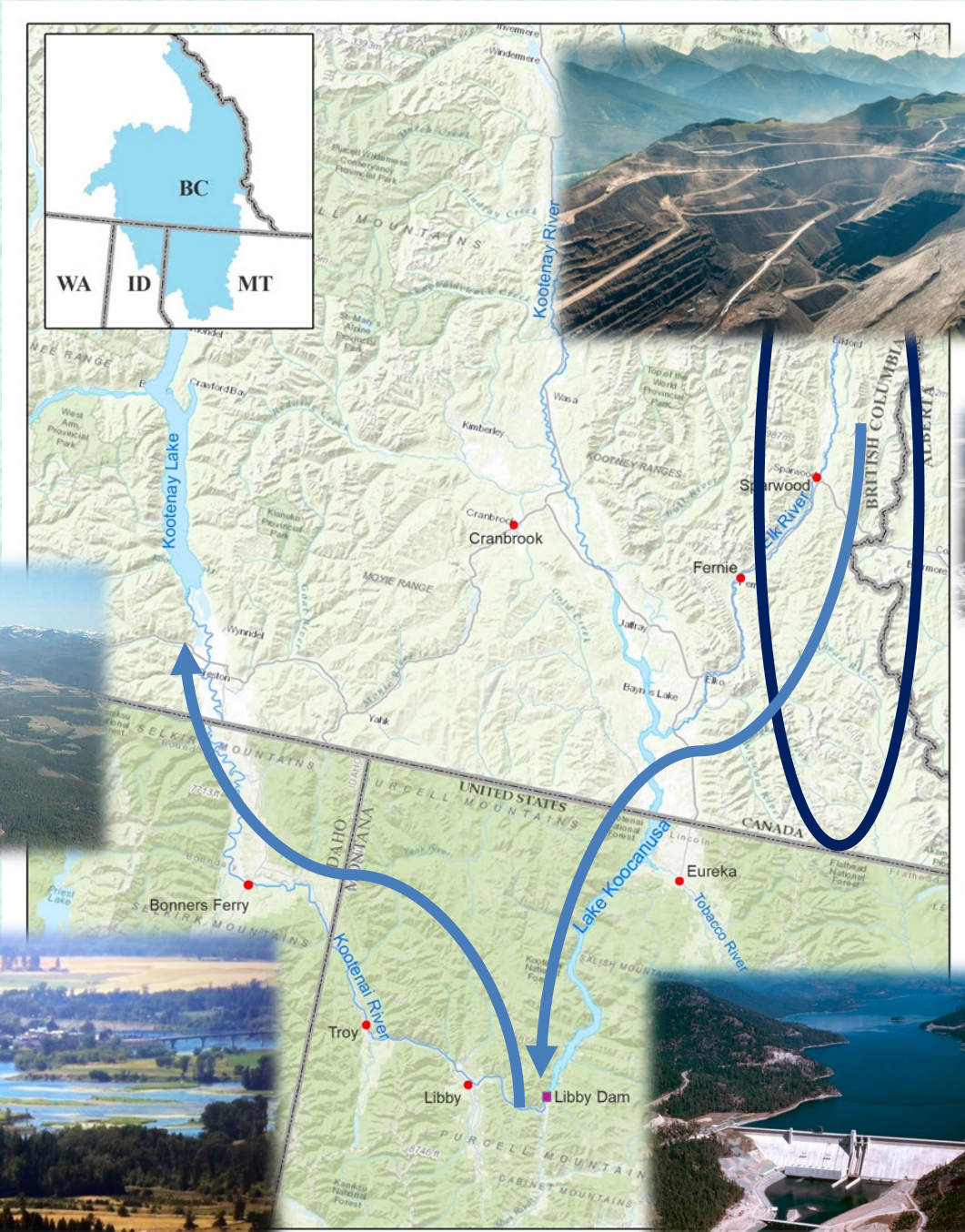


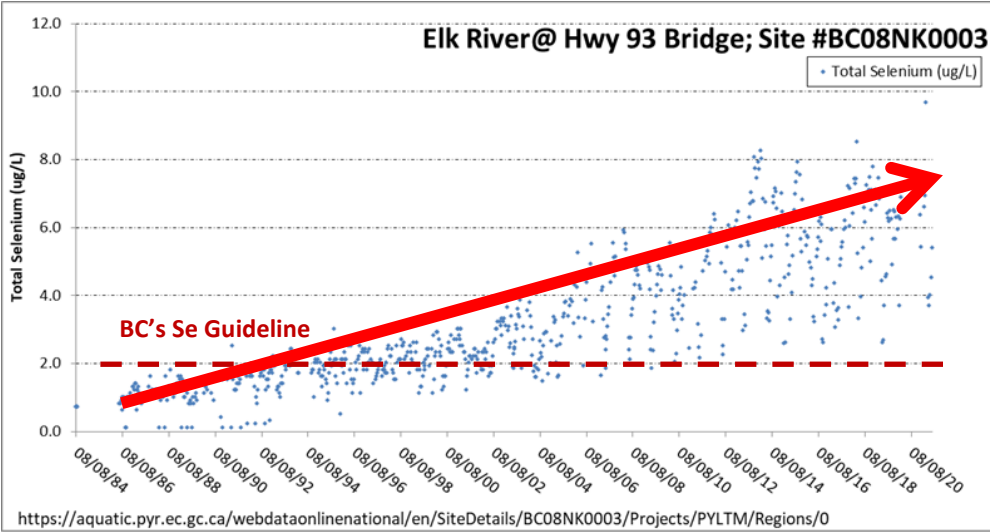
# Elk River Valley Mining



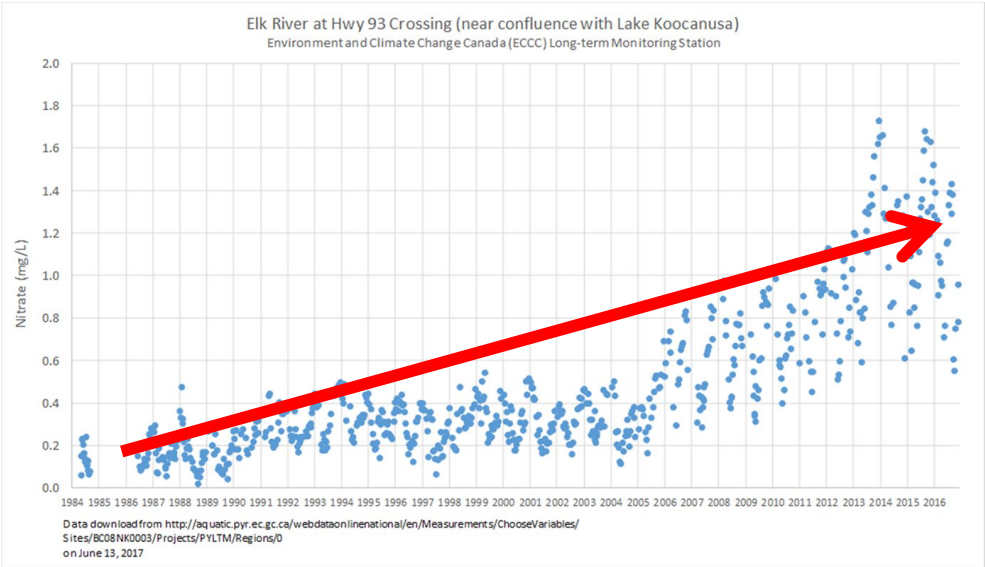
[https://thenarwhal.ca/teck-resources-selenium-fight-montana/?fbclid=IwAR3sXyqZCCucUW4Lio\\_DygXrP\\_Z4umdMfLP5lFFeGqjD5UaKAv6tXwFNXM](https://thenarwhal.ca/teck-resources-selenium-fight-montana/?fbclid=IwAR3sXyqZCCucUW4Lio_DygXrP_Z4umdMfLP5lFFeGqjD5UaKAv6tXwFNXM)

