

FAQ'S

WHAT IS SELENIUM?

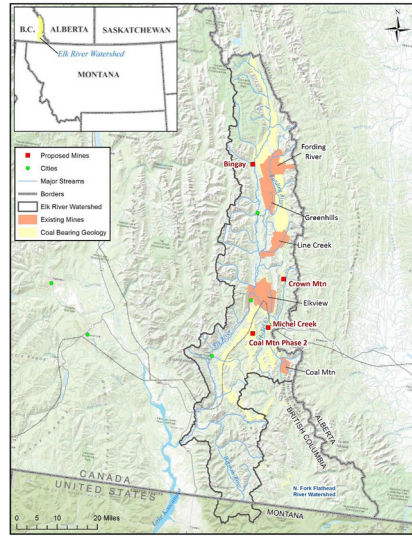
Selenium (Se) is a naturally occurring element that is present in sedimentary rocks, shales, coal, and phosphate deposits and soils. Selenium is a micro nutrient, essential for biological processes to occur for humans and animals. Although selenium is an essential micro nutrient, at high levels it can be toxic.

WHAT IS A THREATENED WATER BODY?

A threatened waterbody currently meets water quality standards but will likely exceed if current trends continue.

WHAT IS A SITE-SPECIFIC STANDARD?

Site-specific water quality standards are derived using data from a specific waterbody or region. In this case, Lake Koochanusa. The 2016 EPA national criteria recommends states adopt site-specific selenium standards whenever possible because of the way Se bioaccumulates and moves up the food chain is very dependent on site-specific conditions.



WATER QUALITY CONCERNS

Montana Department of Environmental Quality (DEQ) is concerned about increasing concentrations of selenium and other contaminants (i.e. nitrate, cadmium, and sulfates) in the Elk River, Canada which drains into Lake Koochanusa, Montana. These contaminants come from waste piles, a bi-product of mining operations in the Elk Valley.

Figure 1. Lake Koochanusa and the Kootenai/Kootenay River Basin (USGS, 2016).

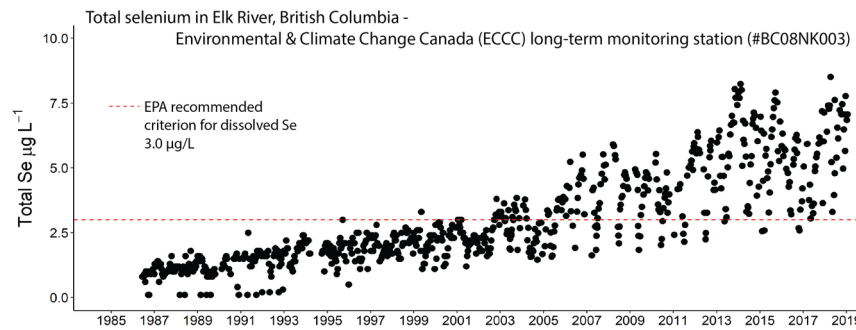


Figure 2. Total selenium concentrations in the Elk River near the Kootenay River confluence in British Columbia, Canada. Red dotted line represents the EPA recommended criterion for dissolved Se in lotic systems of 3.0 µg/L.

Figure 2 illustrates the increasing selenium concentration over time found in the Elk River in British Columbia. Approximately 95% of the selenium entering Lake Koochanusa comes from the Elk River. This increasing trend in selenium is what led to DEQ in 2012 to list Lake Koochanusa Aquatic Life as threatened for selenium.

WHAT IS BEING DONE?

Over the last 5 years, DEQ has maintained an innovative collaboration with the British Columbia Ministry of Environment & Climate Change (BC ENV) to address rising selenium levels in Lake Koochanusa. The Lake Koochanusa Monitoring and Research Group (LKMRG) was formed in 2014. In 2015 the LKMRG set the development of a selenium site-specific standard as the top priority.

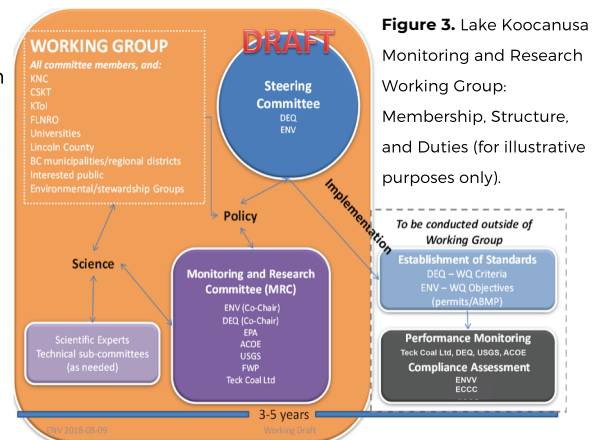


Figure 3. Lake Koochanusa Monitoring and Research Working Group: Membership, Structure, and Duties (for illustrative purposes only).

