

**FISHERY MANAGEMENT PLAN UPDATE
COASTAL SHARKS
AUGUST 2021**

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	August 2008 Addendum I – September 2009 Addendum II – May 2013 Addendum III – October 2013 Addendum IV – August 2016 Addendum V – October 2018
Amendments:	None
Revisions:	None
Supplements:	None
Information Updates:	None
Comprehensive Review:	2022: Blue shark (ICCAT) 2023: Hammerhead sharks stock assessment (SEDAR 77)

The Atlantic States Marine Fisheries Commission (ASMFC) adopted a fishery management plan (FMP) for coastal sharks in 2008 (ASMFC 2008) to complement federal management actions and increase protection of pregnant females and juveniles in inshore nursery areas. The FMP regulates 40 different species of coastal sharks found on the Atlantic coast. The ASMFC does not actively set quotas for any shark species and follows NOAA Fisheries (National Oceanic and Atmospheric Administration) openings and closures for all shark management groups. Species in the prohibited category may not be possessed or taken. Sandbar sharks (*Carcharhinus plumbeus*) may only be taken with an Atlantic Highly Migratory Species (HMS) Shark Research Fishery Permit. All species must be landed with their fins attached to the carcass by natural means through offloading, with the exception of smooth dogfish (*Mustelus canis*).

Addendum I (ASMFC 2009) modified the FMP to allow limited smooth dogfish processing at sea (removal of fins from the carcass), removed smooth dogfish recreational possession limits, and removed gill net check requirements for smooth dogfish fishermen. The goal of Addendum I was to remove restrictive management intended for large coastal sharks (LCS) from the smooth dogfish fishery and to allow fishermen to continue their operations while upholding the conservation measures of the FMP.

In 2012, NOAA Fisheries created the smoothhound complex for the management of both the Florida smoothhound and smooth dogfish. Addendum II (ASMFC 2013a) modified the FMP to allow year-round smooth dogfish processing at sea and allocated state shares of the smooth dogfish federal quota. The goal of Addendum II was to implement an accurate fin-to-carcass weight ratio and prevent the quota of the smoothhound shark complex from being harvested by one state.

Addendum III (ASMFC 2013b) modified the species groups for hammerhead and blacknose sharks to ensure consistency with NOAA Fisheries. The addendum also increased the recreational size limit for all hammerhead shark species to 78 inches fork length (FL) and blacknose and finetooth sharks to 54 inches FL.

Addendum IV (ASMFC 2016) allows smooth dogfish carcasses to be landed with corresponding fins removed from the carcass if the total retained catch, by weight, is composed of at least 25% smooth dogfish, consistent with federal management measures.

Addendum V (ASMFC 2018) allows the ASMFC to streamline the process of state implementation of federal shark regulations so that complementary measures are seamlessly and concurrently implemented at the state and federal level whenever possible. Previously, any changes, with the exception of those related to commercial quotas, possession limits and season dates, had to be accomplished through an addendum.

To ensure compliance with interstate requirements, North Carolina also manages the coastal shark complex under the North Carolina Fishery Management Plan for Interjurisdictional Fisheries (IJ FMP). The goal of the IJ FMP is to adopt fishery management plans consistent with North Carolina law, approved by the Mid-Atlantic Fishery Management Council, South Atlantic Fishery Management Council, or the ASMFC by reference and implement corresponding fishery regulations in North Carolina to provide compliance or compatibility with approved fishery management plans and amendments, now and in the future. The goal of these plans, established under the Magnuson-Stevens Fishery Conservation and Management Act (federal council plans) and the Atlantic Coastal Fisheries Cooperative Management Act (ASMFC plans), are like the goals of the Fisheries Reform Act of 1997 to “ensure long-term viability” of these fisheries (NCDMF 2015).

Management Unit

The management unit includes the entire coast-wide distribution of the resource from the estuaries eastward to the inshore boundary of the exclusive economic zone (EEZ). The management unit is split between the Atlantic and Gulf of Mexico regions for aggregated LCS, hammerhead, non-blacknose small coastal sharks (SCS), and blacknose sharks. The management units for pelagic sharks and sandbar sharks (Shark Research Fishery) are not split by region; the respective management units are the Atlantic and Gulf of Mexico combined.

Goal and Objectives

The Interstate FMP for Coastal Sharks (ASMFC 2008) established the following goal and objectives. The goal of the Interstate FMP for Coastal Sharks is to promote stock rebuilding and management of the coastal shark fishery in a manner that is biologically, economically, socially, and ecologically sound.