# Let's Talk Water.....

## Water Chemistry – Selenium Increasing



## Water Chemistry – Nitrogen Increasing



# Background — EPA Recommended Criteria

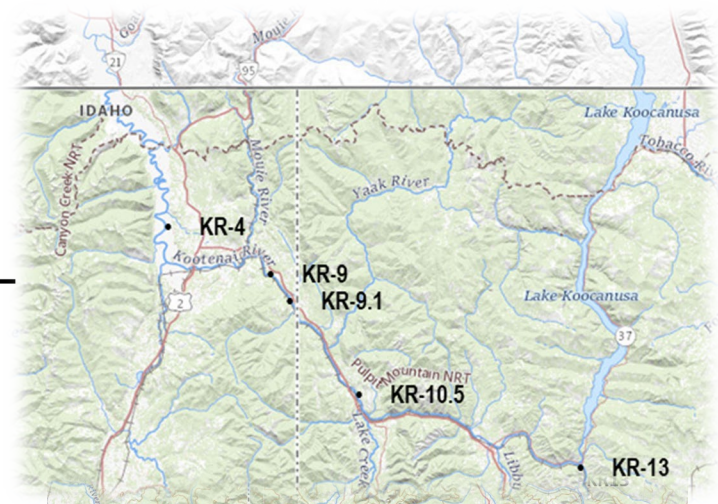
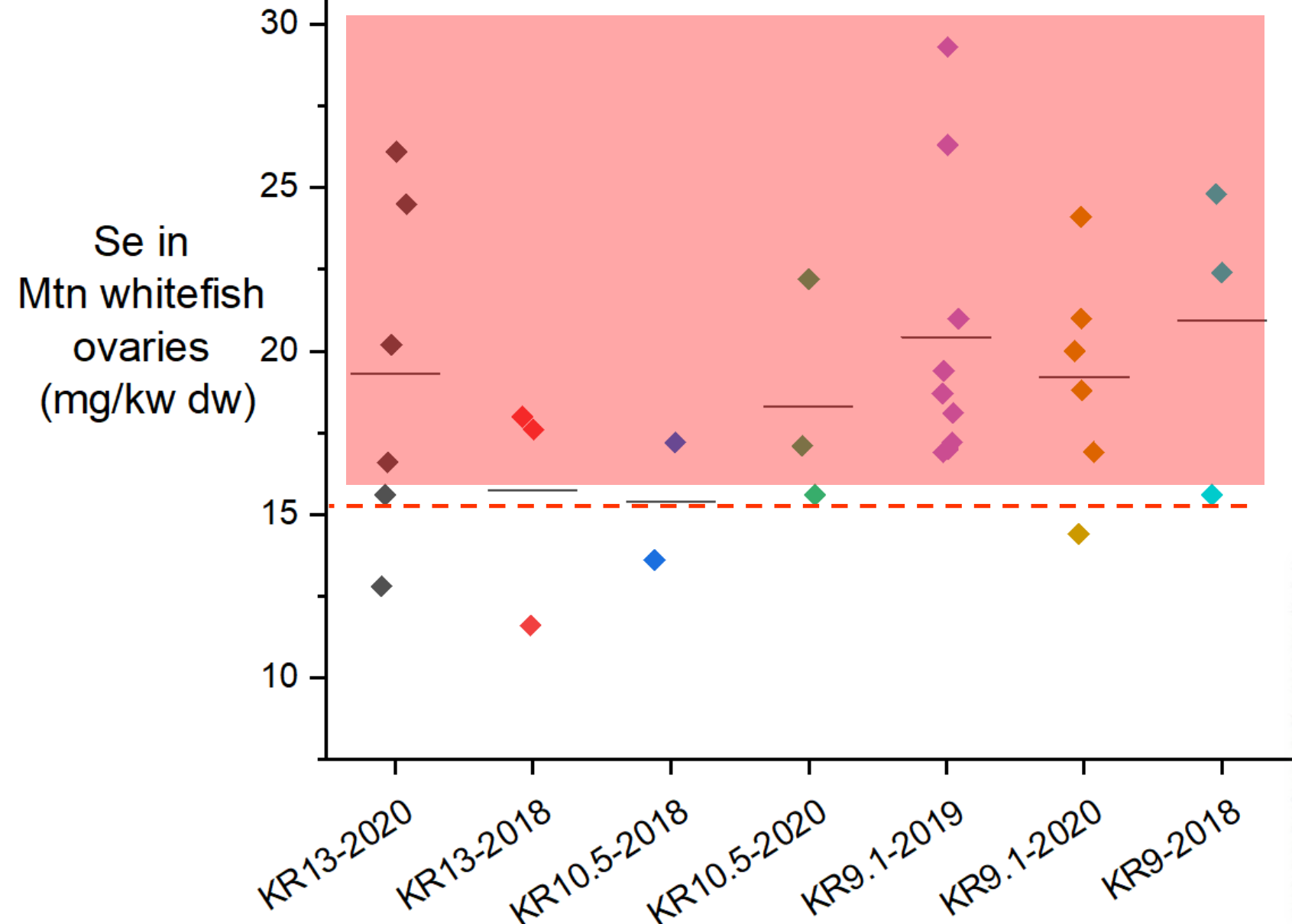
Criterion Version	Egg-Ovary <sup>1</sup> [mg/kg dw]	Chronic				Short-term
		Whole Body <sup>1</sup> [mg/kg dw]	Muscle <sup>1</sup> [mg/kg dw]	Water Lentic <sup>1</sup> [µg/L]	Water Lotic <sup>1</sup> [µg/L]	Water <sup>1</sup> [µg/L]
2016 Selenium Criterion	15.1	★ 8.5	11.3	1.5 (30 day)	3.1 (30 day)	Intermittent exposure equation
1999 Selenium Criteria	N/A	N/A	N/A	5 (4 day)	5 (4 day)	Acute Equation based on water column concentration

