September 2022
Water Policy Interim Report

REPORT TO THE 68TH MONTANA LEGISLATURE

INVISIBLE TOXICITY: A STUDY OF SELENIUM STANDARDS FOR LAKE KOOCANUSA (HJ37)

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This report is a summary of the work of the Water Policy Interim Committee, as outlined in the Water Policy Interim Committee's 2021-22 work plan and House Joint Resolution 37 (2021). Members received additional information and public testimony on the subject, and this report is an effort to highlight key information and the processes followed by the Water Policy Interim Committee in reaching its conclusions. To review additional information, including audio minutes and exhibits, visit the Water Policy Interim Committee website: www.leg.mt.gov/water.

A full report, including links to the documents referenced in this print report, is available at the Water Policy Interim Committee website: www.leg.mt.gov/water.

HOUSE JOINT RESOLUTION 37

That the Legislative Council be requested to designate the Environmental Quality Council, subject to section 5-5-217, MCA, and to direct sufficient staff resources, pursuant to section 5-11-112, MCA, to establish a collaborative process with the Department of Environmental Quality to:

- Analyze the data and processes referenced in and used to support rulemaking to determine if ARM 17.30.632, as it pertains to Lake Koocanusa, complies with the Montana Water Quality Act and the federal Clean Water Act; and
- Offer recommendations on what changes, if any, are needed to ARM 17.30.632 or supporting documentation.

DRAFT FINDINGS OF THE WATER POLICY INTERIM COMMITTEE

1. Selenium is a micronutrient that may be toxic in high doses.
2. Selenium affects fish by interrupting the reproductive cycle.
3. Elevated levels of selenium have been recorded in Lake Koocanusa and the Kootenai River, attributable to coal mining operations further upstream in British Columbia.
4. The Department of Environmental Quality and other agencies have been gathering water quality and fish tissue data in the basin since at least 2015. As the regulatory agency for water quality in Montana, DEQ has contemplated site-specific criteria since that time.
5. Mathematical modeling was used to compute protective criteria for water column and fish tissue limits for selenium in Lake Koocanusa and the Kootenai River. Various federal, tribal, and non-Montana entities and the public provided input into these calculations.
6. The proposed selenium standards rule underwent hearings and comments in late 2020, including a hearing in front of the Water Policy Interim Committee. The rule was approved by the Board of Environmental Review and subsequently the Environmental Protection Agency.
7. Some have questioned if selenium levels have increased, if the selenium modeling was correctly calibrated, and if various fish species were adequately sampled.
8. The Board of Environmental Review reversed the prior board decision when it determined the selenium rule for the water column standard is more stringent that federal standards. The board has ordered a rewriting of the selenium rule, but it is unclear of the order's effect.
9. The DEQ submitted written findings to the Board of Environmental Review, as provided under the stringency review. The rule remains in effect.

INTRODUCTION

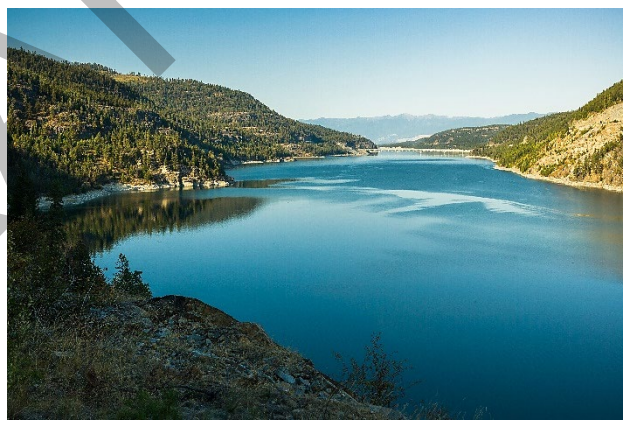
The federal Clean Water Act requires the nation to improve the nation's waters. It allows the states to execute this legislation, ranging from assessing the quality of waters, setting standards for those waters, and issuing permits to pollute those waters. The setting of standards for the Kootenai River and the Lake Koocanusa reservoir behind Libby Dam is the subject of this report.

Though a highly localized issue in far northwestern Montana, this study also involved more than the WPIC and the DEQ, including another legislative interim committee, a legislatively created board, federal agencies, tribes, a state, and a province.

LAKE KOOCANUSA AND THE KOOTENAI RIVER

The Kootenai River, known as the Kootenay in Canada, begins in the Beaverfoot Range of the Rocky Mountains west of Banff, Alberta. Its name stems from an indigenous word for "water people."[1] The river runs 485 miles to the Columbia River at Castlegar, British Columbia, draining a watershed of 16,180 square miles. Much of the river course follows the Rocky Mountain Trench, a geologic feature caused by geologic faulting.

The river flows southward into Montana, before bending northwesterly near Libby and coursing through northeastern Idaho and back into Canada. The river's J-shaped course flows around the Purcell Mountains, and is bound by the Continental Divide ranges to the east, the Selkirk Mountains in the west, and the Cabinet Range in the south.[2] The river bends again to join the Columbia River before entering the state of Washington. Tributaries include the Vermilion, Cross, Palliser, White, Wild Horse, St. Mary, Elk, Fisher, Yaak, Moyie, Goat, and Slocan rivers. Major lakes and reservoirs include Kootenay Lake and Lake Koocanusa.



LAKE KOOCANUSA (STOCK PHOTO)

The river is subject to the Columbia River Treaty. The Kootenai River has four dams along its course, providing mostly for flood control. The first dam is at Libby.

Lake Koocanusa is a 90-mile-long reservoir formed by Libby Dam. The dam's authorized purpose is flood control and hydropower. The dam was constructed under the Columbia River Treaty between the U.S. and Canada.[3]

[1] https://www.britannica.com/place/Kootenay-River
[2] https://kootenairivernetwork.org
[3] https://www.nwd.usace.army.mil/CRSO/Project-Locations/Libby/

The dam and reservoir also provide recreation, water quality, and fish and wildlife benefits. The Kootenai River downstream is home to bull trout (a threatened species under the Endangered Species Act) and white sturgeon (endangered).[4] Sport fish include rainbow trout, west slope cutthroat trout, brook trout, Kokanee salmon, burbot, whitefish, Kamloops trout, and others.

SELENIUM AND LAKE K

Scientists and government agencies have kept a watchful eye on water quality in "Lake K" and the Kootenai River since at least 1972. [5]

Increasing levels of selenium and other contaminants (nitrates, cadmium, sulfates) have long emanated from the Elk River Valley, an upstream tributary in British Columbia.[6] Coal mining in Canada has caused selenium levels to rise, as water running through waste rock piles carries selenium and other substances into the watershed.[7]

BULL TROUT (STOCK PHOTO)

Coal mining in the Elk River Valley began in 1897 east of Fernie, British Columbia. Today, Teck Resources Ltd. operates four Elk Valley mines, employing approximately 4,000 workers and exporting "steelmaking coal" mostly to the Asia-Pacific region.[8] As one of the world's largest sources of steelmaking coal, the mines are expected to operate for years into the future. Other deposits in the valley may also be mined.

Selenium is an element present in sedimentary rock, shales, coal, and phosphate deposits and soils.[9] It is a micronutrient essential for fish and human diets, but can bioaccumulate and is toxic at high levels. In fish, which are more sensitive to selenium than humans, selenium halts reproduction, causing deformities at a young age and resulting in fewer fish.[10] For example, a year class of fish could disappear.[11]

Ninety-five percent of the selenium entering Lake Koocanusa is from the Elk River.[12] The DEQ listed aquatic life in the lake as "threatened" due to rising selenium levels.[13]

[4] https://www.nwd.usace.army.mil/CRSO/Project-Locations/Libby/
[5] https://www.usgs.gov/centers/wyoming-montana-water-science-center/science/kootenai-river-basin-dissolved-selenium-data
[6] Department of Environmental Quality, *Selenium Site-Specific Criterion Update*, 2020
[7] U.S. Geological Survey, *Selenium and mercury in the Kootenai River, Montana and Idaho, 2018-2019,* 2020
[8] Teck Resources Ltd., *2021 Annual Report,* 2022
[9] Department of Environmental Quality, *Selenium Site-Specific Criterion Update*, 2020
[10] Testimony of Tonya Fish, Region 8 water quality standards contact (EPA) to HJ37 special committee, Feb. 28, 2022.
[11] Testimony of Trevor Selch, fisheries pollution control biologist (FWP) to HJ37 special committee, Feb. 28, 2022.
[12] Department of Environmental Quality, *Selenium Site-Specific Criterion Update* (2020)
[13] Ibid.

The Clean Water Act allows authorized state agencies to set water quality standards. These standards are subject to approval from the Environmental Protection Agency. In 2016, the EPA recommended that states adopt "site-specific" standards because how the element bioaccumulates and moves up the food chain depends on local conditions.[14]

LIBBY DAM (USGS)

In 2020, the department proposed a water quality standard for selenium for the Kootenai River from the U.S.-Canada border to the Montana-Idaho border, including the Lake Koocanusa reservoir, citing elevated selenium levels.

The DEQ held a public hearing on the selenium criteria on Nov. 5, 2020. This hearing came after a Oct. 9, 2020, hearing by the WPIC, which has oversight of water quality and quantity issues. The WPIC did not object to the rule at that time. On Dec. 24, 2020, the Board of Environmental Review adopted the rule.[15] The Environmental Protection Agency approved the rule in February 2021.

DISCUSSION OF THE STANDARD

The rule has been the subject of challenge and discussion ever since its adoption.

In particular, the Montana Legislature passed House Joint Resolution 37, requesting a study to "analyze the data and processes referenced in and used to support rulemaking".

The Legislative Council assigned the study to the Water Policy Interim Committee, which has jurisdiction over the quality and quantity of water.[16] To meet the spirit of the resolution, which requested the study be assigned to the Environmental Quality Council, the WPIC created the HJ37 Special Committee on Selenium Standards in Lake Koocanusa[17] to "engage in additional, thoughtful, collaborative, and scientifically defensible analysis with state regulators to determine whether the 2020 site-specific standards for Lake Koocanusa are appropriate."[18]

The special committee held three public meetings in 2022.[19] The special committee reviewed data assembled by the DEQ and heard the scientific statements from other experts, such as the EPA, U.S. Geological Survey, Confederated Salish and Kootenai Tribes, Kootenai Tribe of Idaho, Idaho Department of Environmental Quality, and the Montana Department of Fish, Wildlife, and Parks. Many of these

[14] Ibid.
[15] Section 17.30.632, ARM (Appendix C).The board no longer has rulemaking authority per SB 233 (2021).
[16] Section 5-5-231, MCA.
[17] Special committee members were Sen. Walt Sales (presiding officer), Sen. Jill Cohenour, Rep. Willis Curdy, Rep. Steve Gunderson, Sen. Ryan Lynch, Rep. Rhonda Knudsen, Rep. Marilyn Marler, Sen. Mark Sweeney, and Sen. Cary Smith.
[18] HJ37 (2021) (Appendix B).
[19] At the time of writing this report, a fourth meeting was being considered.

agencies and others composed the Lake Koocanusa Monitoring and Research Working Group,[20] which first met in October 2015,[21] to review data and create a methodology for the rule.

Work group members told the committee that the standard was based in science and necessary to protect Lake K's water quality.

WATER SAMPLING ON LAKE K. (USGS)

The DEQ said although deformities have not been documented in Lake Koocanusa,[22] ongoing monitoring has recorded the highest selenium concentrations in fish tissue on record.[23] All water quality standards are reviewed every three years, so the selenium standard could change with relevant evidence.

