



Lower Kootenai Ecosystem Restoration & Contaminants Monitoring Status and Updates

*Shawn Young & Genny Hoyle
Kootenai Tribe of Idaho*

*Crown of the Continent
March 15, 2023*



Natural History of Kootenai Valley

Kootenai Aboriginal Territory



Historical Cottonwood Galleries

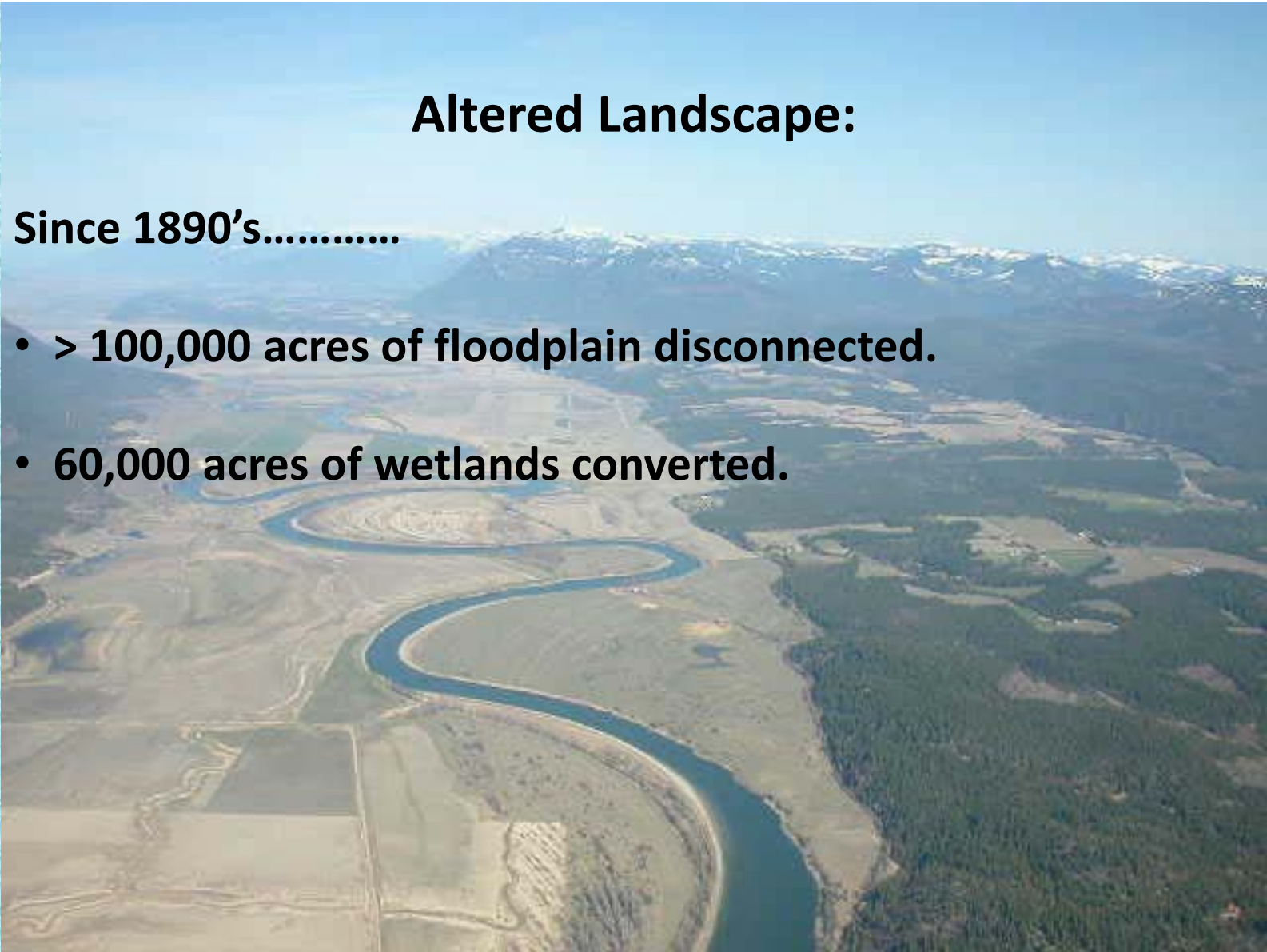
Early 1900s =
60,000 to 100,000 board
feet processed daily



Altered Landscape:

Since 1890's.....

- > 100,000 acres of floodplain disconnected.
- 60,000 acres of wetlands converted.





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



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



1989



1989 - Present



**Sturgeon Program is
30+ years old.**

**Burbot Program is
18+ years old.**



2015



Jose Ponce, KTOI Hatchery Manager



Dan Aitken, KTOI Sturgeon Technician

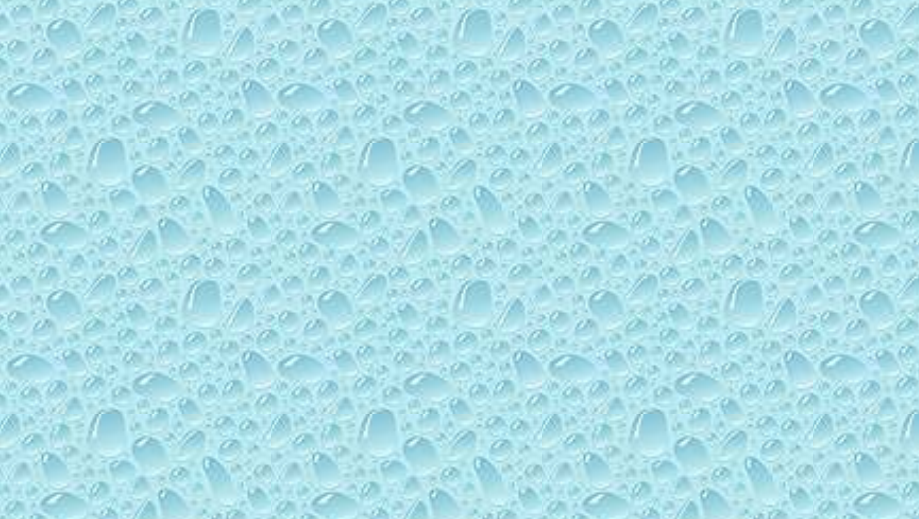


KTOI Staff Preparing Female



Mark Elliston, KTOI Technician







2012/02/12 17:22:30



E

1.8 C

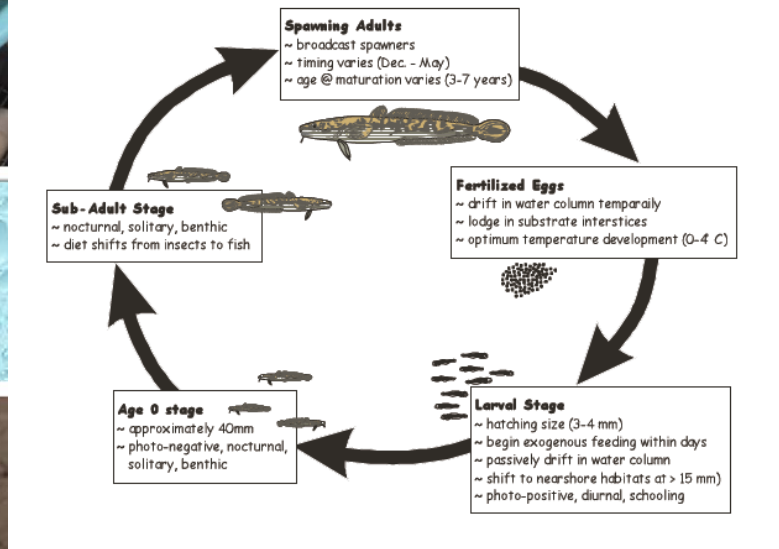
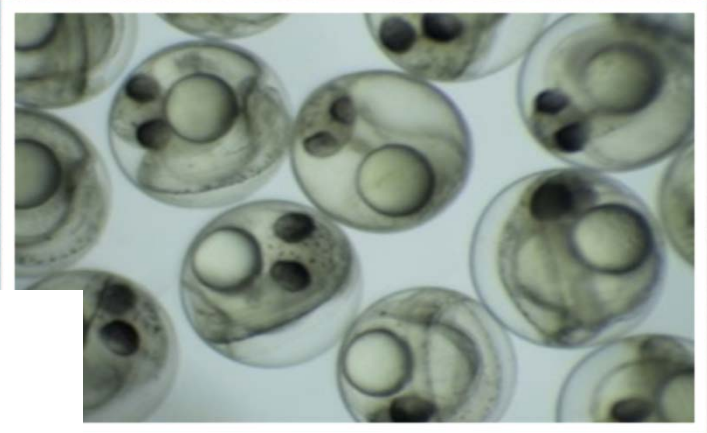
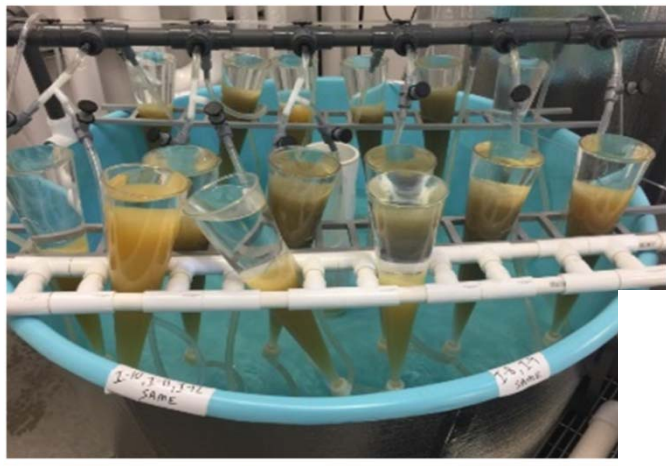
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E

1.8 C





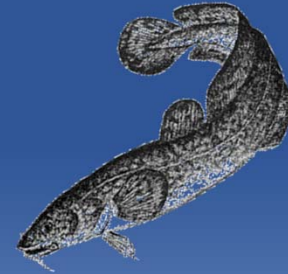
First hatchery males confirmed sexually mature during 2020 & 2021.



Hatchery Burbot are viable, mature adults at 2-3 years old; and have been spawning since 2014.



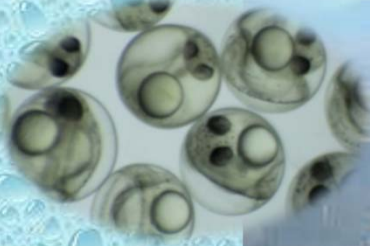
Program Status



- ✓ “Ward off extinction”
- ✓ Rebuild population structure / fill year-class gaps
- **Restore a self-sustaining Sturgeon and Burbot populations in the Lower Kootenai River Ecosystem.**



Future Habitat Solutions



Picture of IDFG staff conducting winter hoopnet surveys, which provide almost all recapture data for adult Burbot



Parental Based Tagging (IDFG)





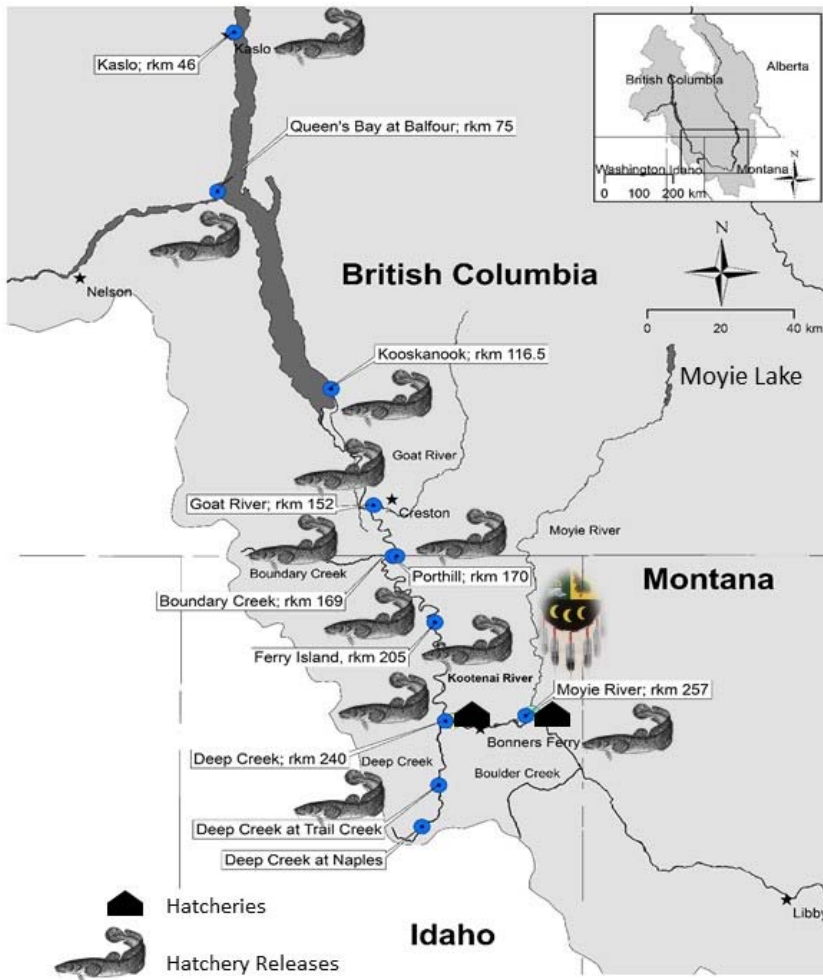


An aerial photograph showing a vast, restored wetland area. A river flows through the landscape, surrounded by lush green marshes and numerous small, interconnected water bodies. In the background, a town is visible, followed by a dense forest and a range of rugged mountains under a blue sky with scattered clouds. The text "This is Canada....." is overlaid on the upper part of the image.

