Smoothskin octopus − *Benthoctopus leioderma*

Overall Vulnerability Rank = Low

Biological Sensitivity = Moderate

Climate Exposure = Low

Sensitivity Data Quality = 17% of scores ≥ 2

Exposure Data Quality = 33% of scores ≥ 2

	Benthoctopus leioderma	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Habitat Specificity	2.3	2.0	
	Prey Specificity	1.5	1.0	
	Adult Mobility	2.9	1.0	
	Dispersal of Early Life Stages	3.3	1.7	
	Early Life History Survival and Settlement Requirements	2.3	1.0	
	Complexity in Reproductive Strategy	1.9	1.0	
	Spawning Cycle	2.3	0.7	
	Sensitivity to Temperature	2.3	3.0	
	Sensitivity to Ocean Acidification	2.0	1.0	
	Population Growth Rate	1.5	0.7	
	Stock Size/Status	1.5	1.0	
	Other Stressors	1.8	0.8	
	Sensitivity Score	Moderate		
Exposure factors	Sea Surface Temperature	NA	NA	
	Sea Surface Temperature (variance)	NA	NA	
	Bottom Temperature	2.1	2.0	
	Bottom Temperature (variance)	2.0	2.0	
	Salinity	NA	NA	
	Salinity (variance)	NA	NA	
	Ocean Acidification	4.0	2.0	
	Ocean Acidification (variance)	1.7	2.0	
	Phytoplankton Biomass	1.2	1.2	
	Phytoplankton Biomass (variance)	1.3	1.2	
	Plankton Bloom Timing	1.6	1.0	
	Plankton Bloom Timing (variance)	2.0	1.0	
	Large Zooplankton Biomass	1.2	1.0	
	Large Zooplanton Biomass (variance)	1.4	1.0	
	Mixed Layer Depth	1.5	1.0	
	Mixed Layer Depth (variance)	2.3	1.0	
	Currents	NA	NA	
	Currents (variance)	NA	NA	
	Air Temperature	NA	NA	
	Air Temperature (variance)	NA	NA	
	Precipitation	NA	NA	
	Precipitation (variance)	NA	NA	
	Sea Surface Height	NA	NA	
	Sea Surface Height (variance)	NA	NA	
	Exposure Score	Low		
	Overall Vulnerability Rank	Low		

Low
Moderate
High
Very High

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Smoothskin octopus (*Benthoctopus leioderma*)

Overall Climate Vulnerability Rank: **Low**. (81% 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: **Moderate**. Dispersal of early life stages was ranked as "high" sensitivity, and adult mobility was ranked as "moderate" sensitivity.

Potential for distribution change: **Low** (91% certainty from bootstrap analysis). Habitat specificity indicated a moderate potential for distribution change, whereas the remaining three distribution attributes indicated low 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 smoothskin octopus, with 74% certainty in expert scores.

Data Quality: 17% of the sensitivity attributes, and 33% 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: Very little is known regarding the biology and ecology of smoothskin octopus. Due to its deep distribution and apparent lack of a pelagic larval stage (see below), it may be less susceptible to changing ocean conditions than the better-studied *Enteroctopus dofleini*.

Life History Synopsis: *Benthoctopus leioderma* is a medium sized species, with a maximum total length of approximately 60 cm and a maximum weight of approximately 3 kg. Its life span is unknown. It is benthic and occurs at depths from 250 to 1,400 m. It is found throughout the shelf break region and the continental slope. The eggs are brooded by the female but mating and spawning times are unknown. Members of this genus in the North Pacific Ocean have been found to attach their eggs to hard substrate under rock ledges and crevices (Voight and Grehan 2000). Smoothskin octopuses tend to have small numbers of eggs (< 200) that develop into benthic hatchlings.

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.

Literature Cited:

Voight, J.R. and A.J. Grehan. 2000. Egg brooding by deep-sea octopuses in the North Pacific Ocean. Biol Bull 198(1): 94-100.

Conners, M.E., C.L. Conrath, and K. Aydin. 2016. Assessment of the octopus stock complex in the eastern Bering Sea and Aleutian Islands. In: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions, pp. 1993-

2048. North Pacific Fishery Management Council, 605 W. 4th Ave, suite 306. Anchorage, AK 99501