Starry flounder − *Platichthys stellatus*

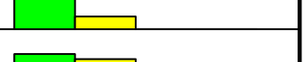
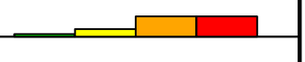
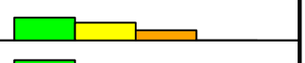
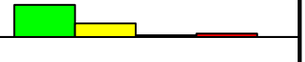
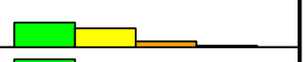
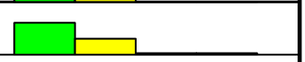
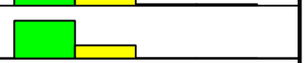
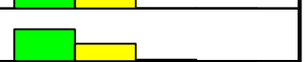
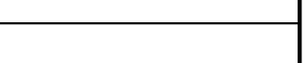
Overall Vulnerability Rank = Low

Biological Sensitivity = High

Climate Exposure = Low

Sensitivity Data Quality = 42% of scores ≥ 2

Exposure Data Quality = 64% of scores ≥ 2

	Platichthys stellatus	Expert Scores	Data Quality	Expert Scores Plots (Portion by Category)
Sensitivity attributes	Habitat Specificity	1.3	2.8	
	Prey Specificity	1.3	2.2	
	Adult Mobility	1.9	1.8	
	Dispersal of Early Life Stages	2.0	1.5	
	Early Life History Survival and Settlement Requirements	2.2	1.2	
	Complexity in Reproductive Strategy	2.0	0.8	
	Spawning Cycle	3.0	1.8	
	Sensitivity to Temperature	1.2	2.2	
	Sensitivity to Ocean Acidification	1.4	2.2	
	Population Growth Rate	3.1	0.8	
	Stock Size/Status	1.8	1.0	
	Other Stressors	1.5	2.5	
	Sensitivity Score	High		
Exposure factors	Sea Surface Temperature	2.0	2.5	
	Sea Surface Temperature (variance)	1.3	2.5	
	Bottom Temperature	2.0	3.0	
	Bottom Temperature (variance)	1.5	3.0	
	Salinity	1.8	2.0	
	Salinity (variance)	2.1	2.0	
	Ocean Acidification	4.0	3.0	
	Ocean Acidification (variance)	1.3	3.0	
	Phytoplankton Biomass	1.8	1.2	
	Phytoplankton Biomass (variance)	1.6	1.2	
	Plankton Bloom Timing	1.5	1.0	
	Plankton Bloom Timing (variance)	1.9	1.0	
	Large Zooplankton Biomass	1.7	1.0	
	Large Zooplanton Biomass (variance)	1.7	1.0	
	Mixed Layer Depth	1.2	1.0	
	Mixed Layer Depth (variance)	1.5	1.0	
	Currents	1.3	2.0	
	Currents (variance)	1.4	2.0	
	Air Temperature	1.9	2.5	
	Air Temperature (variance)	1.0	2.5	
	Precipitation	NA	NA	
	Precipitation (variance)	NA	NA	
	Sea Surface Height	1.2	2.5	
	Sea Surface Height (variance)	1.2	2.5	
	Exposure Score	Low		
Overall Vulnerability Rank		Low		

Low
Moderate
High
Very High

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Starry flounder (*Platichthys stellatus*)

Overall Climate Vulnerability Rank: **Low**. (100% 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: **High**. Population growth rate (3.2) and spawning cycle (3.1) and were ranked as "high" sensitivity.

Potential for distribution change: **High** (86% certainty from bootstrap analysis). Habitat specificity indicated very high potential for distribution change, whereas adult mobility and dispersal of early life stages indicated high 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 starry flounder, with 67% certainty in expert scores.

Data Quality: 42% 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: Abundance and biological data are lacking to inform how changing environmental conditions in the Bering Sea could affect stock productivity, abundance, and the distribution of starry flounder.

Life History Synopsis:

Starry flounder are a shallow-water species that has a widespread distribution from San Francisco to Alaska and west to the Korean peninsula. In Alaska, they are captured in survey catches in northern Bristol Bay but are most commonly found in estuaries on the west coast of the U.S. (Ralston 2005, Orcut 1950). Their habitat can be described as an abundant physical habitat that is moderately disturbed in some areas. Due to their widespread distribution, they are most likely a generalist.

Most of what is known regarding starry flounder biology, feeding habits and early life-history comes from research conducted on the west coast of the U.S. (Hart 1975, Orcut 1950). They are found on gravel, clean shifting sand, hard stable sand, and mud substrata, but the largest catches are from soft sand substrate. Prey from mud (sternapsid worms) and sand (*Siliqua patula* clams) habitats have been observed in the stomach of a single individual, suggesting fish move freely from one habitat type to another. Starry flounder also consume crabs, shrimps, worms, clams and clam siphons, other small mollusks, small fishes, nemertean worms, and brittle stars. They are also a euryhaline species with a wide tolerance for salinity, being found 75 miles up the Columbia river. Spawning occurs in December and January in California, in February-April in Washington and Oregon, and most likely in the spring in Alaska. The spawning season is protracted for a few months. It is unknown if spawning migrations occur in the Bering Sea but occasional large catches of starry flounder have been made by commercial vessels fishing in Bristol Bay during the spring. Larval diffusion requirements are unknown for this species but lack of retention may cause advection into deeper, more unsuitable, waters. For larvae, at least those in California, larval duration has been observed 2-3 months from January through March.

The extent of larval predation is unknown, however, the survival of larvae is thought to be more strongly dependent upon the availability of suitable prey than on predation pressure.

Literature Cited:

Hart, J. L. 1973. Pacific Fishes of Canada. Fish. Res. Bd. Canada, Bull. 180, 740 p.

Orcutt, H. G. 1950. The life history of the starry flounder *Platichthys stellatus* (Pallas). Calif. Dept. Fish and Game Fish Bull. No. 78, 64 p.

Ralston, S. 2006. An assessment of starry flounder off California, Oregon, and Washington. In: Status of the Pacific coast groundfish fishery through 2005: stock assessment and fishery evaluation, volume II. Pacific Fishery Management Council, Portland, Oregon. 74 p.