Fish are more sensitive to selenium than humans, especially during the reproductive cycle.[24] And selenium accumulates through the food web and affects different organisms differently.[25] Selenium concentrations have also increased downstream of Montana and Lake K, as evidenced by increasing levels found in white sturgeon, whitefish, and burbot.[26]

The department's rulemaking process has been challenged by local elected officials and Teck Resources. The company's four active mines are the primary source of elevated selenium levels. Specifically, Teck said, the rule was rushed, selenium levels may not be increasing, fish tissue samples are unreliable due to incorrect collection, and the statistical modeling used to set the selenium limits was incorrectly calibrated and did not follow best practices.[27]

The company cited the department's "misuse of fish tissue data," such as claiming alarming trends in selenium levels, collecting fish tissue data at the wrong time in a fish lifecycle, or not collecting enough data.[28]

[20] Members also included the British Columbia Ministry of the Environment, University of Saskatchewan, U.S. Fish and Wildlife Service, and consultants for Teck Resources Ltd. The working group did not include the Idaho Department of Environmental Quality.
[21] http://lakekoocanusaconservation.pbworks.com
[22] Deformities would not be expected in surviving adult fish. Testimony of Lauren Sullivan, water quality science specialist (DEQ) to HJ37 special committee, Jan. 27, 2022.
[23] Testimony of Myla Kelly, Water Quality Standards Section supervisor (DEQ), to HJ37 special committee, Jan. 27, 2022.
[24] Testimony of Tonya Fish, Region 8 water quality standards contact (EPA), to HJ37 special committee, Feb. 28, 2022.
[25] Testimony of Jason Gildea, Region 8 Water Division policy advisor (EPA), to HJ37 special committee, Feb. 28, 2022.
[26] Testimony of Genny Hoyle, aquatic biologist (Kootenai Tribe of Idaho), to HJ37 special committee, Feb. 28, 2022.
[27] Teck Resources Ltd., memo to HJ37 special committee, January 27, 2022.
[28] Teck Resources Ltd., memo to HJ37 special committee, Feb. 28, 2022.

The department noted that selenium rules are meant to be preventative, i.e. before widespread problems occur. The department found elevated levels of selenium in its fish tissue sampling. The Department of Fish, Wildlife, and Parks continues to collect fish tissue samples.

A University of California-Davis research ecologist testified to the special committee that the statistical modeling used to determine the quantitative limits for selenium was not correctly calibrated.[29] Thus, the model overpredicted concentrations in the food web, and therefore the standard is too strict.[30] [31]

DELIBERATIONS OF BOARD OF ENVIRONMENTAL REVIEW

The rule was appealed to the Board of Environmental Review, which hears administrative appeals of certain DEQ actions.

Teck Resources and the local officials specifically asked the Board of Environmental Review for a stringency review under state law.[32] Montana law allows the board to review a rule to determine if it was set more stringent that federal standards.[33] The board agreed the water column standard was more stringent that federal standards.[34]

The board ruled that the rule was aimed "in a manner adverse to" Teck Resources and would "impact discharge limitations for new projects in Lincoln County." [35] The board also ruled that "in order to have a valid and enforceable lake water column standard, new rulemaking must be initiated."[36]

[29] Testimony of Dr. Samuel Luoma, research ecologist (University of California-Davis) to HJ37 special committee, Feb. 28, 2022.
[30] Ibid.
[31] In a written response, the department stated that Luoma's assertions account only for selenium in zooplankton, a primary food source for fish in the system. A proper model should also be calibrated for piscivorous fish, such as burbot and chub, that eat other fish (DEQ memo to HJ37 special committee, March 9, 2022). The department reviewed 13 modeling scenarios through the monitoring working group (DEQ memo to HJ37 special committee, March 9, 2022), and two independent selenium experts reviewed the modeling (Testimony of John Kilpatrick, director (Wyoming-Montana Water Science Center (USGS)) to HJ37 special committee, Feb. 28, 2022.) See also Appendix F.
[32] Notice of schedule for implementation of review by the Board of Environmental Review, *In the Matter of Petitions of Teck Coal Limited and the Board of County Commissioners of Lincoln County, Montana, for Review of ARM 17.30.632(7)(a) Pursuant to Mont. Code Ann. Section 75-5-203—Stringency Review of Rule Pertaining to Selenium Standard for Lake Koocanusa*, June 30, 2021.
[33] Section 75-5-203, MCA (Appendix G).
[34]Final agency action and order of the Board of Environmental Review, *In the Matter of Petitions of Teck Coal Limited and the Board of County Commissioners of Lincoln County, Montana, for Review of ARM 17.30.632(7)(a) Pursuant to Mont. Code Ann. Section 75-5-203—Stringency Review of Rule Pertaining to Selenium Standard for Lake Koocanusa*, April 19, 2022 (Appendix D). This ruling does not apply to the fish tissue standards.
[35] Ibid.
[36] Ibid.

It is unclear when and if new rulemaking will occur. [37] The DEQ responded to the BER ruling with a written response, as also provided for in the same section of state law.[38] The rule remains in effect.

TECK RESOURCES WATER TREATMENT PLANT IN ELK VALLEY, B.C. (TECK RESOURCES)

For now, the selenium water column standard for Lake Koocanusa remains 0.8 micrograms per liter,[39] while the selenium water column standard for all Montana lakes (excepting Lake Koocanusa) is 5 micrograms/L. Montana's selenium water column standard of 3.1 micrograms/L for the Kootenai River is the same as Idaho's standard.[40]

But it is also unclear of the effect a Montana administrative rule would have on an upstream Canadian entity like the coal company or on a downstream state (Idaho).

The British Columbia Ministry of the Environment proposed a water column selenium guideline slightly higher than Montana's and a whole-body fish standard lower than Montana's.[41] These guidelines do not have direct legal standing, but must be considered in provincial decisions, such as land use decisions, best management practices, and discharge authorizations.[42, 43]

Meanwhile, Teck Resources is expanding its water treatment capacity to meet water quality management measures required by the Elk Valley Water Quality Plan, which was approved by the British Columbia Minister of Environment in 2014. The company must comply with a water quality guideline that matches the British Columbia guideline of 2.0 micrograms/L in Lake Koocanusa.[44] The company has five water treatment plants, and its process reportedly removes 95 percent of the selenium and nitrate in the water.[45] The company is also managing water flows to control selenium release at its source, through water diversions and geosynthetic covers. Teck expects to quadruple its water treatment capacity by the end of 2022.[46]

[37] Standards may be reviewed during the DEQ's triennial review of water quality standards and/or if new data shows a different standard is warranted.
[38] Section 75-5-203, MCA (Appendix G).
[39] U.S. EPA Region 8 memo to Steven Ruffatto, Montana Board of Environmental Review chairman, Feb. 25, 2021.
[40] Standards for fish tissue differ from those for the water column. Ibid.
[41] Meeting notes from the Lake Koocanusa Monitoring and Research Working Group, Nov. 18, 2021.
[42] Ibid.
[43] British Columbia Ministry of Environment, *Fact Sheet Water Quality Guidelines*, 2016.
[44] Teck Resources must comply with its permit based on measurement of in-stream water quality, which includes treated and untreated runoff water. Teck Resources Ltd., memo to WPIC, Aug. 31, 2022.
[45] Teck Resources Ltd., *Fact Sheet: Elk Valley Water Quality Plan*, 2022. The company is not required to treat all runoff from its mining sites, however permit compliance is measured by in-stream water quality, which includes treated and untreated runoff.
[46] Ibid.

The company states that Montana's water quality standard "may not be achievable with existing technology," and that it is "taking steps to challenge this standard."[47]

COMMITTEE RECOMMENDATIONS

At the time of the drafting of this report, neither the WPIC nor the special committee have offered recommendations on this issue.

A legislative response, including repealing the selenium rule, may be limited due to the authority of the EPA and the primacy of the federal Clean Water Act.

At the time of the drafting of this report, the Board of Environmental Review continued to hear motions related to its April action ordering new rulemaking. Much of the board discussion revolved around interpretations of section 75-5-203, MCA.[48]

[47] Teck Resources Ltd., *2021 Annual Report,* 2022, 22-23.
[48] See Appendix G.

APPENDIX A:
WATER POLICY INTERIM COMMITTEE MEMBERS

Before the close of each legislative session, the House and Senate leadership appoint lawmakers to interim committees. The members of the Water Policy Interim Committee, like most other interim committees, serve one 20-month term. Members who are reelected to the Legislature, subject to overall term limits and if appointed, may serve again on an interim committee. This information is included in order to comply with 2-15-155, MCA.

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A JOINT RESOLUTION OF THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA REQUESTING AN INTERIM STUDY OF SELENIUM LEVELS IN LAKE KOOCANUSA, INCLUDING A COLLABORATIVE REVIEW OF THE MODELING, ANALYSIS, AND WATER QUALITY STANDARDS ADOPTED IN 2020.

WHEREAS, the Board of Environmental Review promulgated a site-specific selenium standard for Lake Koocanusa on December 11, 2020, and the United States Environmental Protection Agency approved the board's new standard in early 2021; and

WHEREAS, some affected stakeholders question the 2020 site-specific selenium standard for Lake Koocanusa and request a cooperative review of the new administrative rule, ARM 17.30.632, technical support documents, background data, and assumptions used in the previous modeling process, and stakeholder desire to complete the model validation process; and

WHEREAS, these affected stakeholders desire an opportunity to engage in additional, thoughtful, collaborative, and scientifically defensible analysis with state regulators to determine whether the 2020 site-specific standards for Lake Koocanusa are appropriate.

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA:

That the Legislative Council be requested to designate the Environmental Quality Council, subject to section 5-5-217, MCA, and to direct sufficient staff resources, pursuant to section 5-11-112, MCA, to establish a collaborative process with the Department of Environmental Quality to:

(1) analyze the data and processes referenced in and used to support rulemaking to determine if ARM 17.30.632, as it pertains to Lake Koocanusa, complies with the Montana Water Quality Act and the

federal Clean Water Act; and

(2) offer recommendations on what changes, if any, are needed to ARM 17.30.632 or supporting documentation.

BE IT FURTHER RESOLVED, that the Legislative Council requests that the Environmental Quality Council invite two members of the Water Policy Interim Committee, including a member of the Senate and a member of the House of Representatives with one each from the majority party and the minority party, to participate as ex officio members of this study.

BE IT FURTHER RESOLVED, that the study be conducted and recommendations be developed with consultation of interested stakeholders, including:

(1) the Lincoln County Board of Commissioners;

(2) selenium experts and other experts who have experience proposing and reviewing water quality standards; and

(3) other appropriate agencies, including the Governor's Office, the Board of Environmental Review, and the Department of Environmental Quality.

BE IT FURTHER RESOLVED, that all aspects of the study, including presentation and review requirements, be concluded prior to April 1, 2022.

BE IT FURTHER RESOLVED, that the final results of the study, including any findings, conclusions, comments, or recommendations of the appropriate committee, be reported to the 68th Legislature, the Governor's natural resources policy advisor, and the British Columbia Ministry of the Environment.

- END -

APPENDIX C: SELENIUM STANDARDS FOR LAKE KOOCANUSA, KOOTENAI RIVER DEC. 25, 2020

17.30.632 SELENIUM STANDARDS FOR LAKE KOOCANUSA AND THE KOOTENAI RIVER

(1) For Lake Koocanusa and the Kootenai River mainstem, the standards specified in (6) and (7) supersede the otherwise applicable water quality standards found elsewhere in state law.

(2) Numeric selenium standards for Lake Koocanusa and the Kootenai River mainstem from the US-Canada international boundary to the Montana-Idaho border are expressed as both fish tissue and water column concentrations. When the aquatic ecosystem is in steady state and selenium data is available for both fish tissue and the water column, the fish tissue standards supersede the water column standard. When the aquatic ecosystem is in non-steady state, both the fish tissue and water column standards apply. The numeric selenium standards apply to the lake, to the river, or to both, as provided in this rule.

(3) As of December 25, 2020, Lake Koocanusa and the Kootenai River aquatic ecosystems are in non-steady state. The department will reassess the status of these aquatic systems triennially and amend this rule to reflect any change.

