



# Idaho DEQ

KOOTENAI/MOYIE WATERSHED ADVISORY GROUP

MAY 3<sup>RD</sup>, 2023

# Agenda

1. INTRODUCTIONS
2. SELENIUM IN THE KOOTENAI RIVER
3. KOOTENAI/MOYIE TRIBUTARY TEMPERATURE LOGGER DISCUSSION
4. NEXT MEETING DATE AND AGENDA ITEMS
5. OPEN DISCUSSION
6. ADJOURN

# Introductions

TODD HIGENS

WATERSHED ANALYST, IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

MAY 3<sup>RD</sup>, 2023



# Selenium

# Selenium

- ▶ Naturally occurring metal in very small trace amounts
- ▶ Essential for aquatic life in trace amounts
- ▶ Very toxic to wildlife in elevated concentrations
- ▶ <https://storymaps.arcgis.com/stories/5c8c3b33b1d04adc8157a04455e7eca1>



Deformed cutthroat trout in lake Kookanusa, photo courtesy of the USGS

# Current Impairment Status for the Kootenai River

- ▶ Two Kootenai River Assessment Units are 303d listed as “Not supporting” for the Cold-Water Aquatic Life Beneficial Use. Selenium was listed as a pollutant based on USGS and Kootenai Tribe of Idaho egg/ovary selenium data.
- ▶ ID17010104PN031\_08 - Idaho/Montana to Moyie River
- ▶ ID17010104PN029\_08 – Moyie River to Deep Creek
- ▶ <https://mapcase.deq.idaho.gov/wq2022/default.html>

# Idaho Selenium Water Quality Standard

I. Chronic				Short-term	
Egg-Ovary (mg/kg dw)	Fish Tissue (mg/kg dw)		Water Column (µg/L)		Water Column (µg/L)
Egg-Ovary	Whole-Body	Muscle	Water Lentic	Water Lotic	Water
15.1 <sup>1</sup>	8.5 <sup>2</sup>	11.3 <sup>2</sup>	1.5 (30 day average) <sup>3</sup>	3.1 (30 day average) <sup>3</sup>	Intermittent Exposure Equation <sup>3,4</sup>
mg/kg dw – milligrams per kilogram dry weight, µg/L – micrograms per liter					
<p>1. Egg-ovary supersedes any whole-body, muscle, or water column element when fish egg-ovary concentrations are measured. Single measurement of an average or composite sample of at least five (5) individuals of the same species. Not to be exceeded; DEQ will evaluate all representative egg-ovary data to determine compliance with this criterion element.</p> <p>2. Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured. Single measurement of an average or composite sample of at least five (5) individuals of the same species where the smallest individual is no less than seventy-five percent (75%) of the total length (size) of the largest individual. Not to be exceeded; DEQ will evaluate all representative whole body or muscle data to determine compliance with this criterion element.</p> <p>3. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. Water column values are the applicable criterion element in the absence of steady-state condition fish tissue data. In fishless waters, selenium concentrations in fish from the nearest downstream waters may be used to assess compliance using methods provided in <a href="#">Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater, EPA-822-R-16-006, Appendix K: Translation of a Selenium Fish Tissue Criterion Element to a Site-Specific Water Column Value (June 2016)</a>.</p> <p>4. Intermittent Exposure Equation=</p> $\frac{WQC - C_{bkgnd}(1 - f_{int})}{f_{int}}$ <p>where WQC is the applicable water column element, for either lentic or lotic waters; <math>C_{bkgnd}</math> is the average background selenium concentration, and <math>f_{int}</math> is the fraction of any 30-day period during which elevated selenium concentrations occur, with <math>f_{int}</math> assigned a value <math>\geq 0.033</math> (corresponding to one day).</p> <p>m. There is no specific acute criterion for aquatic life; however, the aquatic life criterion is based on chronic effects of the selenium on aquatic life and is expected to adequately protect against acute effects.</p>					

