

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

b. Natural Heritage Program

1. **Global:** G2 imperiled

2. **New York:** SNR not ranked

Tracked by NYNHP?: No

Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need

-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		-
Northeastern US	Yes	Declining	Declining	Moderate Decline of the Atlantic Population, Last 40 years		-
New York	Yes	Declining	Declining			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	-	-			-
Vermont	No	-	-			-
Ontario	No	-	-			-
Quebec	No data	Unknown	Unknown		none	-

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).

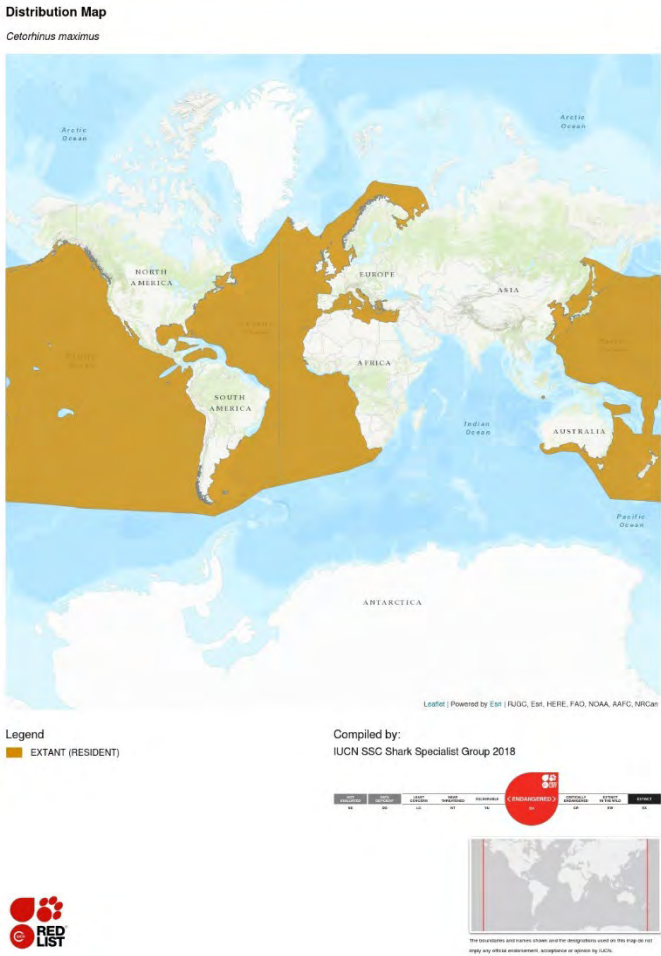


Figure 1: IUCN Red List distribution map of the basking shark

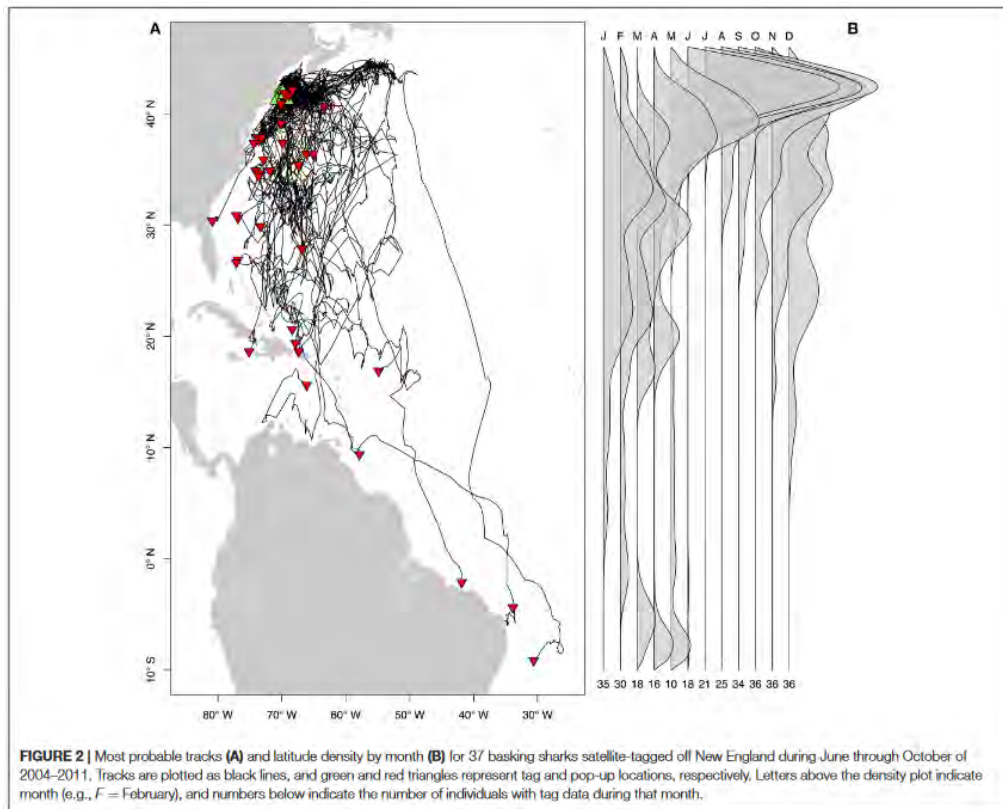


Figure 2: Probable tracks (A) and latitude density by month (B) of 37 basking sharks satellite-tagged off New England during June-October 2004-2011

