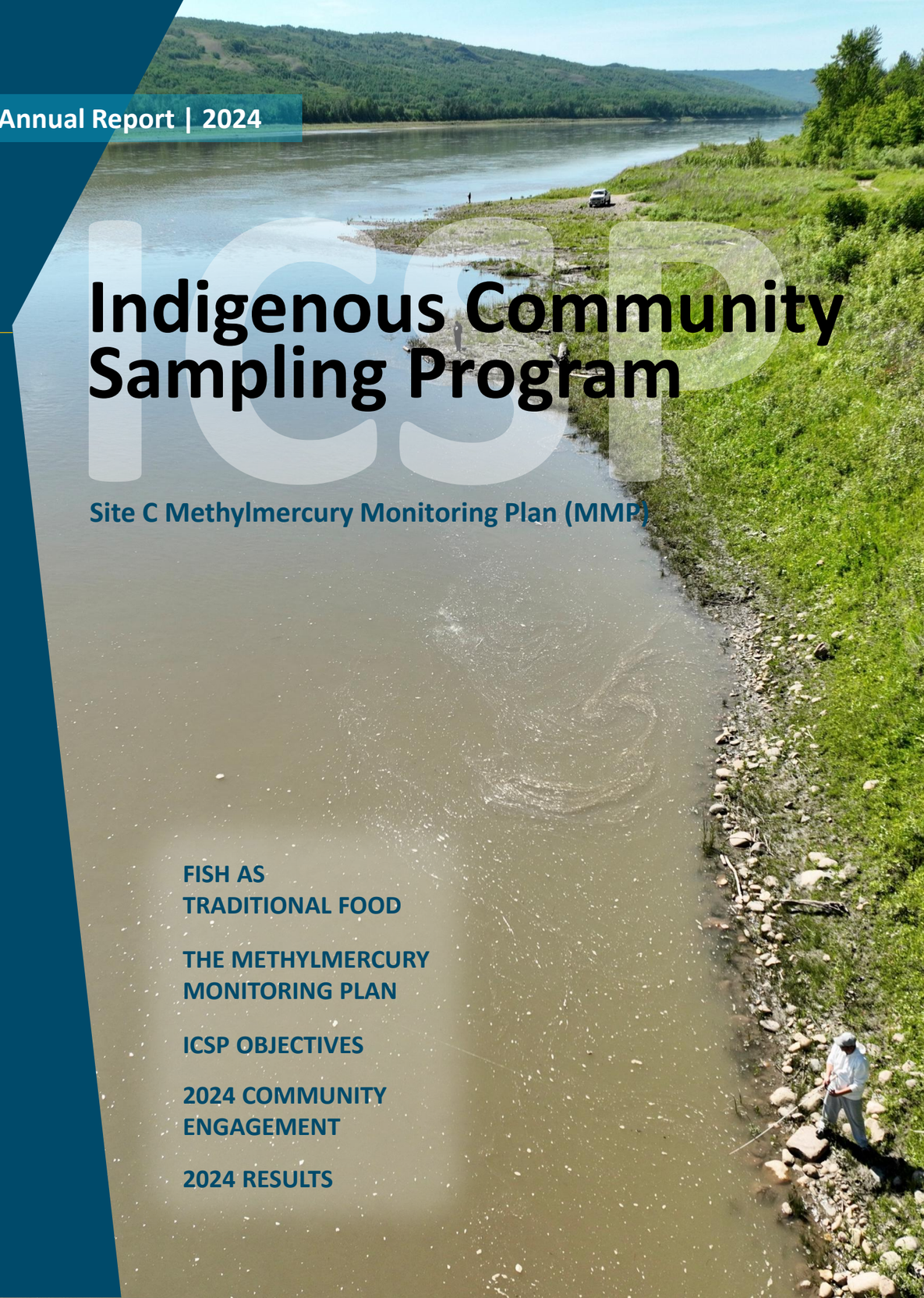
ICSP

Annual Report | 2024

Indigenous Community Sampling Program

Site C Methylmercury Monitoring Plan (MMP)



FISH AS TRADITIONAL FOOD

THE METHYLMERCURY MONITORING PLAN

ICSP OBJECTIVES

2024 COMMUNITY ENGAGEMENT

2024 RESULTS

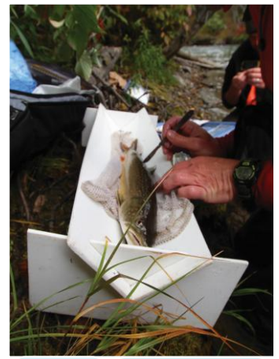
Version 1.0 – October 20, 2025

content

ICSP | Annual Report | 2024

FEATURES

PAGE



ICSP

Indigenous Community Sampling Program

Cover: Photo 1 by Brendan Bushy

AZIMUTH

FISH IS GOOD FOR YOU

HEALTH BENEFITS OF EATING FISH

Eating fish can provide numerous health benefits due to fish's rich nutritional profile.

- Studies have shown that traditional diets are healthier than non-traditional diets.
- Compared to other types of meat, fish have higher levels of good fats (omega-3 fats) and lower levels of bad fats (saturated fats).
- Fish are high in beneficial vitamins and minerals, like vitamin D and the essential elements selenium, and iron.
- Replacing store-bought processed foods with fish can help achieve a more balanced diet.

Photos by Deborah Prince (Ref #2)

FISH AS TRADITIONAL FOOD

In 2009 the First Nations Food, Nutrition and Environment Study concluded work in BC with the following findings:

- Fish is a culturally, spiritually, economically, and nutritionally important traditional food for many Indigenous Peoples in Canada.
- About half of Indigenous people in Canada face food insecurity.
- The current diet of many Indigenous people in Canada is nutritionally inadequate.
- Increased access to fish that is safe to eat can help address these issues.

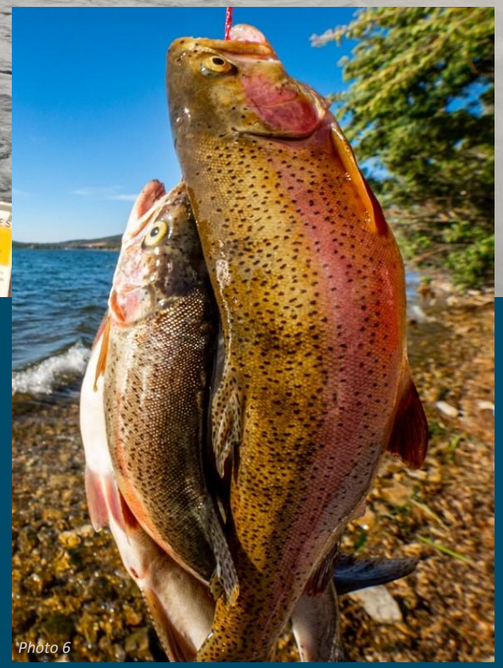


Photo 6

FISH METHYLMERCURY
in NATURAL HABITATS

Mercury is a naturally occurring element that is found in low levels everywhere – in air, water, soil, plants, animals, and humans.

BIOMAGNIFICATION UP THE FOOD CHAIN

Bacteria in the bottom of lakes and rivers transform naturally occurring mercury into methylmercury (MeHg; see figure).

Methylmercury levels naturally increase up the food chain. Predatory fish have higher levels of methylmercury than fish lower down the food chain. That's why Lake Trout, Bull Trout and Walleye have more methylmercury than Kokanee, Mountain Whitefish or Rainbow Trout.

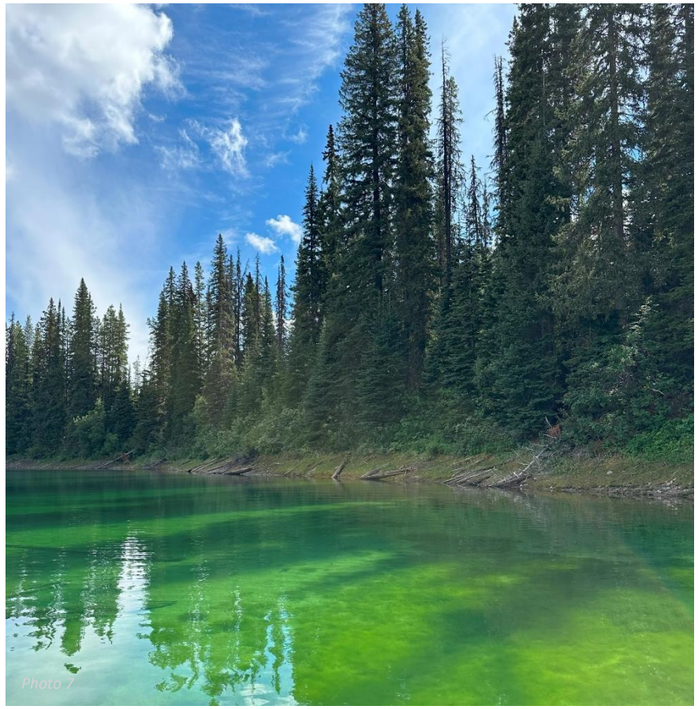
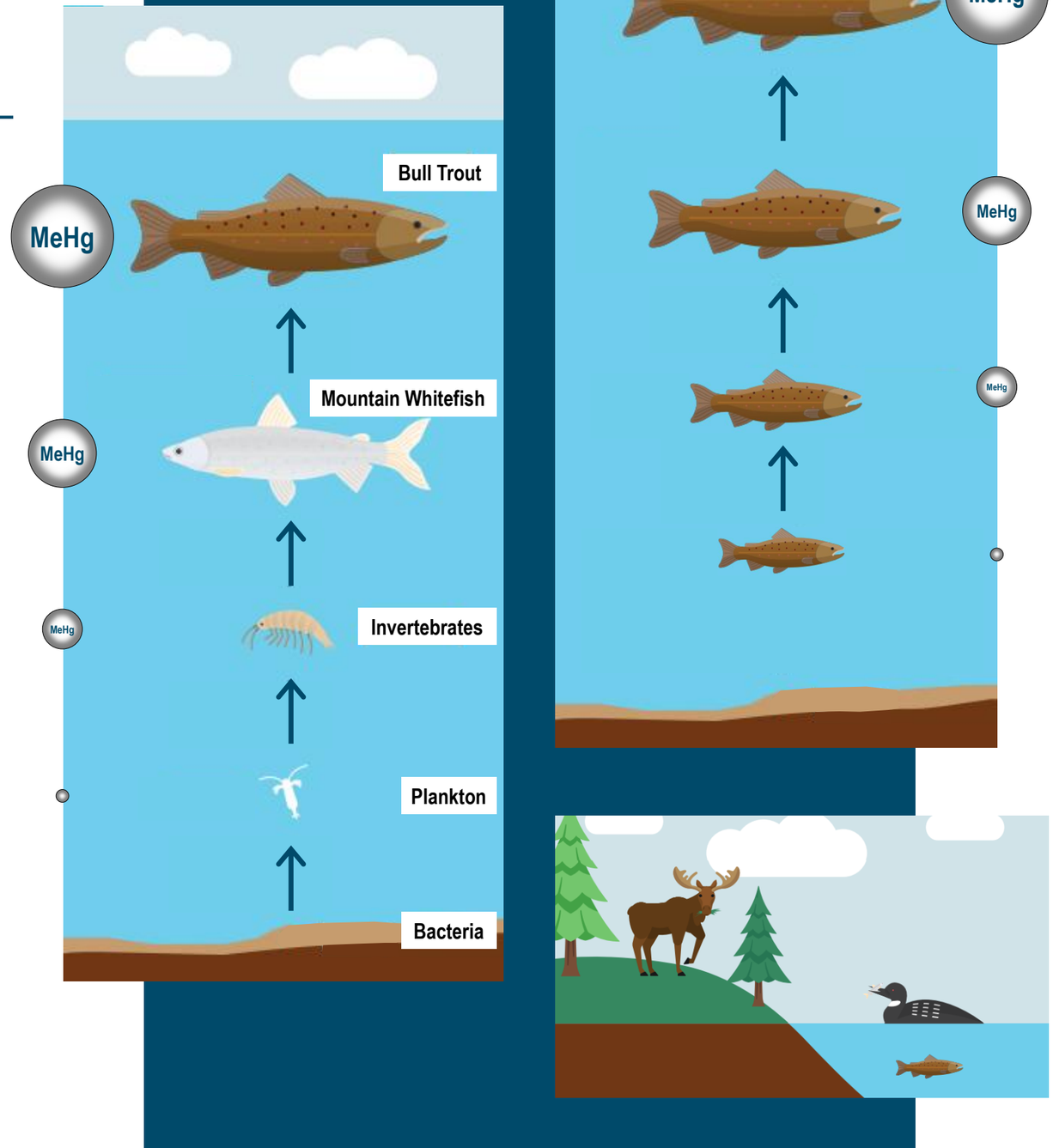


Photo 7



BIOACCUMULATION IN OLDER FISH

Larger, older fish of all species accumulate higher concentrations of methylmercury in their tissue compared to younger smaller fish (MeHg; see figure).


Photo 8

METHYLMERCURY IN ANIMALS

The amount of methylmercury in an animal depends on the amount and type of fish it eats. Non-fish-eating animals like moose have low levels, while fish-eating wildlife like loons can have higher methylmercury levels.

Humans consume small amounts of methylmercury when we eat fish.

For more information, scan below.

SCAN ME

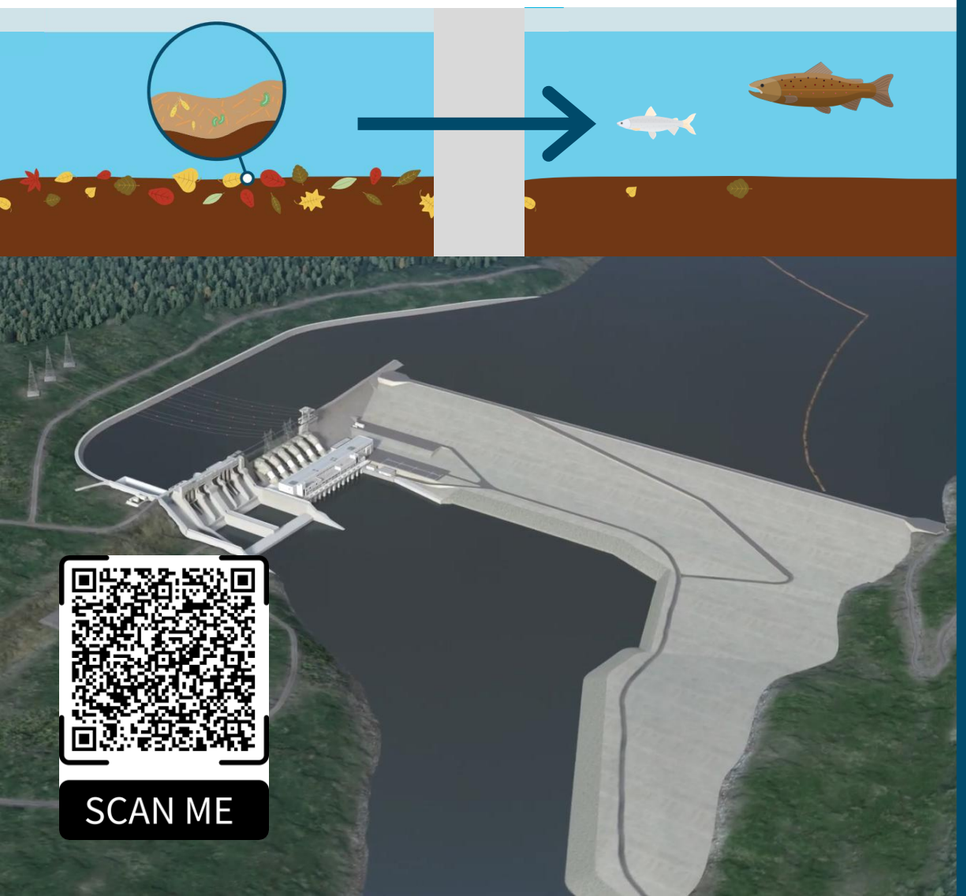
SITE C and changes in FISH METHYLMERCURY

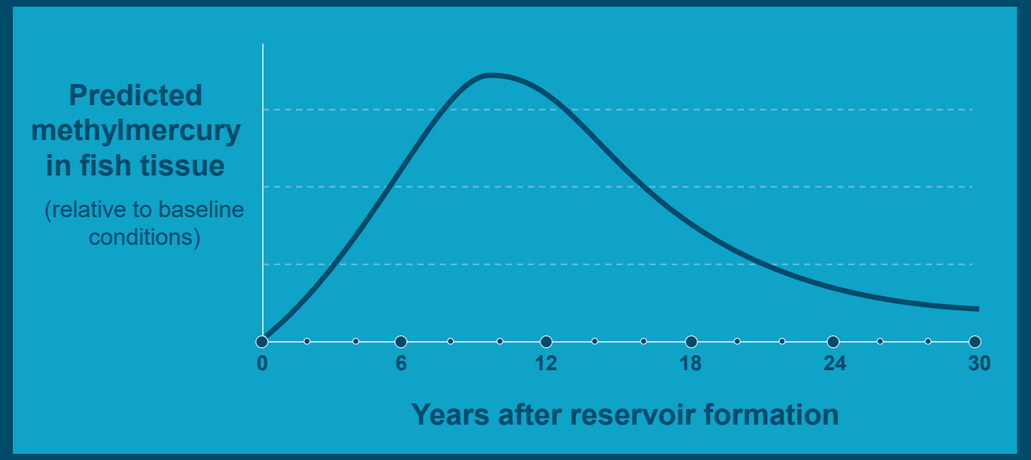
RESERVOIR EFFECT

Prior to filling the Site C Reservoir, Peace River fish had low methylmercury levels, similar to other B.C. water bodies.

The creation of the Site C Reservoir is expected to lead to an initial increase in methylmercury as bacteria decompose organic material in areas that used to be dry land, converting inorganic mercury to methylmercury.

Over the years, as organic matter diminishes, methylmercury production will slow, causing levels to drop across the food chain.





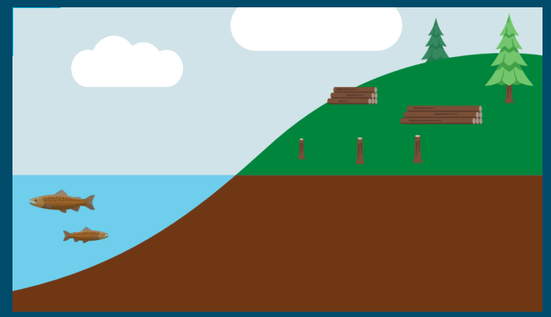
MONITORING

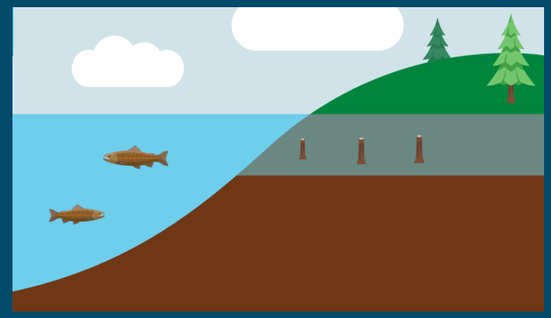
To verify the predicted changes that the Site C project will have on fish methylmercury levels, BC Hydro is working with Indigenous groups, communities and health authorities to implement a Methylmercury Monitoring Plan (MMP; see next page for more information).

