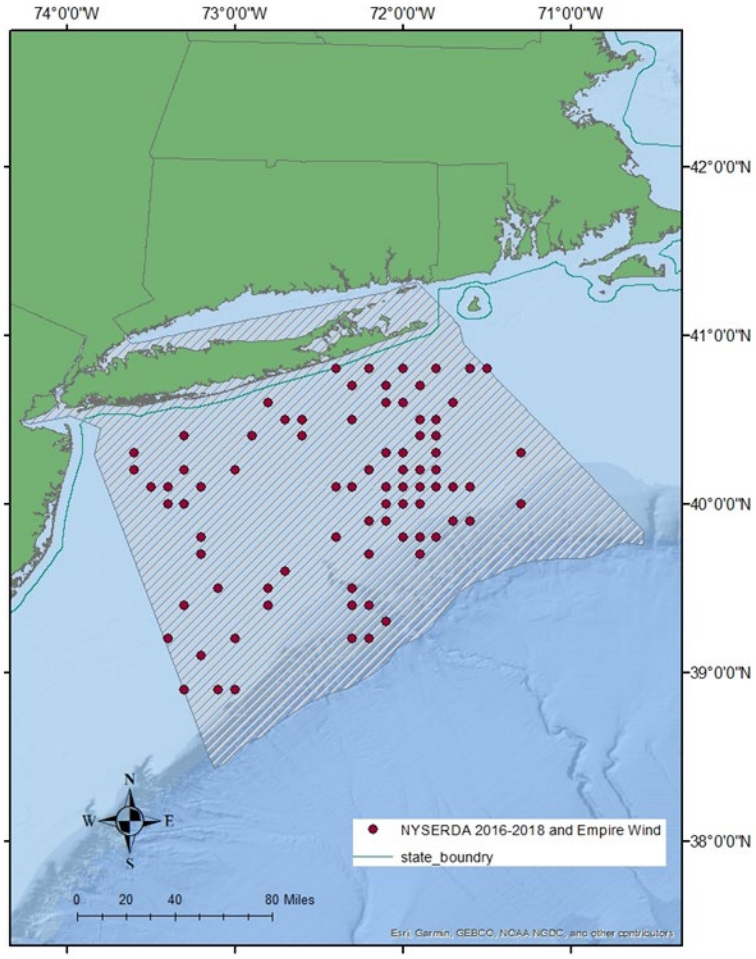

Figure 8: NY digital aerial survey

Details of historic and current occurrence:

Scalloped hammerhead records are available for NY from digital aerial surveys (see Figure 8)

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, Shallow Subtidal
c. Marine, Deep Subtidal
d. Pelagic

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:

The scalloped hammerhead shark inhabits coastal warm temperate and tropical seas worldwide. It occurs over continental and insular shelves, and in adjacent deep waters, but is rarely found in waters colder than 22°C (Compagno 1984). They are a pelagic shark found in coastal and semi-oceanic areas over continental and insular shelves (Rigby et al. 2019). It ranges from intertidal and surface to depths up to 450-512m (Sanches 1991, Kimley 1993). Scalloped hammerhead sharks are usually found at the surface to 275m depths with a maximum record of 1,043m (Rigby et al. 2019). It has also been seen entering enclosed bays and estuaries (Compagno 1984). Adult aggregations can be found offshore over seamounts and near islands, while neonate and juvenile groups are common in near shore nursery habitats (Compagno 1984). Females migrate to coastal areas to pup while adults usually spend most of their time in midwater and offshore areas (Rigby et al. 2019).

V. Species Demographics and Life History

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

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):*

Scalloped hammerhead sharks are a long lived (20-30 years), late maturing and relatively slow growing species (Branstetter 1990). This species maximum size is 370 to 420 cm total length (TL) (Rigby et al. 2019). Scalloped hammerhead sharks are highly mobile. They have been observed making short migrations along continental margins and between oceanic islands (Kholer and Turner 2001, Duncan and Holland 2006). Tagging studies showed that this species aggregates around and travels to “hot spots” (Holland et al. 1993, Kohler and Turner 2001, Duncan and Holland 2006). This species is capable of traveling long distances up to 1,600-1,900 km, and will also leave areas for long periods of time, from 2 weeks to almost a year before returning (Kholer and Turner 2001, Bessudo et al. 2011). In a mark and recapture study of scalloped hammerhead sharks on the East Coast of the U.S. and Gulf of Mexico, individuals moved less than 100 km (Kholer and Turner 2001). Nursery habitats are inhabited by juveniles for up to or more than a year (Duncan and Holland 2006). The scalloped hammerhead is an opportunistic feeder. Their diet includes a variety of teleosts, cephalopods, crustaceans, and rays (Compagno 1984, Bush 2003). Males reach maturity at 140 to 198 cm (TL). Females reach maturity at 200 to 250 cm (TL) with an age of 13.2 years. The reproductive cycle is annual or biennial (Rigby et al. 2019). This species is

viviparous, with a gestation period of 9-12 months (Stevens and Lyle 1989). Females move inshore to birth (Millet et al. 2013) ,and produce litters of 12 to 41 pups that are 31 to 57 cm (TL). Maximum age is 35 years and generation length is 24.1 years (Rigby et al. 2019).

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

Hammerheads are the second most abundant species in the international fin trade (Clarke 2004, Clarke et al. 2006a, 2006b). They are caught in a variety of fisheries including artisanal and small-scale commercial fisheries, bottom longlines as well as offshore pelagic longlines and gillnets. Hammerheads suffer high levels of bycatch and at vessel mortality (Morgan and Burgess 2007, Morgan et al. 2009).

The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial harvest)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)

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:

In NYS, anglers must enroll in the recreational marine fishing registry prior to pursuit of this species. New York anglers may take one scalloped hammerhead per vessel per trip with a minimum fork length of 78 inches. Any shark that is landed must have head and fins attached while returning to the dock (NYSDEC 2021). As of March 2013, the scalloped hammerhead is listed under CITES Appendix II (CITES 2013).

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

Current management strategies in New York aim to improve the capacity to sample and quantify demersal and pelagic shark populations at all life stages and the role the state's waters play in their life cycle (NYSDEC 2005).

The New York State Wildlife Action Plan (NYSDEC 2005) provides recommendations for conservation/management actions for pelagic shark species:

- Develop fact sheets for distribution to commercial and recreational fisherman regarding the well being of the pelagic shark stocks.

- Conduct literature review to determine the pupping and juvenile habitat requirements for pelagic coastal sharks in the Middle Atlantic bight.

- Modify New York's regulations as necessary to conform to the federal protection of sharks.
- Initiate a volunteer shark data collection program which would collect additional catch and biological information from New York's recreational anglers.

- Develop appropriate webpage information relative to the shark species found in the Mid-Atlantic bight and their status.

The scalloped hammerhead is listed as a large coastal shark by NOAA, under the Atlantic Highly Migratory Species Fishery Management Plan for Atlantic Tuna, Swordfish and Sharks (NMFS 2006). This listing results in the monitoring of international stock and development of future management goals.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	

Table 2: Recommended conservation actions for scalloped hammearhead (Rigby 2019).

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Originally prepared by	Shawn Ferdinand
Date first prepared	April 19, 2013
First revision	
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Shortfin mako **Date Updated:** 1/12/2024

Scientific Name: *Isurus oxyrinchus* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Lamnidae

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

Shortfin mako shark are a temperate and tropical specie, found in the Atlantic, Pacific and Indian oceans**.** In northwestern Atlantic, this species ranges between 20° and 40°N, bordered by the Gulf Stream in the west and the mid-Atlantic ridge in the east (Casey and Kohler 1992). It is a highly migratory species, with tagging data showing a single well-mixed population in the Northern Atlantic (Casey and Kohler 1992). Shortfin mako is a large, late-maturing pelagic shark species. Its life-history makes it vulnerable to mortalities associated with bycatch in longline and other fisheries (COSEWIC 2011). In 2011, the majority of shortfin mako harvest is from the U.S. Atlantic Coast and Gulf of Mexico. In 2011, U.S. commercial fisheries harvested over 207,000 pounds of shortfin mako (NOAA 2013). In 2012, International Commission for the Conservation of Atlantic Tunas (ICCAT) conducted a stock assessment for shortfin mako sharks, concluding that the fishery was not overfished, but was vulnerable and recommended a precautionary approach to prevent the overfishing stocks (ICCAT 2012). The IUCN Red List status has changed from vulnerable in 2009 to endangered in the 2019 assessment (Rigby et al. 2019).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** GNR, Unranked

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered

-Northeast Regional SGCN: RSGCN

-COESWIC: Threatened

-CITES: II

Status Discussion:

Shortfin mako is assessed to be globally endangered due to its estimated decline (Rigby et al. 2019). In 2017, ICCAT found that overfishing was occurring, and the stock was overfished as well (ICCAT 2017, Rigby et al. 2019).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	1980s to present		Choose an item.
Northeastern US	Yes	Declining	Stable	1986-present (Northwest Atlantic)		Choose an item.
New York	Yes	Declining	Stable	Not specified		Choose an item.
Connecticut	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
Massachusetts	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
New Jersey	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

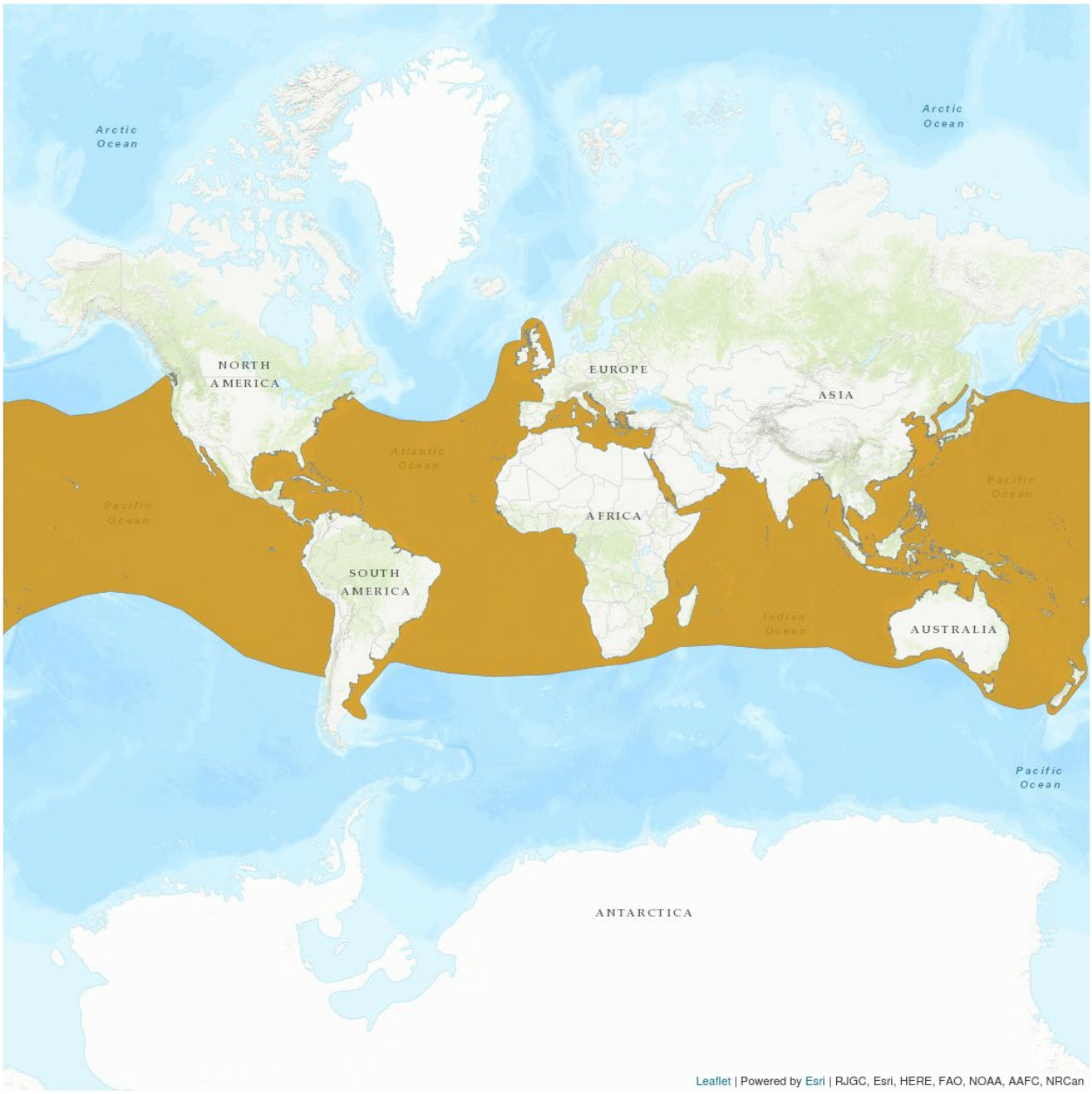
The National Marine Fisheries Services Cooperative Shark Tagging Program is an ongoing effort from recreational, commercial anglers and NMFS to tag sharks throughout the Atlantic Ocean and Gulf Coast. Since 1962 over 221,000 sharks of 52 different species have been tagged. The tagging of sharks provides information on stock identity, movements and migration, abundance, age and growth, mortality and behavior (NMFS 2011).

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. 2019). Shortfin makos are distributed circumglobally in tropical and temperate seas. In the western Atlantic, this species spans from the Grand Banks south to Uruguay and northern Argentina, including the Gulf of Mexico and Caribbean (Cailliet et al. 2009). Analysis of longline logbooks show a decline in catch per effort of 40% between 1986-2000 in the northwest Atlantic (Baum et al. 2003). The median size of shortfin mako sharks caught off the eastern coast of Canada has declined since 1998, suggesting the loss of larger sharks (Campana et al. 2005). A stock assessment was conducted in 2012 by ICCAT for the shortfin mako. Results of their assessment found the North Atlantic stock to be in good health, with a low probability of being overfished. However, their analysis had inconsistencies between estimated biomass and CPUE trends, producing wide confidence intervals in estimated trajectories, meaning that a precautionary approach should be taken in the management of this species.

Distribution Map

Isurus oxyrinchus



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2018

Figure 1. IUCN Red List Shortfin Mako distribution map (Rigby 2019)

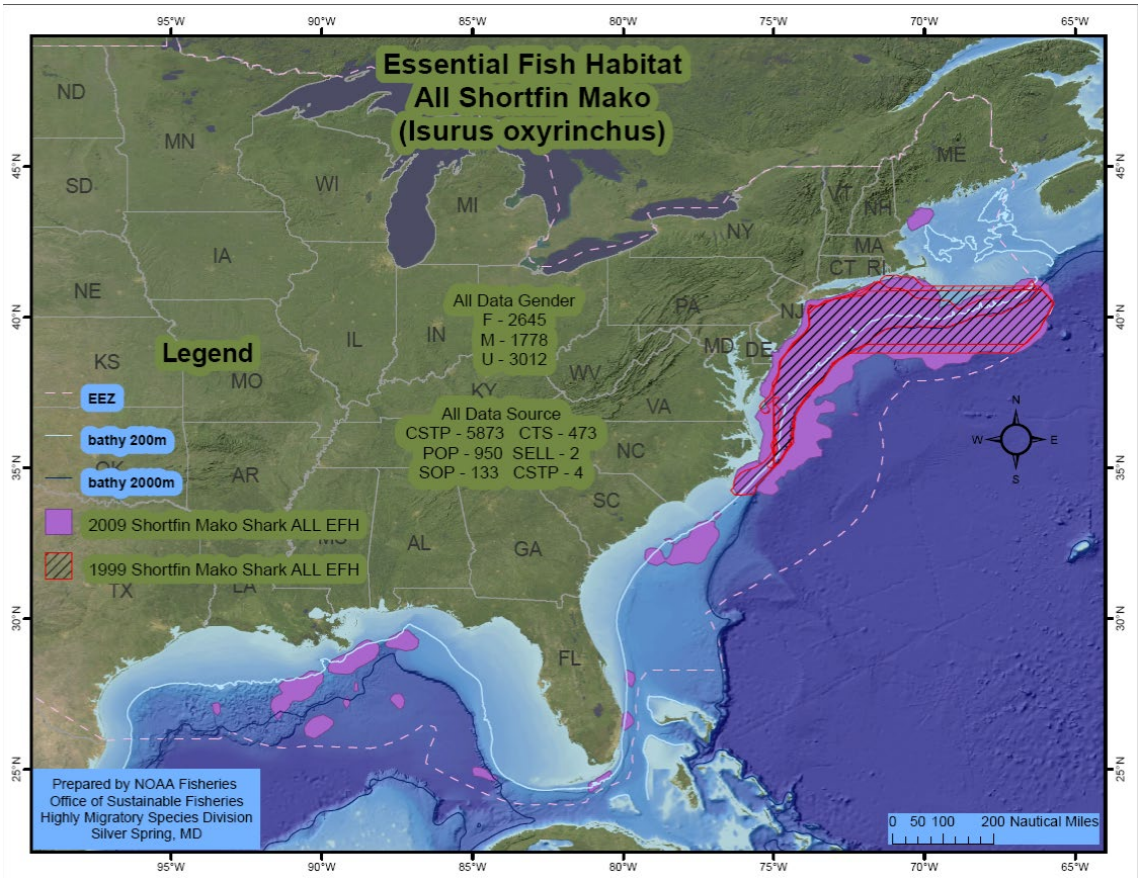


Figure 2. Essential habitat for shortfin mako (NMFS 2009).

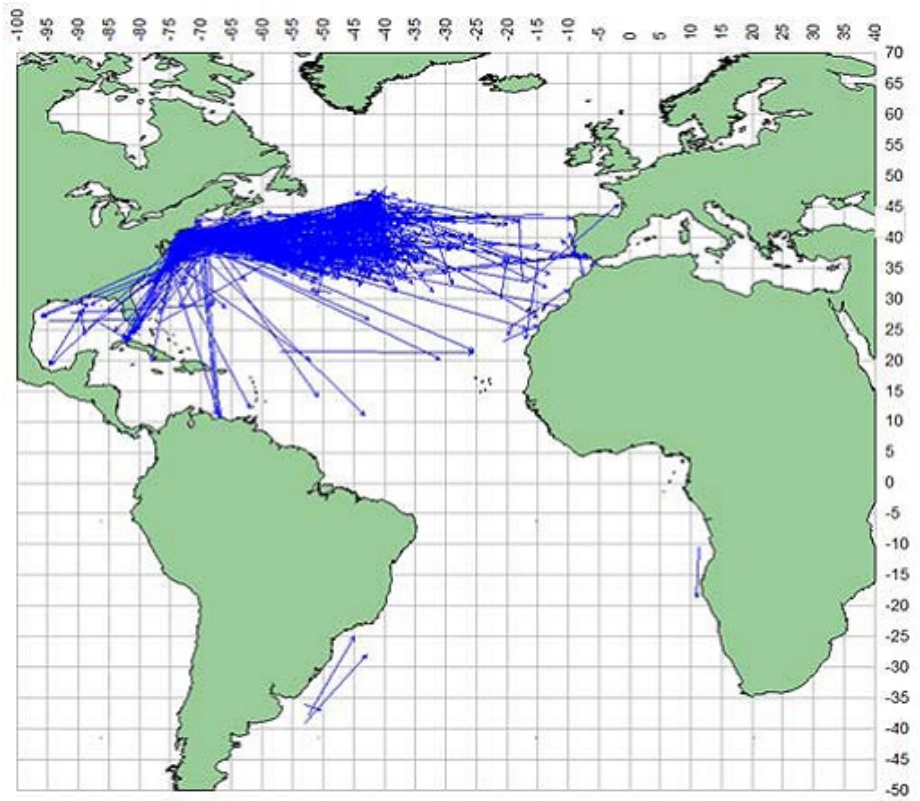


Figure 3. Straight displacement between release and recovery of tagged shortfin mako sharks (ICCAT 2012).

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

This species was considered common off the south shore of Long Island (Briggs and Waldman 2002).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of shortfin mako in New York.

Details of historic and current occurrence:

Historic:

Latham (1964) found it in Long Island Sound at Orient in 1947. Stuart Brill (NYSDEC) caught a pup on rod and reel at Oak Beach in 1971.

Current:

There are no current occurrence records in New York.

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%	Core	

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, Deep Subtidal

b. Marine, Shallow Subtidal

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:

Shortfin makos are neritic and oceanic that occupy epipelagic and mesopelagic zones. This species is found worldwide in tropical and warm-temperate waters at depths of 888m (Rigby et al. 2019).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

Shortfin makos have a 3-year reproductive cycle with an estimated gestation period of 15 to 18 months. Litter sizes are mainly 10 to 18 pups but can range from 4 to possibly 30 pups (Rigby et al. 2019) They are ovoviviparous, and once hatched they feed by oophagy in utero(Passarelli et al. 2018). Size at birth is 60 to 70 cm total length (TL) with the maximum size of this species around 445 cm (TL). Females mature at 265 to 312 cm (TL) and are usually 10 to 21 years, but can be a maximum of 28 to 32 years. Males mature at 166 to 204 cm (TL) (Rigby et al. 2019)

Instantaneous rate of natural mortality is estimated to be 0.16 and the estimated generation length is 14 years. Results from a tagging study show this species makes extensive movements up to 3,433 km and having 36% of recaptures caught at greater than 420 km from the tagging location (Casey and Kohler 1992). Mitochondrial DNA shows that there is a separation of female shortfin makos between eastern and western Atlantic populations; however, DNS shows that male mixing is occurring across the North Atlantic (Casey and Kohler 1992). The diet of shortfin makos consist of teleost fishes and cephalopods (Stillwell and Kohler 1982, Stevens 1984).

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

The shortfin mako is commonly caught by target fisheries and as bycatch in longline and gillnets directed at tuna and billfish (Cailliet et al. 2009, Rigby et al. 2019). This species is mainly taken as bycatch in offshore and high-seas waters by industrial pelagic fleets. It is also caught in coastal longlines, gillnets, and sometimes trawls (Rigby et al. 2019) It is also a prized recreational fish, commonly sought after and retained for its high quality meat (Cailliet et al. 2009). Due to its high value, when it is caught as bycatch it is often kept (Campana et al. 2005).

The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial harvest)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch--discards)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fishing)
4. Energy Production & Mining	Renewable Energy (offshore wind farms)

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:

In NYS, anglers must enroll in the recreational marine fishing registry prior to pursuit of this species. New York anglers may take one shortfin mako per vessel per trip with a minimum fork length of 71 inches for males and 83 inches for females. Any shark that is landed must have head and fins attached while returning to the dock (NYSDEC 2021).

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

Current management strategies in New York aim to improve the capacity to sample and quantify demersal and pelagic shark populations at all life stages and the role the state's waters play in their life cycle (NYSDEC 2005).

The New York State Wildlife Action Plan (NYSDEC 2005) provides recommendations for conservation/management actions for pelagic shark species:

- Develop fact sheets for distribution to commercial and recreational angler regarding the well-being of the pelagic shark stocks.