In support of this goal, the following objectives are in place for the Interstate Shark FMP:

1. Reduce fishing mortality to rebuild stock biomass, prevent stock collapse, and support a sustainable fishery.
2. Protect essential habitat areas such as nurseries and pupping grounds to protect sharks during particularly vulnerable stages in their life cycle.
3. Coordinate management activities between state and federal waters to promote complementary regulations throughout the species' range.
4. Obtain biological and improved fishery related data to increase understanding of state water shark fisheries.
5. Minimize endangered species bycatch in shark fisheries.

DESCRIPTION OF THE STOCK

Biological Profile

Sharks belong to the class Chondrichthyes (cartilaginous fish) that also includes rays and skates. Relative to other marine fish, sharks produce few young in their lifetime. The low reproductive rate is due to slow growth, late sexual maturity of females, one to two-year reproductive cycles, and small litter size (Musick 1999). These biological factors leave many species of sharks vulnerable to overfishing (Stevens et al. 2000).

Sharks exhibit a number of different reproductive strategies ranging from giving birth to live pups (young) to egg laying (Dulvy and Reynolds 1997). Generally, female sharks produce a small number (2 to 25) of large-body pups (Simpfendorfer 1992). For some species, an increased gestation period allows for larger pups which is thought to increase juvenile survivorship (Stevens and McLoughlin 1991). Adults usually gather in specific areas to mate although little is known about shark mating behavior for most species. Sharks also exhibit a wide variety of life history traits across species. Some pelagic species such as shortfin mako (*Isurus oxyrinchus*) or Atlantic thresher (*Alopias vulpinus*), generally remain in offshore ocean environments their whole lives (Casey and Kohler 1992; Smith et al. 2008). Other shark species have an estuarine-dependent component to their life cycle. For example, mature female Atlantic sharpnose sharks (*Rhizoprionodon terraenovae*) and sandbars (*Charcarhinus plumbeus*) travel from near-shore coastal areas into estuarine habitats to pup (Grubbs et al. 2007; Carlson et al. 2008). Coastal shark nursery areas, such as bays and estuaries, are discrete, productive, and highly structured habitats that provide juveniles ample nutrients and refuge from predators (Heupel et al. 2007). Once mature, these shark species will emigrate into coastal ocean environments to continue their life cycle. The variability of life history traits (growth rate, age-at-maturity, reproduction rate,

etc.) and highly mobile nature of sharks makes fisheries management across multiple species difficult (Cortés 2002).

Stock Status

Stock status is assessed by species complex for most coastal sharks and by species group for those with enough data for an individual assessment (Table 1). NOAA Fisheries produces an annual Stock Assessment and Fisheries Evaluation (SAFE) Report that reviews the status of Atlantic HMS fish stocks (tunas, swordfish, billfish, and sharks; NOAA Fisheries 2021), which can be found at <https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-stock-assessment-and-fisheries-evaluation-reports>. These reports are required under the Magnuson-Stevens Fishery Conservation and Management Act and provide the public with information on the latest updates in Atlantic HMS management.

Stock Assessment

Stock status varies between species and species group (Table 1). In 2015 The Southeast Data Assessment and Review (SEDAR) completed a benchmark stock assessment on the smoothhound shark complex (*Mustelus spp.*) in the Gulf of Mexico and Atlantic smooth dogfish in the Atlantic through SEDAR 39. The assessment found that neither stock was overfished or experiencing overfishing (SEDAR 2015).

The SEDAR 21 (2011) benchmark assessment of dusky (*Carcharhinus obscurus*), sandbar, and blacknose (*Carcharhinus acronotus*) sharks indicated that both sandbar and dusky sharks were overfished with overfishing occurring for dusky sharks. Blacknose sharks, part of the SCS complex, were also overfished with overfishing occurring. The Coastal Shark Management Board of ASMFC approved the blacknose shark assessment for management use in February 2012 and NOAA Fisheries' Highly Migratory Species Division (HMS) incorporated the results of the assessment as part of Amendment 5a to its FMP (NOAA Fisheries 2013). The dusky shark stock assessment was updated in 2016 and resulted in a determination of the population being overfished with overfishing occurring (SEDAR 2016). In 2017, a new sandbar shark stock assessment was conducted through SEDAR and the same status as the 2011 assessment was determined that the population was overfished but overfishing was not occurring (SEDAR 2017).