This is Canada.....

**Photo provided by Norm Allard, Lower Kootenay Band Biologist;
Photo of Lower Kootenay Band Restoration Project**

Hatchery Sturgeon and Burbot Release Sites throughout the Lower Kootenai Ecosystem



Example of Lower Tributary Release Sites



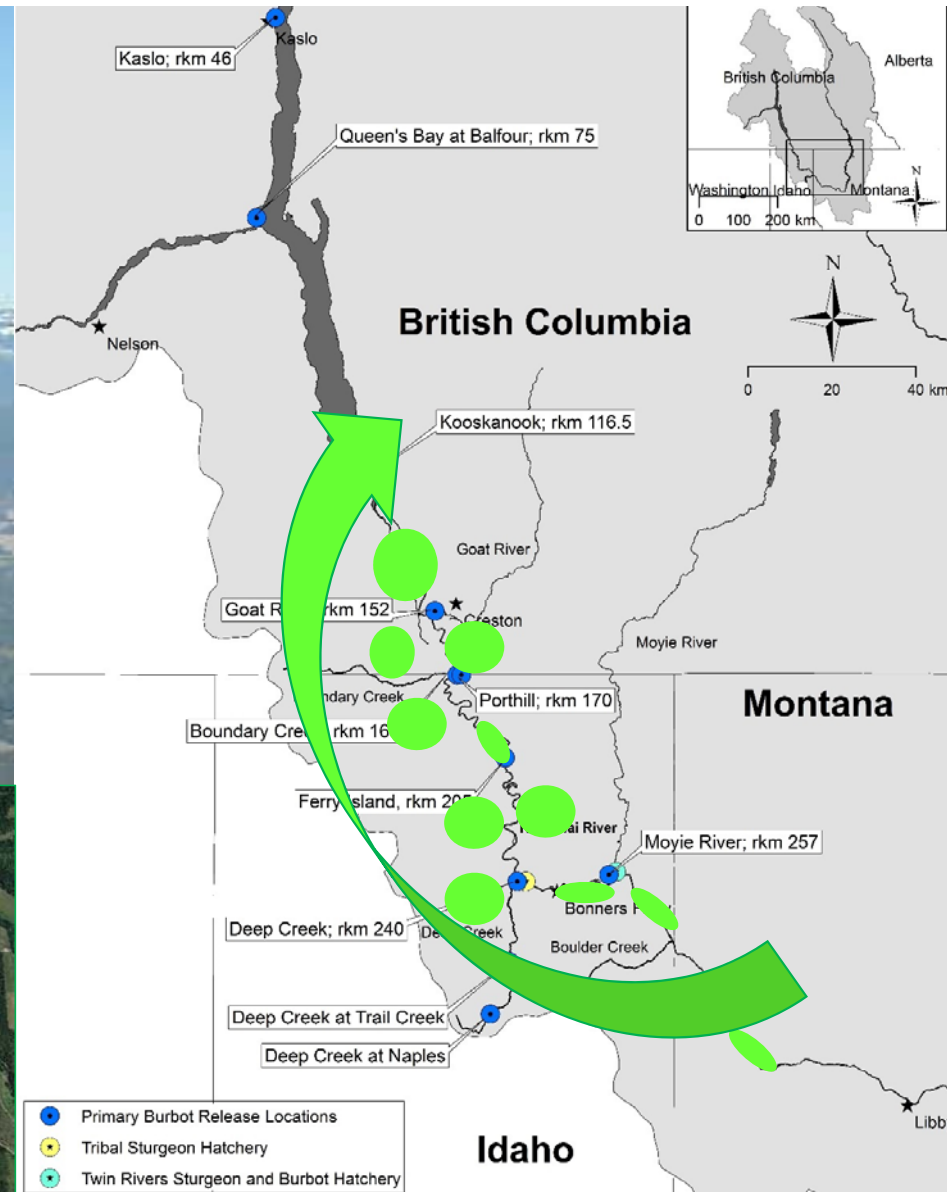
Habitat Project – Floodplain Reconnect

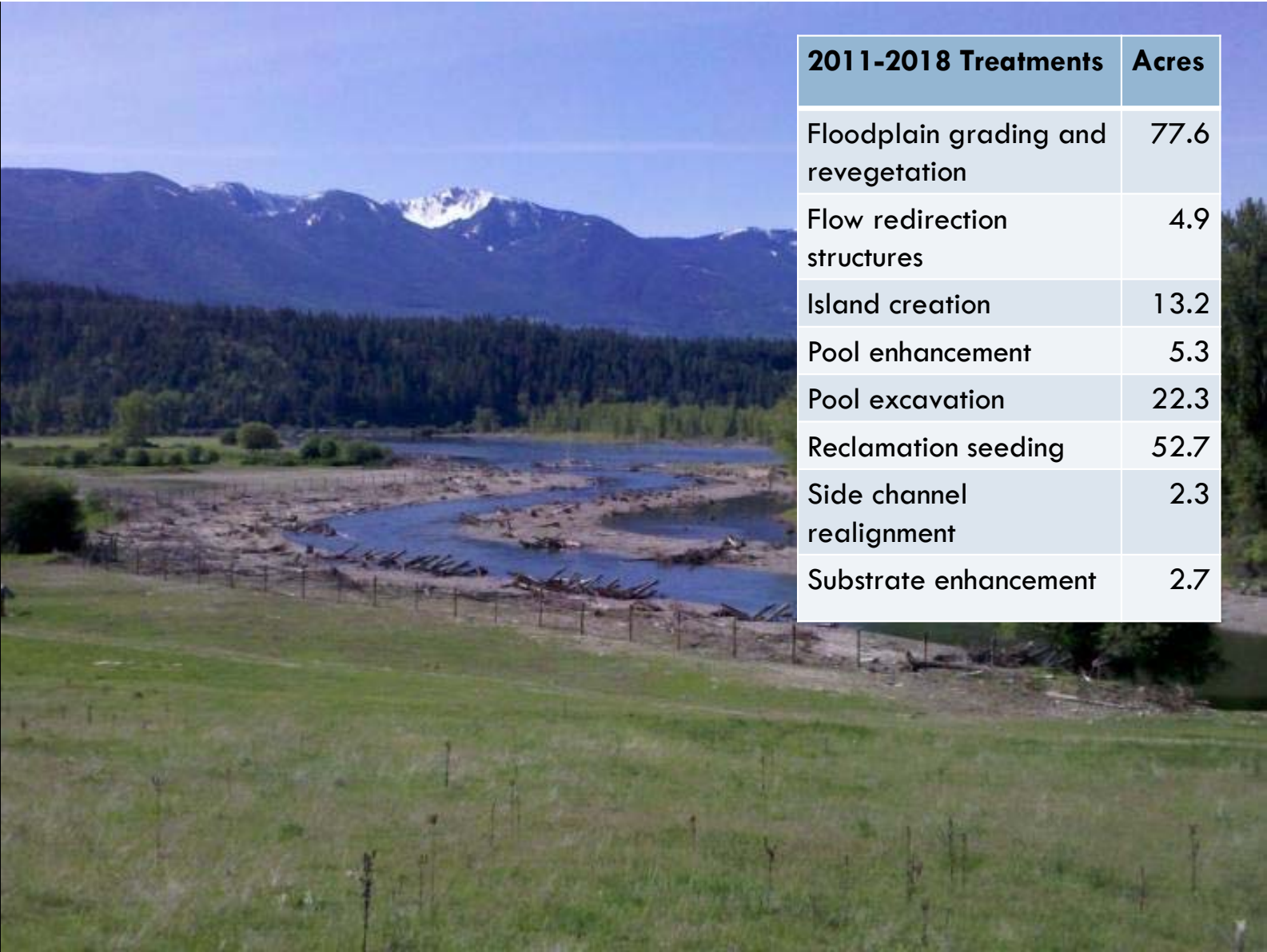


Since 1890's.....

- > 100,000 acres of floodplain disconnected.
- 60,000 acres of wetlands converted.

Habitat Restoration Programs / Targeted Actions taking place to reverse this condition.





2011-2018 Treatments	Acres
Floodplain grading and revegetation	77.6
Flow redirection structures	4.9
Island creation	13.2
Pool enhancement	5.3
Pool excavation	22.3
Reclamation seeding	52.7
Side channel realignment	2.3
Substrate enhancement	2.7







Acquiring land for wildlife and creating a legacy of conservation

- Five Wildlife Mitigation properties acquired since 2002
- 1100 mitigation acres under Tribal management





