

## How exposure to metals reduces fish survival, threatening orcas

Salmon are a critical food source for orcas. Our research shows that exposure to metals damages their sense of smell, reducing the chance of salmon survival.

Salmon have a sense of smell thousands of times stronger than a dog's. They depend on smell to find food, avoid predators and return to their birthplace to spawn.

The lab of Professor Evan Gallagher, director of the UW Superfund Research Program, has shown that exposure to even small amounts of metals at levels found in Puget Sound reduces the ability of salmon to smell.

**The result:** Fewer salmon for orcas, reducing the prospects for orca recovery.



Puget Sound salmon are a critical prey species for orcas.

## Developing biomarkers to monitor fish health

Copper and cadmium are both listed among the most harmful chemicals to human health by the Agency for Toxic Substances and Disease Registry, a public health agency of the US government.

These chemicals end up in Puget Sound as byproducts of manufacturing. Tobacco smoke and some foods also contain cadmium.

Gallagher leads research to explore how cadmium damages the sense of smell in fish. His lab uses zebrafish to study the cellular processes that underlie neurological damage caused by metal exposure. The lab also samples for metals in the Lower Duwamish Waterway Superfund site in Seattle.

Ultimately, the lab aims to develop biomarkers that can be used to monitor the health of salmon and other fish at Superfund sites and to effectively evaluate remediation efforts.

## About the UW Superfund Research Program

The University of Washington Superfund Research Program is an interdisciplinary program that conducts and communicates about research on the impacts of metal neurotoxicity on human and ecological health. Our research focuses on metals that commonly occur at Superfund hazardous waste sites. The program is housed at the UW Department of Environmental & Occupational Health Sciences.



Margaret Mills, a post-doctoral researcher in the Gallagher lab, demonstrates a protocol developed by the lab to test the sense of smell in zebrafish.



UW SRP Director, Evan Gallagher, leads research into how metal exposure causes neurological damage in fish like Pacific salmon.

## LEARN MORE

- The Gallagher Lab: <http://bit.ly/2Sz1mIY>
- UW Superfund Research Program: <http://deohs.washington.edu/srp/>
- Cadmium toxicity: <http://bit.ly/2Od5api>
- Cleanup of the Lower Duwamish Waterway Superfund site: <http://bit.ly/2D9JCZI>
- Regulating the use of toxic substances: <http://bit.ly/2OYH86Q>

## CONNECT

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