- Conduct literature review to determine the pupping and juvenile habitat requirements for pelagic coastal sharks in the Middle Atlantic bight.

- Modify New York's regulations as necessary to conform to the federal protection of sharks.

- Initiate a volunteer shark data collection program which would collect additional catch and biological information from New York's recreational anglers.

- Develop appropriate webpage information relative to the shark species found in the Mid-Atlantic bight and their status.

The shortfin mako is listed as a large coastal shark by NOAA, under the Atlantic Highly Migratory Species Fishery Management Plan for Atlantic Tuna, Swordfish and Sharks (NMFS 2006). This listing results in the monitoring of international stock and development of future management goals.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	

Table 2: Recommended conservation actions for shortfin mako (Rigby et al. 2019)

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Originally prepared by	Shawn Ferdinand
Date first prepared	January 29, 2014 (Samantha Hoff)
First revision	January 12, 2024 (Siobhan Keeling)
Latest revision	

Species Status Assessment

Common Name: Smooth hammerhead shark **Date Updated:** 1/12/2024

Scientific Name: *Sphyrna zygaena* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Sphyrinidae

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

One of the larger species in the genus *Sphyrna*, the smooth hammerhead shark is a coastal-pelagic and semi-oceanic species. It primarily stays on the continental shelf and prefers waters around 20m deep, although it has been reported at depths of 200m (Ebert 2003). Smooth hammerheads are thought to be present in low abundance in the western North Atlantic; they are rarely caught as bycatch in the commercial highly migratory species pelagic longline fisheries or by recreational fisherman using rod and reel (Miller, 2016). Data from pelagic longline records suggest that in the northwest Atlantic between 1981 and 2005, smooth hammerhead sharks have declined by 91%. However, data is very limited for smooth hammerhead sharks (Hayes, 2007). In the northwest Atlantic, the large hammerhead shark complex, which includes smooth hammerheads, scalloped hammerheads (*Sphyrna lewini*), and great hammerheads *(Sphyrna mokarran*), have experienced some of the most severe declines amongst shark species. However, these trends are most likely driven by trends in scalloped hammerhead abundance (Baum and Blanchard, 2010). Species-specific information on smooth hammerheads is limited and distinguishing between hammerhead species is challenging; for example, bycatch was historically reported as Sphyrna spp. (Gallagher and Klimley, 2018). In 2016, the National Marine Fisheries Service National Oceanic and Atmospheric Administration conducted an Endangered Species Status Review of smooth hammerhead sharks. The results suggest that although the species is displays characteristics that make it inherently vulnerable to extinction (e.g., slow growth rates), current conditions were deemed unlikely to cause extinction. However, there was a high degree of uncertainty in the assessment (Miller et al., 2016).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; Non-SGCN, Potential Conservation Need

b. Natural Heritage Program

i. **Global:** G3G4, Vulnerable/Apparently Secure, status rounded to G3

ii. **New York:** SU, Unrankable **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable

-Northeast Regional SGCN: RSGCN

-CITES: II

Status Discussion:

There is limited information on stock assessments of smooth hammerheads due to the lack of species-specific data. Studies have reported large declines in relative abundance for the hammerhead complex (Baum et al. 2003, Jiao et al. 2008).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	Since 1986		Choose an item.
Northeastern US	Yes	Declining	Declining	Since 1986 (Northwest Atlantic)		Choose an item.
New York	No data	Unknown	Unknown	Not specified	Not specified	Choose an item.
Connecticut	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
Massachusetts	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
New Jersey	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*
There are no known monitoring activities in New York.

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. 2019). In the western Atlantic, smooth hammerheads range from Nova Scotia to southern Florida (Last and Steven 2009). Population data specific to smooth hammerheads are unavailable for the northwest Atlantic. Globally, populations are thought to be decreasing (Casper et al. 2005). Commercial fishing logbook data in the U.S. pelagic longline fishery between 1986-2000 and observer data between 1992-2005 estimated a decline of 89% for the hammerhead complex (Baum *et al*. 2003).

Pelagic longline observer data indicated that *Sphyrna spp.* declined by 76% between 1992-2005 (Camhi et al. 2009).

Distribution Map

Sphyrna zygaena

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2018

Figure 1. IUCN Red List Smooth Hammerhead Shark distribution map (Rigby 2019)

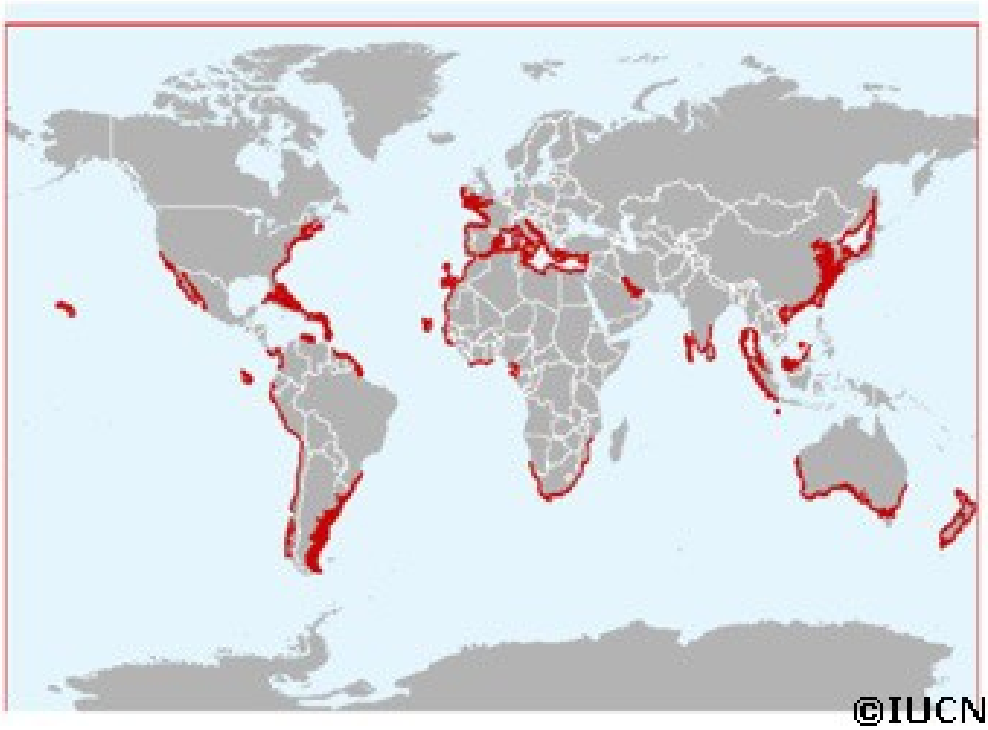

Figure 2. Distribution of smooth hammerhead (IUCN 2005).

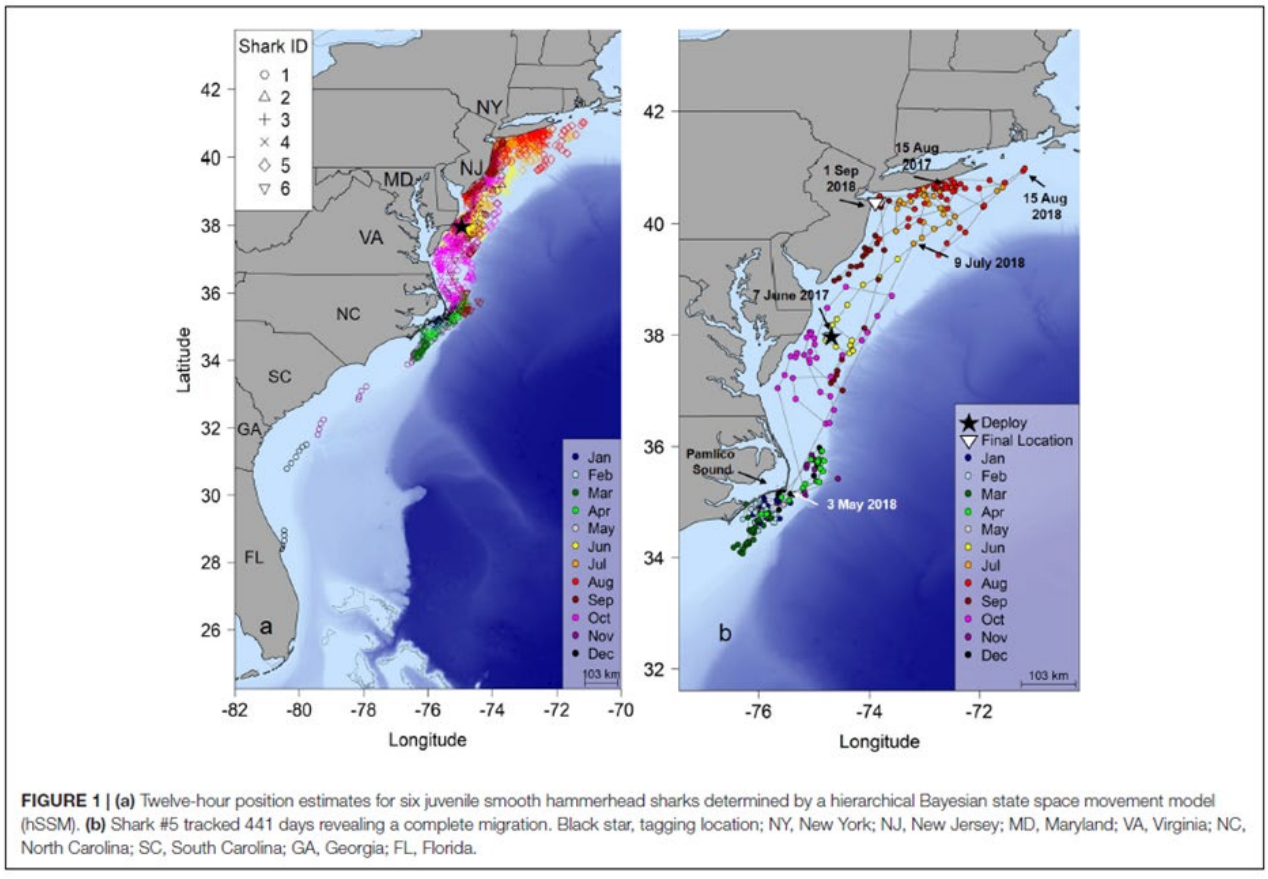

FIGURE 1 | (a) Twelve-hour position estimates for six juvenile smooth hammerhead sharks determined by a hierarchical Bayesian state space movement model (hSSM). **(b)** Shark #5 tracked 441 days revealing a complete migration. Black star, tagging location; NY, New York; NJ, New Jersey; MD, Maryland; VA, Virginia; NC, North Carolina; SC, South Carolina; GA, Georgia; FL, Florida.

Figure 3. Estimated locations of six tagged juvenile smooth hammerhead sharks (Logan et al., 2020)

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

Sphyrna zygaena is a relatively common and widespread shark in temperate waters. It is captured in a number of fisheries throughout its range, mostly by gillnet and longline (Simpfendorfer 2005). Juveniles are seen in large congregations during migration periods. Adults are seen single or in small schools (Florida Museum of Natural History 2008).

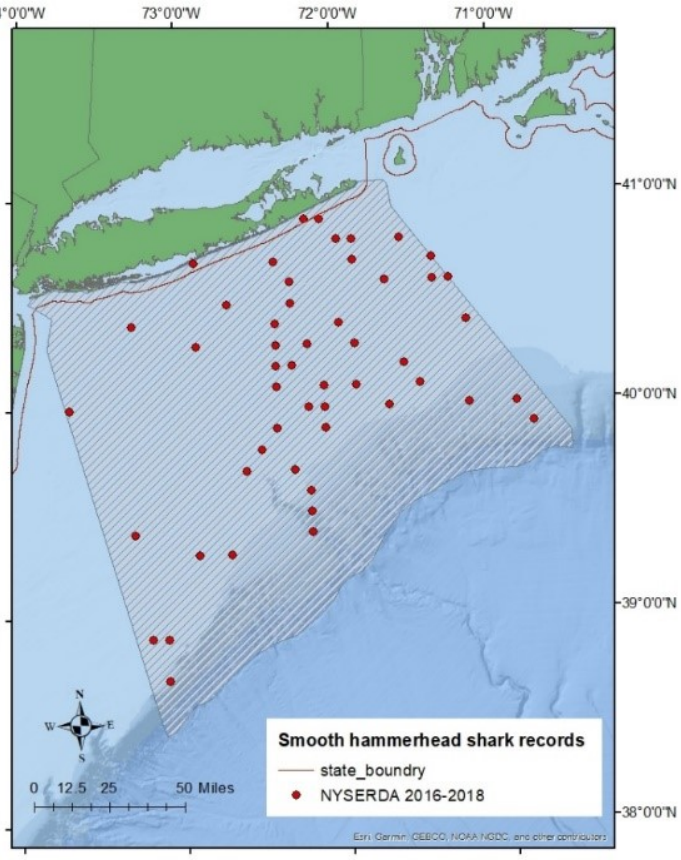

Figure 4. Records of smooth hammerheads within the NY offshore planning area between 2015-2020

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of smooth hammerhead shark in New York.

Details of historic and current occurrence:

In the western North Atlantic, juvenile smooth hammerheads have shown consistent use of coastal areas in the New York Bight during the summer months and travel south to the coastal areas off Cape Hatteras, North Carolina, during the winter months. Additional research may lead these areas to be designated as essential fish habitats (Logan et al., 2020).

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%	Core	

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. Pelagic

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:

The smooth hammerhead is a coastal-pelagic and semi-oceanic species. It occurs on the continental shelf, preferring waters around 20 m deep (Ebert 2003). They are found at depths of 200 m and possibly 500 m (Rigby et al. 2019) commonly found over deep reefs on the edge of the continental shelf (Smale 1991). Nursery habitat is smooth sandy substrates in shallow waters up to 10m (Bass et al. 1975). Smooth hammerheads leave coastal habitats when they are of 2 to 3 years of age and are the most oceanic hammerhead species (Rigby et al. 2019).

V. Species Demographics and Life History

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

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):*

The maximum age of smooth hammerheads has yet to be determined; however, it possible that individuals may live 20 years or longer (FLMNH 2008). Smooth hammerheads less than 2 m in length consume inshore squid and teleosts (Smale 1991, Last and Stevens 1994). Larger adults consume squid, teleosts, other sharks and rays (Compagno 1984, Stevens 1984). . Smooth Hammerhead reach a maximum size of 370 to 400 cm total length (TL) with males maturing at 250 to 260 cm TL. Females mature at around 246 to 265 cm TL and it's estimated that they are 15 years of age. Smooth hammerhead are viviparous with a gestation period of 10 to 11 months. Their size at birth is 49 to 63 cm TL and they have litter sizes of 20 to 50 pups (Rigby et al. 2019). This species is more tolerant of temperate waters than other *Sphyrna sp.*. During the summer months, this species migrates towards the poles, and migrates back towards the equator during the colder winter months (Ebert 2003).

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

Hammerheads are the second most abundant species in the international fin trade (Clarke 2004, Clarke et al. 2006a, 2006b). They are caught in a variety of fisheries including artisanal and small-scale commercial fisheries, bottom longlines as well as offshore pelagic longlines and gillnets. Hammerheads suffer high levels of bycatch and vessel mortality (Morgan and Burgess 2007, Morgan et al. 2009).

The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial fishing)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
3. Climate Change & Severe Weather	Habitat Shifting & Alteration (increasing ocean temperature)

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:

In NYS, anglers must enroll in the recreational marine fishing registry prior to pursuit of this species. New York anglers may take one smooth hammerhead per vessel per trip with a minimum fork length of 78 inches. Any shark that is landed must have head and fins attached while returning to the dock (NYSDEC 2021).

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

As of March 2013, the smooth hammerhead is listed under CITES Appendix II, due to its similarity in appearance to the globally endangered scalloped hammerhead (CITES 2013). Current management strategies in New York aim to improve the capacity to sample and quantify demersal and pelagic shark populations at all life stages and the role the state's waters play in their life cycle (NYSDEC 2005).

The New York State Wildlife Action Plan (NYSDEC 2005) provides recommendations for conservation/management actions for pelagic shark species:

- Develop fact sheets for distribution to commercial and recreational fisherman regarding the well being of the pelagic shark stocks.
- Conduct literature review to determine the pupping and juvenile habitat requirements for pelagic coastal sharks in the Middle Atlantic bight.
- Modify New York's regulations as necessary to conform to the federal protection of sharks.
- Initiate a volunteer shark data collection program which would collect additional catch and biological information from New York's recreational anglers.
- Develop appropriate webpage information relative to the shark species found in the Mid-Atlantic bight and their status.

The smooth hammerhead is listed as a large coastal shark by NOAA, under the Atlantic Highly Migratory Species Fishery Management Plan for Atlantic Tuna, Swordfish and Sharks (NMFS 2006). This listing results in the monitoring of international stock and development of future management goals.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1. Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	

Table 2: Recommended conservation actions for smooth hammerhead (Rigby et al. 2019)

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Originally prepared by	Shawn Ferdinand
Date first prepared	April 3, 2013
First revision	
Latest revision	January 12, 2024 (Siobhan Keeling)

briaSpecies Status Assessment

Common Name: Smooth skate **Date Updated:** 1/12/2024

Scientific Name: *Malacoraja senta* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Rajiformes

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

The smooth skate is one of the smallest species of skate endemic to the north-western Atlantic, occurring off the banks of Newfoundland and the southern Gulf of St. Lawrence, Canada, southward to New Jersey. There are four (possibly five) distinct concentrations of smooth skate off Canada, separated by wide areas where individuals never occur (Kulka et al. 2006). Individuals have been caught off the south shore of Long Island in Northeast Fishery Science Center (NEFSC) trawl surveys, but generally very few individuals are caught in inshore areas of Southern New England and the Mid-Atlantic Bight (44th SAW 2007). Smooth skate are not targeted in any commercial fishing operations, but are taken in mixed fisheries or as by-catch by trawls, long-lines, crab pots and scallop dredges (Kyne et al. 2012). The Northeast Skate Complex Fishery Management Plan (FMP) prohibits the possession of smooth skate and establishes biomass targets and essential fish habitat for this species. Like other elasmobranchs, this species exhibits characteristics that make them vulnerable to exploitation such as late maturity and a long life span.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** GNR, Unranked

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable

-Northeast Regional SGCN: RSGCN

-COSEWIC: Funk Island- endangered, Laurentian-Scotian- special concern, Hopedale Channel- data deficient, Nose of the Grand Bank- data deficient

Status Discussion:

The majority of the smooth skate population occurs in Canada, where survey data show population declines of 73-91%, warranting the endangered status. The U.S. portion of the population declined in the 1970s but has been stable at lower levels since. The U.S. population is negatively affected by fisheries and biomass indices were below biomass thresholds until recently, resulting in a status of Near Threatened (44th SAW 2007, Sulikowski et al. 2009b). The globally endangered status is justified as the majority of the total population (~75%) is found within Canadian waters (Kyne et al. 2012). The smooth skate has been flagged for priority reassessment by the IUCN and is currently

undergoing revision (Kyne et al. 2012). The 3-year average survey biomass of 0.23 kg/tow for 2009-2011 was 77% above the overfished threshold and 85% above the maximum sustainable yield target, indicating the stock could be rebuilt before the 2020 deadline if the current biomass trends continue (NEFMC 2012).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Unknown	1980-present		Choose an item.
Northeastern US	Yes	Stable	Stable	1980-present (Mid-Atlantic Bight)		Choose an item.
New York	Yes	Declining	Unknown	1980-present		Choose an item.
Connecticut	Yes	Declining	Unknown	1980-present	Not Listed	No
Massachusetts	Yes	Declining	Unknown	1980-present	Not Listed	No
New Jersey	Yes	Declining	Unknown	1980-present	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	Yes	Declining	Unknown		E, SC, & DD	Choose an item.

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

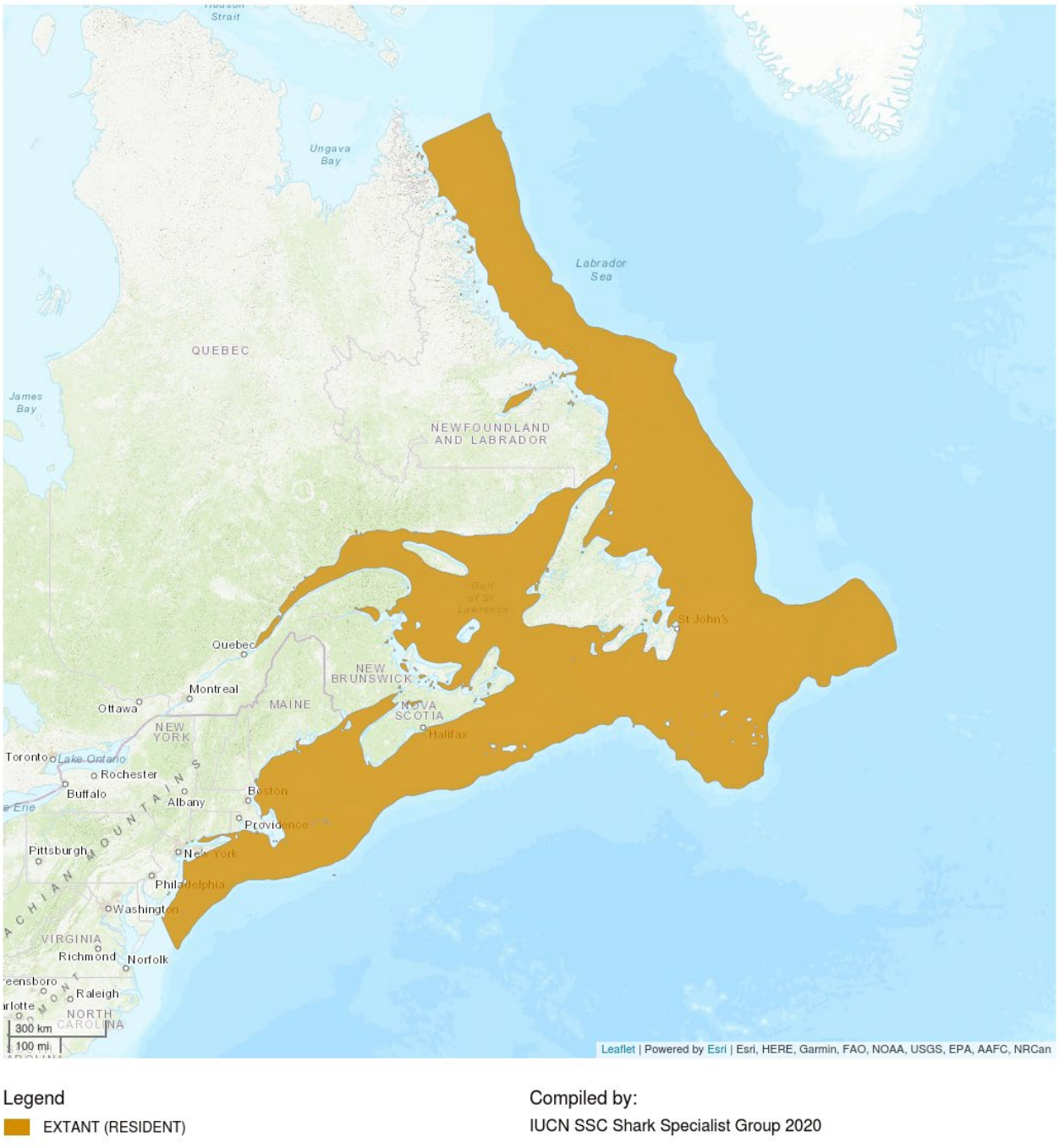
Monitoring in New York *(specify any monitoring activities or regular surveys that are conducted in New York):*
There are currently no monitoring activities in New York.