Community Stewardship
Landowner Collaboration
International Cooperation



Integrated Adaptive Management and Transboundary Coordination



INTERNATIONAL
KOOTENAI ECOSYSTEM
RECOVERY TEAM



KOOTENAI RIVER
BURBOT ANNUAL
PROGRAM REVIEW



KOOTENAI RIVER
HABITAT RESTORATION
PROGRAM CO-
MANAGER & AGENCY
REVIEW TEAM



KOOTENAI RIVER
HABITAT RESTORATION
PROGRAM PEER
REVIEWER ADVISORY
TEAM



KOOTENAI RIVER WHITE
STURGEON ANNUAL
PROGRAM REVIEW



KTUNAXA NATION
PROTOCOL



SELKIRK CARIBOU
INTERNATIONAL
TECHNICAL WORK
GROUP



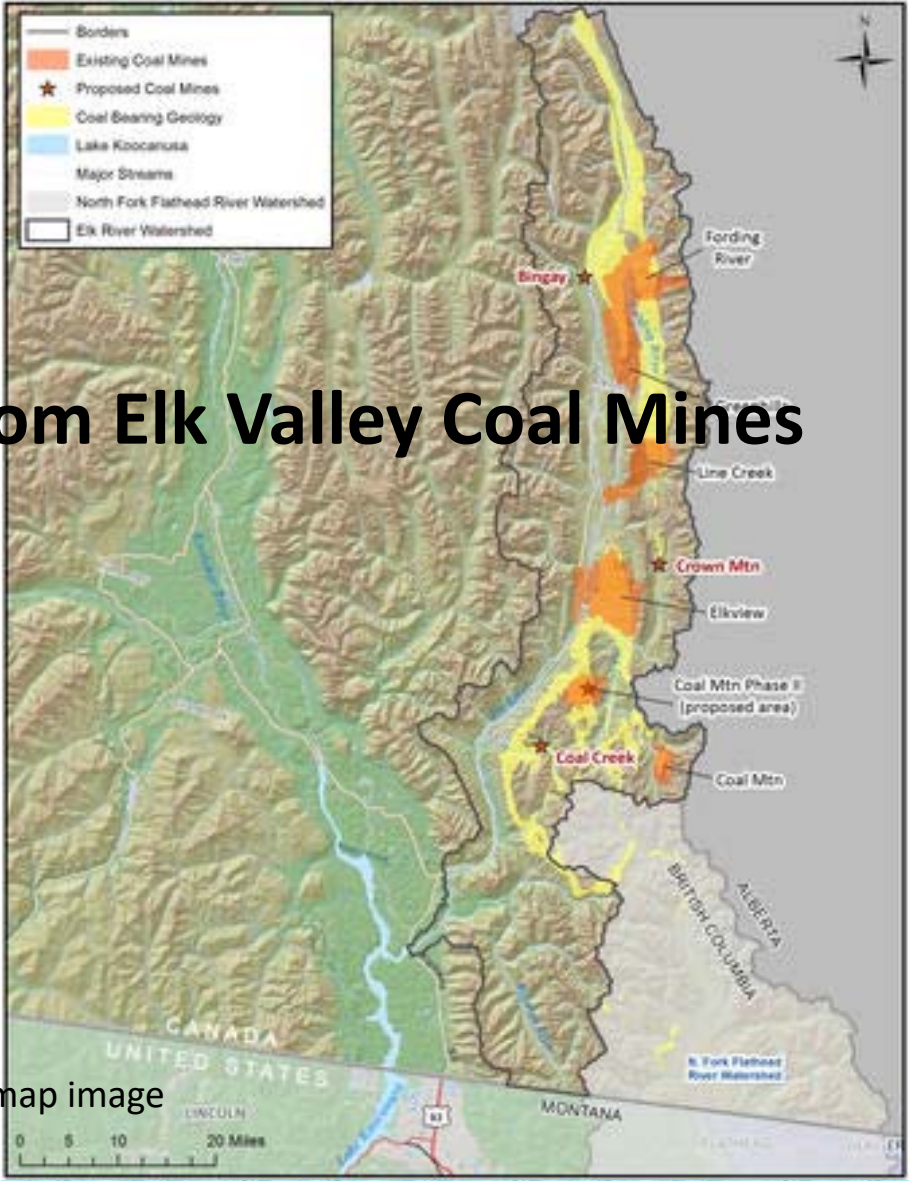
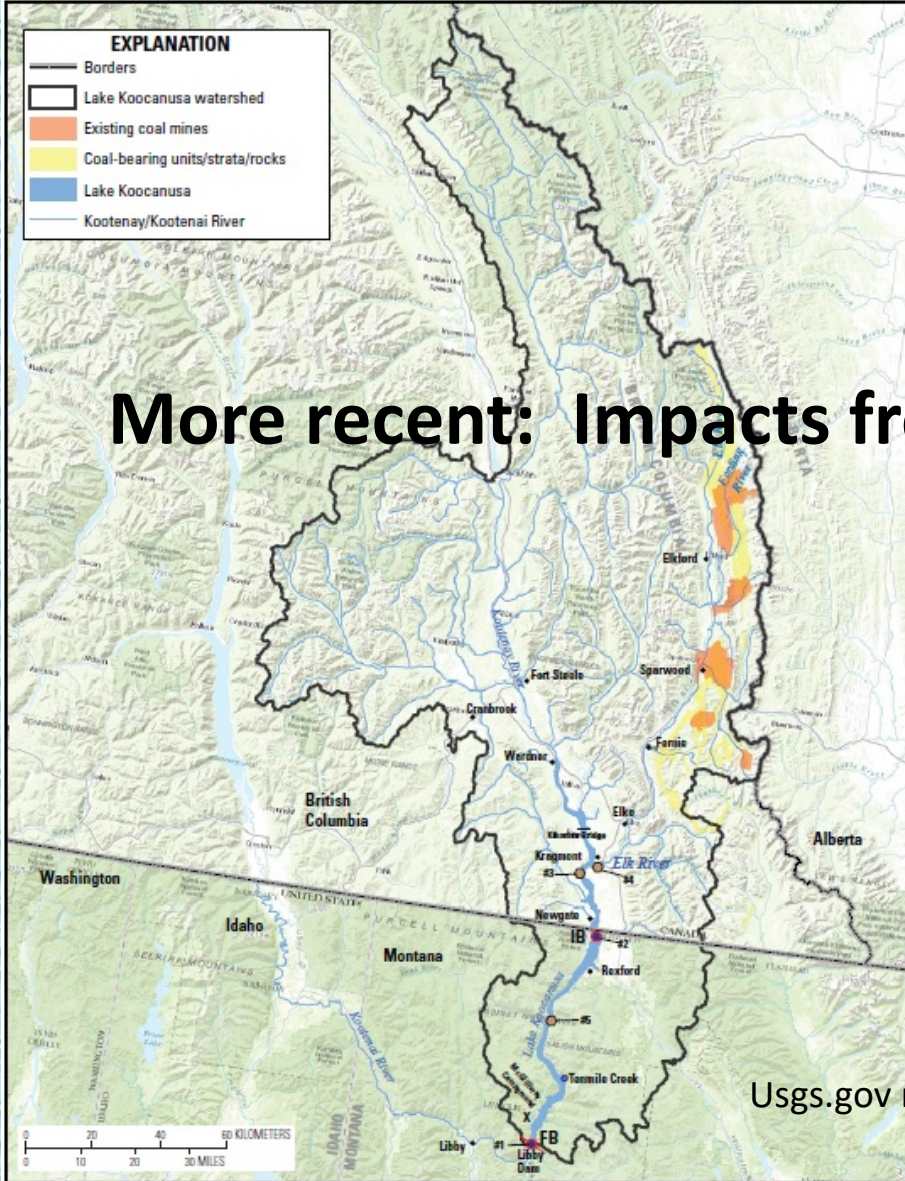
UPPER COLUMBIA WHITE
STURGEON RECOVERY
INITIATIVE



U.S. FISH AND WILDLIFE
RECOVERY TEAM

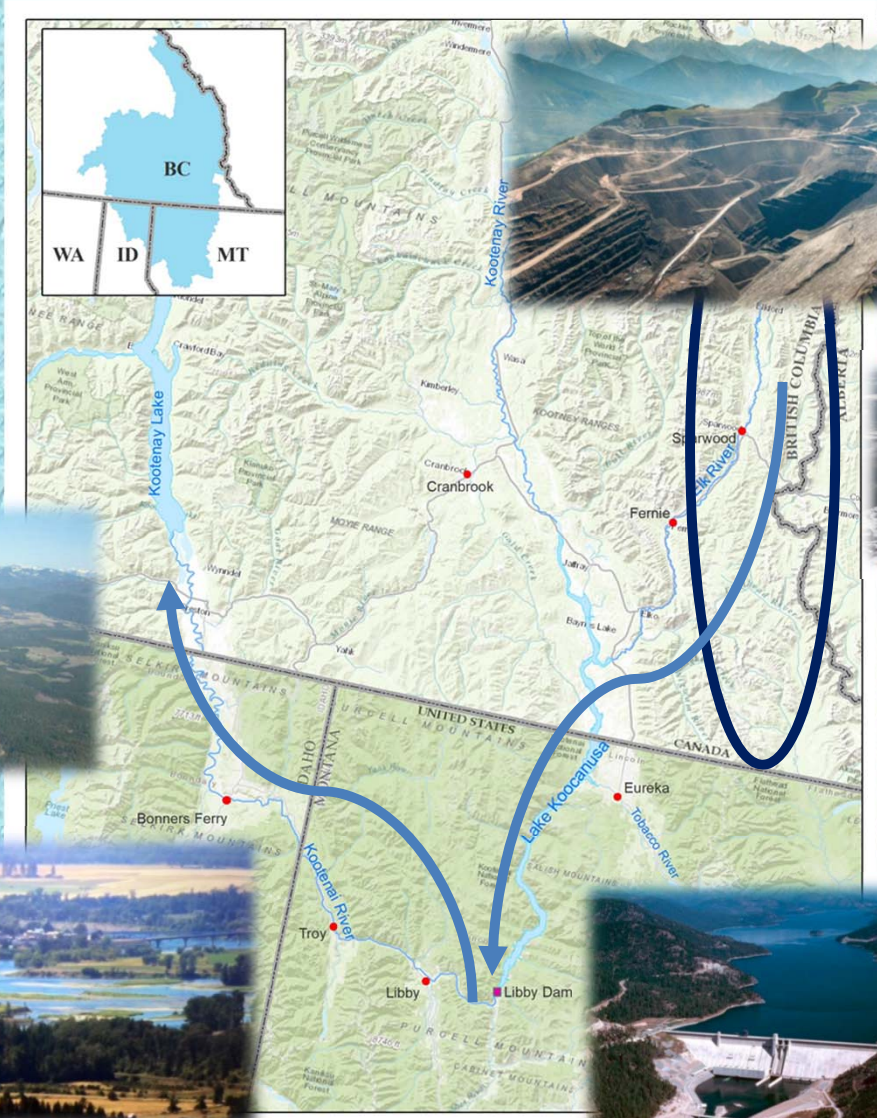
Restoring and Conserving a Legacy for Generations to Come...





More recent: Impacts from Elk Valley Coal Mines

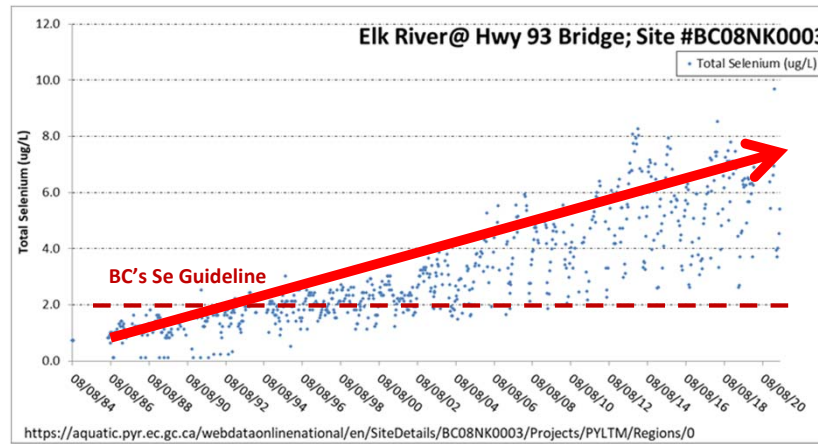
Usgs.gov map image



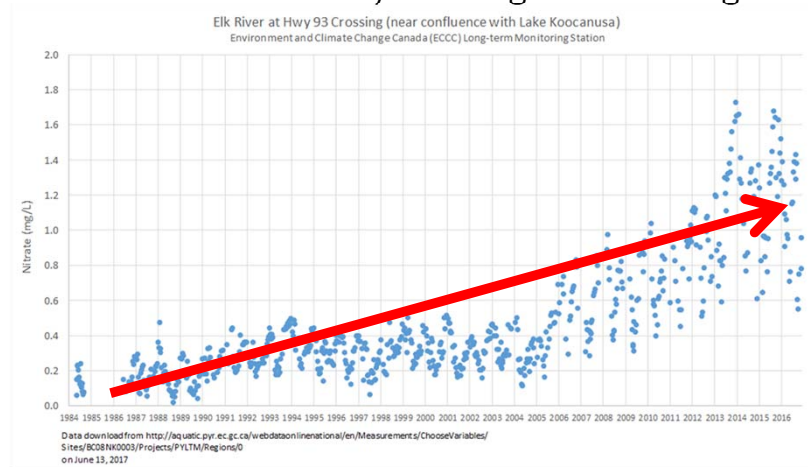
https://thenarwhal.ca/teck-resources-selenium-fight-montana/?fbclid=IwAR3sXyqZCCucUW4Llo_DygXrP_Z4umdMfLP5jFFeGqjfDSUaKAv6tXwFNXM

Let's Talk Water.....

