

# Sand Tiger – *Carcharias taurus*

Overall Vulnerability Rank = High ■

Biological Sensitivity = High ■

Climate Exposure = High ■

Data Quality = 79% of scores  $\geq 2$

<i>Carcharias taurus</i>		Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)	
Sensitivity attributes	Stock Status	3.1	1.8		
	Other Stressors	1.8	1.8		
	Population Growth Rate	3.8	2.6		
	Spawning Cycle	1.8	2.4		
	Complexity in Reproduction	1.8	1.8		
	Early Life History Requirements	1.0	3.0		
	Sensitivity to Ocean Acidification	1.0	2.4		
	Prey Specialization	1.3	2.8		
	Habitat Specialization	1.3	3.0		
	Sensitivity to Temperature	1.3	3.0		
	Adult Mobility	1.0	3.0		
	Dispersal & Early Life History	1.0	3.0		
	<b>Sensitivity Score</b>		<b>High</b>		
	Exposure variables	Sea Surface Temperature	3.9	3.0	
Variability in Sea Surface Temperature		1.0	3.0		
Salinity		2.8	3.0		
Variability Salinity		1.2	3.0		
Air Temperature		1.0	3.0		
Variability Air Temperature		1.0	3.0		
Precipitation		1.0	3.0		
Variability in Precipitation		1.0	3.0		
Ocean Acidification		4.0	2.0		
Variability in Ocean Acidification		1.0	2.2		
Currents		2.1	1.0		
Sea Level Rise		1.2	1.5		
<b>Exposure Score</b>		<b>High</b>			
<b>Overall Vulnerability Rank</b>		<b>High</b>			

## **Sand Tiger (*Carcharias taurus*)**

Overall Climate Vulnerability Rank: **High** (76% certainty from bootstrap analysis).

Climate Exposure: **High.** Two exposure factors contributed to this score: Ocean Surface Temperature (3.9) and Ocean Acidification (4.0). Sand Tiger Shark are pelagic but associate with benthic habitats.

Biological Sensitivity: **High.** Two attributes scored above 3.0: Population Growth Rate (3.8) and Stock Status (3.1). Sand Tigers have a moderate population growth rate for a shark, but this is still low compared to many other marine species (Smith et al., 1998). Sand Tiger were identified as a Species of Concern by the U.S. in 2004 owing to historic declines in abundance and low productivity. Even though a status review indicated that declines in abundance were not as severe as originally reported, the Sand Tiger remains on the Species of Concern list due to the uncertainty in abundance estimates and their exceptionally low productivity (Carlson et al. 2009;

[http://www.nmfs.noaa.gov/pr/pdfs/species/sandtigershark\\_detailed.pdf](http://www.nmfs.noaa.gov/pr/pdfs/species/sandtigershark_detailed.pdf))

Distributional Vulnerability Rank: **Very High** (94% certainty from bootstrap analysis). Sand Tigers are habitat generalists and highly mobile. In addition, Sand Tigers are ovoviviparous and do not have planktonic eggs and larval stages.

Directional Effect in the Northeast U.S. Shelf: The effect of climate change on Sand Tiger is very likely to be neutral (>95% certainty in expert scores). Sand Tiger is a highly mobile temperate shark. There is very little information available that suggests negative or positive effects of climate change.

Data Quality: 79% of the data quality scores were 2 or greater indicate that data quality is moderate.

Climate Effects on Abundance and Distribution: There is very little information on the effect of climate change on Sand Tigers.

Life History Synopsis: The Sand Tiger is a highly mobile, coastal shark species that occurs in United States waters from the Gulf of Maine to Florida and in the northern Gulf of Mexico (Carlson et al., 2009). Males reach maturity at a length of 190-195 cm TL between 6-7 years of age; females mature later (9-10 years) at 220-230 cm TL (Gilmore et al., 1983; Goldman et al., 2006; Carlson et al., 2009). Evidence suggests a 2-year reproductive cycle for Sand Tigers in the western North Atlantic, with gestation likely taking a year followed by a year resting period (Branstetter, 2002; Carlson et al., 2009). Multiple batches of eggs are produced and encapsulated, but typically only one capsule is fertilized (Branstetter, 2002). The additional eggs and eventually smaller siblings provide nourishment for the largest pups, resulting in one or two pups born each year (Branstetter, 2002; Carlson et al., 2009). Juveniles occupy shallow estuarine and coastal nursery habitats between Massachusetts and North Carolina during late spring and summer (McCandless et al., 2007). Adults occur off Florida and in the Gulf of Mexico year round, and venture as far north as the Gulf of Maine during summer and fall months (Branstetter, 2002; Carlson et al., 2009). Both Juveniles and adults are generalist predators that consume lobsters, crabs, and squids, but prey primarily on fishes such as Summer Flounder, skates, Monkfish (Goosefish), sea robins, Scup, Spot, Bluefish, Butterfish, and Tautog (Branstetter, 2002). There are not many predators of this large, demersal shark, but there is evidence of cannibalism (Branstetter, 2002). Sand Tigers were targeted and a frequent bycatch species until regulations prohibited landing the species from federal and state waters ((NMFS 1999; ASMFC 2008; Carlson et al., 2009). The Atlantic States Marine Fisheries Commission manages Sand Tigers through an interstate fishery management plan and NMFS manages

them through the Consolidated Atlantic Highly Migratory Species Fishery Management Plan (ASMFC 2008; NMFS 2006)

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