Trends Discussion *(insert map of North American/regional distribution and status):*
The current population trend is increasing according to the IUCN red list (Kulka et al. 2020). Northeast Fishery Science Center autumn survey biomass indices of smooth skate were highest during the 1960s and late 1970s, but have been stable at lower levels since the mid-1980s. The 2003-2005 biomass index was slightly above the threshold, but quickly declined. The 2007 biomass index of 0.14 kg/tow fell below the biomass threshold reference point (0.16 kg/tow) and the National Marine Fisheries Service considered the smooth skate to be overfished (44th SAW 2007). Since 2000, the total annual catch of smooth skate in the NEFSC spring surveys ranged from 30 fish in 2000 to 71 fish in 2006, while the total annual catch in the autumn surveys ranged

from 55 fish in 2000 to 44 fish in 2006 (SAFE Report 2008). The 3-year moving average survey biomass for 2009-2011 is 0.23 kg/tow, 77% above the overfished threshold (0.13 kg/tow) and 85% of the maximum sustainable yield target (0.27 kg/tow) (NEFMC 2012). If the current biomass trends continue, the stock could be rebuilt before the deadline of 2020 (NEFMC 2012).

Distribution Map

Malacoraja senta



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. IUCN Red List Smooth Skate Distribution Map (Kulka et al. 2020)

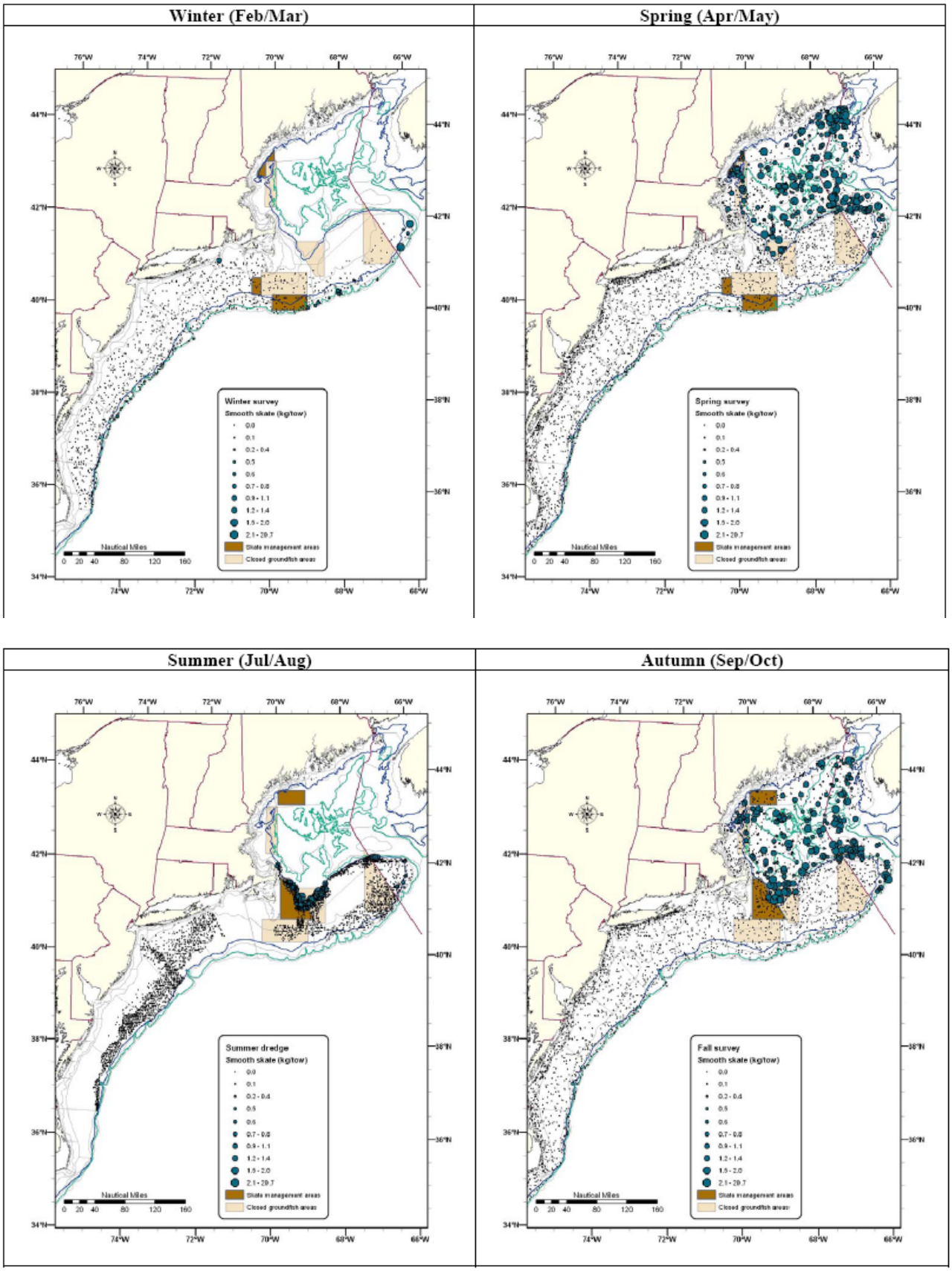


Figure 2. Smooth skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys (NEFMC 2009).

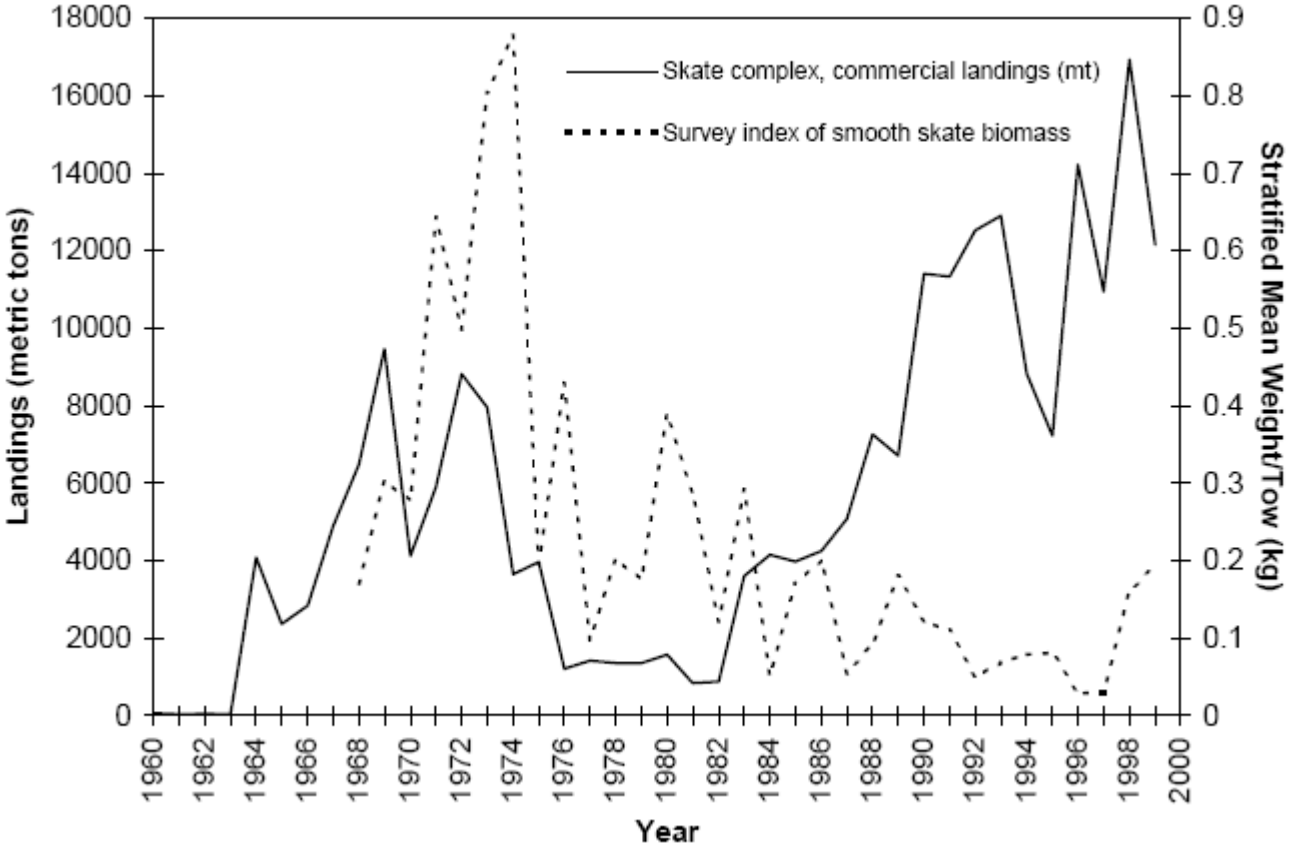


Figure 3. NEFSC spring survey index of smooth skate biomass and commercial landings for the skate complex from the Gulf of Maine to the Mid-Atlantic Bight (Packer et al. 2003).

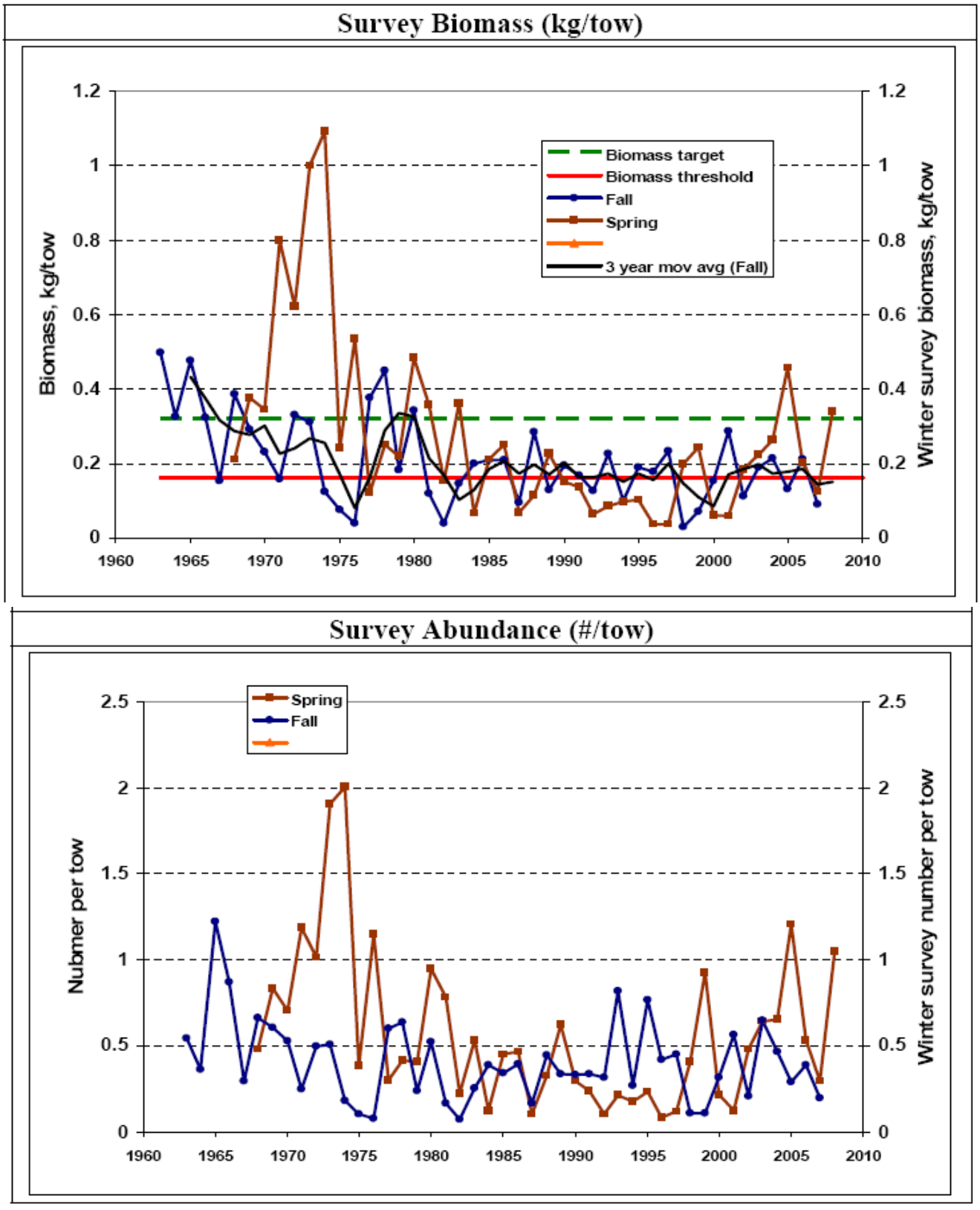


Figure 4. Smooth skate stratified mean weight and number per tow for the winter, spring and fall NEFSC trawl surveys from Cape Hatteras, NC to the Gulf of Maine (NEFMC 2009).

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

Smooth skate are a boreal species whose center of distribution is in the Gulf of Maine, therefore occurrences in New York are uncommon.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of smooth skate in New York.

Details of historic and current occurrence:

Historic:

McEachran and Musick (1975) found no individuals in the Mid-Atlantic Bight during their groundfish surveys from 1969-1970, but NEFSC trawl surveys have caught individuals off the south shore of Long Island since the 1960s (NEFMC 2009, Packer et al. 2003).

Current:

NEFSC bottom trawl surveys have caught individuals off the southern shore of Long Island as recently as 2008 (NEFMC 2009).

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, Deep Subtidal
b. Estuarine, Brackish Deep Subtidal
c. Marine, Deep Subtidal, Benthic Geomorphology, Benthic Flat

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:

The smooth skate occurs in deep brackish and marine waters from 25 to 1,436 meters but is most abundant between 70-480 meters (McEachran and Musick 1975, Kyne et al. 2012, Kulka et al. 2020). It appears to be temperature specific, occupying a narrow range of water temperature throughout its range (3-10˚C) (Kyne et al. 2012). Smooth skate are a demersal species found on continental shelves and slopes (Kulka et al. 2020). It prefers substrates of soft mud and clay bottoms of deeper troughs and basins, and sand and shells of the offshore banks (Sulikowski et al. 2009b). Smooth skate are very selective in their diet, eating mostly small crustaceans through most of its life and only taking fish at largest sizes (Sulikowski et al. 2009b). Co-occurrence and possibly competition with the thorny skate may have led to food specialization in smooth skate and possibly caused the low abundance and low diversity of prey species in the diet of this species (Packer et al. 2003). Smooth skate do not undergo large-scale migrations but they do move seasonally in response to temperature, moving offshore in summer and autumn and returning inshore in winter and spring.

V. Species Demographics and Life History

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

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):*

Smooth skates are oviparous, and offspring are 8 to 10cm total length (TL) when hatched. This species reaches a maximum size of 71cm (TL). Males reach maturity at 41 to 54cm (TL), and females reach maturity at 47 to 57 cm (TL) when they are about 9.5 years (Kulka et al 2020). Not much is known about the life history of smooth skate. A single fertilized egg is deposited in a capsule and incubation time may be anywhere from 6 months to 2 years (NEFMC 2009). The smooth skate, like many other north Atlantic skates, is reproductively active year round. Age at 50% maturity is estimated to be between 9 and 10 years for males and between 8 and 9 years for females (Sulikowski et al. 2009a). Maximum age is 14 years and generation length is about 16 years (Kulka et al. 2020). The greatest source of morality is from overfishing and by-catch mortality, although individuals may be prey for grey seals in some portions of their range.

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

The primary threat to smooth skate is incidental catches in a variety of fisheries throughout its range. Although there are no direct fisheries for this species, they are often taken as by-catch in fisheries targeting other species then discarded. Coupled with their low reproductive rate and low intrinsic rate of increase, smooth skate have low resilience to fishing mortality (Sulikowski 2009b). Although there are possessions on smooth skate landing and the population is considered to be stable, albeit at low levels, this species has the potential to become overfished again (Sulikowski 2009b). Direct potential effects of climate change on skates have not been studied, but temperature

fluctuations and habitat shifting may negative affect the smooth skate since they occupy a relatively narrow temperature range.

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Climate Change & Severe Storms	Habitat Shifting & Alteration (warming ocean temperature)
3. Climate Change & Severe Storms	Temperature Extremes

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:

The smooth skate is managed under the New England Fishery Management Council's Skate Complex Fishery Management Plan (FMP), implemented in 2003. The FMP includes mandatory reporting by species, possession prohibition on the smooth skate, and other various measures to aid in the recovery of overfished species, however, landings have yet to be recorded by species and over 99% are reported as 'unclassified skates' (Kyne et al. 2012). Smooth skate were petitioned for listing under the Endangered Species Act in 2011, but NOAA Fisheries determined that status review was not warranted at that time. The rebuilding target for this species is 2020, and it appears that the stock may be rebuilt before the deadline if the current biomass trend continues (NEFMC 2012).

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

Fishery-independent data for skates where individual species are reported is important to understand populations and abundance of smooth skate as well as their distribution in New York. Monitoring and collection of biological data for the smooth skate would provide an updated biological assessment to better understand life history characteristics and determine if they are breeders in New York waters. Implementing rules and regulations as necessary and appropriate consistent with the rules and regulations implemented by the NMFS will support the recovery of this species throughout its range.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**

3.1 Species management 3.1.1 Harvest management	
3.2 Species recovery	

Table 2: Recommended conservation actions for smooth skate (Kulka et al. 2020).

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Originally prepared by	Samantha Hoff
Date first prepared	April 18, 2013
First revision	
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Thorny skate **Date Updated:** 1/12/2024

Scientific Name: *Amblyraja radiata* **Updated by:** Siobhan Keeling

Class: Chondricthyes

Family: Rajidae

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

The thorny skate is a temperate to arctic species distributed on both sides of the North Atlantic Ocean. The northwest Atlantic population occurs from Greenland and Hudson Bay, Canada, southward to South Carolina, most commonly at depths of 50 to 100 meters (Packer et al. 2003). Its geographic range includes contrasting population trends; the USA has experienced severe declines (80-90%) while Canadian and some northeast Atlantic populations have been relatively stable or increasing in recent years (Kulka et al. 2009, 2020). There is evidence indicating population segregation and division into subpopulations, but it is currently unknown if genetic mixing of subpopulations takes place in the northeast or northwest Atlantic stocks (Kyne et al. 2012). Thorny skate have been caught off the south shore of Long Island in the New York Bight, but they are most abundant in the Gulf of Maine and Georges Bank offshore strata with very few individuals caught in inshore Mid-Atlantic or Southern New England regions (NEFMC 2009). In recent years (2016-2021), there have been no catches of Thorny Skate in the NEFSC trawl survey within the NY Bight, but thorny skate been reported throughout the NY Bight in the NOAA observer program. In the U.S., thorny skate have been targeted and taken as by-catch in numerous fisheries and survey indices have declined steadily since the late 1970s. Commercial and recreational fisheries for thorny skate are now prohibited in the U.S. and management is coordinated by the Northeast Fishery Management Council (NEFMC) under the Northeast Skate Complex Fishery Management Plan of 2003. Despite management actions, U.S. populations have not recovered (New England Fishery Management Council, 2020). As a boreo-Arctic species, southern habitats may become less suitable with increases in temperature, resulting in ranges shifting northward (Kulka et al., 2020). The thorny skate was petitioned for listing under the ESA but a review in 2016 found that despite low biomass throughout the U.S. management area, there were no distant population segments, and the species was not at risk for extinction throughout all or a significant portion of their range (NMFS, 2017).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; HPSGCN

b. Natural Heritage Program

i. **Global:** GNR, Unranked

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: vulnerable

-Northeast Regional SGCN: RSGCN

- COSEWIC: special concern (May 2012)

Status Discussion:

Although the overall abundance of thorny skate includes several hundred millions of individuals, the potential occurrence of subpopulations with different age and growth rates and the potential lack of protection under a continuing U.S. wing fishery warrant a global assessment of vulnerability by the IUCN (Kyne et al. 2012). Biomass of thorny skate has declined steadily in the southern portion of the Northwest Atlantic since the late 1970s. Abundance has recently declined to historic lows despite prohibition of landings in the U.S. (implemented in 2003). The Northeast Fishery Management Council (NEFMC) has determined that thorny skate stock is not experiencing overfishing but is overfished (NEFMC 2020). The most recent IUCN assessment in 2019 determined that Northwest Atlantic Southern population is critically endangered (Kulka et al., 2020).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	severe abundance decline from 1980-present		Choose an item.
Northeastern US	Yes	Declining	Declining	severe abundance decline in Mid-Atlantic Bight 1980-present		Yes
New York	Yes	Declining	Unknown	severe abundance decline 1980 – present		Yes
Connecticut	Yes	Declining	Unknown		Not listed	No
Massachusetts	Yes	Declining	Unknown		Not listed	No
New Jersey	Yes	Unknown	Unknown		Not listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	Yes	Declining	Declining	severe abundance decline from mid 1970s – present	Special concern	Choose an item.

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):*

NOAA's NEFSC conducts spring and autumn bottom trawl surveys annually from Cape Hatteras, NC to the Gulf of Maine. NEFSC winter surveys focus on Southern New England and the Mid-Atlantic offshore regions. However, low catch efficiency for thorny skate may limit the applicability of this survey to monitor thorny skates. The NOAA observer program in the NY Bight does encounter thorny skates.

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

The current population trend is decreasing according to the IUCN red list (Kulka et al. 2020). Skates have been reported in New England fishery landings since the late 1800s. However, landings never exceeded more than a few hundred metric tons until the rise of distant water fishing fleets in the 1960s. Historically, catches were never recorded by species (Sosebee 2006). Northeast Fishery Science Center (NEFSC) spring and autumn survey biomass indices for thorny skate have declined continuously since the 1960s. Thorny skate are currently overfished; biomass has declined from 5.6 kg/tow in the NEFSC bottom trawl survey in the 1970s to 0.15 kg/tow in 2019 and 2021 (NEFMC, 2022). In the twentieth year of a 25-year rebuilding plan, the thorny skate is only at 3.5% of the rebuilding target and shows no sign of rebuilding (NEFMC, 2023).

