



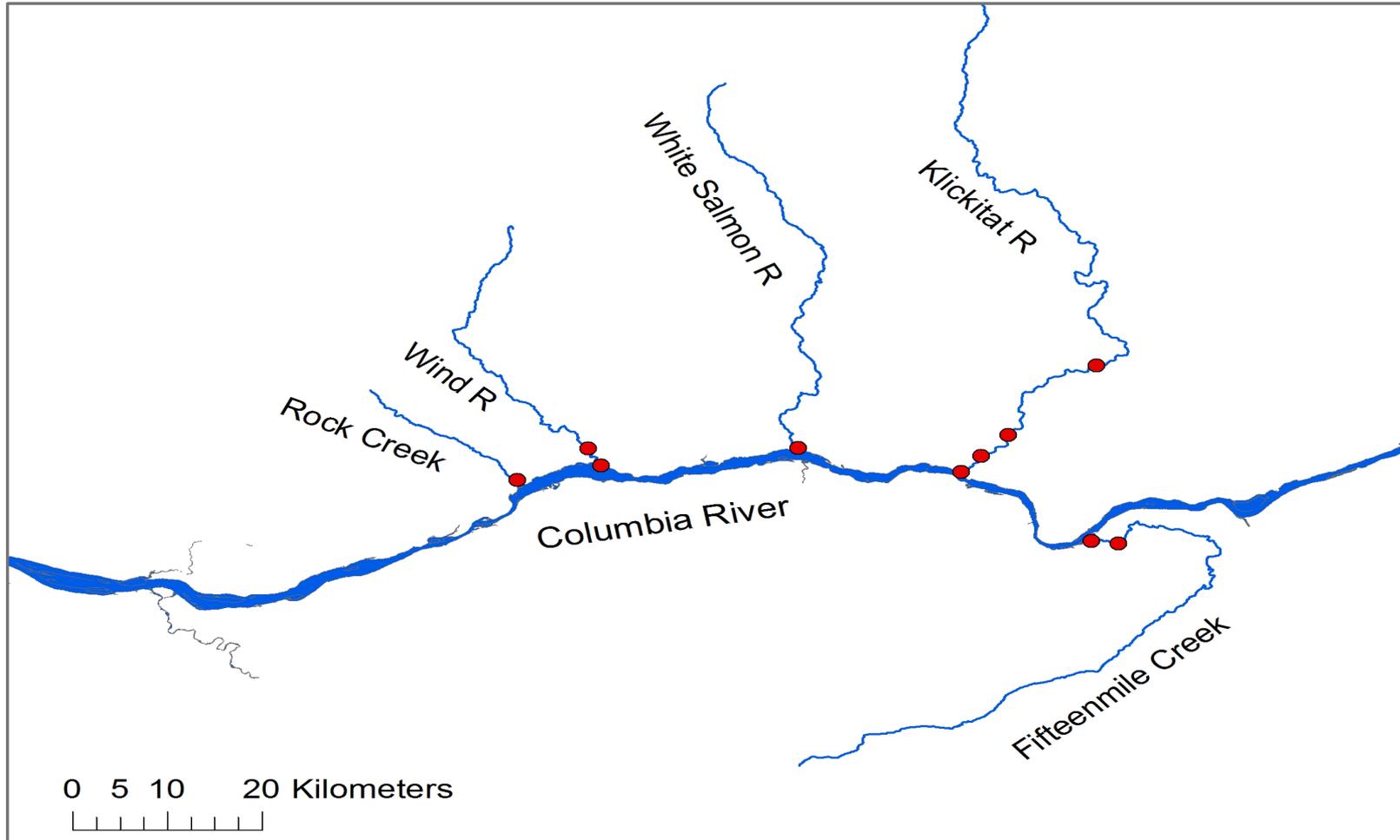
# Mercury Concentrations in Pacific Lamprey and Sediments in the Columbia River Basin

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# Research Objectives

- ▶ Measure Hg concentrations in ammocoetes and adult Pacific Lamprey and sediments among and within multiple streams in the mid Columbia River.
- ▶ Compare these findings to published data from other regions in the US.