Water Chemistry – Selenium Increasing



Water Chemistry – Nitrogen Increasing

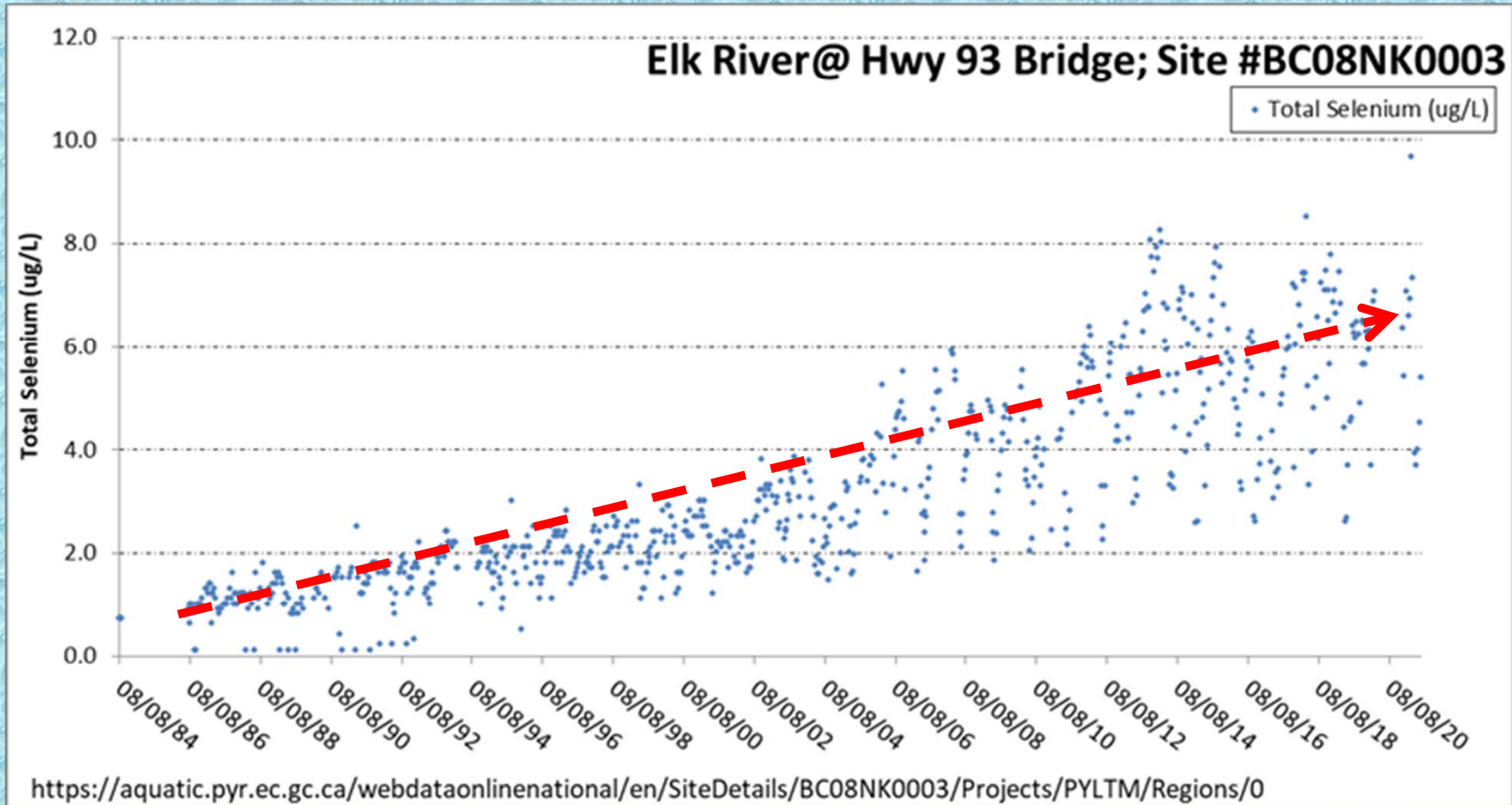


Current – Elk River Mining



- Active wastewater treatment sub-optimal to date;
- Saturated rock-fill (SRF's) effectiveness TBD;
- New active wastewater treatment plant slated to come online @January 2022 at the Fording River Operations;
- Mitigation needs to be at the scale of the project(s);
- 3 new proposed mines in the Elk River Valley

Selenium Trends: 1980's - Present



Background — EPA Recommended Criteria

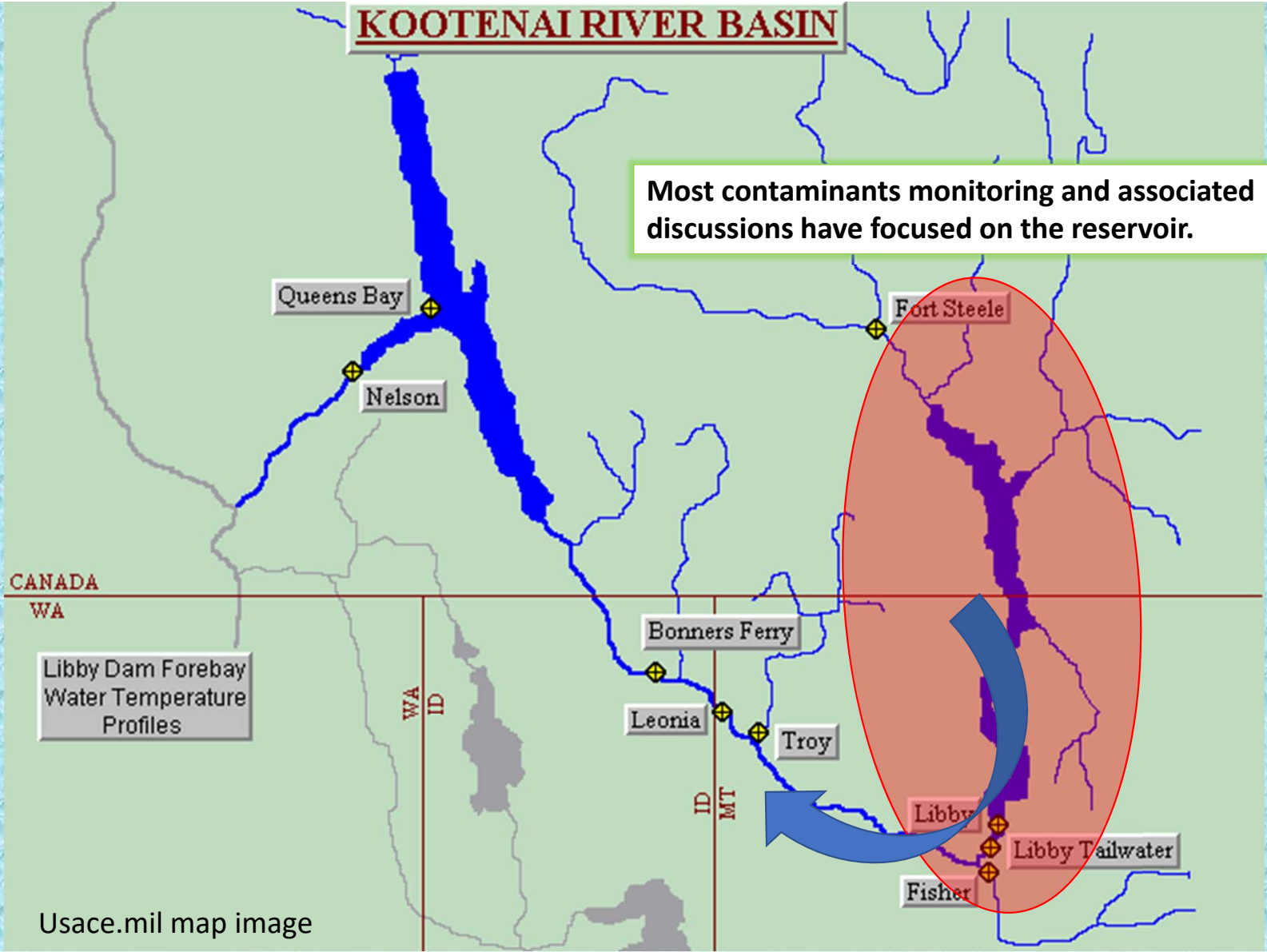
Criterion Version	Chronic					Short-term
	Egg-Ovary ¹ [mg/kg dw]	Whole Body ¹ [mg/kg dw]	Muscle ¹ [mg/kg dw]	Water Lentic ¹ [µg/L]	Water Lotic ¹ [µg/L]	Water ¹ [µg/L]
2016 Selenium Criterion	15.1	★ 8.5	11.3	1.5 (30 day)	3.1 (30 day)	Intermittent exposure equation
1999 Selenium Criteria	N/A	N/A	N/A	5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

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



KOOTENAI RIVER BASIN

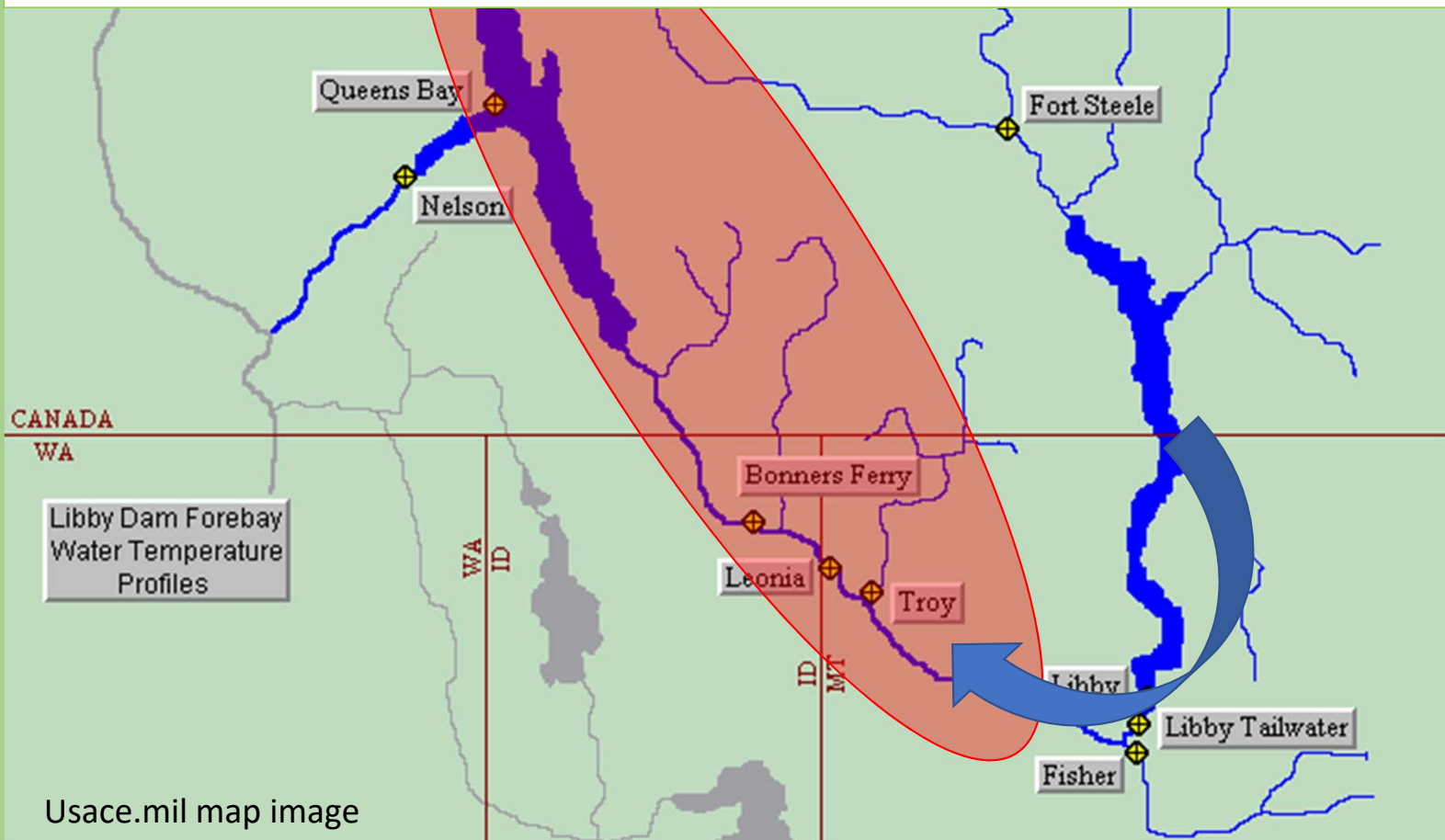
Most contaminants monitoring and associated discussions have focused on the reservoir.