(4) The water column standards are derived from modeling selenium bioaccumulation in fish tissue and reflect criteria that protect the aquatic life beneficial use. Permit conditions and limits developed from the water column standards comply with the fish tissue standards.

(5) No person may violate the numeric water quality standards in (6) through (7).

(6) Fish tissue standards will be instantaneous measurements not to be exceeded. Fish tissue sample results shall be reported as a single value representing an average of individual fish samples or a composite sample, each option requiring a minimum number of five individuals from the same species. Fish tissue standards are applicable to tissues of fish in Lake Koocanusa from the US-Canada international boundary to the Libby Dam and in the mainstem Kootenai River from the outflow below the Libby Dam to the Montana-Idaho border. Egg/ovary tissue standards supersede any muscle or whole-body standards, as well as the water column standards in (7), when fish egg/ovary samples are available and when the aquatic ecosystem is in steady state. When fish egg/ovary samples are unavailable, and the aquatic ecosystem is in steady state, fish muscle or whole-body standards supersede the water column standards in (7).

Fish Tissue	Selenium Concentration
Eggs/Ovaries	15.1 mg/kg dry weight (dw)
Muscle	11.3 mg/kg dw
Whole Body	8.5 mg/kg dw

(7) Water column standards are the numeric standards for total dissolved selenium computed as a 30-day average, and shall not be exceeded more than once in 3 years, on average.

(a) Lake Koocanusa from the US-Canada international boundary to the Libby Dam: 0.8 µg/L.

(b) Kootenai River mainstem from the outflow below the Libby Dam to the Montana-Idaho border: 3.1 µg/L.

History: 75-5-201, 75-5-301, MCA; IMP, 75-5-301, MCA; NEW, 2020 MAR p. 2336, Eff. 12/25/20.

**BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA**

IN THE MATTER OF: PETITIONS OF TECK COAL LIMITED AND THE BOARD OF COUNTY COMMISSIONERS OF LINCOLN COUNTY, MONTANA, FOR REVIEW OF ARM 17.30.632(7)(A) PURSUANT TO MONT. CODE ANN. SECTION 75-5-203 – STRINGENCY REVIEW OF RULE PERTAINING TO SELENIUM STANDARD FOR LAKE KOOCANUSA	**CAUSE NOS. BER 2021-04 and 08 WQ** **FINAL AGENCY ACTION AND ORDER OF THE BOARD OF ENVIRONMENTAL REVIEW**

I. PROCEDURAL HISTORY

On June 30, 2021, Teck Coal Limited ("Teck") petitioned the Board of Environmental Review ("Board" or "BER") under § 75-5-203, MCA (the "Stringency Statute"), to determine whether Administrative Rules of Montana (ARM) 17.30.632(7)(a) (the "Lake Numeric Standard"), which sets a water column standard for selenium in Lake Koocanusa of 0.8 micrograms per liter, is more stringent than the comparable federal guideline. On October 14, 2021, the Board of County Commissioners of Lincoln County ("Lincoln County") filed a similar petition with the Board. The Board consolidated the two petitions (collectively, the "Petitions") and determined, with Teck's waiver, that the eight-month period provided in § 75-5-203(4)(a), MCA, would commence on October 14, 2021, the

date Lincoln County filed its petition. The rulemaking record that culminated in the promulgation of the Lake Numeric Standard (the "Record" or "RR") was compiled and made available to the public and the Board on December 15, 2021.[1] The Board requested submission of written comments addressing the issues presented by the Petitions by January 13, 2022. The Board received comments from the Idaho Conservation League; the Confederated Salish and Kootenai Tribes, together with the Kootenai Tribe of Idaho (collectively, the "Tribes"); Lincoln County; the Montana Department of Environmental Quality ("DEQ" or the "Department"); the Montana Environmental Information Center together with the Clark Fork Coalition (collectively, "MEIC/CFC"); the U.S. Environmental Protection Agency ("EPA"); Montana Trout Unlimited; the Montana Mining Association; the Treasure State Resources Association of Montana; Wildsight; and Teck. The Board requested that responsive comments be submitted by January 21, 2022. The Board received responses from Teck, DEQ, EPA, and Lincoln County.

On January 31, 2022, the Board held a public hearing to receive oral comments on the Petitions. Oral comments were received from Montana Senator Mike Cuffe (Senate District 1); Teck; Lincoln County; Mr. John O'Connor from

[1] The Record or "RR" can be found on the BER Website under the Selenium Rule Review "Record Supporting the Promulgation of ARM 17.30.632" https://deq.mt.gov/files/DEQAdmin/BER/Documents/Record.pdf

Bonners Ferry, Idaho; Lincoln County Commissioner Jerry Bennett; Lincoln County Commissioner Josh Letcher; EPA; DEQ; the Tribes; the Idaho Conservation League; MEIC/CFC; Wildsight; Idaho Rivers United; Ms. Erin Sexton; Montana Trout Unlimited; Ms. Lexie Defremery from Bonner County, Idaho; Ms. Becca Rodack from Boundary County, Idaho; and the British Columbia and Montana chapters of the Back Country Hunters and Anglers. A transcript of the public hearing was made available to the Board. The Board requested proposed decision documents by February 11, 2022, and received proposed documents from DEQ, MEIC/CFC, and Teck.

After detailed consideration and analysis of the records, documents, transcripts, and comments; and the relevant rules, statutes, and other authorities; and after in-depth deliberations at its February 25 and April 8, 2022 meetings; the Board makes the following Findings of Fact and Conclusions of Law.

II. FINDINGS OF FACT

1. The controlling statute is § 75-5-203, MCA, the Stringency Statute, which reads in relevant part, following its amendment in 2021:

> **State regulations no more stringent than federal regulations or guidelines.** (1) Except as provided in subsections (2) through (5) …. the department [previously board] may not adopt a rule to implement **75-5-301**, **75-5-302**, **75-5-303**, or **75-5-310** that is more stringent than the comparable federal regulations or guidelines that address the same circumstances. …

> (2) The department [previously board] may adopt a rule to implement this chapter that is more stringent than comparable federal regulations or guidelines only if the department [previously board] makes a written finding after a public hearing and public comment and based on evidence in the record that:
>
> (a) the proposed state standard or requirement protects public health or the environment of the state; and
>
> (b) the state standard or requirement to be imposed can mitigate harm to the public health or environment and is achievable under current technology.
>
> (3) The written finding must reference pertinent, ascertainable, and peer-reviewed scientific studies contained in the record that forms the basis for the department's [previously board's] conclusion. The written finding must also include information from the hearing record regarding the costs to the regulated community that are directly attributable to the proposed state standard or requirement.
>
> (4) (a) A person affected by a rule that the person believes to be more stringent than comparable federal regulations or guidelines may petition the board to review the rule. If the board determines that the rule is more stringent than comparable federal regulations or guidelines, the department [previously board] shall comply with this section by either revising the rule to conform to the federal regulations or guidelines or by making the written finding, as provided under subsection (2), within a reasonable period of time, not to exceed 8 months after receiving the petition….

2. Upon request of DEQ, acting under its authority provided in §§ 75-5-201 and 75-5-301, MCA, the Board initiated rulemaking of the new selenium rules (ARM 17.30.632), including the Lake Numeric Standard, by publication in the Montana Administrative Register on October 9, 2020. RR 000044 (9/24/20 BER Mtg. Agenda); RR 001326-31 (10/09/20 Notice to Hold Hr'g on Prop. Amend. ARM 17.30.602 and ARM 17.30.632).

3. In conjunction with its request for rulemaking, DEQ advised the Board that the Lake Numeric Standard is not more stringent than the EPA recommended criteria because it was "developed using federally-recommended site-specific procedures." RR 000001-2 (9/09/20 Mem. from Kirsten H. Bowers [DEQ Att'y] to BER). The Board's initiation of rulemaking for the Lake Numeric Standard adopted DEQ's conclusion asserting that "[t]he proposed Lake Koocanusa water column standard (30-day chronic) is no more stringent than the recommended EPA 304(a) criteria because it was developed using federally recommended site-specific procedures; therefore, it is more accurate than the *generally applicable national lentic (lake) number*." RR 001330 (19 Mont. Admin. Reg., 1793 (Oct. 9, 2020)) (emphasis added). Thus, DEQ and the Board rejected the "generally applicable national lentic (lake) number" as the comparable federal guideline. The Board relied on DEQ's conclusion regarding stringency throughout the rulemaking. RR 002333-2334, 2422, 2427 (12/11/20 BER Transcript); RR 002544-45 (12/24/20 Notice of Amend. and Adoption for ARM 17.30.602 and ARM 17.30.632 in Mont. Admin. Reg.).

4. The Board finalized promulgation of the new selenium rules by publication in the Montana Administrative Register on December 24, 2020. RR 002482-2546 (12/24/20 Notice of Amend. and Adoption for ARM 17.30.602 and ARM 17.30.632 in Mont. Admin. Reg.).

5. Regarding stringency of the Lake Numeric Standard compared to the federal guideline, the Board's final promulgation stated that the Lake Numeric Standard was not more stringent than the federal guideline because "[t]he proposed water column standard for Lake Koocanusa (0.8 µg/L) is based on EPA 304(a) fish tissue criteria and site-specific bioaccumulation modeling, following the site-specific procedures set forth by EPA in its current 304(a) guidance." RR 002544-45 (12/24/20 Notice of Amend. and Adoption for ARM 17.30.602 and ARM 17.30.632 in Mont. Admin. Reg.). Because the Board concluded that the Lake Numeric Standard was not more stringent than the federal guideline, it also concluded that it "is not required to make written findings required by § 75-5-203(2), MCA." *Id*.

6. The Petitions sought the Board's review of the Lake Numeric Standard pursuant to the Stringency Statute to determine if it is more stringent than the comparable federal guideline that addresses the same circumstances and, if it is, whether the Stringency Statute's requisite findings had been or could be made based on the Record and whether the rulemaking publications complied with the Stringency Statute.[2]

[2] *See* Petition to Review ARM 17.30.632 For Compliance with MCA § 75-5-203 ("Teck Petition"), June 30, 2021, BER Mtg. Materials for Aug. 13, 2021, pg. 105, retrieved from https://deq.mt.gov/files/DEQAdmin/BER/Documents/2021%20Agendas/BER-Packet-20210813.PDF (on March 25, 2022); Petition to Review ARM 17.30.632

7. Teck is a company conducting coal mining operations in the Elk Valley area in British Columbia. Teck's Elk Valley operations are subject to regulation by British Columbia pursuant to, among other laws, Ministerial Order No. M113, the 2014 Elk Valley Water Quality Plan, and Permit 107517 issued to Teck by the B.C. Ministry of Environment under the B.C. Environmental Management Act. Permit 107517 includes selenium water quality compliance limits and site performance objectives for Teck's discharges that eventually enter the Elk River, which is a tributary to Lake Koocanusa. RR 000087-88, 91-92, 94-99 (9/2020, DEQ, *Derivation of a Site-Specific Water Column Selenium Standard for Lake Koocanusa* ("DEQ Derivation Doc."); *see also* Teck Petition, pp. 14-15.

8. Teck participated in collaborative efforts, initiated by Teck's Canadian regulators, to consider whether British Columbia's Water Quality Objective of 2.0 micrograms per liter is protective of Lake Koocanusa. DEQ participated in the collaborative efforts. Some of the information and data used, developed, and considered during that process, including information and data provided by Teck, are referenced and relied upon in the technical support documents that serve as the basis for the new rule, ARM 17.30.632. *Id.*

For Compliance with MCA § 75-5-203 ("Lincoln County Petition"), Oct. 14, 2021, BER Mtg. Materials for Oct. 29, 2021, pg. 161, retrieved from https://deq.mt.gov/files/DEQAdmin/BER/Documents/2021%20Agendas/20211029_Packet.pdf (on March 25, 2022).