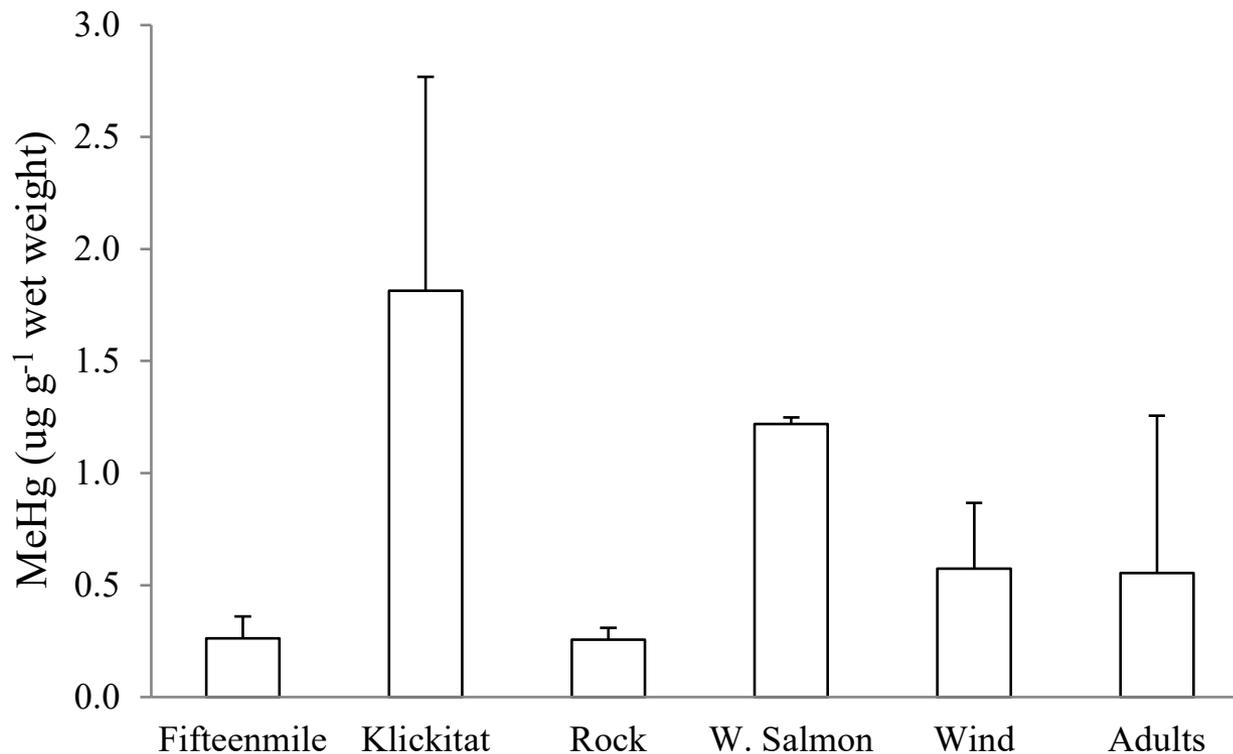
# Sample Collection Locations



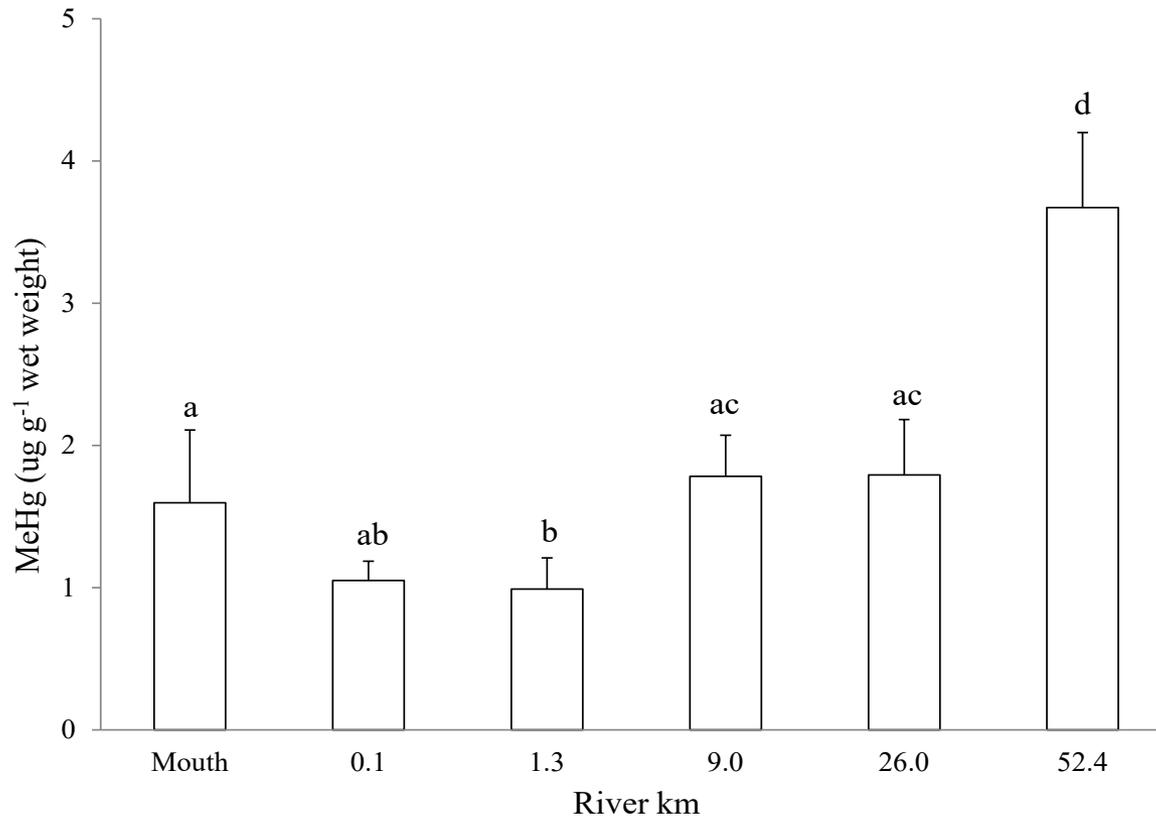
Study streams and sampling locations for larval Pacific lamprey

- ▶ Adult samples collected at Columbia River dams for lamprey recovery projects to obtain additional information on the potential risks for lamprey reproduction and for human health from consumption.
- ▶ Lamprey samples were analyzed at the PNNL Marine Sciences Laboratory in Sequim, for THg and MeHg. Sediment samples were analyzed for THg at PNNL in Richland.
- ▶ Total and MeHg for lamprey were determined by cold vapor atomic fluorescence spectrometry (CVAFS) described in EPA Methods 1631 and 1630.