\*EPA 2016 Selenium Fact Sheet; EPA 822-F-16-00

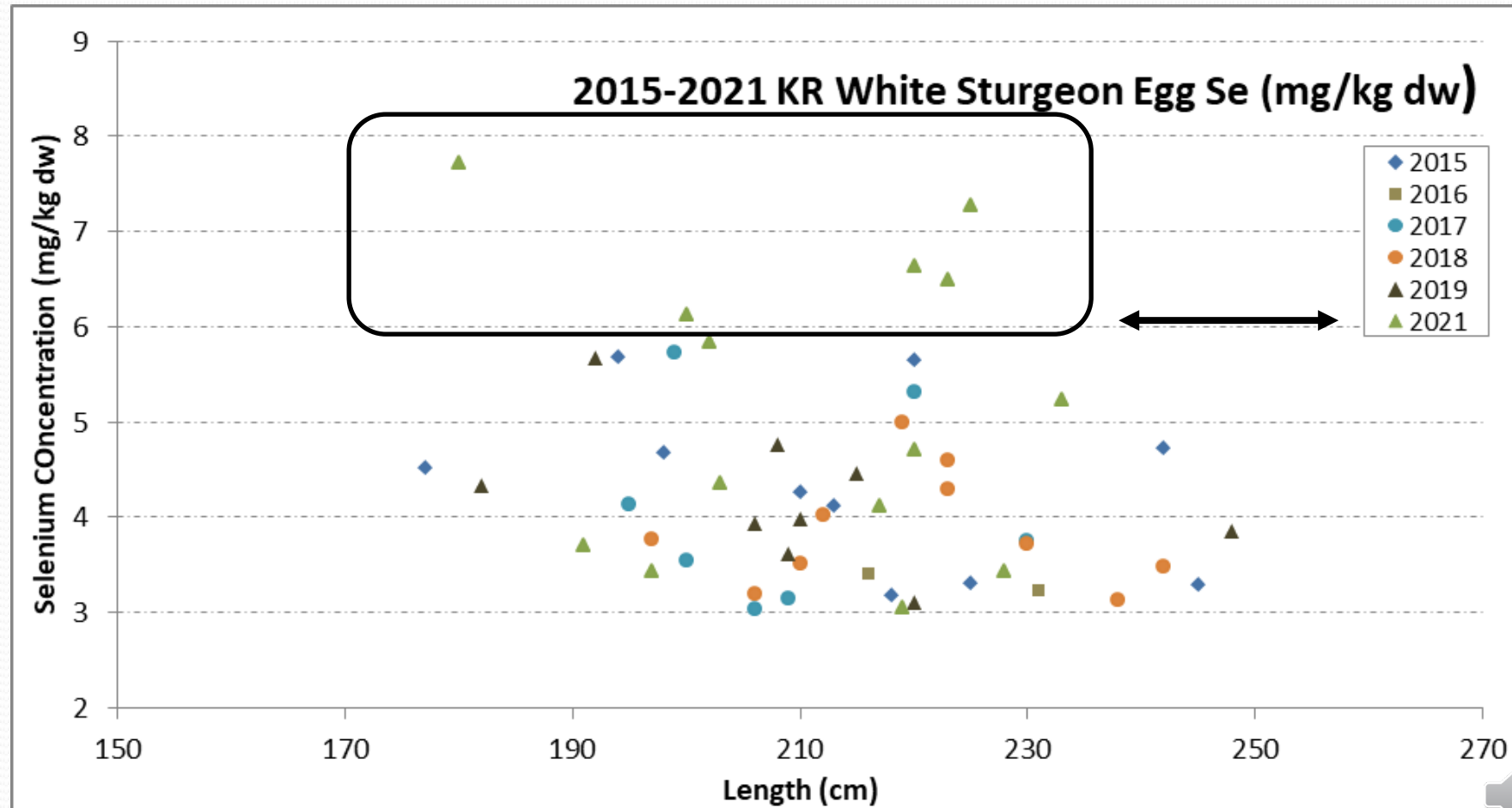


# Mountain Whitefish eggs & ovary tissue exceed EPA & states' regulatory criteria (dashed red line).

*Provisional data & slide provided courtesy of USGS.*



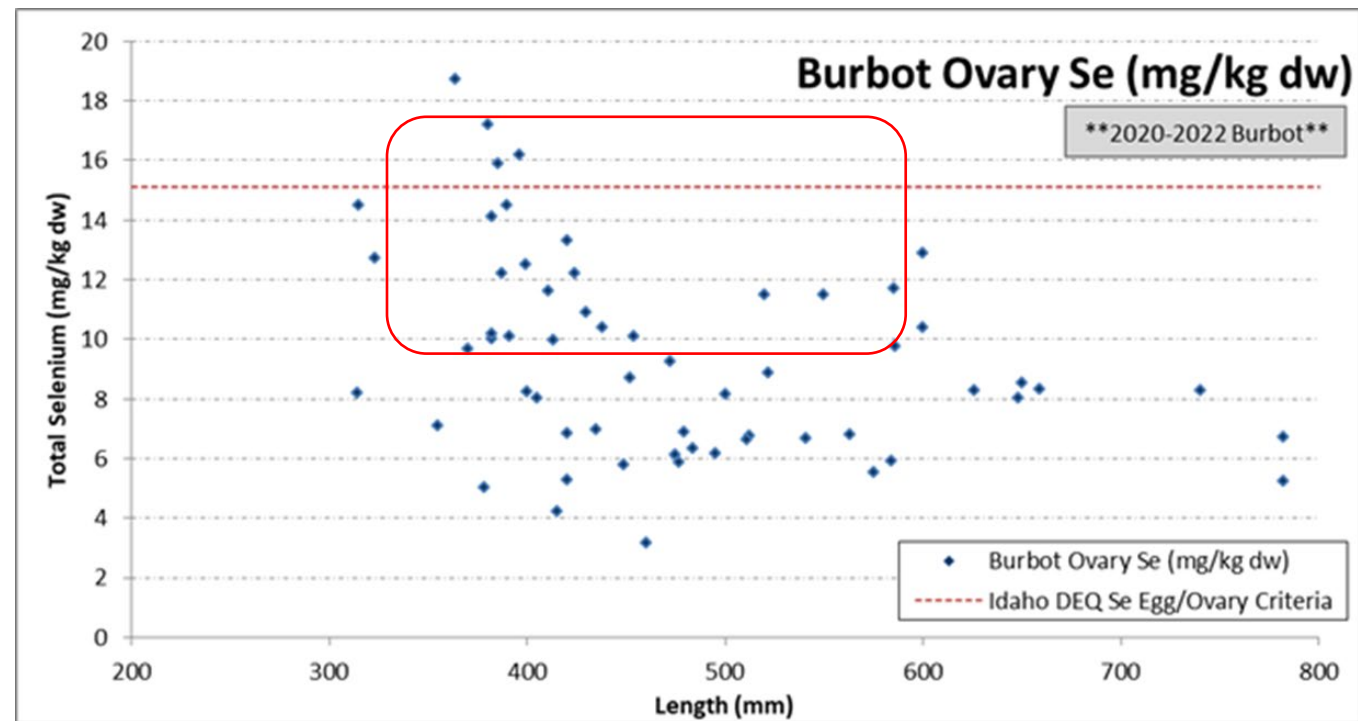
# KR White Sturgeon





# NOT-SO-FUN FACTS

## Burbot – Egg Selenium

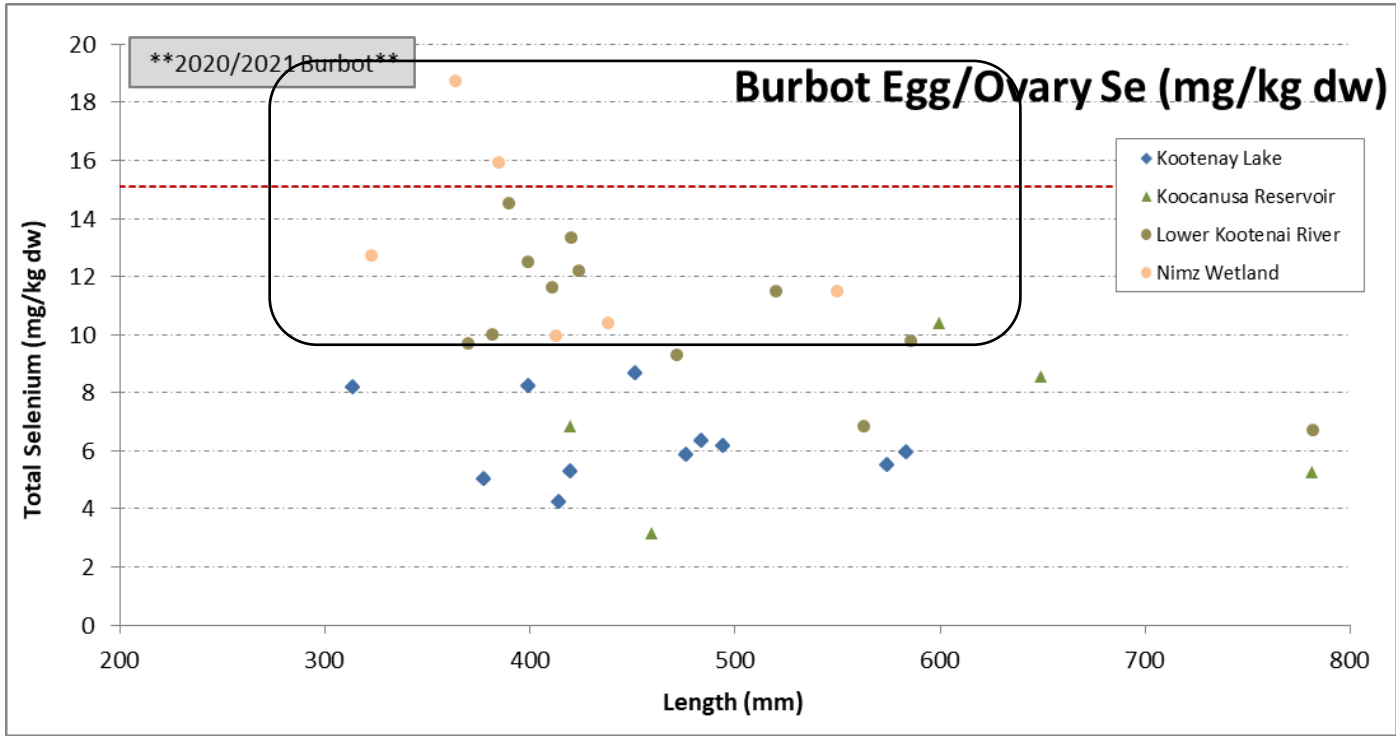


- Burbot egg Se concentrations are increasing; and some females' eggs exceed protective criteria.
- Burbot sensitivity to metals isn't known due to lack of interest in the species historically. At present, Burbot are gaining deserved respect.
- KTOI has study plans; yet again, no funding to conduct the studies.