9. Teck participated in the rulemaking for ARM 17.30.632 by attending public meetings, submitting formal written comments and delivering oral comments at public meetings, including the November 5, 2020 public hearing. RR 001269-73 (9/24/20 BER Transcript); RR 001465-71 (11/5/20 BER Transcript); RR 001894-2091 (11/23/20 Teck Comment Letter). Teck's comments included its assertion that the Lake Numeric Standard failed to comply with the Stringency Statute. *Id.*

10. On December 31, 2020, DEQ Director McGrath wrote to the International Joint Commission, which has authority to enforce the Boundary Waters Treaty, requesting action against transboundary pollution stemming from Elk River valley mining operations. Teck Petition, Ex. D.

11. On December 11, 2020, DEQ Director McGrath testified before the Board that "[b]y us adopting this standard today, what that does is continue to put the pressure on British Columbia to indeed adopt their own standard that is aligned with us." RR 002402 (12/11/20 BER Transcript).

12. The Board of County Commissioners of Lincoln County is a political subdivision of the State of Montana. That portion of Lake Koocanusa located in the United States is within Lincoln County. Lincoln County Petition, p. 14.

13. Lincoln County participated in the rulemaking for ARM 17.30.632 by attending public meetings, submitting formal written comments, and delivering

oral comments at public meetings. RR 001796-1801 (Lincoln County Comment Letter); RR 001439-1443 (11/5/20 BER Transcript).

14. When promulgating the Lake Numeric Standard, the Board "recognize[d] that the lake will probably be considered impaired for selenium." RR 002505 (20 Mont. Admin. Reg. 2359 (12/24/20)).

15. When promulgating the Lake Numeric Standard, the Board noted that if Lake Koocanusa is listed as impaired for selenium, "then new projects would need to discharge at concentrations equal to or less than the proposed standard of 0.8 [micrograms per liter]." RR 002497 (20 Mont. Admin. Reg. 2351 (12/24/20)).

16. There is no federal standard for selenium, but there is a federal guideline. RR 000306 (2016 EPA Guideline, explaining the distinction between a CWA Section 304(a)(1) guideline, which "represents a non-regulatory, scientific assessment of ecological effects" and a water quality standard which is associated with a specific designated use and adopted by a state or tribe).

17. On July 13, 2016, EPA announced the release of final updated guidelines to states and tribes for selenium. 81 Fed. Reg. 45285-86 (7/13/16). "EPA's recommended water quality criteria are scientifically derived numeric values that protect aquatic life or human health from the deleterious effects of pollutants in ambient water." *Id*. For selenium in lentic water (still or slow-moving fresh water), EPA recommends a water column numeric value of 1.5 micrograms per

liter (the "EPA National Lake Numeric Guideline"); a fish whole body tissue numeric value of 8.5 mg/kg dw; a fish muscle tissue numeric value of 11.3 mg/kg dw; and a fish egg/ovary numeric value of 15.1 mg/kg dw. *Id*.; RR 000313 (EPA, *Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016,* Table 1).

18. The 2016 EPA Guideline was "derived for the protection of 95% of species nation-wide," specifically including white sturgeon in the Kootenai River, from impacts of selenium, including selenium released by "resource extraction activities." RR 000090 (DEQ Derivation Doc.); RR 000320, 455-456 (2016 EPA Guideline). Appendix K to the 2016 EPA Guideline provides suggested models (the "EPA Site-Specific Models") for use by states and tribes if they choose to deviate for specific sites from the generally applicable national guideline. RR 001035-78 (2016 EPA Guideline, Appendix K). The "site-specific procedures" referenced by DEQ and the Board (*see* Findings of Fact ¶3 and ¶5 *supra*) are the EPA Site-Specific Models. RR 002544-45 (24 Mont. Admin. Reg. 2398-99 (12/24/20); BER Hr'g Tr. ("Jan. 31 Hearing") 30:1-8 (1/31/22).

19. The EPA Site-Specific Models consist of complicated mathematical formulas using assumptions and inputs determined by the user. The user has discretionary latitude in selecting the assumptions and inputs and changes in the

assumptions and inputs of course change the result. *Id*.; RR 002544-45 (24 Mont. Admin. Reg. 2398-99 (12/24/20)); RR 000078-119 (DEQ Derivation Doc.).

20. The new selenium rules provide "[n]umeric selenium standards," including a "water column standard" for Lake Koocanusa of 0.8 micrograms per liter: the Lake Numeric Standard. ARM 17.30.632.

21. DEQ and EPA agree that the Lake Numeric Standard is a water quality standard for Montana Water Quality Act and federal Clean Water Act purposes. Jan. 31 Hearing 23:3-6, 31:24-25.

22. Using an EPA Site-Specific Model, the Lake Numeric Standard was supported by modeling scenarios that use a whole-body fish tissue threshold of 5.6 mg/kg dw, which is more stringent than the federally recommended level of 8.5 mg/kg dw. RR 000127 (DEQ Derivation Doc.). As stated by DEQ testimony to the Board, "the 5.6 was used as an input to come up with a water column value of .8." RR 001251 (testimony of Myla Kelly, DEQ Manager of Water Quality Standards and Modeling Section, 9/24/20 Board Transcript). A model scenario using the federally recommended level of 8.5 mg/kg dw was also presented, but that scenario altered other model inputs (bioavailability and Kd percentile) to be more "conservative" (i.e., more stringent). RR 000125-27 (DEQ Derivation Doc.).

23. In its rationale for approval of the new selenium rule, EPA noted that the Lake Numeric Standard "is more stringent than the recommended water column

criterion element for lentic aquatic systems in EPA 2016 (1.5 µg/L)." Teck Petition, Exhibit B (EPA Letter to Board, EPA Rationale (February 25, 2021), p. 12 (pdf p. 15) n. 22; *see also* p. 2 (pdf p. 5), n. 6; p. 6 (pdf p. 9), n.11).

24. Concerned that "Montana must simultaneously move toward reducing redundant and unnecessary regulation that dulls the state's competitive advantage while being ever vigilant in the protection of the public's health, safety, and welfare," the Montana Legislature enacted House Bill 521 in 1995, which was codified as the Stringency Statute. Mont. HB 521, 54th Leg. (1995).

25. In enacting House Bill 521, the Legislature intended that the agency promulgating a standard or requirement must "include as part of the initial publication and all subsequent publications a written finding if the rule in question contains any standards or requirements that exceed the standards or requirements imposed by comparable federal law." *Id*.

26. The Legislature intended that the "written finding must include but is not limited to a discussion of the policy reasons and an analysis that supports the board's or department's decision that the proposed state standards or requirements protect public health or the environment of the state and that the state standards or requirements to be imposed can mitigate harm to public health or the environment and are achievable under current technology." *Id*.

27. Based on the Board's conclusion that the Lake Numeric Standard was not more stringent than the comparable federal guideline, the Board did not make the written findings required by § 75-5-203, MCA, when it promulgated the Lake Numeric Standard. RR 002544-45 (24 Mont. Admin. Reg. 2398-99 (12/24/20)) and it did not have reason to include in the Record evidence specifically to support such findings. *Id.* Whether the Record contains such evidence is questionable. Teck Comments pp. 16-24 (1/13/22).

28. Teck and the Lincoln County argue that the Stringency Statute requires peer-reviewed studies to support the findings required by the statute. Teck Petition p. 2; Lincoln County Petition p. 2. DEQ argues to the contrary. DEQ Comments p.11-13 (1/13/22).

III. CONCLUSIONS OF LAW

1. This matter regards compliance with the Stringency Statue, not whether the Lake Numerical Standard is the appropriate standard.

2. The Board is an "agency" an "entity or instrumentality of the executive branch of state government." Section 2-15-102(2), MCA.

3. Pursuant to § 2-15-3502(4), MCA, the Board serves a "quasi-judicial function," which is defined as "an adjudicatory function exercised by an agency, involving the exercise of judgment and discretion in making determinations in controversies." Section 2-15-102(10), MCA. This includes "interpreting,

applying, and enforcing existing rules and laws" and "evaluating and passing on facts." *Id*.

4. One such issue that the law places within the Board's authority is, upon petition, to review a rule pursuant to the Stringency Statute. Therefore, the Board has a statutory duty to consider the Petitions and issue final agency action on them. Section 75-5-203(4)(a), MCA.

5. Prior to July 1, 2021, setting water quality standards—including the Lake Numeric Standard—was solely within the Board's authority. Section 75-5-301(2), MCA (2019); 2021 Mt. SB 233; § 75-5-301(2), MCA (2021). Pursuant to that authority, the Board created the Record and promulgated the Lake Numeric Standard. (*See* Findings of Fact ¶¶ 2-4 *supra*).

6. Administrative standing determinations made by quasi-judicial agencies (such as the Board) depend "on the language of the statute and regulations which confer standing before that agency." *Williamson v. Mont. PSC*, 2012 MT 32, ¶ 30, 364 Mont. 128, 272 P.3d 71, 82. Administrative standing "may permissibly be less demanding than the criteria for judicial standing." *Id.* In this case, the statute that confers standing requires that the person be "affected by" the Lake Numeric Standard. Section 75-5-203(4)(a), MCA. The statute does not condition the amount or type of effect required. It simply requires that the person be "affected by" the Lake Numeric Standard. A "person" is defined in the Montana Water

Quality Act to include a "firm, corporation, partnership, individual, or other entity and includes persons resident in Canada." Section 75-5-103(26), MCA.

7. Teck's Petition and the Record demonstrate that it is affected by the Lake Numeric Standard because its Canadian coal mining operations, monitoring data and other information, and the regulatory requirements placed upon it by provincial and Canadian authorities were used during rulemaking. The Lake Numeric Standard was aimed at Teck and was immediately used by DEQ in a manner adverse to Teck. *See* Findings of Fact ¶¶ 7-11 *supra*.

8. Lincoln County's Petition and the Record demonstrate that it is affected by the Lake Numeric Standard because Lake Koocanusa is in Lincoln County and, as the Board recognized, an impairment listing of the lake is probable and would impact discharge limitations for new projects in Lincoln County. *See* Findings of Fact ¶¶ 12-15 *supra*.

9. The Lake Numeric Standard is a water quality standard subject to the Stringency Statute. *See* Findings of Fact ¶¶ 21, 25 *supra*; ARM 17.30.632(7); § 75-5-302, MCA.

10. The EPA National Lake Numeric Guideline is "comparable" to and "address[es] the same circumstances" as the Lake Numeric Standard because both are definitive numeric criteria, both address the same "particular parameter," which is selenium, both address lentic/lake waters, and both aim to protect aquatic life

from the effects of selenium, including the release of selenium related to resource extraction. *See* Findings of Fact ¶¶ 16-18 *supra*; § 75-5-203(1), MCA; *Pennaco Energy v. Mont. Bd. of Envtl. Review*, 2007 Mont. Dist. LEXIS 513, *44 (affirmed *Pennaco Energy, Inc. v. Mont. Bd. of Envtl. Review*, 2008 MT 425, 347 Mont. 415, 199 P.3d 191).

11. In *Pennaco*, the Court held that the Stringency Statute is "triggered only when EPA has promulgated a federal regulation, guideline or criteria addressing the particular parameter involved" and since the parties agreed "there [were] no national numeric criteria for [the particular parameters involved]," the statute was not triggered. 2007 Mont. LEXIS at *44 (Dist. Ct. reasoning upheld 347 Mont. at 428, 199 P.3d at 200). In the present case, the Stringency Statute is triggered by the EPA National Lake Numeric Guideline. *See* Findings of Fact ¶ 17 *supra*.