# Results

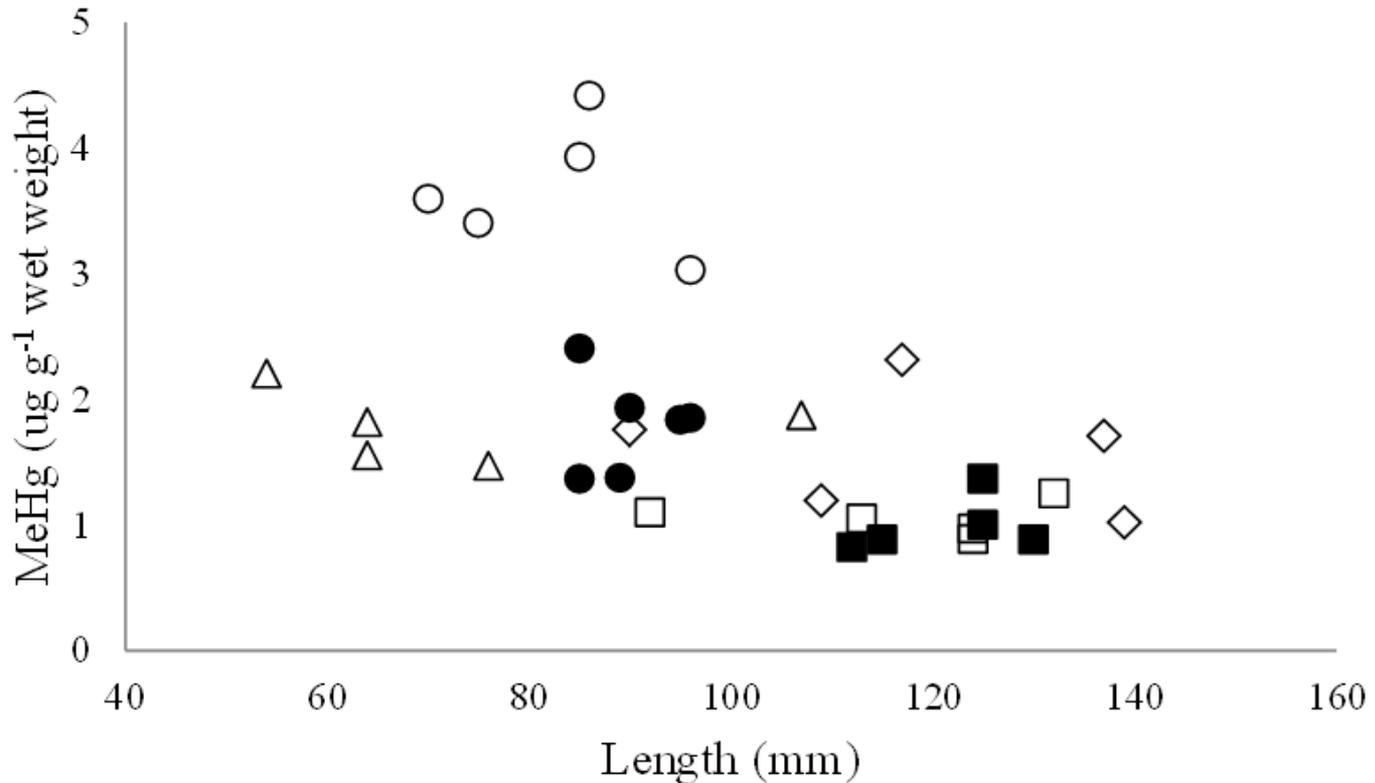


Methyl Hg concentrations in Pacific lamprey ammocoetes and adults from the tributary streams of the mid- Columbia River. Values are means  $\pm$  SD.