The 2007 SEDAR 13 assessed the SCS complex, finetooth (*Carcharhinus isodon*), Atlantic sharpnose (*Rhizoprionodon terraenovae*), and bonnethead (*Sphyrna tiburo*) sharks (SEDAR 2007). The SEDAR 13 peer reviewers considered the data to be the 'best available at the time' and determined the status of the SCS complex to be adequate. Finetooth, Atlantic sharpnose, and bonnethead were all considered to be not overfished and not experiencing overfishing. Atlantic sharpnose and bonnethead were more recently assessed by SEDAR 34 (SEDAR 2013). Atlantic sharpnose are still considered not overfished or undergoing overfishing. Based on SEDAR 34, bonnethead were not overfished or undergoing overfishing. However, the assessment combined the Gulf of Mexico stock and the Atlantic stock for the assessment. Because data shows that they are in fact two separate stocks, the results of the assessment were rejected and the status of the Atlantic stock is officially considered unknown.

SEDAR 11 (2006) assessed the LCS complex and blacktip sharks (*Carcharhinus limbatus*). The LCS assessment suggested that it was inappropriate to assess the LCS complex as a whole due to the variation in life history parameters, different intrinsic rates of increase, and different catch and abundance data for all species included in the LCS complex. Based on these results, NOAA Fisheries changed the status of the LCS complex from overfished to unknown. As part of SEDAR 11, blacktip sharks were assessed for the first time as two separate populations: Gulf of Mexico and Atlantic. The results indicated that the Gulf of Mexico stock was not overfished and overfishing was not occurring, while the status of blacktip sharks in the Atlantic region was unknown. A new stock assessment for Atlantic blacktip sharks was completed in December 2020 (SEDAR 65) and the stock assessment concluded that the stock is not overfished and overfishing is not occurring.

In 2017, the International Commission for the Conservation of Atlantic Tunas (ICCAT) updated a 2012 stock assessment for shortfin mako sharks (*Isurus oxyrinchus*). This assessment used another modeling approach which incorporated more abundance indices, sex-specific life history data, and tagging information. Based on model results, the population was considered overfished with overfishing occurring (ICCAT 2017). On March 3, 2019, NOAA HMS implemented final measures to address the overfishing and overfished condition of Atlantic shortfin mako under Amendment 11 to the HMS FMP (NOAA Fisheries 2019). The rules respond to the determination by ICCAT that all member countries need to reduce shortfin mako landings by 72-79% to prevent further population decline. The final commercial rule as implemented allows for Atlantic shortfin mako commercial retention only by properly permitted operations using pelagic longline and gillnet gear and only if the shark is dead at haul back. Additionally, retention by pelagic longline gear is only allowed if a functional electronic monitoring system is on board the vessel. Recreational measures include an increase in the minimum size limit from 54 inches FL to 71 inches FL for males and to 83 inches FL for females. In April of 2019, the ASMFC Coastal Shark Board adopted complementary size limit measures for the recreational fishery in state waters to provide consistency with size limits in federal waters.

Porbeagle sharks (*Lamna nasus*) were assessed by ICCAT in 2009 (ICCAT 2009). The assessment found that while the northwest Atlantic stock was increasing in biomass, the stock was considered to be overfished with overfishing not occurring. The most recent porbeagle shark stock assessment, which was completed in 2020, came to the same determination as the 2009 stock assessment; the northwest Atlantic stock is overfished but overfishing is not occurring (ICCAT 2020; NOAA Fisheries 2021).

The most recent blue shark stock assessment was completed in 2015 ICCAT (ICCAT 2015). The assessment found that domestically, the north Atlantic stock is not overfished and overfishing is not occurring. The international north Atlantic stock is not likely overfished and overfishing is not likely occurring. The next stock assessment is scheduled for 2022.

A 2009 stock assessment for the Northwest Atlantic and Gulf of Mexico populations of scalloped hammerhead sharks (*Sphyrna lewini*) indicated the stock is overfished and experiencing overfishing (Hayes et al 2009). This assessment was reviewed by NOAA Fisheries and deemed appropriate to serve as the basis for U.S. management decisions (SEFSC 2010). In response to the assessment findings, NOAA Fisheries established a scalloped hammerhead rebuilding plan

that will end in 2023. However, since the assessment, research has determined that in the US Atlantic a portion of animals considered scalloped hammerheads are actually a cryptic species, recently named the Carolina hammerhead (*Sphyrna gilberti*). Little to no species-specific information exists regarding the distribution, abundance, and life history of the two species. Therefore, both species are currently managed under the name scalloped hammerhead. The hammerhead complex stocks (scalloped, great, smooth) will be assessed through SEDAR 77. Completion is scheduled for spring 2023 (SEDAR 2021).