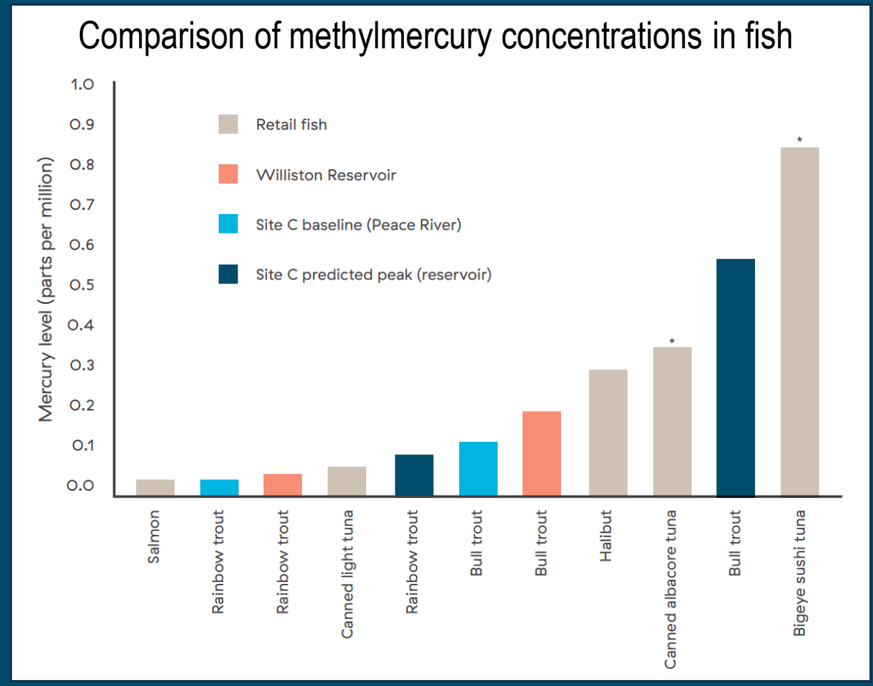
METHYLMERCURY INCREASES

Now that Site C Reservoir is full, we expect that levels of methylmercury in fish will increase for approximately 10 years. Tissue methylmercury concentrations of fish in the reservoir are predicted to increase by 3-4 times current levels, while concentrations in downstream fish are only expected to peak at 2x baseline (downstream of Many Islands, AB no increases are expected). This is followed by a decrease over the next 20-30 years to levels that are similar to natural lakes and rivers in the area.

The bar chart below compares baseline methylmercury concentrations to predicted peak concentrations, as well as concentrations in the Williston Reservoir and common retail fish.







**Refer to Health Canada for consumption guidelines for canned albacore tuna and fresh tuna: https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/environmental-contaminants/mercury/mercury-fish-questions-answers.html#ca2*

THE MMP
Methylmercury Monitoring Plan

WHAT IS THE MMP?

The Methylmercury Monitoring Plan (MMP) was developed to measure changes to levels of methylmercury in fish after the creation of the Site C Reservoir and provide information on how much fish is safe for people to eat.

To date, the MMP has focused on characterizing baseline (i.e., prior to reservoir creation) levels of methylmercury in fish. Now that the reservoir has been created, the MMP will track changes in methylmercury levels and provide updated fish consumption guidance.

The three components (figure right): the Core MMP, the Fish Consumption Program, and the Indigenous Community Sampling Program (ICSP).

The Core MMP targets six species of fish (see below) for mercury analysis, using non-lethal sampling.

Photo 9

TARGET FISH FOR THE CORE MMP:

Bull Trout

Walleye

Rainbow Trout

Mountain Whitefish

Longnose Sucker

Redside Shiner

WHAT IS THE ICSP?

The ICSP is an Indigenous community methylmercury monitoring program targeting fish commonly consumed by people, but distinct from the sampling locations and species covered under the Core MMP.

WHAT IS THE CONSUMPTION PROGRAM?

Potential human health risks from methylmercury depend not only on the concentration in fish, but also the amount of fish that people eat. This program aims to quantify fish consumption and establish guidance for how much fish is safe to eat.

WHAT IS THE CORE MMP?

It is the primary MMP sampling program, monitoring methylmercury in fish in the Peace River from the Peace Canyon Dam through Site C Reservoir and downstream to Many Islands, AB. The program also monitors mercury in water, sediment, porewater, and bugs.

SCAN ME

Photo 10

THE ICSP

Indigenous Community Sampling Program

An Indigenous community methylmercury monitoring program that samples fish people eat, but is distinct from the sampling locations and species covered under the Core MMP.

ICSP OBJECTIVES

There are three main objectives of the ICSP Program:

- Test the levels of methylmercury in fish that people eat, but which are not monitored in the Core MMP.
- Provide opportunities for Indigenous communities to participate in monitoring changes to the environment from the Site C Project.
- Improve food security and food sovereignty for Indigenous communities by building skills and knowledge related to methylmercury in fish.

Photo 11 by Brendon Bushy

Photo 13 by Brendon Bushy

Photo 12 by Ben Jackson

COMMUNITY CHAMPIONS are trained to collect fish tissue samples and are the link between BC Hydro and Indigenous communities.

THE

ICSP

Indigenous Community Sampling Program

2024 COMMUNITY ENGAGEMENT

In 2024, the ICSP provided baseline data on fish methylmercury levels before reservoir filling.

Two training events were conducted, one at McLeod Lake and one at Northern Lights College on June 27 and 28. The sessions covered methylmercury in reservoirs, an MMP overview, and hands-on training in fish tissue sampling.

CHAMPIONS TRAINED IN 2024

10 Blueberry River First Nation

12 McLeod Lake Indian Band

BLUEBERRY RIVER FIRST NATIONS

MCLEOD LAKE INDIAN BAND

Photo 14

Photo 15

Each Community Champion received a “Fish Kit” for sampling.

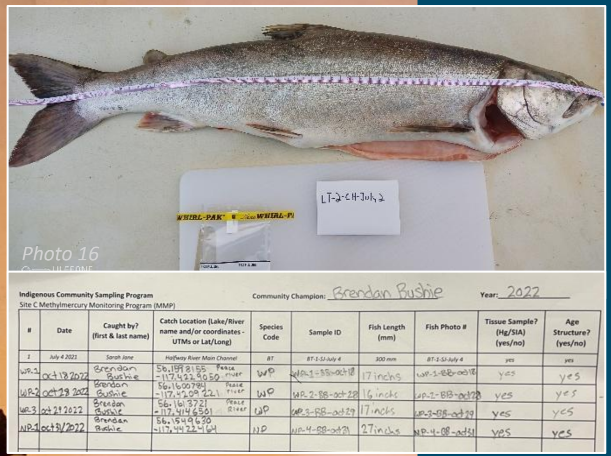
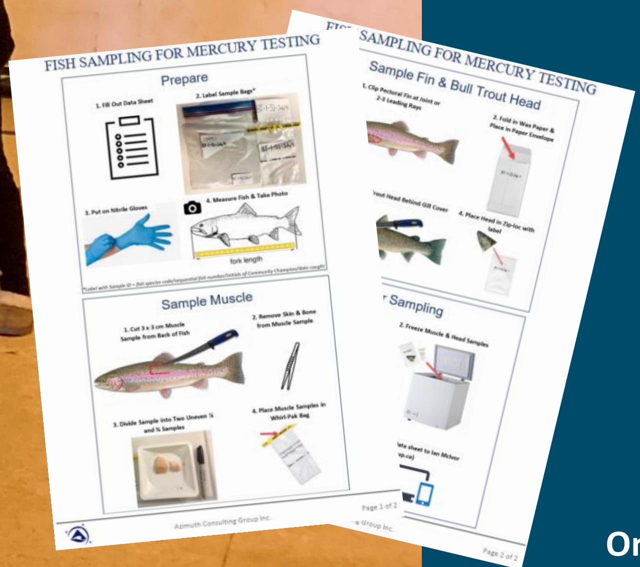


Photo 16

Trained Community Champions sampled fish throughout summer, reporting data and submitting tissue samples for mercury analysis.



In 2022 and 2023, Azimuth created a “Quick Start Guide” and an online training video as reference guides. A Peace River Fish ID Key is also available.

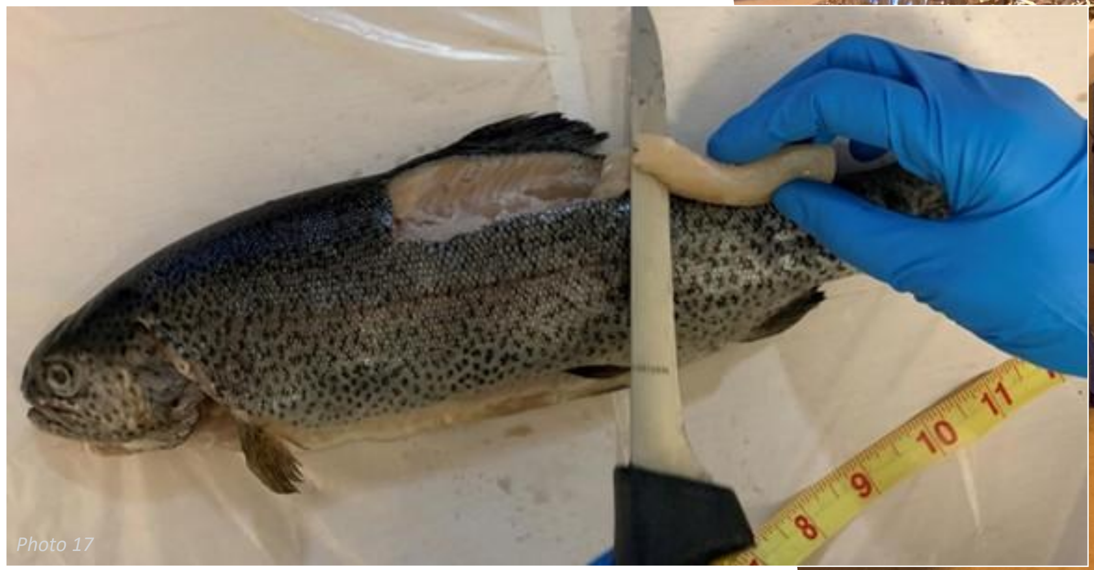


Photo 17

Online Training Video

SCAN ME

Fish ID Guide

SCAN ME

ICSP

2024 SAMPLES

Blueberry River

Doig River

Halfway River

Fort St. John

Taylor

Hudson's Hope

Saulteau

McLeod Lake

Dene Tha'

2024 ICSP AT A GLANCE

Community Champions from Dene Tha' and McLeod Lake collected 48 fish samples (listed right) below the Site C project area (Peace-Smoky River confluence) and in the Crooked/Pack River drainage (McLeod Lake and Crooked River).

- **Sampling from July through October 2024**
- **2 Nations: Dene Tha', and McLeod Lake**
- **48 fish samples from 3 species.**
- **Samples from Crooked/Pack drainage (13) Peace-Smoky River confluence (35)**

5 Northern Pike

13 Bull Trout

30 Walleye

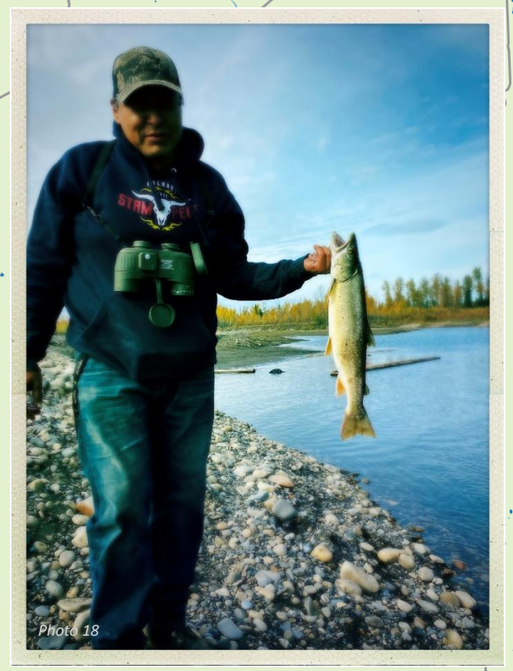


Photo 18

ICSP
2024 RESULTS

DATA ANALYSIS

When the ICSP fish methylmercury data were analyzed, the following variables were included:

- Mercury – total mercury concentrations in fish tissues.*
- Fork Length – fish length (nose to tail fork) was used as an indicator of fish size and age.

In the following pages, mercury data are presented for each species sampled in the ICSP program from 2021 to 2024 compared to results from the Core program. Note that the graphs all use the same scale to help visualize mercury content across species.

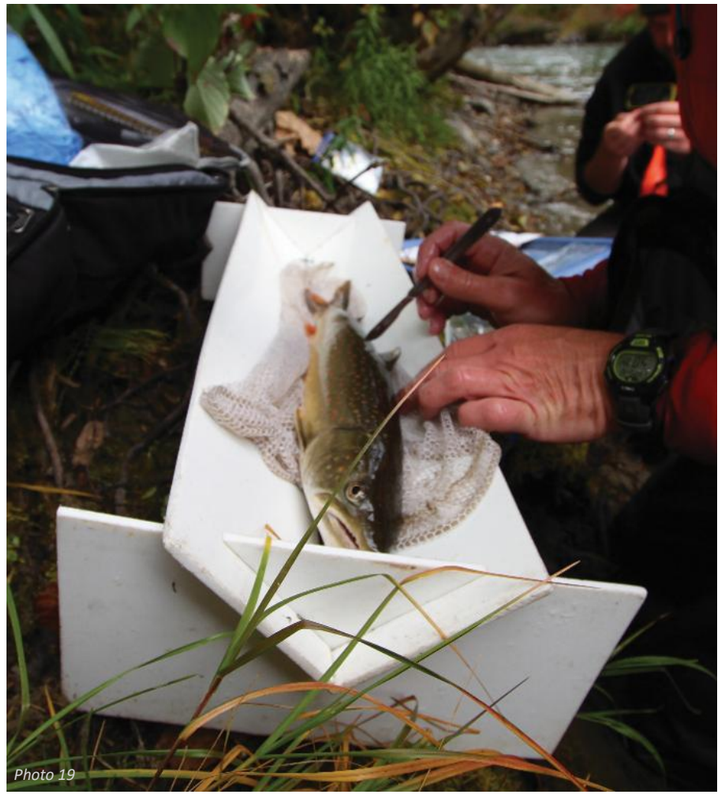


Photo 19

**Note that it is assumed that all mercury in fish tissues is present as methylmercury.*

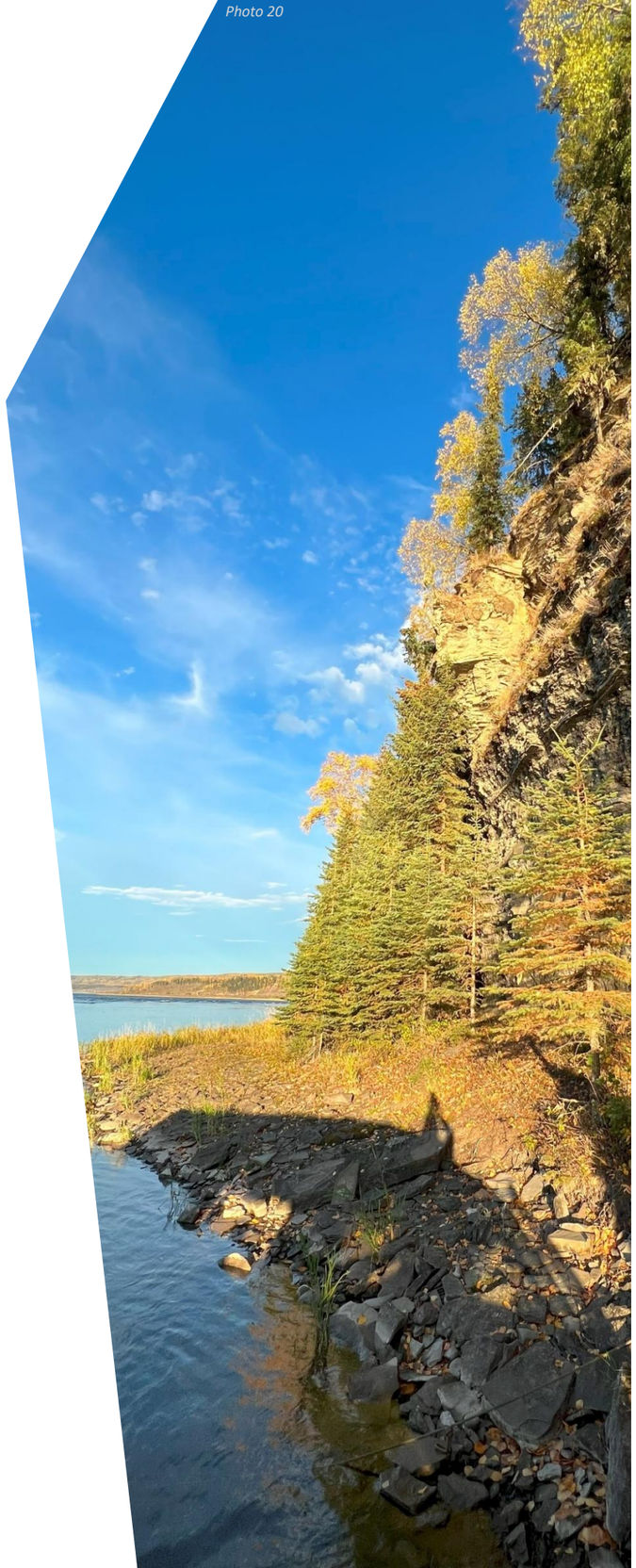


Photo 20

FISH MERCURY CONCENTRATIONS

Average mercury concentrations in muscle tissue for fish species collected in the Core MMP (2017-2022) and ICSP (2021-2024) programs from the Peace River Watershed are summarized below. Bug-eating species such as Rainbow Trout and Mountain Whitefish tend to have lower mercury levels, while fish-eating species higher in the food web, such as Walleye and Northern Pike, have higher mercury concentrations.

These results are meant to provide a rough idea of the amount of mercury in these fish. Actual mercury concentrations will vary from place to place and over time, particularly once the reservoir is created. See the annual MMP reports for specific concentrations for targeted locations and species.