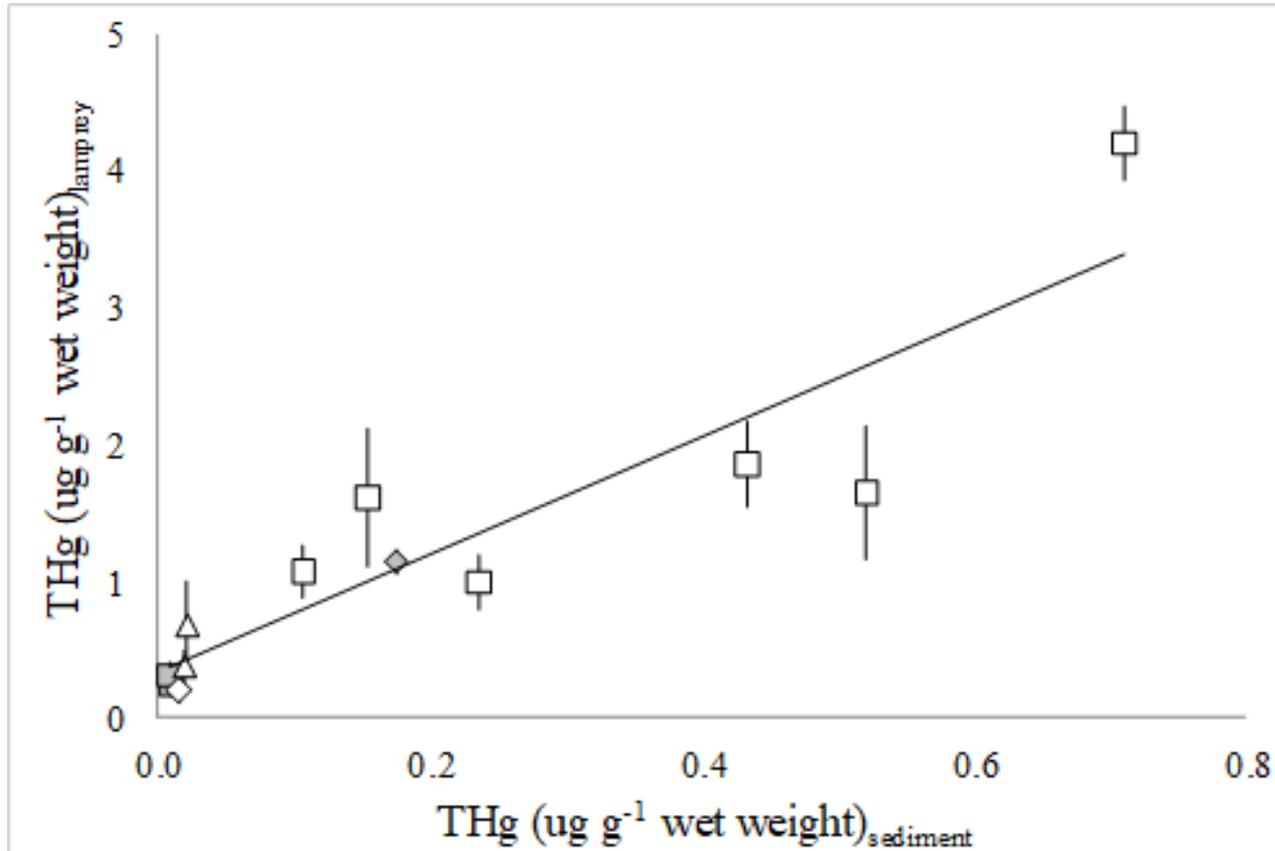


Methyl Hg concentrations in relation to river km for Pacific lamprey ammocoetes in the Klickitat River. Values are means  $\pm$  SD. Values without letters in common are significantly different from each other.