DESCRIPTION OF THE FISHERY

Current Regulations

All non-prohibited shark management groups opened in North Carolina on January 1, 2020 (Table 2) reflecting NOAA Fisheries openings for these complexes. Commercial fishing shark management groups are outlined in Table 3. NOAA Fisheries closes the shark complexes when 80% of their quota is reached. When the fishery closes in federal waters, the Interstate FMP dictates that the fishery also closes in state waters. No harvest or size restrictions are in place for LCS, but there is a retention limit that is set and changed by NOAA fisheries based on available quota. It is unlawful to possess any shark (with the exception of smooth dogfish) without tail and fins naturally attached to the carcass through offloading. Commercial fishermen may completely remove the fins of smooth dogfish, if the total retained catch, by weight, is composed of at least 25% smooth dogfish. If fins are removed, the total wet weight of the shark fins may not exceed 12% of the total dressed weight (dw) of smooth dogfish carcasses landed or found onboard a vessel. It is unlawful for a vessel to retain, transport, land, store, or sell scalloped hammerhead, great hammerhead, or smooth hammerhead sharks with pelagic longline gear onboard. It is unlawful for a vessel to retain sandbar sharks unless the vessel is selected to participate in the shark research fishery, subject to retention limits established by NOAA Fisheries and only when a NOAA Fisheries approved observer is onboard. It is unlawful to use gears other than rod and reel, handlines, large and small mesh gill nets, shortlines (maximum of two shortlines, 500 yards each with 50 hooks or less, hooks shall not be corrosion resistant and must be designated by the manufacturer as circle hooks), pound nets/fish traps, and trawl nets. It is unlawful to use a large mesh (stretched mesh size greater than or equal to five inches) gill net more than 2,734 yards in length to capture sharks. It is unlawful to sell shark to anyone who is not a federally-permitted shark dealer. NOAA Fisheries sets quotas for coastal sharks through their 2006 Consolidated Highly Migratory Species Fishery Management Plan (HMS FMP) (NOAA Fisheries 2006). As indicated above, the states follow NOAA Fisheries openings and closings, which are based on available quotas (Table 2).

Commercial Fishery

Table 2 summarizes preliminary coast-wide Atlantic commercial landings data from 2020. Shark management groups with Atlantic region quotas are LCS, hammerhead, non-blacknose SCS, blacknose, and smoothhound. Commercial landings of LCS totaled 212,983 pounds dw in 2020, which was an increase of 68,847 pounds dw from 2019. Total commercial landings of hammerhead sharks were 38,225 pounds dw in 2020, which was an increase from 31,542 pounds dw reported in 2019. Commercial landings of non-blacknose SCS shark species in 2020 totaled

229,445 pounds dw, a decrease from the 294,962 pounds dw observed in 2019. The commercial landings total of blacknose sharks south of 34° N latitude (Kure Beach, North Carolina) in 2020 was 10,685 pounds dw. Commercial retention of blacknose sharks is prohibited north of 34° N latitude. Commercial landings of smoothhound sharks in 2020 were 585,942 pounds which was a decrease from the 798,621 pounds dw landed in 2019. Shark management groups with no regional quotas are sandbar (shark research fishery), blue, porbeagle, and other pelagics. There are no reported landings for porbeagle or blue sharks. Other pelagic shark landings were 96,138 pounds dw. The shark research fishery landed 50,192 pounds dw of sandbar sharks.

In North Carolina, total shark commercial landings steadily decreased from 2011-2015, remained relatively stable from 2015-2019, and decreased from 2019 to 2020 (Figure 1; Table 6). Some management groups' landings have had an increasing trend over the last ten years while others have shown a decreasing trend. Smoothhound shark landings have steadily decreased from 1,614,844 pounds in 2010 to 54,486 in 2020. Although peak harvest of pelagic sharks was highest in 2014, there has been an overall decreasing trend. LCS (non-hammerhead) harvest also peaked in 2014. Hammerhead and SCS landings have been increasing in the last 10 years.

Recreational Fishery

Recreational harvest estimates for SCS in North Carolina has fluctuated in the past 10 years from a low of 2,545 pounds in 2017 to a peak in harvest of 106,765 pounds in 2019 (Table 7). The 2020 landings (21,114 pounds) was similar to the 10-year average (25,427 pounds). Recreational harvest for LCS in North Carolina tends to be less than for SCS. Annual harvest was 551 pounds in 2020 and averaged 7,082 pounds from 2011 to 2020 (Table 8). Recreational harvest of pelagic sharks in North Carolina is highly variable. Harvest was 0 pounds in 2020 and has ranged from 0 to 479,443 pounds from 2011 to 2020 (Table 9). Recreational harvest of smooth dogfish in North Carolina is variable and often low, although releases are common. Harvest for smoothhound ranged from 0 to 186,261 pounds and averaged 23,265 pounds from 2011 to 2020 (Table 10). Recreational landing estimates for all shark species across all years have been updated and are now based on the Marine Recreational Information Program (MRIP) new Fishing Effort Survey-based calibrated estimates. Due to small sample sizes and the relatively rare occurrence of landings, the percent standard errors (PSE) is high for many years of recreational shark landings. For more information on MRIP methodology and changes see <https://www.fisheries.noaa.gov/topic/recreational-fishing-data>.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

North Carolina does not collect individual lengths for sharks other than spiny dogfish; sharks arrive at the dock dressed (i.e. gutted with head and tail removed). Landings in pounds dw are recorded by the Trip Ticket Program.

