



ZOO

# RIVER OTTERS OF THE GREEN-DUWAMISH: BIOMONITORS OF ECOLOGICAL HEALTH

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## Why river otters?

North American river otters (*Lontra canadensis*) are native to Washington and present in the Green-Duwamish watershed. Because they are top predators with relatively localized home ranges, river otters are vulnerable to biomagnification of persistent pollutants in aquatic ecosystems. As such, they are also considered potential “biomonitors,” or organisms that integrate information about the health and quality of the environment.

North American river otter (*Lontra canadensis*)



## Why the Green-Duwamish River?

The Lower Duwamish Waterway (LDW) is a Superfund site for which the United States Environmental Protection Agency (EPA) recently approved a plan for remediation. This situation provides a unique opportunity to understand the changes that the LDW will experience.

In its baseline assessment, the EPA selected the river otter as a representative mammal species to evaluate existing contaminant loads. The study determined that PCBs may pose a risk for adverse effects to otters; however, these conclusions were derived from calculations of estimated exposure. To date, there are no published empirical data on pollutant levels in river otters in the Puget Sound region.

## What are we doing?

River otters routinely use conspicuous sites called latrines to urinate, defecate and scent-mark. In summer and fall of 2016, we collected 33 otter scat from seven latrine sites along the banks of the Green-Duwamish River, ranging from river miles 0-55 (Figure 1). We analyzed these scat samples for organic contaminants, including polychlorinated biphenyls (PCBs), using gas chromatography/mass spectrometry.

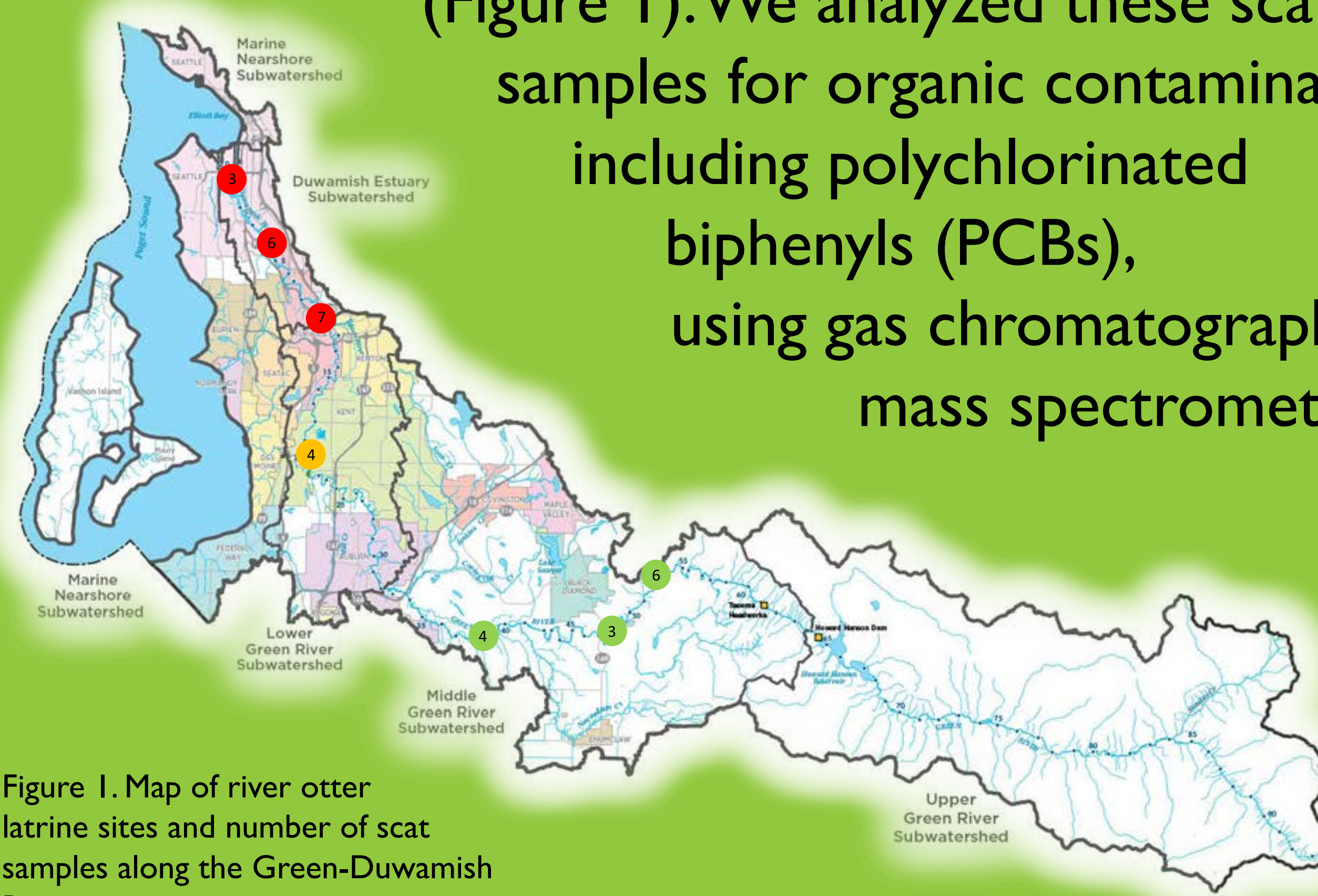


Figure 1. Map of river otter latrine sites and number of scat samples along the Green-Duwamish River. Modified from map produced by KCIT-Natural Resources and Parks; DNRP GIS, Visual Communications & Web Unit.