Distribution Map

Amblyraja radiata

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. Thorny Skate range and global status (IUCN Redlist Kulka et al., 2020)

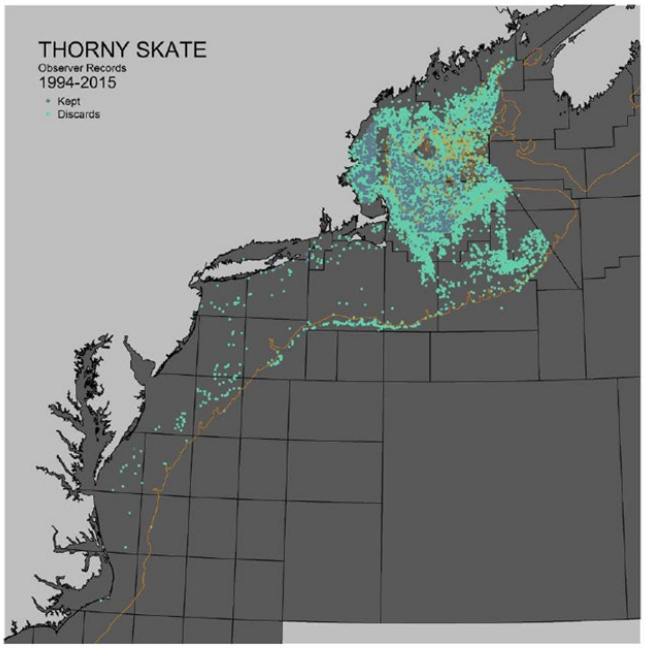

Figure 12. Kept and discards of thorny skate (*Amblyraja radiata*) from the observer program from 1994-2015.

Figure 2. Thorny skates from the NOAA observer program (1994-2015) (Sosebee et al. 2016)

1. Northwest Atlantic (South): Southern Gulf of St. Lawrence (4T), Canada (1971–2018): abundance (mature individuals), trawl; Scotian Shelf and Bay of Fundy (4VWX), Canada (1970–2017): abundance (mature individuals), trawl; Georges Banks, Canada/Gulf of Maine, USA (5Z) (1970–2017):abundance (mature individuals), trawl; Northeastern (NOAA–NEFSC) USA (1970–2017): standardized CPUE, kg/tow (Fall and Spring season), trawl.

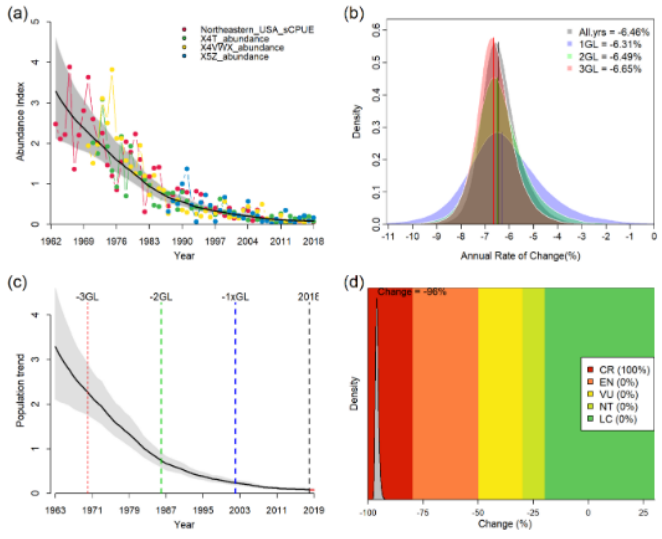

Figure 1. JARA results for *Amblyraja radiata* in the 4T, 4VWX (Canada), 5Z (Canada/USA), NOAA–NEFSC (USA) showing (a) the JARA fit to the observed time–series, (b) the posterior probability for the percentage annual population change calculated from all the observed data (in grey) and from the last 1 generation length of data (in blue), 2 generation length of data (in green), and 3 generation length of data (in red) with the mean (solid lines) shown relative to a stable population (% change = 0, black dashed line), (c) the observed (black line) and predicted (red line) population trajectory over three generations (48 years, dashed grey lines), and (d) the median decline over three generation lengths (dashed line) and corresponding probabilities for rates of population decline falling within the IUCN Red List category.

Figure 3. Thorny Skate status in the Northwest Atlantic (South) (IUCN Redlist Kulka et al., 2020)

Source: NEFMC (2022).

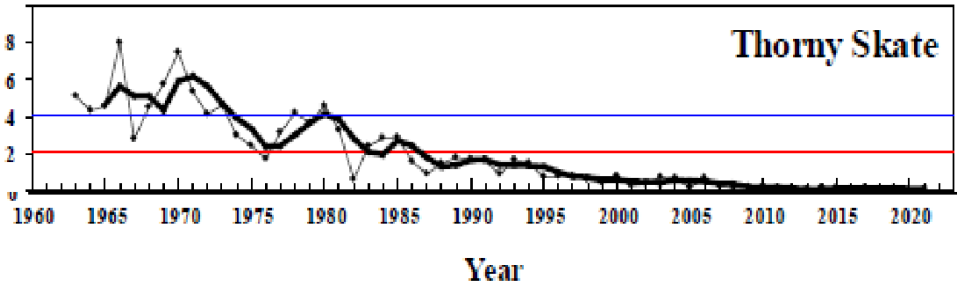

Figure 4. Thorny Skate biomass (kg/tow) from the NEFSC Bottom Trawl (NEFMC, 2022)

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

Thorny skates are most abundant in the Gulf of Maine and the Georges Bank with very few fish caught in inshore Mid-Atlantic regions (NOAA 2009).

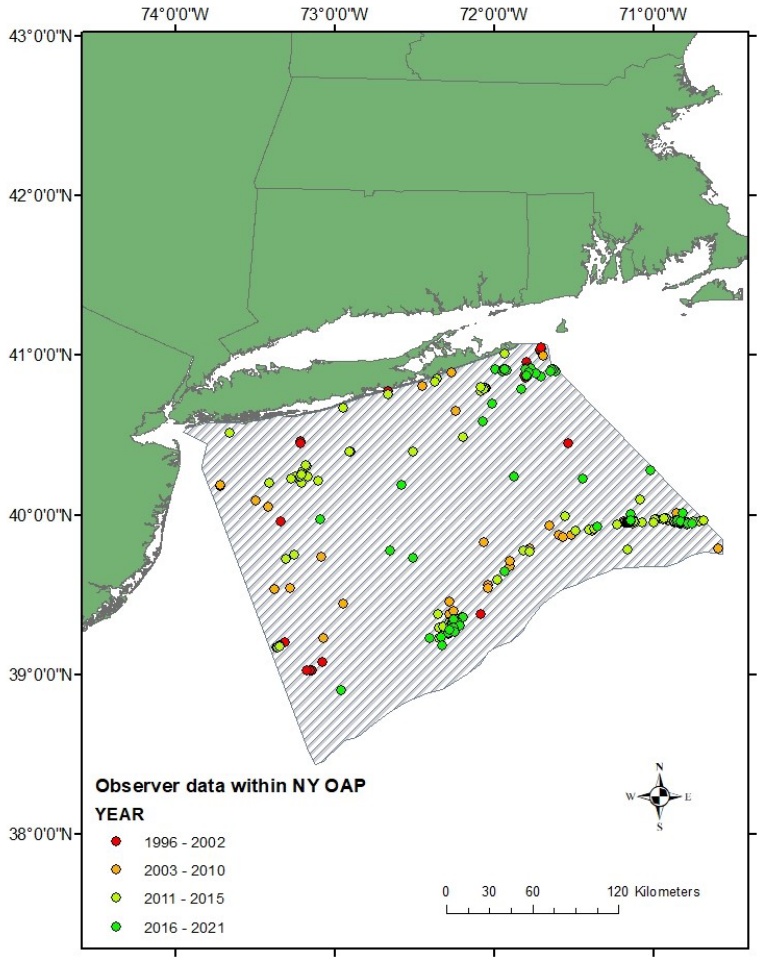

Figure 5: Records of Thorny Skate in New York from the NOAA observer program

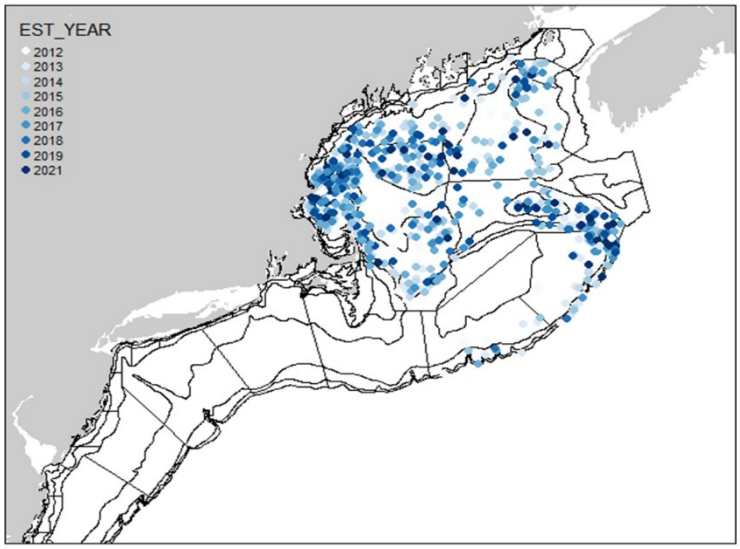

Figure 6. Records of Thorny Skate in the NEFSC bottom trawl survey. Low catch efficiency may contribute to the lack of species detections in the New York Bight (Sosebee et al., 2016)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of thorny skate in New York.

Details of historic and current occurrence:

Individuals were observed at depths of 786-896 meters off New York by Bigelow and Schroeder in 1953 and an isolated specimen was found off Long Island at 59 meters offshore (Packer et al. 2003). Thorny skate are encountered in the NY Bight in the NOAA observer program. In recent years, they have not been encountered in the NEFSC bottom trawl survey.

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, Deep Subtidal

b. Marine, Deep Subtidal, Benthic Geomorphology, Benthic Flat

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:

Thorny skate are found over a variety of bottom substrates including sand, mud, gravel, broken shell and pebbles (Kulka et al. 2009). This species is demersal and are usually found at 25 to 440m depths. They occur in nearshore regions up to 1,400m depths and occupy continental and insular shelves (Kulka et al. 2020). It occurs in water temperature ranging from -1.3˚C to 14˚C, with highest concentrations between 2.5˚C and 5˚C (Packer et al. 2003). Skates generally don't undergo large-scale migrations, but they do move seasonally in response to changing water temperatures, moving offshore in summer and early autumn and returning inshore during winter and spring. The thorny skate is an opportunistic feeder on the most abundant and available prey species including crustaceans, squids, bony fishes, and polychaetae worms (Kulka et al. 2009).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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):*

Thorny skate are oviparous and reproduce year round, although the highest percentage of mature females producing capsules is during the summer (NOAA 2009). In low temperature environments of northern latitudes, females may deposit 10-20 egg capsules a year, each containing one fertilized egg (Packer et al. 2003). Gestation under laboratory conditions lasted 2 to 2.5 years, while in low temperature environments development averages 2.5 to 3 years (NOAA 2009). Females reach maturity at 38.4 to 87.3 cm (TL) and produce 10 to 45 egg cases per year. Out of these egg cases, only 38% hatch. Males reach maturity at 44 to 83 cm (TL) and thorny skates hatch at a size of 10.4 to 11.4 cm (TL) (Kulka et al. 2020).

The maximum size of individuals varies geographically over the species range; a longitudinally increasing trend in size at sexual maturity is observed as this species moves south from Labrador (Kulka et al. 2009). In the Northwest Atlantic, thorny skates reach 111cm total length (TL), while in the North Sea they reach a maximum size of 66cm (TL). In the North Sea, thorny skates mature at 5.6 years while the Northwest Atlantic thorny skates mature at 11 years. Generation length is 10.6 years in the North Sea and 16 years in the Northwest Atlantic (Kulka et al. 2020). The most common source of mortality is fishing, although predation of egg capsules also occurs.

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

The most significant threat to thorny skate is fishing, primarily from commercial ground fishing and scallop dredging operations. The thorny skate is frequently taken as by-catch and discarded; recreational and foreign landings are considered insignificant (NOAA 2009). Although this species is not preferred for use in the skate wing fishery, its distribution overlaps with the most significant portion of the skate wing and bait fisheries. Thorny skate embryos suffer from substantial predation and are eaten by halibut, goosefish, Greenland sharks, and predatory gastropods while adults may be eaten by seals, sharks and halibut (NOAA 2009). Competition for prey resources may exist between thorny and smooth skate, although studies indicate this may be a limited threat as thorny skate are more widespread with a generalist diet (NOAA 2009).The species has experienced range constriction consistent with climate change. As a cold water species, climate change is a growing threat to the species sub nationally. The NEFMC also considered the growing gray seal population as a potential threat.

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (illegal harvest)
3. Climate Change	Habitat shifting & alteration

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

Yes: ✓ **No:** _____ **Unknown:** _____

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

The Skate Complex Fishery Management Plan (FMP) was implemented in 2003 and applies to federal waters from Maine to Cape Hatteras, North Carolina. The FMP includes reporting requirements by individual species, prohibition on overfished species such as the thorny skate, and trip limits for the skate wing fishery. The North Atlantic Fisheries Organization (NAFO) set the world's first international quota in 2005 by establishing a total allowable catch (TAC) limit for skates (primarily for the thorny skate).

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

Species-specific fishery independent data is needed to better understand the status of thorny skate in New York. Compliance with the requirements of the FMP and implementation of new rules and regulations consistent with those developed by the NMFS would support the recovery of this species throughout its range. The NEFMC published an update on the Thorny Skate rebuilding plan in 2023 stating that "Proposed approaches to address thorny skate rebuilding include continued possession prohibition, gear-modifications or time-area closures targeted to the gear type and/or areas where thorny skate are most encountered, and revisiting the thorny skate rebuilding plan" (NEFMC, 2023). Climate change and range constriction to cooler and/or deeper waters is a threat at the subnational and national level.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
3.1 Species management 3.1.1. Harvest management	continued possession prohibition
5. Law and Policy 5.1 Legislation 5.1.2 National legislation	gear-modifications or time-area closures to reduce bycatch

Table 2: Recommended conservation actions for thorny skate.

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Originally prepared by	Samantha Hoff
Date first prepared	April 17, 2013
First revision	January 29, 2014
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Thresher shark **Date Updated:** 1/12/2024

Scientific Name: *Alopias vulpinus* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Alopiidae

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

Thresher sharks occur worldwide in tropical, subtropical, and temperate waters. This species inhabits coastal epipelagic and oceanic epibenthic area. It usually occurs 40-75 miles of land over continental and insular shelves and slops (Strasburg 1958, Compagno 1984, Holts 1998). In the western Atlantic, this species ranges from Newfoundland to Cuba and into the Gulf of Mexico (Compagno 2001). Northwest and central Atlantic logbook and observer records for common and big-eye (*A. superciliosus*) thresher sharks combined show a decline of 50-80% from 1986-2005 (Goldman 2009). Population trend of this species is unknown in New York. Thresher sharks are globally vulnerable due to having slow life history characteristics, a low capacity to recover from moderate levels of exploitation, and high levels of unmanaged and unreported mortality by target and bycatch fisheries (Goldman et al. 2009).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; High Priority SGCN

b. Natural Heritage Program

i. **Global:** GNR, Unranked

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Vulnerable

-Northeast Regional SGCN: RSGCN

-CITES: II

Status Discussion:

All species of the genus *Alopias* are listed globally vulnerable on the IUCN Red List. Declining populations, slow life history characteristics, low capacity to recover from and unmanaged and unreported mortalities have caused populations to decline globally (Goldman et al. 2009). Thresher sharks are vulnerable because of their epipelagic habitat occurring within the range of many gillnet and longline fisheries (Goldman et al. 2009). A majority of common thresher shark harvests are from fisheries in the eastern Pacific. Western Atlantic fisheries supply roughly 1/3 of the annual U.S. harvest of thresher shark. In 2010, 61,290 pounds were harvested off the East Coast, mainly from North Carolina, New Jersey and Virginia (NOAA 2013). The International Commission for the Conservation of Atlantic Tunas (ICCAT) reviews an ecological risk assessment for pelagic sharks caught in Atlantic longline fisheries. Thresher shark was deemed the least vulnerable on the assessment (Cortés et al. 2008)

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	1986-present		Choose an item.
Northeastern US	Yes	Declining	Stable	1986-present (Northwest Atlantic)		Yes
New York	Yes	Declining	Stable	Not specified		Yes
Connecticut	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
Massachusetts	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
New Jersey	No data	Choose an item.	Choose an item.	Not specified	Not listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Choose an item.	Choose an item.	Not specified	Not listed	Choose an item.

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):*

There are no known monitoring activities in New York.

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. 2022). In the western Atlantic, thresher shark ranges from Newfoundland south to Cuba and into the Gulf of Mexico (Last and Stevens 1994). Logbook and observer records from 1986-2005 showed a decrease in population 50-80% in the Northwest and Western Central Atlantic (Baum et al. 2003). In the North Atlantic, thresher sharks are estimated to be declining. In the Eastern North Pacific the population trend is increasing according to a managed fishery, which may not reflect overall population trends in the Pacific (Rigby et al. 2022).

Distribution Map

Alopias vulpinus

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2018

Figure 1. IUCN Red List Thresher Shark distribution map (Rigby et al. 2022)

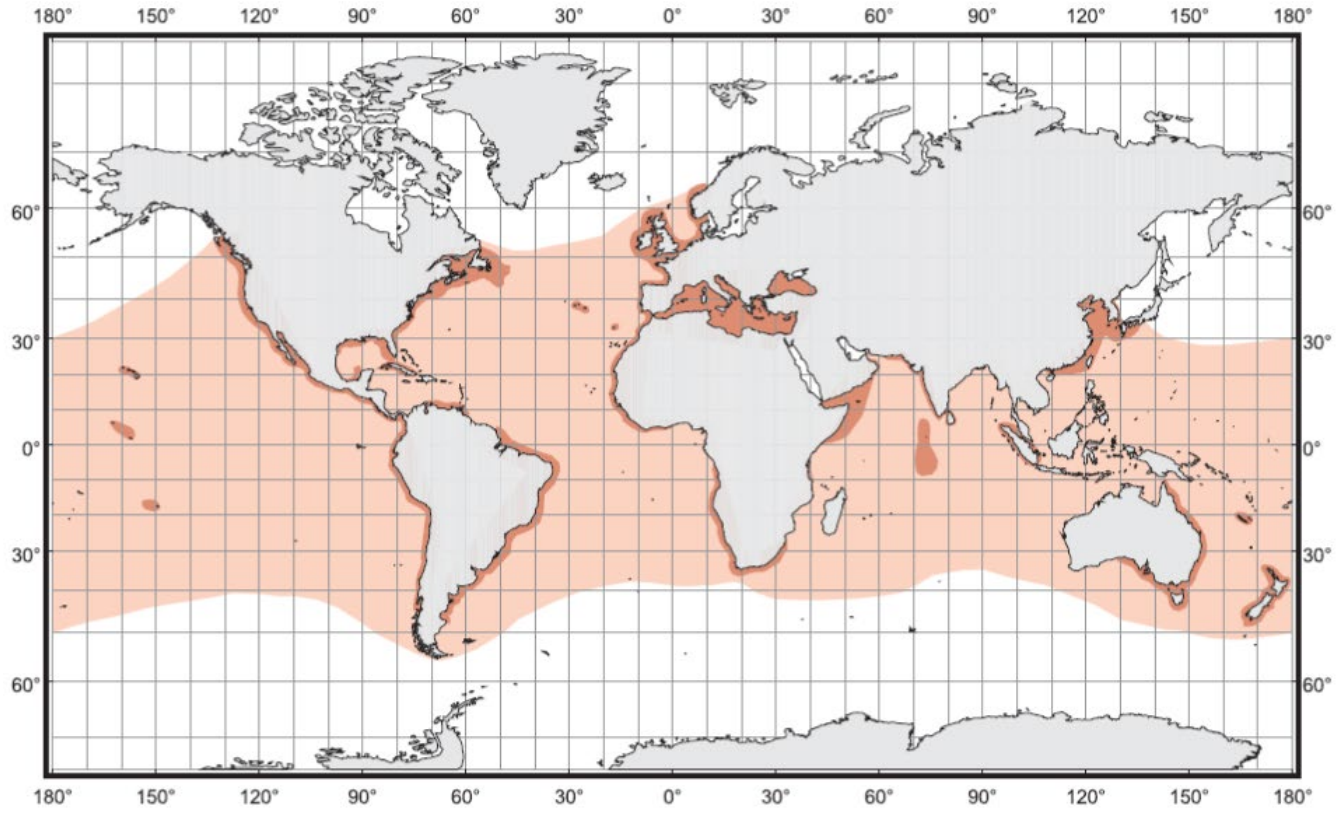

Figure 2. Global distribution of thresher shark (Compagno 2001).

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

Thresher sharks are sporadically recorded in the northwest and central Atlantic, with big-eye thresher sharks being more common (Goldman et al. 2009). Briggs and Waldman (2002) considered the thresher shark to be common in waters surrounding Long Island.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of thresher shark in New York.

Details of historic and current occurrence:

Historic:

This species was recorded to be in the Long Island Sound at Orient in 1946 (Briggs and Waldman 2002).

Current:

Annually, there are reports of a few individuals caught of the south shore of Long Island (Briggs and Waldman 2002).

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%	Core	

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

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:

Thresher sharks occur worldwide in tropical, subtropical and temperate waters, with a tolerance for cold waters (Castro 1983). This species inhabits coastal to epipelagic and oceanic epibenthic areas, but usually occurs 40-75 miles of land over continental and insular shelves and slops (Strasburg 1958, Compagno 1984, Holts 1998). Young juveniles are often seen inshore and in shallow bays. (Compagno 2001). Thresher sharks are mainly found in coastal temperate waters but are also found in oceanic areas at depths ranging from 650m to the surface (Rigby et al. 2022).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

Thresher sharks are a long-lived with slow life history characteristics. At birth, thresher sharks are 120-150 cm total length (TL) and individuals can reach a maximum of 573 –635 cm (TL) when fully grown (Rigby et al. 2022). Female thresher sharks are estimated to mature between 3-9 years of age and between 260-465cm total length (Bigelow and Schroeder 1948, Cailliet et al. 1983). Males are mature between 3-7 years of age (Calliet et al. 1983) and they have a total length of 260-420 cm (Rigby et al. 2022). This species can reach 20+ years old (Gervelis 2005). The most recent estimation of generation time is 8-14 years old (Cortés 2008). Thresher sharks have an annual or biennial reproductive cycle and produce litters of 2 to 6 pups that are aplacental viviparous oophagous (Rigby et al. 2022). Thresher sharks feed on schooling and bottom fishes and squid. Thresher shark commonly stuns it prey using its long tail (Compagno 2001). During the warm season, this species undertakes inshore and northerly coastal migrations, traveling in schools segregated by sex and size (Smith et al. 2008).