Fishery-Independent Monitoring

The North Carolina Division of Marine Fisheries (NCDMF) established a fisheries-independent adult red drum longline survey in 2007 (P365) that operates in Pamlico Sound from July to October. Atlantic coastal shark species captured in the survey are measured, tagged, and released. In 2019, three Atlantic sharpnose and one bull shark interaction occurred. During 2020, sampling was impacted during March through June due to the COVID pandemic. Executive Order (EO) 116, issued on March 10, 2020, declared North Carolina under a State of Emergency and was soon followed by EO 120 which implemented a statewide Stay at Home Order for all non-essential State employees. During this time, sampling did not occur.

NCDMF has conducted a fisheries-independent gill net survey which has been conducted in Pamlico Sound since 2001 (P915). The objective of this project is to provide annual indices of abundance for key estuarine species in North Carolina that can be incorporated into stock assessments. Data from this survey are used to improve bycatch estimates, evaluate management measures, and evaluate habitat usage. Results from this project are used by the NCDMF and other Atlantic coast fishery management agencies to evaluate the effectiveness of current management measures and to identify additional measures that may be necessary to conserve marine and estuarine stocks. Developing fishery independent indices of abundance for target species allows the NCDMF to assess the status of these stocks without relying solely on commercial and recreational fishery dependent data. Sampling is a stratified random sampling design in Pamlico Sound, utilizing multiple mesh gill nets (3.0-6.5 inch in one-half inch increments). In 2019, a total of 82 individual coastal sharks were captured in the gill net survey (Table 11), which is less than the project's annual average of 140 individual sharks. During 2020, Program 915 sampling did not occur. Sampling in 2020 was impacted by the COVID pandemic. Executive Order (EO) 116, issued on March 10, 2020, declared North Carolina under a State of Emergency and was soon followed by EO 120 which implemented a statewide Stay at Home Order for all non-essential State employees. During this time, fishery-independent projects were not able to take place, delaying future gillnet sampling.

RESEARCH NEEDS

The 2019 review of the ASMFC FMP (ASMFC 2019) for coastal sharks lists the following research needs:

Species-Specific Priorities

- Investigate the appropriateness of using vertebrae for ageing adult sandbar sharks. If appropriate, implement a systematic sampling program that gathers vertebral samples from the entire size range for annual ageing to allow tracking the age distribution of the catch as well as updating of age-length keys.
- Determine what is missing in terms of experimental design or/and data analysis to arrive at incontrovertible conclusions on the reproductive periodicity of sandbar sharks.
- Continue work on the reconstruction of historical catches of sandbar sharks, especially catches outside of the US EEZ.

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- Investigate the length composition of the F3 Recreational and Mexican fisheries for sandbar sharks more in depth as this fishery is estimated to have a large impact on the stock mainly due to selecting age-0 fish.
- Research to estimate the degree of connectivity between the portions of the sandbar stock within the US and outside of the US EEZ.
- Study the distribution and movements of the sandbar stock relative to sampling coverage. It is possible that none of the indices alone track stock-wide abundance trends.
- Develop and conduct tagging studies on dusky and blacknose stock structure with increased international collaboration (e.g., Mexico) to ensure wider distribution and returns of tags. Expand research efforts directed towards tagging of individuals in south Florida and Texas/Mexico border to get better data discerning potential stock mixing.

General Priorities

- Generally update age and growth and reproductive studies for all species currently assessed, especially for studies with low sample sizes or over 20 years old.
- Determine gear-specific post-release mortality estimates for all species currently assessed.
- Determine life history information for data-poor species that are currently not assessed.
- Examine female sharks during the pupping periods to determine the proportion of reproductive females. Efforts should be made to develop non-lethal methods of determining pregnancy status.
- Expand or develop monitoring programs to collect appropriate length and age samples from the catches in the commercial sector by gear type, from catches in the recreational sector, and from catches taken in research surveys to provide reliable length and age compositions for stock assessment.
- Continue investigations into stock structure of coastal sharks using genetic, conventional and electronic tags to determine appropriate management units.
- Evaluate to what extent the different CPUE indices track population abundance (e.g., through power analysis).
- Explore modeling approaches that do not require an assumption that the population is at virgin level at some point in time.
- Increase funding to allow hiring of additional HMS stock assessment scientists. There are currently inadequate staff to conduct stock assessments on more than one or two stocks/species per year.

