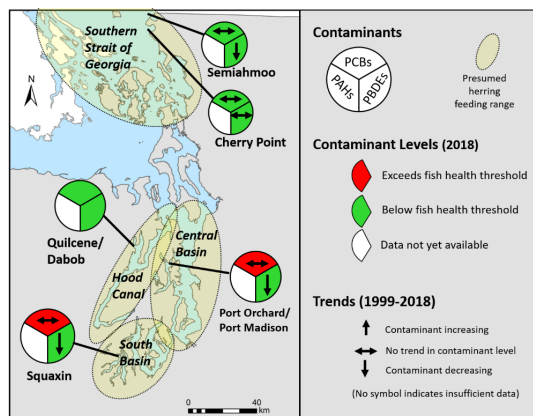


PUGET SOUND VITAL SIGNS

INDICATOR CONTAMINANTS IN PACIFIC HERRING

The contaminants in Pacific herring indicator currently tracks the concentration of PCBs and PBDEs in the whole bodies of herring. The levels of these persistent organic pollutants (POPs) in herring signal not only harmful concentrations in this species, but also the extent of contamination in the pelagic food web. POPs threaten the health of herring and other forage fish, the health of the fish, wildlife and humans who consume them, and the overall productivity of the pelagic habitat.



Contaminant levels in 5 herring stocks from 1999 to 2018. Red indicates high contamination, with some herring (5th percentile or greater) exceeding the fish health threshold for that contaminant. Green indicates low contamination, with most herring (95th percentile or more) below the threshold for that contaminant. Arrows indicate time trends: upward (increasing trend), downward (decreasing trend), or horizontal (no significant trend).

Key Vital Sign Indicator Results

- The contaminants in Pacific herring indicator failed to meet the recovery target (see target description) because PCBs continued to exceed an adverse fish health effects threshold in two of the five monitored stocks. For detailed results, see the [Interpretation of Results](#) section.
- PCBs remained high in the two stocks (Port Orchard/Madison and Squaxin Pass) from the more urbanized Central and South Basins of Puget Sound. Virtually all herring samples from those stocks have exceeded the fish health threshold over the past 20 years. These high PCB levels warrant continued concern for several reasons:
 - PCBs impair herring health and can reduce their survival.
 - Reduced herring survival can limit food supply to the numerous predators that rely on them.
 - PCBs in herring are transferred up the food chain to their predators, including [Chinook salmon](#), and ultimately to [Southern Resident killer whales](#) (SRKW) who feed on salmon. This results in PCBs levels in both SRKW and Chinook salmon high enough to impair their recovery.
- PCBs are low (with 95% of fish below the health effects threshold) in Quilcene Bay, Semiahmoo Bay and Cherry Point herring stocks. Virtually all herring have been below the fish health threshold from 2002-2018 in Semiahmoo Bay, and since 2014 in Quilcene Bay. Only a few samples of herring from the Cherry Point stock have exceeded the threshold since 2012.
- PBDEs are low (with 95% of fish below the health effects threshold) in all five herring stocks and they continue to decline or remain stable everywhere, suggesting remediation actions have been effective at mitigating these contaminants.

Indicator Progress



Target Status



Target

By 2030, 95% of the samples gathered across Puget Sound habitats exhibit a declining trend of contaminant levels, or are below thresholds of concern for species or human health.

By 2050, 95% of the samples gathered across Puget Sound habitats exhibit contaminant levels below thresholds of concern for species or human health and show no increasing trends.

Target fact sheet

Data Source

West et al. (2017)

Washington State Department of Fish and Wildlife, Toxics Biological Observation System (unpublished data)

Indicator Lead

Louisa Harding
Louisa.Harding@dfw.wa.gov
 Washington Department of Fish and Wildlife

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CONTRIBUTING PARTNERS



Washington
Department of
**FISH &
WILDLIFE**

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