

# MEETING NOTES

## Monitoring & Research Committee (MRC) Teleconference November 18, 2021

### Meeting Objectives

- Share updates on the status of the Lake Koochanusa Monitoring and Research Working Group
- Share updates on the status of B.C. and Montana regulatory processes re: Selenium
- Share information on monitoring and recent scientific studies from various agencies

### Meeting Highlights

- New Montana Steering Committee co-chair and B.C. MRC co-chair
- B.C. and Montana regulatory updates
- Monitoring updates from KTOI, MT FWP, Teck and USGS
- Selenium toxicity studies updates from Teck
- B.C. Stewardship update re: Westslope Cutthroat Trout recovery

### Working Group Updates

Sean Moore (B.C. ENV, Steering Committee co-chair) and Myla Kelly (MT DEQ, MRC co-chair) reviewed the agenda and goals for the meeting. The focus of the day was on sharing updates about B.C. and Montana's regulatory processes following the working group's selenium recommendations received last year, receiving presentations on monitoring updates and recent scientific studies from various agencies and facilitating discussion about the information shared. Co-chairs acknowledged the desire to return to in-person meetings in the future and underlined the value of continuing to work together through the working group.

Myla introduced MT's new Steering Committee co-chair Amy Steinmetz. Amy is the new Water Quality Division Administrator for MT DEQ. She brings with her a background in science and a long history of working in the areas of water quality standards, remediation and public water. Sean introduced B.C.'s new MRC co-chair, Jillian Tamblyn. Jillian is a Policy Analyst in ENV's Southeast Coal unit, which is responsible for environmental protection regulatory oversight of the Elk Valley mines within the Environmental Protection Division.

Myla and Sean shared updates regarding the status and next steps for the working group. The focus of Lake Koochanusa Monitoring and Research Working Group (LKMRWG) for the past several years has been on two things: first - sharing information from across various agencies and jurisdictions on monitoring, data and science and providing a venue to discuss those learnings and information; and second - working toward development of recommendations on selenium guidelines and standards for Lake Koochanusa. With the recommendations work completed last year, Montana went forward with their rulemaking process in fall of 2020, and B.C. continues to work on their path forward for the Water Quality Objective (WQO) and Elk Valley Area Based Management Plan (ABMP). While that work is ongoing, B.C. and Montana continue to fully support the LKMRWG in its function to serve as a venue for sharing information and discussing results of monitoring and science initiatives. Through the 2020 MRC survey co-chairs solicited feedback from the members and observers of the LKMRWG about how the working group has been doing and what it might look like in the future. A summary of the

feedback received has been broadly shared and is available to anyone who is interested, and co-chairs continue to receive feedback through MRC meetings, correspondence and other channels. The input from the survey, along with any and all other feedback received, will inform decisions on next steps for the working group. B.C. and MT look forward to diving into those discussions on next steps, but it is vital that first the work is complete on making use of the LKMRWG's selenium recommendations through B.C.'s path forward for the WQO and potential amendments to the ABMP. In the meantime, it is currently anticipated that the MRC will continue to meet twice annually in the spring and fall.

Co-chairs paused for comments. Heather McMahon (KNC) commented that the MRC Survey was implemented a year ago and there have been continued delays on B.C.'s WQO since that time which could inform additional or updated feedback from members if they were to respond again. Heather asked if the survey would be re-issued or if co-chairs were counting on feedback through MRC meetings. Sean and Myla acknowledged the interval of time since the survey was implemented and emphasized B.C. and MT are open to receiving feedback from LKMRWG members, and designated observers. Erin Sexton (CSKT) commented that US Tribes have felt the LKMRWG was not an appropriate substitute for an overarching federal framework since it was established, and they reiterated that perspective in their MRC survey responses. Erin elaborated that US Tribes' concerns are focused on lack of inclusion for entities such as the State of Idaho, and the lack of federally- and Indigenous-led framework.

Co-chairs also shared an update regarding recent discussions amongst Executives of B.C, Montana, and Idaho. Separate from the LKMRWG, in July leadership of B.C.'s ministries of Environment and Climate Change Strategy; Energy Mines and Low Carbon Innovation; Forests, Lands, Natural Resource Operations and Rural Development, and the Environmental Assessment Office met with leadership of Montana's Department of Environmental Quality and Idaho's Department of Environmental Quality, with representatives from the EPA observing. The focus of the meeting was to provide an overview of B.C.'s regulatory framework in the Elk Valley. B.C. and Montana anticipate reconvening that group of leaders again once B.C.'s path forward on the WQO and potential ABMP amendments is in place, to explain the approach and answer any questions. These discussions have established a direct avenue for executive level engagement across our jurisdictions, which will be of value as we move forward.

To close the working group updates agenda item, Myla identified some recent updates to the LKMRWG's wiki page, which were circulated via email the day prior. Teck's 2020 monitoring report was released in June and is available on the wiki. The Transboundary Monitoring Task Group's (TMTG) 2020 Field report was recently uploaded. And a Montana Fish Wildlife and Parks (MT FWP) dataset on fish tissue and macroinvertebrates is now available under the "Data" folder. Links are as follows:

- Teck Annual Report:  
<http://lakekoocanusaconservation.pbworks.com/w/file/fetch/145582971/EVP%20S9.8%20Koo%20canusa%20Reservoir%202020%20Monitoring%20Report%20June%202020.pdf>
- TMTG Field Report:  
<http://lakekoocanusaconservation.pbworks.com/w/file/146897427/TMTG%20Koo%20canusa%20Field%20Report%202020.pdf>
- MT FWP dataset:  
<http://lakekoocanusaconservation.pbworks.com/w/file/146891748/FWP%20Koo%20canusa%20Selenium%20Data%20MASTER%202008-2020.xlsx>

Travis Schmidt (USGS-MT) asked for clarification about which data is and is not available on the U.S. Water Quality Portal. Lauren Sullivan (MT DEQ) noted much of the historic data for the reservoir is not on the portal and there has been a recent push to add data from the last couple years to the portal, including the data collected through the TMTG. She noted MT fish tissue data is not currently on the portal, with the exception of data collected through the TMTG. Lauren offered to connect with Travis offline to further explore the availability of data on the portal.

### **B.C. Selenium Objective Update – Sean Moore & AJ Downie**

Sean shared the following update on B.C.'s WQO. B.C. remains committed to establishing a WQO for the Canadian portion of Koochanusa reservoir, using a science-based process informed by the best data available. ENV staff have been working on a plan to complete work on the selenium WQO for Lake Koochanusa as part of a broader process that includes an amendment to the ABMP for the Elk Valley. Those pieces would proceed together as an integrated approach to ensure transparent and timely implementation of the WQO. This enables B.C. to go into the public comment period on a draft WQO and confidently communicate how the WQO fits into the broader regulatory framework if questions are received about how it is used or what it means as a policy statement. Once finalized following public comment, B.C. will use the new WQO to inform the amendment of the Koochanusa selenium target in the ABMP, which then will be translated into permit requirements.

This work builds on the LKMRWG's six-year collaborative and transparent multi-stakeholder process of monitoring, information sharing, and expert advice which informed the development of a predictive ecosystem-scale model delivered in August 2020. Over a period of several months, B.C. worked closely with the Ktunaxa Nation Council (KNC) using that model, testing the key factors of the model, understanding the assumptions and limitations, and applying the best available information and B.C.'s specific guidance and protocols to derive a credible recommended selenium objective. The result is a proposed draft selenium WQO for Lake Koochanusa, which is a policy document co-drafted by ENV and Ktunaxa Nation Council that describes the aquatic ecosystem of the reservoir; defines the values of the water body and influences on those values, including from the perspective of the Ktunaxa Nation; summarizes and references the predictive selenium ecosystem model; reviews available data and assesses current selenium levels in lake Koochanusa; proposes low-risk selenium concentrations in the water column and in fish tissue; and recommends a broad monitoring framework for the selenium water concentration and fish tissue concentration objectives to monitor for attainment of the objective once it's finalized.

ENV's collaborative work with the KNC identified that the most sensitive use or value for Lake Koochanusa is human consumption of fish at Ktunaxa's preferred consumption rates. ENV and the KNC defined a water column selenium concentration of 0.85 µg/L in Lake Koochanusa and a whole-body fish tissue selenium concentration of 5.2 mg/kg (dry weight, or 1.3 mg/kg wet weight) as the proposed objectives for this use/value. Collaborative development of the draft selenium WQO for Lake Koochanusa between B.C. and the KNC is now complete. The proposed WQO is in draft format because it has not yet moved through the final stage of the WQO development process, which will be a public comment period. B.C.'s WQOs are approved provincial policy statements that apply to specific waterbodies. The WQOs are not legally enforceable standards or limits on their own. However, these policies must be considered in relevant decisions made by statutory decision makers within ENV and may guide other processes, such as land use decisions. In this case, the selenium WQO will inform work to be conducted under a process that will review and update the ABMP and associated waste

discharge authorization. Any review and update of the ABMP must be initiated by B.C.'s ENV Minister via an Order, and so the next step for the WQO, the public comment period, will occur once a Ministerial Order is released to begin the ABMP review and update process. Following the public comment period which will occur at the beginning of the ABMP process, a final proposed WQO will be forwarded for official approval and will then inform the rest of the ABMP review and update process.

Sean opened the floor for KNC representatives to share their perspective on the update so far. Heather McMahon (KNC) expressed appreciation for the work with ENV on developing the WQO and noted the KNC looks forward to seeing it released for public comment and to work together to finalize the WQO. However, the KNC is disappointed that the WQO work has not been completed in alignment with the 2020 B.C.-MT Joint Workplan, which sought to achieve aligned selenium recommendations in the fall of 2020. The KNC does not see the need for coupling the WQO and ABMP processes together and eagerly await the release of the WQO, including the recognition it provides of Ktunaxa cultural values that are of great concern and importance to the KNC. The KNC views this process as being delayed and is concerned the decoupling of B.C. and MT's objectives/standards constrains the ability of Indigenous governments to be on the same page and inhibits the protection of shared waters. Joe Skorupa (US FWS) asked whether there are any plans to try and reconcile MT's standard and B.C.'s WQO. Co-chairs noted that presently the MT standard is approved and implemented, while the B.C. proposed WQO is moving toward a public comment period and although the selenium numbers are very close, they are not the same. The potential to seek full alignment is a question B.C. and MT will need to consider in the future, and B.C.'s upcoming public comment period on the WQO will provide an opportunity for stakeholders to share their perspective.

AJ Downie (B.C. ENV), Director of the Southeast Coal unit in the Environmental Protection Division, further explained the ongoing work to build the integrated WQO/ABMP process that Sean described. B.C. is continuing to work with the KNC to confirm the process and scope of potential amendments to the ABMP, including reassessing the Koocanusa selenium target that is defined in the ABMP following finalization of the WQO. The ABMP is a water quality planning tool which informs regulatory decisions including Environmental Assessments (EAs) and waste discharge permit requirements in B.C. It identifies the targets to be achieved in the Elk Valley and then permit requirements set the specific legal requirements including when and how those targets will be achieved. As the key planning tool in the Elk Valley which drives the setting of legal requirements and the implementation of management strategies, the ABMP is the most appropriate venue for the selenium WQO to be considered once it is approved.

In addition to reassessing the selenium target in the plan, based on the new scientific information in the selenium WQO, B.C. has also learned a great deal in recent years through implementation of the current version of the ABMP, in relation to both the content of the plan, and how it is applied. As a result, ENV staff are recommending a broader update to the ABMP based on all of our learnings. The decision to amend the ABMP, including the scope of any amendments, must be made by the B.C. ENV Minister, meaning the details of the process cannot be confirmed until that decision has been made via a Ministerial Order. However, in the interest of transparency AJ shared some of what ENV and the KNC are considering in their scoping work for this process, including: having the Province take the lead role in drafting the plan amendment, which is different from the past when the ENV Minister ordered Teck to prepare the plan; transitioning the plan into a higher-level framework that will support effective decision making in the plan area - not just decisions regarding Teck's operations, but rather all potential operations in the area; updating foundational knowledge and key assumptions based on

scientific learnings; reassessing the selenium target in Kooconusa reservoir, informed by the Kooconusa selenium WQO, new science and technology; and identifying processes for reviewing and/or updating other constituents, targets, and order stations in the ABMP. B.C. and KNC are still working on an engagement strategy but expect there will be opportunities for US partners to input at appropriate junctures throughout the process, including the public comment period on the WQO.

More detail on the integrated WQO/ABMP path forward will come once B.C. and KNC have agreed on a draft Ministerial Order and ABMP Amendment Terms of Reference. AJ and Sean acknowledged it has taken longer than anticipated to get this process underway and that LKMRWG members and observers are eager to see the outcomes. In terms of timing staff currently anticipate the process will be initiated early in the new year (e.g. within weeks to months). The final scope will dictate the timelines from then forward, and ENV anticipates it may take between 12-24 months to fully complete the amendment process – however ENV and KNC are also contemplating a possible ministerial decision on the selenium target part-way through the amendment process in order to expedite that very important piece of the decision-making.

AJ and Sean opened up the floor for questions. Randal McNair (Wildsight) asked B.C. to clarify who it considers ‘partners’ for developing the ABMP’s selenium target reassessment. AJ clarified that ENV is working with internal partners including other B.C. Ministries, but the overall project is a partnership between B.C. and the KNC. ENV and the KNC are working very closely, meeting often, sharing information and intend to co-draft the ABMP amendment and to develop the overall process for the path forward collaboratively together. Heather McMahon (KNC) added that while KNC does not share the perspective that the WQO and ABMP processes need to be joined, KNC does very much support the need for an ABMP amendment and is deeply engaged with B.C. on developing that. She also clarified that the engagement strategy for the ABMP process is still being developed by B.C. and KNC, so details about engaging other groups in that process cannot be confirmed at this time.

Joe Skorupa (US FWS) and Erin Sexton (CSKT) asked whether the WQO numbers might change given the current draft status of the document. Sean clarified that the drafting of the WQO between ENV and the KNC, including setting the proposed numbers, is complete but the document is still draft. Today B.C. is verbally sharing the draft numbers with Working Group members and observers in advance of the formal public comment period. Once the Ministerial Order for the WQO/ABMP process is released, the draft WQO document will be released for public comment, following which B.C. and KNC would consider the feedback and whether any potential changes should be recommended. Once that analysis is complete, ENV and KNC would make any necessary changes to the document and put it forward to ENV and KNC decision-makers to explain the feedback received and any changes proposed, and seek final approval.

Patricia McGrath (US EPA) expressed appreciation for the update and support for the steps being taken and asked about timing. How long it would be before permits are revised and would compliance schedules provide additional time after the permit changes are made for Teck to come into compliance? AJ acknowledged that timeliness is very important and is a key focus for his team as they work on the process with the KNC. He clarified that they are contemplating a two-step amendment whereby the selenium target reassessment would be undertaken early in the process as soon as the WQO is finalized following its public comment period, so that there is more certainty around that target as soon as possible. This may be a way to accelerate the work needed to fully translate the WQO through B.C.’s regulatory processes into a target along with a timeline and expectations of what it will

take to achieve that target. AJ's team is also exploring how much of the permit amendment work can be prepared in advance, and identifying opportunities to undertake key steps for the ABMP and subsequent permit changes in parallel in order to minimize any lag between an updated ABMP and permit changes.

