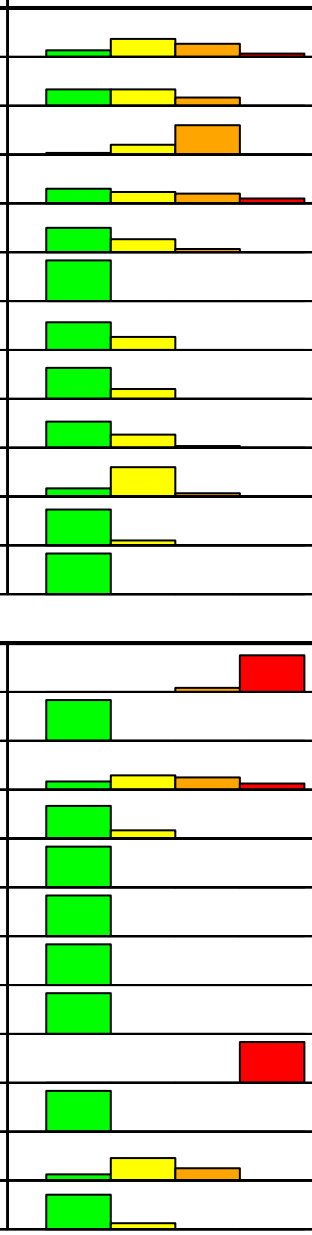
Smooth Dogfish − *Mustelus canis*

Overall Vulnerability Rank = Low

Biological Sensitivity = Low
Climate Exposure = High
Data Quality = 88% of scores ≥ 2

	Mustelus canis	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Stock Status	2.3	0.8	
	Other Stressors	1.8	2.3	
	Population Growth Rate	2.7	2.8	
	Spawning Cycle	2.1	2.8	
	Complexity in Reproduction	1.5	2.0	
	Early Life History Requirements	1.0	3.0	
	Sensitivity to Ocean Acidification	1.3	2.6	
	Prey Specialization	1.2	3.0	
	Habitat Specialization	1.4	3.0	
	Sensitivity to Temperature	1.9	3.0	
	Adult Mobility	1.1	2.8	
	Dispersal & Early Life History	1.0	3.0	
	Sensitivity Score	Low		
Exposure variables	Sea Surface Temperature	3.9	3.0	
	Variability in Sea Surface Temperature	1.0	3.0	
	Salinity	2.4	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	1.1	1.5	
	Exposure Score	High		
	Overall Vulnerability Rank	Low		



Low
Moderate
High
Very High

Smooth Dogfish (*Mustelus canis*)

Overall Climate Vulnerability Rank: **Low** (84% certainty from bootstrap analysis).

Climate Exposure: **High**. Two exposure factors contributed to this score: Ocean Surface Temperature (3.9) and Ocean Acidification (4.0). Smooth Dogfish are demersal / semi-pelagic and complete their life cycle in marine habitats.

Biological Sensitivity: **Low**. One attribute scored above 2.5: Population Growth Rate (2.5). Dogfish (*Mustelus sp.)* have low population growth rates compared to many teleost species, but have relatively high productivity when compared to other shark species (Smith et al., 2008).

Distributional Vulnerability Rank: **Very High** (100% certainty from bootstrap analysis). Smooth Dogfish are habitat generalists and highly mobile as adults, making seasonal migrations. In addition, Smooth Dogfish are viviparous (Conrath and Musick, 2002).

Directional Effect in the Northeast U.S. Shelf: The effect of climate change on Smooth Dogfish is likely to be neutral (90-95% certainty in expert scores). Smooth Dogfish inhabits temperate waters and may benefit from warming on the Northeast U.S. Shelf. But ocean acidification may reduce productivity and no changes in distribution have been observed over the past 30 years despite significant warming.

Data Quality: 88% of the data quality scores were 2 or greater indicate that data quality is moderate.

Climate Effects on Abundance and Distribution: Little specific information exists on the effect of climate on Smooth Dogfish. Dixson et al. (2015) suggested that Smooth Dogfish feeding could be affected by ocean acidification by the end of this century. In regional studies of distribution, Smooth Dogfish was not included (Nye et al., 2009) but examination of NEFSC trawl survey suggests no change in the center of the distribution over the last 30 years (http://oceanadapt.rutgers.edu/, website last checked 13 June 2015).

Life History Synopsis**:** Smooth Dogfish is a viviparous, demersal, marine elasmobranch species that occurs from the Bay of Fundy, Canada, to Argentina, but is rare north of Cape Cod and absent along the central American coast (Able and Fahay, 2010). Females reach 50% maturity at 102.3 cm fork length (4.41 years of age)and males at 85.4 cm fork length (2.46 years of age) (Conrath and Musick, 2002; Conrath et al., 2002). Mating occurs from May to September followed by a 10-12 month gestation (Branstetter, 2002; Conrath and Musick, 2002; Able and Fahay, 2010). Pupping occurs in estuarine waters from Virginia to Massachusetts (McCandless et al. 2007). Litters of 3-18 pups are born in spring and summer (older, larger females produce larger litters), and juveniles remain in the estuarine nursery areas until fall (Able and Fahay, 2010). Larger juveniles occur in deeper waters of bays before joining adults on the continental shelf (Able and Fahay, 2010). During their first year, Smooth Dogfish prey on polychaetes, decapod shrimp, crabs, bivalves, and small estuarine fish (Able and Fahay, 2010). Adult Smooth Dogfish occur from estuaries to the continental shelf edge with seasonal migrations from the inshore pupping and nursery grounds in spring to early fall to the winter grounds on the continental shelf edge off North Carolina to New Jersey (Branstetter, 2002; Able and Fahay, 2010). Decapod crustaceans (crabs, lobsters, shrimp) are the dominant prey of adult Smooth Dogfish, but squid, bivalves, gastropods, and several species of teleosts are also frequently consumed (Gelsleichter et al., 1999; Able and Fahay, 2010). Smooth Dogfish are preyed on by larger sharks and teleosts (Smith 1995, Gelsleichter et al., 1999, Able and Fahay, 2010). The Smooth Dogfish is managed in state waters under the by

Atlantic States Marine Fishery Commission's Interstate Fishery Management Plan for Atlantic Coastal Sharks (ASMFC, 2013). Federal management for Smooth Dogfish falls under the Consolidated Atlantic Highly Migratory Species Fishery Management Plan per Amendment 3 (NMFS 2010). The Atlantic smooth dogfish stock was recently assessed and is not considered overfished nor is overfishing occurring (SEDAR 2015).

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