

Spotted Seatrout – *Cynoscion nebulosus*

Overall Vulnerability Rank = High ■

Biological Sensitivity = Moderate ■

Climate Exposure = Very High ■

Data Quality = 88% of scores ≥ 2

<i>Cynoscion nebulosus</i>		Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)	
Sensitivity attributes	Stock Status	2.1	1.6		
	Other Stressors	2.5	2.6		
	Population Growth Rate	1.7	2.7		
	Spawning Cycle	2.2	2.6		
	Complexity in Reproduction	2.4	2.5		
	Early Life History Requirements	2.8	2.5		
	Sensitivity to Ocean Acidification	1.4	2.8		
	Prey Specialization	1.2	3.0		
	Habitat Specialization	2.0	3.0		
	Sensitivity to Temperature	1.4	3.0		
	Adult Mobility	1.9	2.7		
	Dispersal & Early Life History	2.4	2.9		
	Sensitivity Score		Moderate		
	Exposure variables	Sea Surface Temperature	4.0	3.0	
Variability in Sea Surface Temperature		1.0	3.0		
Salinity		2.8	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		3.4	1.5		
Exposure Score		Very High			
Overall Vulnerability Rank		High			

Spotted Seatrout (*Cynoscion nebulosus*)

Overall Climate Vulnerability Rank: **High** (68% 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 occurs during all life stages. In most areas, Spotted Seatrout complete their entire life history within estuaries, with some movements onto the shelf in colder areas.

Biological Sensitivity: **Moderate**. Two sensitivity attributes scored above 2.5: Other Stressors and Early Life History Requirements (2.5). Deterioration of coastal waters due to urbanization, dredging, and other human activities has contributed to a decline in Spotted Seatrout abundance in some areas. Spotted Seatrout are estuarine and early life stages develop in estuaries (Bortone 2003) making them susceptible to changes in air and nearshore temperature changes.

Distributional Vulnerability Rank: **High** (54% certainty from bootstrap analysis). Two attributes indicated vulnerability to distribution shift. Spotted Seatrout have the potential to be dispersed during egg and larval stages although most development occurs within estuaries. Adults are mobile and make seasonal migrations in colder areas including the Northeast U.S. Shelf.

Directional Effect in the Northeast U.S. Shelf: The effect of climate change on Spotted Seatrout on the Northeast U.S. Shelf is estimated to be neutral, but with a high degree of uncertainty (<66% certainty in expert scores). The uncertainty likely stems from the general lack of data on the species in the region. Adult distribution may extend northwards as warming continues, but the magnitude of this extension could be minimal over the next 30 years. The effect of ocean acidification over the next 30 years is likely to be minimal.

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

Climate Effects on Abundance and Distribution: Relatively little information exists regarding the role of climate in affecting Spotted Seatrout productivity or distribution. Working in the Gulf of Mexico, Froeschke and Froeschke (2011) found that distribution of juvenile Spotted Seatrout was strongly associated with temperature and salinity. Working in Florida Bay, Kearney et al. (2014) found minimal decreases in Spotted Seatrout habitat availability under several climate change scenarios. These studies suggest that as the Northeast U.S. Shelf warms, areas may become more favorable to Spotted Seatrout.

Life History Synopsis: Spotted Seatrout is an estuarine-dependent fish species of the western north Atlantic that occurs from Cape Cod, Massachusetts, to Florida and the Gulf of Mexico, but is rare north of Delaware Bay (Able and Fahay, 2010). Adults are mature by age 2, and spawning occurs from May to August with a peak from late May – early June (Able and Fahay, 2010). Spotted Seatrout are highly fecund and spawn repeatedly during their relatively long spawning season (ASMFC, 2011). Spawning occurs in a variety of estuarine habitats including seagrass beds, sandy banks, shell reefs, and inlets, but seagrass beds in warm water with salinities > 15 seem to be the most used (ASMFC, 2011). Eggs and larvae are pelagic and remain in the estuaries or bays where they were spawned (Able and Fahay, 2010). Seagrass beds are important habitat throughout the life of Spotted Seatrout, and while juveniles settle into a variety of estuarine habitats, seagrass beds and marsh edge habitat are the most used (Able and Fahay, 2010; ASMFC, 2011). Juveniles travel in schools for several years and inhabit larger tributaries and lower estuarine habitat (ASMFC, 2011). Juveniles prey on benthic invertebrates, especially

copepods, mysid shrimp, and as they get larger, penaeid and palaemonid shrimp (ASMFC, 2011). Many larger estuarine fish species are predators of juvenile Spotted Seatrout (Able and Fahay, 2010). Juveniles and adults are, in general, non-migratory, staying within 10-15 km of their natal estuary (ASMFC, 2011). However, movement to deeper warmer water during cold weather has been observed, and the population north of Cape Hatteras may migrate to coastal ocean waters off North Carolina during late fall and winter and back into estuaries and bays in spring and summer (Able and Fahay, 2010). Adult Spotted Seatrout are piscivorous, but also feed on decapod crustaceans such as penaeid and palaemonid shrimp (Able and Fahay, 2010; ASMFC, 2011). Striped Bass, Croaker, Barracuda, and Tarpon are common predators of the species (Able and Fahay, 2010). There is no coast-wide assessment of Spotted Seatrout. The Atlantic States Marine Fisheries Commission coordinates management, but assessments are conducted on a state-by-state basis (ASMFC, 2011). Stocks in the northern part of the range are experiencing overfishing, but the southern stocks appear to be sustainably harvested (ASMFC, 2011).

Literature Cited:

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