12. DEQ's theory that the EPA National Lake Numeric Guideline is not the "comparable" guideline on the grounds that the Lake Numeric Standard is site-specific fails, not only because it is contrary to the plain statutory language, but also because this argument would render the Stringency Statute a nullity as to site-specific rules which is directly contrary to the express terms of the statute making it applicable to site-specific standards. Section 75-5-203(1), MCA (specifically stating its applicability to standards set pursuant to § 75-5-310, MCA, which allows site specific standards). Also, this argument would be counter to the intent

and purpose of the stringency statute. *See* Findings of Fact ¶¶ 24-25 *supra*. Mont. HB 521, 54th Leg. (1995).

13. The Lake Numeric Standard is mathematically lower and thus more stringent than the comparable federal guideline (the EPA National Lake Numeric Guideline). *See* Findings of Fact ¶¶ 17, 20 *supra*. The Board erred when it determined that the Lake Numeric Standard is not more stringent than the comparable federal guideline. Section 75-5-203(1), MCA.

14. While the EPA lacks authority under Montana's Stringency Statute, its conclusion that the Lake Numeric Standard "is more stringent than the recommended water column criterion element for lentic aquatic systems in EPA 2016 (1.5 µg/L) [the EPA National Lake Numeric Guideline]" is confirming evidence that the comparable federal guideline is the EPA National Lake Numeric Guideline. *See* Findings of Fact ¶ 23 *supra.*

15. The EPA Site-Specific Models are not "comparable" to the Lake Numeric Standard because the Lake Numeric Standard is a definitive numeric water quality standard while the EPA Site-Specific Models consist of complicated mathematical formulas using assumptions and inputs determined by the user who has discretionary latitude in selecting the assumptions and inputs and changes in the assumptions and inputs change the result. *See* Findings of Fact ¶¶ 19-20 *supra*.

The Board erred when it treated the EPA Site-Specific Models as comparable to the Lake Numeric Standard. Section 75-5-203(1), MCA.

16. Although the EPA Site-Specific Models are not the comparable guideline, it is significant to note that the modeling conducted by DEQ to determine the Lake Numerical Standard used an input criterion more stringent than the federal guideline, thus, rendering the Lake Numerical Standard more stringent even under DEQ's theory. *See* Findings of Fact ¶ 22 *supra*.

17. No written findings were provided by the Board for the Lake Numeric Standard. Written findings are required by the Stringency Statute under MCA §§ 75-5-203(2) and (3) when the standard is more stringent than the comparable federal guideline. Therefore, by not providing written findings the Board erred and the Lake Numeric Standard violates the Stringency Statute. *See* Findings of Fact ¶¶ 26-27 *supra*. Section 75-5-203(1), MCA.

18. Because the initial publication of the new selenium rules failed to inform the public that the Lake Numeric Standard is more stringent than the federal guideline and failed to provide the written findings required by the Stringency Statute for public review and comment, the rulemaking for the Lake Numeric Standard violates the Stringency Statute. Section 75-5-203, MCA; *See* Findings of Fact ¶¶ 3, 25 *supra*.

19. The Stringency Statute requires evidence in the rulemaking record supporting the required findings for a rule more stringent than the federal guideline. Sections 75-5-203(2) and (3), MCA. However, it is not necessary for the Board to determine now whether the Record contains the necessary evidence, because if DEQ determines to make the findings required by the Stringency Statute, DEQ must ensure that such evidence exists in the record. Section 75-5-203, MCA; *See* Findings of Fact ¶¶ 26-27 *supra*.

20. The Stringency Statute expressly requires "peer-reviewed scientific studies" to support a more stringent than federal rule. Section 75-5-203(3), MCA. The legislative history supports this reading of the statute. *See* Minutes, MT. Senate, 54th Leg. Reg. Session, Comm. on Natural Resources, March 28, 1995, p. 5.

IV. ORDER

Based on the Board's full consideration of the foregoing Findings of Fact and Conclusions of Law, and the supporting record, as well as arguments submitted, IT IS ORDERED that:

1. Teck and Lincoln County each has standing to bring its Petition.

2. The Lake Numeric Standard is more stringent than the comparable federal guideline.

3. The Board erred, as a matter of law, when it concluded the Lake Numeric Standard was not more stringent than the comparable federal

guideline and that it did not need to make the written findings required by §§ 75-5-203(2) and (3), MCA.

4. The Lake Numeric Standard and the rulemaking upon which it is based fail to comply with the Stringency Statute. Sections 75-5-203(1), (2) and (3), MCA.

5. The Stringency Statute sets forth the applicable remedy to be implemented by DEQ. Section 75-5-203(4)(a), MCA.

6. Because the Board's rulemaking failed to comply with § 75-5-203, MCA, in order to have a valid and enforceable lake water column standard, new rulemaking must be initiated.

7. That this is the Final Agency Decision of the Board.

DATED this 19th day of April, 2022.

/s/ *Steven Ruffatto*
STEVEN RUFFATTO
Chairman
Board of Environmental Review

DEQ
Montana Department
of Environmental Quality

DRAFT
Written Findings for the Site-Specific Water Column Selenium Standard for Lake Koocanusa, MT

March 2022

Prepared by:
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APPENDIX E: DRAFT FINDINGS FOR WATER COLUMN SELENIUM STANDARD FOR LAKE K

Table of Contents

1.0 INTRODUCTION

On December 11, 2020, the Board of Environmental Review (board), voted to adopt the Department of Environmental Quality's (department) proposed selenium water quality standard for Lake Koocanusa into state law and determined the proposed standard was no more stringent than federal guidelines. Therefore, there was no requirement for the completion of written findings as described in MCA 75-5-203. The multi-part standard includes fish tissue and water column components with the following numeric values: 15.1 mg/kg dry weight (dw) egg/ovary, 11.3 mg/kg dw muscle, 8.5 mg/kg dw whole body, and 0.8 µg/L total dissolved selenium in Lake Koocanusa and 3.1 µg/L in the Kootenai River mainstem. See ARM 17.30.632. The frequency and duration of the fish tissue standards are instantaneous measurements, not to be exceeded. The water column standard is computed as a 30-day average and shall not be exceeded more than once in three years, on average.

The standards were adopted into state law on December 25, 2020, and codified in ARM 17.30.632. The water quality standards were approved by the U.S. Environmental Protection Agency (EPA) on February 25, 2021. Petitions were filed to the board by Teck Coal Limited (Teck) on June 30, 2021, and by Lincoln County on October 14, 2021, with both petitions calling for a review of the stringency determination for the site-specific water column standard for Lake Koocanusa in ARM 17.30.632(7)(a). On February 25, 2022, the board reversed its previous stringency determination and determined that the site-specific water column standard for Lake Koocanusa is more stringent than comparable federal guidelines. The department will, therefore, comply with MCA 75-5-203 by making the written findings set forth in 75-5-203(2), MCA. Presented in this document are the written findings supporting ARM 17.30.632(7)(a) required under MCA 75-5-203(2) and MCA 75-5-203(3).

2.0 WRITTEN FINDINGS

The purpose of this document is to complete the written findings described in MCA 75-5-203 for the site-specific water column selenium standard for Lake Koocanusa. The document has been structured to address each statutory requirement individually. MCA 75-5-203 states that the written findings must be based on the record. Citations to the board's rulemaking record on the matter are included with the prefix "RR" followed by the page number, and the full record can be found on the DEQ Standards website at https://deq.mt.gov/files/Water/WQPB/Standards/pdf/BER_Record.pdf

75-5-203(2)(a) The proposed state standard or requirement protects public health or the environment of the state

Selenium Toxicity

The selenium water quality standard for Lake Koocanusa is necessary to protect aquatic life from the toxic effects of selenium (**RR_000001**). The water quality standard is a multi-part standard comprised of egg/ovary, muscle or whole body, and water column components (**RR_000074**). The multi-part water quality standard accounts for diet as the primary pathway of selenium exposure (**EPA, 2016; RR_000317**). EPA (2016) states that traditional methods for predicting toxicity on the basis of exposure to water column concentrations do not work for selenium because the behavior and toxicity of selenium in aquatic systems is highly dependent on site-specific factors (**RR_000310**). Therefore, the protection of the egg/ovary

selenium concentration levels are the foundational basis of the federal EPA guideline (EPA, 2016). From the egg/ovary tissue the other fish tissue (muscle and whole body) standards and water column standard were derived (EPA, 2016). The most influential step in selenium bioaccumulation in the food web is the uptake of dissolved selenium into particulate selenium at the base of the food web and this can be characterized as the Kd. This is operationally defined as the concentration of selenium in particulate material divided by the concentration in the water column (**Presser and Luoma, 2010; RR_001111**). As selenium is further transferred through the food chain, a variety of toxic effects can manifest with the most well-documented being reproductive teratogenesis and larval mortality of egg- laying vertebrates (**EPA, 2016; RR_000328**). While selenium is an essential nutrient, a narrow margin exists between the amount of selenium required by an organism and the amount that can cause toxicity with egg-laying vertebrates being more sensitive to selenium than mammals (**EPA, 2016; RR_000327-RR_00329)**. For Lake Koocanusa, larval survival of egg-laying vertebrates, specifically fish, were determined to be the most sensitive endpoint (**RR_000093**). Presser and Luoma (2010) describe some of the effects in fish being larva and fry survival and growth and deformity (**RR_002945**). EPA (2016) outlines a variety of lethal and sublethal deformities that can occur in developing fish exposed to selenium where those fish with deformities can die shortly after hatching or their overall fitness is reduced to a level whereby their rate of survival is less than normal young fish. EPA (2016) further states that the percentage of deformed adults observed during surveys will likely underestimate the underlying percentage of deformed young (**RR_000329**). Biologists with Fish Wildlife and Parks (FWP) have corroborated this for the Lake Koocanusa system, stating that selenium affects fish at the reproductive level which can be challenging to detect beyond sampling selenium concentrations in egg/ovary tissues and that as a result of the sampling methods used in routine FWP fish surveys adult fish are preferentially captured and they would not expect to see deformities in surviving adult fish in their sampling (**RR_002146**). At the center of many technical discussions in the process of standards setting for Lake Koocanusa was the topic of a lag time before effects are fully realized in fish tissues (**RR_004233**). EPA (2016) notes that in a system with new inputs, concentrations in fish tissue can take years to be detected at stable concentrations in a lentic system (**RR_000417**).

Selenium Inputs and Scientific Approach

Jenni et al. (2017) reports annual selenium loads entering Lake Koocanusa have increased from 2,600 kilograms (kg) in 1992 to over 13,000 kg in 2012, representing more than a fivefold increase over 20 years (**RR_002844**). Presser and Naftz (2020) show a continuing increase in selenium concentrations for decades recorded at Highway 93 on the Elk River, British Columbia, a tributary to Lake Koocanusa. The Canadian data presented in Presser and Naftz (2020) shows concentrations below 1 μg/L in 1985 with a steady increasing trend to over 8 μg/L by 2020 (**RR_001146**). Furthermore, Presser and Naftz (2020) show cross sectional areas of Lake Koocanusa with selenium concentrations greater than1 μg/L increasing from 2016-2019 (**RR_001170-001171**). The Lake Koocanusa Monitoring and Research Group and Selenium Technical Subcommittee that guided the department's work, was established, in part based on the increasing levels of selenium entering Lake Koocanusa.