A MULTI-YEAR COLLABORATIVE PROCESS

1) COLLECT DATA FOR
ECOSYSTEM SCALE
MODEL

Science decision - A multi-agency collaborative effort

2A) DEVELOP LEVELS OF
PROTECTION

Risk Decision - Levels of protection alternatives

2B) RUN THE SELENIUM
MODEL SCENARIOS

Modeling Process - i.e. identify appropriate data, evaluate data, run statistics, use the EPA/USGS selenium model

3) DEVELOP A RANGE OF
PROTECTIVE WATER
COLUMN VALUES

Statistics Process - compile the results of the model runs and include uncertainty

4) SELECT A PROTECTIVE
WATER COLUMN VALUE

Policy decision - select a protective number to adopt as the selenium water column criterion

WHAT IS THE NEW DATA SHOWING?

Selenium water column values:

Data collected at US sites within the reservoir from 2013-2018 showed four samples exceeded the EPA recommended criteria of 1.5 µg/L.

Fish Egg/Ovary selenium concentrations:

Within the reservoir three individual fish egg/ovary samples were found to exceed the EPA recommended standard of 15.1 mg/kg have been detected.

Fish muscle tissue selenium concentrations:

Fish muscle tissue selenium levels increased significantly from 2008 sampling to 2013 sampling. The 2019 sample results showed decreased levels similar to 2008 results.