MANAGEMENT STRATEGY

Most Atlantic shark species are highly mobile and the NOAA Fisheries' HMS Management Division is responsible for managing them under the Magnuson-Stevens Fishery Conservation and Management Act. In cooperation with an advisory panel, the division develops and implements FMPs for these species and management groups. The ASMFC adopts NOAA Fisheries regulations in state waters.

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TABLES

Table 1. Stock status designations for coastal sharks species groups.

Species or Complex Name	Stock overfished?	Stock undergoing overfishing?	Stock assessment year and comments
<i>Pelagic</i>			
Porbeagle	Yes	No	2020: Rebuilding ends in 2108
Blue	No	No	2015
Shortfin Mako	Yes	Yes	2017
All other pelagic species	Unknown	Unknown	
<i>Large Coastal Sharks</i>			
Blacktip	Unknown	Unknown	2020
Aggregated Large Coastal Sharks-Atlantic Region	Unknown	Unknown	2006: Difficult to assess as a species complex due to various life history characteristics/lack of available data
<i>Non-blacknose Small Coastal Sharks</i>			
Atlantic Sharpnose	No	No	2013
Bonnethead	Unknown	Unknown	2013
Finetooth	No	No	2007
<i>Hammerhead</i>			
Scalloped	Yes	Yes	2009: Rebuilding ends in 2023
<i>Blacknose</i>			
Blacknose	Yes	Yes	2011: Rebuilding ends in 2043
<i>Smoothhound</i>			
Smooth Dogfish	No	No	2015
<i>Research</i>			
Sandbar	Yes	No	2017: Rebuilding ends 2070
<i>Prohibited</i>			
Dusky	Yes	Yes	2016: Rebuilding ends in 2107
All other prohibited species	Unknown	Unknown	

Table 2. Summary of the estimated 2020 coast-wide Atlantic coastal shark commercial fishery landings and annual quota (lb dw) (NOAA Fisheries 2020).

Management Group	Region	2020 Quota (lb dw)	Season Opening	Season Closing	2020 Landings (lb dw)
Aggregated LCS	Atlantic	372,552	1/1/20	12/31/20	212,983
Hammerhead		59,736			38,225
Non-Blacknose SCS		582,333			229,445
Blacknose (South of 34° N. latitude only)		37,921			10,685
Smoothhound		3,973,902			585,942
Sandbar (shark research fishery)	No	199,943			50,192
Blue	Regional Quotas	601,856			0
Porbeagle		3,748			< 1,300
Other pelagics		1,075,856			96,138

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Table 3. List of commercial shark management groups.

Management groups	Species within group
Prohibited	Sand tiger, bigeye sand tiger, whale, basking, white, dusky, bignose, Galapagos, night, reef, narrowtooth, Caribbean sharpnose, smalltail, Atlantic angel, longfin mako, bigeye thresher, sharpnose sevengill, bluntnose sixgill and bigeye sixgill sharks
Research	Sandbar sharks
Non-Blacknose Small Coastal	Atlantic sharpnose, finetooth, and bonnethead sharks
Blacknose	Blacknose sharks
Aggregated Large Coastal	Silky, tiger, blacktip, spinner, bull, lemon, and nurse
Hammerhead	Scalloped hammerhead, great hammerhead and smooth hammerhead
Pelagic	Shortfin mako, common thresher, oceanic whitetip, *porbeagle, and *blue sharks
Smoothhound	Smooth dogfish (referred to as smoothhound throughout this report)

*Although porbeagle and blue sharks are in the Pelagic Management Group, they each have their own quota.

Table 4. Recreationally permitted species list.

SPECIES AUTHORIZED FOR RECREATIONAL HARVEST			
Large Coastal Sharks (LCS) (non-ridgeback LCS & tiger)	Small Coastal Sharks (SCS)	Pelagic Sharks	Other
Blacktip Bull Hammerhead, great Hammerhead, scalloped Hammerhead, smooth Lemon Nurse Spinner Tiger	Atlantic Sharpnose Blacknose Bonnethead Finetooth	Blue Oceanic whitetip Porbeagle Shortfin mako Thresher	Smoothhound Shark (Smooth Dogfish)

Table 5. Recreational size and bag limits. Non-listed species are prohibited.