Genny Hoyle (KTOI) expressed appreciation for the proposed WQO and noted that although modelling has shown it may be protective of the reservoir, data is emerging from the lower Kootenay river below Libby Dam indicated impairment at higher concentrations in that area. Genny suggested this points to a fundamental flaw in the development of the selenium recommendations and standards/objectives in that they did not consider conditions below the dam.

Jason Gildea (US EPA) echoed Patricia's comments and asked about the proposed projects currently going through B.C.'s EA process – how will the WQO be used in the context of the EA processes given the timeline for the WQO/ABMP process? Todd Goodsell is a Project Assessment Director at B.C.'s Environmental Assessment Office (B.C. EAO) observing today's meeting and offered to answer the question. EAO considers water quality targets, objectives or standards as part of their work to identify 'significance thresholds' for EAs. EAO is very aware of the ongoing work related to the WQO/ABMP process and its relevance to EAs. There are currently three active EAs for the Elk Valley all in the pre-application phase, as well as two inactive proposals. Incorporating the WQO information will be carefully considered when the three active proposals get underway early next year.

Heather McMahon (KNC) noted Genny's comments about the Lower Kootenay river and reminded the group that the river flows back to B.C. after winding through Montana and Idaho. The KNC do not recognize the international boundary and it is not part of their stewardship responsibilities to all living things. Hearing about impacts in the lower river and recognizing the stewardship work of the KTOI in recovering burbot and white sturgeon highlights the need to understand the watershed in its entirety and in a way that recognizes the stewardship responsibilities of Indigenous governments. Regarding Jason's question about EAs, Heather noted B.C. and KNC are will working to understand how the reservoir will be protected, and acknowledged that KNC shares deep concern for the need to address historic impacts and future loads in the area. Heather also noted the KNC, CSKT and KTOI have issued letters to B.C. and the government of Canada asking the Elk Valley EAs to be paused. Erin Sexton (CSKT) also noted the CSKT and KTOI requests to pause Elk Valley EAs until aligned standards for the lake that are protective and enforceable are achieved. Todd Goodsell (B.C. EAO) commented that EAO takes these requests from KNC, CSKT and KTOI very seriously and the EAO is working with the KNC to address the concerns mentioned in those requests, with meetings on that subject scheduled for December. B.C.'s Minister of Environment responded to those requests in September saying now is not the appropriate time and we don't have a mechanism to pause those EAs because they are currently in the pre-application phase. That phase means they haven't submitted applications yet, after which technical review begins. While it is not appropriate to suspend the processes at this time it is important to note EAO will often ask for additional information to inform its analysis, which can often result in suspension of the process while that information is gathered. That may be what happens for the Elk Valley proposals. EAO continues to liaise with ENV regarding the timing and processes for the WQO/ABMP process but it is possible EAO will consider issuing information request for proponents to show how they would meet a draft target or new target in the future. EAO is keen to consider any info that may be missing once we get to the technical review phase.

## MT Selenium Standard Update – Myla Kelly

Myla provided an update on implementation of MT's selenium standards for Lake Koocanusa; a petition before the MT Board of Environmental Review (BER) regarding the selenium standard; and MT's legislative Study Bill HJ37.

Informed by the work of the LKMRWG and the Selenium Technical Sub-Committee's recommendations MT adopted its selenium standard into State law in December 2020. As with all water quality standards in the US it was then submitted to the US EPA for approval, which was granted in February 2021. With the standards now in place, MT has begun development of a monitoring assessment methodology for the reservoir and Kootenai River. This is the process by which the State will use readily available data to determine if standards are met in waterways. There are methodologies for all kinds of pollutants. The current work is focused on the method for selenium fish tissue because that is new for Montana DEQ. Once development of the draft methodology is complete there will be a stakeholder and public review process to provide input.

Earlier in 2021 Teck Coal and Lincoln County Commissioners filed separate petitions to the MT Board of Environmental Review (BER) asking for review of the selenium standard, stating the new standard is more stringent than the US EPA standard. MT DEQ's position is that the standards are not more stringent – the federal criteria are based not on water column concentrations but on fish tissue and the 2020 standards represent a translation of federal fish egg ovary criteria (15.1 mg/kg dry weight) into muscle, whole-body, and water column concentrations. MT adopted tissue standards consistent with federal criteria and the translation for the other parameters was consistent with federal processes and guidance for deriving those criteria using a mechanistic model. Next steps for this petition include making the BER's record of decision available to the public and taking comments on the merits of the petition and whether the standard is more stringent than federal criteria, as well as an opportunity for comments in response to the initial comments. There is a regulated timeline for this process of 8 months starting from the time the petition was received. At the most recent BER meeting, the Board decided to base that timeline on the receipt of the more recent submission from county commissioners from October. The deadline therefore is mid-June 2022. Potential outcomes could include: the Board determining the standard is, or is not, more stringent than federal criteria; and if they find it is more stringent they could direct MT DEQ to undertake a stringency analysis or undertake new rulemaking. Myla emphasized this petition process is handled by the BER separately from MT DEQ, so folks should check the BER webpage (<https://deq.mt.gov/about/ber>) regularly to track the process and direct any questions to the BER's secretary at [deqbersecretary@mt.gov](mailto:deqbersecretary@mt.gov).

A bill to study the selenium standard set for Lake Koocanusa (Study Bill HJ37) was passed during the previous MT legislative session in 2021. The bill was passed and assigned to the Water Policy Interim Committee (WPIC) of the legislature. A special committee was subsequently formed to review the process by which MT DEQ set the selenium standard. It includes four members of the WPIC and four members of the Environmental Quality Council (EQC). The special committee has not met yet. MT DEQ has not been in contact with the special committee about exact goals yet but are looking forward to providing the committee with any information it needs. The special committee's meetings are likely to be open to the public including opportunities for comment, however the committee and its processes are not determined by MT DEQ, so any questions should be directed to the WPIC chair or the special committee's officer. Updates on the happens of WPIC and HJ37 can be found on the WPIC webpage (<https://www.leg.mt.gov/committees/interim/wpic/>).

Myla opened up the floor for questions. Joe Skorupa commented to explain the difference between MT's standard and B.C.'s proposed WQO. The MT standard is a site-specific translation of a national standard, while in B.C. it's a site-specific objective with fish wholebody concentrations. In order to reconcile the two, and if tribal fish consumption is the most sensitive use, it seems the MT wholebody concentration may need to come down. Joe noted that EPA has narrative standards that supersede numeric standards, so if the wholebody concentration target were to go down it is arguably no more stringent than the EPA's narrative standard.

MT Rep. Steve Gunderson asked about recent updates to MT FWP's fish consumption advisories, and whether selenium was recently removed from the health advisory there. Trevor Selch (MT FWP) clarified his agency does not currently have any advisories driven by selenium. There is fish consumption guidance for mercury, based on muscle tissue concentrations. Trevor noted US agencies analyze muscle tissue concentrations for consumption advisories while US Tribes consider wholebody concentrations. There was previously a consumption advisory listing for elevated selenium concentrations in Burbot, and there may be Peamouth Chub which isn't consumed very frequently with some elevated concentrations. Trevor committed to follow-up with additional information (ACTION) and later in the meeting he did so in the chatbox, providing a link to the updated MT Fish Consumption Guidelines (<https://fwp.mt.gov/binaries/content/assets/fwp/fish/montanasportfishconsumptionguidelines.pdf>). Joe Skorupa further clarified that the mean concentrations of around 9 mg/kg dry weight in muscle tissue, would lead to consumption guidance. While there are individual peamouth with concentrations greater than 9 mg/kg, the mean value is less than 9 mg/kg so there is no current consumption guidance is in place.

### Elk Valley Updates - AJ Downie

AJ (B.C. ENV) walked through a presentation to provide a regulatory overview and update on the Elk Valley, with a focus on how ENV manages water quality in the valley. The slides are available on the wiki at:

<http://lakekoocanusaconservation.pbworks.com/w/browse/#view=ViewFolder&param=Meeting%2013%20Presentations>.

AJ began by explaining the Area Based Management Plan (ABMP), the Valley-Wide discharge permit (issued under the *Environmental Management Act*, EMA) and how they relate to regulatory requirements. The ABMP is the overarching water quality management strategy for the Elk Valley, which was approved by the B.C. Minister of the Environment. It informs decision making because the Minister, in approving the ABMP, has directed all statutory decision makers under B.C.'s EMA to consider the plan. It acts as a policy foundation that must be considered in making decisions. The ABMP includes identification of a number of water quality targets that are intended to stabilize and reduce concentrations of key constituents associated with coal mining including selenium, nitrate, sulphate and cadmium in the watershed.

The valley-wide discharge permit (EMA permit #107517) provides a vehicle to ensure implementation of the ABMP. The permit sets regulatory requirements for Teck that must be met, including water quality Site Performance Objectives and compliance limits; treatment requirements – which are reviewed and updated on a regular basis; and other requirements like water quality, aquatic life and groundwater monitoring, research and development requirements and adaptive management.

The permit is about 100 pages long including many regulatory requirements beyond water quality limits and targets. Water quality targets are established at different sites within the valley which we call “order stations” because they were established via the Ministerial Order for the ABMP, (illustrated as blue dots in the map on slide 3). There are also compliance points downstream from each mine site intended to provide a location where all point and non-point sources of discharges from the mines can be captured and monitored to track conditions immediately downstream, in addition to the mainstem order station locations specified in the Ministerial Order.

Slide 4 illustrates how the elements of the ABMP, including water quality targets, are translated and used in B.C.’s approach for regulating and managing water quality in the Elk Valley over time. The targets in the ABMP have been translated into site performance objectives at the order stations in the valley-wide permit. Then a regional water quality model is used for a few things. When the permit was first issued, the regional model was used to back-calculate predicted concentrations that would need to be met at the boundary and downstream of each mine, and this information was used to set water quality compliance points. The regional model is also, and perhaps most importantly, used to determine where and when mitigation projects, such as water treatment plants, need to be built in order to meet water quality targets and site performance objectives. Implementation plans are the result of applying the regional model and they articulate Teck’s plan for how they’ll meet the ABMP targets and permit limits, using the predictive model. Originally this was called an ‘Implementation Plan’ (IP), and subsequent iterations are an ‘Implementation Plan Adjustment’ (IPA). The information and results from the IP are taken by B.C. regulators and they examine what near-term treatment proposals are identified in the IP, and then B.C. incorporated those proposals into the permit as specific regulatory requirements for development and implementation of water treatment.

There is also a research and development program in the permit, a range of monitoring programs, such as regional aquatic effects monitoring and other more localized programs, as well as overarching requirements for an adaptive management plan. As new information becomes available over time, and on a three-year cycle, there is a regular review and update of the regional water quality model, the IP/IPA, and the translation of those pieces into treatment requirements. The three-year cycle of reviewing and updating the water quality model and IPA includes both EMA permits managed by ENV and *Mines Act* permits issued by the Ministry of Energy, Mines and Low Carbon Innovation. The current work to prepare a potential amendment to the ABMP is in addition to the regular three-year cycle of reviewing and updating the model and IPA. B.C.’s regulatory approach is designed to use information from research and development work, monitoring and assessment programs, and adaptive management plans, as well as any new scientific information, to periodically evaluate whether the ABMP itself needs to be amended or updated. That is what B.C. and the KNC are currently working on as they feel an update to the ABMP is now appropriate. Per the feedback loop illustrated on slide 6, this would allow for a reevaluation of the selenium target in the ABMP itself and as the process moves forward that would be translated into a permit requirement and then the most recent version of the water quality model would be used to identify updated Implementation Plan requirements which then can be incorporated as requirements in the valley-wide permit.

AJ proceeded to provide an update on the current stats of the regional water quality model. The model was recently reviewed and updated by Teck. Technical reviewers have been reviewing the 2020 model update over the last several months with the goal of wrapping that work up soon, because work is now underway to begin development of the next IPA. The 2020 model update has improved the model in a number of ways, such as incorporating source terms for Saturated Rock Fills and new

waste rock spoils, adding a new climate driven hydrology module, and incorporating groundwater flow and mass attenuation. As with any model there remain some key uncertainties that reviewers continue to be mindful of as they review the update and make decisions. B.C. reviewers are nearing the completion of their review, concluding that the regional water quality model is generally well calibrated to measure water quality data and that they are comfortable using the model to support the development of the next IPA, and for use throughout the next three-year planning cycle.

Teck is currently developing the next IPA and proactively engaging ENV, the KNC and other B.C. agencies. Teck anticipates the IPA will be ready for review in 2022. The IPA describes specific mitigation strategies to meet Site Performance Objectives and compliance limits in the valley-wide permit. Regarding water treatment in the valley, Teck is now using active water treatment and Saturated Rock Fills to remove selenium and nitrate from surface water, and antiscalant modules have been deployed throughout the watershed to control the rate of calcite formation. Research and development continues to be a high priority for everyone and especially Teck to continue investigating alternative source control and treatment technologies for managing order constituents. The picture on slide 8 shows the new active water treatment facility at Fording River Mine that has been under construction in accordance with earlier versions of the IP. Slide 10 provides a list of key water treatment projects. Line creek has been removing selenium and nitrate since 2014. Commissioning has commenced at the Fording River South Active Water Treatment Plant and it should be up and running shortly. The Saturated Rock Fill facility at Elkview Mine was behind schedule but has now been operating since August 2021. Metrics in the slide 10 table identify removal rates. B.C. is close to making final decisions on phase 1 for the Fording River North Saturated Rock Fill, which will be the second Saturated Rock Fill facility in the valley. Expectations for upcoming treatment include: an application from Teck for phase 3 construction on the Elkview Operations Saturated Rock Fill; and phase 2 on the Fording River Operations North Saturated Rock Fill. Discussions are also underway regarding the Line Creek Operations Mine, Dry Creek Conveyance and Supplementation application which is an interim water quality mitigation proposal that is expected to be received by regulators in January 2022. The longer-term Water Management Plan for this watershed is currently under review, and new treatment requirements for Dry Creek will likely be set in 2022. B.C. continues to prioritize review of source control, treatment and remediation.

Regarding compliance and enforcement, ENV has a multi-year compliance plan developed with input from the KNC and coordinated with partner agencies in B.C. ENV's compliance and enforcement program is handled by a separate team within the ministry. That team conducts quarterly inspections on the valley-wide permit and annual inspections for eight other effluent discharge permits. Air, refuse and explosives permits are inspected at least once every four years. In the current fiscal year (from April 1<sup>st</sup>), ENV staff have conducted 26 inspections at Teck mines. Teck has reported nine exceedances of selenium limits and seventeen exceedances of nitrate limits in the Elk River watershed, as well as one exceedance of the Koocanusa selenium target. B.C. takes those reports very seriously and rely on a compliance and enforcement policy and procedure and a decision matrix to guide enforcement responses. That includes a principle of escalating enforcement for continuing non-compliances. Currently, eleven administrative monetary penalties related to non-compliances for Teck are being prepared. All inspection reports are available online. More information on inspections reports can be found at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/reporting/env-compliance-inspection-report> and inspection reports themselves can be searched at <https://nrccd.gov.bc.ca/>.