Usace.mil map image

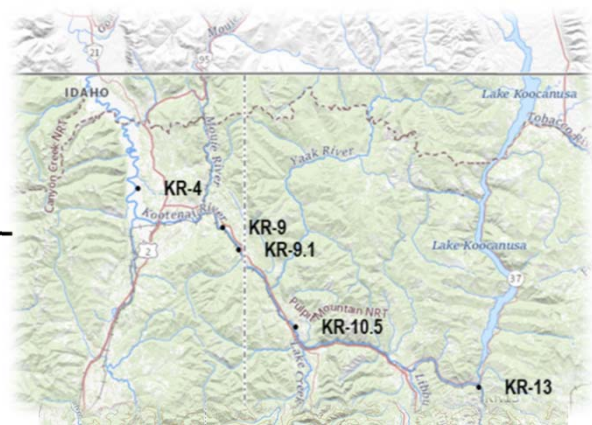
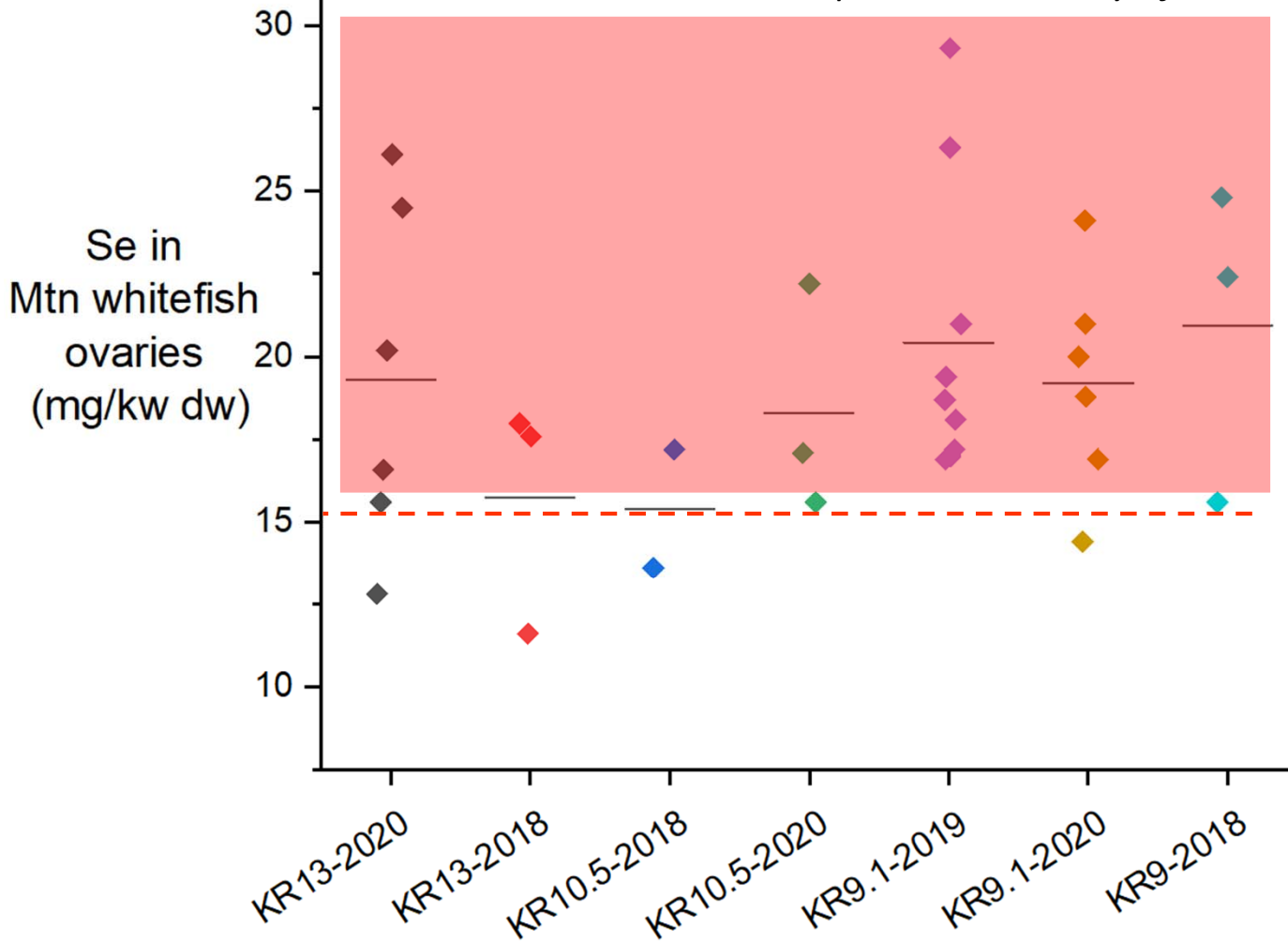
KOOTENAI RIVER BASIN

Given the persistent and increasing trends of Selenium and Nitrate over time, the Kootenai Tribe of Idaho is concerned about possible negative impacts down-river.



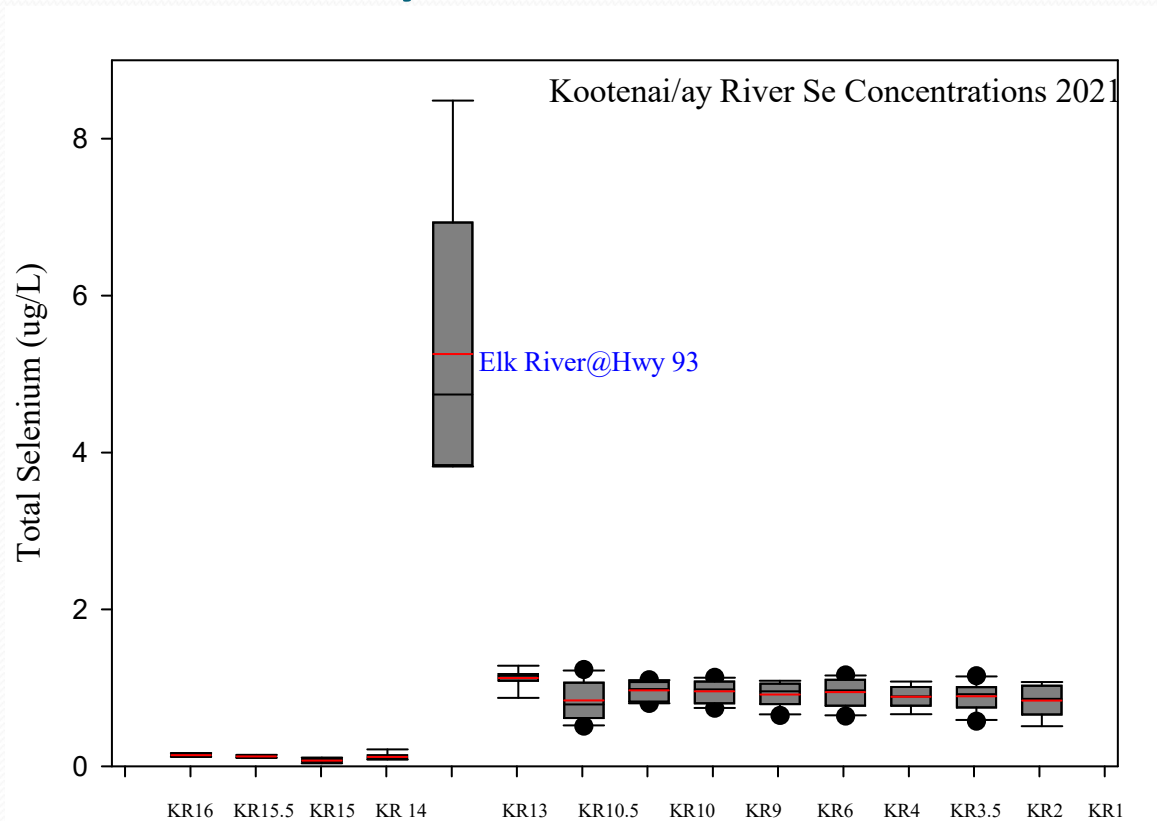
Mountain Whitefish eggs & ovary tissue exceed EPA & states' regulatory criteria (dashed red line).

Provisional data & slide provided courtesy of USGS.

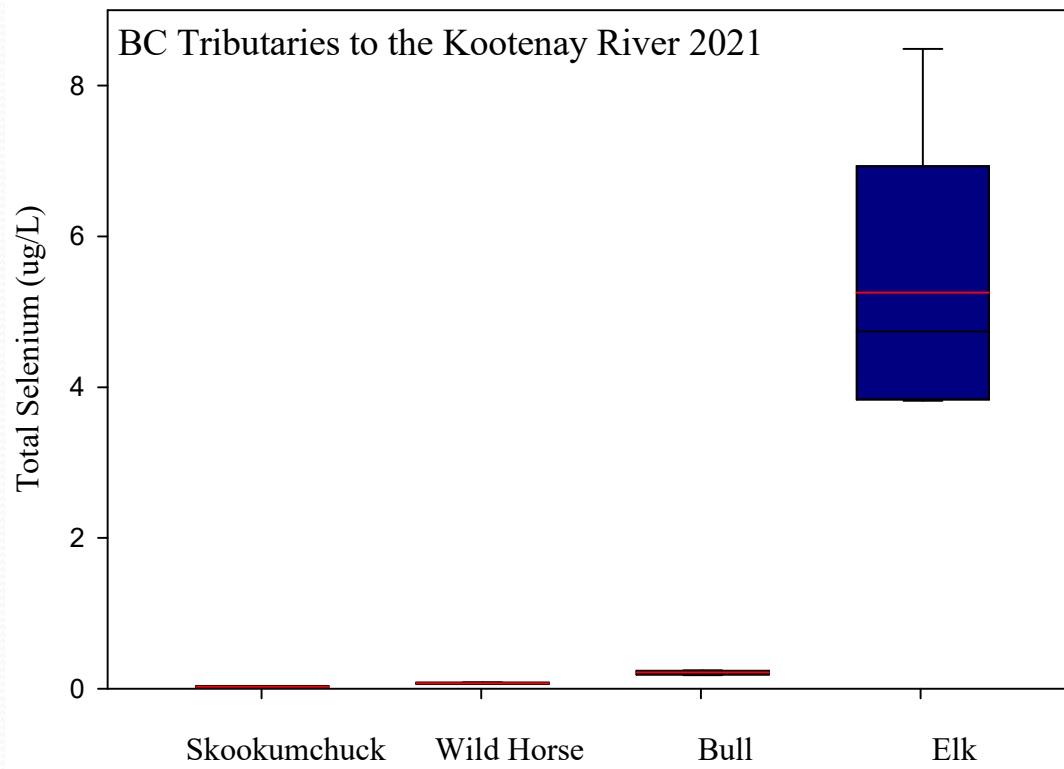
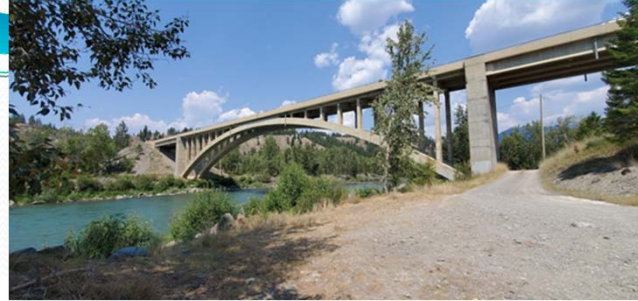


Kootenai Tribe of Idaho Monitoring Results

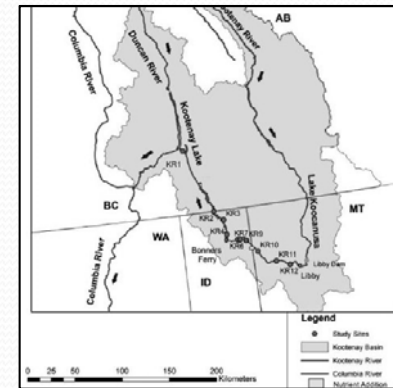
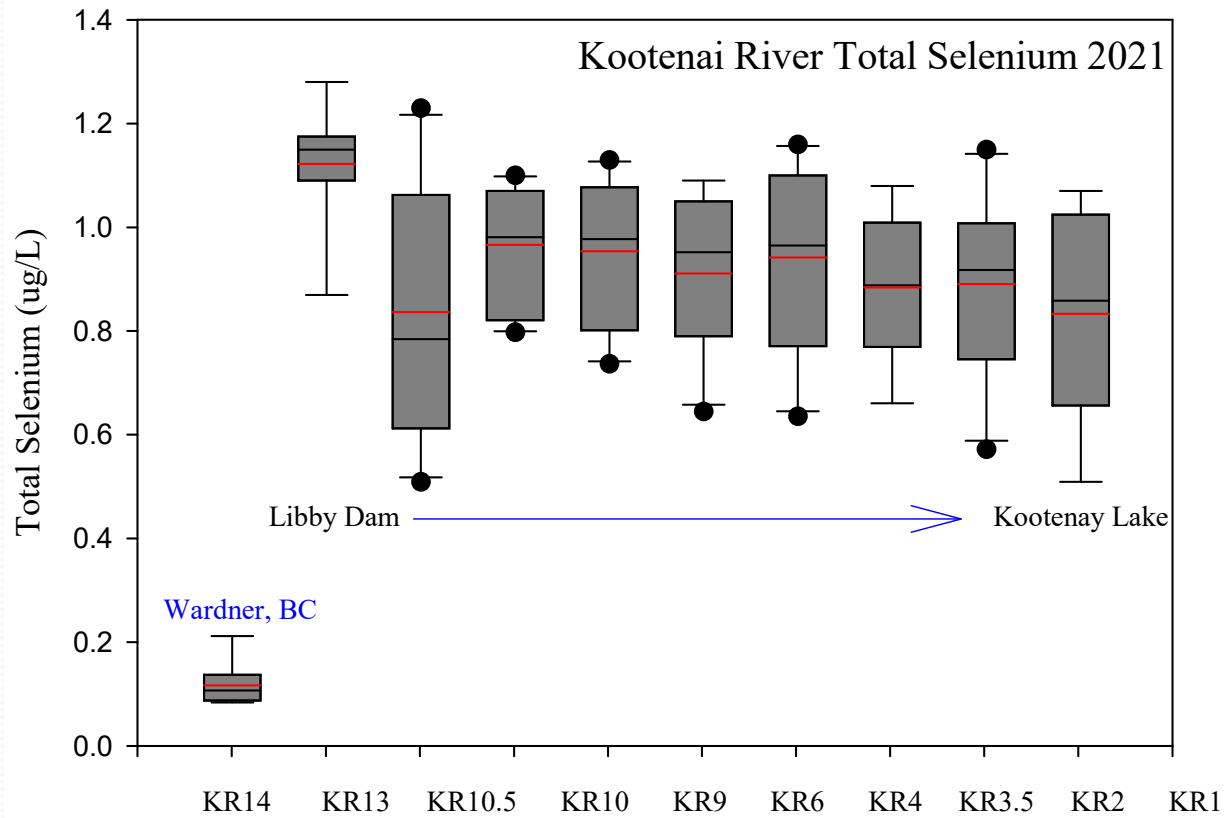
Kootenay/ai Basin– Total Se