SELENIUM WATER COLUMN AND FISH TISSUE DATA

FISH DATA COLLECTED AND ANALYZED BY FWP

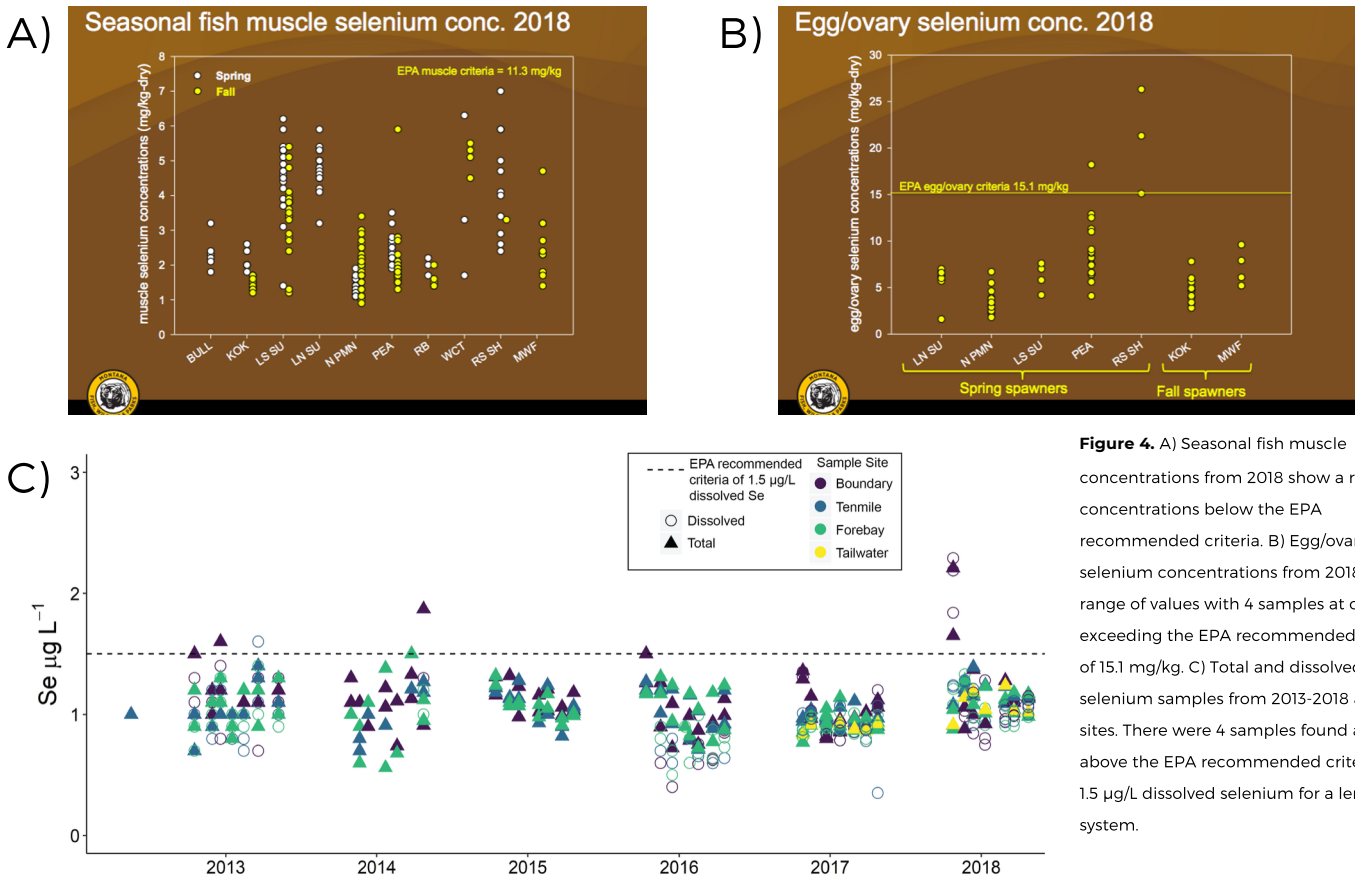


Figure 4. A) Seasonal fish muscle concentrations from 2018 show a range of concentrations below the EPA recommended criteria. B) Egg/ovary selenium concentrations from 2018 have a range of values with 4 samples at or exceeding the EPA recommended criteria of 15.1 mg/kg. C) Total and dissolved selenium samples from 2013-2018 at US sites. There were 4 samples found at levels above the EPA recommended criteria of 1.5 µg/L dissolved selenium for a lentic system.

OTHER WATER QUALITY TRENDS

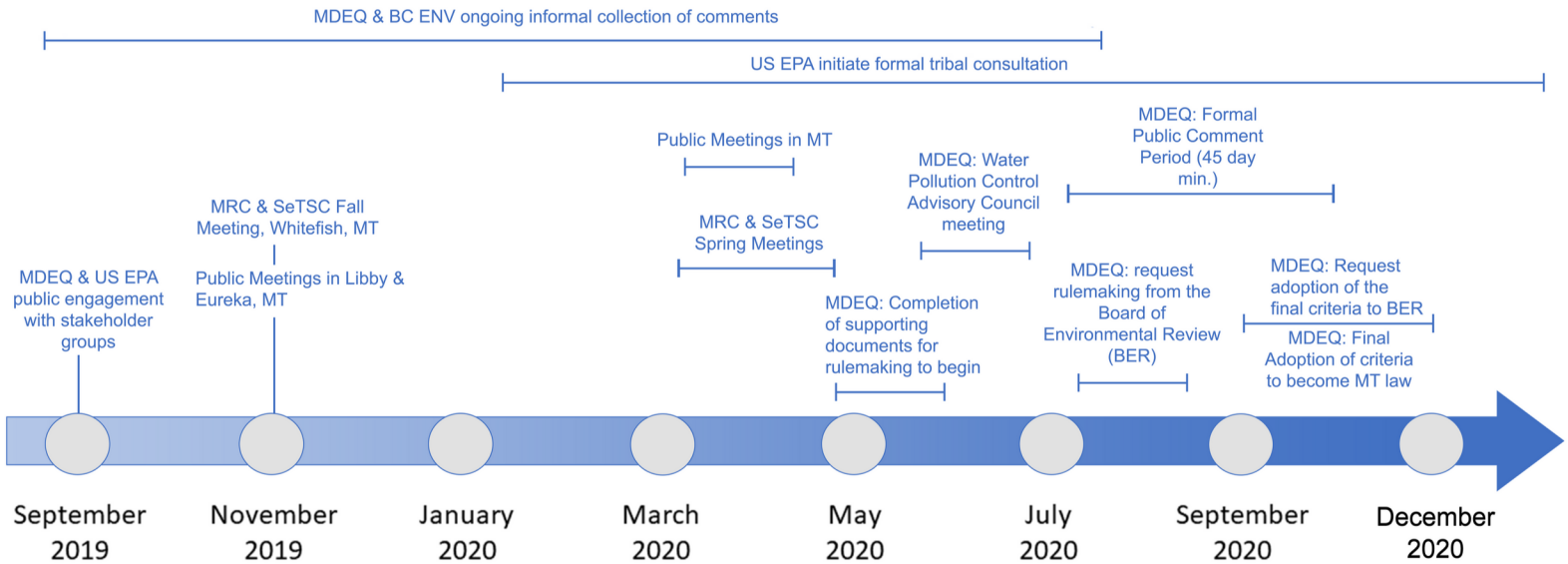
Nitrate: Data collected from 2013-2019 at US sites showed nitrate values ranging from detection limit to 0.75 mg/L. DEQ remains concerned about elevated nitrate levels entering Lake Koocanusa from the Elk Valley.

Cadmium: Data results showed concentrations mostly below detection limit. The samples at concentrations above detection limit were found at low concentrations

Sulfates: Low concentrations were detected at US Lake Koocanusa sampling sites.

DRAFT - TENTATIVE TIMELINE

DEVELOPMENT OF A SELENIUM SITE SPECIFIC CRITERION



Please contact us with any questions or comments

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For more information please visit the following websites:

<https://deq.mt.gov/DEQAdmin/LakeKoocanusa>

<http://lakekoocanusaconservation.pbworks.com>