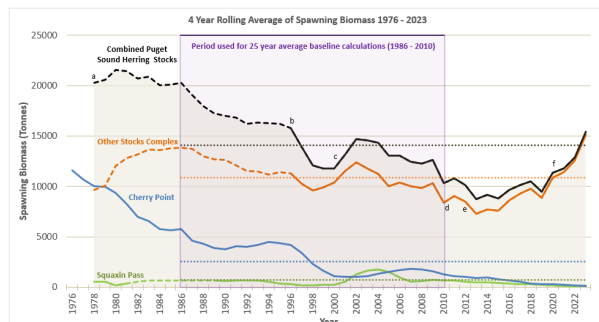


# PUGET SOUND VITAL SIGNS

## INDICATOR BIOMASS OF SPAWNING PACIFIC HERRING

The biomass of spawning Pacific Herring indicator is the estimated annual tonnage (four-year average) of herring that have reproduced in Puget Sound. Estimates are based on surveys of the density and extent of eggs deposited by herring on marine vegetation. Herring, along with a few other small schooling fish species, play a unique role in the food web: they are an essential source of food for larger fish, seabirds, and marine mammals.



a. Surveys of stocks other than Cherry Point did not begin in earnest until 1975, so the four year average is not presented until 1978. The 1978 estimate includes 14 stocks of the Other Stock Complex in addition to Cherry Point and Squaxin Pass, by 1986, at least two years of estimates were available for all Puget Sound stocks that had been identified up to that time.  
b. 1996, surveys transitioned from a rotating sampling schedule to a schedule that attempted to survey all known stocks every year.  
c. 2000, the Willolhet Bay stock was identified and was first surveyed and included in estimates of the Other Stocks Complex biomass.  
d. 2010, acoustic trawl surveys were discontinued and spawn deposition surveys became the only regular source of Puget Sound herring abundance data.  
e. 2012, the Elliott Bay stock was identified and was first surveyed and included in estimates of the Other Stocks Complex biomass.  
f. 2020, the COVID-19 pandemic interrupted surveys at the peak of what was likely the largest herring spawning season in Puget Sound since the 1980s.

Four-year average spawning biomass estimates for three genetic stock groups and the combined total are shown with dashed and solid lines; dashed lines represent periods of incomplete data; each color corresponds to a different stock group, and black is the combined total of all stocks. The 25-year mean (1986-2010) for each stock is referenced as a baseline and is shown with horizontal dotted lines of corresponding colors.

## Key Vital Sign Indicator Results

- In 2023, the 4-year average spawning biomass for the Other Stocks Complex exceeded 14,000 metric tons for the first time in this time series. This high average is the result of high spawning biomass in 2020 and 2023, and about average spawning biomass in 2021 and 2022. The Other Stocks Complex consists of all Puget Sound herring stocks other than Cherry Point and Squaxin Pass. In contrast, the 4-year averages of the genetically distinct Cherry Point and Squaxin Pass stocks remain well below their baselines. Therefore, our conclusion about progress of Pacific Herring stocks in Puget Sound remains “Mixed.”
- We estimate 17,984 metric tons of total herring spawning biomass for the southern Salish Sea in 2023. This is an increase of about 39% from 2022, but is shy of the recent high estimate of 18,559 metric tons in 2020 ([click here to download a table of annual biomass estimates](#)).
- No spawning was observed for the Cherry Point herring stock in 2023. This is the first time in the history of these surveys that we did not find evidence of spawning by the Cherry Point herring stock. It is worth noting that our surveys did not extend into Canadian waters in 2023, so spawning may have occurred outside our survey area. Surveys will be extended into Canadian waters in 2024.
- Record high spawning estimates were observed in 2023 at the Port Orchard/Port Madison and the Purdy spawning areas leading to the highest estimates of spawning biomass we've observed in both the Central and South Sound regions.
- During the 2023 season we continued to observe shifts in spawning distribution for some stocks and once again observed herring spawning in areas that had not been previously documented.

Indicator  
Progress

Target  
Status



Target

No targets are currently set for this indicator.

Data Source

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