## What did we find?

At two sites in the Lower Duwamish Waterway (LDW, river miles 0-5), PCB levels were 9.1 and 19.3 mg/kg (geometric means, lipid weights) – above the reported threshold value of 9 mg/kg associated with adverse effects for river otters (Figure 2). By river mile 10, PCB levels dropped to 2.6 mg/kg, with remaining upriver sites ranging from 0.4-1.8 mg/kg. Based on preliminary genetics data, we infer that otters remain in local river reaches, so scat contaminant levels reflect local environmental concentrations.

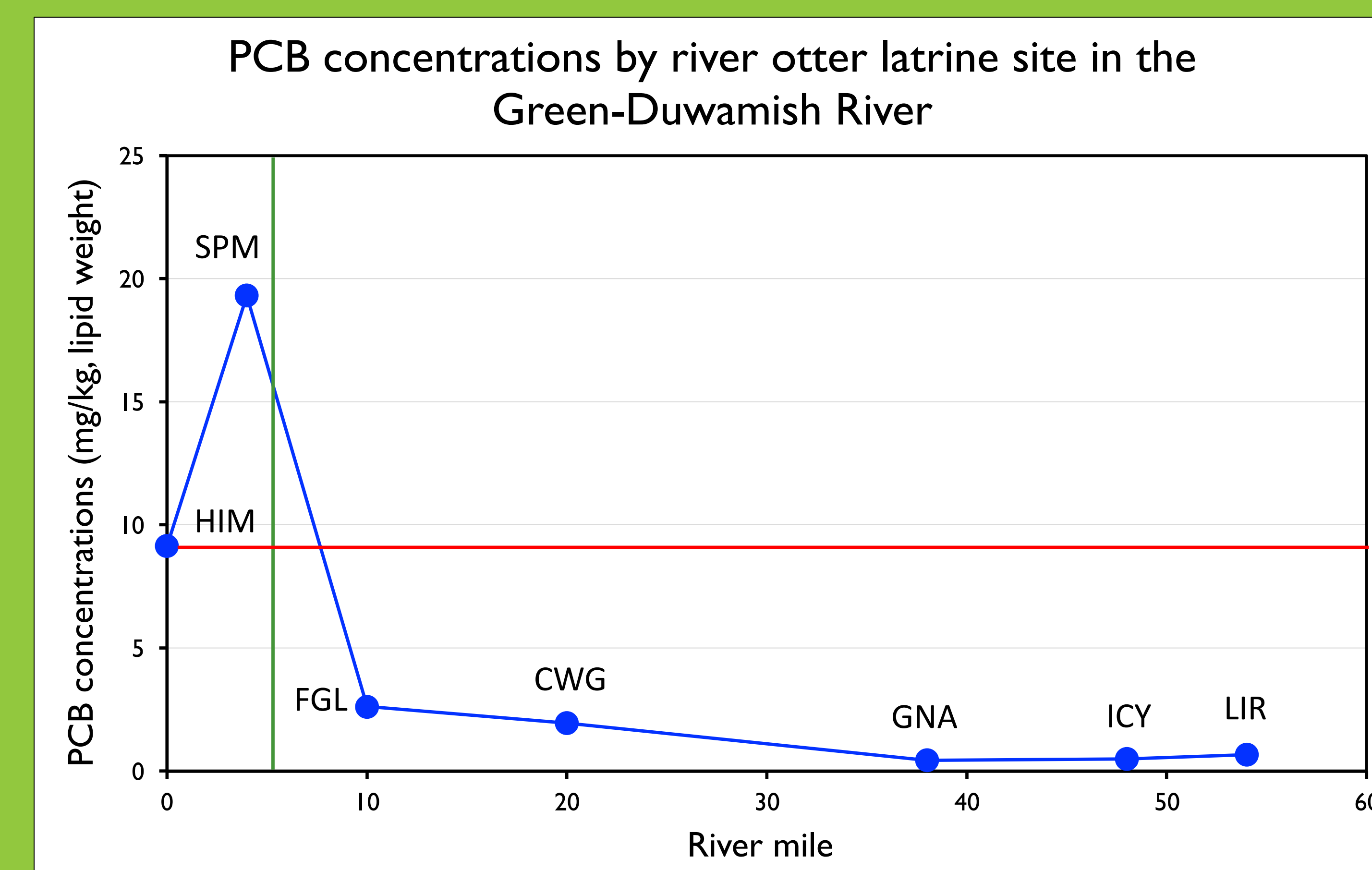


Figure 2. PCB concentrations from river otter scat collected at latrine sites (geometric means, lipid weights) along the Green-Duwamish River. Left of green vertical line represents Lower Duwamish Waterway Superfund site (RM 0-5). Red horizontal line denotes published threshold for adverse effects on river otters.

## What does it mean?

These are the only empirical contaminant data available for a mammal or apex predator in the Green-Duwamish, and they reveal:

- otters may be impacted by contaminant loads in the LDW;
- the contamination gradient along the Green-Duwamish is reflected in otters, indicating they may be useful biomonitors; and
- a baseline level of contamination in otters that may be of great value for assessing ecological impacts of long-term cleanup efforts.

Scat collected in 2017 and analyses for brominated flame retardants, organochlorine pesticides, stable isotopes, and genetics will provide additional depth and breadth to these results. Significant questions remain as to the potential individual health and population impacts of environmental contaminants in this top-level aquatic predator.