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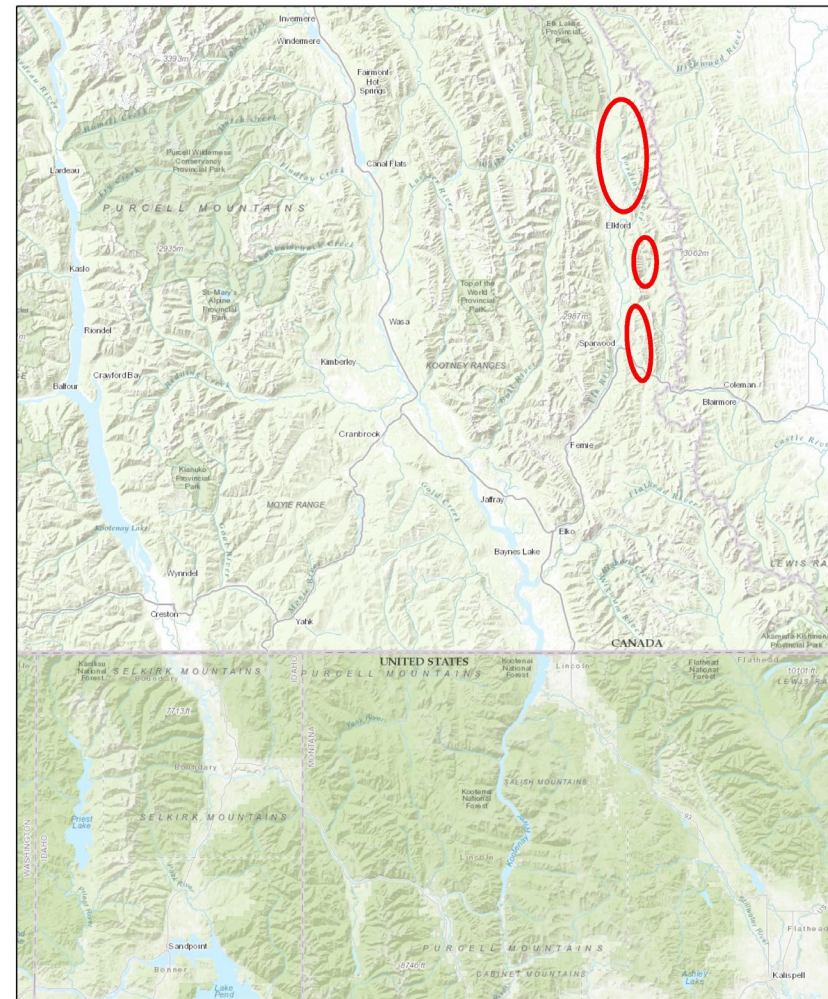


# Source of the Selenium

- ▶ The selenium pollution is a byproduct of coal mining in Canada
  - ▶ Elk River, British Columbia
  - ▶ Elevated Selenium concentrations have been observed in the Kootenai and Columbia River systems
  - ▶ Affects British Columbia, Montana, Idaho, Washington and the Confederated Salish and Kootenai Tribes
- 
- ▶ <https://storymaps.arcgis.com/stories/5c8c3b33b1d04adc8157a04455e7eca1>

