

Large Coastal Carcharhinid Sharks Guild

Blacktip Shark *Carcharhinus limbatus*

Bull Shark *Carcharhinus leucas*

Lemon Shark *Negaprion brevirostris*

Spinner Shark *Carcharhinus brevipinna*

Tiger Shark *Galeocerdo cuvieri*

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DESCRIPTION

Taxonomy and Basic Description

The blacktip, bull, lemon, spinner, and tiger sharks are members of the family Carcharhinidae. Blacktip, bull, and spinner sharks reside in the genus *Carcharhinus* (32 species). All are viviparous (bear live young with a maternal connection) with the exception of tiger sharks, which bear live young but have no maternal connection (ovoviviparous).

The blacktip shark is a moderate sized shark reaching a maximum reported total length (TL) of 270 cm or 106 in. (Compango 1984). Blacktip sharks are recognizable by a prominent “Z” line along their sides, a moderately long and pointed snout, robust body, and black tips on the pectoral, dorsal, and pelvic fins. They are often confused with spinner sharks which also have black tips on their anal fins and a longer snout.



Considered rapidly maturing compared to other species of sharks, males mature at 4 to 5 years old (138 cm or 54 in. TL), and females mature at 6 to 7 years old at around 160 cm (63 in.) TL (Castro 1996). Once mature, blacktip sharks reproduce every other year (biennial) and produce an average of 4 pups (Castro 1996). The maximum observed age for blacktip sharks is 23.5 years old.

The bull shark is a large shark, reaching a reported maximum length of 340 cm (134 in.) TL (Compango 1984). Bull sharks are recognizable by their robust body, blunt, rounded snout, lack of interdorsal ridge, and large, broadly triangular dorsal fin. Bull sharks are



relatively slow to mature with males reaching maturity at 14 to 15 years old (210 cm or 83 in. TL), and females maturing at around 18 years old at a length of approximately 225 cm (89 in.) TL (Branstetter and Stiles 1987). Once mature, they produce litters of 2 to 12 pups and likely have a biennial reproductive mode. The maximum reported age is 32 years old.

The lemon shark is a relatively large shark reaching a reported maximum length of 368 cm (145 in.) TL (Compango 1984). The lemon shark is recognized by its pale yellow to olive gray coloring, blunt snout, equal sized first and second dorsal fins, and no interdorsal ridge. Life history information is lacking for lemon sharks, but they are generally thought to be slow growing and long lived.



Male and female lemon sharks are thought to reach maturity around 12 to 13 years old at a length of 225 to 235 cm (89-93 in.) TL (Brown and Gruber 1988). Once mature, lemon sharks give birth to litters of 4-17 pups every 2 years. Maximum age is estimated as 30+ years old.

The spinner shark is a relatively large shark with a maximum reported length of 300 cm (118 in.) TL (Compango 1984). The spinner shark is often confused with blacktip sharks, but can be differentiated by the presence of a blacktip on the anal fin, pointed snout, slender body, and smaller dorsal fin. Both species have a prominent “Z” line along their sides, and black tips on the pectoral, dorsal, and pelvic fins. Life history information is lacking for the spinner shark, but they are thought to mature at 7 to 8 years old at a total length of 170 to 180 cm (67-71 in.) (Branstetter 1987). Once mature, they are thought to have a biennial reproductive mode producing anywhere from 2 to 30 pups, although 7-11 is more common (Castro 1993). The maximum estimated age is thought to be 25-30 years.



The tiger shark is a large shark with a maximum reported length of 550 cm (217 in.) TL (Simpendorfer 1992). Tiger sharks are easily recognizable by their large blunt snouts, dark black spots and bars along the length of their body, and interdorsal ridge. Tiger sharks exhibit rapid growth and mature at around 10 years of age at a length of 250-350 cm (98-138 in.) TL (Randall 1992). The reproductive mode is thought to be biennial, producing litter sizes of 10-80 pups (average of 33). The maximum age is estimated to be 45-50 years old (Branstetter et al. 1987).



Status

The above-mentioned species are classified as large coastal sharks (LCS) and are managed as a complex by the National Marine Fisheries Service (NMFS). Status determination for LCS is hampered by a lack of species specific data. The large coastal shark complex was last assessed in 2006, and the results of that assessment prompted a 50% reduction in available commercial quota. Blacktip sharks were assessed separately, but a lack of species specific data led to an “unknown” stock status. Bull, lemon, spinner, and tiger sharks have never had a species specific stock assessment due to a lack of critical data including life history, catch, and fishery-independent data. Tiger sharks were shown to be in decline in the late 1990s, although fishery-independent surveys suggest that numbers may be improving. The International Union for Conservation of Nature (IUCN) lists bull, lemon, and tiger sharks as “Near Threatened”, and blacktip and spinner sharks as “Vulnerable” in the northwest Atlantic. South Carolina-specific data are only available for blacktip sharks. Catch per unit effort data from the South Carolina Department of Natural Resources shark gillnet survey suggest an increase in abundance of blacktip sharks in estuarine waters (Figure 1).