# NOT-SO-FUN FACTS

## Burbot – Egg Selenium

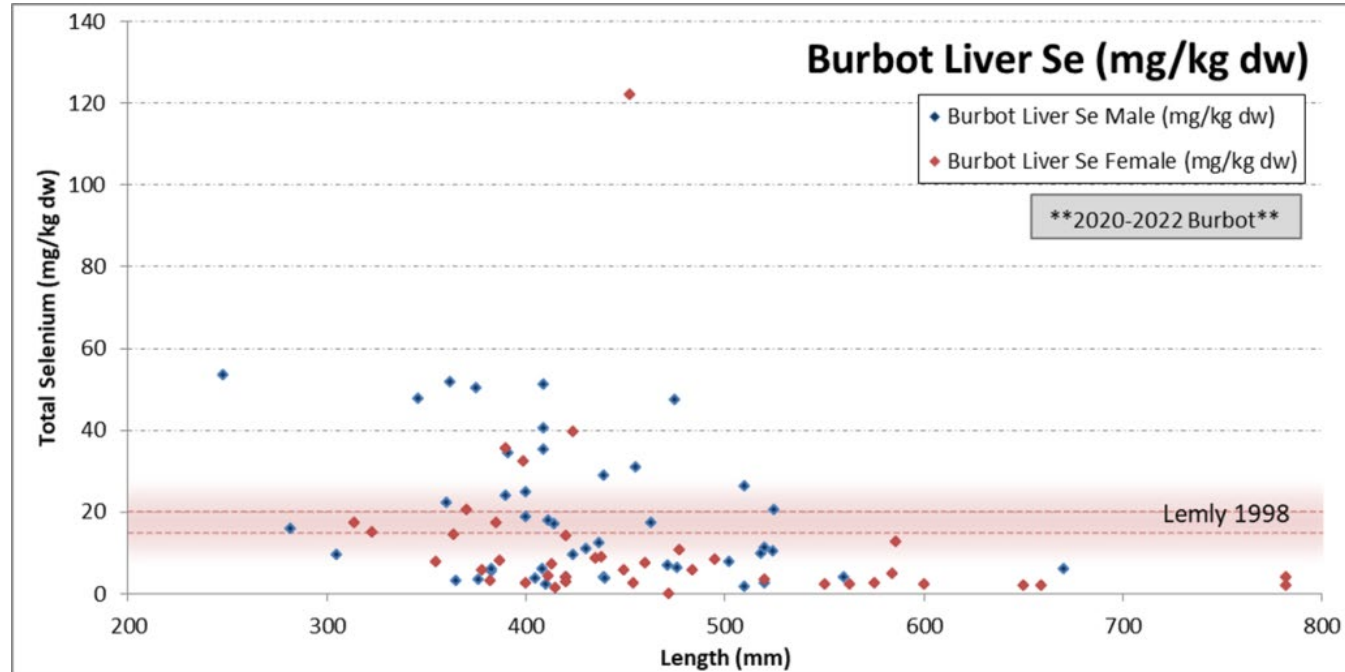


- Burbot egg Se concentrations are correlated to release site habitat types. Burbot released to river and wetlands habitats have higher Se than those released into Kootenay Lake.