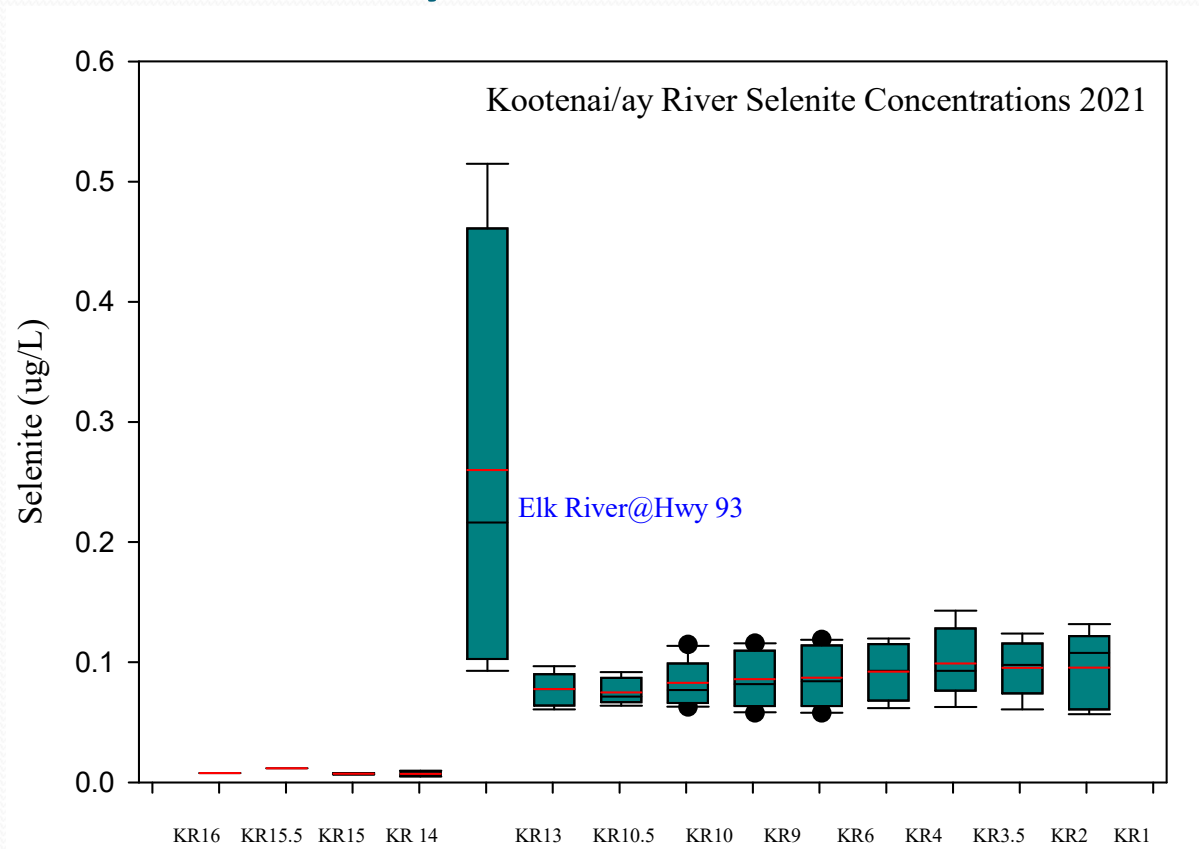
BC Tributaries - Se



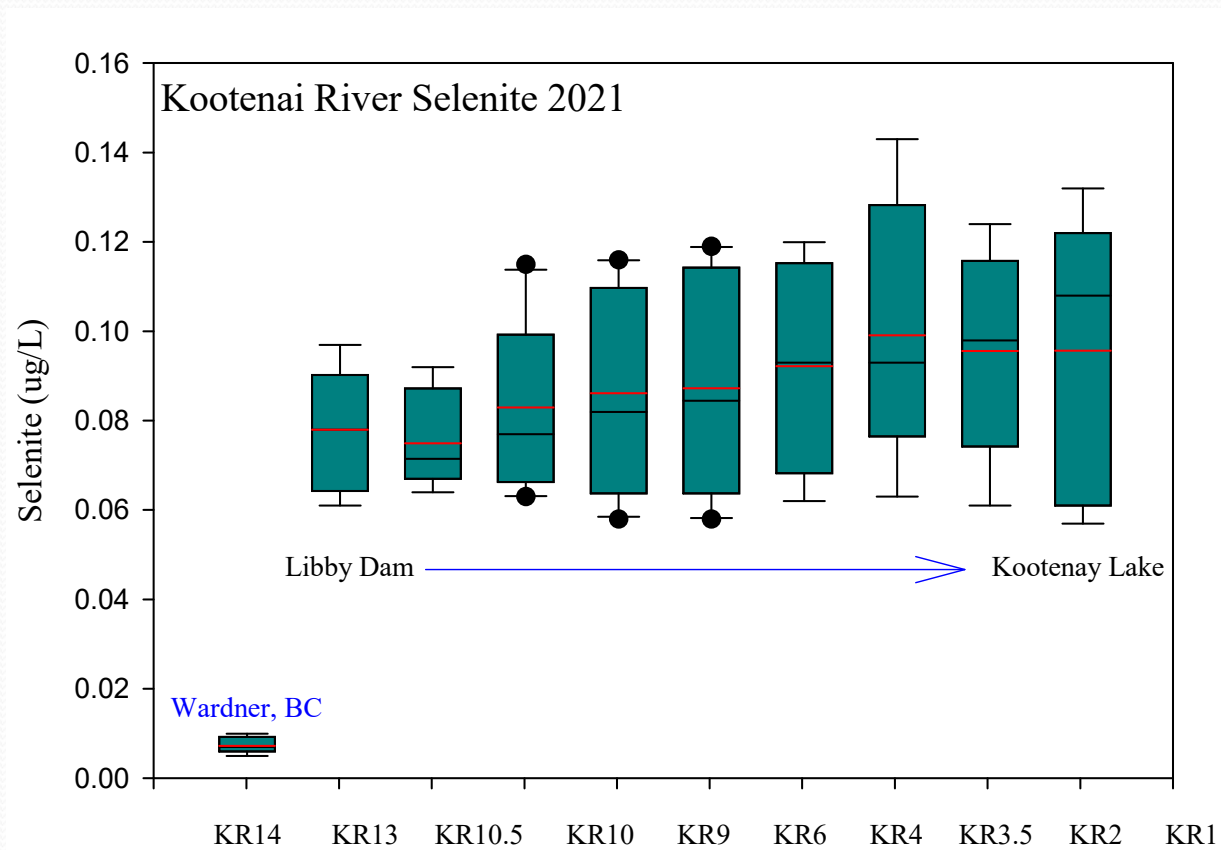
Lower Kootenai River– Total Se



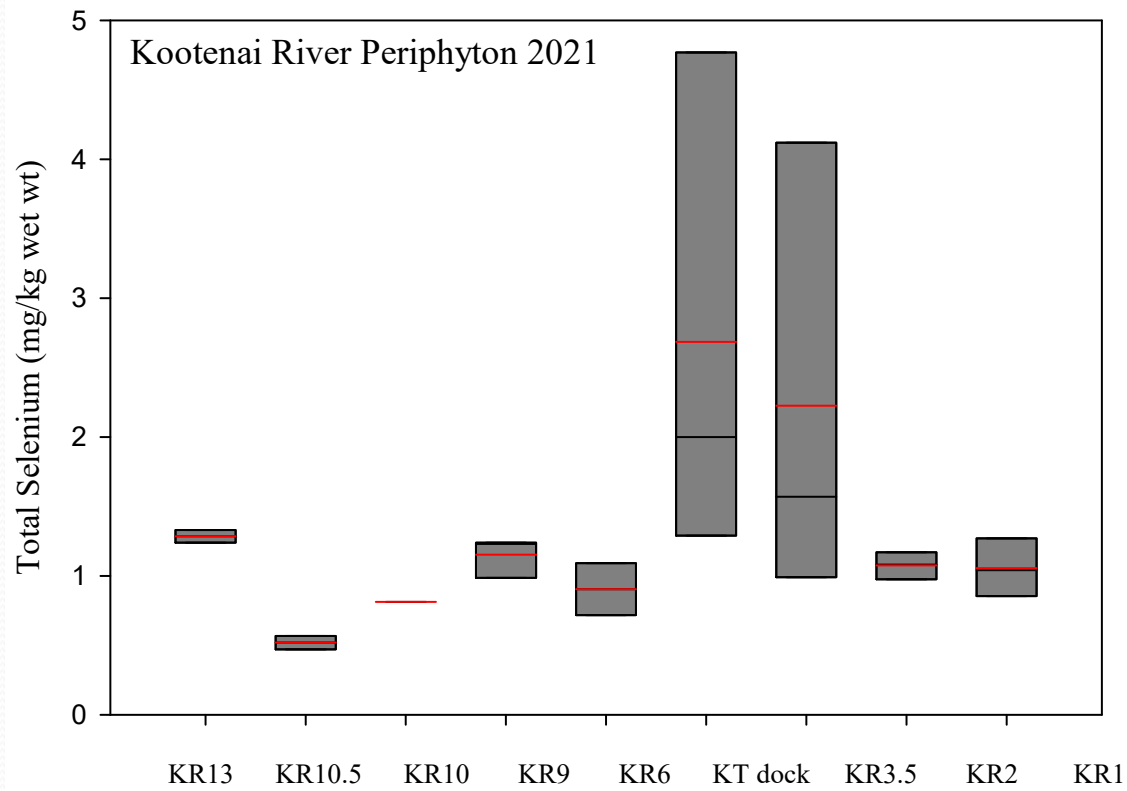
Kootenay/ai Basin - Selenite



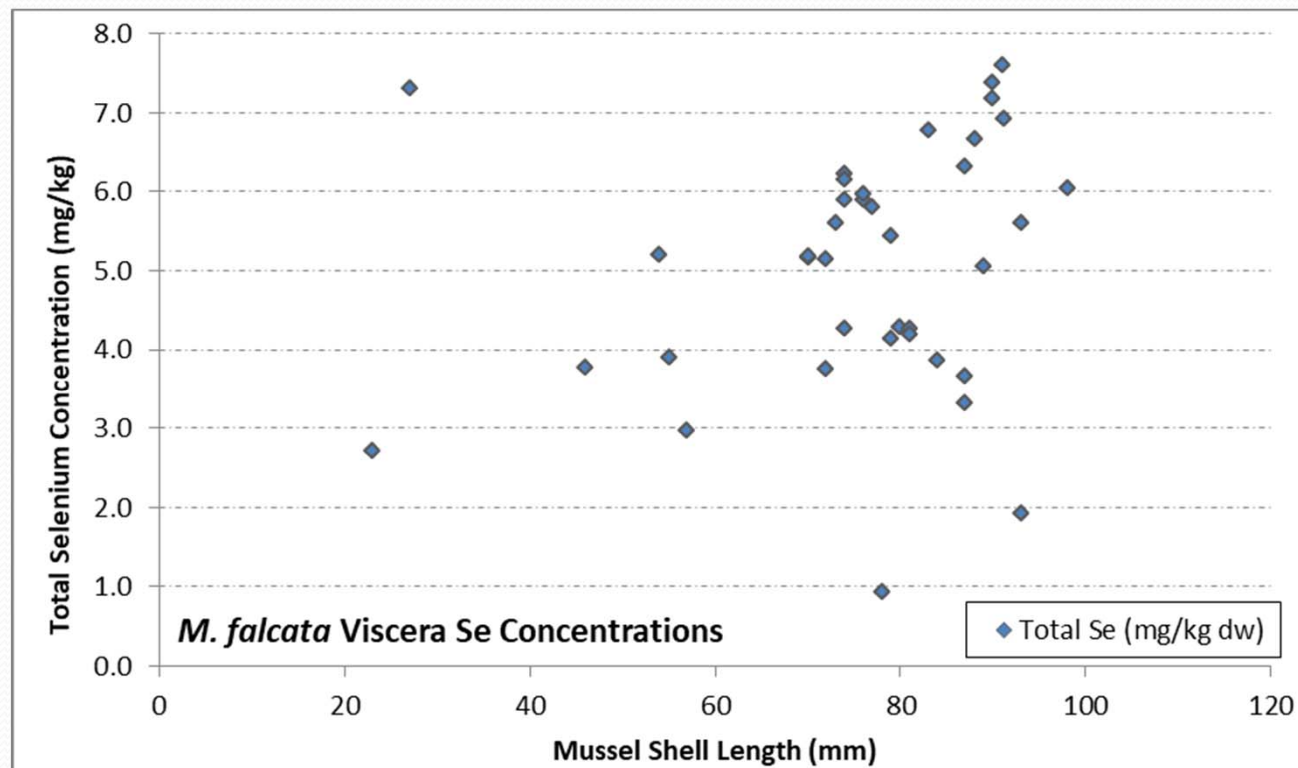
Lower Kootenai River - Selenite



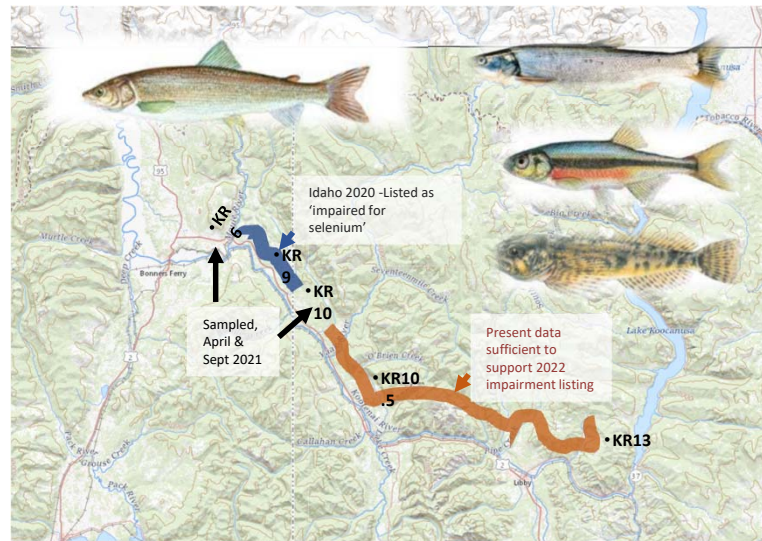
Periphyton



Mussels – *Western Pearlshell*



Kootenai River downstream of Libby Dam is now selenium impaired in Montana and Idaho based on fish tissue concentration exceedances.....