# Results

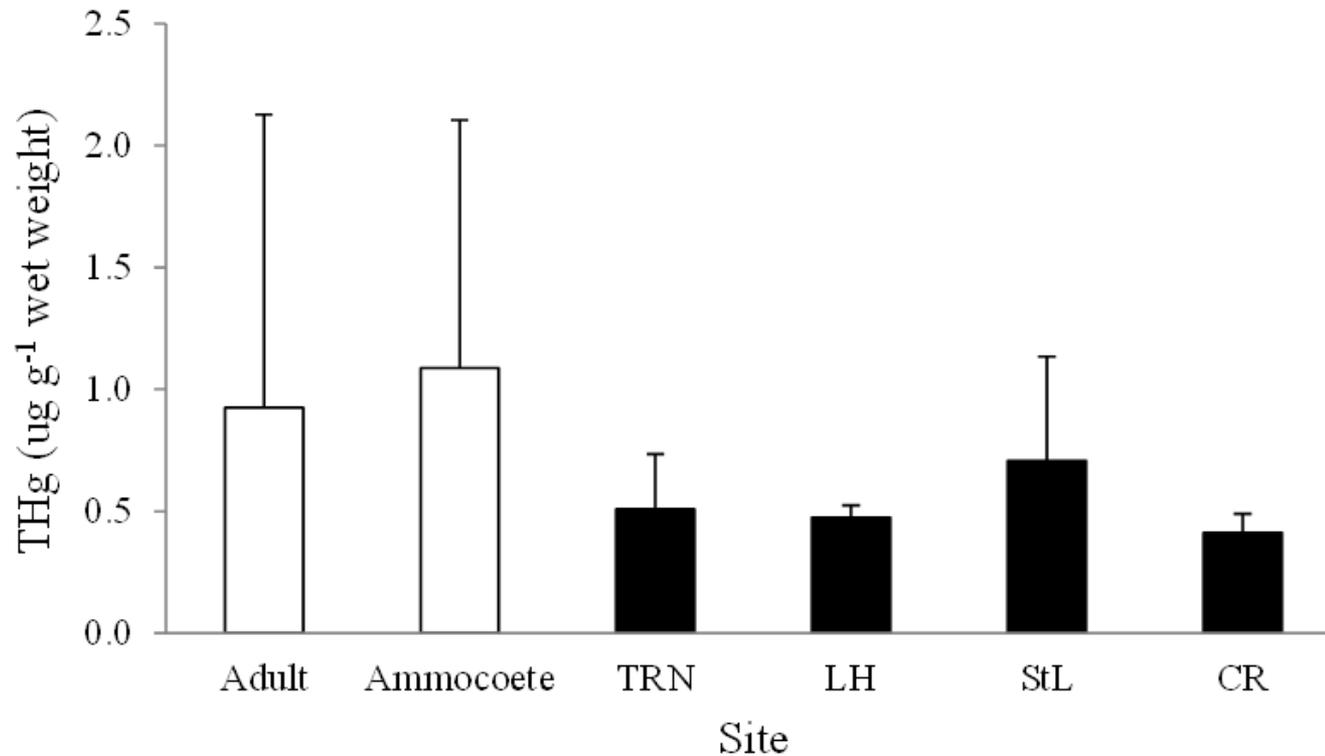


The relationship between length and MeHg concentration in tissue of Pacific lamprey ammocoetes from the Klickitat River. Symbols are river km: mouth ( $\diamond$ ), 0.1 km ( $\square$ ), 1.3 km ( $\blacksquare$ ), 9 km ( $\triangle$ ), 26 km ( $\bullet$ ) and 52 km ( $\circ$ ).



Relationship between sediment THg and tissue in Pacific lamprey ammocoetes. Symbols represent the Klickitat River (open square), Fifteenmile Creek (closed square), Wind River (open triangle), Rock Creek (open diamond) and White Salmon River (closed diamond).

# Results



Total Hg concentrations (mean ± SD) in Pacific lamprey ammocoetes and adults from the mid- Columbia River (open bars) and other North American locations (closed bars). Site designations are: Trinity River, CA, Lake Huron, St. Lawrence River, ON and Connecticut River, MA.

- The lowest mean ( $\pm$  SD) tissue MeHg concentration found in this study was  $0.26 \mu\text{g}\cdot\text{g}^{-1} \pm 0.09$  for ammocoetes collected from Fifteenmile Creek.
- THg concentrations in the Klickitat River sediments were approximately 50 times higher than those of sea lamprey and show a direct relationship with ammocoete THg concentration suggesting that these ammocoetes and those in other tributaries have probably experienced some adverse effects from Hg.
- When compared with other species, Hg concentrations in ammocoetes suggest they may be exposed to lethal and sub-lethal levels of MeHg that could adversely affect recruitment and population recovery.
- High concentrations of MeHg in adults could also have important implications for population recovery. Studies have shown that elevated tissue MeHg can lead to reproductive impairment in fish through multiple mechanisms and may be transgenerational as well.

# Acknowledgements

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