Fish Species	Mercury (mg/kg ww)
Walleye	0.27
Goldeye	0.25
Northern Pike	0.16
Lake Trout	0.15
Bull Trout	0.14
Burbot	0.13
White Sucker	0.10
Longnose Sucker	0.08
Mountain Whitefish	0.05
Rainbow Trout	0.03

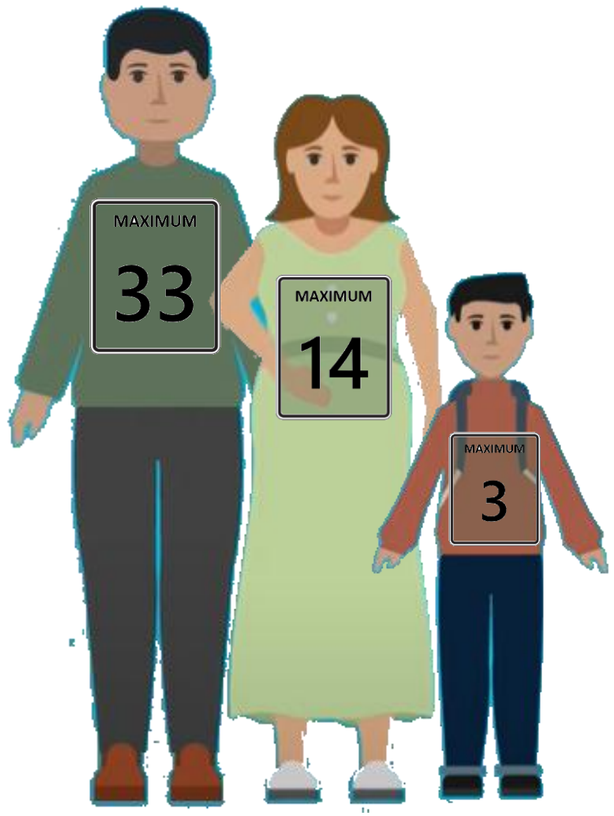
How Much Fish Can I Eat?

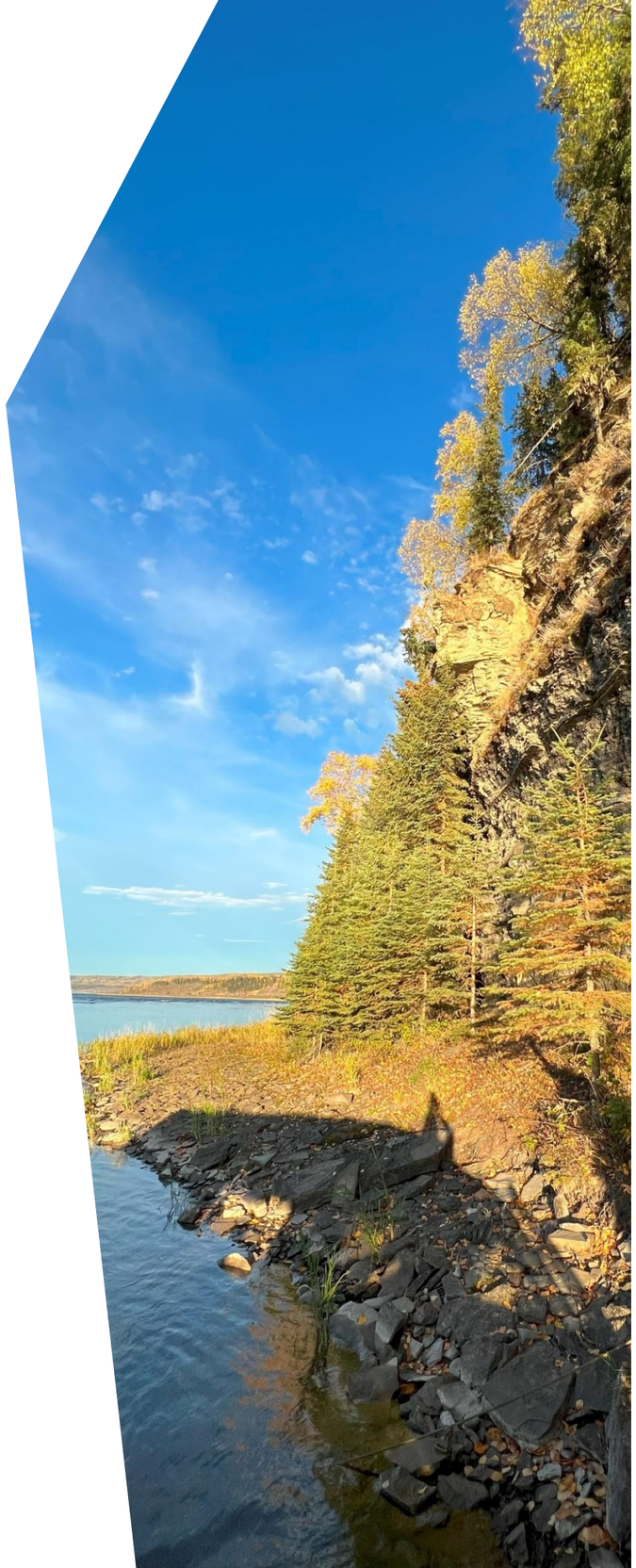
Health Canada guidance on safe levels of exposure

Methylmercury occurs naturally in fish and people are exposed to small amounts of methylmercury when they eat fish. People can safely tolerate exposure to some methylmercury, but exposure to too much methylmercury can be harmful to the brain and nerves.

Health Canada provides guidance on how much methylmercury people can be exposed to without risk of harm. These amounts vary, depending on a person's age and if they are, or could be pregnant.

Health Canada's guidance on methylmercury exposure are like speed limits – people won't necessarily be harmed if they exceed them, but it is best to keep exposure below them.





This brochure provides information on how much fish a person can safely eat

Information on the amount of methylmercury in fish was used to calculate how many servings of fish people can eat every month without going over Health Canada's safe levels of exposure for methylmercury. An example for Northern Pike is shown below.

Guidance is provided for different lengths of fish, measured in millimeters or inches

Guidance is provided for children less than 12 years old (C), people who are or could be pregnant (P), and others (O)

Northern Pike

Size[mm|in] | Mercury[ppm]	C	P	O
400|16 | 0.06	24	43	101
550|22 | 0.12	12	21	50
700|28 | 0.22	6	11	27

Safe to Eat

- Once Every Day
- Once Every Other Day
- Twice a Week
- Once a Week
- Twice a Month
- Once a Month

The number of servings of fish a person can safely eat every month. The squares are coloured according to the legend to the left.

For people fishing in the Peace River, the MMP provides detailed guidance for different locations:

SCAN ME

HOW BIG IS A SERVING OF FISH?

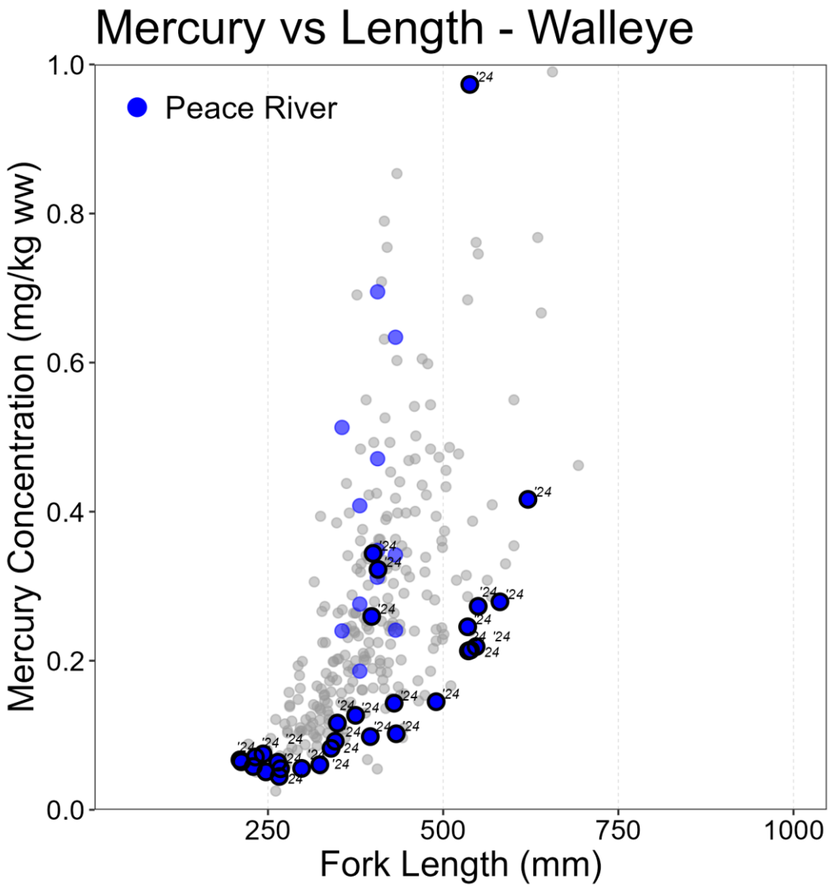
100 g (0.2 lbs) serving size for children.

163 g (0.4 lbs) serving size for adult.

Walleye

OVERVIEW

- Walleye, a top predator in the Peace River, primarily eats other fish. Being higher in the food chain, Walleye have higher levels of mercury. They are found downstream of the Site C Dam.
- All Walleye caught to date in the ICSP are from the Peace-Smoky River confluence. In 2024, 30 fish were caught (dark blue points labelled “24”) compared to 12 caught from 2022-2023 (blue points). Walleye sizes have been comparable to fish captured in the Core MMP (grey).



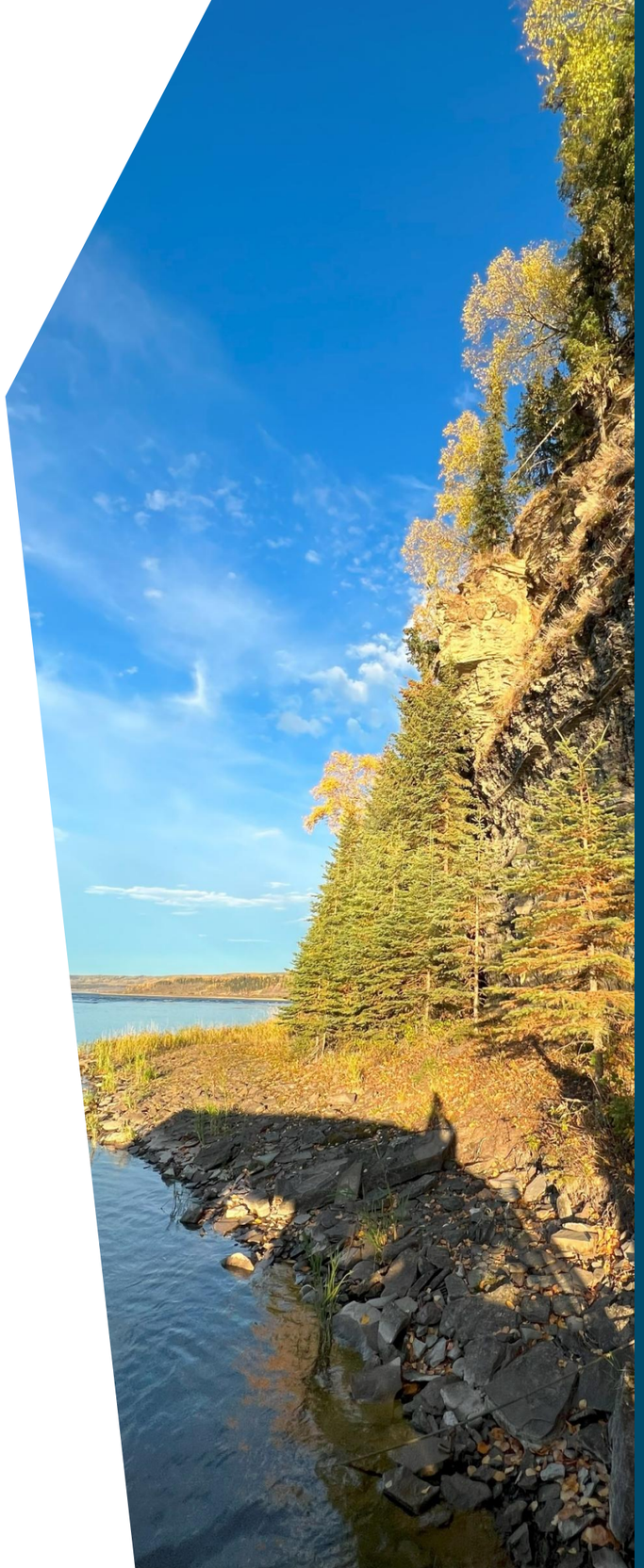


Photo 21

FISH MERCURY RESULTS

- Positive relationship between mercury and fish length.
- Large amount of variation in mercury concentrations for fish between 300-400 mm.
- 2022-2024 ICSP results are consistent with the Core MMP data.

FISH CONSUMPTION GUIDANCE

- For Walleye caught in the Peace River and its tributaries, follow consumption guidance from Core MMP data (table below):

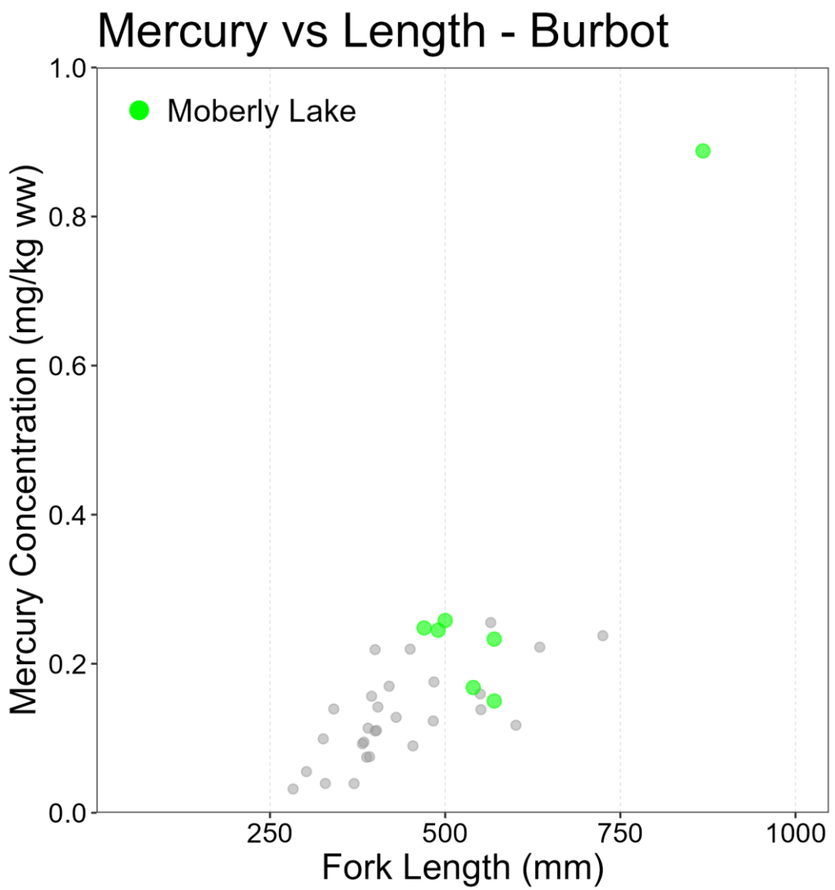
Peace River Walleye*				
Size mm|in	Hg ppm	C	P	O
300|12	0.15	9	17	40
400|16	0.28	5	9	21
500|20	0.47	3	5	13

**Mercury (Hg ppm) estimates and monthly servings for CORE MMP fish (up to 20”) from the Peace River (Pine confluence to Many Islands); see Appendix F, 2022 Annual Report.*

Burbot

OVERVIEW

- Burbot are bottom dwellers, more common in the lower reaches of the Peace River study area. They are long-lived and may eat other fish, meaning they can contain higher levels of mercury.
- In the ICSP, Burbot have only been caught in Moberly Lake (lower plot, green points), but prior to 2024. These data were combined with other programs to develop Moberly Lake guidance (see Appendix A of the 2023 report; QR code next page). Core MMP fish (grey) are shown for comparison.



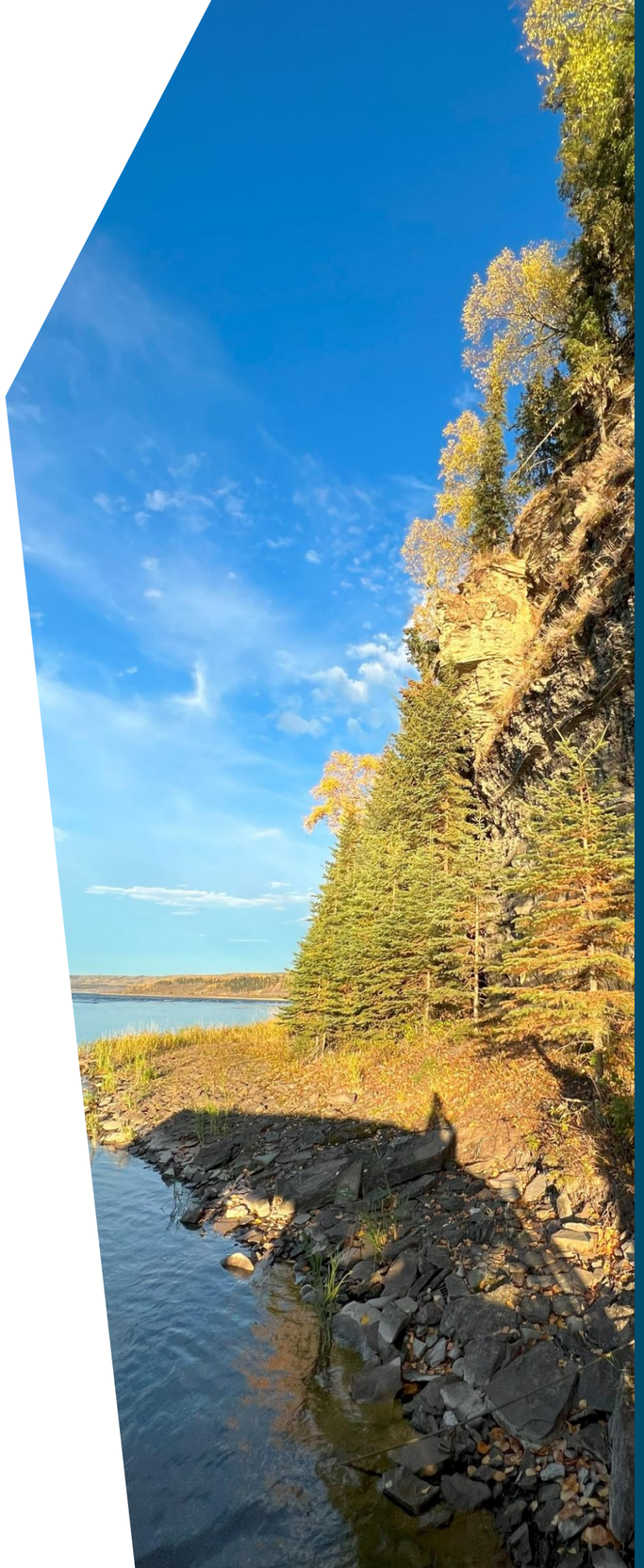


Photo 22

FISH MERCURY RESULTS

- Positive relationship between mercury and fish length. Larger/older fish have higher levels than smaller/younger fish.
- ICSP results consistent with Core MMP data. Highest mercury concentration is from a large Burbot (868 mm) caught in 2022.

