

Fish Health in the Kootenai River and Koocanusa Reservoir



This factsheet uses data found on the United States Water Quality Portal (WQP) to compare selenium concentrations found in fish in the Kootenai River and Koocanusa Reservoir against US Environmental Protection Agency protective criterion.

The WQP is a cooperative service sponsored by the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council.

US EPA water criteria for selenium

The United States Environmental Protection Agency (US EPA) national water quality criteria for selenium consists of four protective elements. The elements listed hierarchically are:

- A fish egg-ripe ovary element
- A fish whole-body and/or muscle element
- A water column element
- A water column intermittent element

The US EPA Technical Support for Implementation of the National Selenium Criterion (October 2021) states that unripe egg/ovary tissue are not representative of selenium concentrations and not appropriate for comparison to the US EPA egg-ovary criterion. Fish ovary samples must be ripe for a meaningful comparison.

Selenium concentrations in fish species compared to US EPA criterion—Kootenai River

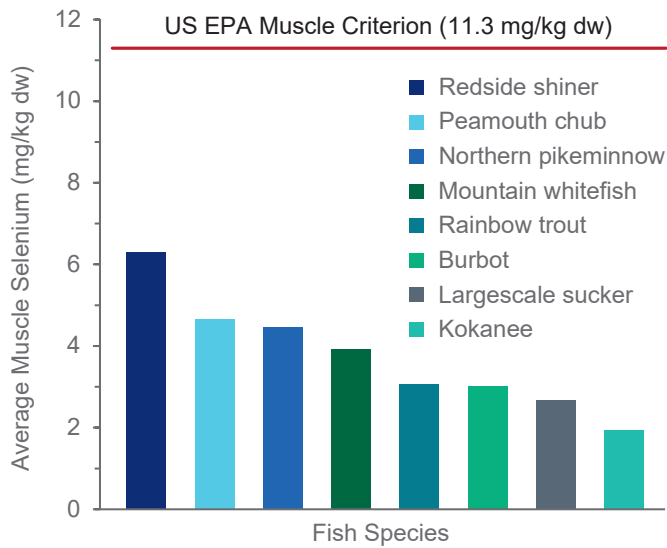
White sturgeon and burbot are species where eggs have been sampled and analyzed from the Kootenai River.

- Average white sturgeon egg selenium concentrations (4.4 mg/kg dw) are approximately **three times lower** than the US EPA protective criterion of 15.1 mg/kg dw for fish eggs.
- Average burbot egg selenium concentrations (8.5 mg/kg dw) are approximately **two times lower** than the US EPA protective criterion of 15.1 mg/kg dw for fish eggs.

Fish tissue muscle data have been collected for thirteen species from the Kootenai River, for which eight have sufficient sample size (i.e., ≥ 5) to compare against the US EPA protective criterion of 11.3 mg/kg dw for fish tissue muscle, see Figure 1.

- Average kokanee muscle selenium concentrations (1.9 mg/kg dw) are approximately **six times lower** than the US EPA protective criterion.
- Average largescale sucker muscle selenium concentrations (2.7 mg/kg dw) are approximately **four times lower** than the US EPA protective criterion and Kootenai River water quality standard.

Figure 1. Average fish tissue muscle selenium concentrations in the Kootenai River are below US EPA muscle protective criterion.



Note: Data presented herein are available from the Water Quality Portal www.waterqualitydata.us

- Average **burbot** muscle selenium concentrations (3.0 mg/kg dw) are approximately **four times lower** than the US EPA protective criterion.
- Average **rainbow trout** muscle selenium concentrations (3.0 mg/kg dw) are approximately **four times lower** than the US EPA protective criterion.

- Average **mountain whitefish** muscle selenium concentrations (3.9 mg/kg dw) are approximately **three times lower** than the US EPA protective criterion.
- Average **northern pikeminnow** muscle selenium concentrations (4.5 mg/kg dw) are approximately **three times lower** than the US EPA protective criterion.
- Average **peamouth chub** muscle selenium concentrations (4.7 mg/kg dw) are approximately **two times lower** than the US EPA protective criterion.
- Average **redside shiner** muscle selenium concentrations (6.3 mg/kg dw) are approximately **two times lower** than the US EPA protective criterion.

Fish tissue whole body data have been collected for eight species from the Kootenai River, for which three species have sufficient sample size (i.e., ≥ 5) to compare against the US EPA whole body criterion and Kootenai River water quality standard of 8.5 mg/kg dw.

- Average **burbot** whole body selenium concentrations (3.7 mg/kg dw) are approximately **two times lower** than the US EPA protective criterion.
- Average **slimy sculpin** whole body selenium concentrations (5.4 mg/kg dw) are **1.6× lower** than the US EPA protective criterion.
- Average **redside shiner** whole body selenium concentrations (5.9 mg/kg dw) are **1.4× lower** than the US EPA protective criterion.