# Source of the Selenium

Elk Valley Mines



0 12.5 25 50 75 100 Miles

# Source of the Selenium

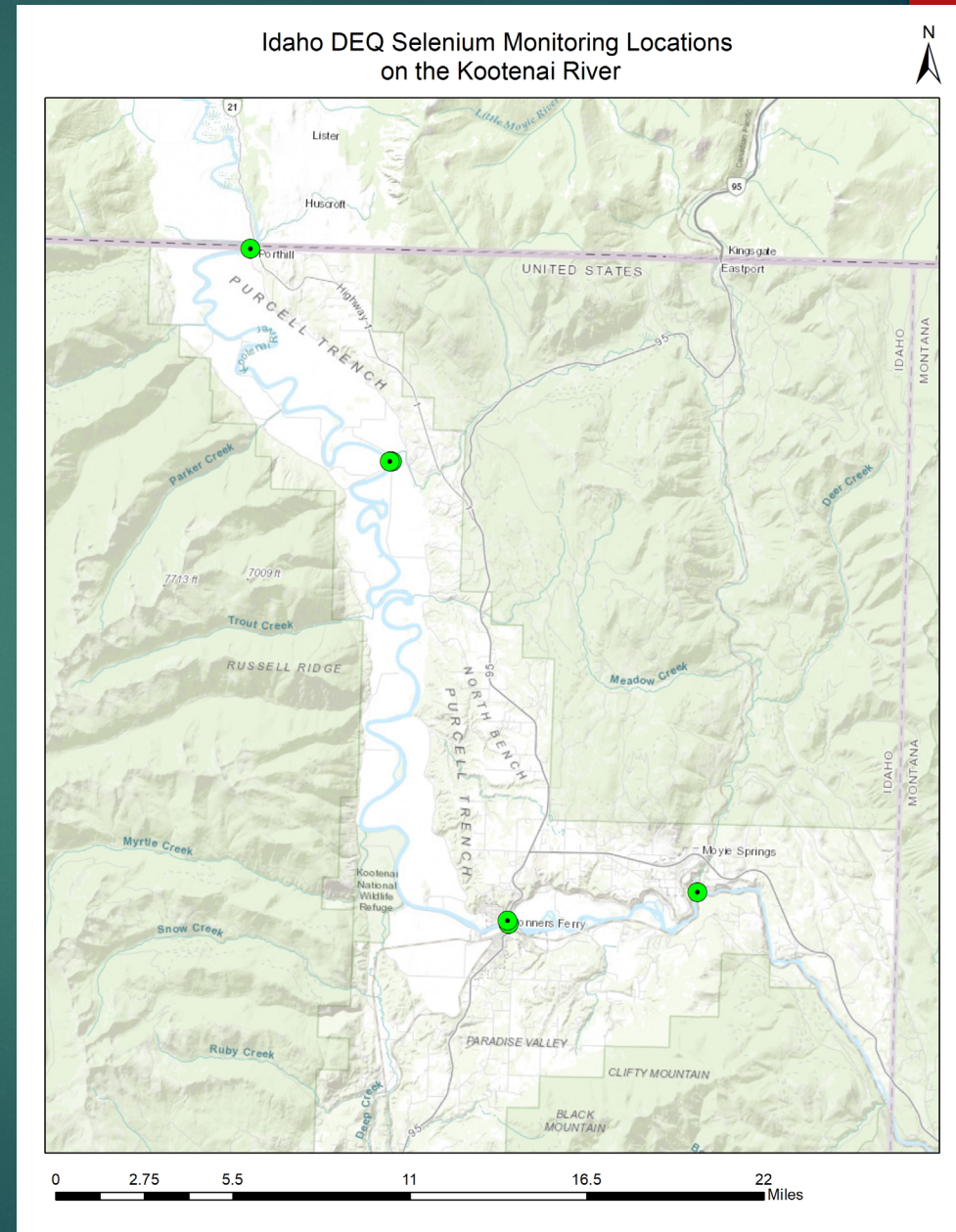
Teck Coal Mine Pit



0 1 2 4 6 8 Miles

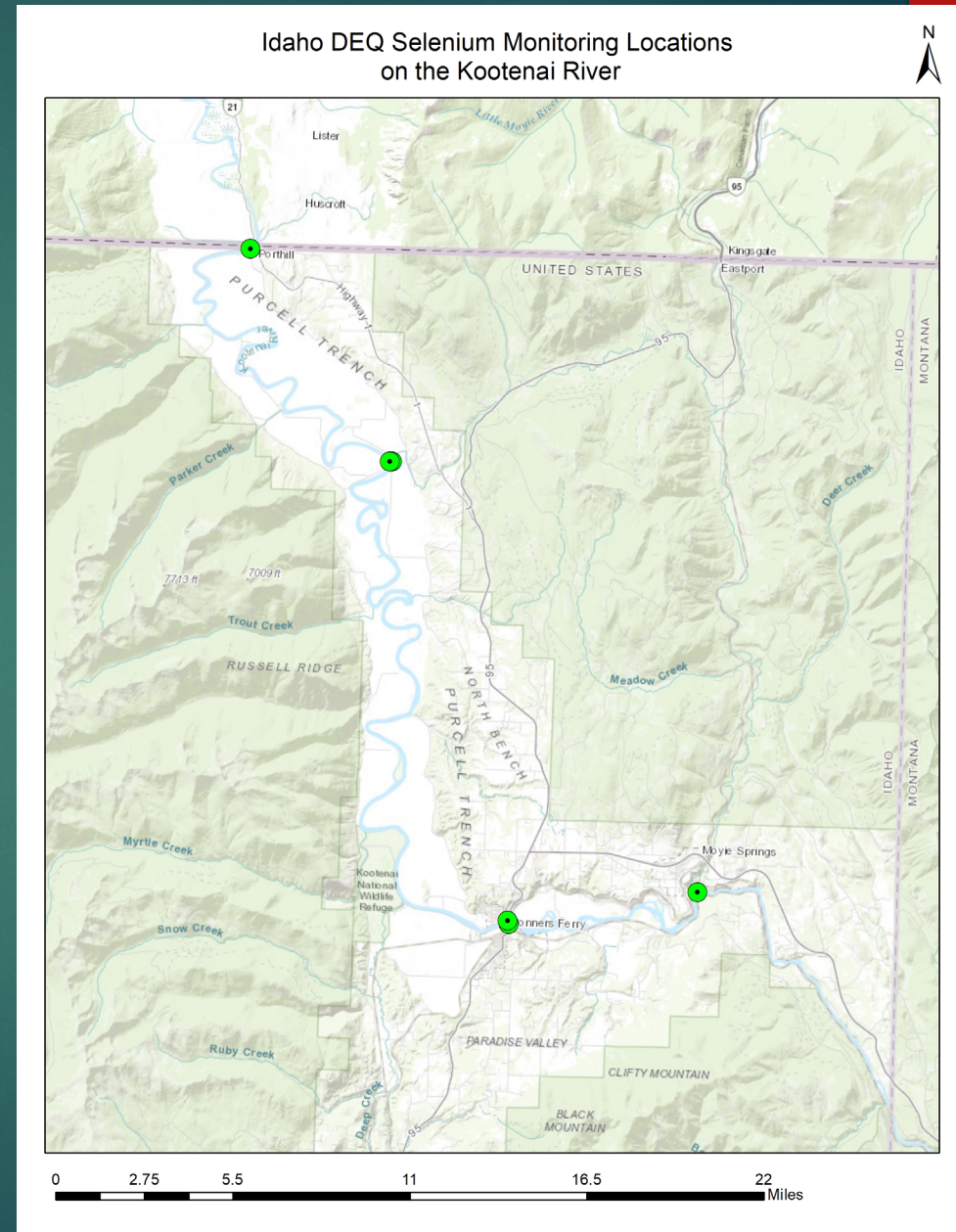
# Idaho DEQ Kootenai River Se Monitoring Sites

