

PFCs in Washington State Rivers and Lakes

During 2008, the Washington Department of Ecology (Ecology) conducted a study to assess levels of perfluorinated compounds (PFCs) in freshwater areas of Washington. Despite the widespread occurrence of PFCs worldwide and the potential health and environmental effects, only scattered information is available on environmental levels in North America. Ecology's statewide assessment represents the first such study in the western United States. The project looked at a variety of PFCs in a range of environmental media including surface waters, wastewater treatment plant effluent, fish tissues (fillet and liver), and osprey eggs.

How PFCs enter our environment

Although PFCs are not manufactured in Washington, they can enter the state's environment through consumer and industrial products that contain trace amounts of the chemicals. Compounds that can degrade to PFCs may also be transported through the atmosphere and undergo transformation into PFCs.

Study's framework

The primary goal of Ecology's study was to determine the extent and magnitude of PFC contamination in different media in Washington. Ecology scientists collected surface water samples during low and high flows from 14 waterbodies including urban, rural, and pristine drainages. The sampled sites were distributed equitably across Eastern and Western Washington. Ecology also sampled discharges from four wastewater treatment plants.

Ecology analyzed PFCs in fish tissues and osprey eggs to determine if PFCs are accumulating in fish and fish-eating birds. Scientists collected fish from seven of the surface water sites. They also collected and analyzed 11 osprey eggs from nests along the Lower Columbia River. Partners in the study included the U.S. Geological Survey and the U.S. Environmental Protection Agency (EPA).

Study findings

- There is widespread occurrence of PFCs at low levels in Washington State surface waters.

What are PFCs?

PFCs are a group of man-made chemicals that include PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate). PFCs persist in the environment, bioaccumulate (build up in the food chain), and have toxic properties. They have the potential to accumulate in humans.

PFCs are used as raw materials in the production of fluoropolymers, which have numerous industrial, and consumer applications. PFCs also are used to produce common products such as non-stick cookware, waterproof and breathable clothing, and stain- and water-repellant coatings.

Why it matters

PFCs have unique chemical properties that are useful for thousands of industrial and manufacturing applications. However, some of these same properties that make them useful also render them persistent, bioaccumulative, and toxic in the environment.

Concern over PFC use has increased due to its detection in a wide range of media including surface water and groundwater, wildlife, humans, ice caps, and precipitation. While EPA has not recommended steps the general population may take to reduce their exposure, EPA has labeled PFOA "likely to be carcinogenic to humans."

- At least one PFC was present in each of the waterbodies tested, including pristine areas.
- The highest levels in surface waters were present in highly urbanized waterbodies and those receiving large amounts of municipal wastewater treatment plant effluent.
- Perfluorooctane sulfonate (PFOS) was the primary PFC detected in fish tissues and osprey eggs.
- A total of 40 percent of fillet samples and 67 percent of liver samples from fish contained quantifiable concentrations of PFOS. PFCs were not detected in fish collected from “background” sites -- pristine sites relatively untouched by human activities (for example, the Quinault River).
- PFOS was also detected in osprey eggs at concentrations higher than surface waters and fish tissues, displaying the bioaccumulative properties of this contaminant. The highest concentrations were found in the Columbia River, below the confluence with the Willamette River.

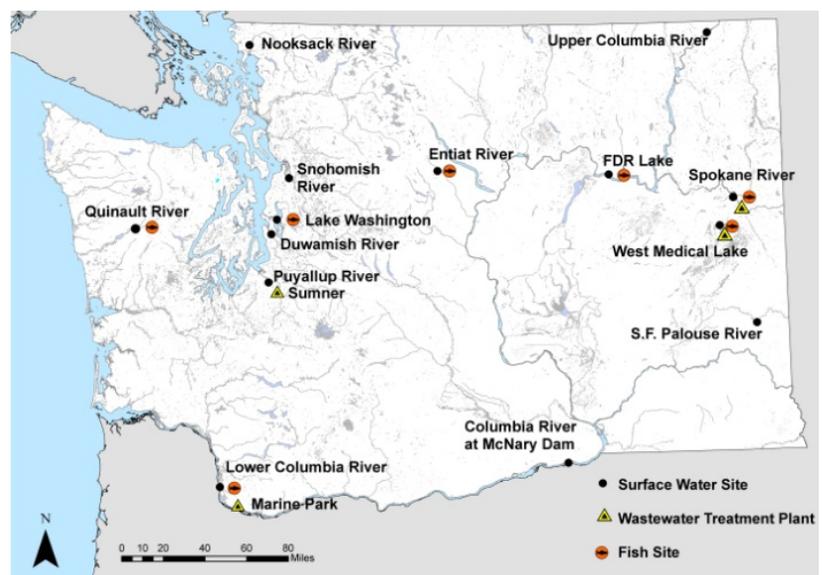
Meaning of the findings

While the study found widespread occurrence of PFCs in Washington, concentrations in all media were generally within or below the range of values recorded at other United States locations. However, the maximum osprey egg concentration was the second highest recorded value in osprey eggs reported in the United States. The data collected indicate that atmospheric deposition and municipal treatment plant discharges appear to be important environmental sources of PFCs in Washington.

Next steps

Ecology is planning to develop a chemical action plan describing efforts that can be undertaken to reduce Washington’s risk from PFCs. Ecology has prepared similar plans for other toxic substances including mercury, PBDEs (flame retardants), and lead.

In 2006, EPA launched the 2010/2015 PFOA Stewardship Program. In the program, companies committed to reducing PFOA by 95 percent from facility emissions and product content by 2010. The companies also committed to work toward eliminating all PFOA emissions and product content by 2015.



State’s PFC sampling locations in 2008

For more information, contact Chad Furl, chad.furl@ecy.wa.gov, 360-407-6060 or Callie Meredith, callie.meredith@ecy.wa.gov, 360-407-6965.

Read *Perfluorinated Compounds in Washington Rivers and Lakes* online at: www.ecy.wa.gov/biblio/1003034.html.

Special accommodations

To ask about the availability of this document in a version for the visually impaired, call the Environmental Assessment Program at 360-407-6764. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.