

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

b. Natural Heritage Program

i. **Global:** G5 Secure

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

Other Ranks:

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

-IUCN Red List: Near threatened (globally)

-Northeast Regional SGCN: Not Listed

Status Discussion:

The status of blue sharks in the Atlantic Ocean remains uncertain, 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 elasmobranchs, 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		-
Northeastern US	Yes	Declining	Stable	Last 25 years (NW Atlantic Ocean)		-
New York	Yes	Declining	Stable	Last 25 years	Not Listed	Yes
Connecticut	No data	-	-		Not Listed	No
Massachusetts	No data	-	-		Not Listed	No
New Jersey	No data	-	-		Not Listed	No
Pennsylvania	No	-	-			-
Vermont	No	-	-			-
Ontario	No	-	-			-
Quebec	No	-	-			-

Column options

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

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

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

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

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

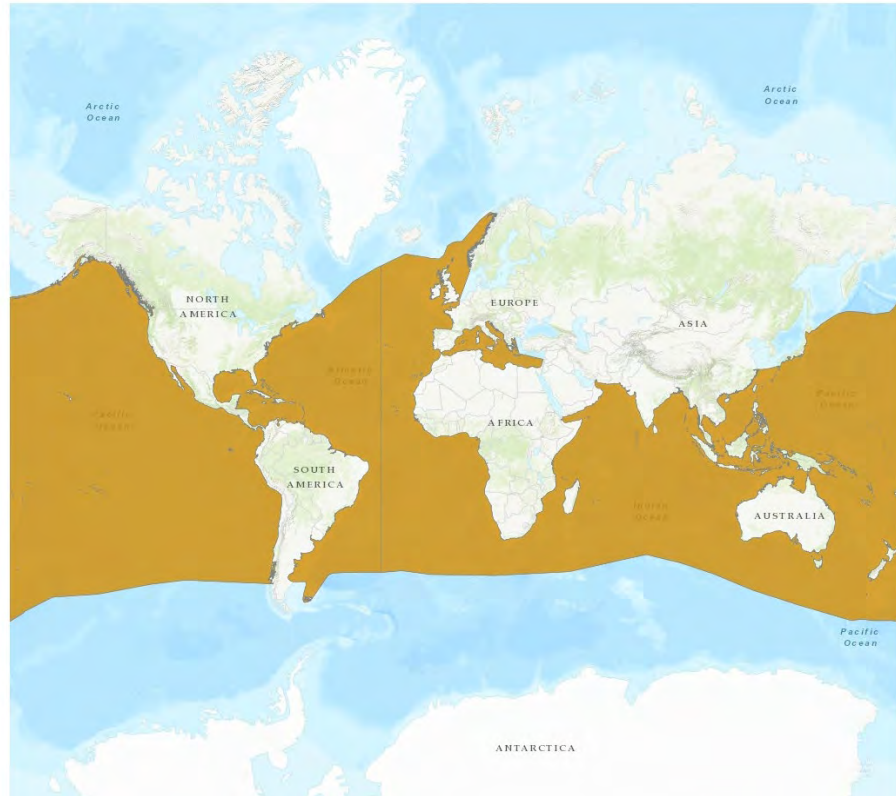


Figure 1. IUCN Red List distribution map of the blue shark (IUCN 2019)