FISH CONSUMPTION GUIDANCE

- For Burbot caught in the Peace River and its tributaries, follow consumption guidance from Core MMP data (left table below).
- For Burbot caught in Moberly Lake, follow consumption advice from the 2023 ICSP report (right table below).

Peace River Burbot*

Size mm | in	Hg ppm	C	P	O
325 | 13	0.08	18	32	76
450 | 18	0.13	11	20	47
575 | 23	0.21	7	12	29

**Mercury (Hg ppm) estimates and monthly servings for CORE MMP fish (up to 23") from the Peace River (Peace Canyon to Many Islands); see Appendix F, 2022 Annual Report.*

Moberly Lake Burbot†

Size mm | in	Hg ppm	C	P	O
325 | 13	0.12	12	21	50
450 | 18	0.17	8	15	35
575 | 23	0.24	6	10	25
750 | 30	0.4	3	6	15

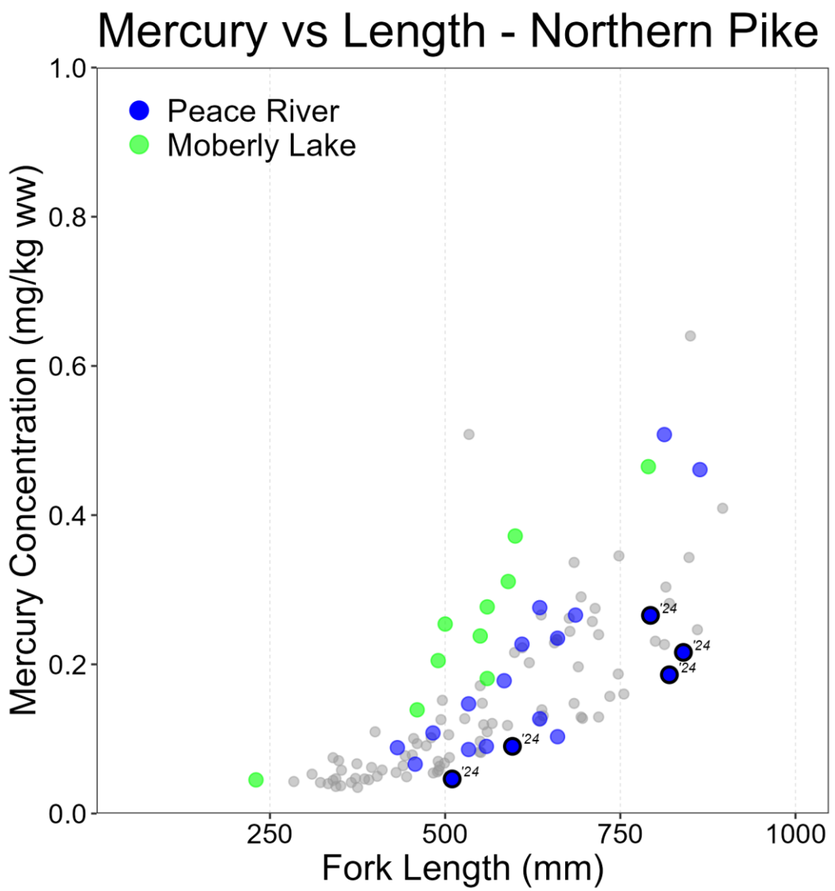
SCAN ME

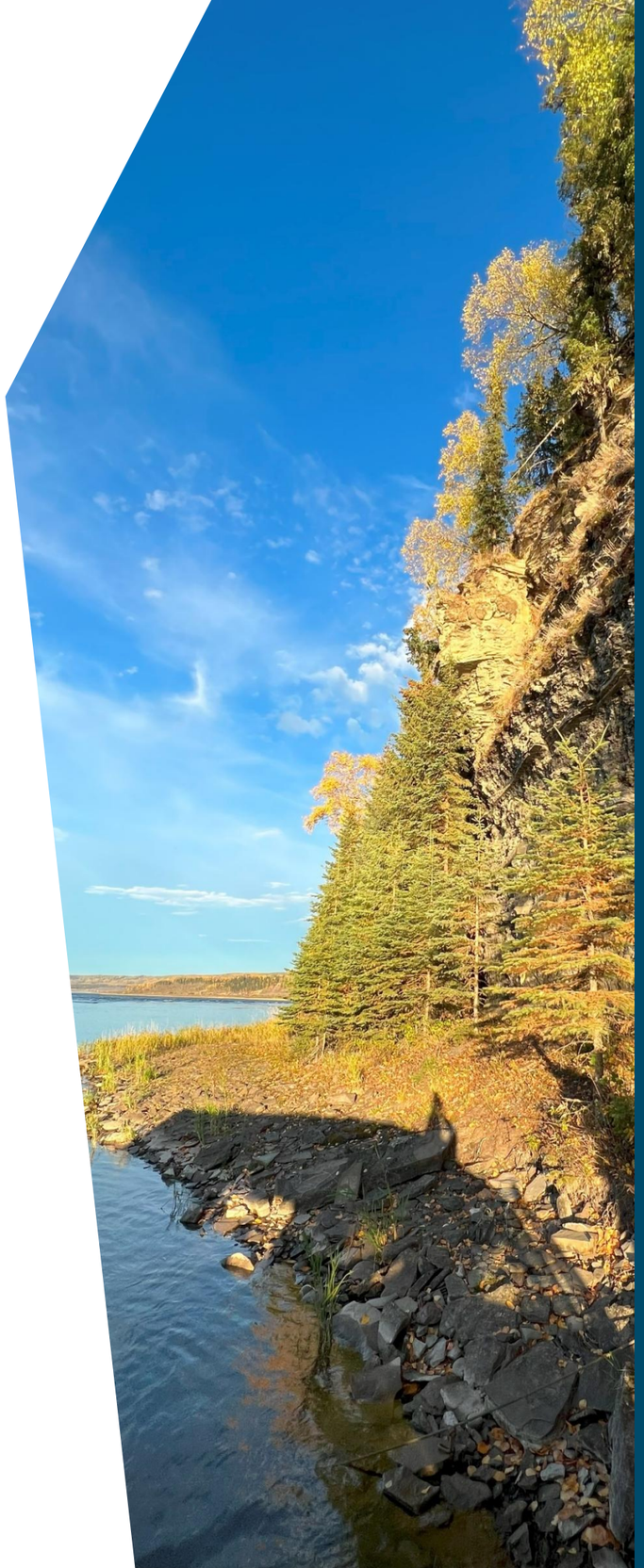
†Mercury (Hg ppm) estimates and monthly servings for fish (up to 30") from Moberly L.

Northern Pike

OVERVIEW

- Northern Pike prefer side channel and confluence habitat along the Peace River. As opportunistic ambush predators, they are higher in the food chain and have higher levels of mercury.
- In the ICSP, Pike have been caught in Moberly Lake and the Peace-Smoky confluence. The plot below shows the results (this year's data labelled with "24") compared to Core MMP fish from the Peace River (grey points). The Moberly Lake data were combined with other programs to develop Moberly Lake guidance (see Appendix A of the 2023 report; QR code next page).





FISH MERCURY RESULTS

- Positive relationship between mercury and fish length.
- The Northern Pike Caught at the Peace-Smoky River confluence appear to be consistent with the Core MMP data.
- Fish from Moberly Lake appear to have higher mercury concentrations than the Core MMP for a given fish length.

FISH CONSUMPTION GUIDANCE

- For Pike caught in the Peace River and its tributaries, follow consumption guidance from Core MMP data (left table below).
- For Pike caught in Moberly Lake, follow consumption advice from the 2023 ICSP report (right table below).

Peace River Northern Pike*

Size mm|in	Hg ppm	C	P	O
400|16	0.06	24	43	101
550|22	0.12	12	21	50
700|28	0.22	6	11	27

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 28") from the Peace River (Peace Canyon to Many Islands); see Appendix F, 2022 Annual Report.*

Moberly Lake Northern Pike†

Size mm|in	Hg ppm	C	P	O
400|16	0.15	9	17	40
550|22	0.25	5	10	24
700|28	0.42	3	6	14

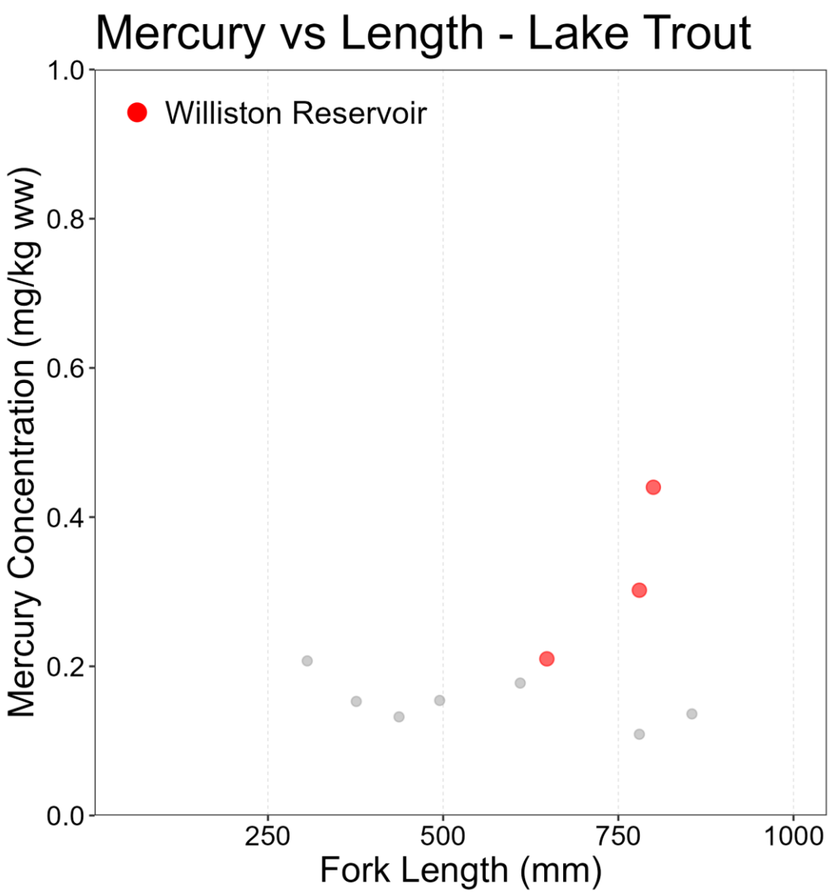
†Mercury (Hg ppm) estimates and monthly servings for fish (up to 28") from Moberly L.

SCAN ME

Lake Trout

OVERVIEW

- Lake Trout are rare in the Peace River, but common in the upstream reservoirs. Young trout eat invertebrates, shifting to preying on other fish as they mature.
- No Lake Trout were caught in the ICSP in 2024, but three were caught in the Williston Reservoir in 2022 with lengths comparable to fish captured in the Core MMP in the Peace River (grey).



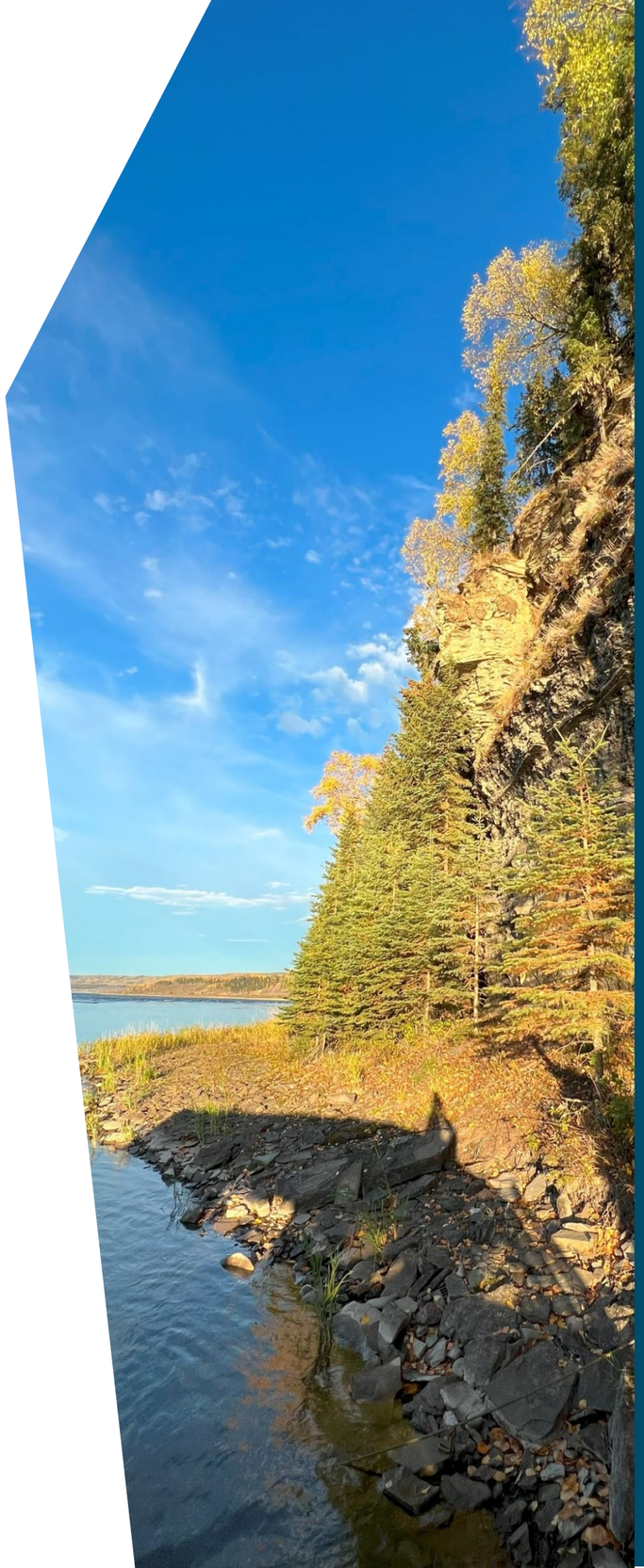



Photo 24

FISH MERCURY RESULTS

- ICSP results appear to show a positive relationship between mercury and fish length.
- Core MMP results do not demonstrate a positive length-mercury relationship.
- ICSP results are not directly comparable to the Core MMP results, since the ICSP fish were collected in Williston Reservoir.

FISH CONSUMPTION GUIDANCE

- For Lake Trout (up to 22”) from Williston Reservoir and tributaries, follow FWCP guidance (table and QR code below):

Lake Trout - Williston & Tribs*			
Size mm|in	C	P	O
560|22	7	12	28

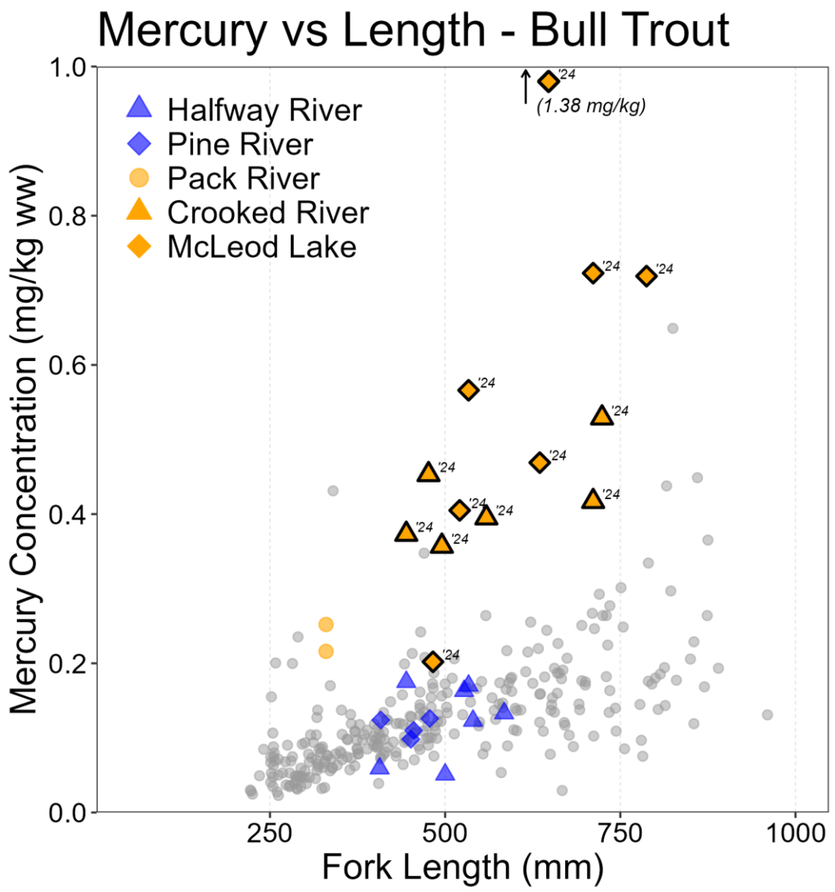
SCAN ME

**Monthly serving guidance from FWCP fish caught in Williston Reservoir or tributaries.*

Bull Trout
Sa-pa*

OVERVIEW

- Bull Trout are most abundant upstream of the Peace-Beaton confluence, utilizing specific spawning habitat on the Halfway River. As opportunistic predators, they feed on invertebrates and fish, altering their diet depending on prey availability.
- Under the ICSP, Bull Trout have been caught in the Crooked/Pack Watershed and in the Halfway and Pine Rivers. The plot below shows the ICSP results (coloured by watershed; 2024 data labelled with “24”) compared to Core MMP fish caught in the Peace River (grey).



*Indigenous name from the Beaver language. Names provided to BC Hydro by the Halfway River First Nation.

