Black Sea Bass − *Centropristis striata*

Overall Vulnerability Rank = High

Biological Sensitivity = Moderate
Climate Exposure = Very High
Data Quality = 92% of scores ≥ 2

	Centropristis striata	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Stock Status	2.0	3.0	
	Other Stressors	1.6	2.2	
	Population Growth Rate	1.6	2.6	
	Spawning Cycle	2.0	3.0	
	Complexity in Reproduction	2.7	2.8	
	Early Life History Requirements	2.6	2.2	
	Sensitivity to Ocean Acidification	1.8	2.9	
	Prey Specialization	1.2	3.0	
	Habitat Specialization	2.3	3.0	
	Sensitivity to Temperature	1.4	3.0	
	Adult Mobility	1.8	2.7	
	Dispersal & Early Life History	1.8	2.5	
	Sensitivity Score	Moderate		
Exposure variables	Sea Surface Temperature	4.0	3.0	
	Variability in Sea Surface Temperature	1.0	3.0	
	Salinity	2.7	3.0	
	Variability Salinity	1.2	3.0	
	Air Temperature	4.0	3.0	
	Variability Air Temperature	1.0	3.0	
	Precipitation	1.2	3.0	
	Variability in Precipitation	1.3	3.0	
	Ocean Acidification	4.0	2.0	
	Variability in Ocean Acidification	1.0	2.2	
	Currents	2.0	1.0	
	Sea Level Rise	1.6	1.5	
	Exposure Score	Very High		
Overall Vulnerability Rank		High		

Low
Moderate
High
Very High

Black Sea Bass (*Centropristis striata*)

Overall Climate Vulnerability Rank: **High** (77% certainty from bootstrap analysis).

Climate Exposure: **Very High**. Three exposure factors contributed to this score: Ocean Surface Temperature (4.0), Ocean Acidification (4.0) and Air Temperature (4.0). Exposure to all three factors occur during all life stages. Black Sea Bass occur in coastal areas during warm months and migrate offshore in cold months and thus are exposed to changes occurring both in offshore and inshore waters.

Biological Sensitivity: **Moderate**. Two sensitivity attributes scored above 2.5: Complexity in Reproduction (2.7) and Early Life History Requirements (2.6). Black Sea Bass are protogynous hermaphrodites and males are territorial (Lavenda, 1949). Eggs and larvae are pelagic and juveniles settle to nearshore and estuaries areas (Able et al., 2006).

Distributional Vulnerability Rank: **High** (98% certainty from bootstrap analysis). Two of the attributes indicated vulnerability to distribution shift. Black Sea Bass are mobile and make inshore-offshore migrations. Eggs and larvae are pelagic and are likely broadly dispersed.

Directional Effect in the Northeast U.S. Shelf: The effect of climate change on Black Sea Bass on the Northeast U.S. Shelf is very likely to be positive (>95% certainty in expert scores). Recruitment will likely increase as temperatures warm and more spawning occurs in the region. Adult distribution will likely extend northwards and the species may move into the Gulf of Maine permanently. The effect of ocean acidification over the next 30 years is likely to be minimal.

Data Quality: 92% of the data quality scores were 2 or greater.

Climate Effects on Abundance and Distribution: Few studies examined the effect of climate factors on the population productivity of Black Sea Bass. Changes in distribution, however, have been linked to warming in the Northeast U.S. Shelf. Howell and Auster (2012) included Black Sea Bass in a warm-adapted assemblages and found increases in abundance in Long Island Sound over the past several decades. Bell et al. (2014) documented northward shift in spring distributions of adults on the Northeast U.S. Shelf and linked this shift to warming temperature.

Life History Synopsis**:** Black Sea Bass is a warm temperate marine species that occurs from the Gulf of Maine to southern Florida and into the Gulf of Mexico (Drohan et al., 2007; Able and Fahay, 2010). The population is managed as three stocks: a Mid-Atlantic stock (north of Cape Hatteras), a South Atlantic Bight stock (south of Cape Hatteras to Florida), and a Gulf of Mexico stock (Drohan et al., 2007; Able and Fahay, 2010). Individuals reach sexual maturity by 2-3 years, but Black Sea Bass are protogynous hermaphrodites, so most individuals <4 years are female and most individuals >5 years are males (Drohan et al., 2007). Black Sea Bass spawn in nearshore areas of the continental shelf beginning in December in the Gulf of Mexico and April through October in the Mid-Atlantic region (Drohan et al., 2007). Eggs are pelagic with temperature-dependent incubation durations ranging from a couple days to a week (Drohan et al., 2007). Larvae are also pelagic, consuming microalgae and zooplankton while being consumed by gelatinous zooplankton (Drohan et al., 2007). The pelagic stage lasts 2-4 weeks before settlement to shell beds or substrate with shell microstructure (Drohan et al., 2007). There is some evidence that settlement can be delayed, but juveniles usually settle in spring and summer to both near-shore shelf and estuarine habitats (Drohan et al., 2007; Able and Fahay, 2010). Juveniles migrate offshore in autumn to overwinter in deeper waters, and then move back inshore in spring (Able and

Fahay, 2010). The primary prey of juveniles is decapods, benthic and epibenthic crustaceans, and small fish (Drohan et al., 2007). Adult Black Sea Bass associate with structurally complex habitat (Drohan et al., 2007). The northern stock migrates offshore and south in the autumn to overwinter as far south as the outer shelf off the coast of Virginia (Drohan et al., 2007). The southern stocks show more site fidelity, but occasionally travel great distances (Drohan et al., 2007). Adult Black Sea Bass are generalist carnivores that feed on infaunal and epibenthic invertebrates such as crustaceans, squid, and small fish (Drohan et al., 2007). The Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council jointly manage the Mid-Atlantic stock through Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (ASMFC, 2014). The stock is not overfished or experiencing overfishing (NEFSC, 2012).

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