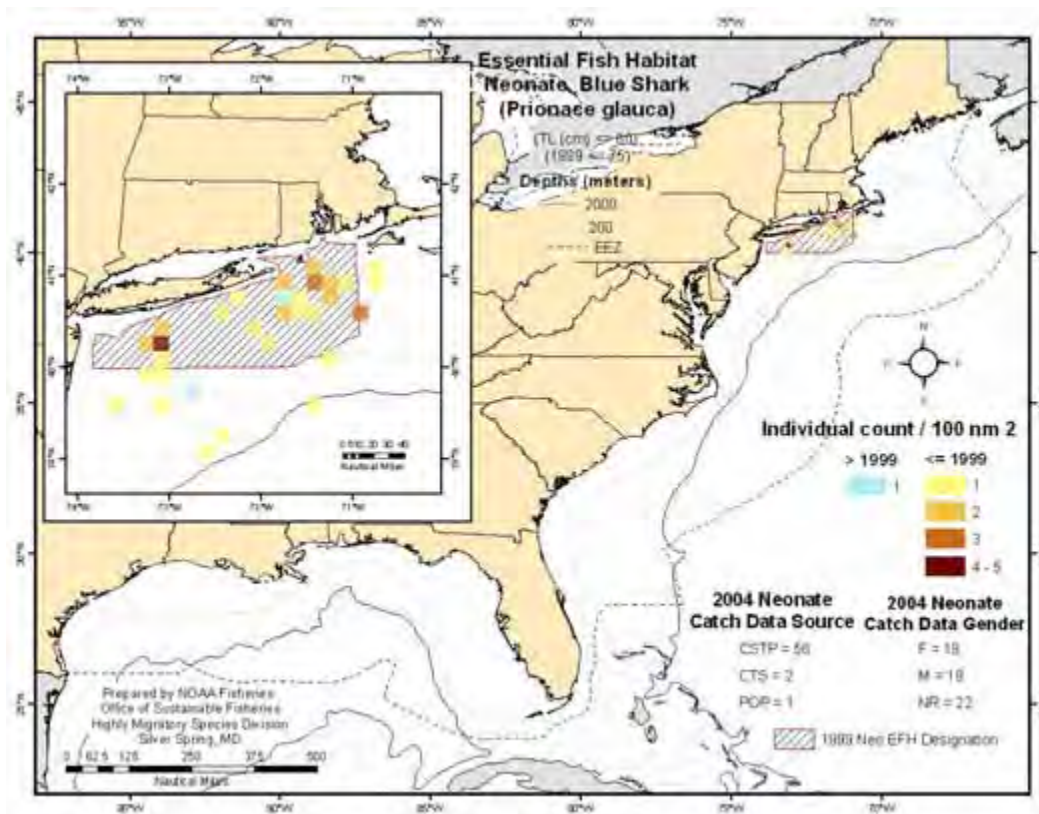


Figure 2. Essential habitat for blue shark neonates (ASMFC 2008)

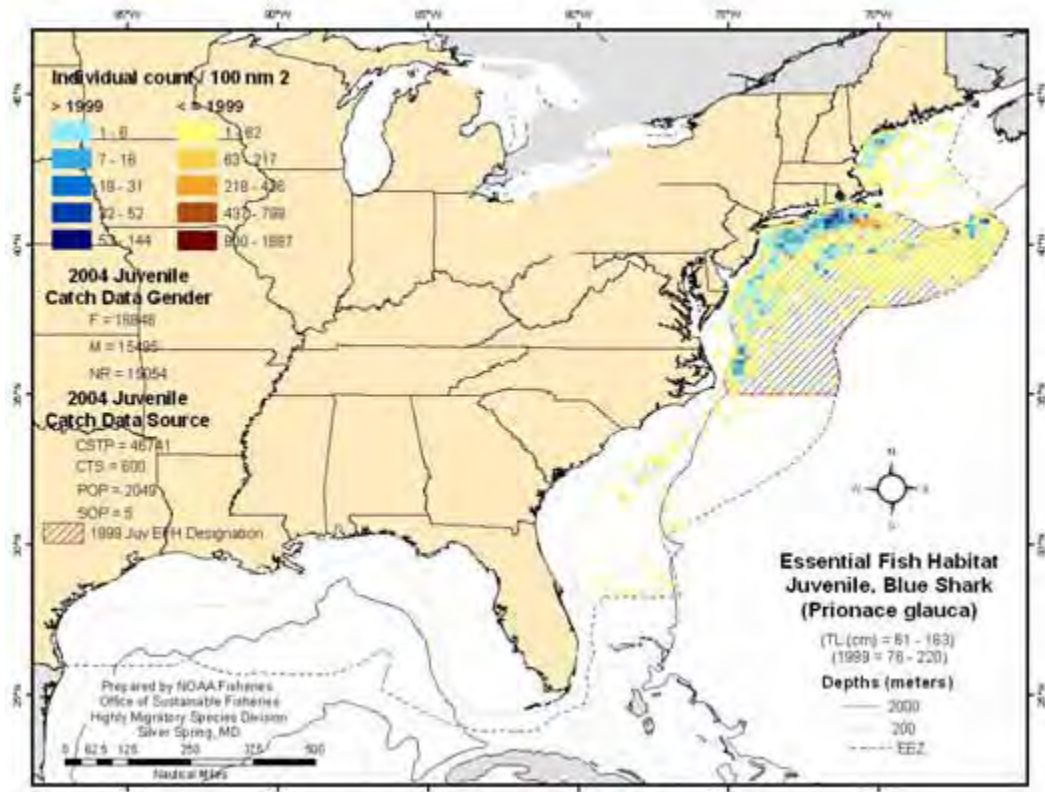


Figure 3. Essential habitat for blue shark juveniles (ASMFC 2008)

