Clearnose Skate − *Raja eglanteria*

Overall Vulnerability Rank = Low

Biological Sensitivity = Low
Climate Exposure = High
Data Quality = 83% of scores ≥ 2

	Raja eglanteria	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Stock Status	2.1	2.4	
	Other Stressors	1.2	1.2	
	Population Growth Rate	2.8	1.6	
	Spawning Cycle	1.9	2.4	
	Complexity in Reproduction	1.2	2.2	
	Early Life History Requirements	1.0	3.0	
	Sensitivity to Ocean Acidification	1.4	2.2	
	Prey Specialization	1.2	3.0	
	Habitat Specialization	1.2	3.0	
	Sensitivity to Temperature	2.3	2.7	
	Adult Mobility	1.8	2.2	
	Dispersal & Early Life History	2.1	3.0	
	Sensitivity Score	Low		
Exposure variables	Sea Surface Temperature	3.9	3.0	
	Variability in Sea Surface Temperature	1.0	3.0	
	Salinity	2.6	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

Clearnose Skate (*Raja eglanteria*)

Overall Climate Vulnerability Rank: **Low** (87% certainty from bootstrap analysis).

Climate Exposure: **High**. Two exposure factors contributed to this score: Ocean Surface Temperature (3.9) and Ocean Acidification (4.0). Clearnose Skate are demersal and complete their life cycle in marine habitats.

Biological Sensitivity: **Low**. One attribute scored above 2.5: Population Growth Rate (2.8). In general, skates have a low population growth rate (higher sensitivity to climate change) (Frisk 2010).

Distributional Vulnerability Rank: **High** (94% certainty from bootstrap analysis). Clearnose Skate are habitat generalists and moderately mobile as adults, making seasonal movements. In addition, skate egg cases are subject to movement by currents and juveniles may move on scales of 1-10 km.

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

Data Quality: 83% 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 Clearnose Skate. Di Santo (2015) found that increased warming and acidification reduce body condition of newly-hatched Little Skate. These reductions in size could result in reduced juvenile survival and thus recruitment if similar effects occur in Clearnose Skate. In regional studies of distribution, Clearnose Skate was not included (Murawski, 1993; 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**:** Clearnose Skate is a benthic marine skate species found from the Nova Scotian shelf to northeastern Florida and the northern Gulf of Mexico from northwestern Florida to Texas, but primarily occurs south of Cape Cod, Massachusetts (Packer et al., 2003). Clearnose Skate reach maturity in 5-6 years (Packer et al., 2003). Spawning occurs in spring and summer north of Cape Hatteras, and eggs are deposited on the benthos in rectangular, horned egg cases (Packer et al., 2003). Eggs incubate for approximately 3 months, and then a small juvenile emerges (Packer et al., 2003). There is no larval stage and juveniles behave similarly to adults (Packer et al., 2003). Clearnose Skate occur year round south of Cape Hatteras, North Carolina (Packer et al., 2003). North of Cape Hatteras, Clearnose Skate are found across the shelf in the southern portion of the Mid-Atlantic region during winter and spring, and then occupy inshore areas south of Cape Cod in summer and fall (NEFSC, 2007). Clearnose Skates are found over soft, rocky, or gravelly bottom (Packer et al., 2003). The diet of Clearnose Skate includes: polychaetes, amphipods, several shrimp and crab species, bivalves, squid, and small fish such as soles, Weakfish, Butterfish, and Scup (Packer et al., 2003). Boring snails may be predators of eggs (Packer et al., 2003). Adults have been found in the stomachs of Sand Tiger and Greater Amberjack (Packer et al., 2003). Clearnose Skate is managed as part of the skate complex by the New England Fishery Management Council and is neither overfished nor is overfishing occurring (NEFSC, 2007).

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