Due to the behavioral tactics used by thresher sharks, they are commonly hooked in the caudal fin. A tail hooked shark increases the fight time and stress paced on the individual. Thresher sharks are a ram ventilator species, which requires it to be constantly moving in order to ventilate. Tail-hooked individuals cannot properly ventilate when brought in to a boat backwards. In a study on post-release survivorship of tail hooked thresher sharks found that with increased fight time, stress levels in the blood greatly increase and mortality was 100% when the fight time was greater than 85 minutes, which places greater stress on the animal (Heberer et al. 2010).

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

Thresher shark fished commercially and recreational throughout their range (Compagno 1990). It is often caught by long line, gillnet, and as by catch in trawls and fish traps (Maquire et al. 2006). Even though it is referred to as bycatch, it is normally utilized and is more a secondary catch (Goldman et al. 2009).

The effect of increased global ocean temperatures on sharks is unknown but is likely to result in changes in distribution, migratory movements, and prey availability (ZSL 2010). Synergistic effects between climate and other present threats, particularly by-catch mortality, will likely exacerbate climate-induced changes (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial fishing)
2. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fishing)
4. Energy Production & Mining	Renewable Energy (offshore wind farms)
5. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch/discard)

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:

In NYS, anglers must enroll in the recreational marine fishing registry prior to pursuit of this species. New York anglers may take one thresher per vessel per trip with a minimum fork length of 54 inches. Any shark that is landed must have head and fins attached while returning to the dock (NYSDEC 2021).

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

Current management strategies in New York aim to improve the capacity to sample and quantify demersal and pelagic shark populations at all life stages and the role the state's waters play in their life cycle (NYSDEC 2005).

The New York State Wildlife Action Plan (NYSDEC 2005) provides recommendations for conservation/management actions for pelagic shark species:

- Develop fact sheets for distribution to commercial and recreational fisherman regarding the well being of the pelagic shark stocks.
- Conduct literature review to determine the pupping and juvenile habitat requirements for pelagic coastal sharks in the Middle Atlantic bight.
- Modify New York's regulations as necessary to conform to the federal protection of sharks.
- Initiate a volunteer shark data collection program which would collect additional catch and biological information from New York's recreational anglers.
- Develop appropriate webpage information relative to the shark species found in the Mid-Atlantic bight and their status.

The thresher shark is listed as a large coastal shark by NOAA, under the Atlantic Highly Migratory Species Fishery Management Plan for Atlantic Tuna, Swordfish and Sharks (NMFS 2006). This listing results in the monitoring of international stock and development of future management goals.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species Management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	

Table 2: Recommended conservation actions for thresher shark (Rigby et al. 2022)

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Originally prepared by	Shawn Ferdinand
Date first prepared	April 24, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Tiger shark **Date Updated:** 1/12/2024

Scientific Name: *Galeocerdo cuvier* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Carcharhinidae

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

The tiger shark is a wide-ranging species, occurring throughout the world's temperate and tropical waters in the open ocean as well as shallow coastal waters. Off the Atlantic Coast, tiger sharks are found from Cape Cod to Uruguay, including the Gulf of Mexico, Bermuda and islands of the Caribbean. Tiger sharks undergo seasonal migrations, moving into temperate waters during warmer months and returning to tropical waters in the winter (Knickle 2010). They have been documented making transoceanic migrations between islands and are capable of traveling long distances in a short amount of time (NMFS 2009). Tiger sharks are rarely encountered north of the Mid-Atlantic Bight, but on occasion have been sighted in shallow coastal areas of New York (NMFS 2009). They are caught in numerous fisheries worldwide, both as target species and as by-catch. The Atlantic Ocean population of tiger sharks is part of the large coastal shark (LCS) complex managed by the National Marine Fisheries Service, which enforces commercial and recreational fishing regulations to combat the overfished status for these species. Although the tiger shark generally does not face a high risk of extinction due to their high fecundity and fast growth rates, there is little information about pupping, nursery areas and population and abundance numbers, therefore continued demand may result in further decline in the future.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; Non-SGCN (Potential CN)

b. Natural Heritage Program

i. **Global:** G4, Apparently Secure

ii. **New York:** N/A **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Near Threatened

-Northeast Regional SGCN: N/A

Status Discussion:

There is evidence of declines for several populations where the tiger shark has been heavily fished, but in general this species does not face a high risk of extinction due to their fast growing and fecund nature (Simpfendorfer 2009). However, continued demand, mainly for fins, may result in further declines in the future and this warrants the IUCN's "Near Threatened" status throughout the range (Simpfendorfer 2009). The 2005/2006 Southeast Data, Assessment and Review (SEDAR) stock assessment for the large coastal shark complex determined that it is inappropriate to assess the LCS complex as a whole due to variation in life history parameters, different intrinsic

rates of increase, and different catch and abundance data (Casey 2006). Based on these results, NOAA Fisheries has changed the status of the LCS complex from overfished to unknown.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Stable			Choose an item.
Northeastern US	Yes	Unknown	Stable	(Northeast Atlantic Ocean)		Choose an item.
New York	Choose an item.	Unknown	Unknown			Choose an item.
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

There are no regular monitoring activities in New York.

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

The current population trend is decreasing according to the IUCN red list (Ferreira and Simpdendorfer 2019). There is no trend data available for New York or the Northeast. Because tiger sharks are managed as part of the large coastal shark complex, there is no individual species data for the tiger shark or indication of their current status.

The U.S. commercial shark fishery is primarily a southern coastal fishery extending from North Carolina to Texas, with 90% of catches during the 1990s coming from the southeastern region. In the East Coast/Gulf of Mexico shark fishery, tiger sharks are the third most common large, coastal species caught in the fishery, accounting for 12-20% of the catch (Simpfendorfer 2009). Estimated commercial landings of tiger sharks are 12,174 lbs. dw for 1998, and 30,274 lbs. dw for 1999 (Cortes 2000). Recreational landings were estimated at 1,380 fish in 1988 and 146 fish in 1999 for

the large coastal shark complex (Cortes 2000). See Figure 6 for commercial landing data from 2001-2006.

Distribution Map

Galeocerdo cuvier

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2018

Figure 1. IUCN Red List Tiger Shark distribution map (Ferreira 2019)

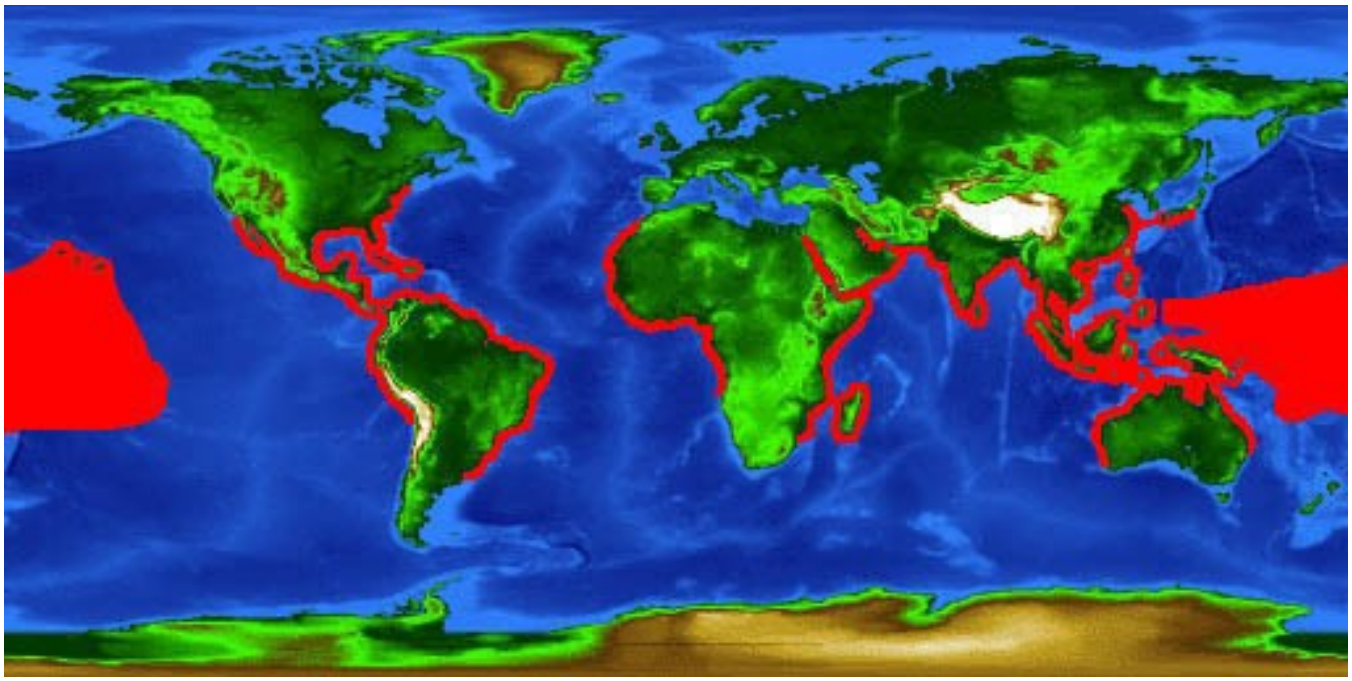

Figure 2. Global distribution of the tiger shark (Knickle 2010)

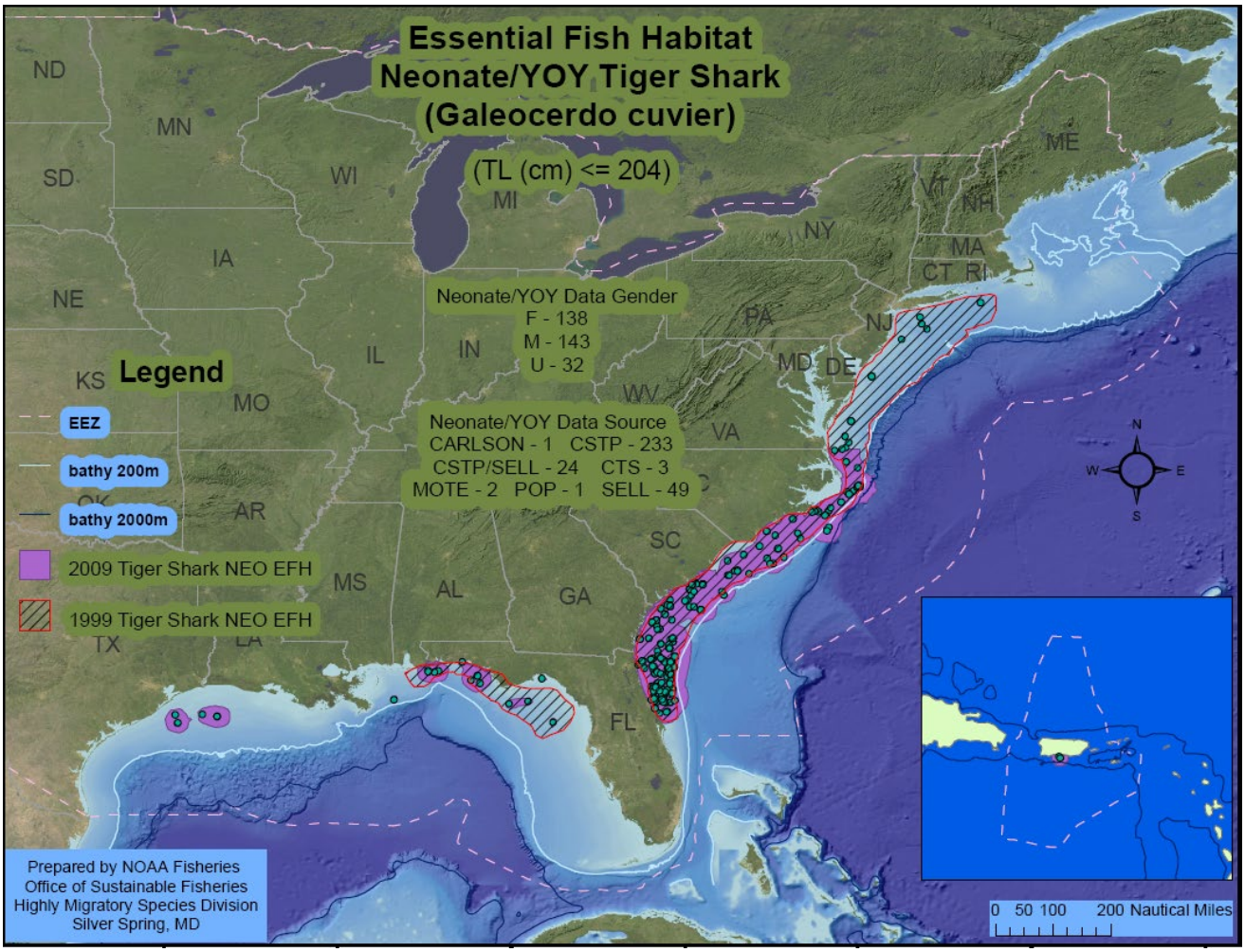

Figure 3. Essential fish habitat of neonate/young-of-the-year tiger shark (NMFS 2009).

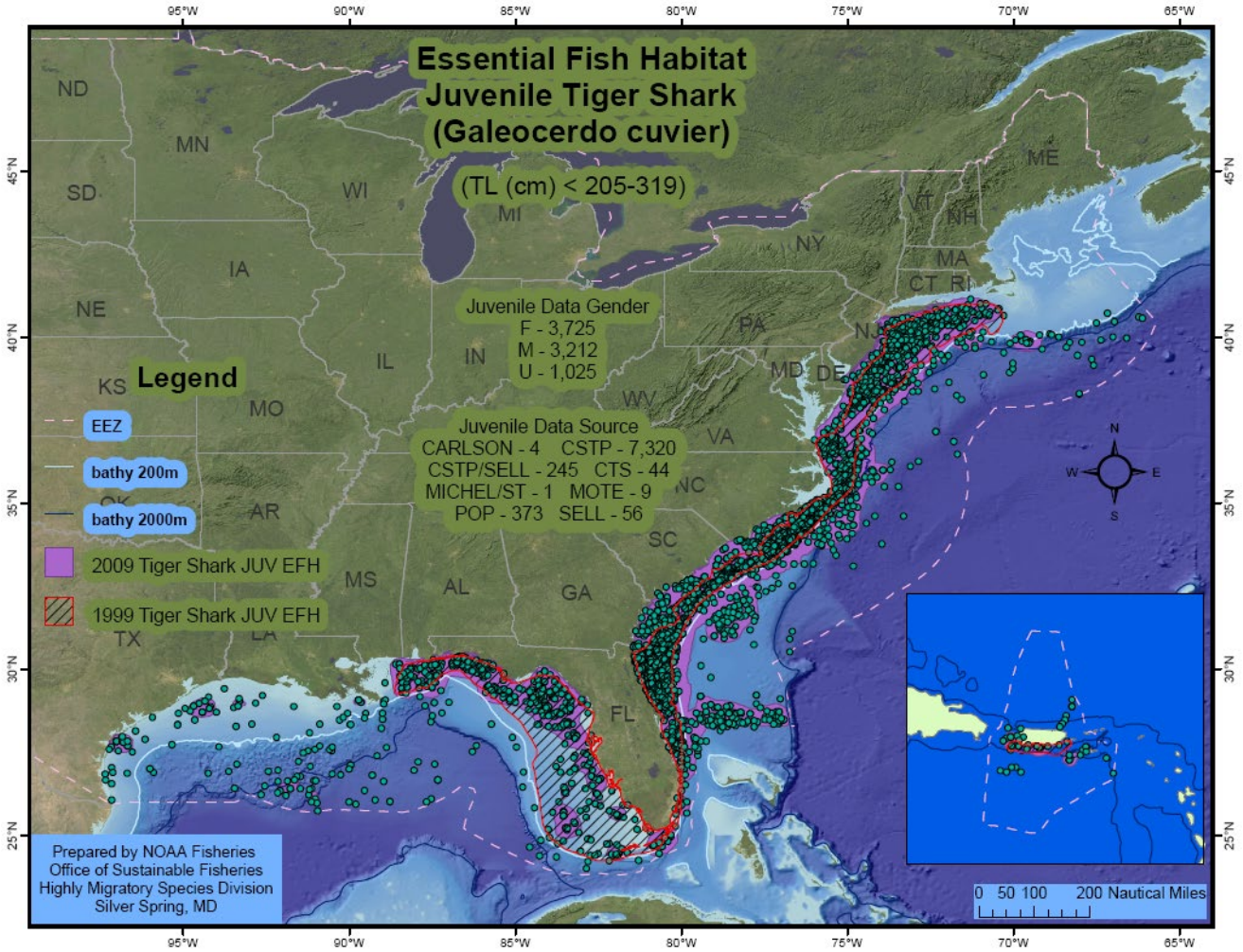

Figure 4. Essential fish habitat of juvenile tiger shark (NMFS 2009).

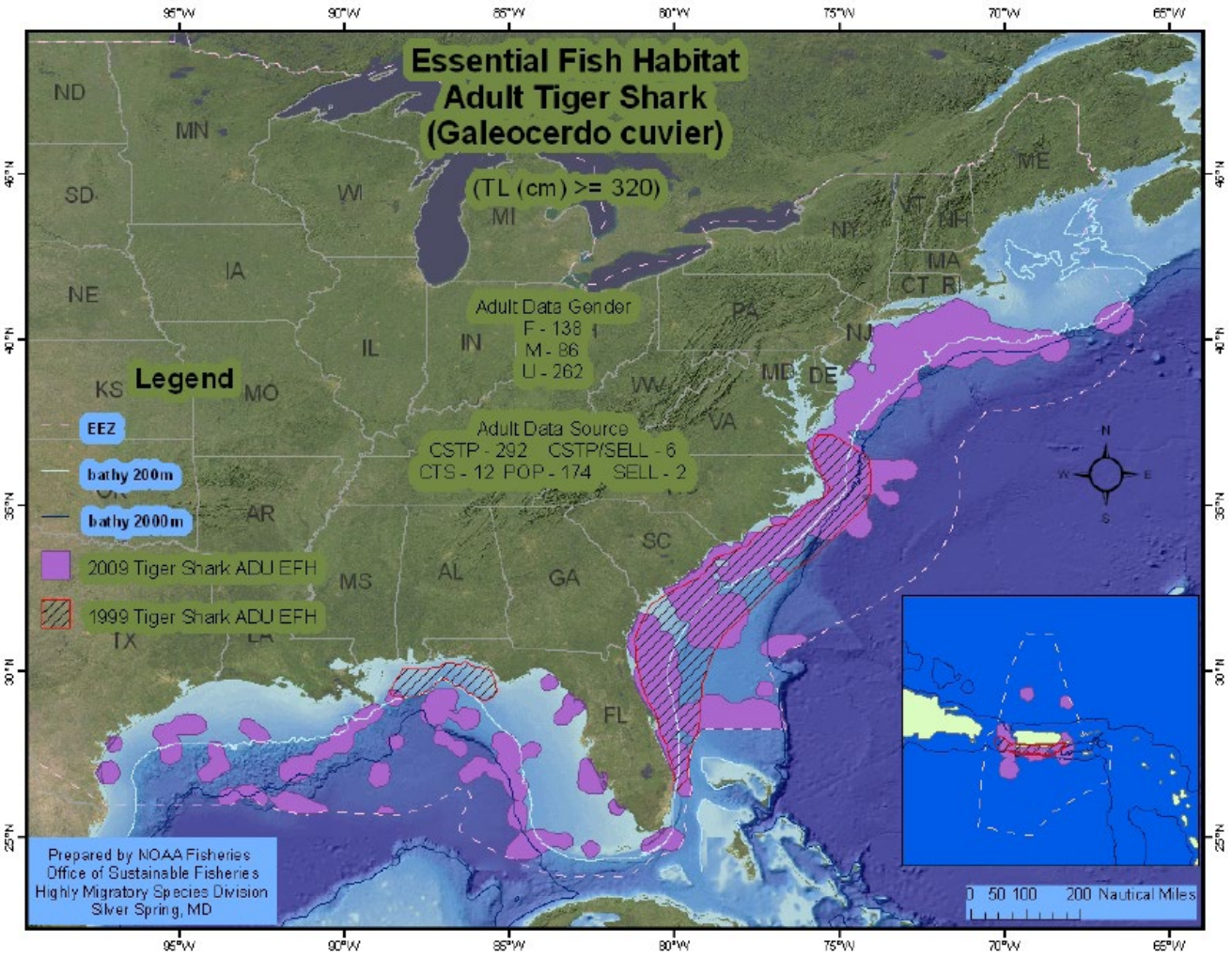

Figure 5. Essential fish habitat of adult tiger shark (NMFS 2009).

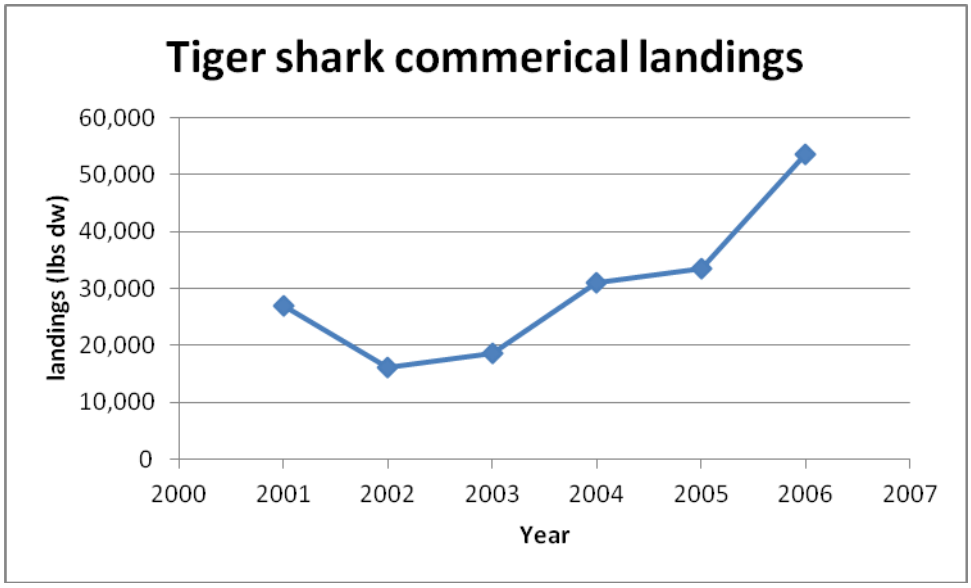

Figure 6. Tiger shark landings in lbs dw for 2001-2006 from the U.S. pelagic longline fishery (NMFS 2007).

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

Tiger sharks are rarely encountered north of the Mid-Atlantic Bight, but they may be found in shallow coastal regions of New York at night during feeding time (NMFS 2009).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of tiger shark in New York.

Details of historic and current occurrence:

Historic:

There is no historical occurrence data available.

Current:

There is no current occurrence data available.

