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.

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

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

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KEY VITAL SIGN MESSAGES

- Pacific herring is an important prey species for Chinook salmon and countless other fish, birds, and mammals.
- Pacific herring is harvested both commercially and recreationally in Puget Sound. They serve as one of the only locally harvested baitfish available for salmon and bottomfish fisheries.
- The size and timing of herring spawning varies regionally and can change dramatically from year to year.
  - Despite an overall increase in total Pacific herring spawn biomass from 2010 to 2022, the spawning biomass of the Cherry Point and Squaxin Pass stocks remained below their respective 25-year mean baseline reference in 2022.
  - In 2022, spawning biomass increased 26% over the previous year, but was about 30% lower than the recent 2020 high. While some spawning areas increased in abundance, others continued to decline.
  - We once again observed herring spawning in previously undocumented areas in 2022.
- Several other forage fish species, such as Northern Anchovy, Pacific sand lance, and surf smelt, are important to Puget Sound.
  - Northern Anchovy is widely reported throughout Puget Sound. Reports of schooling fish between 2015 and 2022, anchovy presence in predator diets, and the highest commercial landings of anchovy in Puget Sound in at least two decades suggest that anchovy abundance has increased. However, researchers lack official population estimates.
  - Like anchovy, there is no official estimate of sand lance abundance in the Salish Sea. Washington Department of Fish and Wildlife (WDFW) and several partners of the PSEMP Forage Fish & Food Webs work group continue to monitor sand lance spawning habitat and have also begun investigating sand lance burying habitat.
  - For the first time since WDFW adopted a quota in 2014 for the commercial surf smelt fishery for Puget Sound, the quota was not reached in 2020, and it has not been reached since then. This reduced harvest is believed to be primarily due to a reduction in the number of fishermen participating in the fishery.
- Zooplankton are important prey for forage fish. A study of these small organisms begun by the Marine Survival Project is continuing to improve our understanding of the Puget Sound food web and has been developed as a Vital Sign for the health of Puget Sound.

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

Washington Department of FISH & WILDLIFE