AJ opened the floor to questions. Erin Sexton (CSKT) requested a summary of any changes in objectives and compliance points through the IPAs, and a summary of treatment technologies including the volume of water that needs to be treated to achieve current compliance points relative to actual volume of water currently being treated, and requested to see the data behind the non-compliance citations including the specific exceedances, and trends for non-compliance across compliance points. AJ clarified there are been no changes to targets, site performance objectives or compliance points over the years. The ongoing work to prepare for a reassessment of the ABMP's selenium target would be the first time since the plan was implemented where changing a target is contemplated. There was a change in early 2021 to move a compliance point in the Upper Fording, which was done to make sure that the compliance point situated at a location to best measure and assess mine-related influences on the Fording River. It was essentially a geographical move with an associated re-calculation using the model, rather than a re-evaluation of a target or a change to the requirements or goalposts that Teck is required to meet. Regarding the volume of water needed to achieve compliance points, B.C. expects that information to be included in the IPA that is currently being developed. Because there is a new regional model, new learnings and improved understanding of the performance of the Saturated Rock Fill facilities, it may not be worthwhile to look at the previous IPA at this time, but in 2022 the Province will be in a much better position to identify what is in place now and what will be needed to meet those targets. Regarding non-compliances, all the ministry's inspection reports, with the details requested, are available at: <https://nrce.d.gov.bc.ca/>.

Jason Gildea (US EPA) asked for clarification about the role of the WQO in the context of re-assessing the ABMP's selenium target, whether the WQO will be in the goal B.C. intends to meet through the ABMP and permitting. AJ explained the WQO is a guiding policy that does not automatically get translated directly into targets. It is derived using the best available science, but it includes calculations using models that rely on conservative assumptions about how selenium behaves in the environment and when it starts to pose a risk of impact. As a policy statement the WQO provides important foundational knowledge and understanding of what low risk conditions are expected to look like in the waterbody. However, exceedance of a WQO does not automatically indicate a likelihood of impact or impairment of designated uses. It is through the target reassessment process where that information will be considered along with other site-specific information and factors to identify a regulatory target (or targets), which protect the designated uses of the lake from impacts, but may or may not be exactly the same as the WQO numbers (two of which are proposed, one for tissue and one for water) now or into the future. Other targets in the ABMP have been structured to change and decrease over time in recognition of historic liabilities and B.C.'s ongoing commitment to use monitoring, impact assessment and adaptive management over time to evaluate the ecosystem and confirm whether adjustments to regulatory targets are needed. A similar approach may be appropriate for Lake Kocanusa, and consideration also needs to be given to the use of water vs. tissue concentrations, and where, when and how to measure the number. To summarize, WQOs and water quality guidelines in B.C. provide very important foundational information to guide decision making by identifying conservative, low risk conditions in water bodies. Decision makers have an interest in protecting all the uses for the waterbody and ensuring that risks are managed appropriately. However, it would be premature at this stage to specify what the target will look like in advance of doing the target reassessment work to make that determination with the KNC and other subject matter experts.

Heather McMahon (KNC) offered comments in response to Erin and Jason's remarks. KNC agrees that the proposed water column number in the WQO is required to protect Ktunaxa cultural values and

while they still need to go through the target reassessment process with B.C., it is important to be clear that protecting KNC cultural values is critical, and the Nation does not share B.C.'s perspective on low- vs. high-risk scenarios, rather KNC is focused on protecting all living things and ensuring cultural values are restored to the Nation and for future generations. KNC's perspective is that the proposed WQO numbers should be used as the new regulatory targets and will be bringing that perspective forward throughout the target reassessment process. Regarding the information Erin requested which will be forthcoming in the new IPA, Heather noted the new IPA will be set within the context of existing regulatory targets (2 µg/L), not new targets.

Jason (US EPA) asked to confirm B.C.'s intent to hold the pen on the new ABMP and for clarification about how the updated ABMP would consider other/new mines and establish a more wholistic valley-wide plan that isn't focused on one permittee. AJ reminded the group that the decision to undertake the ABMP update and what the scope will be for that is subject to a ministerial decision, and he is sharing at this time the intent for that process currently being discussed between ENV and the KNC. With that caveat in mind, ENV and the KNC are contemplating holding the pen on the updated ABMP, whereas the first version of the plan was drafted by Teck at the Minister's order, and so it focused on describing how water quality would be managed regarding their mines. Nevertheless the plan applies to anyone operating in the area. B.C. feels it could be easier to apply the plan if it was written by the ministry with an understanding that there may be other decisions needed regarding other proponents. So the intent currently is for the Ministerial Order to direct ENV to draft the amendment with the KNC, which would provide an opportunity to re-write the plan as a framework that better supports the decision making that needs to occur, and provides a different type of direction to the ministry, including for the consideration of other projects should they proceed through the EA process.

Erin Sexton (CSKT) expressed disappointment in the timeframes being discussed and the fact that the new IPA will be set in the context of the existing target. CSKT sees a desperate need to begin to address legacy damages of mining in the watershed before looking at adjusting management plans to address new mining proposals. Erin feels the legacy impacts of mining are being lost in the conversation and looks forward to seeing them addressed.

The B.C. presentation continued with a final slide regarding the status of EAs for proposed projects in the Elk Valley, delivered by Todd Goodsell (B.C. EAO). Todd reminded the group that EAs are the first step in the regulatory process for major projects in B.C., and major mines require an EA certificate before any permits can be issued. A key step within the EA process is determining if the project will result in 'significant effects' to inform decisions by Ministers on whether to issue a certificate. The term significant effects is critical to understand the severity of potential impacts and EAO works to define that term collaboratively with members of the EA working group. Presently any proponent coming forward to propose a mine in the Elk Valley needs to demonstrate how they would meet the targets set out in the ABMP, and if the ABMP were to change EAO would ask for more information to demonstrate how the updated plan would be achieved. Todd acknowledged it is challenging in this case given the timelines for the different processes, but emphasized EAO can work with participants to determine how to determine if potential impacts on water quality would be significant and noted that EAO often relies on WQOs, water quality guidelines, and the work of other B.C. agencies, including that of AJ and his team, to inform those significance thresholds. Often numerical standards set through such processes will be the same for significance thresholds in the EA process, but not always. Todd then provided an overview of the current status of Elk Valley proposals. There are three active EAs in

the valley (Crown Mountain, Michel Coal, and the Fording River extension) and two inactive proposals that have been dormant for several years and for which proponents have not confirmed plans to continue in the process. All three of the active EAs are in the pre-application phase, and they are all being coordinated with B.C. EAO and the Impact Assessment Agency of Canada. Crown Mountain and Michel Coal are being assessed under the previous version of B.C.'s *Environmental Assessment Act* (2002), and the Fording River Extension project is being assessed under the new 2018 Act – this is due to when the projects began their EA processes. It is possible that Crown Mountain and Michel Coal may need to transition to the new Act and EAO is working with proponents on that potential outcome. Crown Mountain and Michel Coal are anticipated to submit applications early in 2022 after a lengthy pre-application phase. At that point EAO would begin the screening process sometime in the first or second quarter of 2022, which would include opportunities for input from many of the members of the LKMRWG. Teck submitted a detailed project description for the Fording River Extension project in the summer of 2021 which provides details of what they propose to do, to inform a readiness decision currently targeted for early 2022. The next step for that project is for EAO to draft a recommendation report for the readiness decision, which they hope to issue for technical advisors review in January 2022, where again many of the members of the LKMRWG, that also serve on the technical advisory committee will be engaged through that process.

In the chatbox of the meeting Randal McNair (Wildsight) asked for clarification of how B.C. reviewers determined the Elk Valley Water Quality model is well calibrated. The question was not answered during the meeting due to time. ENV staff provided the following answer afterwards for inclusion in this summary: The water quantity and water quality modules of the Regional Water Quality Model (RWQM) were both independently calibrated against measured data collected between 2004 and 2018. The water quantity model was calibrated at 48 mainstem and tributary locations and the water quality model was calibrated at 45 mainstem and tributary locations. Graphs and statistics describing both the water quantity and quality calibrations at all nodes were provided in the reporting and ENV rigorously reviewed the RWQM report and all of the calibration graphs and statistics.

### **TMTG Update – Robyn Roome & Myla Kelly**

Robyn Roome (B.C. ENV, TMTG co-chair) and Myla Kelly (MT DEQ, on behalf of the MT DEQ co-chair Galen Steffens) provided an update on the Transboundary Monitoring Task Group (TMTG). Robyn began by reviewing the origins and of the TMTG, which was established in 2018 with membership from B.C. ENV, MT DEQ, Teck Coal, the US Army Corps of Engineers (US ACE), with US EPA representatives observing. A project charter was development approved in 2018 setting out the goals for the project, which included: developing a common understanding of current transboundary water quality monitoring activities and data in the reservoir; identifying key gaps for 2019-20 transboundary water quality monitoring with respect to US requested data, and recommending actions to jointly address monitoring needs for the US portion of the reservoir; and recommending processes, actions, roles and responsibilities to jointly address making the 2019-20 monitoring data available to project participants, with consideration for potential public roll-out. Through the successful implementation of the project a number of accomplishments were achieved, including: development and implementation of the 2019-20 Koochanusa Sampling Program (sampling matrix), which outlined sample medium/constituents, sampling frequency/number of sites, methodologies, and responsibilities; cost-sharing with Teck covering sample shipping and analytical costs; agreement to share information through data upload to the WQX Portal; implementation of the 2019 and 2020

sampling programs (with 2020 impacted by COVID travel restrictions); and the production of the 2019 and 2020 Field Reports, including summary figures, which are available on the wiki (2019 Field Report:

<http://lakekoocanusaconservation.pbworks.com/w/browse/#view=ViewFolder&param=2019%20Field%20Report>, and 2020 Field Report:

<http://lakekoocanusaconservation.pbworks.com/w/browse/#view=ViewFolder&param=2020%20Field%20Report>). Robyn and Myla acknowledged and expressed appreciation for the substantial effort and collaboration that was required to complete those accomplishments.

Myla spoke to the conclusion of the TMTG and next steps. The TMTG continued to meet in 2021 to determine whether there was value in extending time and scope of TMTG. At this point there is much agreement that monitoring in the Lake Koocanusa watershed is long-term, with many parties conducting monitoring, some with shared objectives, others with specific additional objectives. Collaboration and info-sharing across agencies can and will bring value and the group concluded this is best accomplished with all parties participating or in some cases, direct coordination between parties. For example, making monitoring data available on the WQX Portal benefits all and coordination is needed to assist with data format and uploading there; and there is value in direct coordination between entities who intend to collect fish tissue data in order to minimize fish mortality and maximize the data from collection.

With the two-year scope of the project now complete, and in light of the discussions about the future amongst its members, the TMTG co-chairs are recommending that transboundary monitoring coordination be a component of the MRC, potentially as a standing item on the MRC agenda, or through a sub-committee. That recommendation will be for consideration by BC/MT executive when they discuss next steps for the working group, as discussed earlier in the meeting.

### **Kootenai River Selenium Monitoring Update – Shawn Young**

Shawn Young (KTOI) walked through a thorough presentation using slides to provide an update on recent monitoring and stewardship efforts conducted by the KTOI and USGS-Idaho. Slides are available at:

<http://lakekoocanusaconservation.pbworks.com/w/file/147063840/KTOI%20Monitoring%20Update%20-%20MRC%20Nov%2018%202021.pdf>.

Shawn began by illustrating various changes to the landscape that have occurred since European settlement in the watershed, using historic photos and maps. Since the 1890s, over 100,000 acres of floodplain were disconnected, and 60,000 acres of wetland converted for the needs of modern society. The construction of Libby Dam in the early 1970s further complicates ecosystem function and, in the context of LKMRWG discussions, has served as a boundary for the conversation. Natural recruitment of White Sturgeon has been very low since the 1960s and they were listed as federally endangered in the US in 1994 and in Canada in 2006. Approximately 1,700 wild adult White Sturgeon remain. Burbot were functionally extirpated by the 1990s and there were not enough Burbot to support a hatchery program nor for use in research.

More recently, mining impacts from B.C. have resulted in further challenges. KTOI appreciates the information sharing provided by the LKMRWG and its member agencies, which has provided KTOI and sister Tribal agencies throughout Ktunaxa territories and other agencies collaborating on

ecosystem restoration projects. Tribes and agencies are very concerned by increasing selenium trends, as shown in the graph on slide 7. The lower Kootenai ecosystem is the recovery area for endangered Kootenai River White Sturgeon under US EPA legislation and the Canadian *Species At Risk Act*. There have been significant investments in programs to conserve aquaculture, restore habitat, enhance nutrients and address terrestrial and riparian wildlife with research, monitoring and evaluation completed by a host of collaborating agencies. All the programs are integrating and active in synergy with each other, using feedback from each to determine next steps.

The recruitment programs have been filling gaps in natural recruitment for over 30 years for White Sturgeon and for over 18 years for Burbot, which has involved significant investment. 26 year-classes of Sturgeon have been successfully released and 12 years for the once-extirpated Burbot. Burbot recovery has been so successful there's now a sport fishery for Burbot in Idaho. However, there is still a lack of natural recruitment for Burbot, with failure occurring at the first life stages of egg incubation and larval development. KTOI continues to work through difficult discussions to determine whether this can be rectified within the bounds of modern society. White Sturgeon face similar challenges with egg incubation and larval development. Overall, 26 year-classes of Sturgeon have been released and about 15,000 fish ages 1-26 are still living in the lower Kootenai and Kootenay Lake. Viable, sexually mature and functional wild adults still spawn en masse in the ecosystems confirmed every year by Idaho Fish & Game and the B.C. Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD). Extinction of the Kootenai White Sturgeon has been successfully warded off and the population structure of Burbot successfully rebuilt. But there are still issues with natural recruitment and more work to be done to restore self-sustaining populations.

Shawn provided an overview of habitat restoration projects in the Lower Kootenai. Flow regime changes have been completed in experimental ways to examine whether the ecosystem could be improved via Libby Dam discharges, including tributary restoration projects and floodplain reconnections. The goal is to build a continuum to move primary productivity down the river system to better reflect natural conditions from over a century ago, within the bounds of modern society. Projects are plotted on a map on slide 16. The first was the Braided Reach project area, which saw about 8 years of extensive projects to assist with Kootenai River White Sturgeon spawning and early life survival, amongst other considerations. Projects are now moving into the highly altered floodplain with several implemented or under discussion. There is also discussion about the B.C. portion of the river near Creston.

The Nimz Ranch reconnection experiments were highlighted as a key success. The ranch is a wildlife mitigation property. Green arrows on slide 18 identify where it was reconnected. Early life stage Burbot were released there because the area warms up earlier supporting early physiologic development and phyto- and zooplankton blooms, food for planktivorous first-feeding Burbot larvae. There is a hypothesis that those are major obstacles to naturally recruiting Burbot population. Hatchery fish can grow but must be released in key target areas for them to perpetuate and survive to adulthood. 3 years after placing newly hatched Burbot in the habitat, 40% of the 2021 broodstock collected and spawned in hatchery (approximately 100 of 240 adults collected) were identified as 2018 releases into Nimz Ranch Reconnect Habitat Project, which exceeded expectations.