- ▶ Twin Rivers Boat Launch
- ▶ Bonners Ferry Bridge South
- ▶ Bonners Ferry Bridge North
- ▶ Copeland Bridge
- ▶ Copeland Boat Launch
- ▶ Porthill Boat Launch



# Idaho DEQ Kootenai River Se Monitoring Sites (cont.)

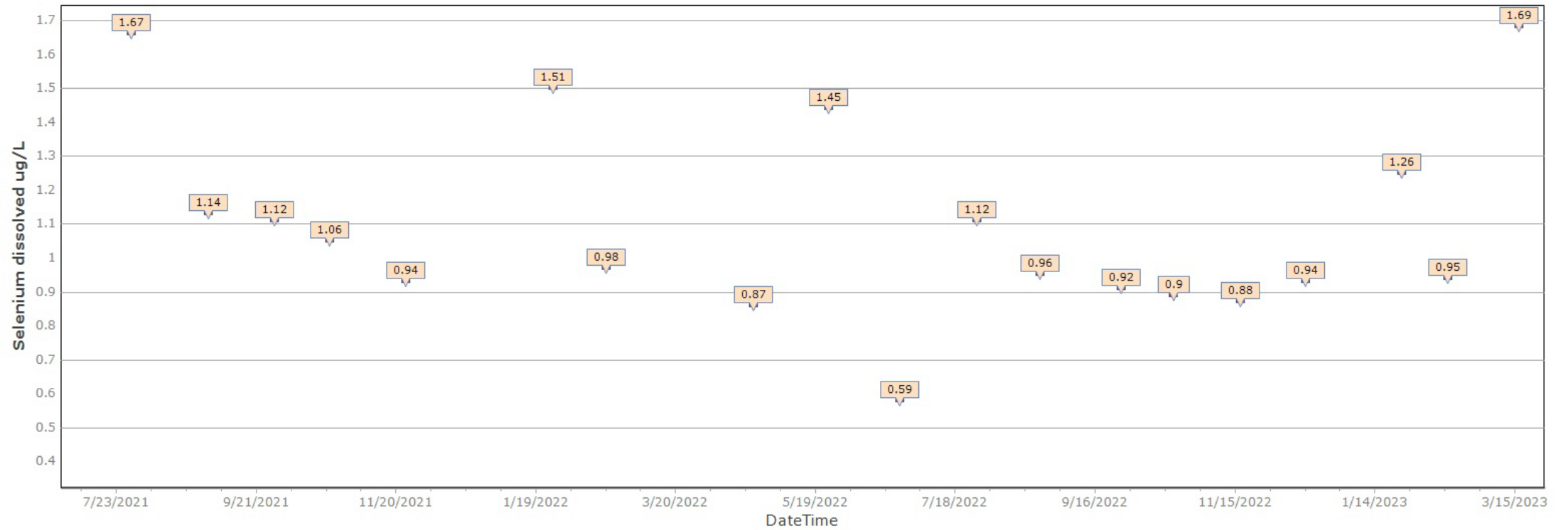
- ▶ Covered under a DEQ Quality Assurance Project Plan (QAPP)
- ▶ Take samples once a month
- ▶ Dissolved selenium 0.45 um filter
- ▶ Temp, conductivity, pH, DO and turbidity



