Ocean Pout − *Zoarces americanus*

Overall Vulnerability Rank = High

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

	Zoarces americanus	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Stock Status	3.6	2.6	
	Other Stressors	1.7	2.0	
	Population Growth Rate	3.0	2.2	
	Spawning Cycle	2.1	2.4	
	Complexity in Reproduction	1.5	2.6	
	Early Life History Requirements	2.4	1.2	
	Sensitivity to Ocean Acidification	1.6	2.2	
	Prey Specialization	1.7	3.0	
	Habitat Specialization	1.7	3.0	
	Sensitivity to Temperature	2.8	2.8	
	Adult Mobility	2.9	2.8	
	Dispersal & Early Life History	3.7	2.4	
	Sensitivity Score	High		
Exposure variables	Sea Surface Temperature	3.9	3.0	
	Variability in Sea Surface Temperature	1.0	3.0	
	Salinity	1.4	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	High		

Low
Moderate
High
Very High

Ocean Pout (*Zoarces americanus*)

Overall Climate Vulnerability Rank: **High.** (100% certainty from bootstrap analysis).

Climate Exposure: **High**. Two exposure factors contributed to this score: Ocean Surface Temperature (3.9) and Ocean Acidification (4.0). All life stages of Ocean Pout use marine habitats.

Biological Sensitivity: **High**. Three sensitivity attributes scored above 3.0: Dispersal and Early Life History (3.7), Stock Status (3.6) and Population Growth Rate (3.0). Ocean Pout do not have dispersive early life stages; eggs are benthic and larvae at large at hatch, quickly associating with benthic habitats (Steimle et al., 1999). Based on a recent assessment ocean pout is overfished but overfishing is not occurring (NEFSC, 2012). Ocean Pout are a relatively long lived species with a slow growth rate (Hoenig, 1983).

Distributional Vulnerability Rank: **Moderate** (93% certainty from bootstrap analysis). Ocean Pout are relatively sensitive to temperature and are habitat generalists, but prefer more complex habitats. However, early life stages are non-dispersive and adults are relatively sedentary.

Directional Effect in the Northeast U.S. Shelf: The effect of climate change on Ocean Pout on the Northeast U.S. Shelf is estimated to be negative, but this estimate is uncertain (66-90% certainty in expert scores). Ocean Pout is a cold-temperate species and warming will likely cause reductions in available habitat. However, there is little direct evidence of the effect of climate change on Ocean Pout productivity and distribution, which contributes to the uncertainty.

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 work has been conducted examining the effect of climate on Ocean Pout productivity. In terms of distribution, Nye et al. (2009) found that the distribution of Ocean Pout shifted poleward and Murawski (1993) linked distribution to temperature: increased temperatures were related with more northward distributions.

Life History Synopsis**:** Ocean Pout is a cool-temperate, marine groundfish that occurs from Labrador and the southern Grand Banks to Virginia (Steimle et al., 1999). Adults reach maturity between 26 – 31 cm or 2-9 years (Steimle et al., 1999; Klein-MacPhee and Collette, 2002). Spawning occurs from late summer to early winter on hard-bottom areas with sheltered crevices in water <10 °C (Steimle et al., 1999). Eggs are fertilized internally then laid in nests in masses encased in a gelatinous substance (Klein-MacPhee and Collette, 2002). The female guards the nest until hatching, approximately 2-3 months, during which time she does not feed (Steimle et al., 1999; Klein-MacPhee and Collette, 2002). The larval stage is short or possibly non-existent. At hatching, Ocean Pout are large, well developed, demersal, and probably stay near the hatch site (Steimle et al., 1999). At this smallest size, Ocean Pout consume small benthic crustaceans, particularly harpacticoid copepods (Steimle et al., 1999). Juveniles inhabit shallow coastal waters around rocks, algae, and shell beds on the shelf and in saline estuarine waters (Steimle et al., 1999). Juvenile Ocean Pout filter sediment for prey and primarily consume gammarid amphipods and polychaetes (Steimle et al., 1999). Squid, Spiny Dogfish, Sea Raven, Atlantic Cod, skates, harbor seals, and cormorants are the primary predators of juveniles (Steimle et al., 1999). Adults are demersal and inhabit most sediment types across the shelf and into the saline parts of estuaries. They are more common at depths <100 m (Steimle et al., 1999). Ocean Pout make localized seasonal migrations from diverse areas of the shelf and estuaries in mid-winter through spring to cooler, rockier areas in summer where they remain through the spawning season to early winter (Klein-MacPhee and

Collette, 2002). Like juveniles, adults filter sediment for prey including polychaetes, molluscs, crustaceans, and echinoderms (Steimle et al., 1999). A variety of fish consume Ocean Pout including: Sandbar Shark, Spiny Dogfish, skates, Atlantic Cod, hakes, Sea Raven, and Bluefish (Steimle et al., 1999; Klein-MacPhee and Collette, 2002). Egg cannibalism may occur during periods of high stress (Steimle et al., 1999). The New England Fishery Management Council manages the Ocean Pout fishery through the Northeast Multispecies Fishery Management Plan. The population ranging from Cape Cod Bay and Georges Bank to Delaware is overfished, but overfishing is not occurring (NEFSC, 2012).

Literature Cited:

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