Shawn next presented provisional, unpublished data for fish tissue and water selenium concentrations. Slide 20 shows selenium concentrations in Mountain Whitefish egg ovary tissues collected from 2018-2020 in the Canyon reach below Libby Dam. The majority of the samples

exceeded the EPA ovary criteria of 15.1 mg/kg dry weight. Slide 22 shows provisional unpublished data with a graph of total selenium in Burbot ovaries where the dotted line identifies Idaho's selenium egg/ovary criteria. Two of the Burbot sampled in 2021 exceeded that criteria in ovary tissue samples and a significant portion of the females showed concentrations ranging from 10-14.5 mg/kg dry weight. The results are worse than expected. Slide 23 shows a similar graph with total selenium concentrations in Burbot liver tissues for fish collected in 2020 and 2021. Although liver concentrations are not used as a regulatory standard they are discussed in literature as important organs that bioaccumulate selenium and other contaminants. In Burbot the liver is a significant portion of their body weight. When comparing to Lemly's 1998 recommendations regarding significant effects concentrations in liver tissue, which is plotted on the slide, we see many fish exceeding that level. One fish showed a concentration of 122 mg/kg dry weight. KTOI is very concerned by these results. In 2022, KTOI anticipates inviting agencies and stakeholders to review a presentation on the complete Burbot dataset for 2020-21 sampling. Slide 24 shows total selenium in water at various sites below Libby Dam, collected in 2021. Shawn noted that the results are well below Montana's adopted criteria of 3.1 µg/L, ranging from 0.8-1.2 µg/L, and yet they are already observing exceedances in fish tissue as discussed previously, which reinforces their concerns. Slide 27 shows selenite concentrations from 2021 at sites downstream of Libby Dam. The graph shows a slight increase as we move downstream from the Dam.

In conclusion, Shawn explained the KTOI data supports their view that there is a pervasive and persistent issue with selenium in the lower Kootenai ecosystem, and it is worse than anticipated. Bioaccumulation across trophic levels is observed, which will likely vary across different habitats and is something KTOI will consider across all their programs. KTOI views contaminant monitoring as a necessity going forward and believes more effective protections across the basin are needed. More information and supporting data will follow in 2022. In closing Shawn thanked his staff and contributing agencies including sister Tribes, State collaborators, MT FWP, MT DEQ, ID Fish & Game, the USGS, US EPA, US ACE and in particular B.C. FLNRORD for their major contributions to restoration efforts.

The floor was opened up for questions. MT Representative Steve Gunderson asked a few questions to clarify aspects of the data Shawn presented. Shawn confirmed all the data presented comes from the Kootenai river below Libby down to Kootenay Lake, and some of the Burbot data was collected from Kootenay Lake. The Burbot data are representative of conditions in Montana, Idaho and B.C., while the Whitefish data primarily represents the Canyon habitat in Montana and Idaho. Rep. Gunderson asked if there had been any testing of surrounding waters for selenium content to establish a point of comparison relative to background or naturally occurring levels. Shawn explained control samples for water are collected above Koocanusa in the mainstem and several contributing partners also collect control samples, all of which confirm the primary source of selenium in the Lower Kootenai is from the Elk River, though there are other contributing factors. Joe Skorupa (US FWS) provided some additional context regarding the US EPA selenium criteria of 3.1 µg/L, emphasizing that EPA's generic national guidance for water (i.e. 3.1 µg/L and 1.5 µg/L) was selected based on the 80<sup>th</sup> percentile of a distribution of 65 site-specific studies where the egg ovary guideline of 15.1 mg/kg dw was translated to a protective water column concentration. Joe noted that the full range of site specific water column values that protected the egg-ovary guideline ranged from 0.1-0.55 µg/L. Joe noted this means the same level of protection is achieved across all those sites within that range (EPA used 65 sites), depending on the site specific conditions. Joe suggested it shouldn't be surprising that 3.1 µg/L may not be protective. Joe also reminded the group that USGS and EPA recently published a report on study

of Mountain Whitefish where they sampled some Kootenai River tributaries and the results were below detection limit with a very low detection limit of 0.034 ug/L. The study concluded more than 95% of the selenium in those fish was coming from Libby Dam discharges. Travis Schmidt (USGS) added that the USGS is finalizing models for net loading of selenium from the Idaho-B.C. border through to the Elk Valley, which will be publicly available once ready. Joe Beaman (US EPA) shared a link in the chatbox to the USGS report where more information on those conclusions can be found: <https://www.sciencebase.gov/catalog/item/5d6d391fe4b0c4f70cf62b77>.

David DeForest (Windward Environmental) asked about ovary concentrations. Noting there is often variability in those concentrations depending on the reproductive status of the fish he asked if there was any information on reproductive status of the fish used in KTOI's data. Shawn explained that it was a narrow range for Burbot, all those females were extremely close to spawning, they were pulled out of broodstock groups that were actively spawning to ensure the latest ovulatory maturation was maintained. There were a few fish outside that window, but Shawn noted given the confined space of the working environment in the hatchery they achieved about as tight a control as they could for that evaluation. They also collected similarly-aged fish as much as possible. More detail will be available in 2022.

The group broke for lunch, about an hour behind schedule due to the robust discussion.

### FLNRORD stuff - John Krebs

John Krebs (B.C. FLNRORD) is the Regional Director of Resource Management, responsible for fish, wildlife and terrestrial stewardship under the *Wildlife Act* and other provincial legislation in B.C. John and his staff have been engaged in significant collaboration with Indigenous governments on stewardship and to provide advice to other land based and aquatic decision in B.C. John was invited by the MRC co-chairs to share an update with the LKMRWG about FLNRORD's work on Westlope Cutthroat Trout (WCT). Slides for this presentation are available on the wiki at: <http://lakekoocanusaconservation.pbworks.com/w/file/147064278/FLNRORD%20WCT%20Update%20-%20Nov%2018%202021%20MRC.pdf>.

The context for this work is the Upper Fording river, a tributary of the Elk River, which holds a population of WCT that have not hybridized with Rainbow Trout. The WCT in this area are a species of special concern under the Canadian *Species at Risk Act* and are have important cultural significance to the Ktunaxa. There are two mines operated by Teck in the area. In 2019, through monitoring led by Teck, there was a discovery of a 93% decline in the adult population of WCT - from approximately 3,700 adults down to less than 500. Juveniles also saw a significant decline though it was less dramatic. This was an unexpected event, although the Upper Fording River and its tributaries have been highly altered by mining, the WCT population in the upper Fording has been monitored since 2012 and was believed to be viable stable population. In response to this discovery the Province, in collaboration with the KNC, led development of a recovery plan for WCT, working with Canada's Department of Fisheries and Oceans, across B.C. ministries and with Teck as key participants.

The WCT Recovery Plan will provide strategic direction and identify actions to address the key stressors believed to have contributed to the population collapse. The role of the plan is assessing threats to recovery; developing goals and objectives for the WCT population and ecosystem; providing

technical advice on measures and actions as well as recommended prioritization of actions for recovery; and enabling a WCT recovery lens to be applied to authorization decisions in the area.

Following the population collapse Teck undertook an evaluation of cause process, which hasn't concluded yet but has been very substantial in terms of evaluating a broad spectrum of stressors and possible causes of the major decline. That work is being synthesized into a capstone report, which is close to being finalized. B.C. has engaged an independent consultant to provide third party review of the evaluation of cause material, and that is ongoing. The evaluation of cause and third-party reviewer's analysis of the evaluation will serve as inputs to the WCT Recovery Plan. There is also a B.C.-level WCT management plan that captures species at risk aspects of a recovery plan at the provincial scale and provides context and a wealth of other information. All those pieces are feeding into a recovery working group that FLNRORD co-leads with the KNC as government resource-managers, which includes a technically focused subgroup with representatives from B.C. agencies, the KNC and Teck. The working group's recommendations will inform B.C. and the KNC's development of the WCT Recovery Plan. This process started in August 2020 with working group members selected and their first workshop held in October, 2020.

After substantial work with consultants, staff, the KNC and the working group a draft WCT Recovery Plan has been developed and was recently shared internally with B.C. and the KNC for initial review. The draft plan will be available for broader review by industry and the public. A date has not yet been determined for that engagement but FLNRORD anticipates moving forward in the latter half of this fiscal year.

Key stressors identified in the draft plan include: stream flows during critical periods (fall migration and over-wintering during low flows) which can result from changes to the landscape and industrial water diversions; the role of extreme winter weather events; water quality constituents such as selenium, nitrates, sulphate and others; and reductions and losses of riparian, tributary, and overwintering habitat. The components of the draft plan include: population recovery goals; threats assessment; and recovery actions along with prioritization and timelines for implementation to meet the plan's goals. Recovery actions will be approved by the Province and Canada's Department of Fisheries and Ocean with endorsement of the KNC and will mainly be implemented by Teck. Some examples of proposed actions include: development and refinement of Environmental Flow Needs (EFN) and water use planning; expediting source control and treatment and technology readiness assessments which are led by ENV and are closely tied to their work on the ABMP; overwintering and riparian habitat restoration, connectivity restoration and habitat protection measures; monitoring water quality and WCT population distribution; research to review water quality effects benchmarks, individual contaminant studies and risk assessments; and basic protections such as angling prohibition (which has been in place for sometime), poaching prevention and invasive species protection.

John opened the floor to questions. MT Representative Steve Gunderson asked what is the recovery trend for WCT since 2019? John indicated there has been a slight increase in population numbers. Rep. Gunderson asked if there was any correlation between selenium levels and the population decline, whether there was a notable increase in selenium concentrations in that area coinciding with the event. John committed to follow-up with clarification on this question (ACTION). Rep. Gunderson also asked whether selenium was a component in the population collapse. John said the ongoing work to

synthesize the evaluation of cause will bring forward the best plausible explanation for what caused the event, and that information can be shared once it is finalized (ACTION).

Chad Hughes (Elk River Alliance) asked if climate change effects are being considered in this work, whether there are any proposed mitigation or adaptative options for trout in the Elk Valley, and if there is likely to be any change in the status of special concern for WCT. John explained he doubt the status of concern is changing but will seek to confirm (ACTION). John acknowledged the role of climate change noting riparian shading and vegetation, water management and water use are all connected to changing temperatures and are areas of focus in the plan.

Travis Schmidt (USGS-MT) asked whether the evaluation of cause only looks at population levels or if it will include documentation of physiological conditions at the time of the event and evaluate the role of selenium. John explained there are approximately twenty detailed studies feeding into the evaluation of cause including assessments of water quality, predation, water use and others. Carla Fraser (Teck) added that winter stress syndrome is one of the causes assessed in the evaluation of cause and that information will be made publicly available on Teck's website once finalized.

Erin Sexton (CSKT) asked how these recovery efforts interface with the EA proposals in the Elk Valley. John explained the work of the recovery plan, including recovery actions and setting of objectives for fish and the ecosystem in the Upper Fording, will inform decision makers, including in the EA processes.

### **Fish Tissue in Kooconusa - Trevor Selch**

Trevor Selch is a fisheries pollution biologist with Montana Fish, Wildlife and Parks (MT FWP). He provided a summary of muscle and egg tissue data from Lake Kooconusa. He noted there is other wholebody data that will not be included in the presentation for this meeting. All measurements discussed in his presentation are in mg/kg dry weight, and the data was collected from annual gill netting in the spring (May) and fall (September). Trevor noted these sampling efforts have lower numbers of fish sampled for WCT and Rainbow Trout due to low population sizes and because of the timing of sampling. His slides are available on the wiki at: <http://lakekooconusaconservation.pbworks.com/w/file/147064011/MT%20FWP%20Monitoring%20Update%20-%20Nov%2018%202021%20MRC.pdf>.

In response to concerns about coal mining expansions MT FWP sought to establish a baseline of data in 2008, which was replicated in 2013 with funding from MT DEQ. From that effort, other questions arose and species became of interest that were not previously included, which 2016-17 sampling efforts sought to address. In 2018 they repeated that sampling effort. The 2019-2020 sampling efforts were funded by Teck through the TMTG project that was discussed earlier in the meeting, and Teck's contractor is processing the tissue that was collected.

Trevor proceeded to go through the data for individual species in detail (slides 3-10). On the slides, diamonds represent individual fish across the years of sampling and the horizontal yellow line identifies the relevant US criteria. Selenium concentrations in muscle tissues for Bull Trout, Longnose and Largescale Suckers, Peamouth Chub, Northern Pikeminnow, Mountain Whitefish, Kokanee, Rainbow Trout, and WCT are all below U.S. criteria concentrations. Bull trout are not considered a high accumulator nor are they highly sensitive to selenium. The Sucker species showed higher

concentrations than Bull trout, with greater variability and some elevated concentrations. Peamouth Chub is a high accumulator, with 2013 showing some higher concentrations and 2020 concentrations being much lower. Northern Pikeminnow are especially abundant in the Reservoir and show less variability in concentrations, which are low. Mountain Whitefish are difficult to collect due to the timing of MT FWP's sampling efforts and show much lower concentrations than what KTOI is observing further downstream. Kokanee were all the same age and mostly all fed on plankton, they showed low variability and low concentrations. Rainbow Trout are another species that is difficult to catch, the highest concentrations for them was in 2016-17. WCT is the State fish of Montana and considered to have the highest sensitivity to selenium in the Reservoir. WCT show much more variability including some elevated concentrations.

Trevor then provided an overview of the relationship between muscle tissue concentrations and egg tissue concentrations using paired samples of Peamouth Chub, Northern Pikeminnow and Kokanee (slides 11-13). For Peamouth Chub there is no relationship between the concentrations. Kokanee also show no relationship. Northern Pikeminnow show a significant relationship between egg and muscle tissue concentrations but there is substantial variability and therefore the relationship is of limited value. Trevor explained these results suggest muscle tissue concentrations may generally be of limited value from an explanatory perspective, and he noted that conclusion is supported by the data Shawn Young presented earlier in the meeting.

Slides 14-20 show selenium concentrations in egg tissues. Slide 14 pools 5 species of fish for which limited egg data is available, using mostly the last 3-4 years, including Rainbow Trout, Burbot, Redside Shiner, Mountain Whitefish and Yellow Perch. For these fish, egg concentrations are below U.S. criteria with the exception of Redside Shiner, which is a high accumulator. Trevor noted there were only four samples for Mountain Whitefish, all below the criteria and much lower than what KTOI have observed further downstream. There were only one year of results for Yellow Perch. Longnose Sucker eggs (slide 15) showed one exceedance of the criteria from 2016-17. Largescale Sucker (slide 16) were all below criteria. There is an abundance of data for Kokanee (slide 17), all of which are well below criteria levels. Northern Pikeminnow (slide 18) are also abundant, and while much of the data is well below the criteria, 2020 showed two of the highest concentrations ever observed – one of which was just below the criteria and one which exceeded it. Peamouth Chub (slide 19) is a high accumulator for which exceedances were observed in 2013, and in 2020 the data shows eggs in 11 of the 24 fish collected exceeded the criteria. WCT (slide 20) also show elevated levels in 2020 with three samples collected in the spring which exceeded the criteria and one of which had concentrations more than double the criteria. Slide 21 shows a comparison of the egg and muscle concentrations for WCT, which Trevor highlighted to underline his earlier conclusion about the limited value of muscle tissue data.