# Twin Rivers

Twin Rivers Selenium

■ Selenium dissolved ug/L



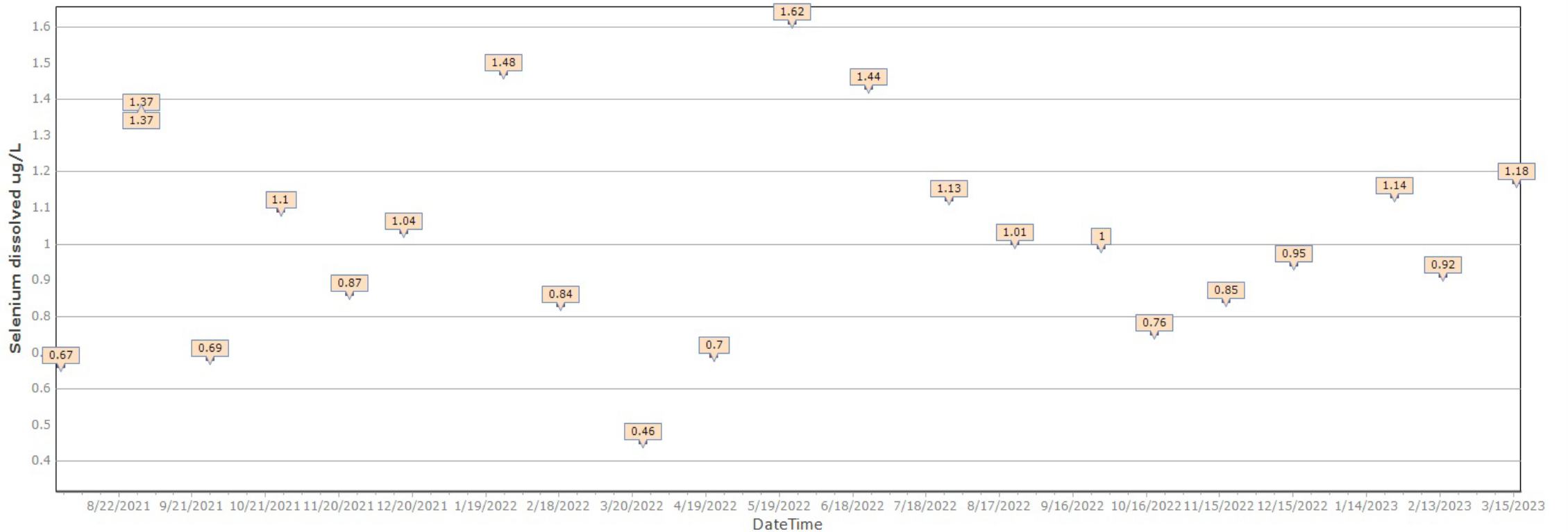
# Twin Rivers



# Bonnars Ferry Bridge South

Bonnars Ferry Bridge South Selenium

■ Selenium dissolved ug/L





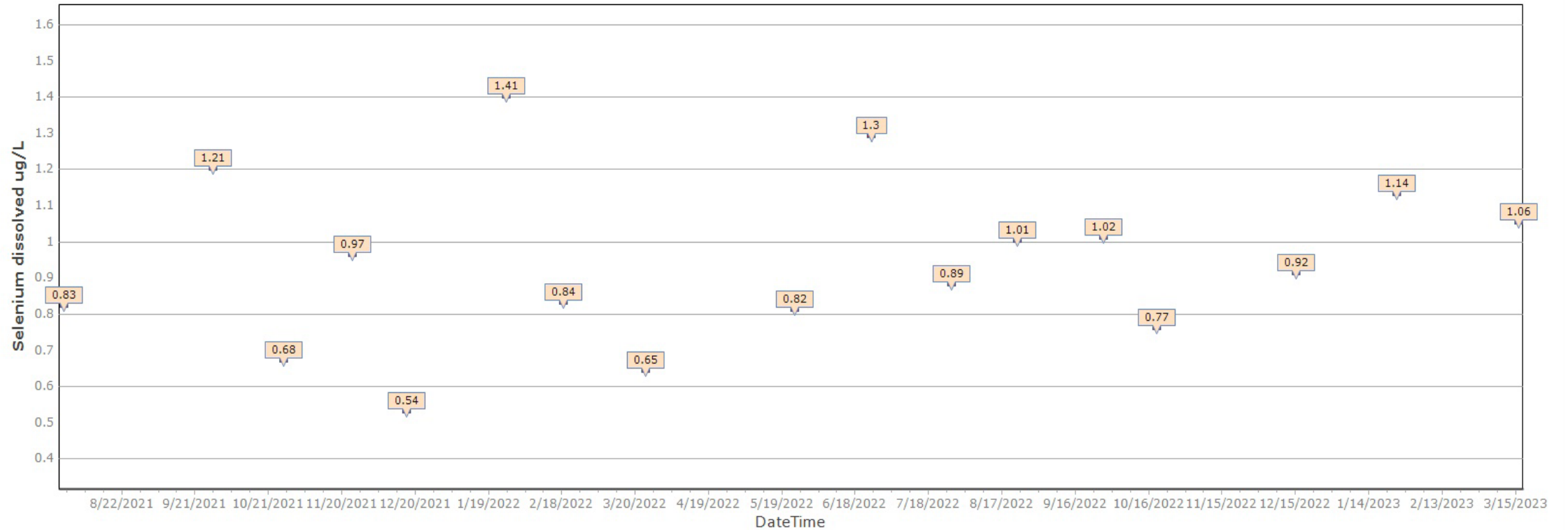
# Bonnars Ferry



# Bonnerr's Ferry Bridge North

Bonnerr's Ferry Bridge North Selenium

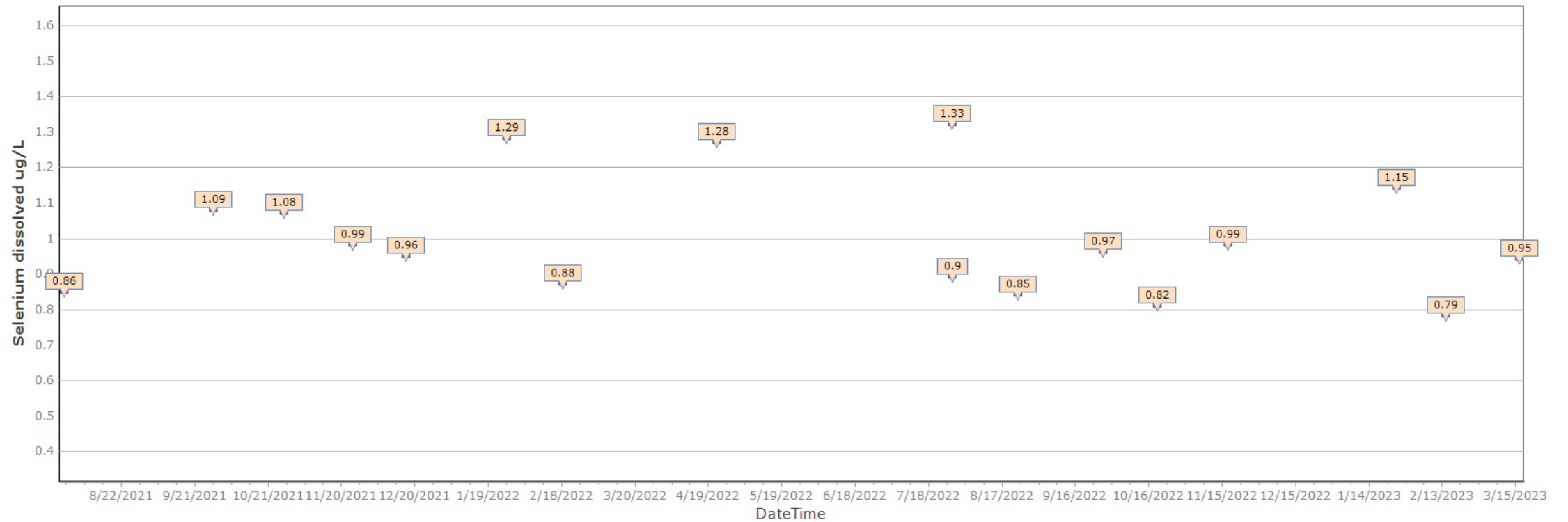
■ Selenium dissolved ug/L



# Copeland Bridge

Copeland Bridge Selenium

■ Selenium dissolved ug/L

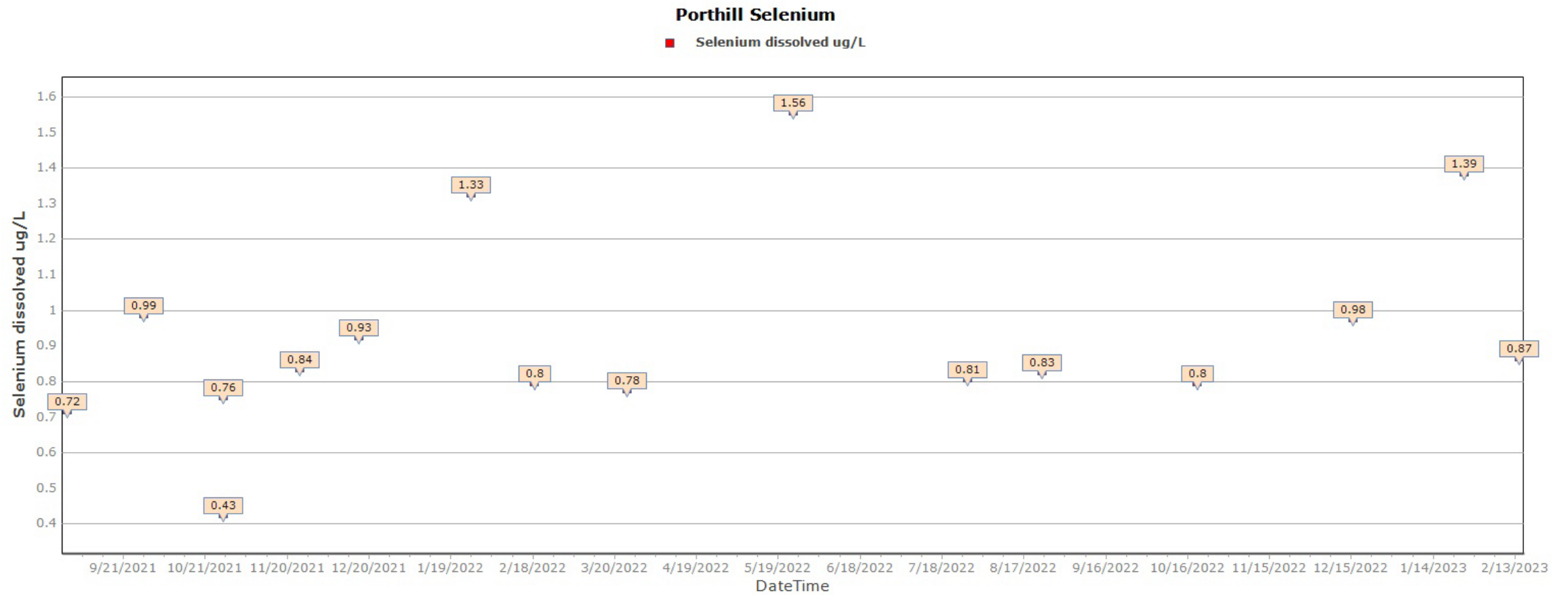


# Copeland



*T. A. Hagens Photography*

# Porthill Dock

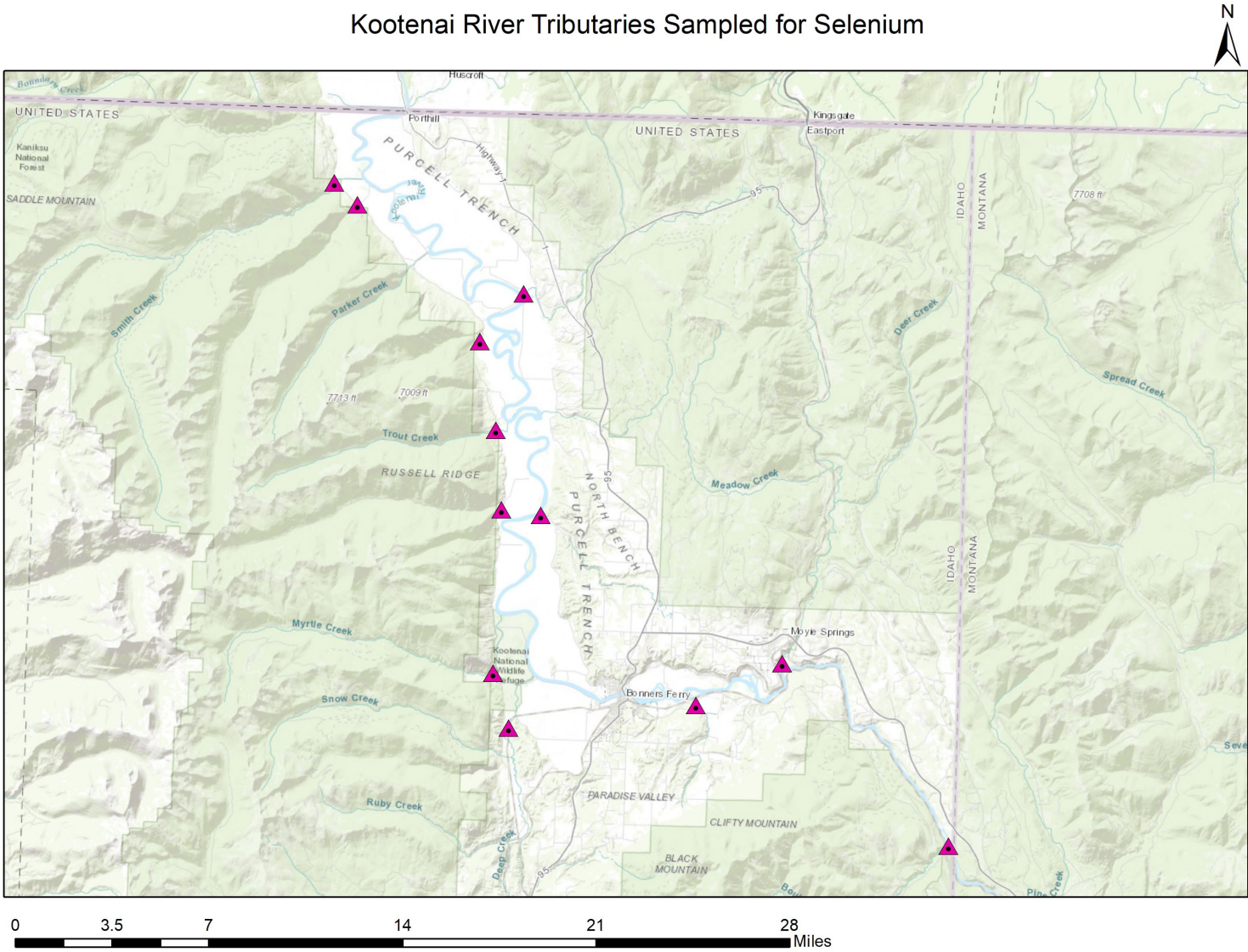