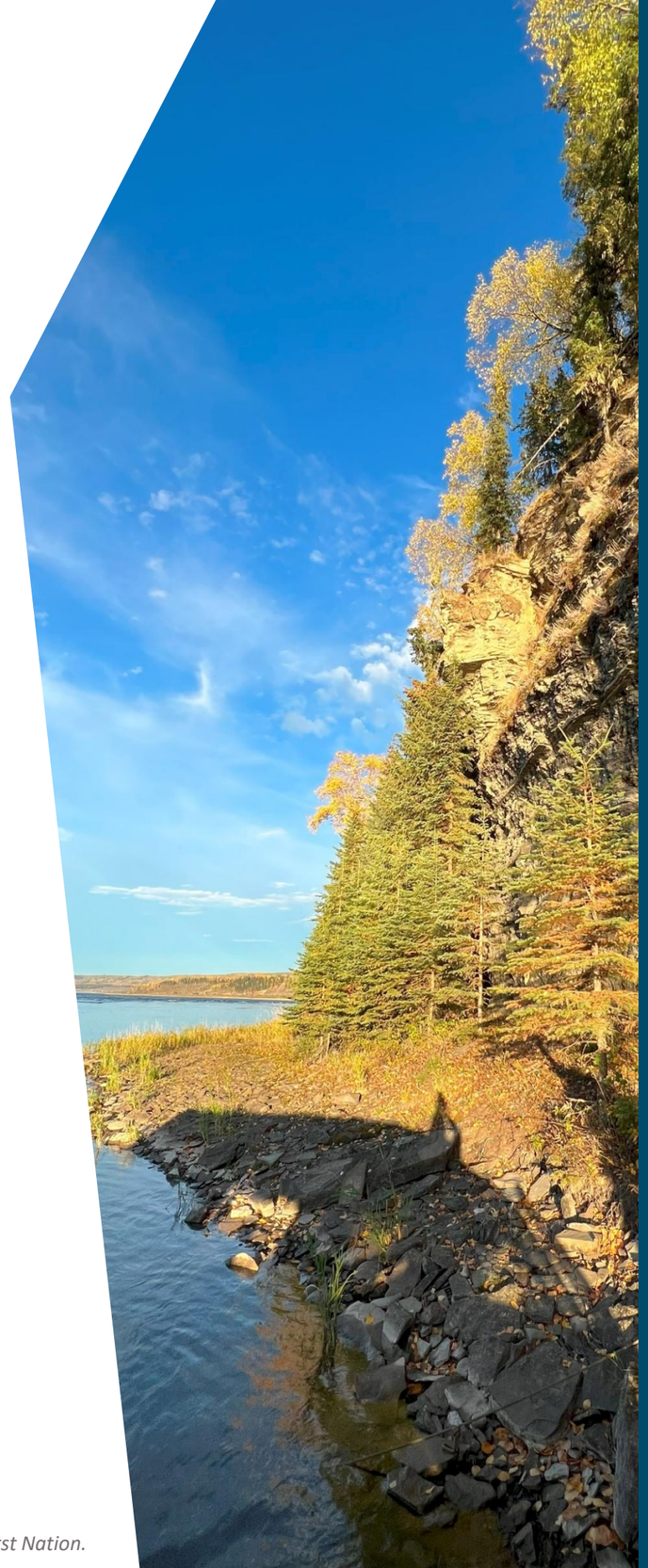



Photo 25

FISH MERCURY RESULTS

- Positive relationship between mercury and fish length. Larger/older fish have higher levels than smaller/younger fish.
- Halfway and Pine River results are consistent with the Core MMP.
- Crooked/Pack Watershed results have higher concentrations than Core MMP fish for a given fish length.

FISH CONSUMPTION GUIDANCE

- For Bull Trout caught in the Peace and its tributaries, follow consumption guidance from Core MMP data (left table below):
- Guidance for fish caught in the Crooked/Pack Watershed is provided in **Appendix A** (summarized in right table below).

Peace River Bull Trout*

Size mm | in	Hg ppm	C	P	O
400 | 16	0.06	24	43	101
550 | 22	0.12	12	21	50
700 | 28	0.22	6	11	27

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 28”) from the Peace River (Peace Canyon to Pine confluence); see Appendix F, 2022 Annual Report.*

Bull Trout - Crooked/Pack Watershed†

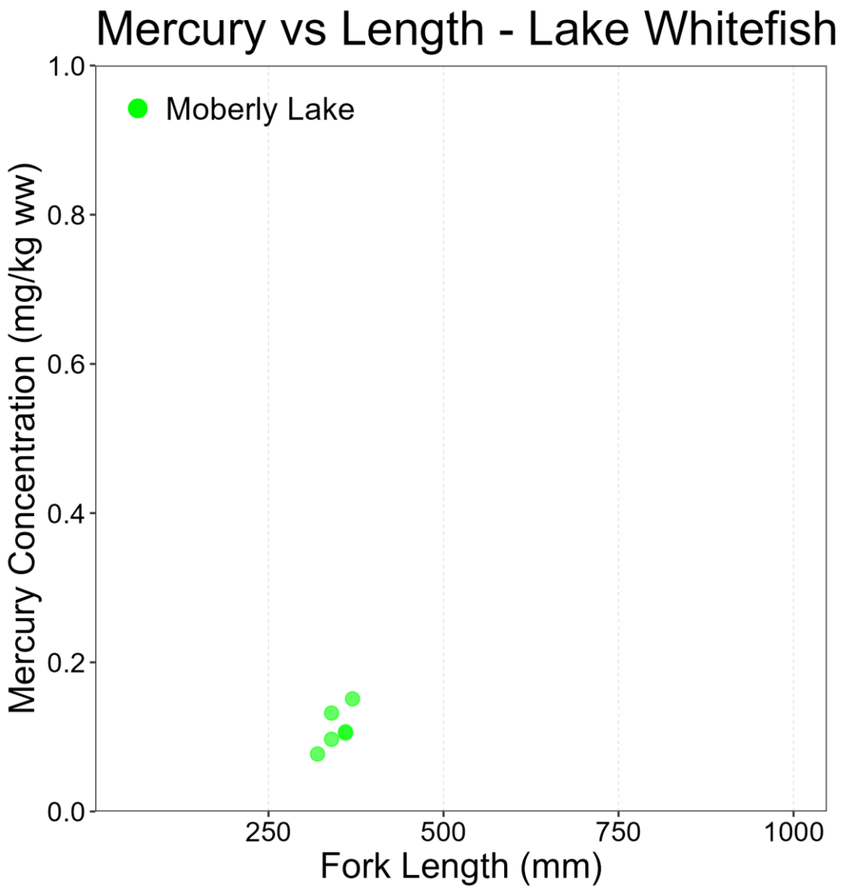
Size mm | in	Hg ppm	C	P	O
400 | 16	0.29	5	8	21
550 | 22	0.45	3	5	13
700 | 28	0.62	2	4	9

*†Mercury (Hg ppm) estimates and monthly servings guidance from fish caught on the Crooked/Pack Rivers; see **Appendix A** below.*

Lake Whitefish Ihuwe-dak'ale*

OVERVIEW

- Lake Whitefish are more common in the lakes of the Peace River Watershed. They are bottom dwelling, feeding primarily on benthic invertebrates.
- All Lake Whitefish caught in the ICSP are from Moberly Lake, but all prior 2024. These data were combined with other programs to develop lake-specific guidance (see Appendix A of the 2023 report; QR code next page).



Indigenous name from the Beaver language. Names provided to BC Hydro by the Halfway River First Nation.

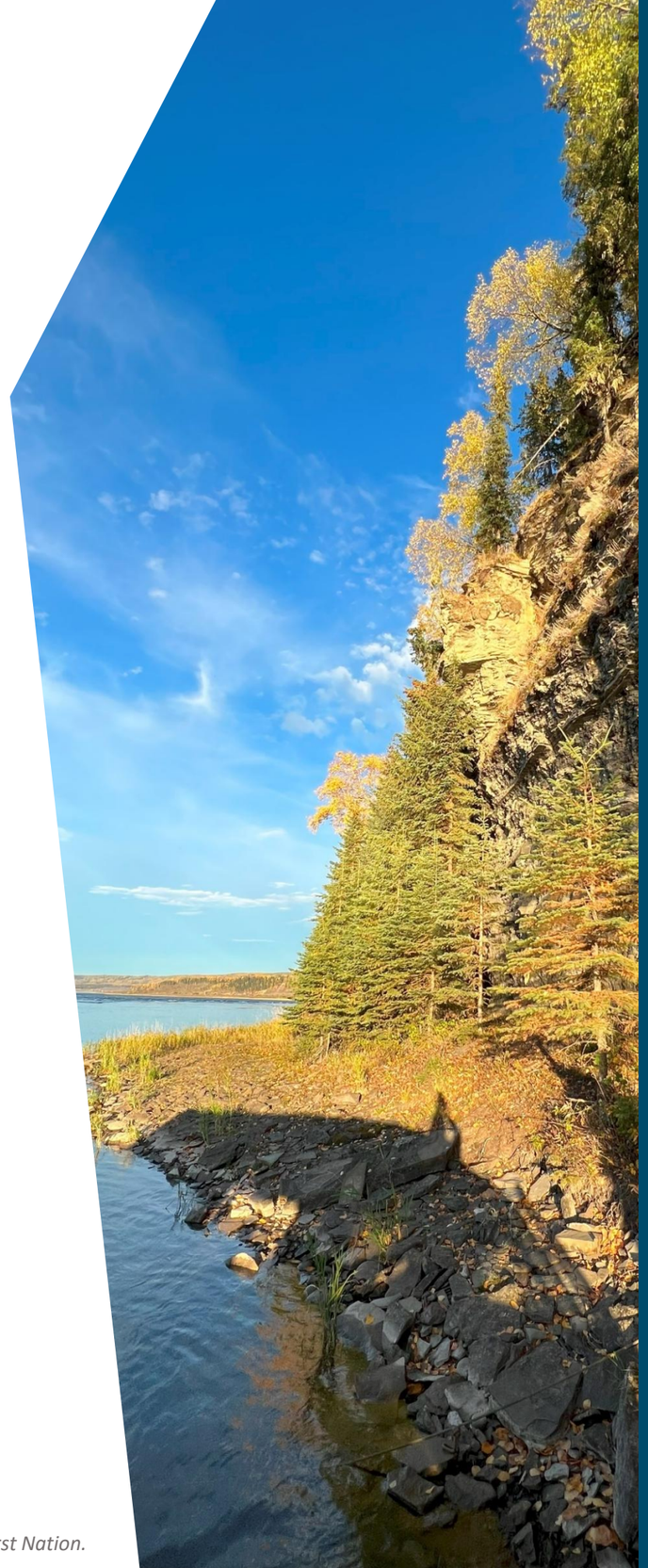


Photo 26

FISH MERCURY RESULTS

- Mercury concentrations appear to increase in larger fish, but are relatively low compared to other fish species caught in the ICSP.

FISH CONSUMPTION GUIDANCE

- For Lake Whitefish caught in Moberly Lake, follow consumption advice from the 2023 ICSP report (table below).
- See **Appendix B** for other consumption guidance in Williston Reservoir.

Lake Whitefish - Moberly Lake *				
Size mm|in	Hg ppm	C	P	O
300|12	0.09	16	28	67

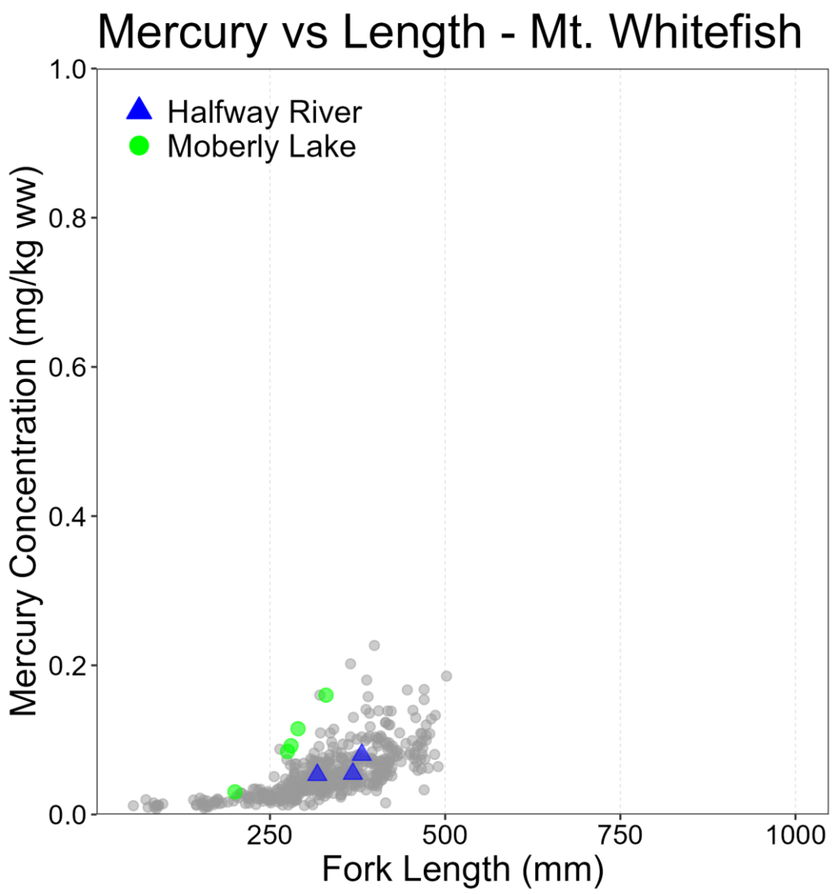
**Mercury (Hg ppm) estimates and monthly servings for fish (up to 12") from Moberly L.*

SCAN ME

Mountain Whitefish

OVERVIEW

- On the Peace River, Mountain Whitefish are most common above the Beatton River confluence, but also occur in many tributaries and lakes throughout the region. They are bottom dwelling, feeding mostly on invertebrates.
- No Mountain Whitefish were caught in the ICSP in 2024. Results from Moberly Lake and the Halfway River are compared to Core MMP data (grey) in the plot below. Moberly Lake results were combined with other programs to develop lake-specific guidance (see Appendix A of the 2023 report; QR code next page).



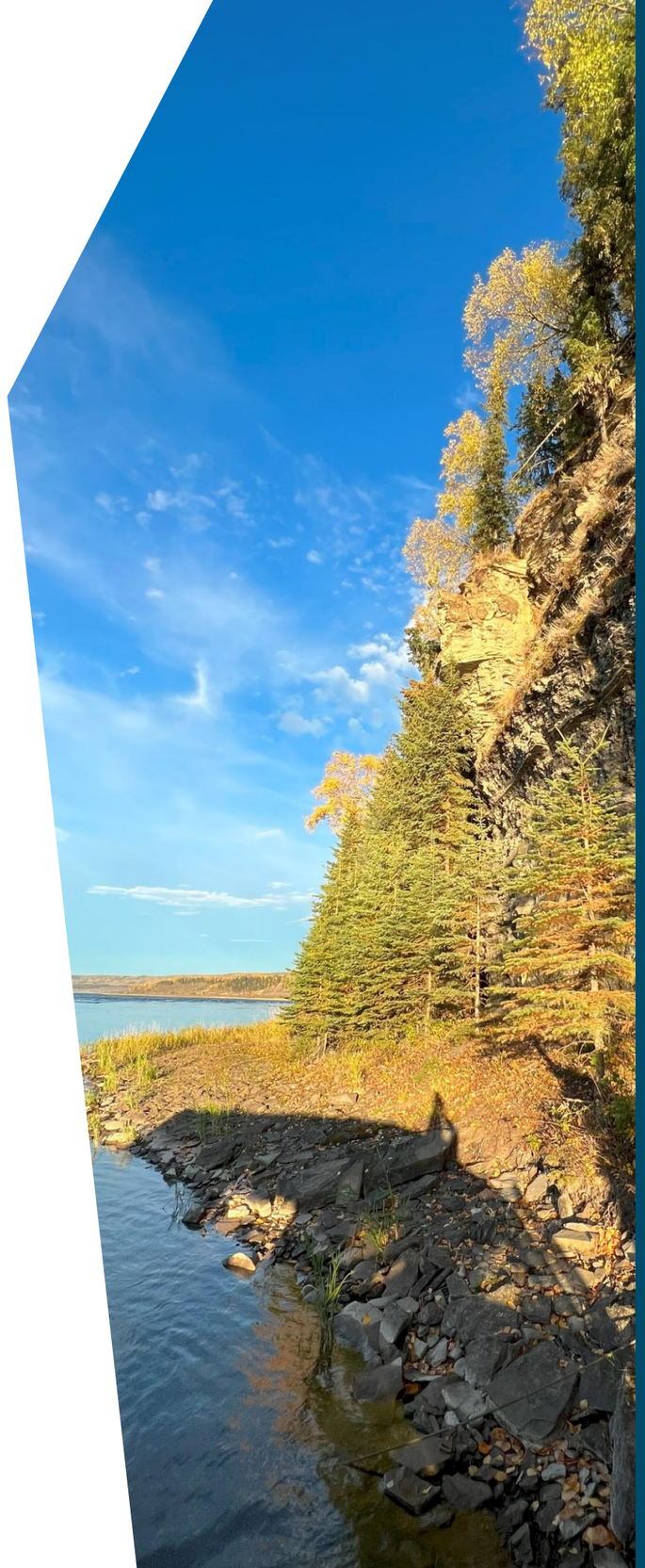


Photo 27

FISH MERCURY RESULTS

- Positive relationship between mercury and fish length.
- 2021 ICSP results from the Halfway River are consistent with the Core MMP data.
- 2022 ICSP results show that Moberly Lake fish generally have higher mercury than Core MMP fish for a given fish length.

FISH CONSUMPTION GUIDANCE

- For Mountain Whitefish caught in the Peace and its tributaries, follow guidance from the Core MMP data (left table below).
- For Mountain Whitefish caught in Moberly Lake, follow consumption advice from the 2023 ICSP report (right table below).