The floor was opened for questions. Joe Skorupa (US FWS) asked about the labelling of the data in Trevor's slides, whether it is egg data only, or ovaries, or a mix of the two. He also asked if the data are from eggs, were they confirmed to be mature eggs. Trevor clarified the data is egg/ovary - they took egg ovaries, extracted the eggs and analyzed them. Due to the timing of the sampling efforts, it can be challenging to get peak maturation in egg samples for all species and there is ongoing debate about whether the eggs being collected are from peak maturation. MT FWP assumes they are not at peak maturation for most species, so the results may not be showing the highest possible concentrations in egg tissue.

Genny Hoyle (KTOI) asked if MT FWP has liver data associated with the fish. Trevor indicated there is liver data from the 2008 sampling but not later years. Genny asked if that data could be shared and Trevor confirmed it is available in the recent data upload to the working group's wiki page ([http://lakekoocanusaconservation.pbworks.com/w/file/146891748/FWP\\_Koocanusa%20Selenium%20Data%20MASTER%202008-2020.xlsx](http://lakekoocanusaconservation.pbworks.com/w/file/146891748/FWP_Koocanusa%20Selenium%20Data%20MASTER%202008-2020.xlsx)) and confirmed he would double check whether there are any hidden columns in the dataset (ACTION).

### **Species Toxicity Studies & Teck Update – Kevin Brix & Carla Fraser**

Kevin Brix (EcoTox LLC) provided an overview of the status and conclusions of species-specific toxicity studies for Redside Shiner, Mountain Whitefish and Northern Pikeminnow, followed by a Teck monitoring update from Carla Fraser (Teck). Kevin and Carla's slides are available on the wiki in a single file at:

<http://lakekoocanusaconservation.pbworks.com/w/file/147064443/Kevin%20Brix%20and%20Teck%20Presentation%20-%20Nov%2018%202021%20MRC.pdf>.

Kevin began with a brief recap of the Redside Shiner toxicity study that was previously shared with the MRC (slide 5). The study was completed using standard techniques of collecting gravid fish from different locations with differing levels of selenium exposure with the intent of collecting a distribution of egg selenium concentrations. Fertilized eggs were brought to a lab where their development, hatching success and early growth were monitored, focusing on deformities in larvae as the primary endpoint. The study found no response relationship as a function of selenium egg concentrations. The EC10 (concentration at which 10% of the organisms tested exhibit a statistically significant effect from selenium) for Redside Shiner appears to be higher than any of the concentrations collected, which was 44 mg/kg dry weight. The study report is being finalized with the draft manuscript undergoing internal review, targeting publication in a peer reviewed journal in January-February 2022.

Moving to Mountain Whitefish, Kevin explained Teck has been trying to understand the sensitivity of the species to selenium since 2010 following a standard selenium toxicity study approach (collecting females from different locations, generating a distribution of egg selenium concentrations and looking at survival). Slide 7 shows results from three different years of study (2010, 2011, and 2013) which show a range of concentrations from 15-33 mg/kg dry weight. The results show no concentration response relationship, suggesting the EC10 for this species is greater than the highest concentration that was tested in the study, which was 33 mg/kg dry weight. Slide 8 shows a plot showing the relationship between the gonado-somatic index (GSI) and ovary selenium concentrations in Mountain Whitefish from reference and mine-exposed sites. Fish are in spawning condition at a GSI of approximately 15%, which is marked on the graph with a dotted line. Kevin reminded the group there is an inverse relationship between ovary concentrations and the GSI and noted that much of Teck's data for Mountain Whitefish historically includes fish that are not ready to spawn, and this graph suggests that may be resulting in bias for the data. The higher concentrations observed are from fish well outside of spawning condition, and as we move toward spawning condition the egg concentrations trend lower. Kevin noted a similar relationship has been observed for Northern Pikeminnow and Redside Shiner, but they're not sure if it's a universal relationship or specific to these species. This dataset demonstrated that additional sampling was needed to find fish selenium ovary concentrations higher than 33 mg/kg dry weight, which led to the development of the 2020-21 Mountain Whitefish Study (slide 9).

The 2020-21 study analyzed historical data focused on Michel Creek with three potential reference locations in the Bull, Flathead and St. Mary's rivers. Michel Creek was selected as the focus for sampling efforts because it has historically shown the highest selenium concentrations. The study targeted collecting 30 females from Michel Creek and 10 from each reference location. Snorkel surveys in early-mid October and temperature loggers were used to identify locations and timing of spawning. Slide 10 shows the temperature profile for Michel Creek. The red line identifies the temperature threshold at which fish would come into spawning condition, which indicated October 15<sup>th</sup> would be a suitable time to begin collecting fish for the study. Gravid fish that were collected were anesthetized and stripped for eggs which were brought to Nautilus Labs for fertilization, after which the fish were processed for various tissue samples. Using the collected and fertilized eggs, researchers attempted to spawn fish on October 30 but determined they were not ripe. 15 females were successfully spawned on November 3<sup>rd</sup>. Unfortunately, a large rain event on November 4-5<sup>th</sup> led to flash floods and the failure of some holding pens from which fish escaped, which was a significant setback for achieving the desired sample numbers. Once stream levels were returning to normal the fish, 6 additional fish from Michel creek were successfully spawned on November 8-10<sup>th</sup>. Only 1 fish from the reference sites was successfully spawned, from the Bull river. Pictures on slide 12 compare a holding pen in normal conditions on the left to the flood conditions on the Bull river on November 5<sup>th</sup> on the right. Results from this study begin on slide 13. 22 fish were sampled in total, less than desired because of the rain event. However, some eggs with concentrations above 33 mg/kg dry weight were successfully collected. The highest concentration of egg selenium collected was 54 mg/kg dry weight. Slide 13 showed concentrations and the egg to muscle ratio of samples, which Kevin noted is similar to the results KTOI presented earlier in the meeting where muscle concentrations are quite a bit lower than eggs with significant variability.

Slide 14 showed results for the fish survival endpoint of this study, measured between 14-21 days post hatching. The lowest survival was from the reference sample in Bull river, 2021 samples were around 25 mg/kg dry weight concentrations, and the average survival rate for all samples was around 91%. Again no concentration response relationship was observed and the highest concentrations had very high survival rates, while lower concentrations showed significant variability. Kevin suggested this could be a result of earlier sampling efforts where fish were stripped of eggs before they were fully ripe. Over the years researchers found they could express eggs from fish that were not fully ripe and this should not have been done, but it is challenging to get the timing right. The EC10 for Mountain Whitefish derived from this study will be greater than the highest concentration collected of 54 mg/kg dry weight. Slide 15 shows results for larval growth, which was also measured 14-21 days post hatching. The highest concentrations observed were from 2021. Ultimately the data is not suitable for a concentration response analysis, and researchers concluded this is due to a study year effect, meaning the data can't be pooled appropriately across years due to statistically significant variation in conditions across years. Kevin indicated the cause may have been temperature differences, for which even a 1-degree difference can have significant impacts. Using only the 2021 data and undertaking a linear regression would result in an EC10 of 55 mg/kg dry weight. Slide 16 shows larval deformity assessment using a graduated severity index running from 0-3. An index value of 0-1 is generally considered to not be of great ecological significance, while values of 2-3 are considered potentially ecologically significant. Slide 17 shows the data results for larval deformity. In 2021 just over 5,000 larvae were assessed, with 10% of that analysis conducted by a second evaluator to confirm consistency in the graduated severity index between evaluators. Once again there was no concentration response relationship observed, and very low deformities were found even at high

concentrations. The EC10 for this endpoint therefore would be greater than the highest collected concentration of 54 mg/kg dry weight. Overall for the Mountain Whitefish study, the EC10 is expected to be greater than 54 mg/kg dry weight. There is some indication of a slight growth effect but not robust enough to estimate an EC10 with the available data. Teck does not plan to pursue any further testing. Researchers anticipate they've collected the highest selenium egg concentrations they are likely to find, meaning there is limited value in further sampling and testing at this time. For next steps, sampling of Mountain Whitefish was recently collected in October and November 2021 as part of annual monitoring to support the development of ovary to wholebody selenium ratio; a draft manuscript of the study is anticipated to be ready for internal review in January 2022 and submission to a peer reviewed journal is anticipated in February-March 2022.

Kevin opened the floor for questions on the Redside Shiner and Mountain Whitefish studies. Travis Schmidt (USGS-MT) asked whether the Bull river, used as a reference site in the Whitefish study, was documented to have low selenium levels. Kevin indicated it was concentrations less than 2 µg/L and probably less than 1 µg/L and noted egg selenium concentrations in Whitefish are often elevated independent of water concentrations, with results of 10-25 mg/kg dry weight routinely observed from reference sites.

Genny Hoyle (KTOI) noted KTOI conducts water chemistry monitoring in the Bull and St. Mary's rivers where they observe trace amounts of selenium, but she wouldn't characterize them a suitable reference sites. Genny suggested Wildhorse and Skookumchuck rivers would be more appropriate, where non-measurable selenium levels are observed, and expressed interest in seeing water chemistry data included in the graphs for comparison of water and fish tissue concentrations. Kevin acknowledged the comments and indicated the final study will include water selenium concentrations. Genny asked whether the Bull sampling was conducted above a hydro project in the area. Cait Good (Teck) confirmed it was above the hydro project.

Joe Skorupa (US FWS) asked if egg to wholebody ratios would be developed, in addition to the muscle to wholebody ratios included in the presentation. Kevin explained they did not collect wholebody data during these studies. He noted the ovary data collected in 2021 was during spawning season, so while it is not a perfect 1:1 comparison to eggs, it will be fairly close. Joe asked whether Kevin thinks it would be feasible or of value to try and run a positive control experiment in Michel Creek, for example by placing a species of Trout with known toxicity sensitivity in enclosures and getting them to spawn. Kevin explained that it would likely be very challenging to get the fish to spawning condition with such an approach, and it might require researchers to feed the fish for some time which would compromise results. Joe asked if there are any species naturally occurring at some of these sites where toxicity sensitivity is already known, anything that could be used as a surrogate for a positive control. Kevin indicated there are none for which expressive studies could be conducted. WCT would fit the profile, but given the recent population decline they would not be appropriate to sample at this time. Kevin acknowledged the desirability of a positive control but explained he doesn't see any easy solutions to address that. He noted that the distribution of sensitivity across species is not surprising and that the distribution in this case is not too significant.

David Janz (University of Saskatchewan) asked about the timing of evaluation of deformities and whether it was done at the time when the fish were swimming upstream, when all the yoke would have been absorbed by the offspring. Kevin indicated it was done at 14-21 days following the swim-up. David noted that would mean all of the yoke would have been absorbed, and that the Environment

Canada protocol for such sampling is to conduct it when 50% of fry reach swim-up. David asked if they fed the fish a clean diet, which Kevin confirmed to be accurate. David asked if the evaluations for deformities, including the use of a second evaluator, was conducted in a blinded fashion, and whether the second evaluator was from an external organization. Kevin explained the evaluation was completely blind with the lab having no knowledge of the fish identifications or how many had been collected, and both evaluators being blind to each other's sample identifications and results. Both evaluators work for Nautilus in Burnaby, B.C. David commented that the lack of response at high concentrations in eggs, as well as the relatively high egg concentrations in the reference fish may indicate this species is exhibiting a tolerance or an adaptive mechanism of some kind. Kevin agreed and noted that is beyond the scope of this study.

Travis Schmidt (USGS) asked if there were abandoned mines on the Bull and St. Mary's rivers. Carla Fraser (Teck) confirmed the presence of the abandoned mines and clarified the sampling efforts were undertaken upstream where there is no risk of influence from the dormant mine sites. Carla noted all these details will be included in the final publication of the study.

Jesse Sinclair (KNC) asked if sediment periphyton data is available for the Bull river. He commented that could be a mechanism to explain low water concentrations if there are pools of selenium in various areas contributing to Mountain Whitefish egg concentrations via diet. Cait Good (Teck) indicated Teck collected reference data for the Bull, but sediment data is not collected routinely there. It is a fish site with sampling of fish conducted every three years as part of Teck's permit requirements for monitoring. Cait committed to confirm the availability of any past sediment and periphyton data (ACTION).

Genny Hoyle (KTOI) commented that Mountain Whitefish travel quite a bit and it would be beneficial to differentiate between resident and migratory fish. We don't know exactly the conditions these fish are exposed to throughout their life, so indicating reference vs. exposed sites might be important to differentiate why certain sites are chosen and highlight the potential uncertainties.

Kevin resumed his presentation, turning to Northern Pikeminnow studies starting on slide 21. The study design was similar to that of the Mountain Whitefish study, with sampling at different locations in the reservoir. The sampling effort for Northern Pikeminnow included 2,643 gear hours using primarily hoop and cod nets, with limited short-set gill nets and angling, from which a total of 79 fish were collected on the B.C. side of the reservoir. Efforts to collect ripe fish had limited success, as shown on slide 22. Only 7 of the females expressed had eggs, of which 3 were partially spent and 2 were successfully fertilized but at high temperatures (above 27 degree Celsius) which may have compromised them. The team experienced some temperature control issues. In mid-July 2019 the team expected to be in a spawning window to collect ripe fish, but had a difficult time finding them, then at the end of July the fish re-emerged but had been spawned out. Overall, the 2019 study was not successful and plans were laid to repeat the study in 2020 which was pushed into 2021 due to the coronavirus pandemic.

In 2021 researchers increased the sampling efforts, focused on the Elk River and Gold Creek, targeting full size females. No changes were made to the toxicity test methods planned. June and July of 2021, when the sampling was planned to take place, was dominated by a heatwave wherein surface air temperatures reached as high as 40 degrees Celsius. Water temperatures around July 21 exceeded 20 degrees Celsius and remained there through the end of the month. The sampling permit only allowed

collection of fish when temperatures were below 20 degrees Celsius, to avoid stressing the fish. Teck applied for a permit modification in mid July, which was granted at the end of the month. Telemetry efforts were successful. The team radio tagged 30 fish at the beginning of June when temperatures were cool, at the Elk mouth and Gold Bay. They setup a series of hydrophones to track where the fish were going and used mobile received around the reservoir and up into creeks and rivers. This was a very active program with daily downloads of data from the stationary receivers, which were analyzed each night to inform where the fish would best to locate the following day's fishing efforts. The telemetry data is still being analyzed, and Kevin showed a snapshot of preliminary results on slide 26. The map on the right with bar graphs show the number of unique fish that passed the different receivers, which shows the majority of fish stayed in those locations, not many were observed up in the Sand area. Gold had the highest number of fish, followed by the Elk, with very few observed up north. The plots on the left of the slide are coded by colour and the size of the dot. Colours indicate timing, with warmer colours being later in the season, and the size indicates the number of hours a given fish was tracked at that location. Each plot is an individual fish. The two top plots are from Gold Bay and the lower two from the mouth of the Elk. Movement of individual fish was variable. The fish in the upper left plot was tagged in Gold bay and only moved back and forth along the coast. By contrast the upper right plot shows a fish tagged in Gold Bay that was never again detected in that area - it went up to Sand and eventually down to the mouth of the Elk for the rest of the season. The team is still going through the telemetry data and is working to develop summary analyses. Overall, they felt the telemetry data was useful for targeting fishing locations but due to the high temperatures they were not able to take advantage of that information as was hoped. The collection of fish was lower in 2021 due to the temperature. Angling hours increased compared to 2019 and were moved further up the Elk River because the water was cooler there.