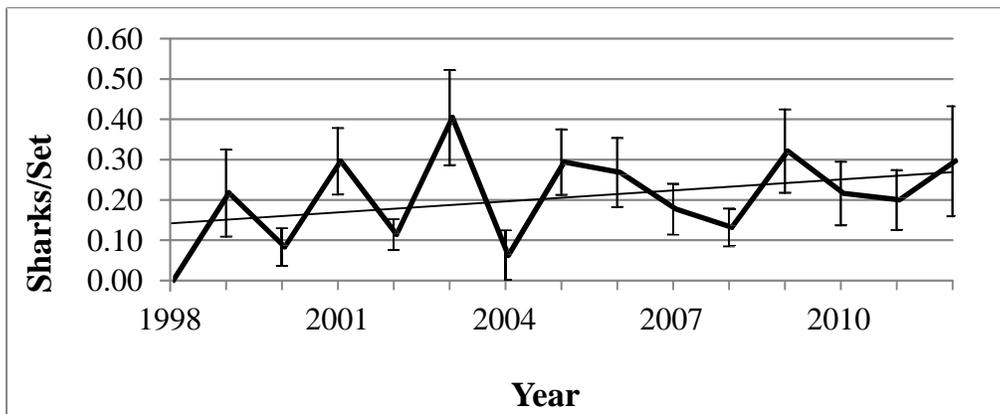


Figure 1. Catch per unit effort (sharks per set) of blacktip sharks from 1998 to 2012 in the South Carolina Cooperative Atlantic States Shark Popping and Nursery Habitat Gillnet Survey. Standard error is denoted by error bars.

POPULATION SIZE AND DISTRIBUTION

Blacktip sharks are common in tropical and subtropical regions in coastal, shelf, and estuarine waters. In the western North Atlantic Ocean, they range from Massachusetts to Brazil (Compagno 1984). In South Carolina, high salinity estuarine waters (25-34 ppt) are utilized as primary nursery areas for young of the year blacktip sharks (Ulrich et al. 2007). Adults and juveniles are common in coastal waters, often in schools, and less common in estuarine waters, although still abundant.

Bull sharks are known to be wide-ranging, including forays into fresh water rivers. They have a worldwide distribution, largely found in coastal waters in tropical to subtropical regions. Within

the western North Atlantic, they occur from New York south through the Gulf of Mexico. In South Carolina, little is known about the population distribution. Survey data suggest they are somewhat uncommon, although this could be due to sampling and gear bias. Within the state, they have been documented in salinities from 0-34 ppt, with all life stages present.

Lemon sharks are primarily found in the western Atlantic Ocean, although populations also exist in the eastern Pacific Ocean. It is a coastal species, primarily occurring in shallow water. In US Atlantic waters, they are found from New Jersey south through the Gulf of Mexico. Little is known about their use of SC waters. All life stages have been documented, generally occurring in salinities from 20-34 ppt.

Spinner sharks are likely globally distributed; however, records are spotty as they are often confused with blacktip sharks. In the US Atlantic Ocean, they are found from North Carolina, south through the Gulf of Mexico. In South Carolina waters, they are primarily found as young of the year, with juveniles and adults occurring further offshore. Young of the year have been documented to be in estuarine waters. They are most abundant in late fall when other shark species have migrated out of SC waters.

Tiger sharks have a global distribution and are most common in coastal waters, although they are also found in open ocean waters, particularly in the Pacific Ocean. In the US Atlantic, they are common from Massachusetts south through the Gulf of Mexico. In South Carolina waters, they are typically found in coastal waters, with some presence in sounds, particularly Port Royal Sound.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

In South Carolina, blacktip sharks are commonly found over sandy and muddy bottoms in estuarine and coastal waters. They are known to actively feed on schooling fish, often in large aggregations. Port Royal Sound, St. Helena Sound, and Bulls Bay have been documented as primary nurseries.

Less is known about habitat requirements for bull and lemon sharks. Habitat use is variable with bull sharks as they have been documented in SC fresh water rivers, coastal shallow creeks, and inlets and coastal rivers. Lemon sharks are primarily found in shallow estuarine water. While young of the year lemons and bulls have been encountered, it is not believed that SC waters are primary nursery habitat.

Spinner and tiger sharks primarily utilize coastal waters. Little is known about habitat requirements for spinner sharks, but they seem to prefer high salinity waters (>32 ppt) and are only found in the estuaries as young of the year sharks in the late fall. Tiger sharks are generally pelagic in nature, however Port Royal Sound may provide a unique habitat for tiger sharks. High catches have been reported by charter captains and recreational anglers, and tagging data from SCDNR surveys indicates that juvenile and adult tiger sharks may have residency there, often staying throughout the summer.