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, Deep Subtidal

b. Marine, Shallow Subtidal

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:

The tiger shark is a saltwater species, preferring seagrass ecosystems of coastal areas but occasionally inhabiting other areas where prey is available, including estuaries, harbors, and lagoons. They spend approximately 36% of their time in shallow coastline habitats, generally from the surface to depths of 150 meters (Heithaus et al. 2002). Tiger sharks are commonly found at 100m but will dive to depths of about 1,000 m. The maximum recorded depth is 1,136. They inhabit shelf, reef and slope habitats (Ferreira and Simpfendorfer 2019). Nurseries appear to be in offshore areas, but they have not been well described. Natanson et al. (1998) reported nursery areas occurring at approximately 35˚N to 29˚20'N (approximately North Carolina to Florida) along the East Coast, out to a depth of 100 meters. Driggers et al. (2008), however, found that tiger sharks in the western North Atlantic Ocean do not use specific areas as nurseries, but that parturition appears to occur over a broad range and the general pupping area from at least 27 to 25˚N, off the coast of southeastern North America and in the Gulf of Mexico. Locations where high abundances of young-of-the-year individuals occurred were likely influenced by areas of high localized productivity.

Essential fish habitat for neonates and juveniles is defined as shallow coastal areas up to depths of 200 meters from Cape Canaveral, FL to offshore of Montauk, Long Island, NY. Adult habitat occurs offshore from Chesapeake Bay, MD south to Ft. Lauderdale, FL (NMFS 2009).

Tiger sharks are voracious, indiscriminate predators, feeding on all kinds of fish, marine mammals, turtles, seabirds, sea snakes, squids, mollusks, crabs, and even carrion and garbage. Tiger sharks are solitary nocturnal predators, except during the mating season or while communally feeding on large carcasses (Draper 2011). As one of the largest carnivores in the ocean, there are few predators that feed on tiger sharks, although some juveniles fall prey to other sharks. Tiger sharks have very large home ranges, swimming up to 16 km in one day and often not returning to that area for a year (Draper 2011).

V. Species Demographics and Life History

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

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):*

Tiger sharks reach a maximum size of 500cm total length (TL) and the largest recorded size was 740 cm (TL). Maximum age is about 27 to 37 years and age at maturity is 4 to 13 years. Males mature at 250 to 305 cm (TL). Females mature at 274 to 345 cm (TL) and are lecithotrophic viviparous (ovoviviparous) (Ferreira and Simpfendorfer 2019). The embryo engages in embryotrophy, where it feeds off uterine fluid during the later stages of its development (Knickle et al. 2018). Tiger Shark Litters average 26 to 33 pups and there has been a maximum recording of 82 embryos (Ferreira and Simpfendorfer 2019). Mating is reported to take place in the northern hemisphere during spring, with pupping occurring during the following spring or summer after an estimated gestation period of 13-16 months (Camhi et al. 1998). Mating occurs before females have given birth to young, indicating that litters are produced every two years or less.(Camhi et al. 1998). Growth and reproductive rates are high, making the levels of mortality that the tiger shark can survive higher than that for many other species of shark.

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

Tiger sharks are caught in many fisheries worldwide, both as target species and by-catch, for commercial and recreational fisheries. Valuable products from tiger shark include flesh, fins, liver oil and cartilage. The fins, skin and liver oil from tiger sharks are considered to be of high quality and can garner good prices, leading to an increase in commercial fishing pressure (Fowler et al. 2005). Tiger sharks are most often taken as by-catch in tuna and swordfish longline fisheries, particularly those operating on or close to the continental and insular shelves. Another threat facing tiger sharks is their tendency to ingest human garbage. Direct effects of climate change on tiger sharks are unknown, but habitat shifts and alterations are likely to influence distribution, abundance and behavior (Harley et al. 2006). As populations of apex predators like the tiger shark decrease, there are cascading effects on marine ecosystem dynamics and lower trophic levels, exacerbating stresses on already highly degraded coastal benthic systems (Myers et al. 2007, Nye et al. 2012).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial and recreational fishing)
2. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
3. Pollution	Garbage & Solid Waste (ingestion of garbage)
4. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperatures)

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:

Tiger sharks are managed by the National Marine Fisheries Service (NMFS) under the Consolidated Highly Migratory Species Fishery Management Plan (FMP). The tiger shark is a member of the large coastal shark species complex, which has a commercial quota of 1,017 tons dressed weight imposed in 2003. There is a recreational bag limit of 1 shark per vessel per trip, and a minimum size of 137 cm fork length for all shark species. The 2006 Consolidated HMS FMP implemented additional measures including mandatory shark identification workshops for federally permitted shark dealers. Shark finning has been banned in the U.S. since 2002, prohibiting any person from finning or possessing shark fins on board a U.S. fishing vessel. The Atlantic States Marine Fisheries Commission also manages tiger sharks under the Interstate Fishery Management Plan for Atlantic Coastal Sharks as part of the non-sandbar large coastal shark group. In NYS, anglers must enroll in the recreational marine fishing registry prior to pursuit of this species. New york anglers may take on tiger shark per vessel per trip with a minimum fork length of 54 inches. Any shark that is landed must have head and fins attached while returning to the dock (NYSDEC 2021).

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

Detailed information on potential use of pupping and nursery areas in New York is essential to protect critical habitat for the tiger shark. Species-specific fishery independent data are needed to assess population status and abundance.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
2.1 Site/area management	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	
5.2 Policies and regulations	
5.4 Compliance and enforcement 5.4.2 National level	

Table 2: Recommended conservation actions for tiger shark (Ferreira and Simpfendorfer 2019).

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Originally prepared by	Samantha Hoff
Date first prepared	April 2, 2013
First revision	
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Western Atlantic Torpedo Ray **Date Updated:** 12/1/2023

Scientific Name: *Tetronarce occidentalis* **Updated by:** Kyle Martin, MISC

Class: Chondrichthyes

Family: Torpedinidae

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

Previously included within *Tetronarce nobiliana*, *T. occidentalis* is now recognized as a separate species (Carvalho et al. 2016). Common name changed from Atlantic torpedo ray to Western Atlantic torpedo ray. The Western Atlantic torpedo ray is a medium-sized electric ray with a disjointed but wide distribution occurring from Nova Scotia to Venezuela (including the Caribbean) in the Northwest and Western Central Atlantic. This demersal to semi-pelagic batoid inhabits continental and insular shelves and slopes from the surface down to 800 m (Dunton 2021). Like other members of the order Torpediniformes, *Tetronarce occidentalis* possesses large electric organs which are used to stun prey and predators. Data is limited throughout this species' range, and while information on interactions with fisheries is lacking, it is potentially threatened by demersal trawl fisheries on the outer continental shelf, and degradation of coral reefs may negatively impact juveniles which are dependent on coral reef habitat. Although population declines have been recorded in areas experiencing intense unmanaged fishing along the southern extent of its range, populations in other parts of its range are believed to be stable.

I. Status

a. Current legal protected Status

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

ii. **New York:** SPCN species of potential conservation need (SGCN 2015)

b. Natural Heritage Program

i. **Global:** Not Ranked

ii. **New York:** Not Ranked **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Least concern

Status Discussion:

Population status for the Western Atlantic torpedo ray is difficult to determine due to a lack of data. It is believed to be stable in most of its range, as much of the deep benthic communities it inhabits are unfished (IUCN 2020).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Unknown	Unknown	Unknown			Choose an item.
Connecticut	No data	Unknown	Unknown			No
Massachusetts	No data	Unknown	Unknown			No
New Jersey	No data	Unknown	Unknown			No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Unknown	Unknown		Not listed	Choose an item.

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):*

In a 2012 survey for Atlantic Sturgeon (*Acipenser oxyrinchus*), a single Western Atlantic Torpedo Ray was captured off the coast of the Rockaways and fitted with an acoustic transmitter. A study published in 2021 tracked movements of this tagged individual (May 2012 – June 2013), which found that the Mid-Atlantic Bight may be important seasonal habitat for the Western Atlantic Torpedo Ray. Additionally, 14 individual captures of Western Atlantic Torpedo between 2005 and 2007 were reported in a trawl survey between May and August (average depth 13.4 m) (Dunton et al., 2010). Both the acoustic and trawl data suggest the Western Atlantic Torpedo Ray utilizes the south shore of Long Island as important habitat intermittently in spring (Dunton et al., 2021).

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

There are no range-wide estimates of population size or trend for the Western Atlantic torpedo ray due to insufficient data.

Figure 1: IUCN Red list Distribution Map of Western Atlantic Torpedo Ray (IUCN 2020)

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

This species is rare throughout its range (Notarbartolo di Sciara et al. 2009). In the past, NYSDEC personnel have seen many Atlantic torpedo from inshore oceanic waters and surf zone off the south shore of Long Island (Briggs and Waldman 2002). One large specimen washed up on the north shore of Long Island in early 2024, which NYSDEC personnel collected samples from. Current rarity in New York is unknown.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of Western Atlantic torpedo ray in New York.

Details of historic and current occurrence:

Historic: Historical evidence, while limited, suggests that Western Torpedo Rays were once relatively abundant in the 1800s from the Gulf of Maine to North Carolina (Dunton 2021).

Current: According to a 2021 study which tracked the movements of a tagged Western Atlantic Torpedo Ray, coastal waters of New York and New Jersey were continuously inhabited, suggesting that the Mid-Atlantic Bight offers important seasonal habitat for this species (Dunton 2021).

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%	Core	

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. Size/Waterbody Type:

1. Marine, Deep Subtidal
2. Pelagic
3. Marine, Shallow Subtidal
4. Marine, Deep Subtidal, Artificial Structure, Reefs

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:

This species can be found from the surface to depths of about 800 meters (Notarbartolo di Sciara et al. 2009, Bester no date). Juvenile Atlantic torpedo rays prefer soft substrates or coral reef habitats; adults are pelagic or semi-pelagic (Notarbartolo di Sciara 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	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

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):*

The Western Atlantic torpedo ray can grow to about 70 inches in length, but average about two or three feet. This species feeds primarily on large fish including sharks, dogfish, flounder, and mullet. It will capture fish with its pectoral fins and deliver an electric shock of 170-220 volts. It can distend its jaw allowing it to swallow large fish. Adults are thought to migrate long distances. Reproduction is ovoviviparous. A female can release up to 60 young after a gestation period of about a year (Bigelow and Schroeder 2002). Males reach sexual maturity at about 22 inches and females reach sexual

maturity at about 35 inches (Capapé et al. 2006). Young feed on yolk, and then receive nourishment by indirect absorption of uterine “milk” which is enriched with fat and protein (Bester 2013).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)

There is little information available describing threats to this species. It is occasionally caught with bottom trawls and line gear (Notarbartolo di Sciara et al. 2009). Because juveniles can be found in coral reefs, habitat degradation from destructive bottom trawling practices may also be a threat (Notarbartolo di Sciara et al. 2009). Data for bycatch and fishing mortality specific to this species is lacking, but the Western Atlantic torpedo ray is potentially susceptible as bycatch of shrimp bottom trawling. Overall, the bulk of the species’ range is suspected to be unfished. Development of infrastructure for offshore wind energy is also a potential threat to this species.

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

Yes:_____ **No:** _X_ **Unknown:**_____

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

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

Management and conservation actions for this species are not described in the literature. Monitoring of catches and research on historical abundance is needed to determine population status for this species (Notarbartolo di Sciara et al. 2009). More basic life history information is also needed.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) - https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.	

Table 2: (need recommended conservation actions for Western Atlantic torpedo ray).

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Originally prepared by	Jim Katz
Date first prepared	April 12, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Kyle Martin)

Species Status Assessment

Common Name: White shark **Date Updated:** 1/12/2024

Scientific Name: *Carcharodon carcharias* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Lamnidae

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

As the world's largest predatory fish, the white shark, frequently called the great white shark due to its size, plays an important role at the top of the marine food web. Despite its fame and reputation, little is known about its biology and behavior. The great white shark is widely distributed, occurring throughout temperate and sub-tropical regions in the northern and southern hemispheres. They are primarily found in coastal and offshore areas of the continental and insular shelves and offshore continental islands. Off the Atlantic Coast, white sharks occur from Newfoundland, Canada, southward to Argentina. Recent tagging studies show that this species undergoes long-distance and transoceanic migrations (Bonfil et al. 2005). White sharks generally aggregate in coastal waters during autumn and winter, moving offshore into oceanic waters during winter and spring, but sightings in the Mid-Atlantic Bight have occurred year round (Weng et al. 2007). Great white sharks are declining and rare due to a history of being illegally hunted by trophy hunters for fins and teeth. They are often caught as by-catch by commercial fishermen and can also become entangled in beach protection nets. As with most species of shark, white sharks are slow-growing with low productivity and high vulnerability to overfishing and there is a significant lack of data on population numbers, abundance, fecundity, age and growth. Although white shark abundance in the Northwest Atlantic is still below historic abundance estimates, evidence suggests that population trends have gradually increased since the 1990s, likely due to changes in fishing regulations. The estimated white shark abundance in the Northwest Atlantic in 2010 was approximately 30% below historic averages (Curtis et al., 2014).

I. Status

a. Current legal protected Status

i. **Federal:** Not Listed **Candidate:** Yes

ii. **New York:** Not listed; High Priority SGCN

b. Natural Heritage Program

i. **Global:** G2, Imperiled

ii. **New York:** S2S3, Imperiled/Vulnerable **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: vulnerable

-Northeast Regional SGCN: RSGCN

-SARA: endangered

-COSEWIC: endangered

-CITES: Appendix II

-CMS: Appendices I & II

-UNCLOS: Annex I

Status Discussion:

Because of the importance of this species as a key predator in marine ecosystems, white sharks were granted protection under Appendix II of CITES, indicating that they are vulnerable to exploitation but not at risk of extinction. The northeastern Pacific Ocean population segment is currently a candidate for listing under the Endangered Species Act. The rationale for the IUCN vulnerable listing states that where detailed population data are available, these indicate that the abundance and average size of white sharks have declined (Fergusson et al. 2009).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown	(Northwest Atlantic Ocean)		Yes
New York	Yes	Unknown	Unknown			Yes
Connecticut	No data	Choose an item.	Choose an item.		Not Listed	No
Massachusetts	No data	Choose an item.	Choose an item.		Not Listed	No
New Jersey	No data	Choose an item.	Choose an item.		Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	Choose an item.			Choose an item.

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):*

There are currently no monitoring activities for the white shark in New York.

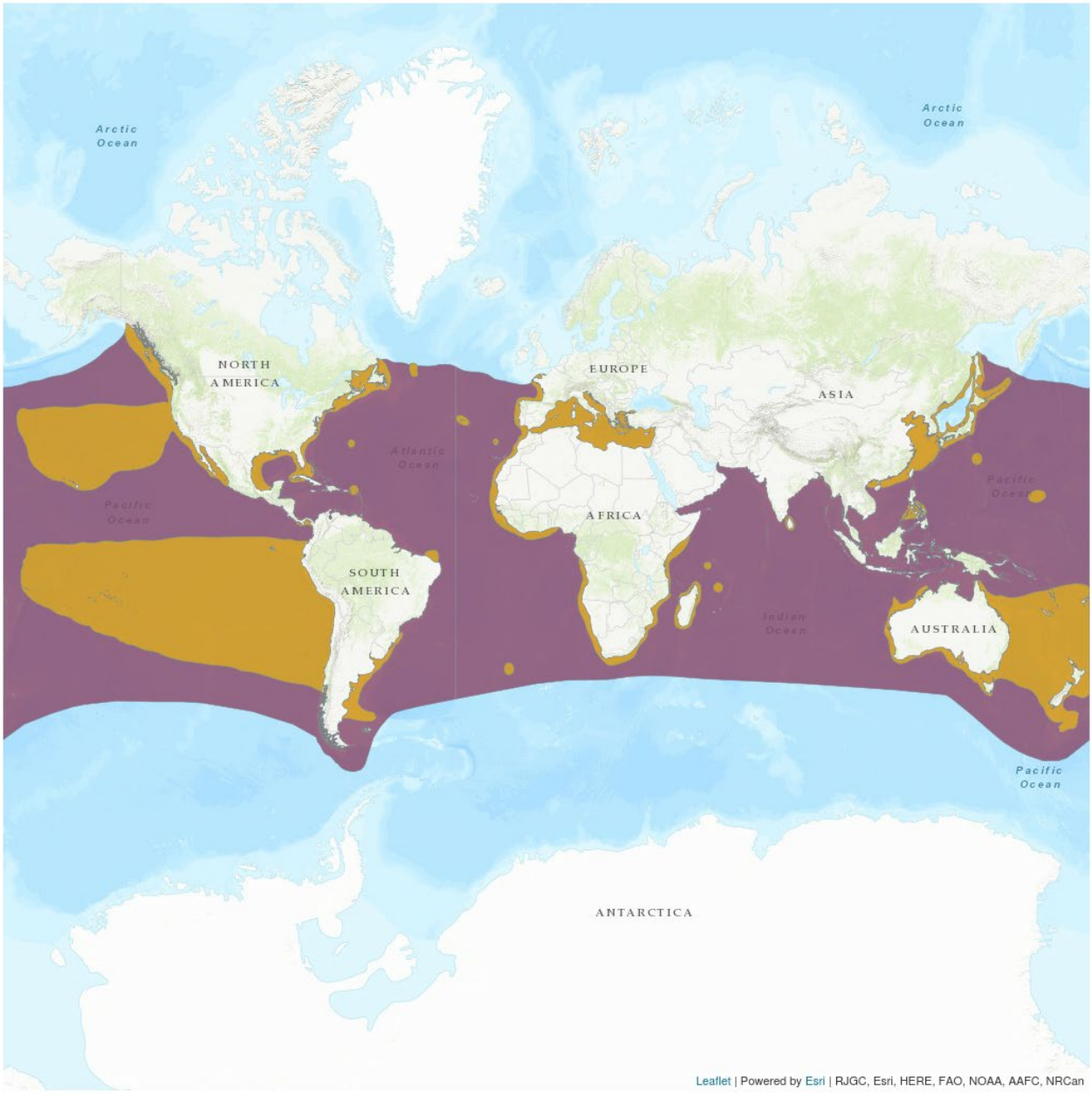
Trends Discussion *(insert map of North American/regional distribution and status):*

The current population trend is decreasing according to the IUCN red list (Rigby et al. 2022). While there is uncertainty in the regional trends, the current estimated population trend for White sharks is decreasing. Over three generations (159 years) there is an estimated global reduction of 30 to 49% (Rigby et al. 2022). Baum et al. (2003) analyzed logbook data from the U.S. pelagic longline swordfish and tuna fleets in the Northwest Atlantic from 1986 to 2000, identifying an estimated

79% decline in CPUE (catch per unit effort) during this period. Global populations have declined 60-95% from the 1950s to the present (CITES 2004).

Distribution Map

Carcharodon carcharias



Legend

EXTANT (RESIDENT)

POSSIBLY EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2018

Figure 1. IUCN Red List White Shark distribution map (Rigby 2022)

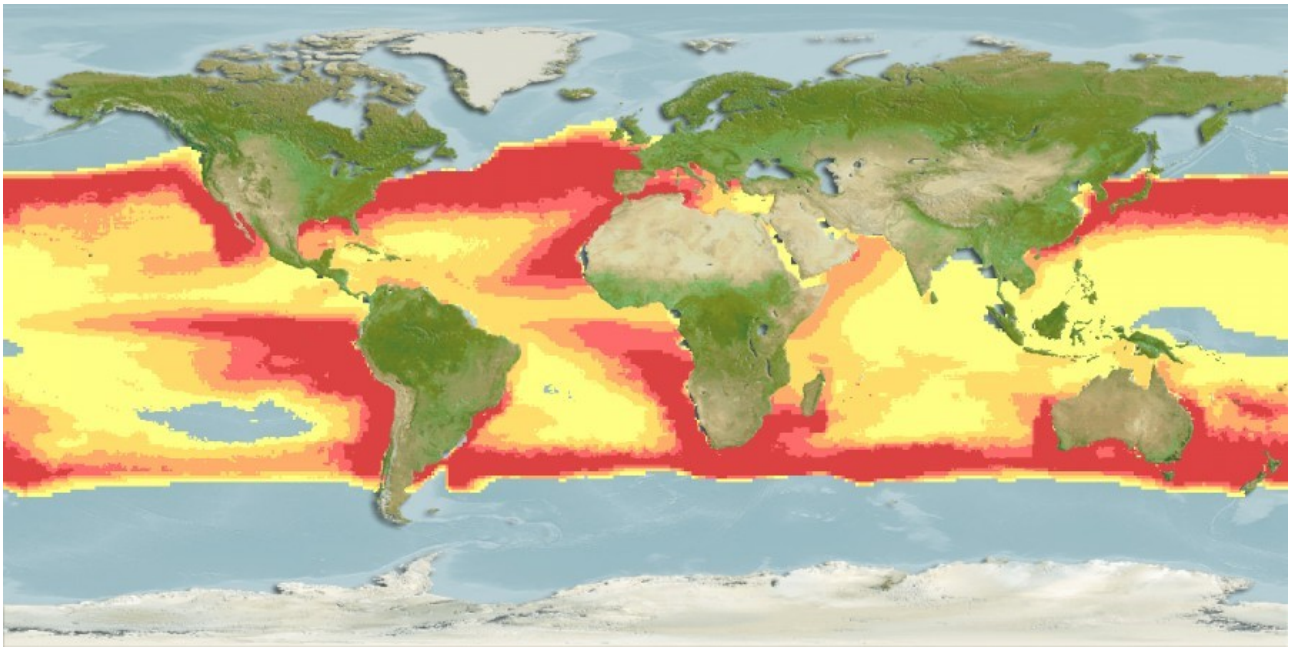


Figure 2. Global distribution of white sharks (www.aquamaps.org).