Peace River Mt. Whitefish*

Size mm|in	Hg ppm	C	P	O
275|11	0.04	37	65	152
350|14	0.05	29	52	122
425|17	0.08	18	32	76

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 17") from the Peace River (Peace Canyon to Many Islands); see Appendix F, 2022 Annual Report.*

Moberly Lake Mt. Whitefish†

Size mm|in	Hg ppm	C	P	O
275|11	0.07	21	37	87
350|14	0.09	16	28	67
415|16	0.12	12	21	50

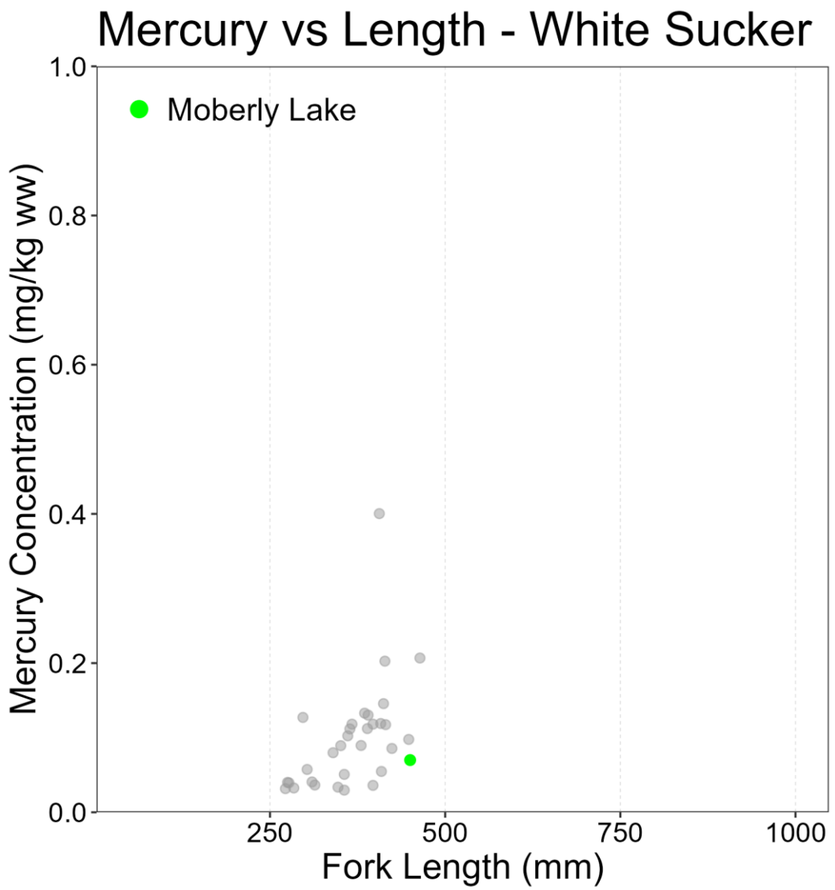
†Mercury (Hg ppm) estimates and monthly servings for fish (up to 16") from Moberly L.

SCAN ME

White Sucker

OVERVIEW

- White Sucker are more common below the Site C Dam, but spawn on tributaries throughout the Peace River. They are also common in lakes across the region. Suckers feed in the bottom substrate, eating worms, clams, and insect larva.
- No ICSP White Suckers were caught in 2024. One was caught in Moberly Lake in 2022 (lower plot; green point) similar in size to the Core MMP (grey). These data were combined with other programs to develop lake-specific guidance (see Appendix A of the 2023 report; QR code next page).



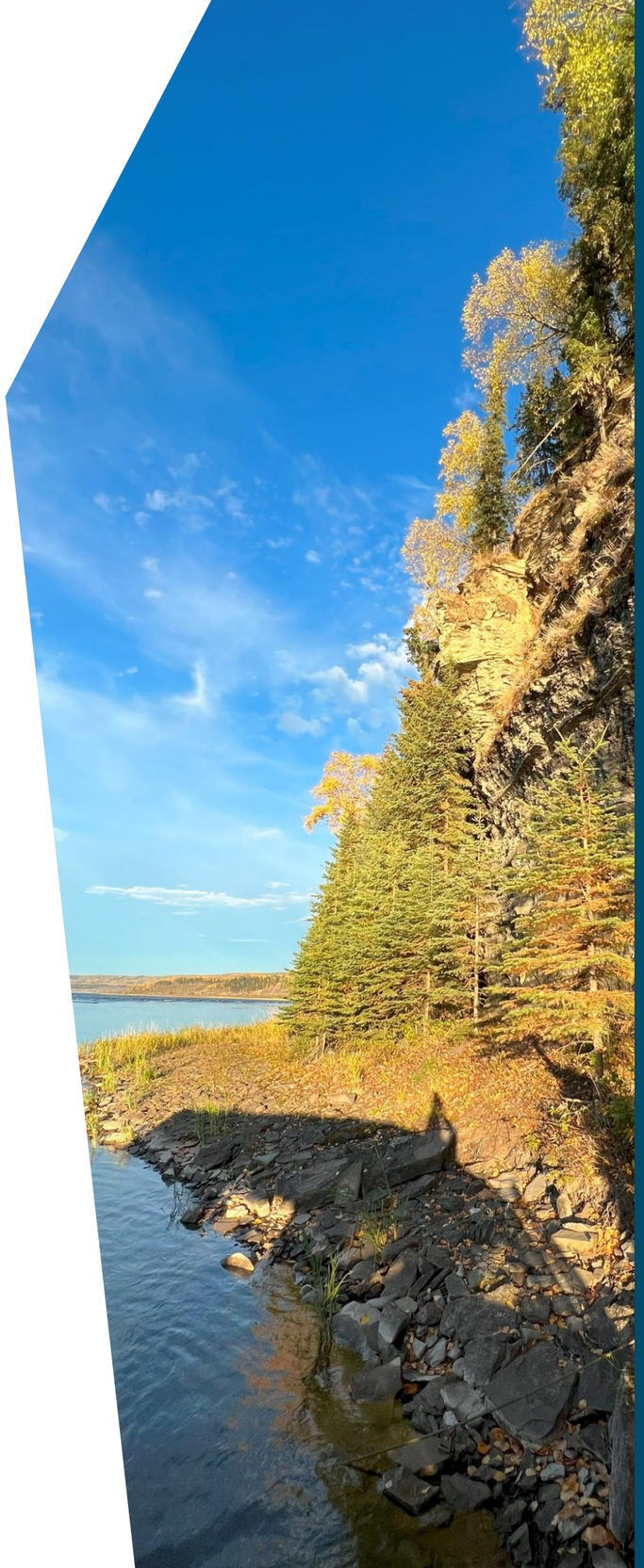


Photo 28

FISH MERCURY RESULTS

- Core MMP data show a positive length-mercury relationship. Larger/older fish have higher concentrations than smaller/younger fish.
- ICSP results are consistent with the Core MMP data.

FISH CONSUMPTION GUIDANCE

- For White Sucker caught in the Peace and its tributaries, follow consumption guidance from Core MMP data (left table below).
- For White Sucker caught in Moberly Lake, follow consumption advice from the 2023 ICSP report (right table below).

Peace River White Sucker*

Size mm | in	Hg ppm	C	P	O
325 | 13	0.06	24	43	101
375 | 15	0.09	16	28	67
425 | 17	0.14	10	18	43

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 17") from the Peace River (Peace Canyon to Many Islands); see Appendix F, 2022 Annual Report.*

Moberly Lake White Sucker†

Size mm | in	Hg ppm	C	P	O
325 | 13	0.06	24	43	101
375 | 15	0.09	16	28	67
425 | 17	0.13	11	20	47

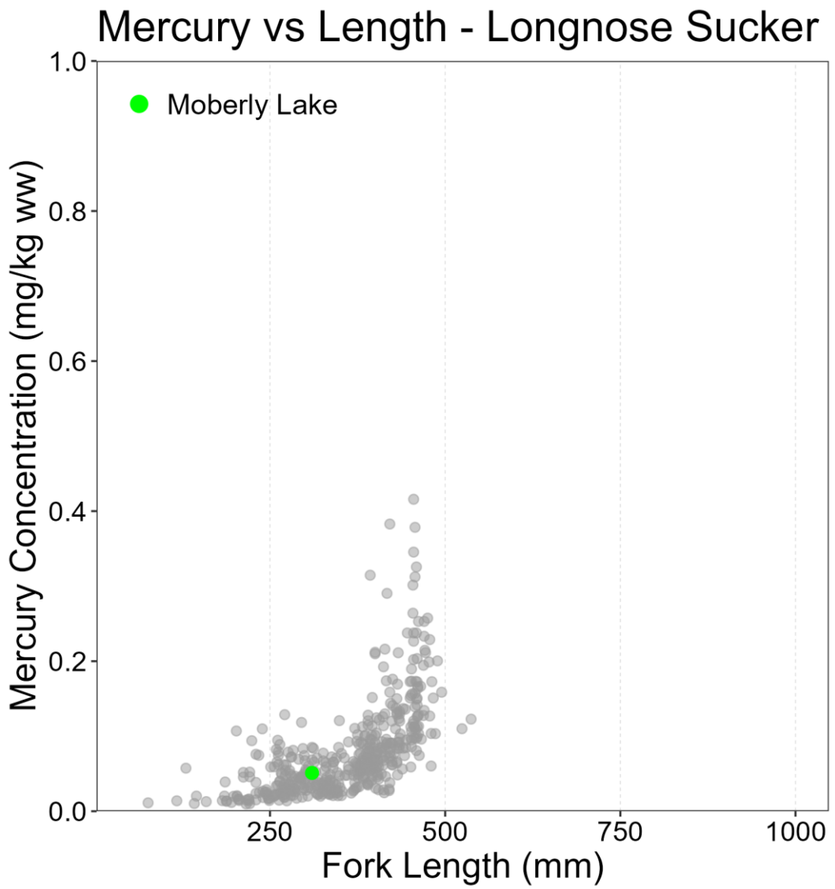
†Mercury (Hg ppm) estimates and monthly servings for fish (up to 17") from Moberly L.

SCAN ME

Longnose Sucker

OVERVIEW

- Longnose Suckers are more common on the Peace River downstream of the Halfway River confluence. They are also common in the lakes of the region. Suckers feed in the bottom substrate, eating worms, clams, and insect larva.
- No ICSP Longnose Suckers were caught in 2024. In 2022, one was caught in Moberly Lake, similar in size to Core MMP fish (grey). These data were combined with other programs to develop lake-specific guidance (see Appendix A of the 2023 report; QR code next page).



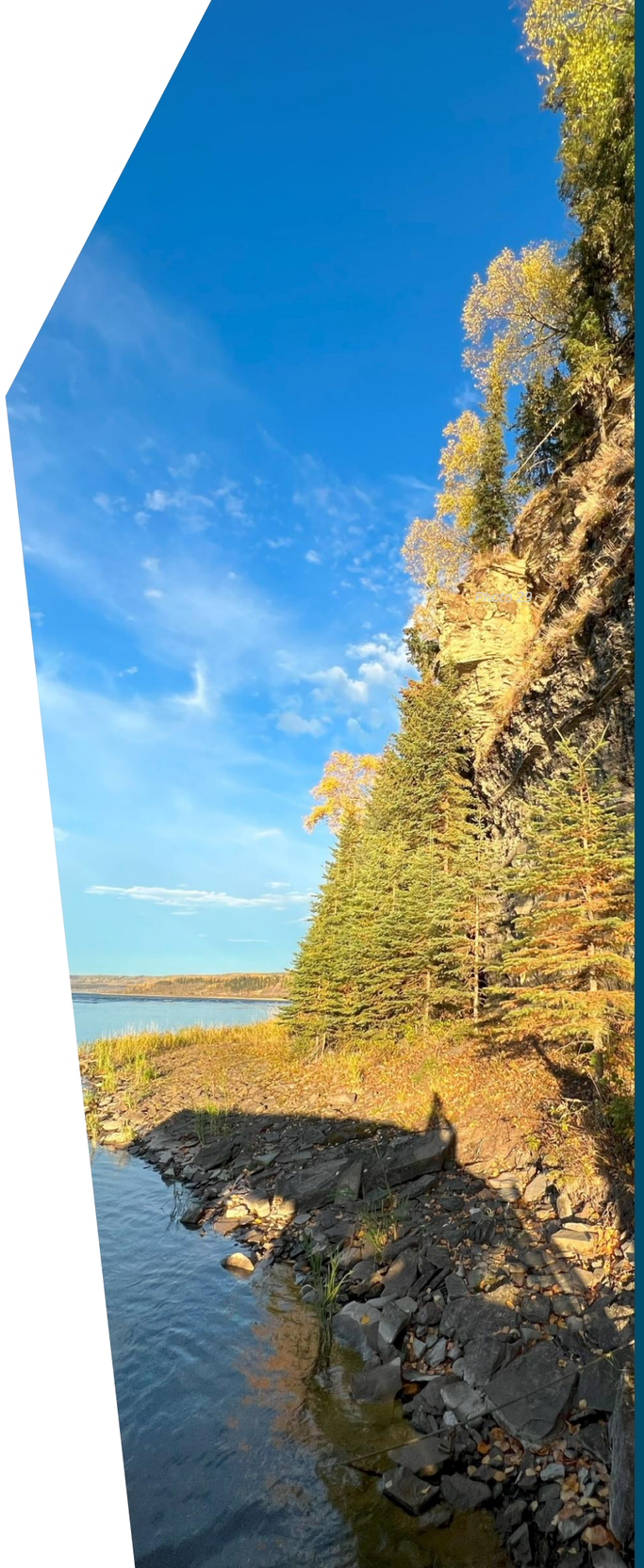


Photo 29

FISH MERCURY RESULTS

- Core MMP data show a positive length-mercury relationship. Larger/older fish have higher concentrations than smaller/younger fish.
- The single ICSP result is consistent with the Core MMP data.

FISH CONSUMPTION GUIDANCE

- For Longnose Sucker caught in the Peace and its tributaries, follow consumption guidance from Core MMP data (left table below).
- For Longnose Sucker caught in Moberly Lake, follow consumption advice from the 2023 ICSP report (right table below).

Peace River Longnose Sucker*

Size mm | in	Hg ppm	C	P	O
325 | 13	0.05	29	52	122
375 | 15	0.07	21	37	87
425 | 17	0.11	13	23	55

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 17") from the Peace River (Peace Canyon to Many Islands); see Appendix F, 2022 Annual Report.*

Moberly Lake Longnose Sucker†

Size mm | in	Hg ppm	C	P	O
325 | 13	0.06	24	43	101
375 | 15	0.09	16	28	67
425 | 17	0.13	11	20	47

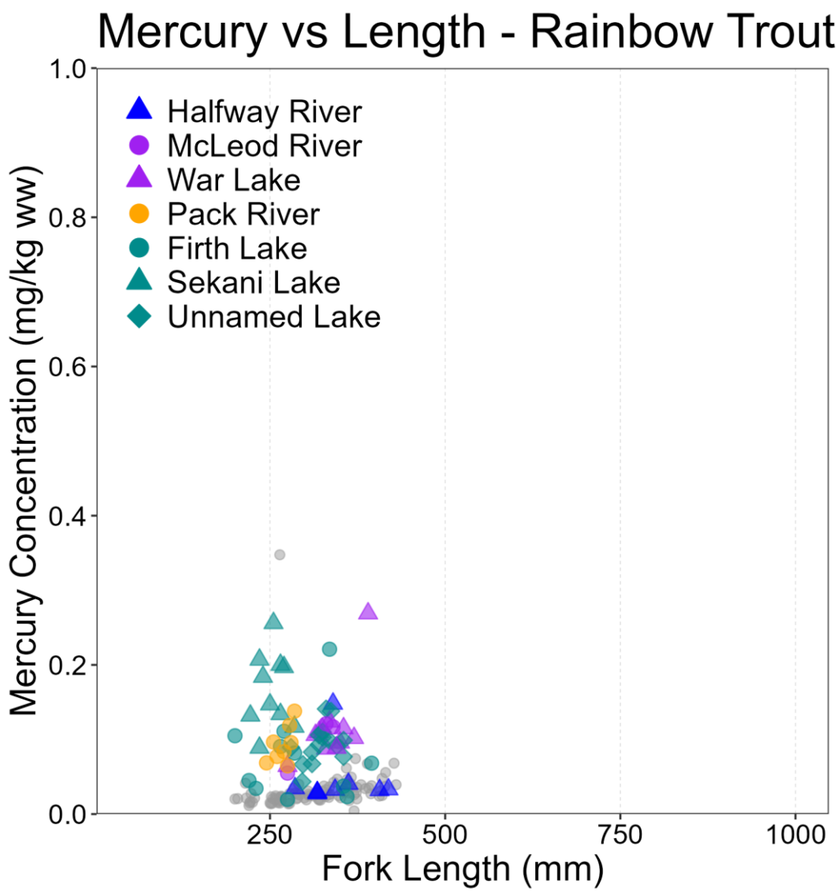
†Mercury (Hg ppm) estimates and monthly servings for fish (up to 17") from Moberly L.

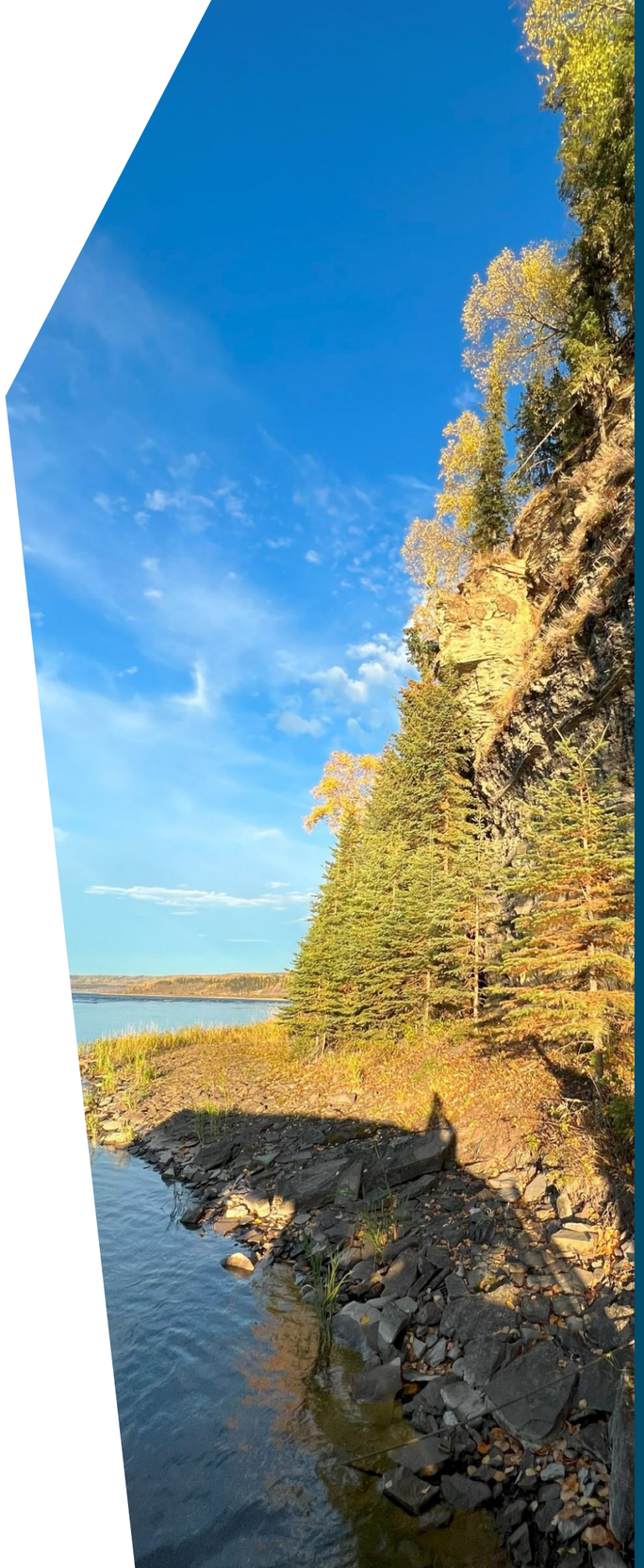
SCAN ME

Rainbow Trout

OVERVIEW

- Rainbow Trout are most common upstream of the Site C Dam. They primarily eat aquatic insects. Feeding lower on the food chain means that Rainbow Trout have lower levels of mercury.
- Rainbow Trout were caught in the Halfway River in 2021 (lower plot, blue points), and in 2023 in the McLeod Lake region in the Pack River, McLeod River, and several local lakes (Firth, Sekani, and Unnamed). Lengths were similar to those in the Core MMP (grey).





