

PUGET SOUND VITAL SIGNS

VITAL Sign FORAGE FISH

Forage fish, an assemblage of small schooling species also known as bait fish, play a crucial role in the food web of the Salish Sea. They are essential prey for larger fish, seabirds, and marine mammals. They also serve as a source of food and fishing bait for humans. The Forage Fish Vital Sign tells us about the population status of Pacific herring and other forage fish species in Puget Sound. Forage fish depend on clean water and natural shorelines. They are susceptible to impacts associated with shoreline development such as poor water quality, habitat degradation, and vessel noise.



School of herring. Photo credit: Florian Graner.

Related Strategies

- Awareness of Effects of Climate Change
- Climate Adaptation & Resilience
- Education Partnerships
- Floodplains & Estuaries
- Funding
- Healthy Shorelines
- Research & Monitoring
- Salmon Recovery
- Smart Growth
- Stewardship & Motivating Action
- Strategic Leadership & Collaboration
- Submerged Aquatic Vegetation

Vital Sign Reporter

PSEMP Forage Fish and Food Webs Work Group

Last Updated

05/22/2025

VITAL SIGN > INDICATOR	PROGRESS	STATUS
Forage Fish		
Biomass of spawning Pacific Herring	MIXED RESULTS	NO TARGET
Regional index of the stock presence and health of forage fish species	INDICATOR TO BE DEVELOPED	NO TARGET

KEY VITAL SIGN MESSAGES

Forage fish play a crucial role in the food web of the Salish Sea. The Vital Sign tells us about the population status of forage fish species. Forage fish depend on clean water and natural shorelines, and are susceptible to impacts associated water quality, habitat degradation, and vessel noise.

- Forage fish are an assemblage of small schooling species also known as bait fish. These include Pacific herring, Northern anchovy, Pacific sand lance, and surf smelt. They are important prey species for [Chinook salmon](#), [groundfish](#) and other fish, [birds](#), and [mammals](#). [Zooplankton](#) are in turn important prey for forage fish.
- Forage fish depend on [clean water](#) and [natural shorelines](#) and are susceptible to water quality and habitat degradation. Some species like anchovy spawn in the open water, while others leave their eggs along the shoreline, either in the sand and gravel or in shallow water on [submerged aquatic vegetation](#).
- While all forage fish are important to the [Puget Sound food web](#), our knowledge on abundance and distribution varies between species. Pacific herring are monitored in a Vital Sign indicator, harvested commercially and [recreationally](#) in Puget Sound, and serve as one of the only locally harvested baitfish for the salmon and groundfish fisheries.
- The size and timing of Pacific herring spawning varies regionally and from year to year. Despite an overall increase in total spawn biomass in Puget Sound from 2010 to 2020, some populations remain below their 25-year average abundance. These declines in spawning result in reduced prey available for the species that feed on them.
- Although researchers lack official population estimates, reports of anchovy in predator diets and commercial landings in Puget Sound suggest that anchovy abundance increased during 2015 and has remained high since then. There is evidence that this led to shifts in marine mammal distribution and impacted juvenile salmonid survival rates.
- Like anchovy, there are no official estimates for sand lance or surf smelt abundance in the Salish Sea. The Washington Department of Fish and Wildlife and several [partners](#) of the [PSEMP Forage Fish and Food Webs](#) work group continue to monitor spawning habitat for both species, and have also been investigating sand lance burying habitat.

BACKGROUND DOCUMENTS

Indicator Targets

- There are currently no indicator targets identified for herring spawning biomass or other forage fish.
- 2020 Ecosystem Recovery Target
 - [Leadership Council Resolution 2011-18: Adopting a 2020 ecosystem recovery target for Pacific herring](#)
 - [Pacific Herring 2020 Target Briefsheet](#)

OTHER RESOURCES

- [WDFW Forage Fish Spawning Ecology and Map](#)
- [2016 Washington State Herring Stock Status Report](#)
- [Assessment and Management of Salish Sea herring](#) (2018)

CONTRIBUTING PARTNERS



TO LEARN MORE ABOUT THE VITAL SIGNS VISIT: vitalsigns.pugetsoundinfo.wa.gov OR CONTACT: vitalsigns@psp.wa.gov