# NOT-SO-FUN FACTS

## Burbot – Liver Selenium



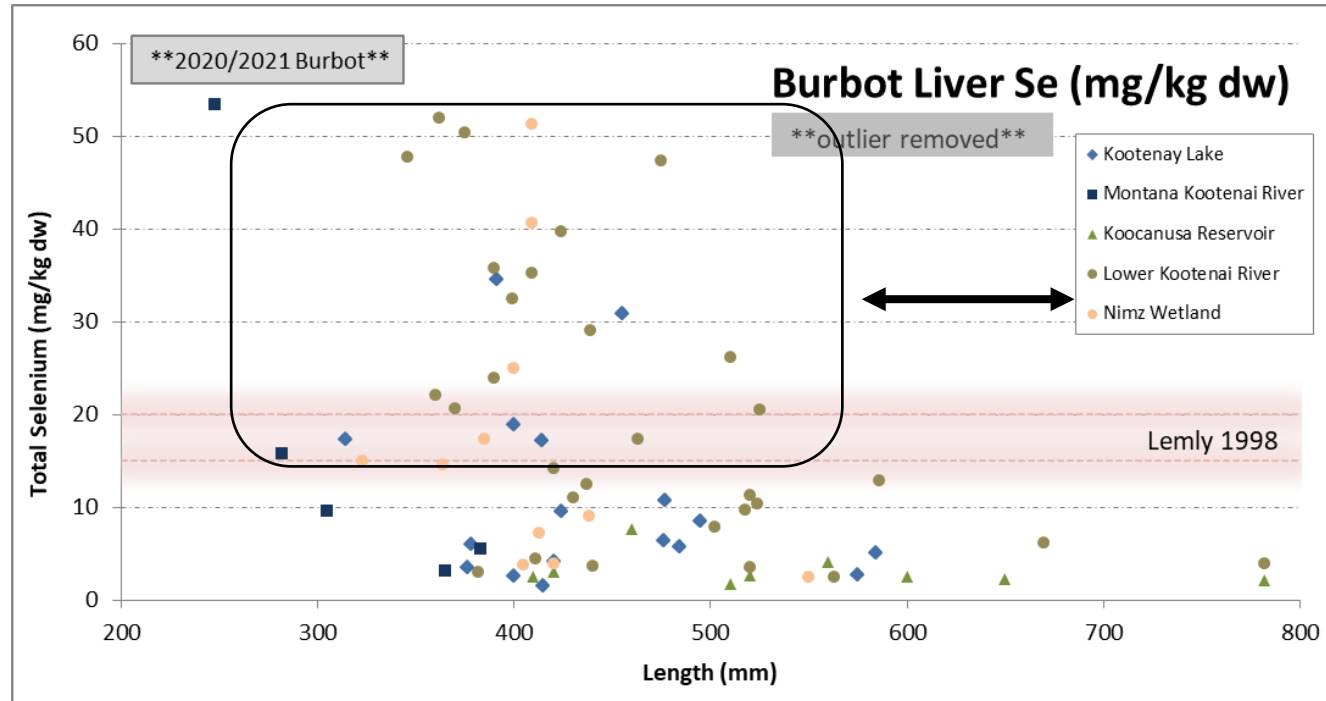
- Livers are very important to fish health and reproduction.
- Burbot liver Se concentrations are increasing; and many exceed protective guidelines.





# NOT-SO-FUN FACTS

## Burbot – Liver Selenium

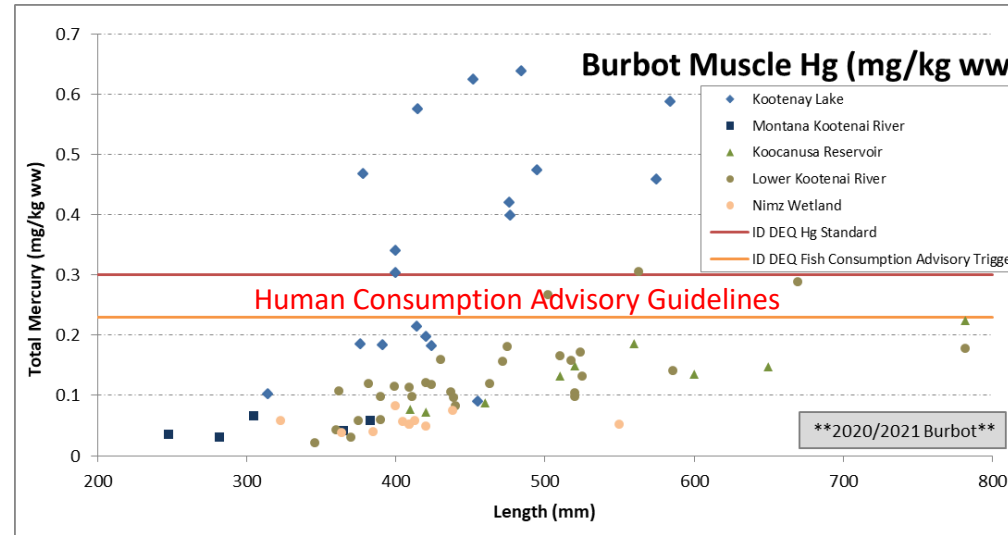


- Burbot liver Se concentrations are also correlated to release site habitat types.
- Burbot released to river and wetlands habitats have higher Se than those released into Kootenay Lake.