In 2013 the British Columbia Minister of Environment issued a Ministerial Order (**RR_003994-RR_004002**) under the Environmental Management Act to remediate water quality effects of past mining activities and to guide environmental management of future mining activities in the Elk Valley, including the Canadian portion of Lake Koocanusa (**RR_000080**). The Order led to the Elk Valley Area Based Management Plan (ABMP) and established a Technical Advisory Committee (TAC) with agencies from Canada and the United States participating (**RR_000087**). That work taking place in Canada, eventually led to the formation of the bi-national Lake Koocanusa Monitoring and Research Working Group that

brought together Montana and British Columbia regulatory agencies and stakeholders. Jenni et al. (2017) describes the establishment of the Lake Koocanusa Monitoring and Research Working Group in 2015 by Montana DEQ and British Columbia Ministry of the Environment and Climate Change Strategy (BC-ENV) to address current and future water quality concerns in the Lake Koocanusa watershed and to work towards joint solutions for managing potential selenium contamination including the development of a site-specific selenium criteria for the protection of aquatic life and wildlife (**RR_002844**). The department co-led the Lake Koocanusa Monitoring and Research Working Group engaging a diverse group of stakeholders, first nation governments, federal agencies, and industry. A Selenium Technical Subcommittee was established comprising leading experts in the field of selenium toxicology from both the United States and Canada (**RR_005231**). Members of the Selenium Technical Subcommittee were identified and invited to participate. This made up a team of bi-national selenium experts, most with careers of over 20 years of expertise in selenium toxicity – collectively over 200 years of direct work with selenium. Member affiliations of the Selenium Technical Subcommittee include: state and provincial co-chairs, tribal and First Nations, federal agencies (EPA, U.S. Fish and Wildlife Service, U.S. Geological Survey), academia (University of Saskatchewan) and an Industry Consultant. The Selenium Technical Subcommittee undertook the following steps to guide the ultimate standards decision: identifying objectives, peer-reviewed conceptual model framework, supplemental targeted data collection by U.S. entities, BC-ENV, and Teck, a peer-reviewed Lake Koocanusa ecosystem model report and supplemental peer-reviewed data and model results, and recommendations on the standard based on the model results. The department worked over many years soliciting feedback from stakeholders and the collective knowledge of the selenium experts throughout the development of a site-specific selenium standard for Lake Koocanusa. (**RR_002109**).

The department followed federal guidance for developing a site-specific water column standard for Lake Koocanusa. The process followed is defined in EPA (2016) Appendix K: Translation of a Selenium Fish Tissue Criterion Element to a Site-Specific Water Column Value (**RR_001035-001078**). The water column component is translated from the fish tissue component utilizing the mechanistic Presser and Luoma (2010) bioaccumulation modeling approach and tailoring it to the Lake Koocanusa ecosystem (**RR_002514**). The department worked with the U.S. Geological Survey (USGS) to complete the modeling effort **(RR_002514; RR_000119-RR_000127)**. The outcome of that work was the peer-reviewed Presser and Naftz (2020) report which utilized the Presser and Luoma (2010) ecosystem model and calibrated it to the Lake Koocanusa ecosystem (**RR_002971-003017**). The final interpretative report was subject to the USGS rigorous scientific protocols for peer-review (**RR_002134**). The department worked with this scientifically peer-reviewed and published model, the associated peer-reviewed report and dataset, and peer-reviewed interactive spreadsheets including different modeling scenarios for the derivation of a site-specific water column standard for Lake Koocanusa (**RR_001175; RR_004062**).

The Presser and Naftz (2020) peer-reviewed report, dataset, and interactive spreadsheets with various modeling scenarios all provided the rationale and food web modeling structure for the quantitative derivation of a site-specific guideline for Lake Koocanusa (**RR_004062**). Model predictions from the peer-reviewed work for a range of protective dissolved selenium concentrations were specific to the EPA national guideline of 8.5 mg/kg whole body criterion element. Modeling assumptions used for modeled scenarios were guided by the goals defined by the Selenium Technical Subcommittee and are summarized here as:

- Consideration of ecologically significant species and those important to stakeholders,
- Protection of ecosystems during maximum dietary exposure (i.e., feeding within a benthic food web),

- Protection of 100% of the fish species in the reservoir assuming a reproductive endpoint from reproductively mature females that are feeding in an ecosystem that functions as a lentic reservoir, and
- Long-term protection for fish in all parts of the reservoir during all phases of reservoir operation, all Se loading profiles, and all water years (**Presser and Naftz 2020; RR_002980**

Derivation of Site-Specific Water Column Standard

The collective scientific expertise of the Selenium Technical Subcommittee guided the development of Lake Koocanusa's site-specific water column Se standard, from data collection to the final recommendations for ecosystem-scale modeling factors (**RR_000124**). Based on the Presser and Naftz (2020) modeling work, the recommendations by the Selenium Technical Subcommittee, Lake Koocanusa Working Group, and the professional judgement of DEQ staff, the final model selected by the department utilizes the EPA recommended whole body guideline of 8.5 mg/kg, the trophic fish model with a 100% aquatic insect diet, 60% bioavailability, and the Kd selected at the 75th percentile which results in a protective water column value of 0.8 µg/L (**RR_000127**). This model was one of the options put forward in the peer-reviewed interactive spreadsheets (Jenni and Schmidt, 2020) that accompanied the Presser and Naftz (2020) report. Specifically, this correlates with the "W6 TFM L3" model listed in Jenni and Schmidt (2020). This model was selected by the department to protect all fish including those piscivores (bull trout and burbot) that may be consuming prey fish with a 100% aquatic insect diet (**RR_004060; RR_004065**). For modeling, Presser and Naftz (2020) characterized the fish species in the reservoir with a 100% insectivore diet as rainbow trout, westslope cutthroat trout, redside shiner, and longnose sucker (**RR_001166**). The adopted 8.5 mg/kg dw fish tissue standard in ARM 17.30.632 is the same value that was used in modeling that led to the site-specific water column standard (**RR_002532**). The department then reviewed the full range of model results provided in the interactive and peer-reviewed spreadsheet and made a risk decision to select at the 75th percentile of the Kd distribution resulting in a protective dissolved selenium concentration of 0.8 µg/L (**RR_004065**). This level of protection meets the protection goals defined for Lake Koocanusa (**RR_002354**). The standards are consistent with the best available science for selenium toxicity and will protect the selenium-sensitive aquatic life in this watershed (**RR_000069**).

With water column concentrations currently near 1 µg/L, data available at the time of rulemaking showed there have been 9 individual fish found with concentrations greater than 15.1 mg/kg dw spanning three species. Moreover, the downstream Kootenai River in Idaho has been listed impaired due to selenium found at high levels in fish tissue. Water quality standards are set to protect the beneficial use (to prevent impacts) and to protect downstream uses (**RR_001538**).[1]

<u>75-5-203(2)(b) The state standard or requirement to be imposed can mitigate harm to the public health or environment and is achievable under current technology</u>

The water column selenium standard for Lake Koocanusa of 0.8 µg/L can mitigate harm to the environment and is achievable under current technology.

[1] Following rulemaking, the 2020 fish tissue data was made publicly available by Fish Wildlife and Parks and posted to the Lake Koocanusa Monitoring and Research Working Group wiki website. Fish egg/ovary data through 2020 show 17 individual fish spanning four species at levels at or above 15.1 mg/kg dw. EPA has indicated that levels at or above 15.1 mg/kg dw in egg/ovary tissue can have toxicological effects on the fish at the reproductive level.

As explained above, the water column selenium standard for Lake Koocanusa is necessary and can mitigate harm to aquatic life in Lake Koocanusa. The site-specific water column standard for Lake Koocanusa is achievable under current technology. EPA (2016) states that two main anthropogenic activities are known to cause increased mobilization of selenium into the aquatic environment. Those two activities include mining of metals, minerals and use of fossils fuels and irrigation of selenium rich-soils (**RR_000320**). The department found no public or private entities discharging to Lake Koocanusa with Montana Pollutant Discharge Elimination System (MPDES) permit effluent limits for selenium. There are no permitted sources of selenium in the Kootenai Watershed (**RR_001213**). This watershed does not have the same selenium rich geologic strata that are found in areas such as the Elk Valley, BC (**RR_001213; RR_002400; RR_002519**). Even if selenium was found in the watershed, this standard is site-specific and only applicable to permits discharging directly to Lake Koocanusa (**RR_002415**). There are no pending discharge permit applications nor has the department heard of any future permits for Lake Koocanusa. FWP's Murray Springs Fish Hatchery (MTG130001) is the only currently permitted facility discharging directly into Lake Koocanusa and selenium is not a pollutant of concern and that permit contains no effluent limits for selenium. There are no other general or individual permits authorizing discharges to or around Lake Koocanusa. The only hard rock permit near Lake Koocanusa is the McGilvary Rock quarry (OP#00167) which is inactive.

Current treatment technologies for activities around Lake Koocanusa include best management practices (BMPs) such as: measures that prevent storm water from coming into contact with pollutants; measures that minimize impervious surface area and retain runoff where it can be treated through infiltration; and measures that provide riparian buffers and reduce erosion to protect surface water from direct site runoff that may contain pollutants. Additionally, mines and industrial sites must document potential pollutants in a storm water pollution prevention plan (SWPPP) and provide adequate control measures to avoid impact to water quality. Existing and future land disturbing and industrial operations are already subject to storm water permitting requirements and BMPs to avoid impacts to surface water and no owner/operator/permittee should incur substantially different or increased treatment costs as a direct result of the site-specific water column standard for Lake Koocanusa. There is no evidence to suggest this site-specific standard will result in increased treatment costs for owners and operators of activities or facilities that discharge to surface water (**RR_002497**).

This standard is achievable under current technology. There are no current or planned point source dischargers to Lake Koocanusa with selenium as a pollutant of concern. Based on evidence in the record there is no significant geological source of selenium in Montana contributing to selenium concentrations in Lake Koocanusa and the two main anthropogenic activities that cause selenium mobilization to the aquatic environment (mining and irrigation of selenium-rich soil) do not occur on or around Lake Koocanusa. However, if there were a need for treatment in the future, this would be achieved through one of the current technologies listed by EPA which include reverse osmosis, iron reduction/precipitation, active biological treatment, aerobic wetlands, and/or biochemical reactors or anaerobic wetlands. It is more likely that any contribution of selenium related to or arising from land disturbing activities would be addressed through BMPs required under applicable General Permits such as the General Permit for stormwater discharges associated with construction activity (MTR100000), the Multi-Sector General Permit for storm water discharges associated with Industrial Activity (MTR000000), or the General Permit for Sand and Gravel Operations (MTG490000).

75-5-203(3) The written finding must reference pertinent, ascertainable, and peer-reviewed scientific studies contained in the record that forms the basis for the department's conclusion.

The department referenced the following pertinent, ascertainable, and peer-reviewed scientific studies contained in the record. Full citations are listed in the reference section:

- EPA (2016)
- Jenni et al. (2017)
- Presser and Luoma (2010)
- Presser and Naftz (2020) and accompanying peer-reviewed database and interactive spreadsheets by Jenni and Schmidt (2020)

EPA (2016) and Presser and Luoma (2010) address selenium toxicology. Jenni et al. (2017), Presser and Luoma (2010), Presser and Naftz (2020) address model development. Jenni et. al. (2017), Presser and Naftz (2020) and accompanying peer-reviewed database and interactive spreadsheets address model development specifically to the Lake Koocanusa ecosystem.

75-5-203(3) The written finding must also include information from the hearing record regarding the costs to the regulated community that are directly attributable to the proposed state standard or requirement.

The department has reviewed permits and activities on and around Lake Koocanusa and determined that this standard is achievable for Montana point source dischargers as there are no point source dischargers with selenium as a pollutant of concern. There is no cost to the regulated community directly attributed to the Lake Koocanusa selenium standard. The regulated community is within Montana because this is a site specific water column standard for Lake Koocanusa, Montana that only applies within Montana's borders. The only potentially affected dischargers are those discharging to Lake Koocanusa, Montana.

No Montana permittee will incur additional costs to treat wastewater for selenium as a direct result of the adoption of ARM 17.30.632(7)(a). Larger land development activities, such as surface mining and construction are already subject to general discharge permit requirements including implementation and maintenance of best management practices (BMPs). The department foresees no additional or different treatment requirements associated with these land disturbing activities directly attributable to the adoption of ARM 17.30.632(7)(a). Available treatment technology and economic cost of treatment can be further considered in future use attainability determinations and in variance development (**RR_002964**).