Slide 29 shows the number of Northern Pikeminnow caught by day and by gear type. Grey identifies gill nets which were used before the temperature problems emerged at which point, they shifted to angling with a bit of gill net work late in the season. In spite of the tremendous effort only two females were collected in spawning condition. Researchers hypothesize they may have missed the spawning window due to the high temperatures. The team also conducted a fish holding experiment, (slide 30) but the high temperatures prevented a full testing of the approach. Fish were held in cod traps at the Elk mouth and did not seem overly stressed but no females developed spawning condition during the holding.

The team plan to try sampling again in 2022. They are unlikely to pursue additional telemetry work at that time due to the tremendous amount of effort involved. They will increase fishing efforts with multiple teams fishing in the reservoir and Elk River in the late afternoon and evenings. They also plan to further develop the fish holding approach and try using Ovaprim injections to induce spawning condition.

Kevin opened the floor for questions. Travis Schmidt (USGS-MT) commented that the team likely did miss spawning window, noting MT FWP reported they spawned at the end of June in the southern half of the reservoir. He asked if the temperature graphs shows were from the rivers or the reservoir. Kevin indicated they are from the reservoir with daily measurements taken when teams went out for sampling. Travis noted temperatures at the border were cooler. Kevin expressed interest in seeing that data and indicated he would follow-up with USGS offline for further discussion about temperatures and spawning times.

David Janz (University of Saskatchewan) commented on the holding pen approach, noting when fish are not quite ripe and held in a pen they will shutdown and start absorbing eggs within a 2-3 day window. If they are held for 10-12 days they will not develop further. David recommended injecting fish with Ovaprim within 72 hours and if they do not induce spawning condition then let them go.

Carla Fraser (Teck) picked up on slide 33 to provide a brief update on Teck's monitoring program. As previously discussed with the LKMRWG the program includes a variety of media analysis such as water quality, zooplankton, sediment quality, benthic invertebrates and fish. Carla will focus on water quality and fish aspects of the program today.

Teck collects samples for water quality at five locations throughout the reservoir including one location upstream and four locations downstream of the Elk. Teck is working on the upstream location to ensure they are capturing any groundwater contributions there. Typically, they will collect composite samples when there is stratification, resulting in individual samples and an average from the composite. Sampling is conducted monthly through the year, with weekly sampling from April through July. Samples are analyzed for major ions, nutrients, metals (total and dissolved fractions), field and conventional parameters (such as pH and temperature), and productivity (Secchi depth and chlorophyll-a). There is quite a bit of variability in conditions between the northern and southern portions of the reservoir, as shown in the pictures on slide 36. Sampling teams take a boat to the border station most of the year but sometimes ice does not allow for that. Teck has been training its crews to work on ice and they've been successful in collecting samples each month through the last few years in spite of the ice.

Slide 37 shows water quality results for selenium concentrations at the first sampling location downstream of the Elk's contributions to the reservoir, with monthly averages from 2013 to October 2021. Results show some exceedance of B.C.'s water quality guideline and Teck's Site Performance Objective of 2 µg/L, typically in April coinciding with the reservoir's draw down period. Slide 38 shows the water quality information for the same timeframe at the border station, with some gaps in the data due to access issues in winter conditions. On average concentrations are below 2 µg/L except in 2018 where concentrations were elevated at the border and downstream of the Elk. A more detailed water evaluation is available in Teck's annual report which was released in June and is available on the LKMRWG wiki site

[http://lakekoocanusaconservation.pbworks.com/w/file/fetch/145582971/EVP%20S9.8%20Koocanusa%20Reservoir%202020%20Monitoring%20Report\\_June%202020.pdf](http://lakekoocanusaconservation.pbworks.com/w/file/fetch/145582971/EVP%20S9.8%20Koocanusa%20Reservoir%202020%20Monitoring%20Report_June%202020.pdf)

The fish monitoring program overview begins on slide 40. Teck looks at fish population health endpoints for Peamouth Chub and Redside Shiner because those fish can be consistently found in many different locations. Selenium tissue concentrations are also analyzed for Redside Shiner, Peamouth Chub and sport fish including Bull Trout, Rainbow Trout, WCT, Kokanee, Mountain Whitefish and Yellow Perch. Slide 41 shows a summary of what has been collected in 2021. Health endpoint assessment data (e.g. length, weight and liver mass) were collected in April. Selenium tissue sampling targeted ripe females with Peamouth Chub tissue samples collected in April, May and June due to uncertainty around the spawning window, and Redside Shiner tissues were collected in June. Slide 42 summarizes collection of non-lethal sampling of six sport fish species, from which muscle plugs were collected. Analytical data for the fish monitoring program is in various stages of quality review and/or pending laboratory analysis. The data will be summarized in Teck's next annual Summary Report which is due to the MRC by June 30, 2022. All of Teck's monitoring reports can also

be found on their website and Teck has recently taken efforts to make information on the website easier to locate. Please visit [www.teck.com/elkvalley](http://www.teck.com/elkvalley) for more information.

At this point the meeting was running over time, and since B.C.'s Elk Valley update earlier in the meeting had already covered updates on water treatment plans and implementation, the presentation concluded, and the floor was opened for questions. Additional information on Teck's water treatment progress can be found on slides 44-49 of the presentation.

Heather McMahon (KNC) asked to clarify when the Fording South treatment plant will be moving to forward flow. Carla confirmed it is planned for December. Heather asked if the next step would be to increase capacity, which Carla confirmed and noted the only question at play there is the volume of water.

Erin Sexton (CSKT) asked for a quick summary of the schedule for treatment plants. Carla pointed to slide 48 of her presentation for this information and explained there was a delay in bringing the Fording River South plant online which was mostly linked to the selenium speciation challenge that had been previously identified at the Line Creek facility. Those challenges required Teck to revisit design plans at a critical time in the process where those plans needed to be finalized, permits issued and construction started, which resulted in a significant delay. Originally the permit planning was to have the facility online in December 2018, meaning it's been delayed three years (now planned to be online in December, 2021). Regarding additional capacity, Teck has been bringing a Saturated Rock Fill facility online and is looking to bring a second Saturated Rock Fill facility online at Fording River North later in November, which will be a year earlier than originally planned. Teck is doing its best to increase capacity as quickly as possible. As they work through the Implementation Plan, they will build any additional required treatment capacity.

Travis Schmidt (USGS-MT) asked what fraction of the Elk River flow at Kooconusa is projected to be treated by 2031. Carla committed to follow-up with that answer (ACTION).

Genny Hoyle (KTOI) indicated she is more interested in understanding the percentage of wastewater treated, because the hydrograph varies. She asked if a range of percentages could be shared, Teck committed to provide that information (ACTION).

### **Monitoring Update from USGS-Montana – Travis Schmidt**

Travis Schmidt (USGS-MT) provided an update on Lake Kooconusa water quality monitoring, his slides are available on the wiki at:

<http://lakekooconusaconservation.pbworks.com/w/file/147175395/USGS%20Lake%20Kooconusa%20MRC%202021.11.12.pdf>.

USGS' objectives for water quality monitoring in the reservoir are to understand the spatial and temporal limnological and biological processes that control variation in selenium and other trace-element concentrations and loads through Kooconusa Reservoir and Libby dam in cooperation with local stakeholders. Discrete water samples are collected monthly by hydrologists while automated continuous sampling is conducted by robots. The data Travis presented is a combination of discrete and continuous water quality parameters, focused on selenium.

The USGS has a remote pontoon at the border and one at the lower part of the reservoir in addition to a stream gauge below Libby dam upon which a platform hosts robots that take samples at multiple depths at a given frequency. Sondes provide continuous water quality data, such as pH, Chlorophyll-a, conductivity and temperature) at the tail water, and data is collected every two hours at the other two locations. Daily samples are composited into weekly samples. A water quality team of staff calibrate the sondes and collect multi-depth samples including dissolved selenium and selenium speciation monthly. The data collected is publicly available. ([Kootenai River bl Libby Dam nr Libby MT - USGS Water Data for the Nation](#) [Lake Koocanusa at international boundary - USGS Water Data for the Nation](#))

Travis showed data results from those two locations (International Boundary and below Libby Dam) and for the greater lake, noting USGS does not have as long a record as other agencies at the Forebay. Beginning with the tailwater just below Libby Dam, which Travis noted is probably the most well-mixed location to sample, the slide showed weekly averages from 2019-2021. Travis noted sample concentrations ranged from 0.40-1.90 µg/L in the tailwater, and the weekly averages (shown on the slide) ranged from 0.60-1.80 µg/L. Travis included Montana's recently adopted Lake Koocanusa selenium standard of 0.8 µg/L (adopted in 2021) on the slide for reference, noting only 3 of the weekly averages were below that target. The maximum weekly average concentration observed at the tailwater was from 2019 at 1.80 µg/L. 6 of the top 10 weekly averages were observed in 2021.

Moving upstream to the International Boundary location, Travis showed a compilation of continuous and discrete data collected between 3-4 depths, from 2019 through to August 2021, using weekly averages. Travis noted sample concentrations ranged from 0.16-2.2 µg/L, and 95% of those exceeded Montana's new 2021 standard of 0.8 µg/L. The weekly averages ranged from 0.65-1.95 µg/L. 8 out of 10 of the highest weekly averages for total dissolved selenium observed at the international boundary occurred in 2021, including a record weekly maximum from April 2021.

Travis then showed a compilation of data taken from the WQX Portal, including samples collected by MT DEQ, US ACE, USGS and Teck, plotted as years on the slide. Travis noted he had difficulty using and interpreting some of the data and emphasized the importance for agencies to be mindful of the metadata that they provide when uploading to the Portal. For example, it was difficult to determine if some samples were total or dissolved selenium. Travis explained that without filtering the data for locations that have fewer samples or samples upstream of the Elk River, it seems higher concentrations are becoming more frequent and the average increasing with time. Travis emphasized the maximum recorded concentration was 4.99 µg/L in January 2021. In closing Travis showed a graph with total dissolved selenium at the mouth of the Elk River from 1998-2020 using Environment Canada data. Travis visually interpreted that the data shows the highs getting higher and the lows rising over time as well. The highest concentration recorded across the 23 years of data was 9.46 µg/L from 2020.

Travis opened the floor for questions. Marko Adzic (Teck) asked about availability of the USGS data presented, where and how to find it. He noted he'd tried finding this data on the USGS database but was unsuccessful. Travis confirmed all the data USGS releases is served directly to the National Water Information System (NWIS) and can be found using location numbers from the data plots he showed in his slides. Travis acknowledged the NWIS is not the most user-friendly resource but confirmed the data is there. Marko commented that Teck would soon be making data available in a unique format on a new website, to make it much more usable for users to access any time they want. Marko noted

Travis' earlier comment that from 2019 onward most of the data is dissolved selenium as opposed to total selenium, asking if something was missing in the available data because he was under the impression both fractions had been collected. Travis explained that not every agency has been collecting both.

Genny Hoyle (KTOI) noted her agency has conducted monthly sampling at the Elk River Highway 93 bridge (the location where the Environment Canada data was collected) and observed an instance of 8.49 µg/L in September. She asked if USGS is collecting speciation in the reservoir. Travis confirmed they collect inorganic and organic species along with every water sample, as part of the monthly discrete sampling. The servo sipper does not collect speciation. Generally, the USGS observes average selenite concentrations of 5-10%, sometimes greater. Genny asked if those numbers are available in micrograms per litre. Travis was unable to confirm and they agreed to connect offline for further discussion and information sharing on that point. Travis noted that data is also available on the NWIS. Carla Fraser (Teck) noted Teck collects selenium speciation data as well, which is summarized in the annual reports and uploaded to the WQX portal. Heather McMahon (KNC) asked if those samples are collected at each transect samples or just one. Carla committed to follow-up with that information (ACTION) and noted that information should also be included in the annual report.

## **Closing**

Co-chairs thanked presenters for their participation and members for contributing to productive discussions. Co-chairs closed by reminding participants a summary of the day's meeting will be prepared and will be made available on the wiki at the earliest convenience along with copies of those presentations which have been approved for distribution.

## Actions

| Action | Who   | Target<br>Completion<br>Date | Progress   | Most<br>Recent<br>Progress<br>Date |
|--------|---|------------------------------|--|------------------------------------|
| 1      | <b>MT FWP clarify status/recent updates to health advisories for consumption of fish re: Selenium</b> | Nov 2021                     | <b>Complete.</b><br>Trevor addressed the question and provided links in the chat during the meeting, included in the summary notes above | Nov 2021                           |

|   |   |            |          |  |          |
|---|---|------------|----------|--|----------|
| 2 | <p><b>B.C. FLNRORD confirm whether elevated selenium levels coincided with WCT population collapse, and whether there was a notable increase in selenium concentrations in that area coinciding with the event.</b></p> | John Krebs | Jan 2022 | <p><b>Complete.</b></p> <p>Confirmed with input from ENV. Monitoring results and the Evaluation of Cause report show, not surprisingly, that there is geographical and seasonal variation in the concentrations of Se and the proportion of fish of different life stages using those areas. Findings indicate that aqueous selenium concentrations met the conditions to contribute to the WCT decline through potential effects on reproduction. Invertebrate selenium concentrations met the conditions in identified areas to contribute to WCT decline through potential growth effects to juveniles and adults. WCT tissue selenium met the conditions to contribute to WCT decline due to potential reproductive effects on early life stages. While these factors had potential contributory effects, none were assessed as meeting conditions for being the sole cause of the WCT decline. Many other factors were considered in the Evaluation of Cause, other factors appear to be larger contributors to the WCT decline.</p> <p>The majority of assessed habitat in time of interest windows (winter, spring, summer-fall) indicated no chronic effects of selenium on WCT reproduction in winter, spring, and summer-fall and most other habitat indicating potential low-level effect. In the spring about 4% more habitat than previous years was assigned a low chronic effects rating (up from no). In the summer-fall about 4% more habitat than previous years was in the moderate chronic effects rating (up from low). This reflects some increases in</p> | Jan 2022 |
|---|---|------------|----------|--|----------|