Selenium concentrations in fish species compared to US EPA criterion—Kooacanusa Reservoir

Fish tissue muscle data have been collected for 14 species from Kooacanusa Reservoir, for which 13 have sufficient sample size (i.e., ≥ 5) to compare against the US EPA muscle criterion. Average muscle selenium concentrations for fish within Kooacanusa Reservoir are 1.5 to 6.0 times lower than the US EPA protective criterion of 11.3 mg/kg dw, see Figure 2.

Fish tissue whole body data have been collected for three species from Kooacanusa Reservoir and have sufficient sample sizes (i.e., ≥ 5) to compare against the US EPA whole body criterion of 8.5 mg/kg dw.

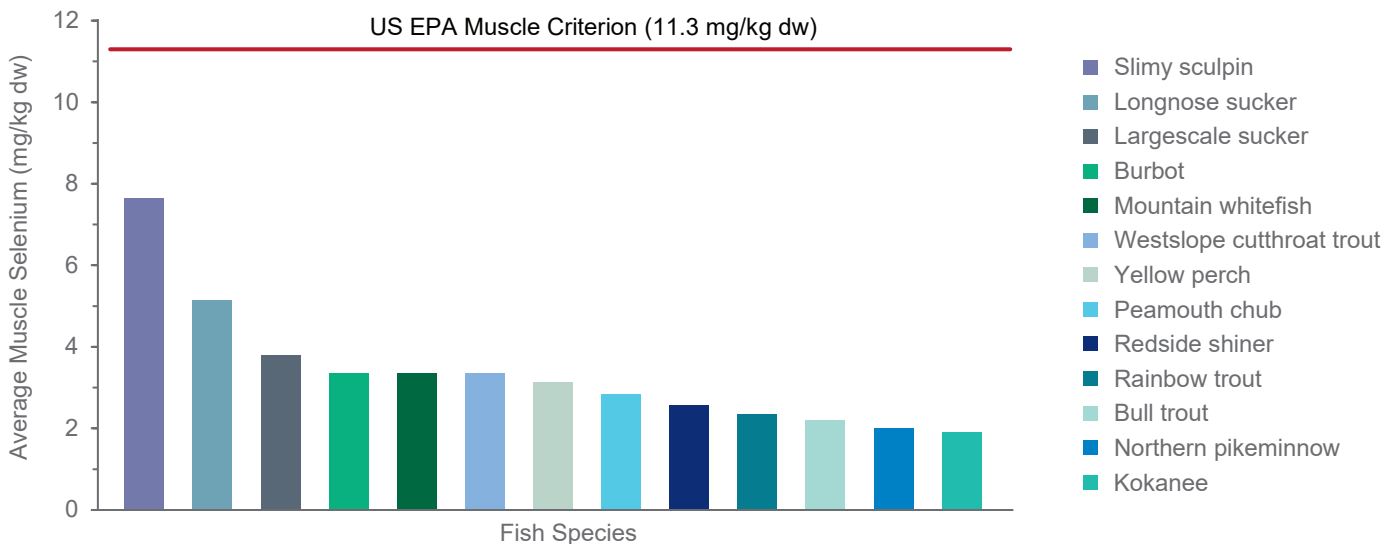
- Average **northern pikeminnow** whole body selenium concentrations (0.9 mg/kg dw) are approximately **nine times lower** than the US EPA protective criterion.
- Average **peamouth chub** whole body selenium concentrations (2.6 mg/kg dw) are approximately **three times lower** than the US EPA protective criterion.
- Average **redside shiner** whole body selenium concentrations (3.6 mg/kg dw) are approximately **two times lower** than the US EPA protective criterion.



The only fish species for which egg selenium concentrations have been determined in Kooacanusa Reservoir is for northern pikeminnow.

- Average **northern pikeminnow** egg selenium concentrations (2.3 mg/kg dw) are approximately **six and half times lower** than the US EPA protective criterion (15.1 mg/kg).

Figure 2. Average fish tissue muscle selenium concentrations in Kooacanusa Reservoir are below US EPA protective criterion.



Note: Data presented herein are available from the Water Quality Portal www.waterqualitydata.us

References

- US EPA (United State Environmental Protection Agency). 2021. Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion Draft. Office of Water EPA 823-D-21-002. October 2021.
- US EPA. 2021. 2021 Revision to: Aquatic life ambient water quality criterion for selenium – Freshwater 2016, Office of Water, Washington, D.C., USA. EPA 822-R-21-006.
- US EPA. 2016. Aquatic life ambient water quality criterion for selenium – Freshwater 2016, Office of Water, Washington, D.C., USA. EPA 822-R-16-006.