THE KOOTENAI(AY) RIVER: A BRIEF OVERVIEW OF SELENIUM AND NITROGEN TRENDS, AND WHAT IT ALL MEANS



Genny Hoyle, Aquatic Biologist, KTOI, Bonners Ferry, Idaho USA

Kootenai River Sub-basin

- •9 million acres (19,420 sq mi)
- •485 miles long
- •Ktunaxa Nation
- •2 Countries
- •2 States, 1 Province
- •Endangered Species
- •Hydropower
- •Resource-based economy



**KTOI slide prepared by S. Ireland



Kootenai Aboriginal Jerritory



**KTOI slide prepared by S. Ireland

The Approach: Tribal Initiatives

HISTORICAL ECOSYSTEM DEGRADATIONS **Beaver trapping** Conversion of floodplain Diking Logging Mining Infrastructure development Non-native species **Commercial harvest** Libby Dam

TRIBAL RESTORATION INITIATIVES

- Nutrient restoration & bio-monitoring
- Kootenai River habitat restoration (mainstem and floodplain reconnection)
- Tributary restoration
- Conservation aquaculture for sturgeon and burbot
- Burbot conservation strategy
- Wetlands & riparian conservation strategy
- Operational loss assessment
- Albeni Falls wildlife mitigation

**KTOI slide prepared by S. Ireland

Basin-wide Long-Term Bio-Monitoring

- Water sampling since 2003; April through September;
- Sites include Wardner, BC, MT, ID, and into Kootenay Lake;
- Monthly water chemistry; including metals
- Chlorophyll
- Macroinvertebrates
- Phytoplankton and Zooplankton
- Sturgeon and Burbot Tissue Contaminants

Elk River Mining Issue

- Coal mining activities since the 1900's, with shift towards strip mining in the 1960's;
- Leaching of selenium, nitrates, sulfates, and other contaminants;
- Lack of wastewater treatment;
- Acute contamination directly downstream of the mines;
- Future mine expansion.

Elk River Mining Issue

- Potential impacts on river flora and fauna to chronic exposure;
- Impacts to threatened and endangered species;
- Impacts to water quality;
- How do agencies/tribes pay for the increased/changed sampling analyses?
- What does remediation and rehabilitation look like?

Nitrogen



**KTOI data, slide prepared by C. Holderman





Koocanusa N and P _{uko Provincial Park} Budget Analysis

- Has the N and P budget for the reservoir changed over the last 35 years?
- Has the retention of N and P behind Libby Dam changed?
 - 4 sample sites
 - Bull River,
 - KR at Wardner,
 - Elk River, and
 - KR below Libby Dam





**KTOI preliminary data, slide prepared by HAY

Elk River Nitrates



on June 13, 2017

Selenium

- Currently picking up detections above the 1.0 µg/L DL in water sampling;
- Detections in low-flow times below Libby Dam, Troy, MT, and downstream into the meander reach below Bonners Ferry, ID;
- Looking into Brooks Lab for lower DL;
- Tissue contaminant analysis for both sturgeon and burbot.

Elk River Mining Coordination

- Two countries with differing Se criteria;
- Two states (MT DEQ; ID DEQ);
- Kootenai River lies within EPA R8 and R10; and
- Three tribal entities (CSKT, Ktunaxa Nation Council, KTOI);
- In general, most agencies and entities are under-staffed.

Elk River Mining Coordination

- Participation in the Lake Koocanusa Monitoring and Research Committee;
- Lack of official tribal inclusion into the decision-making process;
- Lack of transparency from Teck;
- Current scope of project is Koocanusa Reservoir and a lack of downstream consideration;
- Heavy focus on aquatics, less on terrestrial.

Participation in the Lake Koocanusa Monitoring and Research Committee

- Data-sharing with agencies;
- Coordination with EPA, USGS, Tribal Entities;
- Participation/observation in the SeTSC;
- Continued commitment to follow the science with respect for traditional uses and values.

Conclusion

- Recognize the importance of a <u>watershed-based approach</u> for research, monitoring, and policy-making;
- Importance of data-sharing capabilities along with lab compatibility;
- Importance of <u>long-term</u>, <u>high quality data sets</u>;
- Instill a sense of urgency to this issue.







Acknowledgements

- KTOI staff Sue Ireland
- IEH-Aquatic Research Damien Gadomski
- HAY Engineering Hassen Yassien