# Kootenai River Tributary monitoring

- ▶ Some parties have alleged that the geology in Idaho is the source of Selenium
- ▶ Selenium data for the tributaries will be needed for a future Total Maximum Daily Load

# Kootenai River Tributary Monitoring

Kootenai River Tributaries Sampled for Selenium



# Tributary Monitoring Results

- ▶ As of this date, we have dissolved selenium results above the laboratory Detection Limit (DL) of 0.5 - ug/L.



Stream	Date	Time	Se dissolved ug/L
Deep Creek	7/29/2021	1:30:00 PM	<0.5
Smith Creek	8/31/2021	11:00:00 AM	<0.5
Myrtle Creek	9/28/2021	1:25:00 PM	<0.43
Mission Creek	10/27/2021	12:10:00 PM	<0.5
Deep Creek	10/27/2021	1:25:00 PM	<0.43
Long Canyon Creek	11/24/2021	12:10:00 PM	<0.5
Fisher Creek	12/16/2021	11:45:00 AM	<0.5
Trout Creek	12/16/2021	12:15:00 PM	<0.5
Cow Creek	1/26/2022	1:20:00 PM	<0.3
Ball Creek	1/26/2022	1:30:00 PM	<0.3
Mission Creek	2/18/2022	11:45:00 AM	<0.5
Boulder Creek	3/23/2022	8:45:00 AM	<0.3
Deep Creek	7/27/2022	1:15:00 PM	<0.3
Myrtle Creek	10/19/2022	11:40:00 AM	<0.3
Boundary Creek	11/17/2022	11:17:00 AM	<0.3
Smith Creek	11/17/2022	12:10:00 PM	<0.3
Fisher Creek	1/25/2023	9:55:00 AM	<0.3
Mission Creek	2/14/2023	10:50:00 AM	<0.5
Moyie River	3/24/2022	10:30:00 AM	<0.3
Moyie River	1/25/2023	12:05:00 PM	<0.3
Moyie River	2/14/2023	9:15:00 AM	<0.5
Moyie River	3/16/2023	9:35:00 AM	<0.5
Moyie River Dam	4/20/2023	8:30:00 AM	<0.5

# Tributary Monitoring Results

# Temperature Loggers?

- ▶ Current status?
- ▶ Are more loggers needed?
- ▶ Are there any specific streams I need to look at for de-listing for temperature or sediment?

▶ <https://storymaps.arcgis.com/stories/f8d2ebacf8e343998c762436d1ad775d>

# Open Discussion

- ▶ Any old or new concerns?

# Next Meeting date?

- ▶ When should we meet again and what should we discuss?