RECREATIONAL SIZE / BAG LIMITS and SEASONS			
Species*	Minimum Size (FL, inches)	Trip Bag Limit/Calendar Day	Season
Atlantic sharpnose	None	1 per person of each species	Jan. 1 – Dec. 31
Bonnethead	None		
Smooth dogfish	None	None	
Hammerheads (Great, Smooth and Scalloped)	78"	1 per vessel <u>OR</u> 1 per person for shore-anglers	
Shortfin mako	71" males 83" females		
Non-Hammerhead LCS, Tiger, Pelagic, Blacknose, and Finetooth Sharks	54"		

*Check proclamation for most current regulations

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Table 6. Summary of North Carolina commercial landings (pounds) for large coastal sharks (LCS), small coastal sharks (SCS), hammerheads, smoothhound, and pelagics from 2011-2020. In this table, sandbar shark landings are included with the LCS and SCS includes blacknose landings.

Year	LCS (non-hammerhead)	SCS	Hammerhead	Smoothhound	Pelagics	Total
2011	149,908	135,924	27,350	1,241,252	245,186	1,799,620
2012	121,674	279,442	15,404	980,285	243,121	1,639,926
2013	157,340	140,798	14,428	783,053	220,872	1,316,491
2014	340,708	204,572	28,264	498,904	424,531	1,496,979
2015	197,950	375,026	41,768	268,429	176,882	1,060,055
2016	288,081	371,140	62,135	178,694	224,746	1,124,796
2017	216,142	359,486	40,743	154,440	240,128	1,010,939
2018	201,146	430,382	55,004	209,760	125,993	1,022,285
2019	263,269	479,464	65,104	102,592	69,182	979,611
2020	211,769	316,438	75,339	54,486	99,468	757,500

Table 7. North Carolina small coastal sharks recreational harvest, discards, and percent standard error (PSE) (including blacknose) 2011-2020.

Year	Harvest		PSE		Number	
	Number	PSE	Weight (lb)	PSE	Released	PSE
2011	1,209	42.5	7,659	44	37,276	33.1
2012	2,082	47.5	11,804	48.4	7,733	43.5
2013	2,171	45.9	13,474	48	16,772	42.1
2014	7,420	56.7	24,060	43.9	2,043	57.5
2015	6,656	41.3	38,499	44.3	15,866	70.4
2016	514	66.6	2,545	63.4	133,214	57
2017	5,768	56.5	19,256	42.3	58,440	60.5
2018	1,678	38.9	9,097	40.9	4,496	39.5
2019	13,736	70.8	106,765	75.8	34,952	36.1
2020	5,074	70.2	21,114	56.0	16,563	50.9

*PSE higher than 50 indicates a very imprecise estimate

Table 8. North Carolina large coastal sharks recreational harvest, discards, and percent standard error (PSE) 2011-2020. Blank indicates years with estimated harvest of zero.

Year	Harvest		PSE		Number	
	Number	PSE	Weight (lb)	PSE	Released	PSE
2011	474	100.0	732	100.0	14,797	88.8
2012	1,345	95.2	15,765	76.8	17,603	80.4
2013	59	113.4	11,128	113.4	7,963	39.8
2014	556	89.4	10,194	91.4	20,647	39.2
2015	10	99.9			139,486	66.1
2016	12	101.0	1,100	101.0	27,885	54.3
2017	910	79.6	27,367	83.4	43,041	43.7
2018	39	84.5	235	95.8	4,916	59.3
2019	60	72.1	3,745	72.1	30,032	40.5
2020	26	74.6	551	100.8	8,567	36.0

*PSE higher than 50 indicates a very imprecise estimate

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Table 9. North Carolina pelagic sharks recreational harvest, discards, and percent standard error (PSE) 2011-2020. Blank indicates years with estimated harvest of zero.

Year	Harvest		Weight (lb)	PSE	Number	
	Number	PSE			Released	PSE
2011	78	76.4	4,803	68.0	24	63.2
2012	291	76.7	17,323	73.6	13	98.3
2013	28	100.8	1,219	100.8	1,865	97.1
2014	26	54.6	2,082	51.5	296	110.5
2015	5,097	76.1	479,443	75.9	987	91.8
2016					3,512	79.0
2017	66	64.1	4,917	62.2	33	86.2
2018	2,043	73.1	160,155	73.1	38	63.0
2019					888	65.7
2020						

*PSE higher than 50 indicates a very imprecise estimate

Table 10. North Carolina recreational harvest, discards, and percent standard error (PSE) of smoothhound 2011-2020. Blank indicates years with estimated harvest of zero.