3.0 PUBLIC INVOLVEMENT

As part of the original rulemaking, MAPA provides for public review and comment of the proposed rule. That public comment period was held from October 9 to November 23 in 2020 with a public hearing held on November 5, 2020. During that time, commenters had an opportunity to provide comment on the rulemaking package, including the Board of Environmental Review's stringency determination. A subset of commenters did comment on that, and the board provided a response during the response to comment.

Public comment on the department's draft written stringency findings will be received between April 4 and May 4, 2022. A public hearing will be held on April 26, 2022. Public notice will be published in the local newspapers in Libby, Troy, and Eureka to promote local awareness and participation in the public comment period.

4.0 CONCLUSION

The rulemaking record provides sufficient evidence to support the 0.8 μg/L site-specific water column standard in ARM 17.30.632(7)(a) as necessary to protect the environment. The site-specific water column standard for Lake Koocanusa will not have a substantial economic impact on the regulated community. There will be no additional costs to the regulated community directly attributable to ARM 17.30.632(7)(a) and the standard is achievable under current technology. These findings will be made a part of the rulemaking record. These findings will be complete upon DEQ's response to substantive comments on ARM 17.30.632(7)(a) received from the public during the public comment period.

5.0 REFERENCES CITED

Jenni, K.E., Naftz, D.L., and Presser, T.S., 2017, Conceptual Modeling Framework to Support Development of Site-Specific Selenium Criteria for Lake Koocanusa, Montana, U.S.A., and British Columbia, Canada, U.S. Geological Survey Open-File Report 2017–1130, https://doi.org/10.3133/ofr20171130

Jenni, K.E., and Schmidt, T.S., 2020, Results of Ecosystem Scale Selenium Modeling in Support of Site-Specific Guidelines Development for Lake Koocanusa, Montana, U.S.A., and British Columbia, Canada, 2020: U.S. Geological Survey data release, https://doi.org/10.5066/P99LM27E

Presser, T.S., Luoma, S.N., 2010, "A methodology for Ecosystem-Scale Modeling of Selenium" Integrated Environmental Assessment and Management, Volume 6, Issue 4, Pages 685-710

Presser, T.S., and Naftz, D.L., 2020, Understanding and documenting the scientific basis of selenium ecological protection in support of site-specific guidelines development for Lake Koocanusa, Montana, U.S.A., and British Columbia, Canada: U.S. Geological Survey Open-File Report 2020–1098, 40 p., https://doi.org/ 10.3133/ ofr20201098

U.S. EPA, 2016, Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater-2016. PA 822-R16-006. U.S. Environmental Protection Agency, Office of Water, Washington D.C

APPENDIX F: DEQ RESPONSE TO WPIC QUESTIONS (MARCH 2022)

DEQ
Montana Department of Environmental Quality

Memo

TO: HJ 37 Special Committee

FROM: The Department of Environmental Quality, Water Quality Division

DATE: March 9, 2022

SUBJECT: DEQ follow up to HJ 37 February 28 meeting requests

Following the WPIC/EQC HJ 37 committee meeting on February 28, 2022, legislative staff and the Department identified a number of follow-up items which are addressed here.

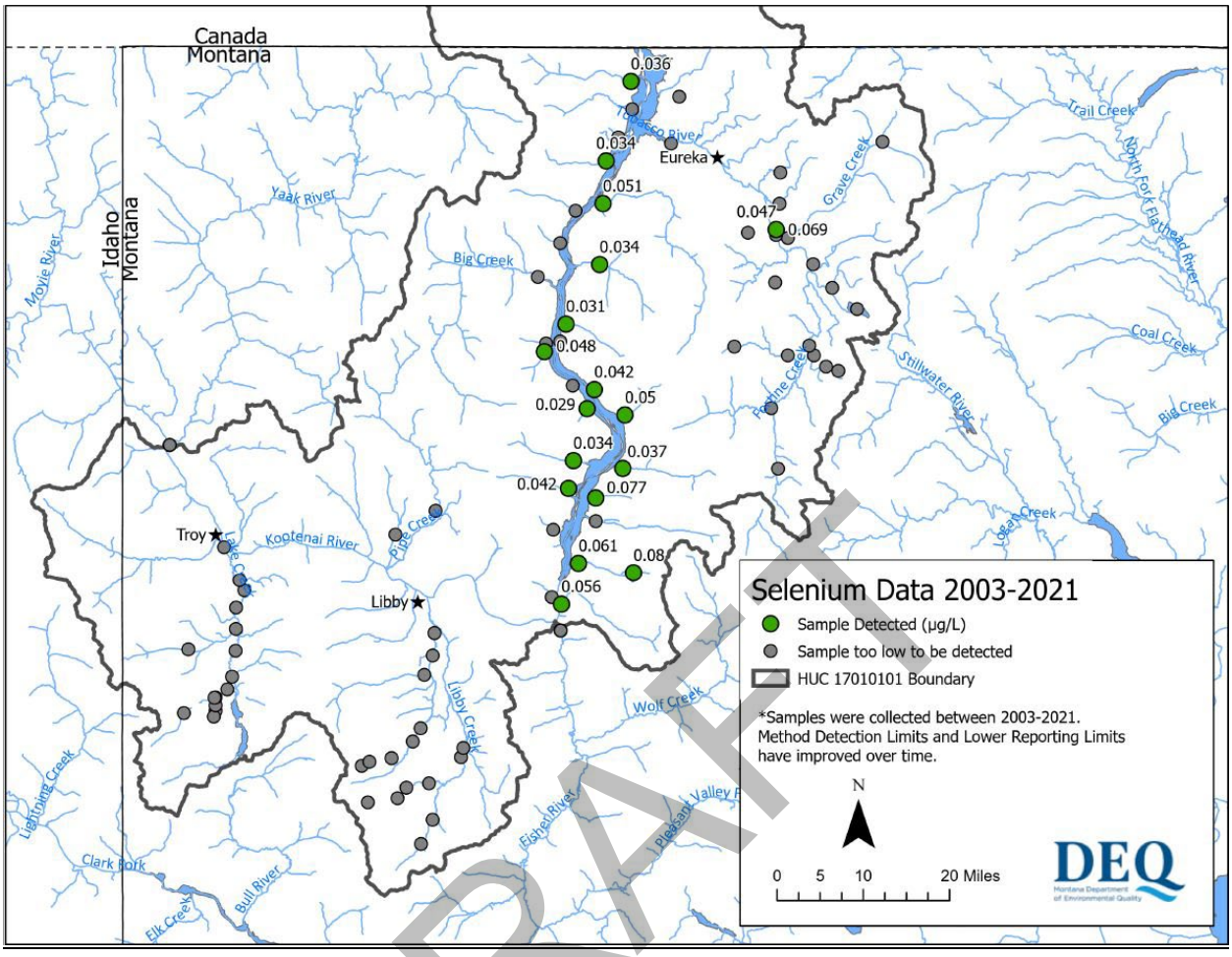
1) Response to Public Comment specific to comments regarding model validation and other technical modeling questions.
2) Cost of staff and laboratory analysis for the 2016 and 2021 Lake Koocanusa tributary sampling and map of selenium tributary results.
3) Written response to Dr. Luoma's testimony during the February 28, 2022, HJ 37 meeting.
4) Full statewide selenium dataset for lentic and lotic waterbodies from the Department's EQuIS database. As requested by Representative Gunderson.

Item 1

For responses to public comment related to modeling, see Comment Nos. 160-178, 181.
https://rules.mt.gov/gateway/ShowNoticeFile.asp?TID=10178

Item 2

	Year 2016	*Year 2021*
Two field crew - salaries including benefits	$672.00	$918.00
Laboratory Analyses Cost	$1,897.50	$2,240.00
Total Per Year	**$2,569.50**	**$3,158.00**



Item 3

During the February 28, 2022, HJ 37 Legislative Committee meeting, Vicki Marquis and Dr. Luoma made the following points or asked the following questions during their testimony under the Teck Resources agenda item. The Department committed to reviewing these points and has taken the time to respond.

Teck's assertions regarding model validation and peer review

RESPONSE: While the Department's work is not required to be peer reviewed, in this case, the development of a site-specific water quality standard for Lake Koocanusa implements a peer-reviewed and science-based approach for ascertaining a protective water quality standard for Lake Koocanusa. Different levels of peer-review were included throughout the process. Items peer-reviewed include the USGS Modeling Framework for Lake Koocanusa (Jenni et al. 2017), Lake Koocanusa Modeling report (Presser and Naftz, 2020), and four peer reviewed databases. The peer-reviewed Presser and Naftz (2020) report utilized the Presser and Luoma (2010) ecosystem model and calibrated it to the Lake Koocanusa ecosystem. The Department worked with this scientifically peer-reviewed and published model and utilized modeling parameters recommended by the Selenium Technical Subcommittee and provided by the USGS in association with the Presser and Naftz (2020) modeling report.

USGS provided the Department with 13 different modeling scenarios in a support document titled, "Results of Ecosystem Scale Selenium Modeling in Support of Site-Specific Guidelines Development for

lake Koocanusa, Montana, U.S.A., and British Columbia, Canada, 2020". The Department reviewed the modeling results, reviewed the recommendations from the Selenium Technical Subcommittee, and then selected the "W6. TFM w/ TL 3 100% AqIns" model from this support document. This model provided to the Department by USGS provided a range of values (0.56-9.86 ug/L). From this range, the Department made a risk decision within the authority of the Department, by selecting at the 75th percentile of the Kd distribution. This corresponds to a protective dissolved selenium concentration of 0.8 ug/L. Calibration and validation of the model was performed by the USGS and was included in the peer-reviewed process.

The model validation is clearly described in Presser and Naftz (2020). The model calibrates a peer-reviewed global model to local conditions by modifying the global model parameter values (in this case, the trophic transfer factors through the bioavailability factor and then using site-specific Kd data based on repeat field-observations over multiple years). As described in Presser and Naftz (2020), the Lake Koocanusa model overpredicted selenium concentrations in zooplankton and invertebrates relative to the concentrations seen in Lake Koocanusa. Thus, the model was calibrated to improve predictions on the local level, using a 60 percent bioavailability to address unmeasured local factors causing over prediction. The 60 percent bioavailability model has been calibrated to be accurate to local conditions informed by the zooplankton and aquatic insect tissue concentrations.

A wide range of Kd values were measured in situ, and it is known to be affected by hydrologic factors such as residence time and selenium speciation. Thus, for the Lake Koocanusa model, the USGS applied a modeling approach utilizing all observed pairs of dissolved: Particulate Se (Kd) to create scenarios accounting for the full range of the observed dataset (full uncertainty). The USGS provided the Department with different food web models from which the Department selected the "W6. TFM w/ TL 3 100% AqIns" model, reviewed the full range of results provided by the USGS (0.56-9.86 ug/L) and selected at the 75th percentile of the Kd distribution. This level of protection meets the protection goals defined at the conception of this work and protects the aquatic life beneficial use.

The goal of the model is to provide a range of guidelines that any jurisdiction might use that is specific to the environment of interest, in this case Lake Koocanusa.
RESPONSE: The Department agrees with this statement. This is exactly what was done for Lake Koocanusa. The USGS provided the Department different food web models to consider. The Department selected the "W6. TFM w/ TL 3 100% AqIns" model. This is a USGS calibrated model using the 60% bioavailability as described in the peer-reviewed modeling report (Presser and Naftz, 2020) and validated to site specific conditions using the zooplankton and aquatic insect data. The only additional step the Department performed was to review the range of guidelines provided (0.56-9.86 ug/L) and select a protective dissolved selenium concentration for Lake Koocanusa. In this case, that value was selected based upon the 75th percentile of the Kd distribution.

> "*The overall goal of this work is to provide an ecosystem-scale model that illustrates the site-specific range of potential selenium exposure and bioaccumulation that can inform the basis for regulatory decision-making by the State and the Province.*" Page 2 Presser and Naftz (2020).

