

# PUGET SOUND VITAL SIGNS

## VITAL SIGN PACIFIC HERRING

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 an essential source of prey for larger fish, seabirds, and marine mammals. They also serve as a source of food and fishing bait for humans. Forage fish, such as Pacific herring, depend on clean water and natural shorelines. They are susceptible to the impacts associated with shoreline development and their accumulation including vessel noise, ambient light, poor water quality, and shoreline armoring. This Vital Sign highlights the population status of Pacific herring in Puget Sound, as the only forage fish species with a reliable estimate of abundance.

### Vital Sign Reporter

PSEMP Forage Fish and Food Webs work group  
(coordinator is James Selleck)  
[jselleck@nrccorp.com](mailto:jselleck@nrccorp.com)

### Last Updated

5/6/2021

VITAL SIGN > INDICATOR	PROGRESS	STATUS
Pacific Herring		
Biomass of spawning Pacific herring	GETTING WORSE	BELOW 2020 TARGET

## 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 vary dramatically from year to year.
  - Despite an overall increase in total [Pacific herring spawn biomass](#) from 2010 to 2020, each stock's current spawning biomass is below its respective 25-year mean baseline reference and 2020 target value.
  - In 2020, spawning biomass increased 235% over the previous year, reaching a level not seen since the 1980s! Over three quarters of this increase was from two spawning areas in the 'Other Stock Complex' (Stick et al., 2014). One of those spawning areas had previously been at such low abundance that it was undetected in 2016 and 2017. While some spawning areas dramatically increased in abundance, others continued to decline.
  - Unusual seasonal timing and areas of herring spawning events in 2019 continued into 2020, continuing a trend seen since monitoring began in the 1970s.
- Several other forage fish species, such as Pacific sand lance and surf smelt, live in Puget Sound.
  - Northern Anchovy, another forage fish species, is widely reported throughout Puget Sound. Reports of schooling fish between 2016 and 2019, and anchovy presence in predator diets, suggest that anchovies may be increasing. However, researchers lack official population estimates. In 2020, beach seining in south Puget Sound did not encounter juvenile anchovy in the fall for the first time since 2014, which may indicate the end of the anchovy boom.
  - Like anchovy, there is no official estimate of sand lance abundance in the Salish Sea, but researchers and fishermen reported an apparent increase in sand lance during 2020. WDFW and several partners of the FF&FW work group continue to monitor sand lance spawning habitat and have also begun investigating sand lance burying habitat.



Herring in Quilcene Bay. Photo Roy Clark.

- 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. This was primarily due to a reduction in the number of fishermen participating in the fishery, and likely reduced demand due to the pandemic.
- Zooplankton are important prey for forage fish. New studies on these small organisms by the University of Washington, King County, and the [Marine Survival Project](#) will improve our understanding of the Puget Sound food web.
- Future indicators of marine benthic invertebrates and groundfish will also help us understand the food web in the Salish Sea. The [WDFW Groundfish Management Unit](#), in collaboration with NOAA Fisheries and the University of Washington, continues to assess status and trends of bottom-dwelling organisms over time.

## Strategies, Actions, And Effectiveness

- [Actions proposed in the Action Agenda](#) that advance this Vital Sign (*let us know if we missed any!*):
  - [Mitigating Contamination to Nearshore Habitat from Creosote Pilings](#)
  - [Implement salmon habitat recovery in Quartermaster Harbor](#)
  - [East Kitsap Forage Fish Monitoring](#)
  - [Forage Fish Habitat Tidal Range](#)
- [Kilisut Harbor / Oak Bay Reconnection](#): <https://www.wsdot.wa.gov/projects/sr116/kilisut-harbor/home> and <http://www.pugetsoundnearshore.org/factsheets/KilisutHarbor-OakBay.pdf>
- Restoration and protection projects funded by the National Estuary Program posted in [National Estuary Program Atlas](#)
- [Whats working to improve this Vital Sign? Answers from effectiveness evaluations](#)

## Background Documents

- [Leadership Council Resolution 2011-18, Adopting a 2020 ecosystem recovery target for Pacific herring](#)
- [Pacific Herring Target Briefsheet](#)

## Other Resources

- [2016 Washington State Herring Stock Status Report](#)
- [Assessment and Management of Pacific Herring in the Salish Sea: Conserving and Recovering a Culturally Significant and Ecologically Critical Component of the Food Web](#)
- [Articles related to herring in the Encyclopedia Of Puget Sound](#)
- [WDFW Forage Fish Spawning Ecology and Map](#)
- [King County phytoplankton and zooplankton monitoring programs](#)
- [Salish Sea Marine Survival Project Zooplankton Sampling program](#)

## Contributing Partners

The Washington Department of Fish and Wildlife Marine Fish Unit (forage fish) monitors forage fish in Puget Sound