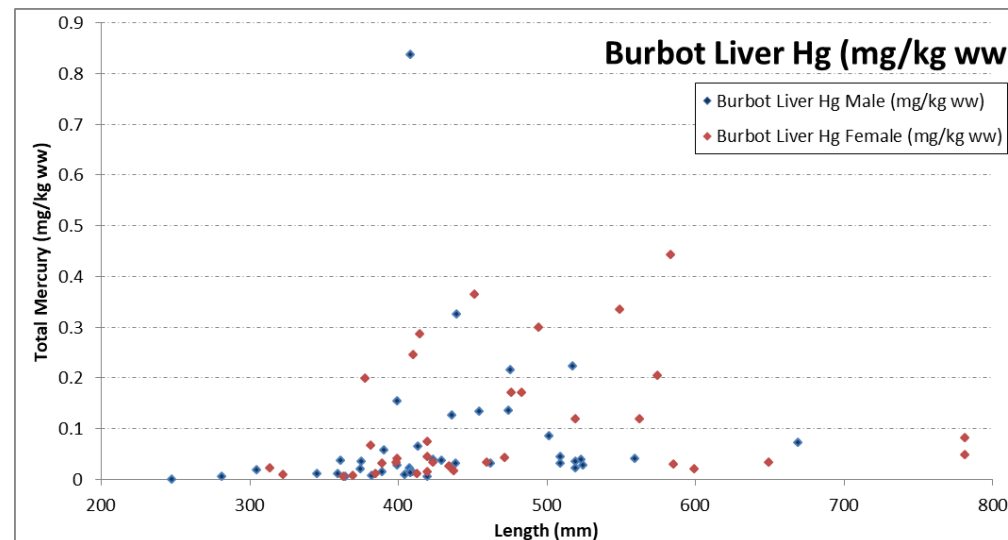


# NOT-SO-FUN FACTS

## Burbot – Muscle, Mercury



## Burbot – Liver, Mercury





These decisions are political, naturally, because they can ultimately involve all 3 branches of State, Provincial and both national governments. THANK YOU for sharing the SCIENCE today! It helps citizens when sharing the truth, the numbers, the facts. ONWARD!



Compromised  
Gill plate  
on a

West Slope Cutthroat  
Caught on the Elk River 5 years ago  
about 10 miles above the dam at Elko.

- more have  
been caught  
since -

# Decline of Native Fish & Wildlife

## NOW.....Elk River Valley Mining

**Kootenai River White Sturgeon ENDANGERED**



- ✓ Very low Sturgeon natural recruitment since 1960's.
- ✓ Federally endangered 1994 (USA) and 2006 (Canada).
- ✓ ~ 1,700 (wild) Adult White Sturgeon remain.

**Burbot FUNCTIONALLY EXTIRPATED**



- ✓ Burbot were functionally extirpated by 1990's.
- ✓ There were not enough Burbot to support a hatchery program, nor to use for research.

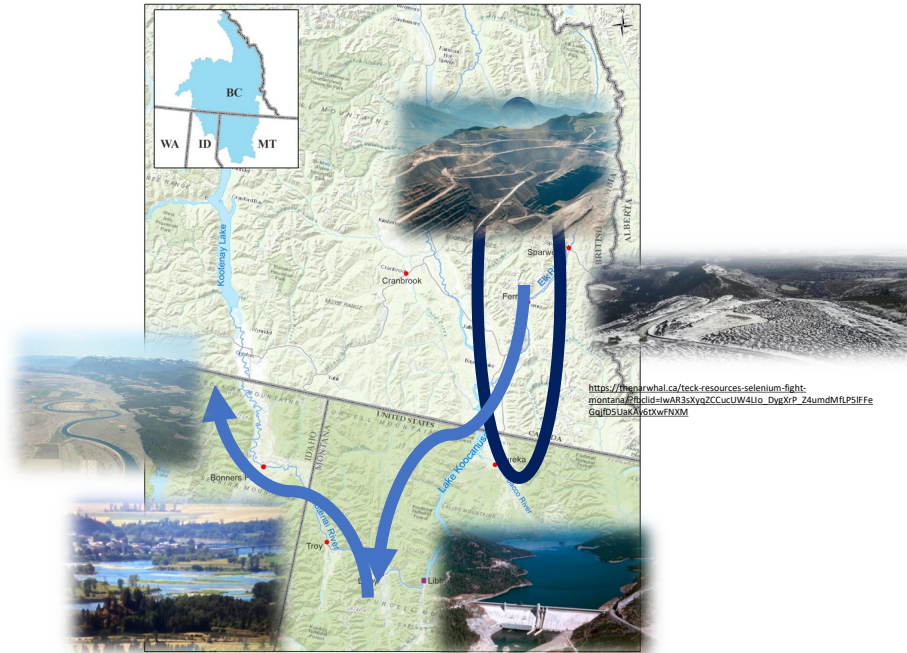
**Bull Trout THREATENED**



**West Slope Cutthroat PETITIONED**



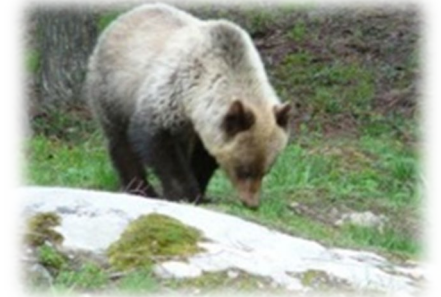
**South Arm Kokanee FUNCTIONALLY EXTIRPATED**



Selenium egg/ovary tissue current exceedances in the following fish:

- ✓ Burbot (Hatchery restored population)
- ✓ Mountain Whitefish (100% of females)
- ✓ Rainbow Trout
- ✓ Northern Pikeminnow
- ✓ Red-sided Shiners
- ✓ Sculpins
- ✓ Wild adult Sturgeon females' egg values are increasing.

**Grizzly Bear THREATENED**



**Canada Lynx THREATENED**



**Woodland Caribou EXTIRPATED IN USA**



## Habitat Restoration - Water on the Landscape



Dilemma...water transports pollution to the landscape



“habitat restoration needed, but transporting pollution”