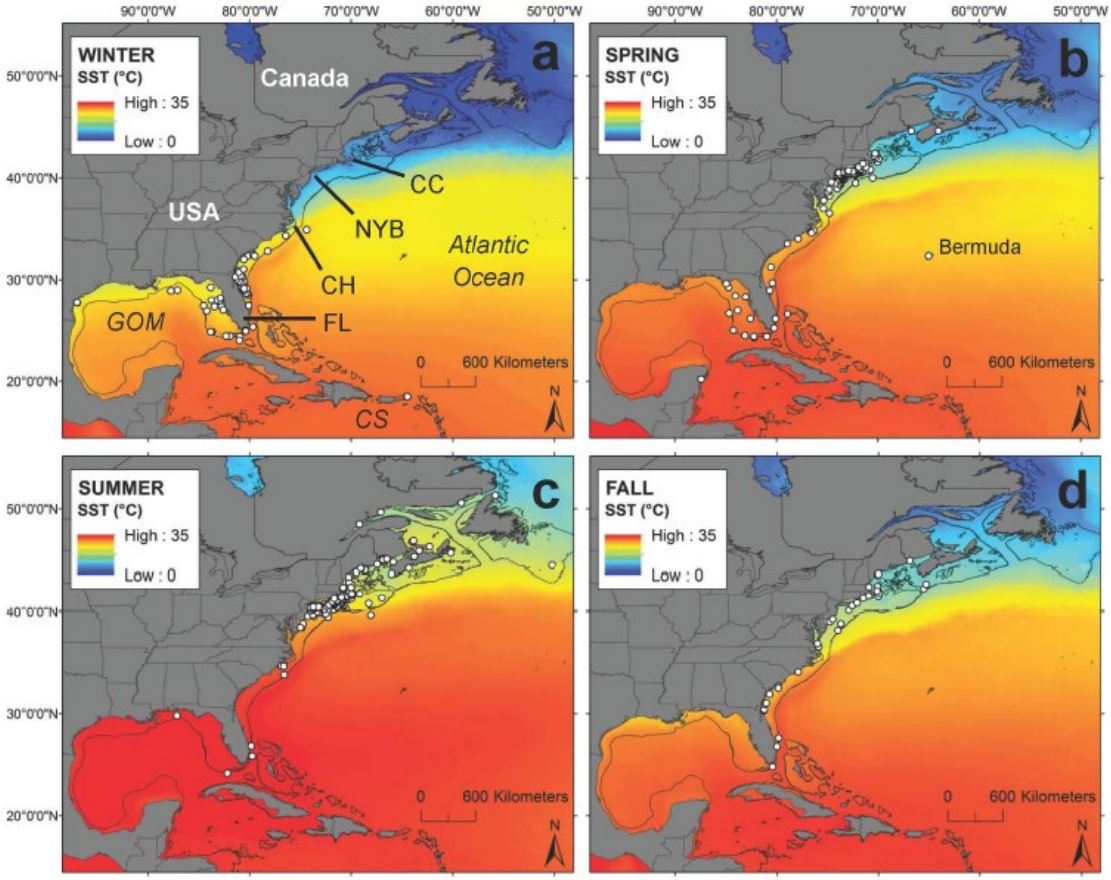


Figure 3. White shark seasonal distribution. Distribution of white shark presence records (white circles) in the NWA during (a) winter, (b) spring, (c) summer, and (d) fall. Positions are overlaid on seasonal average SST conditions (1985–2001). The 200 m bathymetric contour is displayed to delineate the edge of the continental shelf. CC = Cape Cod, NYB = New York Bight, CH = Cape Hatteras, FL = Florida, GOM = Gulf of Mexico, and CS = Caribbean Sea.
doi:10.1371/journal.pone.0099240.g003

Figure 3. White shark seasonal distribution in the western north Atlantic (Curtis et al., 2014)

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

White sharks are fairly uncommon compared to other widely distributed species, being most frequently reported from South Africa, Australia, California, and the northeast United States (Fergusson et al. 2009). Sightings in New York are most common in fall and winter but have occurred year-round and information on medium and long-range movement patterns in the Atlantic Ocean are lacking.

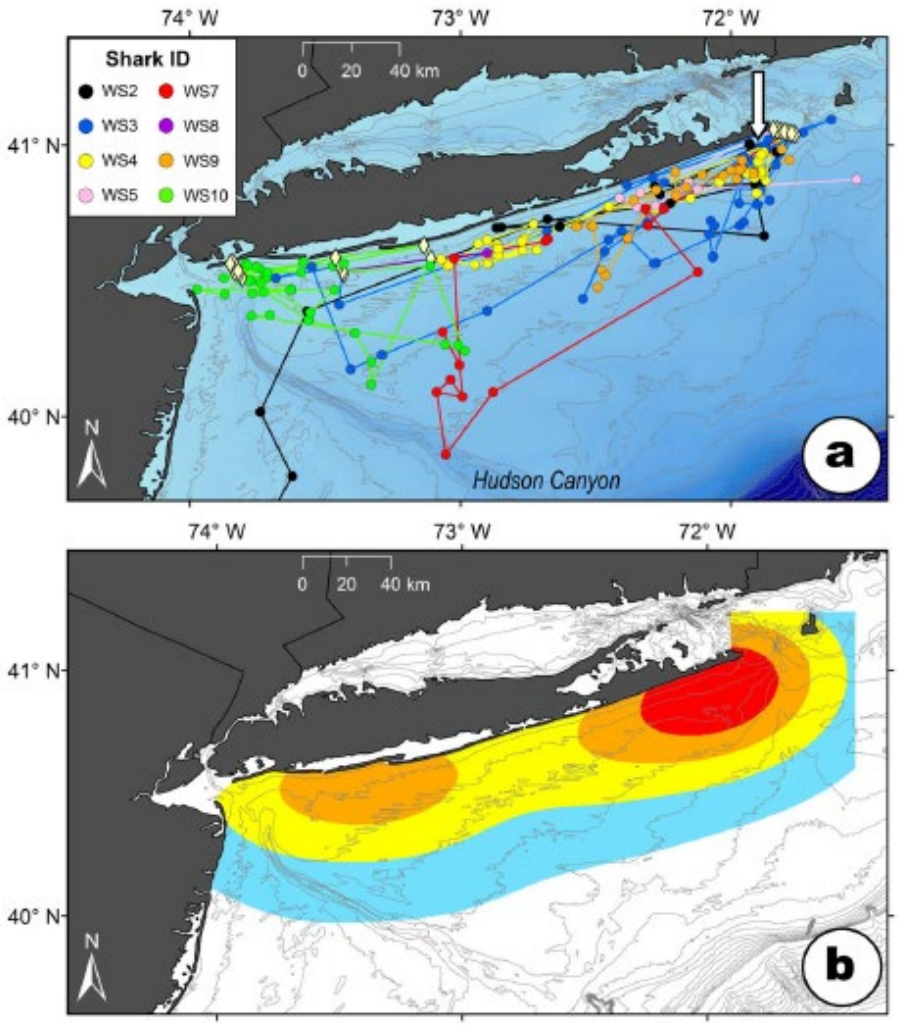


Figure 2. Tracks of eight YOY white sharks (**a**) and kernel utilization distributions (blue = 95%; yellow = 75%; orange = 50%; red = 25%) of the tagged sharks (**b**) off Long Island, New York, during August through October, 2016. The arrow indicates the tagging location. Diamond symbols represent locations of acoustic receivers where YOY white sharks were detected. Bathymetric contours (gray lines) are in 10 m increments.

Figure 4. YOY white shark movements (Curtis et al., 2018).

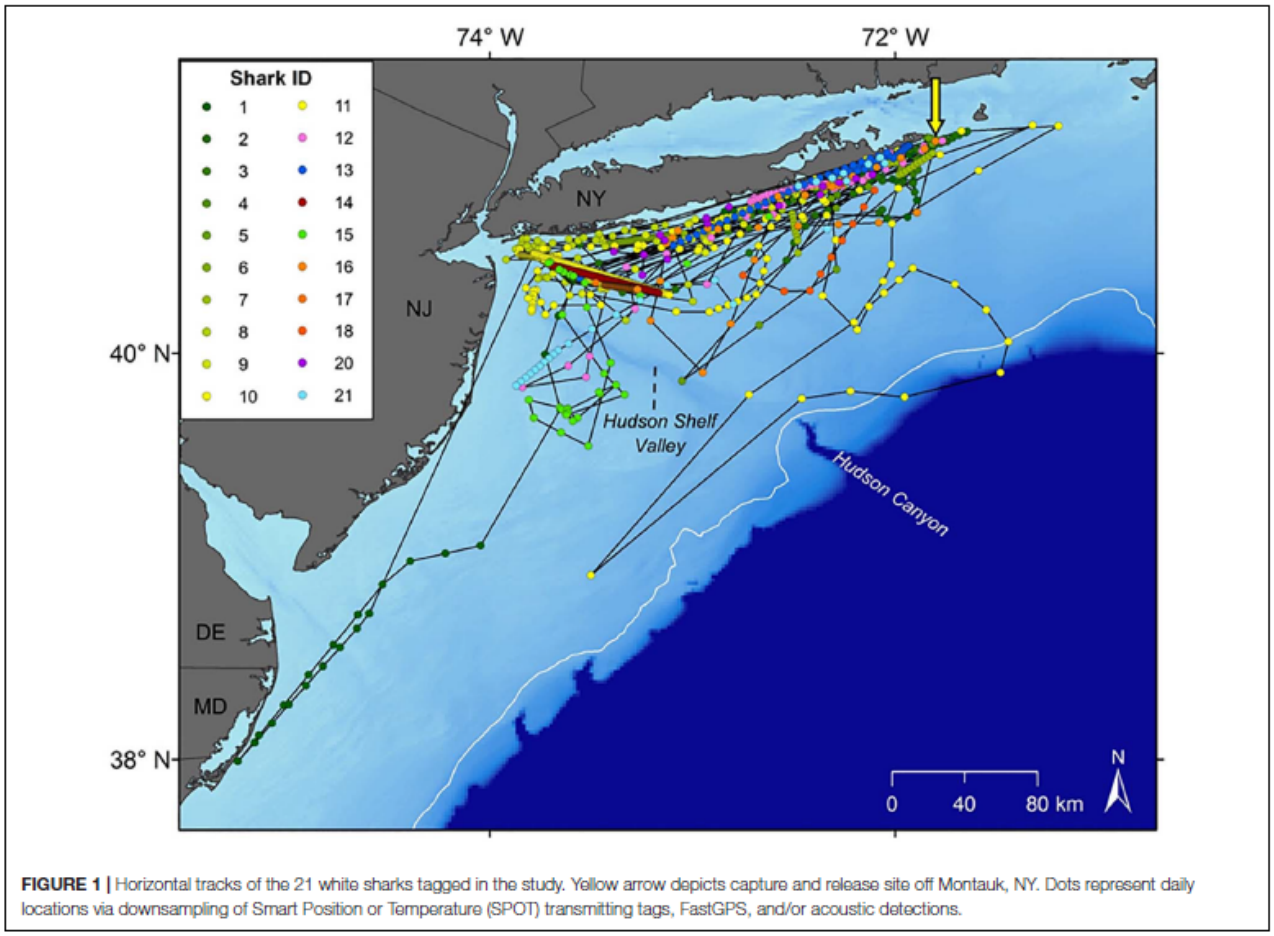


FIGURE 1 | Horizontal tracks of the 21 white sharks tagged in the study. Yellow arrow depicts capture and release site off Montauk, NY. Dots represent daily locations via downsampling of Smart Position or Temperature (SPOT) transmitting tags, FastGPS, and/or acoustic detections.

Figure 5. YOY tagged white sharks (Shaw et al., 2021))

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of white shark in New York.

Details of historic and current occurrence:

There are NY records of this species with data from several sources (e.g., Curtis et. al. 2014). Young of the year white sharks are found predominantly in the New York Bight (64%), but YOY sharks also occur as far south as the central coast of NJ and as far north as MA bay. In contrast, older sharks were found farther north, between Cape Cod, MA, and Canada. Tracking data from Curtis et al. (2018) revealed that while YOY white sharks were seen up to 90 km offshore, 97% of observations during the summer were within 20 km of the south shore of Long Island (Curtis et al., 2018). This pattern of residency over the summer months suggests that this area is a nursery

ground (Curtis et al., 2014, 2018). NOAA has designated the NY Bight as an Essential Fish Habitat for YOY white sharks, and recent work by Shaw et al. (2021) will help refine the habitat designation, which may lead to the creation of a habitat of particular concern.

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, Deep Subtidal

b. Pelagic

Habitat or Community Type Trend in New York

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

The white shark is principally a pelagic coastal and offshore inhabitant of continental and insular shelves, frequenting waters from the surface to depths of 1,875 meters and preferring waters with surface temperatures of 59 to 72˚F (Chewning and Hall 2009). They may be found from the surfline and the intertidal zone to far offshore and near oceanic islands, patrolling for their prey (seals, sea lions and walruses), and occasionally entering shallow bays. Recent research has demonstrated that adults spend most of the year in the oceanic environment and can migrate across ocean basins (Bonfil et al. 2005). Results from this tagging study showed individuals undergoing transoceanic migrations, returning to the original capture location, diving to depths of 980 meters, and tolerating water temperatures as low as 3.4˚C. Juveniles remain closer to shore, but also undertake very long-distance coastal migrations, crossing national boundaries. Patterns in movement and abundance within some areas are thought to be linked with temperature variations and life stage, however this may only have a minimal effect on the distribution of white sharks and is not considered responsible for the decline over recent decades (WCS 2004).

White sharks are an important apex predator in marine systems, actively feeding during the daytime on prey species like marine mammals (seals, sea lions, elephant seals, dolphins) and fish (including other sharks and rays) (Fergusson et al. 2009). They play an important role in the marine food web by controlling populations of their prey.

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Yes	Choose an item.	Choose an item.	Choose an item.

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):*

White sharks have a suspected 2 to 3 year reproductive cycle with a litter size of 2 to 17 pups that are aplacental viviparous with oophagy and histrophy (Rigby et al. 2022). The gestation period is estimated at 12 to 18 months (WCS 2004). At birth white sharks are 120 to 150 cm Total Length (TL) and the maximum size of an individual is estimated at 600 to 640 cm TL. Males reach maturity at 310 to 410 cm TL and females reach maturity at 400 to 500cm TL. For females, their maximum age is estimated around 73 years and they reach maturity around 33 years. (Rigby et al. 2022) Unlike most other fish, white sharks are able to maintain their body temperature higher than that of the surrounding water by using a heat exchange system in their blood vessels (Goldman 1997). Life span is estimated at anywhere between 23-60 years (WCS 2004). Breeding season and nursery locations are unknown. For the most part white sharks are solitary animals but from time to time they are seen in pairs or small groups (Chewning and Hall 2009).

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

Threats to white sharks include targeted sport fisheries for game fish records and trophies (jaws and teeth), protective beach meshing, decline in prey abundance from overfishing, media-fanned persecution campaigns to kill great white sharks after a biting incident occurs, and degradation of inshore habitats used as pupping and nursery grounds (Kyne et al. 2012). Coupled with their low reproductive capacity and late maturity, populations are vulnerable and slow to recover from depleted numbers. They are also caught either accidentally as by-catch or targeted and sold for their flesh, skins, oil, and fins. Their habit of congregating at coastal locations and their inquisitive nature make them behaviorally as well as biologically vulnerable to commercial and recreational fisheries (WCS 2004). White sharks are rarely caught in offshore pelagic fisheries abut are caught as bycatch in inshore fisheries (Rigby et al. 2022). Habitat degradation from development, pollution and overfishing also threatens this species and may exclude it from certain coastal areas, possibly traditionally used for feeding or as nurseries, where it was historically more abundant (Fergusson et al. 2009). Direct effects of climate change on white sharks are unknown, but changes in distribution, abundance, and behavior are likely to result from habitat alteration and temperature changes (Harley et al. 2006). However, white sharks are a prohibited species in state and federal waters. Illegal fishing , bycatch, and offshore energy development should remain threats. As top trophic level predators that can accumulate contaminants, pollution (industrial, pesticides etc.) may be included as a threat. Illegal fishing and bycatch are the primary threats to white sharks in the subnation. As apex predators, white sharks can accumulate high concentrations of contaminants, but it is uncertain how this influences population health.

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (recreational fisheries)
2. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperature)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (illegal landings)
4. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch/discard)
5. Energy Production & Mining	Renewable Energy (offshore wind)

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:

The great white shark is listed under Appendix II of CITES, which covers species that although not currently threatened with extinction, may become so without trade controls. Regulated trade is allowed provided the exporting country issues a permit based on findings that the specimens were legally acquired and trade will not be detrimental to the survival of the species or its role in the ecosystem. Shark finning has been banned in the U.S. since a 1993 Federal FMP for Atlantic sharks was developed, and since 1997 retention and possession of great white sharks has been prohibited for both commercial and recreational fisheries (Kyne et al. 2012). Although laws protecting sharks are strict, loopholes and inadequate enforcement cause problems promoting the black market for white shark products (Fergusson et al. 2009). Because white sharks undergo long-distance, trans-boundary movements, national legislation is no guarantee of survival of the species. New York anglers are prohibited from possessing White sharks (NYSDEC 2021).

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

Management measures and educational programs are needed to prevent or reduce unintentional mortality of white sharks and reduce the negative stigma associated with this species. Research is needed to better understand if white sharks have nursing areas in New York waters in order to provide protection. Better enforcement of regulations prohibiting white shark possession would help reduce illegal trade of shark products and international coordination is needed to enforce regulations and protect this widespread species. Australia has developed a management plan for white sharks which provides a blueprint of necessary management actions to protect this species and could be applied to other populations.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions	
Action Category	**Action**
1.1 Site/area protection	
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management	
3.2 Species recovery	

Table 2: Recommended conservation actions for white shark (Rigby et al. 2022)

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Originally prepared by	Samantha Hoff
Date first prepared	March 28, 2013
First revision	January 29, 2014 (Samantha Hoff)
Latest revision	January 12, 2024 (Siobhan Keeling)

Species Status Assessment

Common Name: Winter skate **Date Updated:** 1/12/2024

Scientific Name: *Leucoraja ocellata* **Updated by:** Siobhan Keeling

Class: Chondrichthyes

Family: Rajidae

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

The winter skate is a benthic batoid endemic to the Northwest Atlantic with distributions ranging from Labrador, Canada, to Cape Hatteras, NC (Figure 1). In the fall, the center of the distribution is in Georges Bank, while in the spring, the species is more broadly distributed across its' range (Packer et al., 2003; Frisk et al., 2008) (Figure 2). Although skates are not known to undertake large-scale migrations, they may move seasonally in response to changes in water temperature in some portions of their range, generally offshore in summer and early autumn, returning in shore during winter and spring (Sosebee 2006). Winter skate life history characteristics (late age to maturity, long generation time, low fecundity, and slow population growth) increase their vulnerability to exploitation, reduce rate of recovery, and increase extinction risk (Kyne et al. 2012). Although there is no commercial target fishery for winter skate, they are commonly caught as by-catch and the stock is in an overfished state. Winter skate are most abundant in the Long Island Sound, off the coast of the South Shore, and in the Hudson-Raritan estuary, with large numbers caught during spring and autumn in the Northeast Fishery Science Center (NEFSC) trawl surveys (NEFMC 2009). Historical declines resulted from international demersal fishing, a threat that was limited in 1977 when the EEZ was extended to 200 nm allowing only U.S. and Canadian fishing vessels (Kulka et al., 2020). Within the U.S. portion of the species range, in the early 1980s, there was an increase in winter skate biomass along with spiny dogfish (Squalus acanthias) following a decline in more commercially valuable ground fishes (e.g., cod, flounders, haddock) (Frisk et al., 2008). According to the NEFSC Bottom Trawl data, following the initial increase in abundance in the 1980s, biomass decreased in the 1990s before increasing and stabilizing in the 2000s (New England Fishery Management Council, 2020). Populations in the U.S. appear to be stable or increasing.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not Listed; SGCN

b. Natural Heritage Program

i. **Global:** GNR (Unranked)

ii. **New York:** SNR (Unranked) **Tracked by NYNHP?:** No

Other Ranks:

-IUCN Red List: Endangered

-Northeast Regional SGCN: RSGCN

-COSEWIC: special concern

Status Discussion:

The winter skate was determined to be overfished because the biomass index dropped below the threshold (44th SAW 2007). Overfishing is not currently occurring because the three-year moving average of the biomass indices did not exceed the minimum threshold, which the Fishery Management Plan (FMP) defines when overfishing is occurring (NEFMC 2009). The IUCN report states that substantial declines (>90%) have occurred in two major areas of the range and although the causes of the decline are mixed and uncertain, a precautionary assessment of Endangered status globally is warranted (Kulka et al. 2009). The winter skate was petitioned for listing under the Endangered Species Act in 2011, but NOAA Fisheries determined that a status review was not warranted at that time (NEFMC 2012).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Stable	Late 1980's-present		Choose an item.
Northeastern US	Yes	Declining	Stable	Late 1980's-present (Mid-Atlantic Bight)		Choose an item.
New York	Yes	Declining	Stable	Late 1980's-present		Yes
Connecticut	Yes	Declining	Stable	Late 1980's-present	Not Listed	Yes
Massachusetts	Yes	Declining	Stable	1989-present	Not Listed	No
New Jersey	Yes	Declining	Stable	Late 1980's-present	Not Listed	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	Yes	Declining	Stable	Late 1980's-present	Not Listed	Choose an item.

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):*

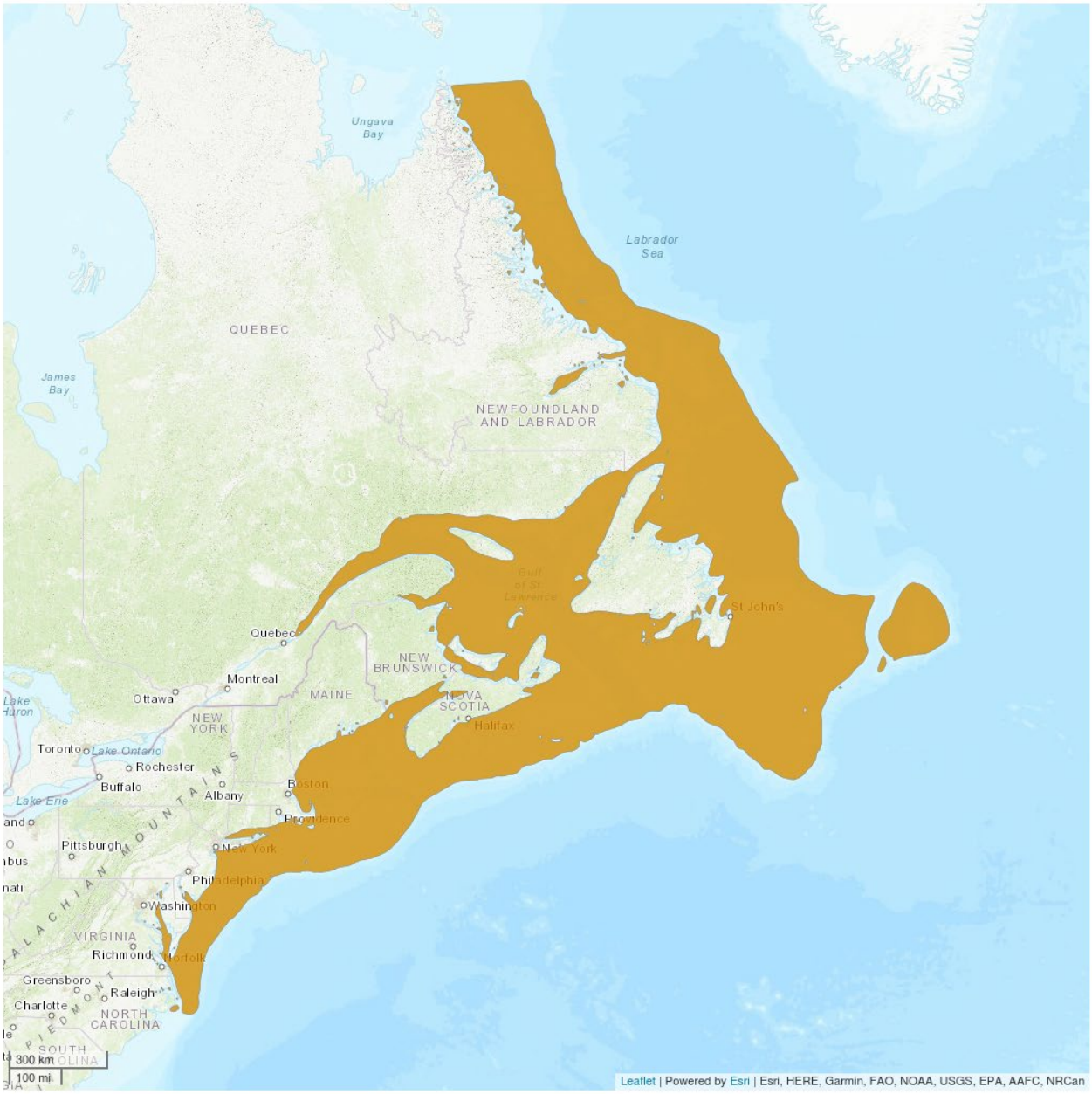
Although there are no direct surveys of winter skate in New York waters, the Connecticut Department of Environmental Protection (CTDEP) spring and autumn finfish trawl surveys in Long Island Sound were conducted from 1984-2006, and the Northeast Fishery Science Center (NEFSC) bottom trawl surveys heavily survey the Mid-Atlantic Bight (see Figures 2 and 3).

