

# PUGET SOUND VITAL SIGNS

## VITAL Sign TOXICS IN AQUATIC LIFE

Organisms living in Puget Sound are exposed to thousands of toxic chemical pollutants that can impact their health and survival. Many of these chemicals also pose a threat to humans who consume contaminated Puget Sound seafood. This Vital Sign tracks four important pollutant groups in Puget Sound that are considered indicators of organism health related to exposure to these pollutants. These groups include chemicals that persist in the ecosystem and can increase in predators as the chemicals move up the food chain, as well as chemicals that are quickly broken down in the environment. Measuring these chemicals in organisms' tissues tells us whether current levels are harmful to the organisms or the predators that consume them, whether they are safe for humans to eat, and whether conditions are improving or getting worse.

The continued presence of these chemicals in the ecosystem also hinders progress towards achieving Puget Sound recovery goals tracked in other Vital Signs. Toxic contaminants reduce [healthy water quality](#), undermine efforts to [protect and restore habitats](#), and threaten [thriving species and food web](#). Moreover, these chemicals impact all indicators recognized by the [vibrant human quality of life](#) and [healthy human population](#) Vital Signs, and raise concerns regarding inequitable health impacts on communities who rely on local Puget Sound seafood.

### Related Strategies

- [Awareness of Effects of Climate Change](#)
- [Climate Adaptation & Resilience](#)
- [Education Partnerships](#)
- [Funding](#)
- [Human Health](#)
- [Oil Spills](#)
- [Research & Monitoring](#)
- [Stewardship & Motivating Action](#)
- [Stormwater Runoff & Legacy Contamination](#)
- [Strategic Leadership & Collaboration](#)
- [Toxic Chemical Pollution](#)
- [Wastewater Systems](#)

### Vital Sign Reporter

PSEMP Toxics Work Group

### Last Updated

05/22/2025

VITAL SIGN > INDICATOR	PROGRESS	STATUS
Toxics in Aquatic Life		
Contaminants in adult salmon	LIMITED DATA	BELOW TARGET
Contaminants in English sole	MIXED RESULTS	BELOW TARGET
Contaminants in juvenile salmon	LIMITED DATA	BELOW TARGET
Contaminants in Pacific herring	MIXED RESULTS	BELOW TARGET
Contaminants in caged mussels	INDICATOR TO BE DEVELOPED	NO TARGET

## KEY VITAL SIGN MESSAGES

Puget Sound's aquatic life – including ESA-listed [Chinook salmon](#), steelhead trout, and [Southern Resident orcas](#) – is exposed to mixtures of thousands of chemicals, many of which are not regulated or controlled. These contaminants can impact the health and survival of exposed species and affect people and animals that consume them.

- PCBs remain a problem. They biomagnify through the Puget Sound food web to levels that harm aquatic life and seafood consumers. For example, juvenile Chinook salmon have levels of PCBs that impair their growth and survival, likely reducing their abundance as a major prey for endangered Southern Resident killer whales.
- Tire-related contaminants in road runoff, such as 6PPD-Q, can kill adult and juvenile [coho salmon](#) and [steelhead](#), rainbow trout, and to a lesser extent Chinook salmon. These chemical exposures are highest in streams near heavily-trafficked roads and limit the success of habitat restoration.
- Although bans and other management actions have reduced flame retardant chemicals (PBDEs) present in some Puget Sound aquatic life. However, they continue to enter Puget Sound (likely via wastewater discharge) at levels that can harm the health of juvenile Chinook salmon and steelhead trout in rivers and estuaries.
- Sediments contaminated with petroleum-based chemicals called PAHs, caused liver cancer in bottomfish in the 1990s. Widespread reductions in [bottomfish](#) liver cancer in recent years suggests sediment cleanups and other remediation efforts have been successful. However, PAHs continue to be detected in mussels in the nearshore, indicating ongoing PAH entry and exposure in Puget Sound.
- Contaminants of emerging concern including PFAS, pharmaceuticals, antibiotics, and industrial chemicals are found as mixtures throughout Puget Sound. They can occur at high enough levels to impact exposed aquatic life throughout the food web, including [Pacific herring](#), Chinook salmon, and Southern Resident killer whales.
- Naturally occurring hormones from human sewage can disrupt hormone function and affect reproduction of exposed aquatic life, when concentrated to unnatural levels via wastewater effluent. Evidence of reproductive impairment has been observed in Puget Sound fish, even in undeveloped areas such as Carr Inlet in South Puget Sound.

## BACKGROUND DOCUMENTS

### Implementation Strategy

The Partnership and its affiliated network of researchers works with the three Strategic Initiative Lead Teams on Implementation Strategy development and operationalization. Please read more about these teams and our shared work at <https://pugetsoundestuary.wa.gov/recovering-puget-sound/>

- [Stormwater Strategic Initiative](#)
  - [Toxics in Fish Implementation Strategy](#)

### Indicator Targets

- [Toxics in Aquatic Life 2050 Recovery Target Fact Sheet](#)
- 2020 Ecosystem Recovery Targets
  - [Leadership Council Resolution 2011-11: Adopting a 2020 ecosystem recovery target for toxics in fish](#)
  - [Toxics in Fish 2020 Target Briefsheet](#)

## OTHER RESOURCES

- [2022 PSEMP Salish Sea Toxics Monitoring Synthesis](#)

## CONTRIBUTING PARTNERS



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