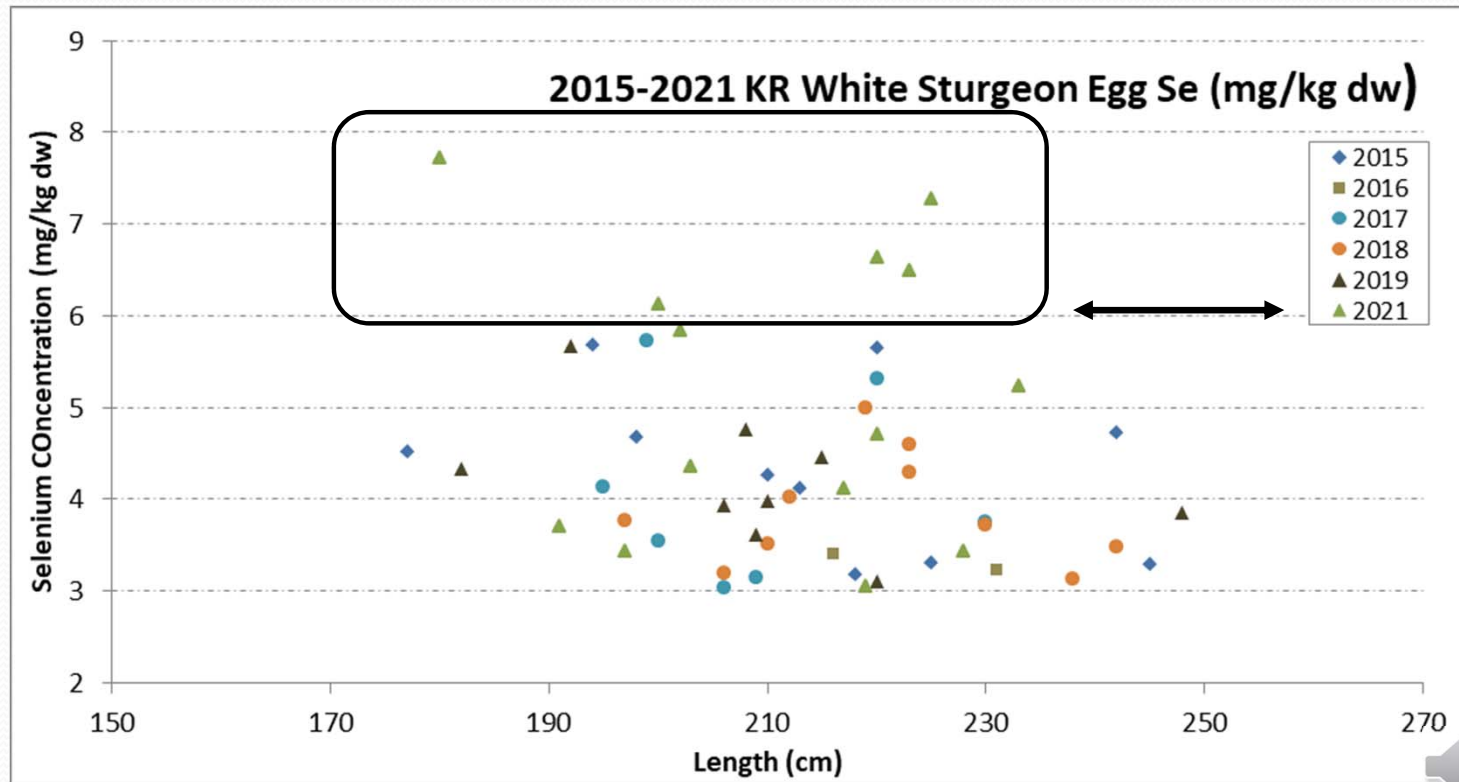


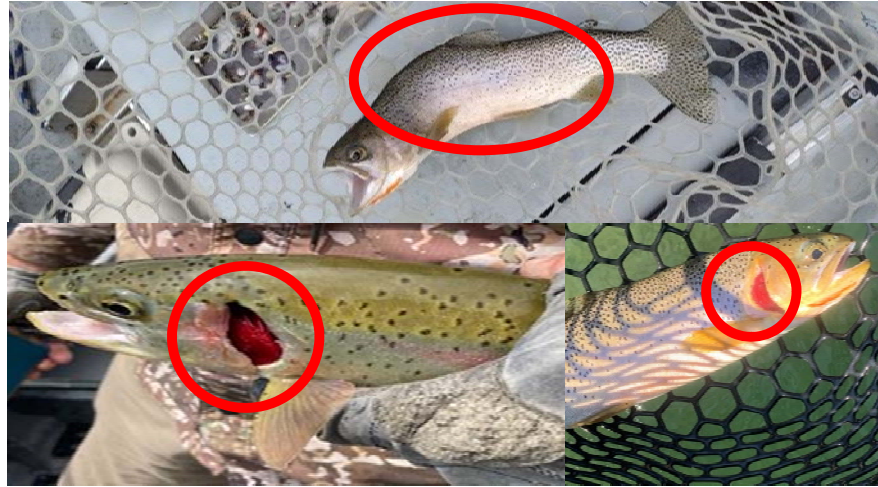
**slide provided courtesy of C. Mebane, USGS

A portion of Burbot and Rainbow Trout females' eggs exceed EPA protective criteria; and we haven't collected Bull Trout or Hatchery Sturgeon yet.



KR White Sturgeon





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

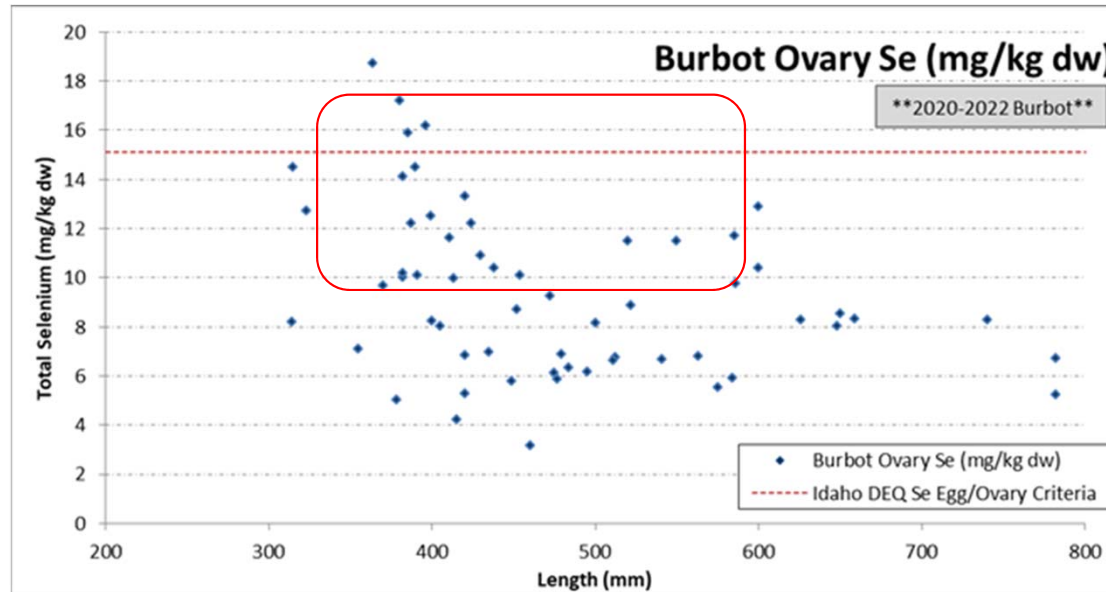
Went Slope Cutthroat
Caught on the Elk River 5 years ago
about 10 miles above the dam at Elko.