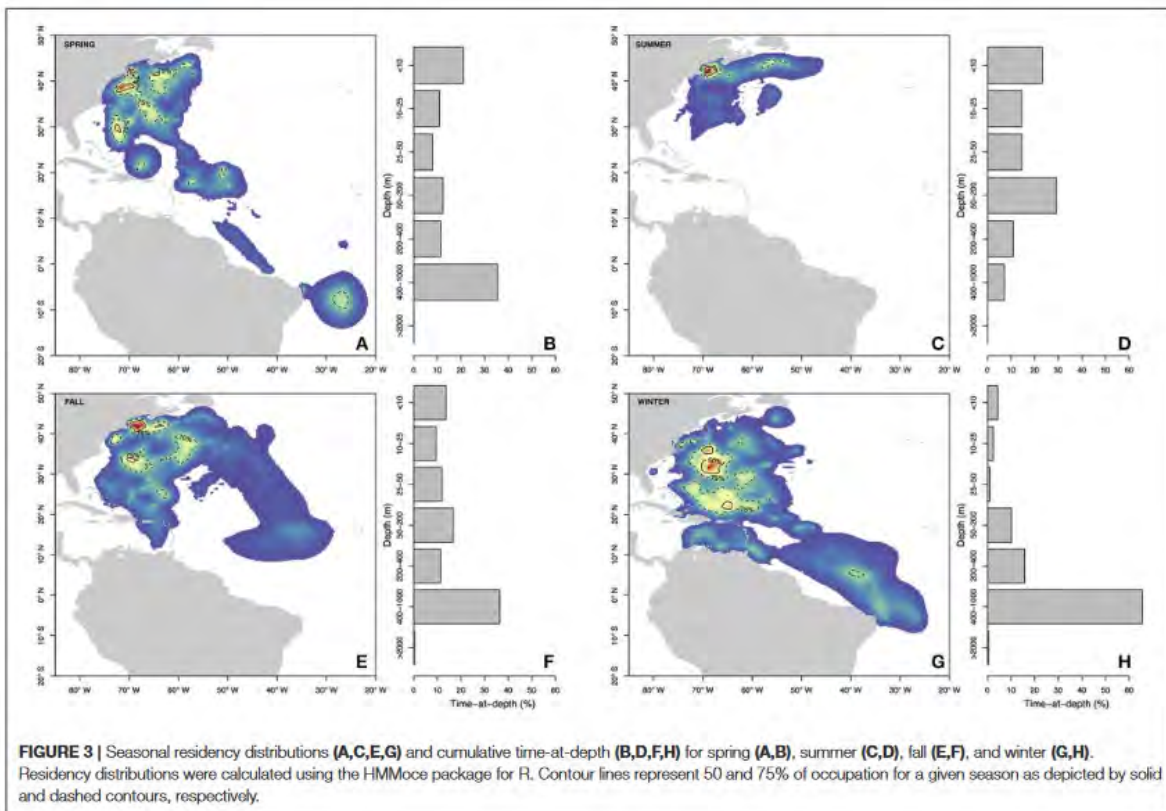


Figure 3: Seasonal residency distributions (A, C, E, G) and cumulative time-at-depth (B, D, F, H) for spring (A, B), summer (C, D), fall (E, F), and winter G, H).