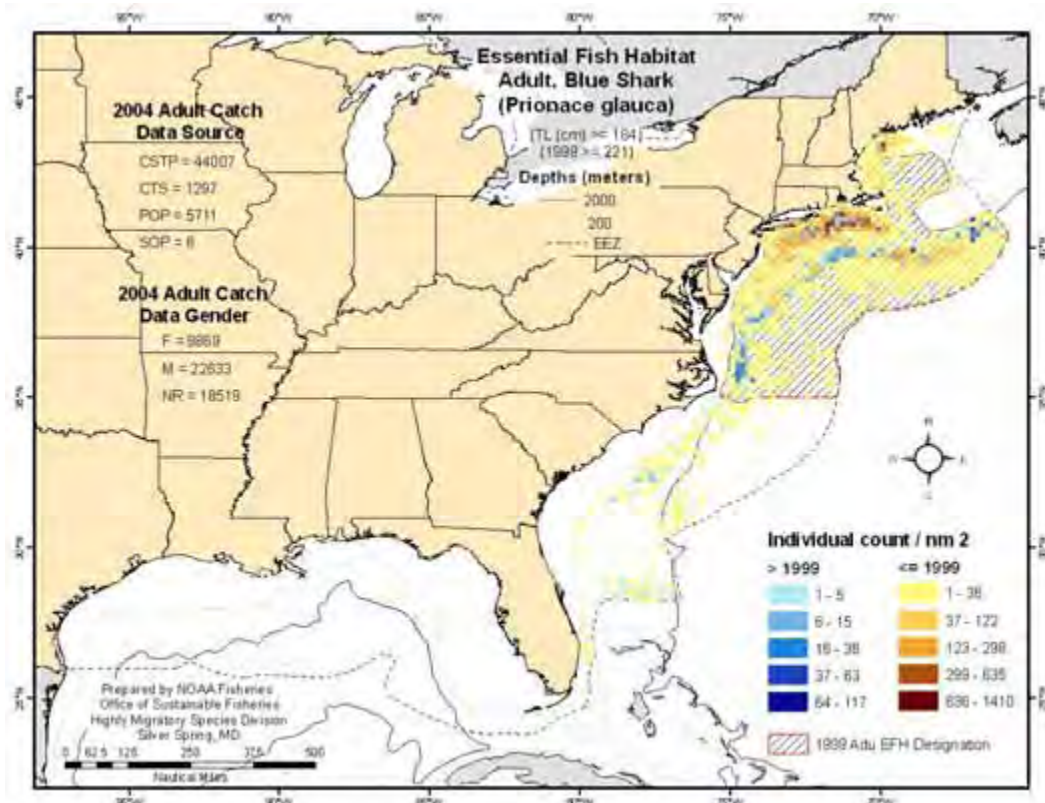


Figure 4. Essential habitat for adult blue sharks (ASMFC 2008)

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

Blue sharks have never been abundant in New York waters.

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	-	Yes	-	-	-

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)

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
3. Energy Production & Mining	3.3 Renewable Energy	3.3.2 Wind farms (offshore)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.1 Recreational or subsistence fishing	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.2 Commercial fishing (+bycatch)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to blue shark.

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.

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

Table 2. Recommended conservation actions for blue shark.

VII. References

- Aires-da-Silva, A.M., J.J. Hoey, and V.F. Gallucci. 2008. A historical index of abundance for the blue shark (*Prionace glauca*) in the western North Atlantic. *Fisheries Research* 92: 41-52.
- (ASMFC) Atlantic Highly Migratory Species Management Division. 2012. 2012 Stock assessment and fishery evaluation report for Atlantic highly migratory species. NOAA Fisheries. 220p.
- Atlantic States Marine Fisheries Commission Coastal Sharks Plan Development Team. 2008. Interstate Fishery Management Plan for Atlantic Coastal Sharks. Fishery Management Report No. 46. 193p.
- Baum, J.K., R.A. Myers, D.G. Kehler, B. Worm, S.T. Harley, and P.A. Doherty. 2003. Collapse and conservation of shark populations in the Northwest Atlantic. *Science* 299(5605): 389-392.
- Branco, V., C. Vale, J. Canario, and M. Neves dos Santos. 2007. Mercury and selenium in blue shark (*Prionace glauca*, L. 1758) and swordfish (*Xiphias gladius*, L. 1758) from two areas of the Atlantic Ocean. *Environmental Pollution* 150: 373-380.
- Camhi, M.D., S.V. Valenti, S.V. Fordham, S.L. Fowler, and C. Gibson. 2009. The conservation status of pelagic sharks and rays: report of the IUCN shark specialist group pelagic shark red list workshop. IUCN Species Survival Commission Shark Specialist Group. Newbury, UK. 78p.
- Campana, S.E., L. Marks, W. Joyce, and N. E. Kohler. 2006. Effects of recreational and commercial fishing on blue sharks (*Prionace glauca*) in Atlantic Canada, with inferences on the North Atlantic population. *Canadian Journal of Fisheries and Aquatic Science*. 63: 670-682.
- Cortes, E., F. Arocha, L. Beerkircher, F. Carvalho, A. Domingo, M. Heupel, H. Holtzhausen, M.N. Santos, M. Ribera, and C. Simpfendorfer. 2010. Ecological risk assessment of pelagic sharks caught in the Atlantic pelagic longline fisheries. *Aquatic Living Resources* 23(1): 25-34.
- Fowler, S.L., R.D. Cavanagh, M. Camhi, G.H. Burgess, G.M. Cailliet, S.V. Fordham, C.A. Simpfendorfer, and J.A. Musick. 2005. Sharks, rays and chimaeras: the status of the chondrichthyan fishes. IUCN Species Survival Commission Shark Specialist Group.