CHALLENGES

Large Coastal Sharks have generally been shown to be in decline in US Atlantic waters. However, the lack of species-specific life history and catch data has hampered efforts to properly manage these species. Life history data are lacking on bull, lemon, and spinner sharks for the Atlantic Ocean, and the life history data that is available is often only from the Gulf of Mexico. The blacktip is the only species for which a species-specific assessment has been attempted, but a lack of data prevented a stock status from being determined. The life history of these species (slow growing, late maturity, and few offspring) means they are highly susceptible to overfishing. These species are harvested commercially for both meat and fins, with their fins fetching some of the highest prices at market. All of these species are also targeted by recreational fisherman, and although minimum size limits prevent most juveniles from being landed, species identification is often problematic which can lead to landings of prohibited and under-sized species.

CONSERVATION ACCOMPLISHMENTS

There are no conservation accomplishments specific to this species at this time.

CONSERVATION RECOMMENDATIONS

- Continue to monitor the stock status of LCS within SC waters through fishery-independent methods, primarily COASTSPAN, and the Adult Red Drum and Coastal Sharks Longline Survey.
- Increase monitoring of large coastal sharks within coastal waters to determine habitat utilization.
- Increase collection of species specific-data to allow for future species-specific stock assessments.
- Partner with other Southeastern states to increase understanding of the life history of species lacking data.
- Investigate fine-scale movement of tiger sharks in Port Royal Sound to determine habitat utilization.
- Improve the public's understanding of the importance of sharks in the ecosystem through outreach activities such as school programs, providing story opportunities for media, and educational brochures.
- Continue to educate the public on the importance of species identification of sharks to ensure undersized and prohibited sharks are not landed.
- The primary action at the state level via law enforcement partnering is to insure adequate compliance with regulatory actions implemented through the federal management plan and subsequent amendments.

MEASURES OF SUCCESS

One of the most important measures of success will be determining species-specific stock statuses for populations of LCS in the US Atlantic. Regional management efforts to maintain healthy, sustainable populations of LCS will require active participation from South Carolina due to its importance as habitat for LCS. Expanding our knowledge on the life history and importance of SC waters for LCS is of the utmost importance. Measures of success will be increasing current knowledge of habitat utilization by LCS, including identifying the relative importance of SC waters to bull and lemon sharks, as well as identifying factors that have led to utilization of Port Royal Sound by tiger sharks. Of the utmost importance is allowing the recovery of LCS sharks to healthy population levels. Maintaining ongoing monitoring programs to continue indices of abundance and trends over time is critical to the success of calculating accurate regional stock assessments.

LITERATURE CITED

- Branstetter, S. 1987. Age and growth estimates for blacktip, *Carcharhinus limbatus*, and Spinner, *C. brevipinna*, sharks from the Northwestern Gulf of Mexico. *Copeia*, 1987(4): 964-974.
- Branstetter, S. and R. Stiles. 1987. Age and growth estimates of the bull shark, *Carcharhinus leucas*, from the northern Gulf of Mexico. *Environmental Biology of Fishes*, 20(3): 169-181.
- Branstetter, S., J.A. Musick, J.A. Colvocoresses. 1987. A comparison of the age and growth of the tiger shark, *Galeocerdo cuvieri*, from off Virginia and from the northwestern Gulf of Mexico. *Fishery Bulletin* 85(2): 269-279.
- Castro, J.I. 1996. Biology of the blacktip shark, *Carcharhinus limbatus*, off the southeastern United States. *Bulletin of Marine Science* 59(3): 508-522.
- Compagno, LGV 1984. FAO species catalogue, Vol. 4. Sharks of the world, Part 2: Carcharhiniformes. FAO Fish Synopsis 4 (125), Part 2: 251-655.
- Randall, J.E. 1992. Review of the biology of the tiger shark (*Galeocerdo cuvier*). In 'Sharks: Biology and Fisheries'. (Ed. J. G. Pepperell.) *Australian Journal of Marine and Freshwater Research* 43: 21-31.
- Simpfendorfer, C. 1992. Biology of Tiger Sharks (*Galeocerdo cuvier*) caught by the Queensland Shark Meshing Program off Townsville, Australia. *Australian Journal of Marine and Freshwater Research*, 43: 33-43
- Ulrich, G.F., CM Jones, W.B. Driggers III, J.M. Drymon, D. Oakley, and C. Riley. 2007. Habitat utilization, relative abundance, and seasonality of sharks in the estuarine and nearshore waters of South Carolina. Pp. 125-139. In McCandless, C.T., N.E. Kohler, and H.L. Pratt Jr., eds. *Shark nursery grounds of the Gulf of Mexico and East Coast waters of the United States*. American Fisheries Society. Symposium 50. Bethesda, Maryland.