The key step in the model is calibration to environment of interest.
RESPONSE: The Department agrees with this statement. This work was performed by the USGS and detailed in the peer-reviewed modeling report (Presser and Naftz, 2020). The calibration was done using a 60% bioavailability and validated to the site-specific zooplankton and aquatic insect data. The Department reviewed the food web models prepared by the USGS and selected the "W6. TFM w/ TL 3

100% AqIns" model. This model was calibrated to the environment of interest and the calibration and validation step went through the peer-review process.

The first run of the model at 100% overpredicts. 30% is the appropriate bioavailability for Lake Koocanusa.

RESPONSE: The Department agrees the 100% percent bioavailability model overpredicts. The USGS also recognized this, therefore describing in detail in the peer-reviewed Presser and Naftz (2020) modeling report their calibration step using the 60% bioavailability. Dr. Luoma suggests 30% bioavailability is an appropriate fit, however, the Department disagrees with this statement. While the Department respects Dr. Luoma's professional opinion, it is not clear why Dr. Luoma only chose to calibrate the 30% bioavailability scenario only to zooplankton when the USGS calibrated also to fish. Dr. Luoma is not applying the bioavailability to each trophic level. Furthermore, it is unclear which food web and diet model Dr. Luoma selected. If Dr. Luoma only selected the Invertebrate to Fish Model (IFM) at 100% zooplankton, this not only represents a model with nearly no bioaccumulation occurring, but it would not meet the protection goals for the reservoir.

Of the 13 food web modeling scenarios the USGS provided, the Department selected the Trophic-level (predator to forage) Fish Model (TFM) assuming prey fish were consuming a 100% aquatic insect diet. This is a piscivorous model with the 60% bioavailability applied to it. It would be more comparable if Dr. Luoma had selected this model for his example. Lastly, Dr. Luoma's statement that he thinks the 30% bioavailability is more appropriate to be applied has not gone through peer-review as did the 60% bioavailability application described in Presser and Naftz (2020). This is simply Dr. Luoma's professional opinion. Dr. Luoma was not part of the Selenium Technical Subcommittee, Teck had a different consultant on that committee, and Dr. Luoma did not submit comments on this during the public comment period.

> "*The results of our analysis and illustrated modeling scenarios show that at least 78 percent of predictions are <1.5 ug/L and at least 46 percent of predictions are <1 ug/L for protection of this community of core benthic feeders. The percentages are based on exposure through a 100-percent chironomid diet and two choices of bioavailability (100 percent and 60 percent for SPM); hence, these scenarios represent conservative, but realistic, choices with the set of 12 categorized fish species*" page 34 Presser and Naftz (2020).
>
> "In sum, this subset of modeling variables, species, and attributes appears to meet the specific goals set out at the beginning, which also impinge on operational interests. These considerations connect to specific scenarios and supporting rationales to represent the system." Page 35 Presser and Naftz (2020).

The DEQ guidance document used the 60% and 100% bioavailability but the Department did not calibrate all the way down to the tightest calibration of 30%.

RESPONSE: The Department did not use the 100% bioavailability model, and it is not in the Department's technical support document as a model the Department selected. The Department used the "W6. TFM w/ TL 3 100% AqIns" model utilizing the 60% bioavailability. This work was validated to local conditions using zooplankton and aquatic insect data and is described in detail in Presser and Naftz (2020). As described in the comments above, the only additional step the Department took was to select at the 75th percentile of the Kd distribution.

A different range of choices is available whether you select the 60%, 45%, or 30% bioavailability. The 60% showed most results between 0.5 and 1.5 ug/L, 45% showed most results between 1-2 ug/L, while the 30% bioavailability application showed most results were between 1.5- 3 ug/L. The most tightly calibrated model is 30% which showed different results than the model the Department used that was not calibrated.

RESPONSE: The Selenium Technical Subcommittee provided technical input throughout a multi-year process from which the USGS incorporated the input in their work which then went through a peer review process. The Department agrees that a different range of choices is the result of utilizing different bioavailability percentages. The range of choices additionally depends on the food web (IFM or TFM) and diet selected. The Department used a peer-reviewed model whereby the calibration of 60% also has been peer reviewed.

DEQ errored when it tested the difference between the whole body 8.5 and 5.6 mg/kg dw. If you want to test the difference of the sensitivity of the model between two choices then you use the same model, put it all the way through the model and see what the outcome is. In this case, despite the difference in the beginning point (the fish tissue) you get the same outcome. The way the Department did that is by juggling parameters. This is not best practice. Juggling coefficients to achieve a desired outcome is not standard scientific methodology and it is not best practice in modeling. This is his cause of concern on how the Department arrived at the 0.8 ug/L standard.

RESPONSE: The Department disagrees with this interpretation of how the Department arrived at 0.8 ug/L as a protective water quality standard for Lake Koocanusa. The derivation of the 0.8 ug/L water column standard is explained in the comments above. DEQ disagrees with the notion that the 0.8 ug/L was derived by juggling modeling parameters. It must be clarified that the Department worked closely with the British Columbia Ministry of Environment throughout the standard setting process and that British Columbia has fish tissue guidelines in place that are lower than those in the U.S. As part of the long-term goal of this multi-year binational effort to adopt the same water column concentration for Montana and British Columbia, British Columbia and the Department jointly reviewed modeling scenarios that considered the British Columbia whole body value of 5.6 mg/kg dw. The modeling scenario utilizing the 5.6 mg/kg whole body value, a bioavailability of 45% and a Kd selection at the 50% percentile was very much guided by the British Columbia of Ministry of Environment to meet their regulatory requirements, which differ from the regulatory requirements in Montana. However, it must be made clear that the Department proposed adoption of 8.5 mg/kg dw as the whole body standard not 5.6 mg/kg dw, and that EPA acted on the Department's water column translation approach utilizing the EPA whole body criterion of 8.5 mg/kg dw, applying a 60% bioavailability and selecting at the 75th percentile of the Kd distribution.

A site-specific model must be calibrated to the site of interest.

RESPONSE: The Department agrees with this comment. This work was completed by the USGS and is described in the Department's comments above. Additional details on the calibration can be found in Presser and Naftz (2020).

It is inappropriate to suggest the choice of a standard was supported by the selenium bioaccumulation model, as was implied by the model's prominent position in the DEQ guidance document.

RESPONSE: The Department respects Dr. Luoma's professional opinion. In this case, the USGS utilized the Presser and Luoma (2010) model and calibrated it to the Lake Koocanusa ecosystem using a 60% bioavailability and validating that model to the site using zooplankton and aquatic insect data. The USGS has stated in testimony that the Department utilized the model as intended.

"*The overall goal of this work is to provide an ecosystem-scale model that illustrates the site-specific range of potential selenium exposure and bioaccumulation that can inform the basis for regulatory decision-making by the State and the Province."* Page 2 Presser and Naftz (2020).

"In sum, this subset of modeling variables, species, and attributes appears to meet the specific goals set out at the beginning, which also impinge on operational interests. These considerations connect to specific scenarios and supporting rationales to represent the system." Page 35 Presser and Naftz (2020).

CONCLUSION

The derivation of the 0.8 ug/L water column standard for Lake Koocanusa included a sound scientific process with input over several years by leading experts in the field of selenium toxicology. The modeling work was completed by the USGS which resulted in a peer reviewed scientific modeling report (Presser and Naftz, 2020). The Department has the discretion to make the risk decisions that were made in selecting the "W6. TFM w/ TL 3 100% AqIns" model and selecting the Kd value at the 75th percentile of the distribution. This decision was informed by the recommendations by those on the Selenium Technical Subcommittee, Lake Koocanusa Monitoring and Research Working Group members, public comment, and the specific protection goals for Lake Koocanusa defined at the beginning of the process.

For reference, the previously defined protection goals for Lake Koocanusa are listed below:

- consideration of ecologically significant species and those important to stakeholders;
- protection of 100% of the fish species in the reservoir assuming a reproductive endpoint from reproductively mature females that are feeding in an ecosystem that functions as a lentic reservoir;
- long-term protection for fish in all parts of the reservoir during all phases of reservoir operation, all selenium loading profiles, and all water years;
- protection of ecosystems during maximum dietary selenium exposure (that is, feeding within a benthic food web); and
- protection of downstream uses including protection of endangered Kootenai River White Sturgeon

As stated above, it is unclear which food web model and diet Dr. Luoma used in his examples for his calibration using 30% bioavailability and why he did not select a piscivorous model, therefore calibrating to fish. It is also unclear why he used only zooplankton and did not use the aquatic insect data for his validation. His comments have not been peer reviewed and he did not submit comments during the public comment period, nor did he participate or request to participate as a member of the MRC during the six year process. Dr. Luoma was not the Teck consultant on the Selenium Technical Subcommittee. As such, he was not part of the more than 25 Selenium Technical Subcommittee meetings where details of the modeling and ecosystem were discussed at length. The model calibration using the 60% bioavailability and validation to the zooplankton and aquatic insect data was included in the peer-reviewed process and is detailed in the modeling report by Presser and Naftz (2020).

As the state of the science evolves with any pollutant and the known impacts on beneficial uses (aquatic life, human health, agriculture, etc.), water quality standards are updated to reflect that science. Both state and federal law require water quality standards be reviewed at least every three years. If the review identifies new information that indicate new or revised water quality standards are needed, DEQ

would conduct rulemaking and submit any new or revised water quality standards to EPA for review and action under the Clean Water Act.

Item 4

Attached is a spreadsheet of all selenium data for lentic and lotic waterbodies found in the Department's EQuIS database. There are two tabs, the first tab is the full dataset and the second tab is the detected samples only per the request from Representative Gunderson. The Department uploads all data from EQuIS into the public National Water Quality Portal Website https://www.waterqualitydata.us/

/s/ Amy Steinmetz 3/9/22

Water Quality Division Administrator,
Amy Steinmetz Date

APPENDIX G: 75-5-203. STATE REGULATIONS NO MORE STRINGENT...

75-5-203. State regulations no more stringent than federal regulations or guidelines. (1) Except as provided in subsections (2) through (5) or unless required by state law, the department may not adopt a rule to implement 75-5-301, 75-5-302, 75-5-303, or 75-5-310 that is more stringent than the comparable federal regulations or guidelines that address the same circumstances. The department may incorporate by reference comparable federal regulations or guidelines.

(2) The department may adopt a rule to implement this chapter that is more stringent than comparable federal regulations or guidelines only if the department makes a written finding after a public hearing and public comment and based on evidence in the record that:

(a) the proposed state standard or requirement protects public health or the environment of the state; and

(b) the state standard or requirement to be imposed can mitigate harm to the public health or environment and is achievable under current technology.

(3) The written finding must reference pertinent, ascertainable, and peer-reviewed scientific studies contained in the record that forms the basis for the department's conclusion. The written finding must also include information from the hearing record regarding the costs to the regulated community that are directly attributable to the proposed state standard or requirement.

(4) (a) A person affected by a rule that the person believes to be more stringent than comparable federal regulations or guidelines may petition the board to review the rule. If the board determines that the rule is more stringent than comparable federal regulations or guidelines, the department shall comply with this section by either revising the rule to conform to the federal regulations or guidelines or by making the written finding, as provided under subsection (2), within a reasonable period of time, not to exceed 8 months after receiving the petition. A petition under this section does not relieve the petitioner of the duty to comply with the challenged rule. The department may charge a petition filing fee in an amount not to exceed $250.

(b) A person may also petition the board for a rule review under subsection (4)(a) if the department adopts a rule in an area in which no federal regulations or guidelines existed and the federal government subsequently establishes comparable regulations or guidelines that are less stringent than the previously adopted department rule.

(5) This section does not apply to a rule adopted under the emergency rulemaking provisions of 2-4-303(1).