| Action | Who   | Target Completion Date   | Progress | Most Recent Progress Date   |          |
|--------|---|--------------------------|----------|---|----------|
| 3      | Arrange for circulation and wiki posting of B.C.'s WCT Recovery plan and the synthesis of the Evaluation of Cause once they are finalized | Secretariat / John Krebs | Jan 2022 | <p>selenium in some areas, seasonally as compared to past years.</p> <p><b>Synthesis of the Evaluation of Cause is available here:</b></p> <p><a href="https://www.teck.com/sustainability/sustainability-topics/water/water-quality-in-the-elk-valley/research-and-monitoring-reports/">https://www.teck.com/sustainability/sustainability-topics/water/water-quality-in-the-elk-valley/research-and-monitoring-reports/</a></p> <p><b>WCT Recovery plan is expected in 2022</b></p> | Jan 2022 |
| 4      | B.C. FLNRORD confirm whether status of special concern for WCT is anticipated to change   | Secretariat              | TBD      | <b>New action from the Nov 18 MRC meeting</b>   | Nov 2021 |
| 5      | MT FWP confirm whether the dataset recently uploaded to wiki contains any hidden columns (re: KTOI request for liver data)                | Trevor Selch             | Jan 2022 | <p><b>Complete.</b></p> <p>There are no hidden columns. Liver data is shown in columns Y, Z, and AA of the excel file on the wiki site. However,1 the only liver Se data was collected in 2008.</p>   | Jan 2022 |
| 6      | Teck confirm availability of sediment periphyton data throughout the bull river   | Cait Good                | 2022 TBD | <b>New action from the Nov 18 MRC meeting</b>   | Nov 2021 |

| Action | Who          | Target Completion Date | Progress                                      | Most Recent Progress Date |
|--------|--------------|------------------------|---|---------------------------|
| 7      | Carla Fraser | 2022 TBD               | <b>New action from the Nov 18 MRC meeting</b> | Nov 2021                  |
| 8      | Carla Fraser | 2022 TBD               | <b>New action from the Nov 18 MRC meeting</b> | Nov 2021                  |
| 9      | Carla Fraser | 2022 TBD               | <b>New action from the Nov 18 MRC meeting</b> | Nov 2021                  |
| 10     | Carla Fraser | ?                      | <b>New action from the Nov 18 MRC meeting</b> | Nov 2021                  |



| <b>Action</b>   | <b>Who</b>                      | <b>Target Completion Date</b> | <b>Progress</b>  | <b>Most Recent Progress Date</b> |
|---|---------------------------------|-------------------------------|--|----------------------------------|
| <b>Completed Actions From Previous Meetings</b>   |                                 |                               |  |                                  |
| <b>Arrange Teck update presentation re: redbreasted sunfish and mountain whitefish toxicity studies</b> | Michel Ryan-Aylward, Myla Kelly | 2021                          | <b>Complete</b><br>Teck's presentation at the Nov 18, 2021 MRC meeting covered these studies   | November 2021                    |
| <b>Develop/arrange for webinar presentation re: how to access monitoring data</b>                       | Sheldon Reddekopp & Myla Kelly  | November 2019                 | <b>Complete</b><br>A live demonstration was provided at the March 2021 MRC meeting   | March 2021                       |
| <b>Collect and compile recommendations from the Working Group re: long-term direction/scope</b>         | Sheldon Reddekopp, Myla Kelly   | February 28, 2019             | <b>Complete</b><br>A survey was implemented in fall 2020 and summary of the responses shared March 2021  | March 2021                       |
| <b>Circulate youtube link to WQX guidance video</b>   | Michel Ryan-Aylward, Myla Kelly | June, 2020                    | <b>Complete/Revised</b><br>This commitment was addressed through the March 2021 live demonstration   | March 2021                       |
| <b>Build plan to keep Data Repository (from State of the Lake Report) updated</b>                       | MRC Chairs                      | September, 2018               | <b>Complete</b><br>MT DEQ contracted Lotic to update the State of the Lake Report. Most data collected in the US has been uploaded to the WQX Portal. ENV working on uploading their data. | July 2019                        |
| <b>Categorize materials on the Wiki Site for easier navigation/consumption</b>                          | Lauren Sullivan and Jody Fisher | December 14, 2018             | <b>Complete</b>  | July 2019                        |

| <b>Action</b>  | <b>Who</b>                     | <b>Target Completion Date</b> | <b>Progress</b>  | <b>Most Recent Progress Date</b> |
|--|--------------------------------|-------------------------------|--|----------------------------------|
| <b>Update Water Quality Management Snapshot</b> <ul style="list-style-type: none"> <li>Clarify the “trigger” for the Transboundary Monitoring Project</li> </ul> | Michel Ryan-Aylward            | November 30, 2018             | <b>Complete</b>  | Nov 21, 2018                     |
| <b>Share additional information about environmental assessment processes</b>   | Sean Moore                     | 2019 TBD                      | <b>Complete</b><br>ENV will arrange for a presentation at the next working group meeting to explain environmental assessment processes in relation to the Water Quality Management Snapshot (timing TBD) | Nov 21, 2018                     |
| <b>Update the Wiki Site with Oct 29 presentation materials</b>   | Jessica Penno                  | November 30, 2018             | <b>Complete</b>  | Nov 20, 2018                     |
| <b>Ensure Wiki Site has list of today’s participants</b>   | Jessica Penno                  | November 30, 2018             | <b>Complete</b>  | November 2018                    |
| <b>Develop repository of governance examples</b>   | Sheldon Reddekopp & Myla Kelly | December 14, 2018             | <b>Dropped</b><br>The BC-MT Kooacanusa Working Group MOU is near finalization. MRC remains a forum to share information regarding ongoing monitoring and science-based activities.                       |                                  |
| <b>Share Transboundary Monitoring Task Group’s Draft Recommended Study Design &amp; clarify opportunity for input</b>  | Doug Hill & Eric Urban         | December 14, 2018             | <b>Complete</b>  | Early 2019                       |

| Action   | Who   | Target Completion Date    | Progress  | Most Recent Progress Date |
|--|---|---------------------------|---|---------------------------|
| <b>Gap Analysis:</b> following the State of the Lake   | MRC Chairs                                  | TBD                       | <b>Complete</b><br>MRC Co-chairs have captured this as advice to develop a project plan for gap analysis as resources become available.   | July 2019                 |
| <b>Share Teck design for 2019-2020 Kooicanusa Monitoring</b>   | ENV co-chair                                | December 2018             | <b>Complete.</b> Recommended study design for 2019-2020 is being developed through the Transboundary Task Group. Targeting completion of draft recommended design by November 30, 2018. | October 2018              |
| <b>State of the Lake Report:</b> <ul style="list-style-type: none"> <li>Continue progress on State of the Lake and send the MRC updates as we make progress. Discuss expanding the scope of the State of the Lake Report.</li> </ul> | MRC chairs/Se Technical subcommittee Chairs | Spring, 2018 and Oct 2018 | <b>Complete.</b> Report results presented at the Apr 2018 web meeting. Draft has been made available to MRC for final comments by May 10, 2018.   | April 2018                |

| Action   | Who   | Target Completion Date | Progress  | Most Recent Progress Date |
|--|---|------------------------|---|---------------------------|
| <b>Coordinate 2018 field work</b> <ul style="list-style-type: none"> <li>Coordinate monitoring and research projects with various agencies, identify funding and data record keeping so that the data is made publically available.</li> </ul> | Se Technical Subcommittee Chairs/MRC chairs               | March, 2018            | <b>Complete.</b> Se TSC has been working to coordinate and plan field work. Se TSC presented 2018 plans at Apr 2018 web meeting. Data compiled in State of the Lake is available via the wiki site above. | April 2018                |
| <b>Steering Committee request to federal government for support</b> <ul style="list-style-type: none"> <li>Report back on the status of this</li> </ul>  | Steering Committee (MRC Chairs to communicate with group) | February 2018          | <b>Complete.</b> US Federal Agency Working Group and Global Affairs Canada are communicating regarding federal involvement. Meetings happening in late April 2018.  | April 2018                |
| <b>Clarity on the scope of this group:</b> is it a Watershed or Reservoir effort?  | Steering Committee (MRC Chairs to communicate with group) | February 2018          | <b>Complete.</b> BC will identify new Steering Committee representation in May 2018.  | Summer 2018               |
| <b>Nutrient phosphorous/nitrate export:</b> characterize from effluent and compare to baseline (look into feasibility and logistics of this effort)  | MRC Chairs  | June, 2018             | <b>Complete.</b>  | April 2018                |
| <b>Mercury data from Teck</b><br>Communicate with Teck on their mercury study and make available to MRC/Se tech subcommittee   | MRC Chairs  |                        | <b>Complete.</b>  | April 2018                |

| <b>Action</b>  | <b>Who</b>                                   | <b>Target Completion Date</b> | <b>Progress</b>  | <b>Most Recent Progress Date</b> |
|--|--|-------------------------------|--|----------------------------------|
| <b>Schedule spring MRC meeting</b><br>Web meeting or face-to-face? Solicit dates and ideas for agenda? Wider coordination? | MRC Chairs                                   | February, 2018                | <b>Complete.</b> Web Meeting was organized for Apr 26, 2018 by new MRC chairs, Myla Kelly and Sheldon Reddekopp.                   | April 2018                       |
| <b>Share Teck public report</b>  | ENV co-chair                                 | May, 2018                     | <b>Complete.</b> Link emailed to MRC on May 14, 2018:<br><a href="#">Teck Coal Ltd web site where 2017 Public Report is posted</a> | May 2018                         |
| <b>Review State of the Lake Report and provide comments to MRC chairs</b>  | All MRC Members                              | May 10, 2018                  | <b>Complete.</b>   | October 2018                     |
| <b>Finalize State of the Lake Report</b>   | MRC Chairs                                   | May, 2018                     | <b>Complete.</b>   |                                  |
| <b>Share State Dept letter to Global Affairs Canada</b>  | Ayn Schmidt (EPA)                            | May, 2018                     | <b>Complete.</b>   |                                  |
| <b>Decide on ENV sampling projects for 2018</b>  | BC ENV Steering Committee rep                | May, 2018                     | <b>Complete.</b> Decisions made on monthly profiling   | October 2018                     |
| <b>Share info on Kootenai River Collaboration</b>  | Jason Gildea (EPA)                           | September, 2018               | <b>Complete.</b>   |                                  |
| <b>Schedule fall MRC meeting</b>   | Steering committee, support by MRC co-chairs | June, 2018                    | <b>Complete.</b>   |                                  |
| <b>Circulate draft MRC Survey for review and input, with a list of LKMRWG organizations</b>                                | Michel Ryan-Aylward, Myla Kelly              | June 8, 2020                  | <b>Complete</b>  | June 9, 2020                     |

**APPENDIX 1 – MEETING AGENDA**

**MRC November 2021 Teleconference**  
**Nov 18, 2021 8:30am – 2:20pm PT / 9:30:am – 3:20 MT**

[Click here to join via Teams](#)

**Or call-in: +1 1 778-401-6289, Conference ID: 768 908 216#**

**Proposed Agenda**

| <b>#</b> | <b>Item</b>  | <b>Speaker(s)</b>   | <b>Time</b>                          |
|----------|--|---|--------------------------------------|
|          | Roll Call  | Michel Ryan Aylward                                       | 10 mins<br>8:30am PT / 9:30am MT     |
| 1        | Lake Kocanusa Monitoring and Research Working Group (LKMRWG) updates | Sean Moore / Amy Steinmetz / Myla Kelly / Jillian Tamblyn | 30 mins<br>8:40-9:10am / 9:40-10:10  |
| 2        | BC selenium objective update   | Sean Moore / AJ Downie                                    | 20 mins<br>9:10-9:30 / 10:10-10:30   |
| 3        | MT selenium standard update  | Myla Kelly  | 20 mins<br>9:30-9:50 / 10:30-10:50   |
|          | Break  |   | 15 mins<br>9:50-10:05 / 10:50-11:05  |
| 4        | Elk Valley updates   | AJ Downie   | 20 mins<br>10:05-10:25 / 11:05-11:25 |
| 5        | Transboundary Monitoring Task Group (TMTG) Update                    | Robyn Roome / Myla Kelly                                  | 15 mins<br>10:25-10:40 / 11:25-11:40 |
| 6        | Kootenai River Selenium Monitoring Update                            | Shawn Young   | 25 mins<br>10:40-11:05 / 11:40-12:05 |

|    |   |                |                                      |
|----|---|----------------|--------------------------------------|
| 7  | BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development:<br><ul style="list-style-type: none"> <li>B.C. Stewardship initiatives re: Westslope Cutthroat Trout</li> </ul> | John Krebs     | 25 mins<br>11:05-11:30 / 12:05-12:30 |
|    | Lunch   |                | 1 hour<br>11:30-12:30 / 12:30-1:30   |
| 8  | MT Fish Wildlife and Parks<br><ul style="list-style-type: none"> <li>Fish tissue in Kooicanusa</li> </ul>   | Trevor Selch   | 25 mins<br>12:30-12:55 / 1:30-1:55   |
| 9  | Teck Selenium Toxicity Studies Update   | Kevin Brix     | 25 mins<br>12:55-1:20 / 1:55-2:20    |
| 10 | Monitoring update from Teck   | Carla Fraser   | 25 mins<br>1:20-1:45 / 2:20-2:45     |
| 11 | Monitoring update from USGS-Montana   | Travis Schmidt | 25 mins<br>1:45-2:10 / 2:45-3:10     |
|    | Closing Remarks   |                | 10 mins<br>2:10-2:20 / 3:10-3:20     |
|    | Adjourn   |                | 2:20 / 3:20                          |