- more have
been caught
since -



NOT-SO-FUN FACTS

Burbot – Egg Selenium

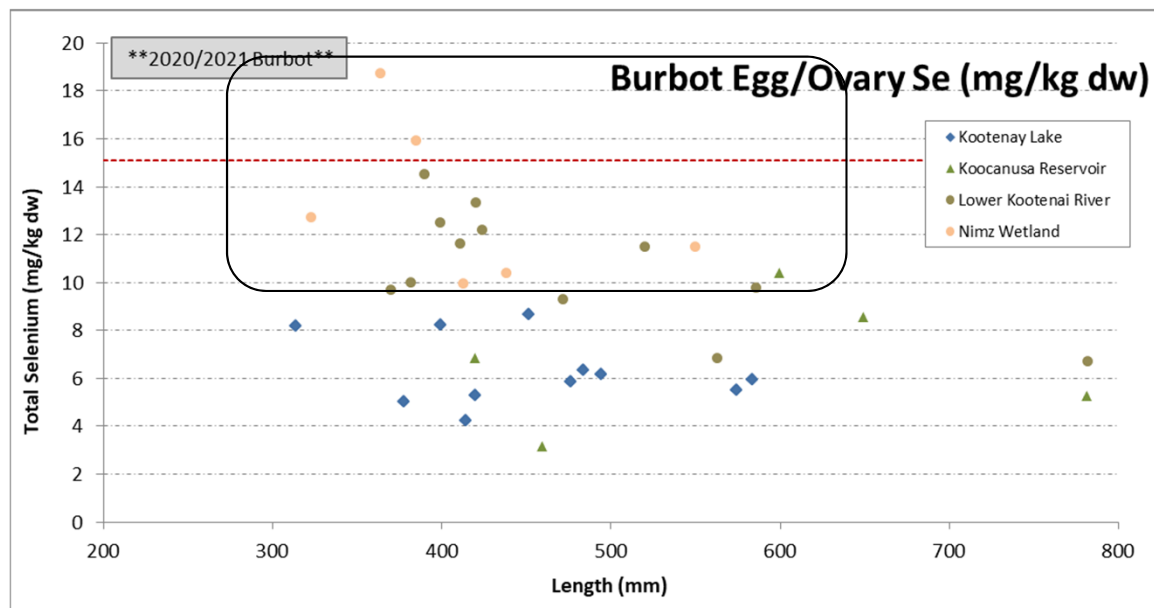


- Burbot egg Se concentrations are increasing; and some females' eggs exceed protective criteria.
- Burbot sensitivity to metals isn't known due to lack of interest in the species historically. At present, Burbot are gaining deserved respect.
- KTOI has study plans; yet again, no funding to conduct the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



NOT-SO-FUN FACTS

Burbot – Egg Selenium

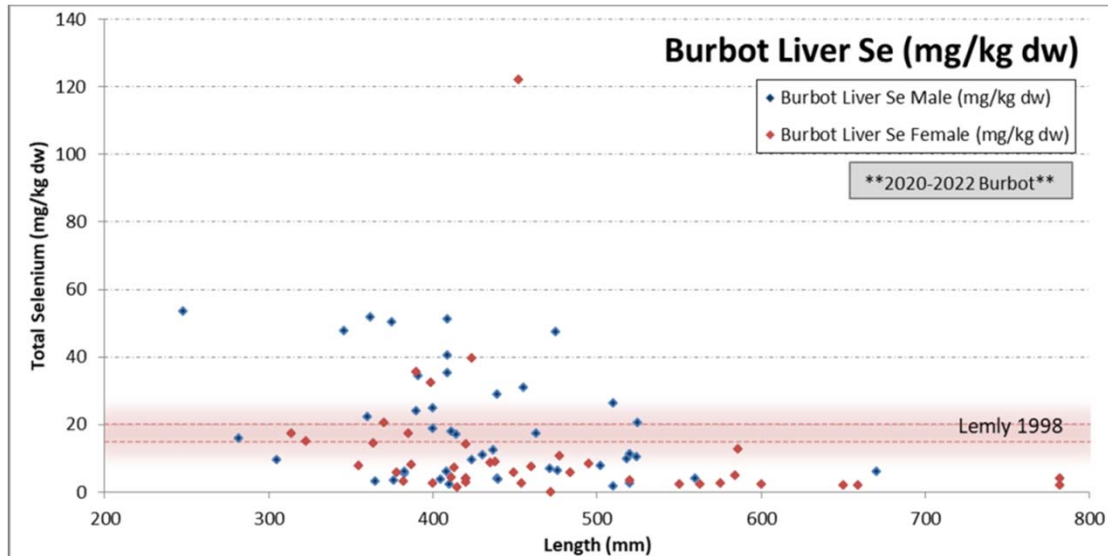


- Burbot egg Se concentrations are correlated to release site habitat types. Burbot released to river and wetlands habitats have higher Se than those released into Kootenay Lake.



NOT-SO-FUN FACTS

Burbot – Liver Selenium

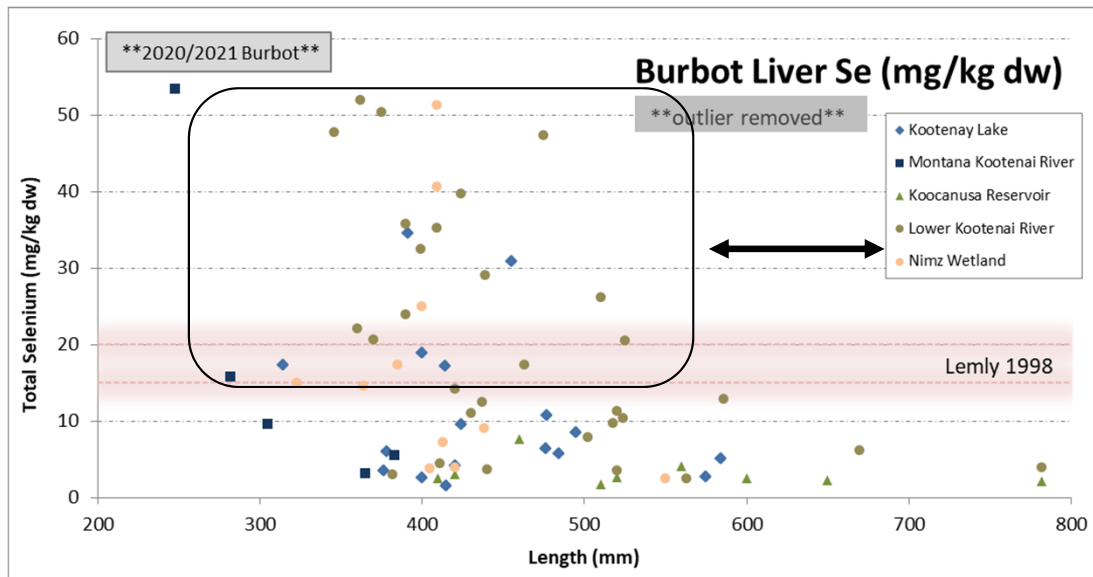


- Livers are very important to fish health and reproduction.
- Burbot liver Se concentrations are increasing; and many exceed protective guidelines.



NOT-SO-FUN FACTS

Burbot – Liver Selenium

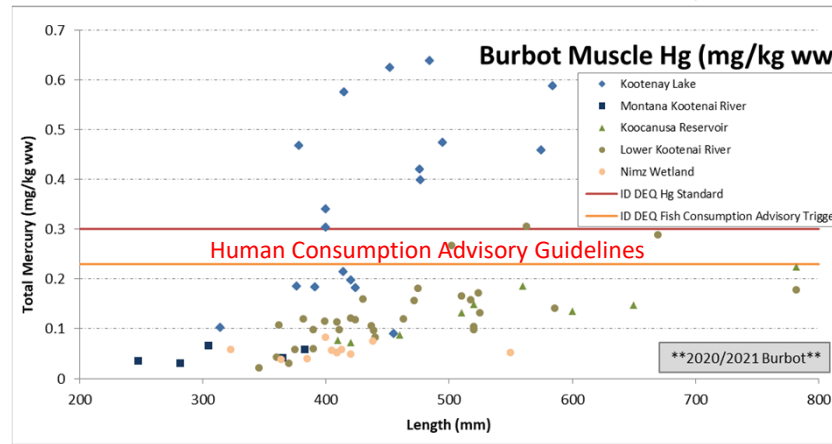


- Burbot liver Se concentrations are also correlated to release site habitat types.
- Burbot released to river and wetlands habitats have higher Se than those released into Kootenay Lake.

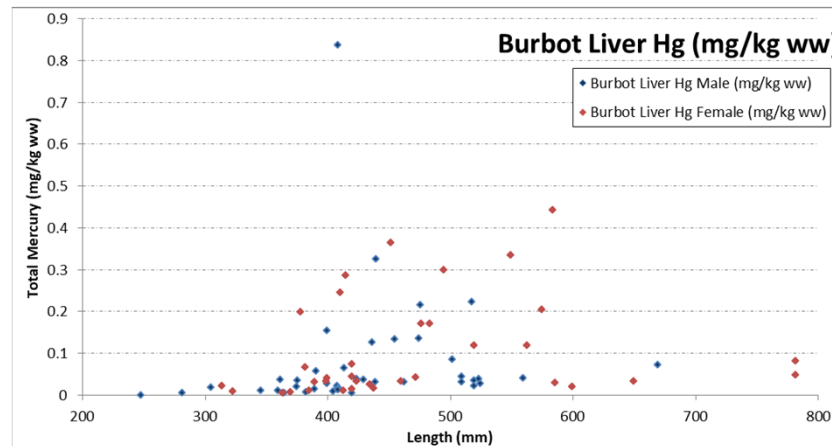


NOT-SO-FUN FACTS

Burbot – Muscle, Mercury



Burbot – Liver, Mercury

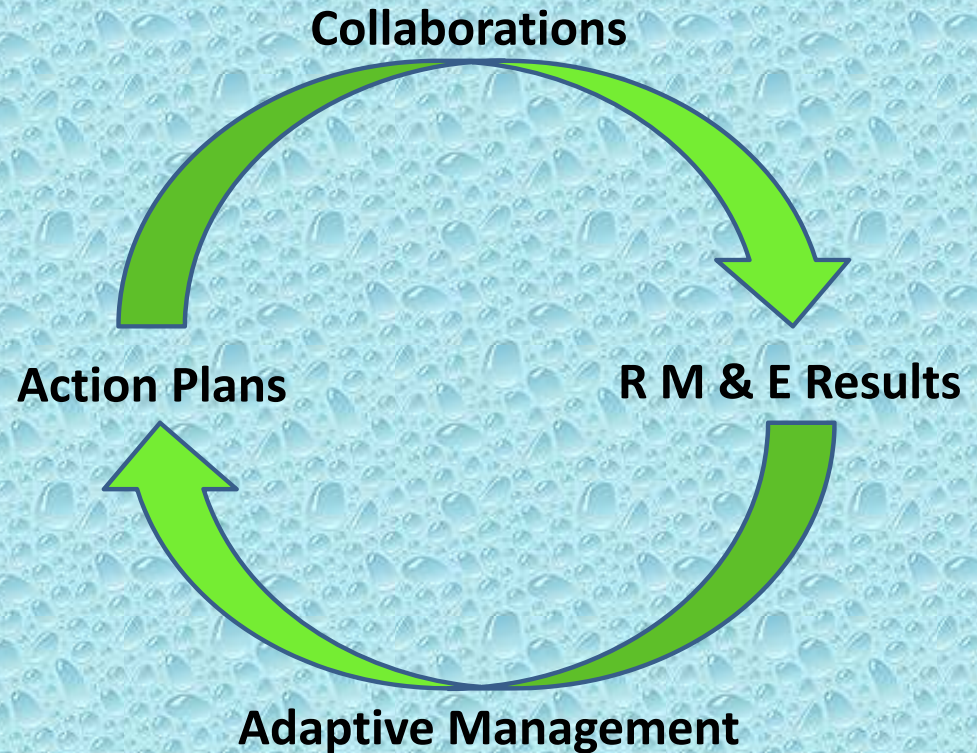


Kootenai Restoration Components

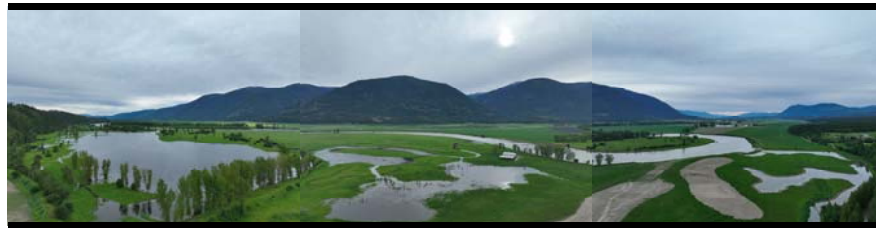
Contributing Programs

- ✓ Conservation Aquaculture
- ✓ Habitat Restoration
- ✓ Nutrient Enhancement
- ✓ Terrestrial & Riparian / Wildlife
- ✓ **CONTAMINANTS MONITORING**

Research, Monitoring and Evaluation completed by a host of collaborating agencies.



Habitat Restoration - Water on the Landscape



Dilemma...water transports pollution to the landscape



“habitat restoration needed, but transporting pollution”





Timeline: Perpetuity

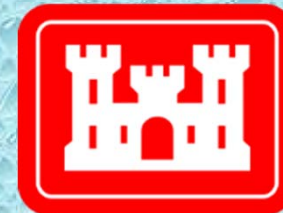
- Maintain engagement;
- Meaningful engagement;
- **Funding** to monitor and mitigate;
- Jeopardizes the \$500 million already invested to the Kootenai Ecosystem restoration.

Billions \$\$\$ needed to possibly achieve measurable mitigation over the lifetime of what are, and will become even worse, legacy impacts.





Collaboration!



Committment!

Thank You for your time!