Year	Harvest		Weight (lb)	PSE	Number	
	Number	PSE			Released	PSE
2011	17,297	62.1	24,711	58.4	431,978	31.8
2012	234	81.6	984	70.8	21,051	36.8
2013	3,423	100.0	8,679	100.0	93,216	49.4
2014					110,938	35.6
2015	1,013	71.2	1,964	71.4	119,678	63.7
2016	10,879	92.6	186,261	97.0	97,256	44.9
2017					34,722	36.2
2018					29,524	49.3
2019	2,856	95.6	6,926	95.6	15,301	73.6
2020	1,289	98.9	3,125	98.9	479,933	49.4

*PSE higher than 50 indicates a very imprecise estimate

Table 11. Shark species captured in the NCDMF 2019 Pamlico Sound Independent Gill Net Survey (P915). During 2020, Program 915 sampling did not occur.

Species	Total Number Measured	Mean Total Length (inches)	Minimum Total Length (inches)	Maximum Total Length (inches)
Bull shark	22	26.9	22.2	48.5
Blacktip	1	45.6	45.6	45.6
Sandbar	38	22.8	16.5	32.0
Smooth dogfish	2	25.0	22.8	27.2
Bonnethead	19	31.4	23.1	37.3

FIGURES

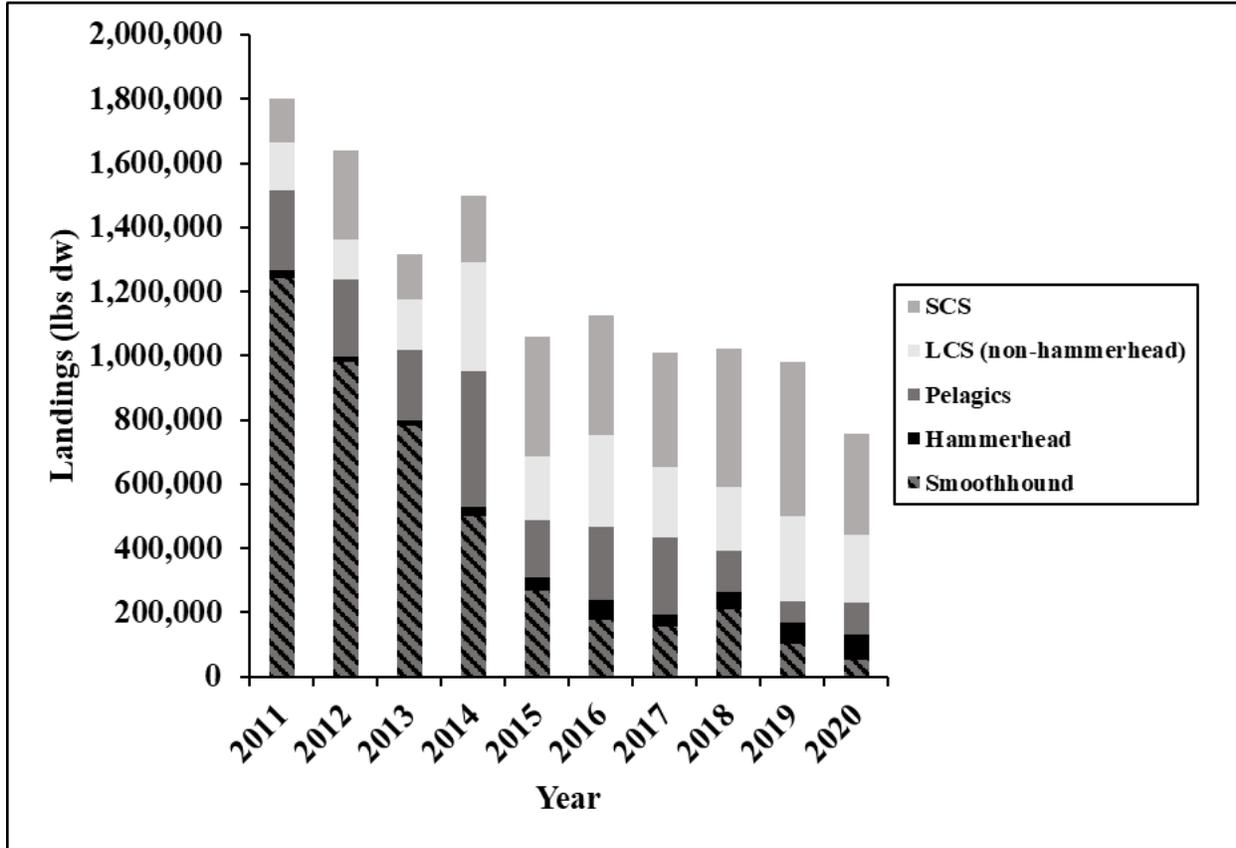


Figure 1. North Carolina commercial shark landings (2011-2020) by management group. In this figure, sandbar shark landings are included with the LCS and SCS includes blacknose landings.