Giant Pacific octopus − *Enteroctopus dofleini*

Overall Vulnerability Rank = Low

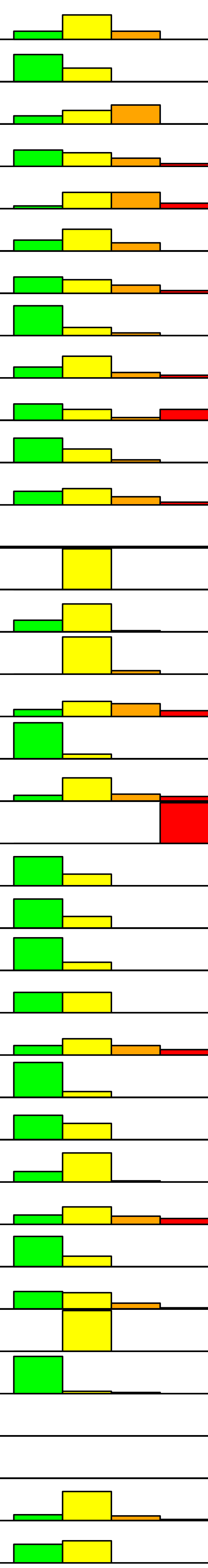
Biological Sensitivity = Low

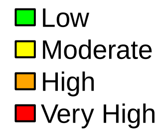
Climate Exposure = Low

Sensitivity Data Quality = 50% of scores ≥ 2

Exposure Data Quality = 64% of scores ≥ 2

	Enteroctopus dofleini	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Habitat Specificity	2.0	2.5	
	Prey Specificity	1.3	2.5	
	Adult Mobility	2.3	2.0	
	Dispersal of Early Life Stages	1.9	1.7	
	Early Life History Survival and Settlement Requirements	2.6	0.8	
	Complexity in Reproductive Strategy	1.9	2.0	
	Spawning Cycle	1.9	1.7	
	Sensitivity to Temperature	1.3	2.8	
	Sensitivity to Ocean Acidification	2.0	3.0	
	Population Growth Rate	2.2	1.7	
	Stock Size/Status	1.5	1.2	
	Other Stressors	2.0	0.7	
	Sensitivity Score	Low		
Exposure factors	Sea Surface Temperature	2.0	2.0	
	Sea Surface Temperature (variance)	1.7	2.0	
	Bottom Temperature	2.1	2.0	
	Bottom Temperature (variance)	2.4	2.0	
	Salinity	1.1	2.0	
	Salinity (variance)	2.3	2.0	
	Ocean Acidification	4.0	2.0	
	Ocean Acidification (variance)	1.3	2.0	
	Phytoplankton Biomass	1.3	1.2	
	Phytoplankton Biomass (variance)	1.2	1.2	
	Plankton Bloom Timing	1.5	1.0	
	Plankton Bloom Timing (variance)	2.3	1.0	
	Large Zooplankton Biomass	1.1	1.0	
	Large Zooplanton Biomass (variance)	1.4	1.0	
	Mixed Layer Depth	1.8	1.0	
	Mixed Layer Depth (variance)	2.3	1.0	
	Currents	1.3	2.0	
	Currents (variance)	1.8	2.0	
	Air Temperature	2.0	2.0	
	Air Temperature (variance)	1.1	2.0	
	Precipitation	NA	NA	
	Precipitation (variance)	NA	NA	
	Sea Surface Height	2.0	2.0	
	Sea Surface Height (variance)	1.5	2.0	
	Exposure Score	Low		
Overall Vulnerability Rank		Low		





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Giant Pacific octopus (*Enteroctopus dofleini*)

Overall Climate Vulnerability Rank: **Low**. (89% certainty from bootstrap analysis).

Climate Exposure: **Low**. With the exception of ocean acidification (4.0), all exposure factors had scores less than 2.5.

Biological Sensitivity: **Low**. Early life history survival (2.6) was ranked as "moderate" sensitivity, and all other sensitivity attributes were ranked as "low" sensitivity.

Potential for distribution change: **High** (54% certainty from bootstrap analysis). Dispersal of early life stages, and habitat specificity, indicated high potential for distribution change, and adult mobility indicated moderate potential for distribution change.

Directional Effect in the Eastern Bering Sea: Projected climate change in the eastern Bering Sea is expected to have a neutral effect on giant Pacific octopus, with 83% certainty in expert scores.

Data Quality: 50% of the sensitivity attributes, and 64% of the exposure factors, had average data quality scores of 2 or greater (indicating at least "moderate" data quality).

Climate Effects on Abundance and Distribution: Data regarding climate effects on *E. dofleini* are sparse. In the southeastern Bering Sea tagged octopus grew and matured faster and had greater horizontal movement in warm fall months relative to cold winter months (Brewer 2016), but it is unclear whether this was the effect of temperature or season.

Life History Synopsis: *E. dofleini* are terminal spawners, dying after mating (males) and the hatching of eggs (females) (Jorgensen 2009). *Enteroctopus dofleini* within the Bering Sea have been found to mature between 10 to 13 kg with 50% maturity values of 12.8 kg for females and 10.8 kg for males (Brewer and Norcross 2012). Obtaining estimates of age at maturity is hindered due to aging difficulty from a documented lack of beak growth checks and soft chalky statoliths (Robinson and Hartwick 1986). In Japan the estimated age at maturity is 1.5 to 3 years and at similar size ranges (Kanamaru and Yamashita 1967, Mottet 1975). Fecundity in the Gulf of Alaska ranges from 40,000 to 240,000 eggs per female with an average fecundity of 106,800 eggs per female (Conrath and Conners 2014). Fecundity was significantly and positively related to the size of the female. Hatchlings are approximately 3.5 mm. Mottet (1975) estimated survival to 6 mm at 4% while survival to 10 mm was estimated to be 1%; mortality at the 1 to 2 year stage is also estimated to be high (Hartwick 1983). Large numbers of planktonic paralarvae of this species have been captured in offshore waters of the Aleutian Islands during June through August. These juveniles were assumed have hatched in the coastal waters along the Aleutian Islands and transported by the Alaska Stream (Kubodera 1991). Since the highest mortality occurs during the larval stage it is likely that ocean conditions have the largest effect on the abundance in the Bering Sea and large interannual fluctuations in abundance should be expected.

There are no directed fisheries for octopus in the Bering Sea and Aleutian Islands (BSAI) region but they are captured incidentally in commercial fisheries, particularly the pot fishery for Pacific cod (Conners et al. 2016). For management purposes they are treated as a target species and have annual catch limits. Quotas are based on an estimate of natural mortality derived from Pacific cod diet data, which is used to provide an estimate of total consumption of octopus by cod.

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