## APPENDIX 2 – ATTENDEES

| <b>Members Present</b>            | <b>Organization</b>    | <b>Email</b>   |
|-----------------------------------|------------------------|--|
| Myla Kelly (MRC co-chair)         | MT DEQ                 | <a href="mailto:Myla.Kelly@mt.gov">Myla.Kelly@mt.gov</a>                               |
| Jillian Tamblyn (MRC co-chair)    | B.C. ENV               | <a href="mailto:Jillian.Tamblyn@gov.bc.ca">Jillian.Tamblyn@gov.bc.ca</a>               |
| Lauren Sullivan                   | MT DEQ                 | <a href="mailto:Lauren.Sullivan@mt.gov">Lauren.Sullivan@mt.gov</a>                     |
| Michel Ryan-Aylward (Secretariat) | B.C. ENV               | <a href="mailto:Michel.RyanAylward@gov.bc.ca">Michel.RyanAylward@gov.bc.ca</a>         |
| Jason Gildea                      | EPA                    | <a href="mailto:Gildea.jason@epa.gov">Gildea.jason@epa.gov</a>                         |
| Carla Fraser                      | Teck Coal Limited      | <a href="mailto:carla.fraser@teck.com">carla.fraser@teck.com</a>                       |
| Marko Adzic                       | Teck Resources Limited | <a href="mailto:marko.adzic@teck.com">marko.adzic@teck.com</a>                         |
| Bill Arling                       | North Coal             | <a href="mailto:barling@northcoal.ca">barling@northcoal.ca</a>                         |
| Dave Baines                       | NWP Coal Canada        | <a href="mailto:dave.baines@nwpc coal.com">dave.baines@nwpc coal.com</a>               |
| Jacob Martin                      | US FWS                 | <a href="mailto:jacob_martin@fws.gov">jacob_martin@fws.gov</a>                         |
| Joseph Skorupa                    | USFWS                  | <a href="mailto:joseph_skorupa@fws.gov">joseph_skorupa@fws.gov</a>                     |
| Trevor Selch                      | MT FWP                 | <a href="mailto:tselch@mt.gov">tselch@mt.gov</a>                                       |
| Ryan Sylvester                    | MT FWP                 | <a href="mailto:RSylvester@mt.gov">RSylvester@mt.gov</a>                               |
| Greg Hoffman                      | USACE                  | <a href="mailto:Gregory.C.hoffman@usace.army.mil">Gregory.C.hoffman@usace.army.mil</a> |
| Theresa Presser                   | USGS                   | <a href="mailto:tpresser@usgs.gov">tpresser@usgs.gov</a>                               |
| Travis Schmidt                    | USGS                   | <a href="mailto:tschmidt@usgs.gov">tschmidt@usgs.gov</a>                               |
| Randal McNair                     | Wildsight              | <a href="mailto:randal@wildsight.ca">randal@wildsight.ca</a>                           |
| Chad Hughes                       | Elk River Alliance     | <a href="mailto:chad@elkriveralliance.ca">chad@elkriveralliance.ca</a>                 |

| <b>Members Absent</b> | <b>Organization</b> | <b>Email</b>   |
|-----------------------|---------------------|--|
| Ryan Hardy            | Idaho FG            | <a href="mailto:ryan.hardy@idfg.idaho.gov">ryan.hardy@idfg.idaho.gov</a>                 |
| Dave Hadden           | Headwaters Montana  | <a href="mailto:Dave.Hadden@headwatersmontana.org">Dave.Hadden@headwatersmontana.org</a> |
| Kent Easthouse        | USACE               | <a href="mailto:kent.b.easthouse@usace.army.mil">kent.b.easthouse@usace.army.mil</a>     |
| Merritt Horsmon       | Idaho FG            | <a href="mailto:merritt.horsmon@idfg.idaho.gov">merritt.horsmon@idfg.idaho.gov</a>       |
| Lars Sander-Green     | Wildsight           | <a href="mailto:lars@wildsight.ca">lars@wildsight.ca</a>                                 |
| Stella Swanson        | Elk River Alliance  | <a href="mailto:stellastrat@gmail.com">stellastrat@gmail.com</a>                         |

| <b>Observers Present</b>                | <b>Organization</b> | <b>Email</b>   |
|---|---------------------|--|
| Amy Steinmetz (Steering Ctte. co-chair) | MT DEQ              | <a href="mailto:asteinmetz@mt.gov">asteinmetz@mt.gov</a>       |
| Sean Moore (Steering Ctte. co-chair)    | B.C. ENV            | <a href="mailto:Sean.Moore@gov.bc.ca">Sean.Moore@gov.bc.ca</a> |

|                             |                         |  |
|-----------------------------|-------------------------|--|
| Robyn Roome (TMTG co-chair) | B.C. ENV                | <a href="mailto:Robyn.Roome@gov.bc.ca">Robyn.Roome@gov.bc.ca</a>                         |
| Kevin Rieberger             | B.C. ENV                | <a href="mailto:Kevin.Rieberger@gov.bc.ca">Kevin.Rieberger@gov.bc.ca</a>                 |
| Jessica Penno               | B.C. ENV                | <a href="mailto:Jessica.Penno@gov.bc.ca">Jessica.Penno@gov.bc.ca</a>                     |
| Genny Hoyle                 | Kootenai Tribe of Idaho | <a href="mailto:genhoyle@kootenai.org">genhoyle@kootenai.org</a>                         |
| Shawn Young                 | Kootenai Tribe of Idaho | <a href="mailto:young@kootenai.org">young@kootenai.org</a>                               |
| Charlie Holderman           | Kootenai Tribe of Idaho | <a href="mailto:cholderman@kootenai.org">cholderman@kootenai.org</a>                     |
| Rich Janssen                | CSKT/UofM               | <a href="mailto:richard.janssen@cskt.org">richard.janssen@cskt.org</a>                   |
| Erin Sexton                 | CSKT/UofM               | <a href="mailto:erin.sexton@umontana.edu">erin.sexton@umontana.edu</a>                   |
| Heather McMahon             | KNC                     | <a href="mailto:hcmahon@ccrffc.org">hcmahon@ccrffc.org</a>                               |
| Jesse Sinclair              | LGL Ltd/KNC             | <a href="mailto:jsinclair@lgl.com">jsinclair@lgl.com</a>                                 |
| Joe Beaman                  | EPA                     | <a href="mailto:Beaman.Joe@epa.gov">Beaman.Joe@epa.gov</a>                               |
| Karen Kesler                | EPA                     | <a href="mailto:Kesler.Karen@epa.gov">Kesler.Karen@epa.gov</a>                           |
| Patricia McGrath            | EPA                     | <a href="mailto:mcgrath.patricia@epa.gov">mcgrath.patricia@epa.gov</a>                   |
| Brian Balmer                | US FWS                  | <a href="mailto:brian_balmer@fws.gov">brian_balmer@fws.gov</a>                           |
| John Kilpatrick             | USGS                    | <a href="mailto:jmkilpat@usgs.gov">jmkilpat@usgs.gov</a>                                 |
| Chad Pederson               | Teck                    | <a href="mailto:Chad.Pederson@teck.com">Chad.Pederson@teck.com</a>                       |
| Christian Baxter            | Teck                    | <a href="mailto:Christian.Baxter@teck.com">Christian.Baxter@teck.com</a>                 |
| David DeForest              | Windward                | <a href="mailto:DavidD@windwardenv.com">DavidD@windwardenv.com</a>                       |
| David Janz                  | U of Saskatchewan       | <a href="mailto:david.janz@usask.ca">david.janz@usask.ca</a>                             |
| Fraser Ross                 | IAAC                    | <a href="mailto:Fraser.Ross@iaac-aeic.gc.ca">Fraser.Ross@iaac-aeic.gc.ca</a>             |
| Tana Stratton               | Global Affairs Canada   | <a href="mailto:Tana.Stratton@international.gc.ca">Tana.Stratton@international.gc.ca</a> |
| Geoff Reid                  | US Dept of State        | <a href="mailto:ReidG@state.gov">ReidG@state.gov</a>                                     |
| Steve Gunderson             | MT State Rep.           | <a href="mailto:Steve.Gunderson@mtleg.gov">Steve.Gunderson@mtleg.gov</a>                 |
| Josh Letcher                | Lincoln County          | <a href="mailto:jletcher@libby.org">jletcher@libby.org</a>                               |

| <b>Additional Attendees</b> | <b>Organization</b> | <b>Email</b>   |
|-----------------------------|---------------------|--|
| Sylvia Correa               | EPA                 | <a href="mailto:Correa.Sylvia@epa.gov">Correa.Sylvia@epa.gov</a>     |
| Tonya Fish                  | EPA                 | <a href="mailto:Fish.Tonya@epa.gov">Fish.Tonya@epa.gov</a>           |
| Michael Fischer             | EPA                 | <a href="mailto:Fischer.Michael@epa.gov">Fischer.Michael@epa.gov</a> |

|                             |                        |  |
|-----------------------------|------------------------|--|
| Julianne McLaughlin         | EPA                    | <a href="mailto:McLaughlin.Julianne@epa.gov">McLaughlin.Julianne@epa.gov</a>   |
| Trevor Watson               | MT FWP                 |  |
| Eric Zimdars                | US ACE                 |  |
| AJ Downie                   | B.C. ENV               | <a href="mailto:AJ.Downie@gov.bc.ca">AJ.Downie@gov.bc.ca</a>   |
| Lisa Paquin                 | B.C. ENV               | <a href="mailto:Lisa.Paquin@gov.bc.ca">Lisa.Paquin@gov.bc.ca</a>   |
| Alison Neufeld              | B.C. ENV               | <a href="mailto:Alison.Neufeld@gov.bc.ca">Alison.Neufeld@gov.bc.ca</a>   |
| Sue Ireland                 | KTOI                   |  |
| Bob Steed                   | Idaho DEQ              | <a href="mailto:Robert.Steed@deq.idaho.gov">Robert.Steed@deq.idaho.gov</a>   |
| Todd Higans                 | Idaho DEQ              | <a href="mailto:Todd.higans@deq.idaho.gov">Todd.higans@deq.idaho.gov</a>   |
| Melissa Shaar               | USGS                   | <a href="mailto:mschaar@usgs.gov">mschaar@usgs.gov</a>   |
| Joshua Cummings             | US Department of State | <a href="mailto:CummingsJI@state.gov">CummingsJI@state.gov</a>   |
| Elizabeth Christensen-Diver | US Department of State | <a href="mailto:ChristensonDiverEC@state.gov">ChristensonDiverEC@state.gov</a>   |
| Douglas D Walker            | US Department of State | <a href="mailto:WalkerDD@state.gov">WalkerDD@state.gov</a>   |
| Ellen Hudson-Heck           | Idaho Conservation     |  |
| Wyatt Petryshen             | Wildsight              |  |
| Anne-Caroline Kroeger       | Elk River Alliance     | <a href="mailto:AnneCarolineKroeger@ElkRiverAlliance.onmicrosoft.com">AnneCarolineKroeger@ElkRiverAlliance.onmicrosoft.com</a> |
| Kevin Brix                  | EcoTox LLC             | <a href="mailto:kevinbrix@icloud.com">kevinbrix@icloud.com</a>   |
| Trevor Hall                 | Teck                   | <a href="mailto:Trevor.Hall@teck.com">Trevor.Hall@teck.com</a>   |
| Cait Good                   | Teck                   | <a href="mailto:Cait.Good@teck.com">Cait.Good@teck.com</a>   |
| Lucy Harrison               | IAAC                   | <a href="mailto:Lucy.Harrison@iaac-aeic.gc.ca">Lucy.Harrison@iaac-aeic.gc.ca</a>   |
| Todd Goodsell               | B.C. EAO               | <a href="mailto:Todd.Goodsell@gov.bc.ca">Todd.Goodsell@gov.bc.ca</a>   |
| Heather Noble               | B.C. EAO               | <a href="mailto:Heather.Noble@gov.bc.ca">Heather.Noble@gov.bc.ca</a>   |
| Matthew Rodgers             | B.C. EAO               | <a href="mailto:Matthew.Rodgers@gov.bc.ca">Matthew.Rodgers@gov.bc.ca</a>   |
| Julia Taylor                | B.C. EAO               | <a href="mailto:Julia.X.Taylor@gov.bc.ca">Julia.X.Taylor@gov.bc.ca</a>   |
| Marla Bojarski              | B.C. EAO               | <a href="mailto:Marla.Bojarski@gov.bc.ca">Marla.Bojarski@gov.bc.ca</a>   |
| Peter Boldt                 | B.C. EAO               | <a href="mailto:Peter.Boldt@gov.bc.ca">Peter.Boldt@gov.bc.ca</a>   |
| Rachel Pennell              | B.C. EAO               | <a href="mailto:Rachel.Pennell@gov.bc.ca">Rachel.Pennell@gov.bc.ca</a>   |
| John Krebs                  | B.C. FLNRORD           | <a href="mailto:John.Krebs@gov.bc.ca">John.Krebs@gov.bc.ca</a>   |
| Ray Morello                 | B.C. FLNRORD           | <a href="mailto:Ray.Morello@gov.bc.ca">Ray.Morello@gov.bc.ca</a>   |

|                     |                 |  |
|---------------------|-----------------|--|
| Jenny Ferone        | ECCC            | <a href="mailto:Jenny.Ferone@ec.gc.ca">Jenny.Ferone@ec.gc.ca</a> |
| Tristan Scott       | Flathead Beacon |  |
| Ainslie Cruickshank | The Narwhal     |  |
| Robert Sisson       | IJC             | <a href="mailto:Rob.Sisson@ijc.org">Rob.Sisson@ijc.org</a>       |

| <b>Observers Absent</b>        | <b>Organization</b> | <b>Email</b>   |
|--------------------------------|---------------------|--|
| Galen Steffens (TMTG co-chair) | DEQ                 | <a href="mailto:galen.steffens2@mt.gov">galen.steffens2@mt.gov</a>           |
| Terri Mavencamp                | MT DEQ              | <a href="mailto:tmavencamp2@mt.gov">tmavencamp2@mt.gov</a>                   |
| Darrin Kron                    | DEQ                 | <a href="mailto:DKron@mt.gov">DKron@mt.gov</a>                               |
| Chris Faubion                  | DEQ                 | <a href="mailto:Christopher.Faubion@mt.gov">Christopher.Faubion@mt.gov</a>   |
| Patrick Williston              | B.C. ENV            | <a href="mailto:patrick.williston@gov.bc.ca">patrick.williston@gov.bc.ca</a> |
| Jim Dunnigan                   | MT FWP              | <a href="mailto:JDunnigan@mt.gov">JDunnigan@mt.gov</a>                       |
| Mike Hensler                   | MT FWP              | <a href="mailto:Mhensler@mt.gov">Mhensler@mt.gov</a>                         |
| TJ Ross                        | Idaho Fish and Game | <a href="mailto:Tj.ross@idfg.idaho.gov">Tj.ross@idfg.idaho.gov</a>           |
| John Bergenske                 | Wildsight           | <a href="mailto:john@wildsight.ca">john@wildsight.ca</a>                     |
| Andrea Raska                   | IAAC                | <a href="mailto:Andrea.Raska@canada.ca">Andrea.Raska@canada.ca</a>           |
| Christian Schmidt              | USGS                | <a href="mailto:cgschmidt@usgs.gov">cgschmidt@usgs.gov</a>                   |
| Chris Mebane                   | USGS                | <a href="mailto:cmebane@usgs.gov">cmebane@usgs.gov</a>                       |
| Chris Ellison                  | USGS                | <a href="mailto:cellison@usgs.gov">cellison@usgs.gov</a>                     |
| Karen Jenni                    | USGS                | <a href="mailto:kjenni@usgs.gov">kjenni@usgs.gov</a>                         |
| Mark Peck                      | Lincoln County      | <a href="mailto:mark.peck@libby.org">mark.peck@libby.org</a>                 |
| Jerry Bennet                   | Lincoln County      | <a href="mailto:jbennett@libby.org">jbennett@libby.org</a>                   |
| Mike Cuffe                     | MT Senator          | <a href="mailto:Mike.Cuffe@mtleg.gov">Mike.Cuffe@mtleg.gov</a>               |

#### Acronyms:

MT DEQ – Montana Department of Environmental Quality

B.C. ENV – British Columbia Ministry of Environment & Climate Change Strategy

FLNRORD – British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development

B.C. EAO – British Columbia Environmental Assessment Office

CCRIFC/KNC – Canadian Columbia River Inter-Tribal Fisheries Commission / Ktunaxa Nation Council  
CSKT – Confederated Salish and Kootenai Tribes  
KTOI – Kootenai Tribe of Idaho  
EPA – Environmental Protection Agency  
MT FWP – Montana Fish, Wildlife and Parks  
USGS – United States Geological Survey  
USACE – United States Army Corps of Engineers  
USFWS – United States Fish and Wildlife Service  
UBC – University of British Columbia  
UofM – University of Montana  
IAAC – Impact Assessment Agency of Canada  
ECCC – Environment and Climate Change Canada  
Idaho DEQ – Idaho Department of Environmental Quality  
LKMRWG – Lake Koocanusa Monitoring and Research Working Group  
MRC – Monitoring and Research Committee  
IJC – International Joint Commission