Harley, C.D.G., A.R. Hughes, K.M. Hultgren, B.G. Miner, C.J.B. Sorte, C.S. Thornber, L.F. Rodriguez, L. Tomanek, and S.L. Williams. 2006. The impacts of climate change in coastal marine systems. *Ecology Letters* 9: 228-241.

Hazin, F.H.V., C.E. Boeckman, E.C. Leal, R.P.T. Lessa, K. Kihara, and K. Otsuka. 1994. Distribution and relative abundance of the blue shark, *Prionace glauca*, in the southwestern equatorial Atlantic Ocean. *Fisheries Bulletin* 92: 474-480.

Kyne, P.M., J.K. Carlson, D.A. Ebert, S.V. Fordham, J.J. Bizzarro, R.T. Graham, D.W. Kulka, E.E. Tewes, L.R. Harrison, and N.K. Dulvy. 2012. The conservation status of north American, Central American, and Carriibbean chondrichthyans. IUCN Species Survival Commission Shark Specialist Group, Vancouver, Canada. 156p.

New York State Department of Environmental Conservation. 2005. New York State Comprehensive Wildlife Conservation Strategy. <http://www.dec.ny.gov/index.html>.

Queiroz N, N.E. Humphries, L.R. Noble, A.M. Santos, and D.W. Sims. 2012. Spatial dynamics and expanded vertical niche of blue sharks in oceanographic fronts reveal habitat targets for conservation. *PLoS ONE* 7(2): e32374.

Reviewed Native Distribution Map for *Prionace glauca* (Blue shark). www.aquamaps.org, version of Aug. 2010. Web. Accessed 20 Feb. 2013.

Stevens, J. 2009. *Prionace glauca*. In: IUCN 2012. Red List of Threatened Species. Version 2012.2.

Tavares, R., M. Ortiz, and F. Arocha. 2012. Population structure, distribution and relative abundance of the blue shark (*Prionace glauca*) in the Caribbean Sea and adjacent waters of the North Atlantic. *Fisheries Research* 129(130): 137-152.

Zoological Society of London. 2010. McNamara, A., J. Atkinson, J. Baillie, B. Collen, K. Breach, H. Froy, S. Khela, A. Mukherjee, J. Peet, R. Smith, W. Fodon, and A. Kuhl. Climate change vulnerability of migratory species: the path ahead. A Project Report for CMS Scientific Council 16, Bonn, 28-30 June. 224p.

NYS DEC. "New York State Species of Greatest Conservation Need." 2015. State Wildlife Action Plan. https://extapps.dec.ny.gov/docs/wildlife_pdf/sgnc2015list.pdf

Coelho, Rui, et al. "Distribution patterns and population structure of the blue shark (*Prionace glauca*) in the Atlantic and Indian Oceans." *Fish and Fisheries* 19.1 (2018): 90-106.

Campana, Steven E., et al. *Current status and threats to the North Atlantic Blue Shark (*Prionace glauca*) population in Atlantic Canada*. Fisheries and Oceans Canada, Ecosystems and Oceans Science, 2015.

Dulvy, N.K., Baum, J.K., Clarke, S., Compagno, L.J.V., Cortés, E., Domingo, A., Fordham, S., Fowler, S.L., Francis, M.P., Gibson, C., Martinez, J., Musick, J.A., Soldo, A., Stevens, J.D. and Valenti, S.V. 2008. You can swim but you can't hide: the global status and conservation of oceanic pelagic sharks and rays. *Aquatic Conservation: Marine and Freshwater Ecosystems* 18(5): 459-482.

Kohler, Nancy E. and Turner, Patricia A. "Distributions and Movements of Atlantic Shark Species: A 52-Year Retrospective Atlas of Mark and Recapture Data" vol. 81, 2018, <https://doi.org/10.7755/MFR.81.2.1>

International Commission for the Conservation of Atlantic Tunas. 2019. MEASURES FOR THE CONSERVATION OF THE NORTH ATLANTIC BLUE SHARK CAUGHT IN ASSOCIATION WITH ICCAT FISHERIES. 19-07, rec. 16-12.