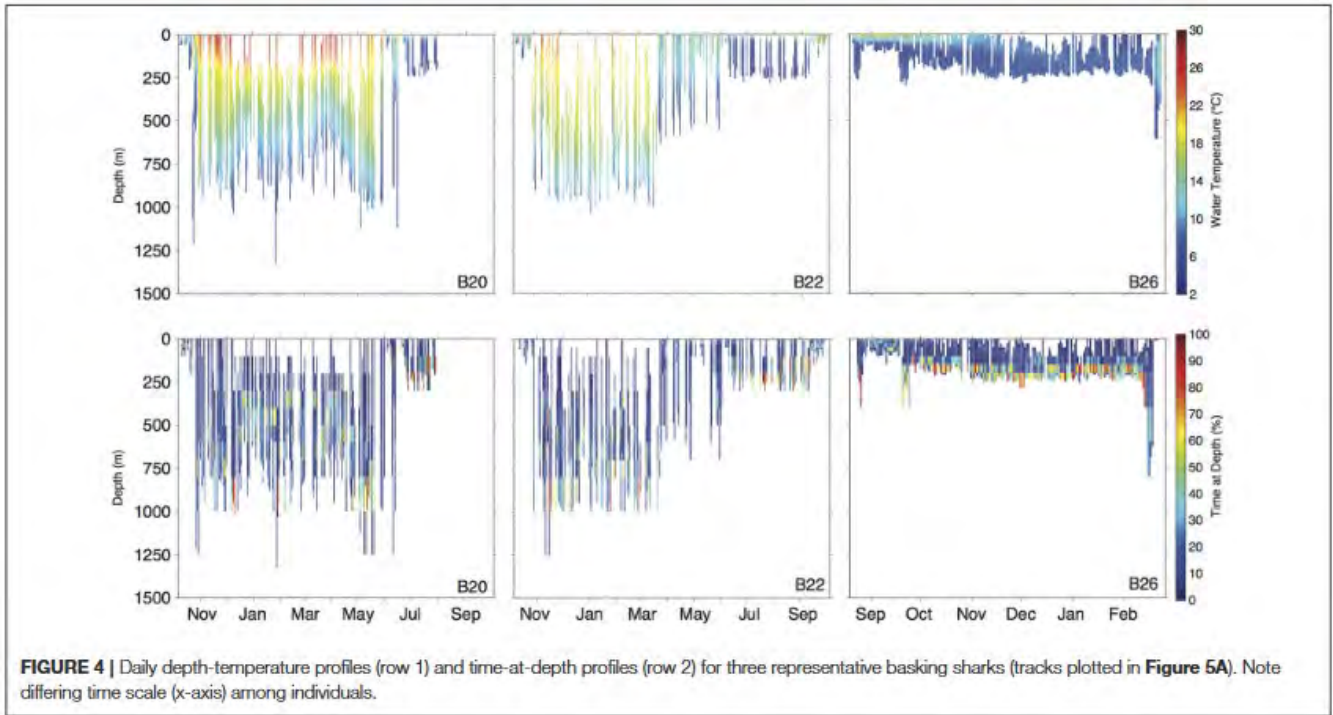


Figure 4: Daily depth-temperature profile (row 1) and time-at-depth profiles (row 2) for three representative basking sharks

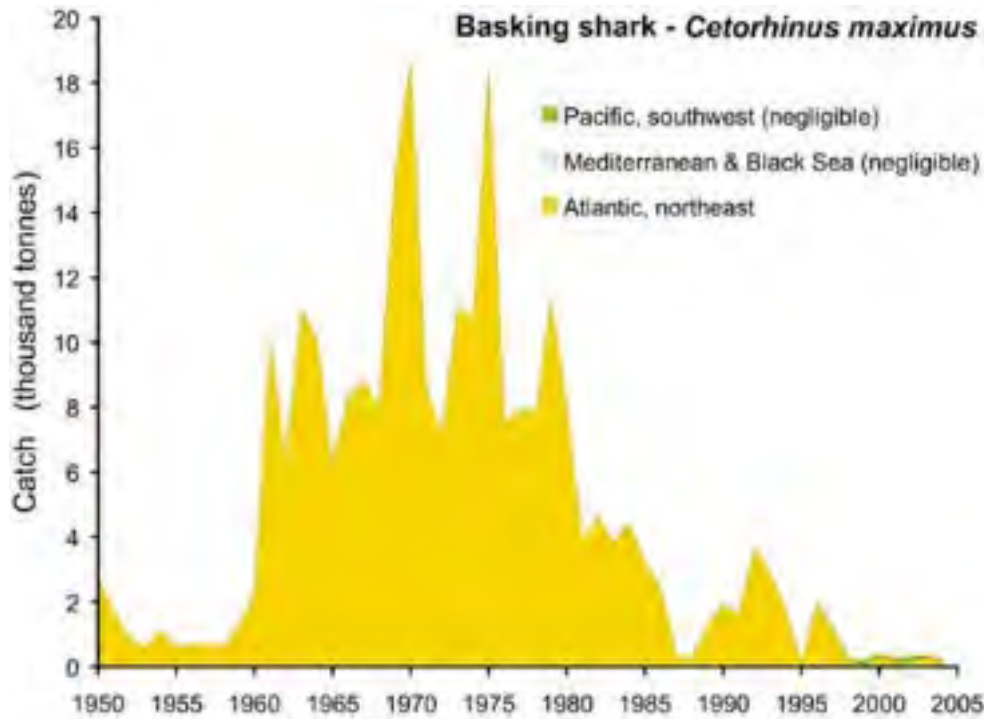


Figure 5: Catches of the basking shark reported to the Food and Agricultural Organization of the United Nations (FAO 2006).

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 elasmobranchs, 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).

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 transequatorial 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?
-	-	Yes	Unknown	-	-

Column options

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

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

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

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).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
3. Energy Production & Mining	3.3 Renewable Energy	3.3.2 Wind farms (offshore)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
4. Transportation & Service Corridors	4.3 Shipping Lanes	4.3.1 Shipping (boat strikes)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.2 Commercial fishing (bycatch)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
6. Human Intrusions & Disturbance	6.1 Recreational Activities	6.1.4 Recreational boating	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.3 Gradual temperature change (warming ocean temperatures)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to basking shark.

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

Yes: X

No:

Unknown:

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

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:

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Action Category	Action	Description
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Harvest management
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Trade management
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Species recovery
A.1 Direct Habitat Management	C.6.5.0.0 Conservation planning	Site/area protection

Table 2. Recommended conservation actions for basking shark.

VII. References

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