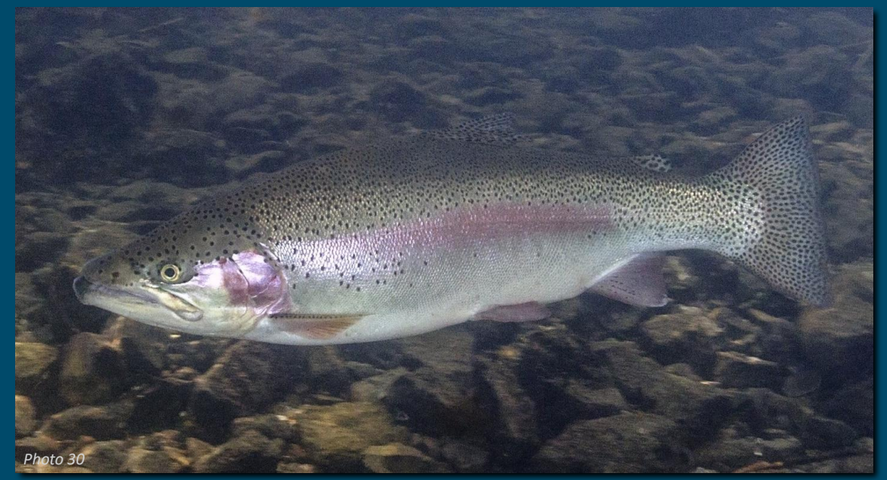


Photo 30

FISH MERCURY RESULTS

- Slight positive Core MMP length-mercury relationship. Levels were higher in the lakes and rivers surrounding McLeod Lake, with a mean concentration of 0.11 ppm. See **Appendix A** for more details.

FISH CONSUMPTION GUIDANCE

- For Rainbow Trout caught in the Peace and its tributaries, follow consumption guidance from Core MMP data (left table below).
- For Rainbow Trout caught in the McLeod Lake area, follow consumption advice from the 2023 brochure (right table below) with further details in **Appendix A.**

Peace River Rainbow Trout*

Size mm|in	Hg ppm	C	P	O
250|10	0.02	74	130	305
325|13	0.03	49	86	203
400|16	0.04	37	65	152

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 16") from the Peace River (Peace Canyon to Many Islands); see Appendix F, 2022 Annual Report.*

Rainbow Trout - McLeod Lake Area†

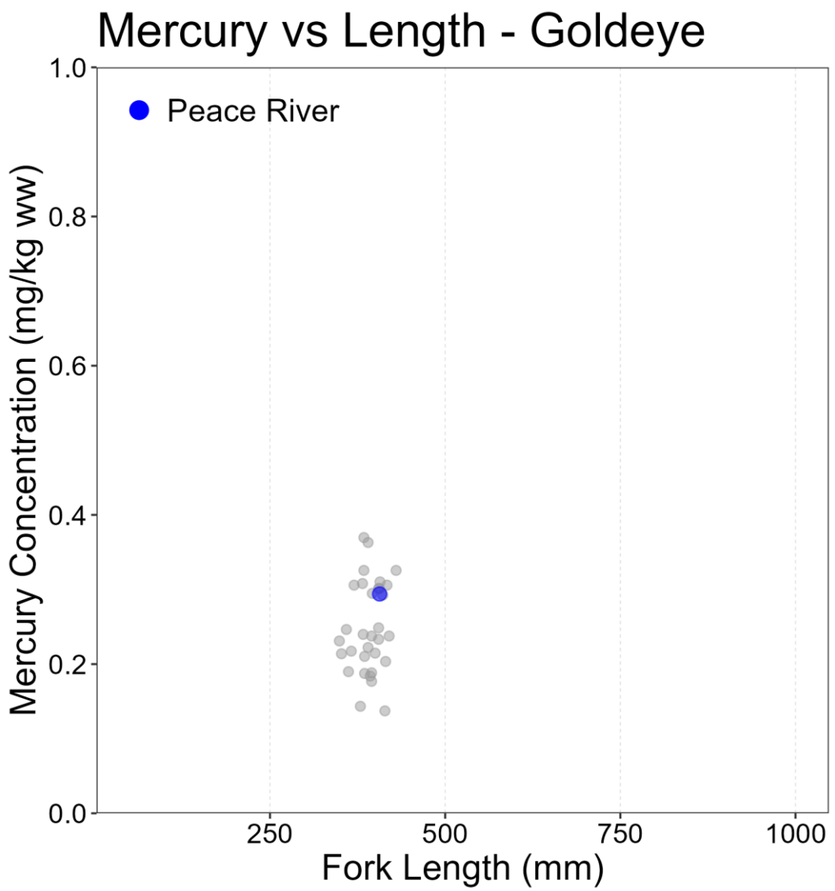
Size mm|in	Hg ppm	C	P	O
299|12	0.11	13	23	55

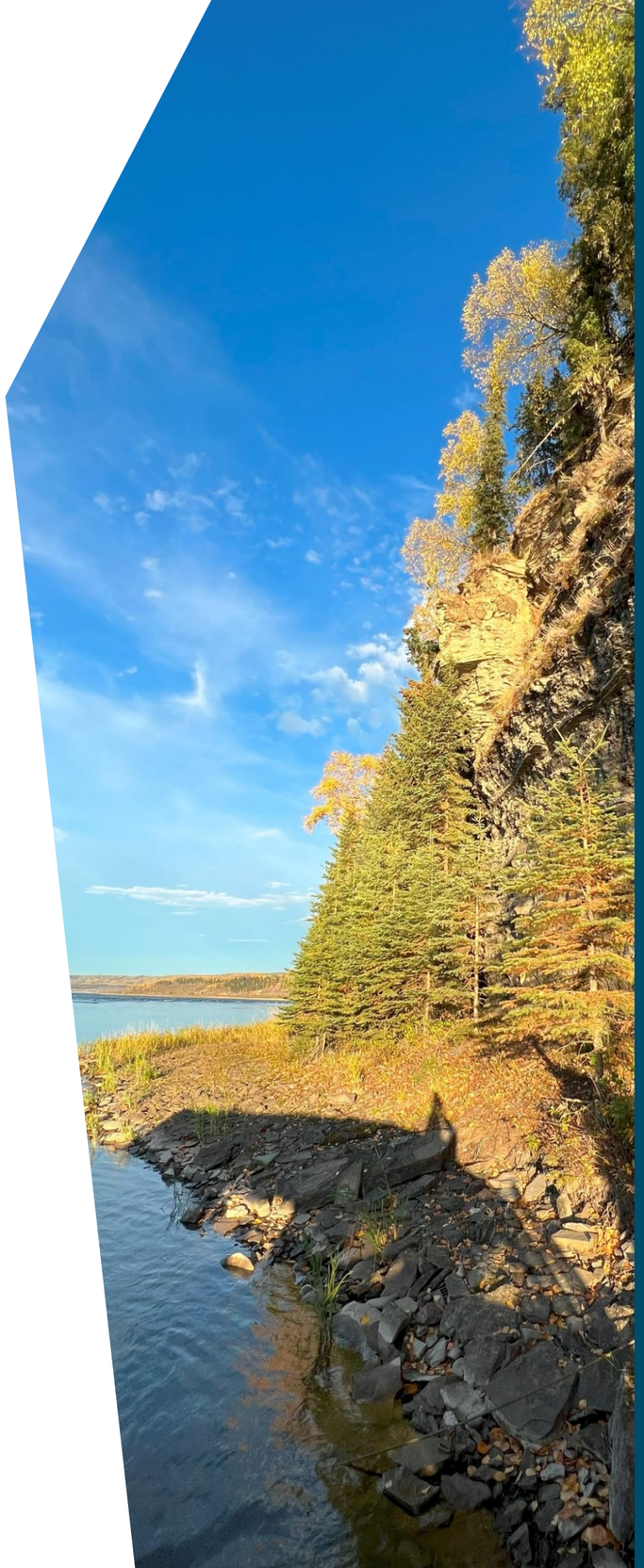
*†Monthly serving guidance based on average size and mercury of McLeod L. fish samples; see **Appendix A** below.*

Goldeye

OVERVIEW

- Goldeye are found downstream of the Pine River. They are migratory and overwinter downstream of the town of Peace River, AB. Goldeye are primarily insect eaters, but will also eat small fish.
- A single Goldeye was caught in the ICSP at the Peace-Smoky confluence in 2023. The length of the fish is comparable to lengths captured in the Core MMP (grey).





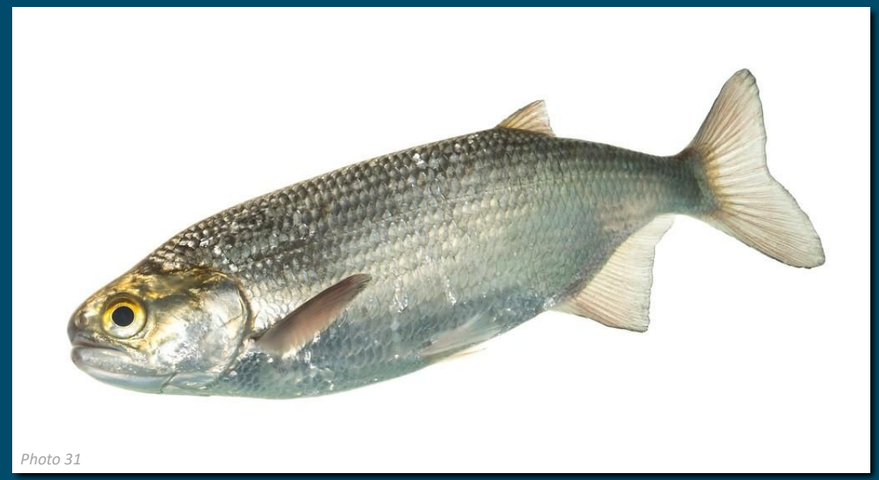


Photo 31

FISH MERCURY RESULTS

- A length-mercury relationship is not seen in the Core MMP data available for this species.
- The single sample obtained in 2023 falls within the mercury concentrations seen in the Core MMP.

FISH CONSUMPTION GUIDANCE

- For Goldeye caught in the Peace River and its tributaries, follow consumption guidance from Core MMP data (table below):

Peace River Goldeye*				
Size mm|in	Hg ppm	C	P	O
395|16	0.24	6	10	25

**Mercury (Hg ppm) estimates and monthly servings guidance for CORE MMP fish (up to 16") from the Peace River (Beatton confluence to Many Islands); see Appendix F, 2022 Annual Report.*

Photo 12 by Ben Jackson

APPENDIX A:

McLeod Lake Region Fish Mercury & Consumption Guidance

Photos by Deborah Prince (Ref #2)

Photo 32

AZIMUTH

ICSP 2024
APPENDIX A

McLeod Lake Region

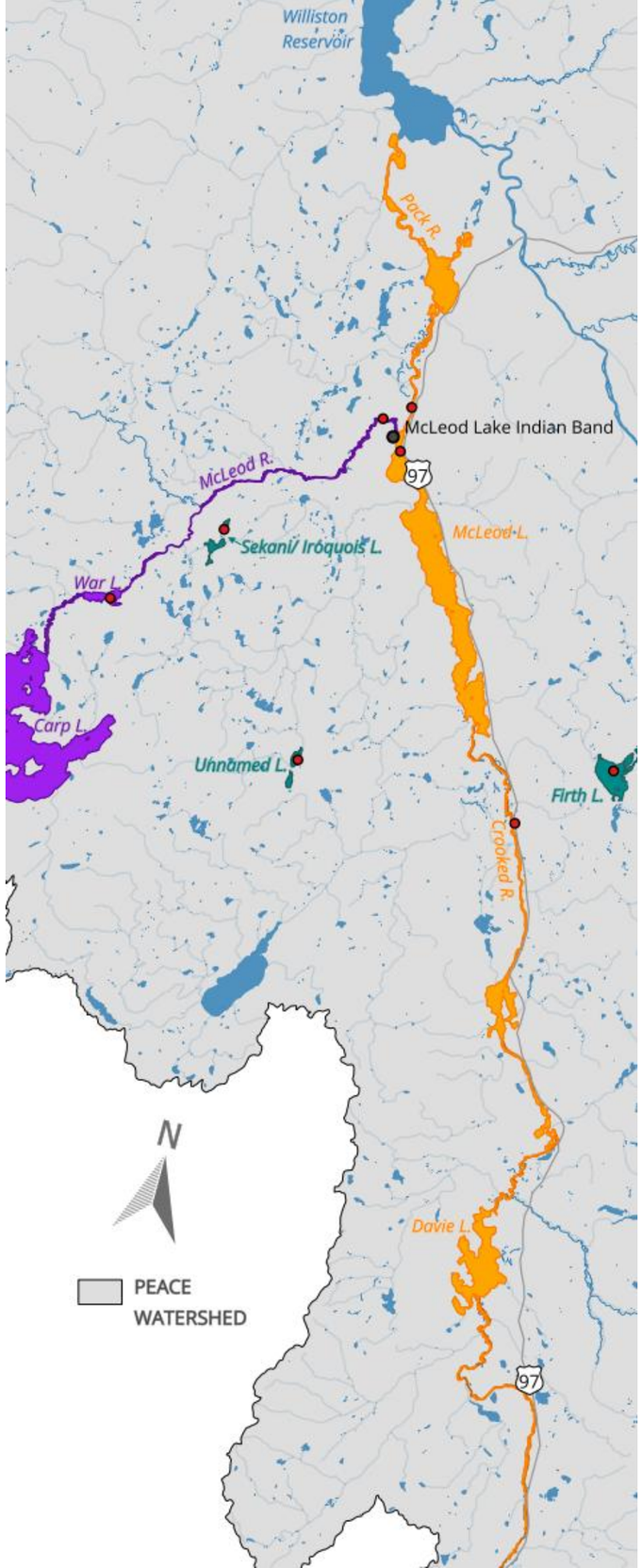
OBJECTIVE

This appendix provides fish consumption guidance for the McLeod Lake area. Unlike the Peace River, the region has unique size-mercury relationships, requiring species-specific guidance.

DATA ANALYSIS

This appendix presents mercury tissue data for Bull Trout and Rainbow Trout sampled by McLeod Lake Indian Band (MLIB) during the 2023–2024 ICSP program in the Crooked/Pack and McLeod River systems, along with three discrete lake locations. The complete dataset is summarized in the table below.

Waterbody	Fish Species: Bull Trout	Fish Species: Rainbow Trout
Crooked/Pack Rivers and Connected Lakes		
Crooked R.	6	
McLeod L.	7	
Pack R.	2	8
McLeod River and Connected Lakes		
McLeod R.		3
War L.		11
Other Lakes		
Firth L.		11
Sekani / Iroquois L.		1
Unnamed L.		15
Total	**15**	**49**



FISH MERCURY CONCENTRATIONS

Levels of methylmercury in Bull Trout and Rainbow Trout were generally higher in the McLeod Lake area than levels seen in the Peace River near Site C. Spatial differences in methylmercury levels can be due to many factors, such as the methylmercury levels present in water and sediment or the number of steps in the food web.

FISH CONSUMPTION GUIDANCE FOR THE MCLEOD LAKE REGION

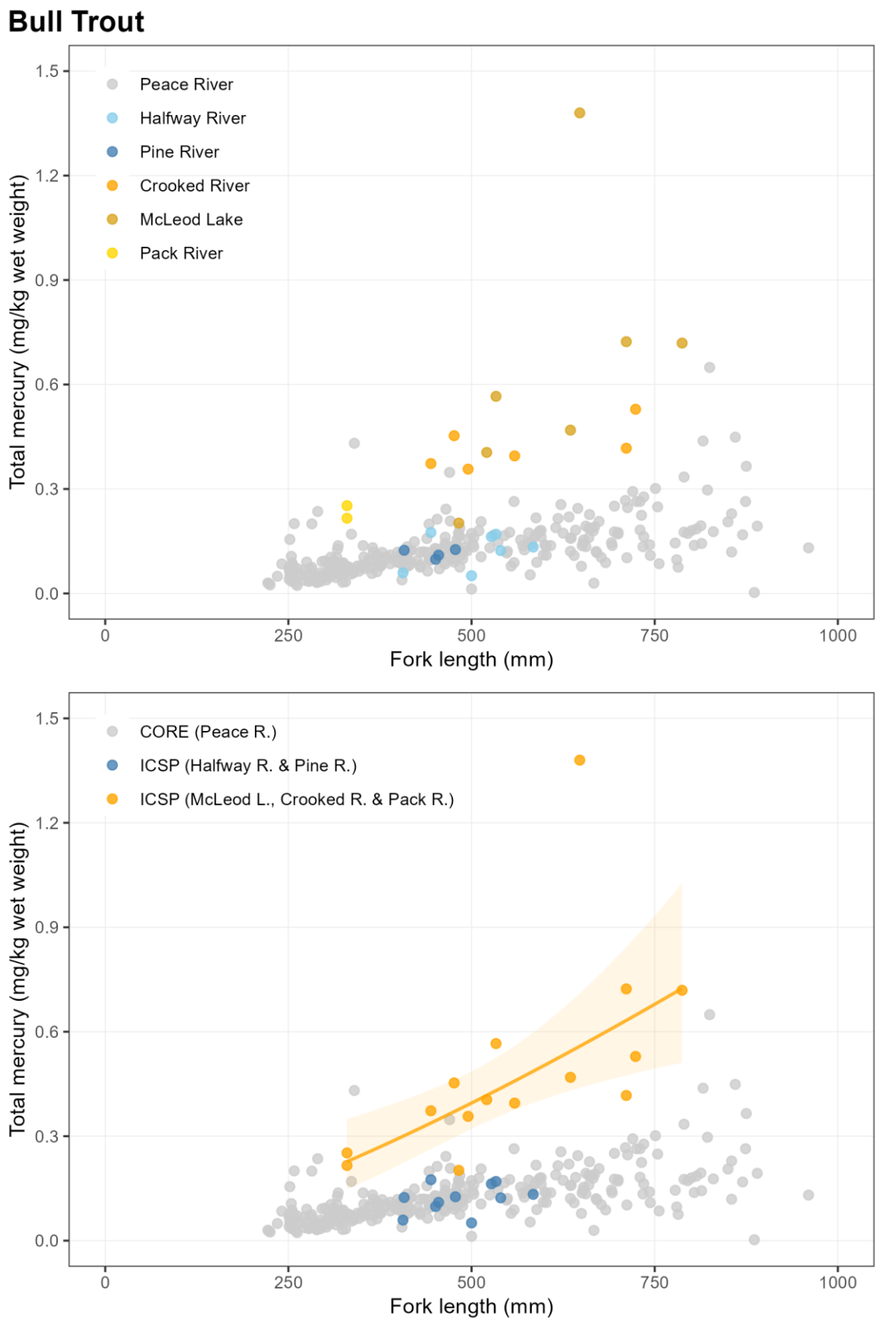
On the following pages, length-mercury relationships are shown for Bull Trout and Rainbow Trout from the ICSP data collected as well as the Core MMP. Consumption guidance was determined using the following approach for each species:

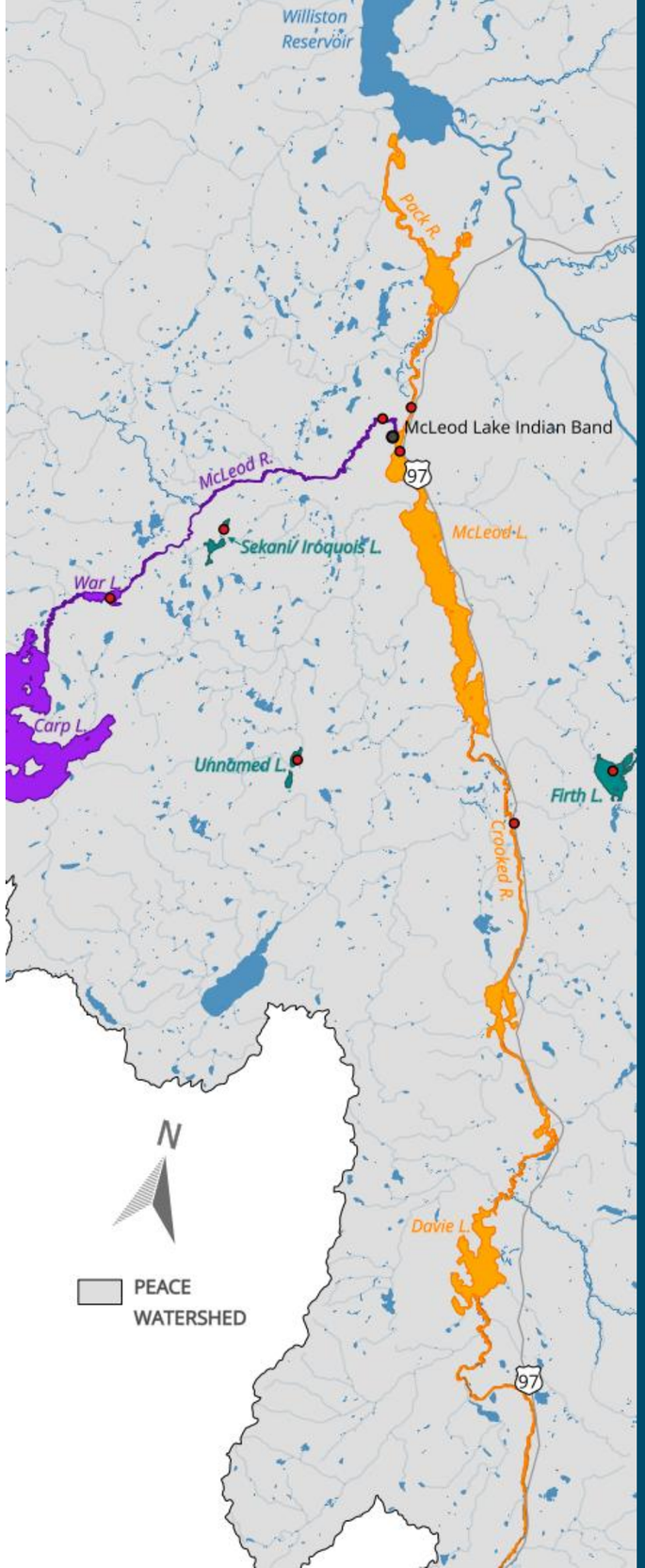
- *Are ICSP results comparable to the Core MMP?*: if length-mercury relationships were comparable, ICSP and Core MMP data were pooled. If not, separate guidance was established.
- *Are ICSP results comparable across watersheds within the McLeod Lake region?*: if length-mercury relationships were comparable, ICSP data were pooled across watersheds to establish consumption guidelines.

Only tissue samples from Bull Trout and Rainbow Trout have been collected in the McLeod Lake area. In the future, as more data is collected for these and other species, consumption guidance will be updated.

Bull Trout

in the Crooked/Pack River System





FISH MERCURY RESULTS

UPPER LEFT PLOT

- Positive relationship between mercury and fish length in ICSP (coloured points) and Core MMP (grey) data. Larger/older fish have higher mercury levels than smaller/younger fish.
- ICSP results from the Crooked/Pack River system (yellow/orange points) are higher than the Core MMP data from the Peace River. Consequently, separate consumption guidance was developed.

LOWER LEFT PLOT

- ICSP length-mercury relationship quantified for the Crooked/Pack River system (orange regression line) for consumption guidance.

FISH CONSUMPTION GUIDANCE

- For Bull Trout caught in the Crooked or Pack Rivers and connected lakes (e.g., McLeod Lake), use the following consumption guidance based on ICSP results (table below):

Bull Trout

Size$^{mm\|in}$ | Hg^{ppm}	C	P	O
400|16 | 0.29	5	8	21
550|22 | 0.45	3	5	13
700|28 | 0.62	2	4	9

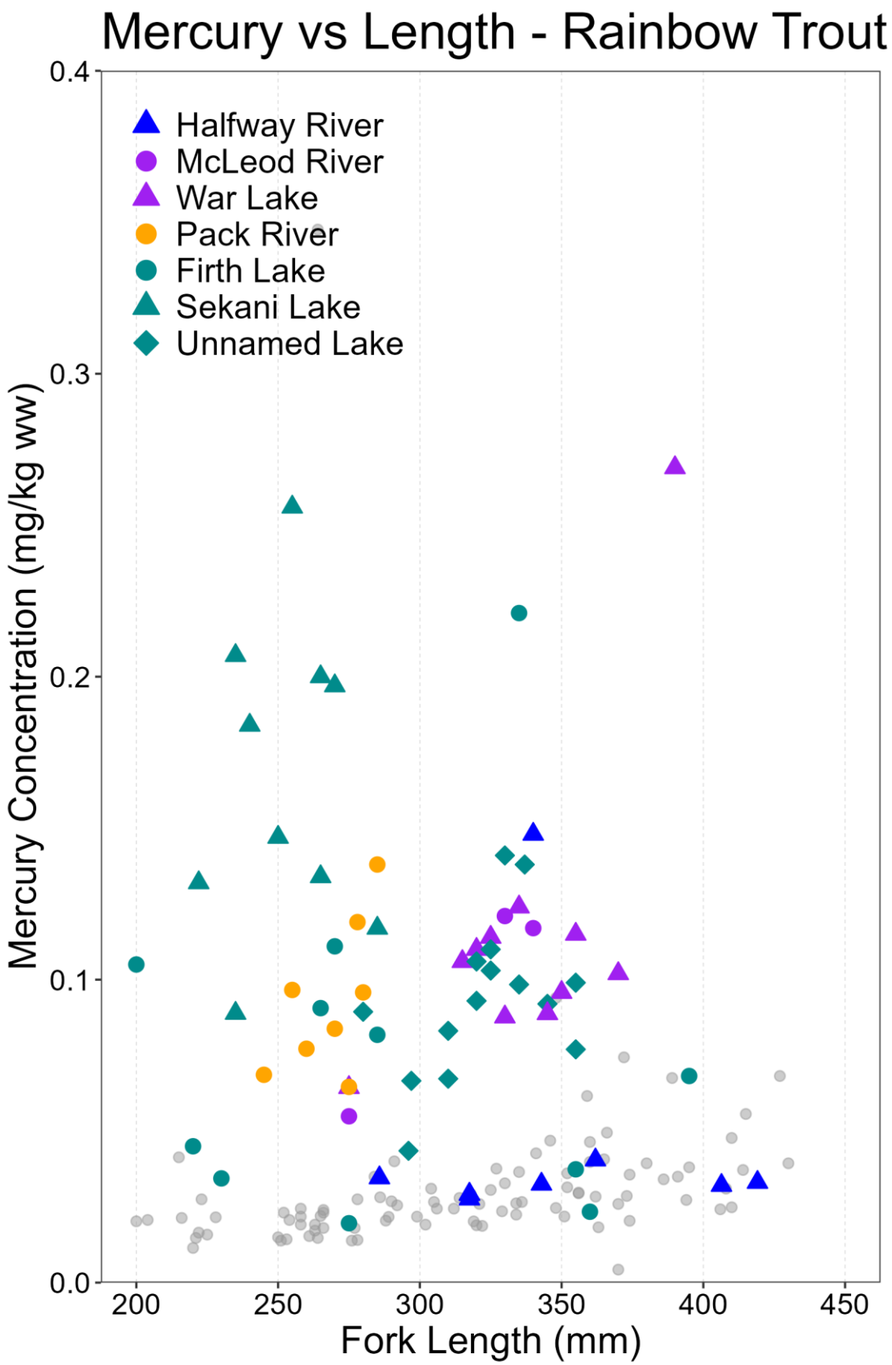
Notes:

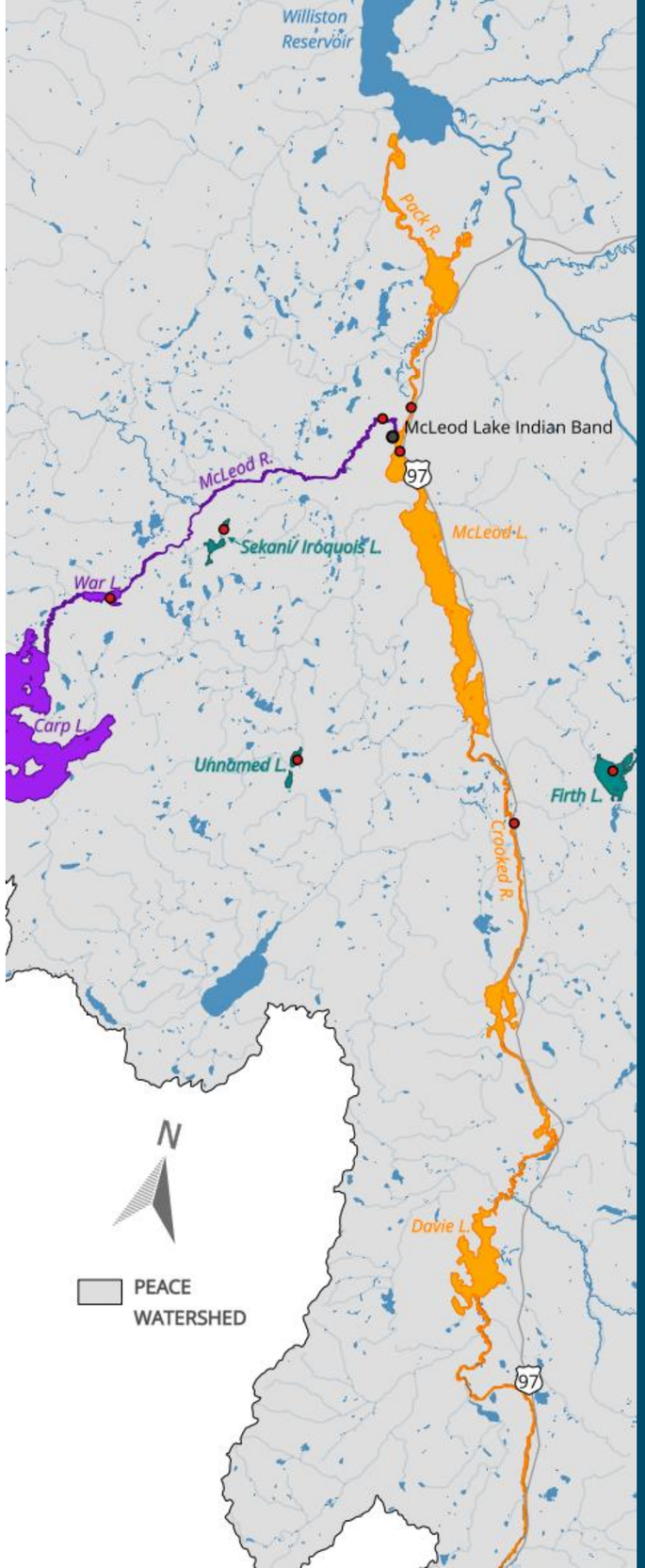
1. *Meals per month (MPM) are given in colour-coded columns for: children under 12 (C), people who are, or could be, pregnant (P), and others (O).*
2. *Colour codes for MPM:*

# of MPM	*Safe to Eat*
MPM ≥ 30	*Once every day*
15 ≤ MPM < 30	*Once every other day*
8 ≤ MPM < 15	*Twice a week*
4 ≤ MPM < 8	*Once a week*
2 ≤ MPM < 4	*Twice a month*
MPM < 2	*Once a month*

Rainbow Trout

in the McLeod Lake Region





FISH MERCURY RESULTS

LEFT PLOT

- ICSP results from the McLeod Lake region were generally higher than the Core MMP data from the Peace River (grey points).
- Results from the Pack and McLeod River systems (orange and purple points respectively) appear to form distinct groupings, but do not show consistent positive length-mercury relationships.
- Results from discrete lakes (teal points) were more variable and also did not show consistent positive length-mercury relationships.

FISH CONSUMPTION GUIDANCE

- In the absence of positive length-mercury relationships, mean mercury level across the McLeod Lake region (0.11 ppm) was used as a basis for the fish consumption advice.
- For Rainbow Trout caught in the McLeod Lake area (McLeod/ Crooked/ Pack Watersheds), follow consumption advice from the 2023 report (table below).

Rainbow Trout - McLeod Lake Area†				
Size mm|in	Hg ppm	C	P	O
299|12	0.11	13	23	55

*†Monthly serving guidance based on average size and mercury of McLeod Lake fish samples; see **Appendix B** below.*

APPENDIX B:

Summary of ICSP Consumption Guidance

APPENDIX B

Baseline Fish Mercury Consumption Guidance

Location	Species	Description	Link
Peace River	Walleye, Burbot, N. Pike, Bull Trout, Mt. Whitefish, White Sucker, Longnose Sucker, Rainbow Trout, Goldeye	Consumption guidance for the Peace River from Peace Canyon to Many Islands based on data collected by the MMP program from 2017-2022. Guidance applies to all tributaries on this section of the river, unless otherwise stated.	SCAN ME
Moberly Lake	Burbot, N. Pike, Mt. Whitefish, White Sucker, Longnose Sucker	Consumption guidance applicable to Moberly Lake based on data collected by the ITUF and ICSP programs from 2020-2023.	SCAN ME
Williston Reservoir	Lake Trout, Bull Trout, Lake Whitefish, Rainbow Trout, Kokanee	Consumption guidance applicable to Williston Reservior based on FWCP guidance.	SCAN ME
Crooked/Pack Rivers	Bull Trout	Applicable to the Crooked/Pack river system and connected lakes (e.g. McLeod Lake) and tributaries, based on data collected by the ICSP program in 2023 and 2024.	This report - p. 23
McLeod Region	Rainbow Trout	Applicable to the region surrounding McLeod Lake - Crooked/Pack and McLeod Rivers, along with rivers and lakes in these watersheds, based on ICSP data collected in 2023.	This report - p. 24

Image Reference List

In order of appearance:

MAIN BROCHURE----------

1. Photo by Brendan Bushy, 2025 ICSP sampling at the Peace-Smoky River confluence, provided by SMS on 27-Jun-2025.
2. Photos provided by Deborah Prince, 2023 ICSP sampling near McLeod Lake, provided by email on 27-Jul-2023.
3. A) rawpixel.com / U.S. Department of Interior (Source), Percussion Images, https://www.rawpixel.com/search/percussion?page=9&path=_topics&sort=curated
4. B) Flickr (Bezaire D, Havens-Bezaire S), Salmon filets hanging on a rack by a river in Alaska, https://www.flickr.com/photos/75988799@N00/3697623415
5. C) Vector Portal, Stock Silhouette Of A Runner 2 Vector Icon, https://vectorportal.com/vector/vector-silhouette-of-a-runner-2/12673
6. Flickr (USDA Photo by Preston Keres), A local catches a trout in at Georgetown Lake in the Pintler Ranger District of Beaverhead-Deerlodge National Forest Montana, https://www.flickr.com/photos/usdagov/48762226763/
7. Azimuth (photo by Ian McIvor), 2023 water sampling at Bralorne-Takla, taken on 1-Aug-2024.
8. US Fish and Wildlife Service (Ryan Hagerty), Comparison of Rainbow trout sizes including a 3 inch, 5 inch, and 10 inch fish, https://www.fws.gov/media/rainbow-trout-sizesjpg
9. Fish and Wildlife Compensation Program (FWCP), Online information video: Methylmercury and fish consumption information in the Peace River system, https://fwcp.ca/mercury/
10. Azimuth (photo by Gary Mann), 2022 MMP supporting media sampling near the Peace-Halfway River confluence, taken on 27-Sep-2022.
11. Photo by Brendan Bushy, 2023 ICSP sampling at the Peace-Smoky River confluence, provided by SMS on 29-Nov-2023.
12. Photo provided by Deborah Prince, 2023 ICSP sampling near McLeod Lake, provided by email on 27-Jul-2023.
13. Photo by Brendan Bushy, 2023 ICSP sampling at the Peace-Smoky River confluence, provided by SMS on 29-Nov-2023.
14. BC Hydro (photo by Dave Hunter), 2024 Fish Consumption Workshop - Dene Tha', taken on 29-Apr-2024.
15. Azimuth (photo by Laura Bekar), 2021 'Fish Kit' contents, taken on 27-Jul-2024.
16. Photo provided by Deborah Prince, Fish LT-2-CH-July2, provided by email on 27-Jul-2023.
17. Azimuth (photo by Ian McIvor), Photo from the 'How To Video', 24-Apr-2023.
18. Photo provided by Amanda Metecheah, Danny Apsassin fishing on the Halfway River, provided by email on 24-Sep-2021.
19. Photo by Mike Tilson (Tsay Keh Dene First Nation), 2019 Site C MMP Internal Technical Forum Presentation, 7 November 2019.
20. Azimuth (photo by Gary Mann), 2022 MMP supporting media sampling near Hudson Hope, taken on 26-Sep-2022.
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APPENDIX A----------

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