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

The current population trend is decreasing according to the IUCN red list (Kulka et al. 2020).NEFSC autumn survey biomass indices of winter skate peaked in the mid- 1980s, declined through the early 1990s, and have since stabilized at moderately higher levels (Sosebee 2006). Spawning stock biomass generally follows the same pattern showing low values in the 1970s followed by an expansion of size composition in the 1980s, and declines beginning in the mid to late 1990s. CTDEEP survey indices suggest that after increasing to a series high from 1984-1989, winter skate in Long Island sound have declined slightly. In 2007 the winter skate was determined to be overfished because the biomass index dropped below the threshold, but overfishing was not occurring because the three-year moving average of the biomass indices did not exceed that maximum threshold (see Figure 4)(NEFMC 2009). Current NEFSC indices of winter skate biomass are about 38% of the peak observed during the mid-1980s (NEFMC 2009).

Distribution Map

Leucoraja ocellata



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. IUCN Red List Winter Skate distribution map (Kulka 2020)

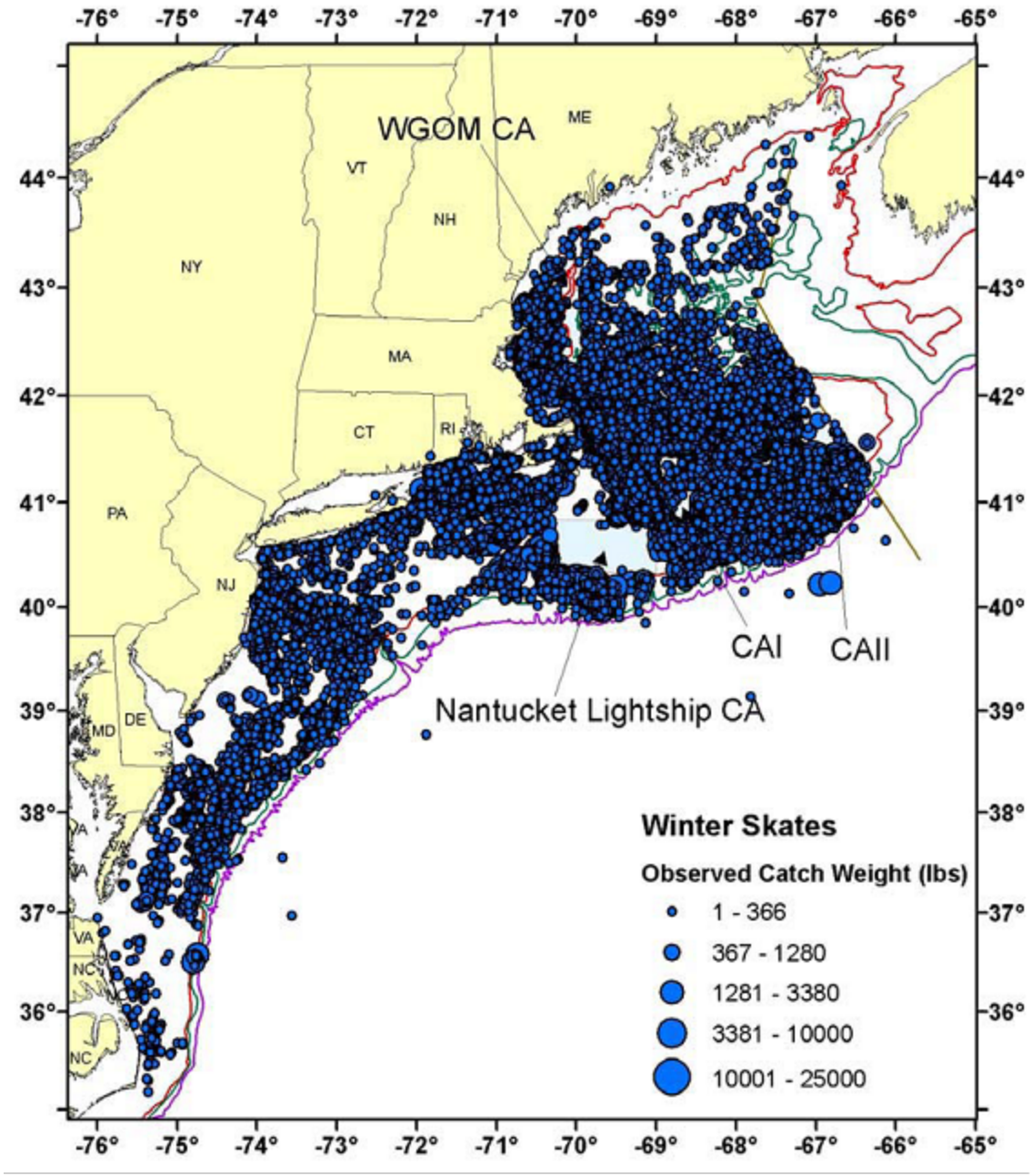


Figure 2. Distribution of winter skates from the Northeast Fisheries Observer Program, 1989-2005 (44th SAW 2007).

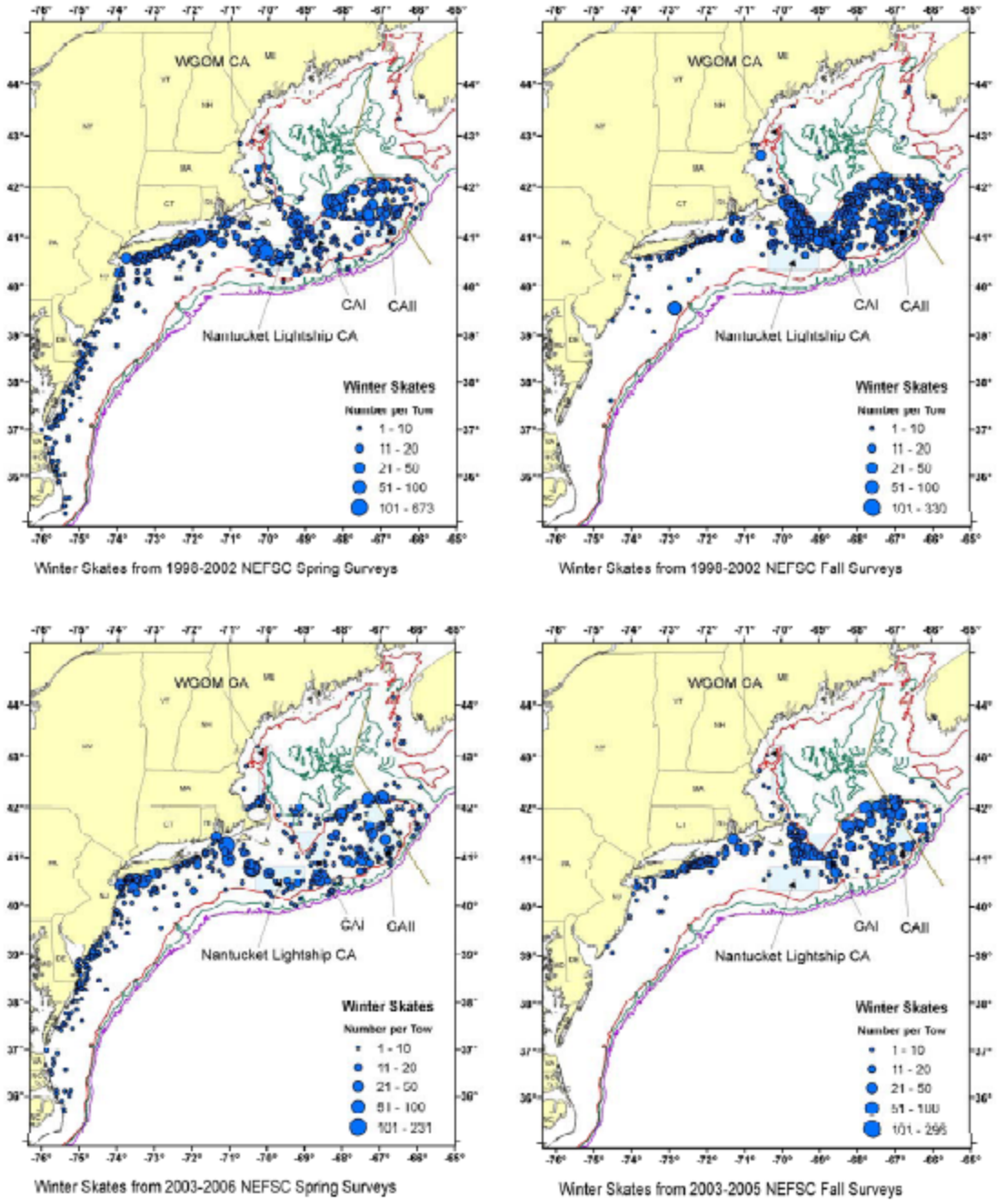


Figure 3. Distribution of winter skate from the spring and autumn NEFSC surveys from 1998-2006 (44th SAW 2007).

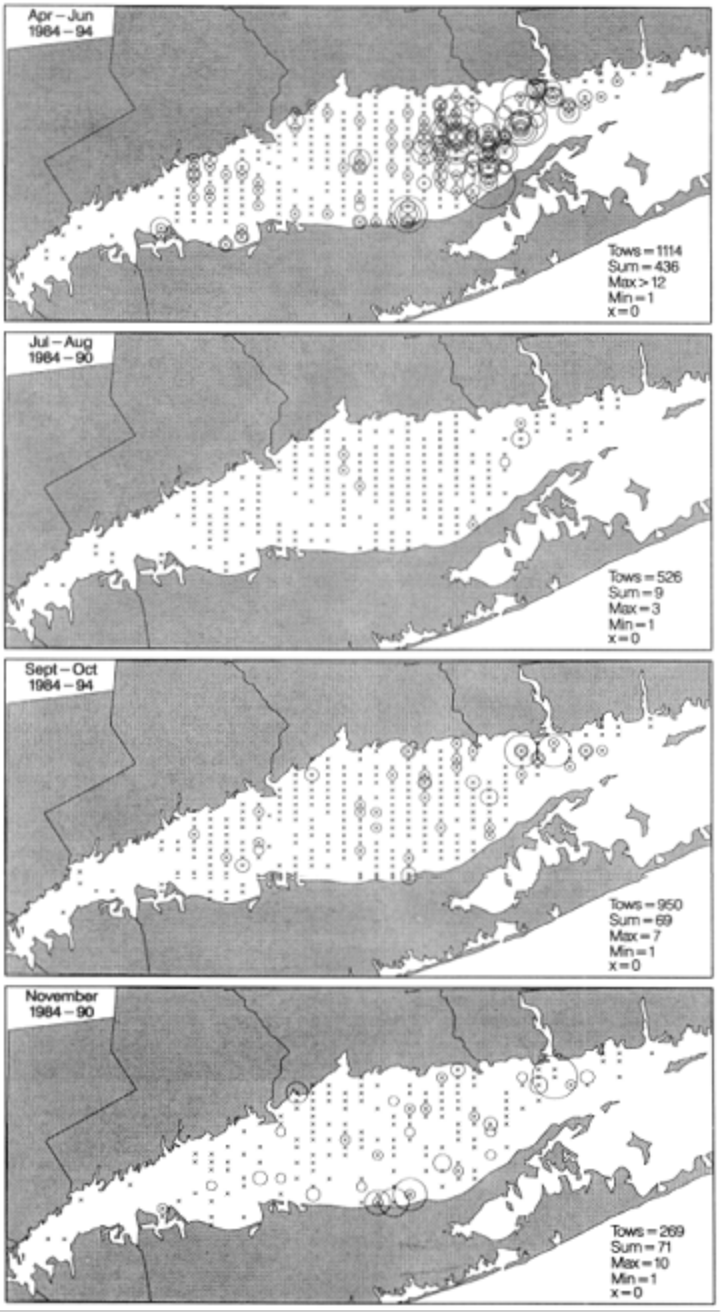


Figure 4. Distribution and abundance of juvenile and adult winter skate collected in Long Island Sound based on the finfish surveys of the Connecticut Fisheries Division, 1984-1994 (Packer et al. 2003).

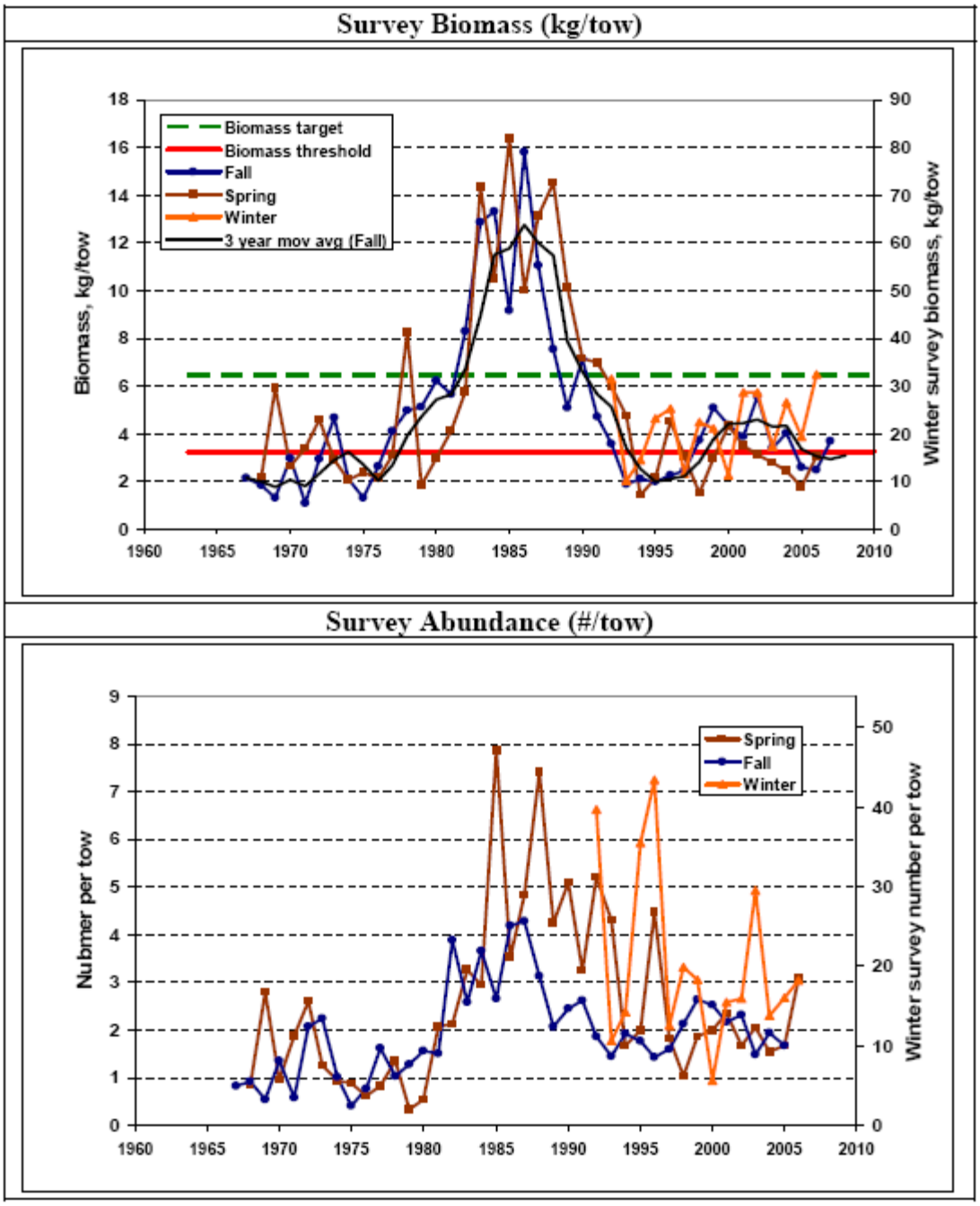


Figure 5. Winter skate stratified mean weight and number per tow for the winter, spring and fall NEFSC trawl surveys from Cape Hatteras, NC to the Gulf of Maine (NEFMC 2009).

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

Winter skate are commonly observed in waters along the New England coast and NEFSC spring and autumn bottom trawl surveys indicate that winter skate are most abundant in the Georges Bank and Southern New England offshore regions (44th SAW 2007). In spring, reports show that winter skate are most abundant in the Long Island Sound on sand bottoms in the Mattituck Sill and Eastern Basin (Packer et al. 2003).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995			
1995-2004			
2005-2014			
2015-2023			

Table 1: Records of winter skate in New York.

Details of historic and current occurrence:

Historic:

Winter skate historically occurred in the Long Island Sound, off the South Shore, and in the Hudson-Raritan estuary, most abundant in winter months.

Current:

Winter skate currently occupy the same distribution they have historically, throughout the Long Island Sound, off the South Shore, and in the Hudson-Raritan estuary.

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%	Core	

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, Benthic Geomorphology, Benthic Flat

b. Marine, Deep Subtidal, Benthic Geomorphology, Benthic Flat

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:

The winter skate is a benthic species, preferring sand and gravel bottoms from the shoreline to 400 meters, with highest abundance occurring at depths of 21-80 meters (Kulka et al. 2009, Packer et al. 2003). They are found at depths of 5 to 725m on continental shelves and upper slopes (Kulka et al. 2020). Some reports suggest that bottom type, rather than depth, are more important in

determining distributions of winter skate (Packer et al 2003). They occur in waters from the surface to 90m in depth. Major prey items are primarily forage fish (herrings, hake) or benthic megafauna (crabs, shrimp), with primary food sources shifting from invertebrates to fish as skates increase in size (44th SAW 2007, Kulka et al. 2009). Some observational records state that winter skate is a permanent resident off southern New England between 15-46 meters although there are seasonal fluctuations in abundance. It has been recorded over a temperature range of -1.2˚C to 19˚C and salinities of 28-35ppt depending on life stage (Packer et al. 2003). Winter skate remain buried in depressions during the day and are more active at night (Packer et al. 2003).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

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):*

Winter skates reach a maximum size of 113 cm total length (TL) with males maturing at 53 to 58cm (TL) (Kulka et al. 2020). They are oviparous and some degree of reproduction takes place year round, although reproduction peaks during the summer months (Packer et al. 2003). Females reach maturity at 65 to 77 cm (TL) and offspring are 11 to 13 cm (TL) with 18 to 36 eggs produced per year (Kulka et al. 2020). Females produce approximately 40 egg cases per year, each containing one embryo. Egg cases are released in offshore waters on rock bottom habitats and embryos remain in the cases during the gestation period of about a year and a half. Common predators include grey seals, gulls, sharks, rays and other larger skate species (Kulka et al. 2009). Due to its slow life history characteristics, winter skate are vulnerable to exploitation, reduced rates of recovery, and risk of extinction. Winter skates exhibit a lifespan of about 20 years, reaching functional maturity at 12 years (Sosebee 2006, Frisk and Miller 2009). There are differences in this species' life history depending on their distribution. In the Gulf of Maine, females mature at 5 years and maximum age is 11 years. On the Scotian shelf, females mature at 14 years and maximum age is 19 years. In the Gulf of St. Lawrence, winter skate mature at 5 years (42cm (TL)) and outside of the gulf they mature at 13 years (75cm (TL)). In the Gulf of St. Lawrence, generation time is about 10 years and generation time is 17 years outside of it.

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

Winter skate are frequently taken as by-catch during groundfish trawling and scallop dredge operations and discarded. Recreational and foreign landings appear to be insignificant at less than 1% of total fishery landings (Packer et al. 2003). Landings have increased since the mid 1980s, partly in response to increased demand for lobster bait and more significantly, to the increased export market for skate wings (44th SAW 2007). Overfishing combined with slow life history characteristics makes this species vulnerable to exploitation. Although direct effects of climate

change on skates are unknown, changes in water temperature and sea level rise are likely to affect individual performance, distribution, and abundance (Harley et al. 2006).

Threats to NY Populations	
Threat Category	**Threat**
1. Biological Resource Use	Fishing & Harvesting Aquatic Resources (bycatch)
2. Climate Change & Severe Weather	Habitat Shifting & Alteration (warming ocean temperature)
3. Biological Resource Use	Fishing & Harvesting Aquatic Resources (commercial harvest)

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

Yes: ✓ **No:** _____ **Unknown:** _____

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

Winter skate have been managed by the National Marine Fisheries Service under the Northeast Skate Complex Fishery Management Plan (FMP) since 2003, along with six other species in the complex (barndoor, thorny, smooth, clearnose, little and rosette skates). The FMP includes catch reporting requirements, a TAC (total allowable catch), possession limits, and prohibitions on possession of barndoor and thorny skate in the U.S (status). In 2011 the New England Fishery Management Council voted in favor of the Framework Adjustment I to the FMP, changing the skate wing fishery possession limit from 5,000 lbs. of skate wings per trip (year-round) to 2,600 lbs. per trip from May 1 through August 31, and 4,100 lbs. per trip from September 1 through April 30. The primary goal of the Framework Adjustment I was to reduce possession limits to a level that the directed skate wing fishery season would extend year-round and not exceed the total available landings.

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

Fisheries independent data are needed where individual species are reported to better understand winter skate abundance in New York (Packer et al. 2003). Investigation of the influence of annual water temperature changes or other environmental factors on shifts in the range and distribution of winter skate are needed to determine potential climate change impacts. Efforts to address skate management issues such as misidentification, high amounts of discards, and limitations in gear technology should be addressed (Kulka et al. 2009).

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Conservation Actions

Action Category	Action
3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management 3.1.3 Limiting population growth	
3.2 Species recovery	
5.1 Legislation 5.1.1 International level 5.1.2 National level	
5.4 Compliance and enforcement 5.4.1 International level 5.4.2 National level	

Table 2: Recommended conservation actions for winter skate (Kulka et al. 2020).

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