

# Update on fish contaminant levels for Porcupine Lake

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# Overview

## Purpose of meeting

Provide an update on fish contaminant testing for Porcupine Lake, including new chromium data indicating 2020 consumption advisories are overly protective of human health

## Presentation Outline

1. Summary of fish sampling and preliminary results reported in 2020
2. Results of further metal testing and resultant lower chromium levels
3. Updated fish consumption advisories

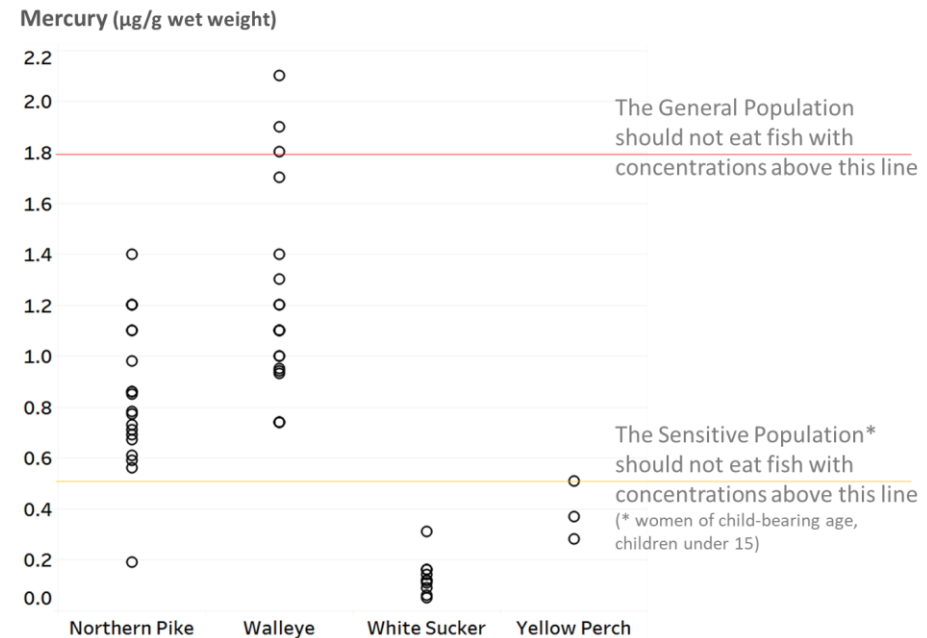
# Recap – Previous Information Meeting

- In 2019, fish sampling was conducted to
  - gather updated information on contaminant levels
  - provide a baseline for potential future changes in the watershed
  - revise fish consumption advisories
- 20 Northern Pike, 20 Walleye, 10 White Sucker and 3 Yellow Perch were collected.
- Chemical analyses were conducted at the ministry laboratories in Toronto.
  - All laboratory test methods follow rigorous quality assurance and quality control processes to ensure that the results are accurate and reproducible.
  - Analysis methods are accredited by the Canadian Association for Laboratory Accreditation (CALA).

# Fish Contaminant Levels (previously reported)

## Mercury

- Most Pike and Walleye exceeded the “do not eat” benchmark for the sensitive population.
- Some Walleye exceeded the “do not eat” benchmark for the general population.
- Levels in White Sucker and Yellow Perch were relatively low.



## Total PCB

- The largest White Sucker was below the detection limit of the analytical method (i.e., less than 20 ng/g) and below the first advisory benchmark of 26 ng/g for an unrestricted advisory for both populations
- Levels in the remaining species can be expected to be lower considering PCBs typically accumulate at higher levels in fatty fish.

# Fish Contaminant Levels – Metals (preliminary)

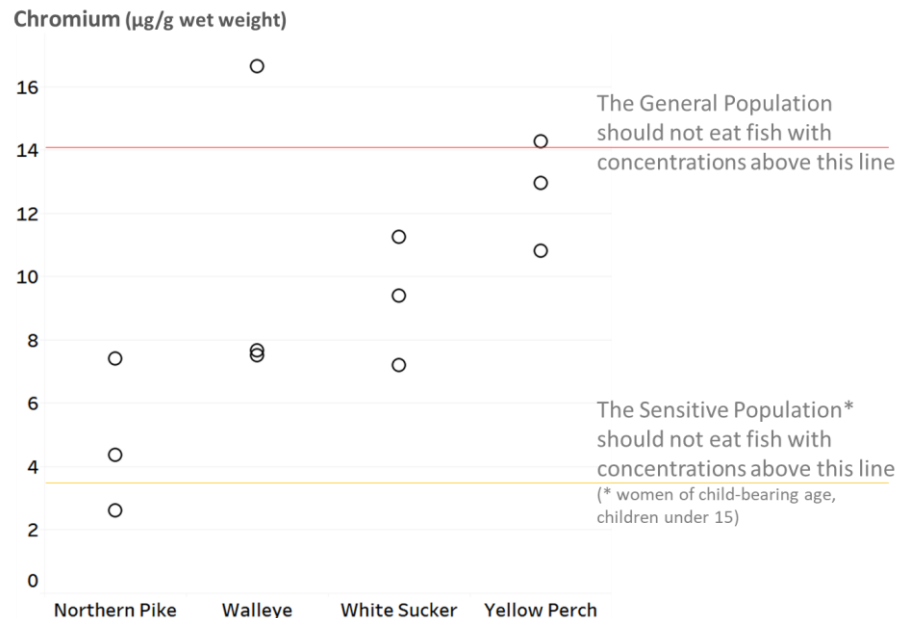
(previously reported)

Levels of all metals, except chromium, were low.

Almost all chromium levels exceeded the “do not eat” benchmark for the sensitive population, and one of three Walleye and Yellow Perch exceeded the “do not eat” benchmark for the general population.

**Additional confirmatory metal analyses were outstanding.**

Health protection guidelines are based on hexavalent chromium (Cr<sup>6</sup>). As there is no reliable lab method to measure Cr<sup>6</sup>, total chromium concentrations are compared against Cr<sup>6</sup> benchmarks, generating conservative consumption advice.



# Fish Consumption Advisories (updated in 2020)

The partial contaminant data collected for the 2019 samples from Porcupine Lake were used in the fish consumption advisories published at Ontario.ca/fishguide in June 2020. Elevated chromium levels observed in the preliminary analysis were responsible for the more stringent advisories. Although elevated chromium levels were of concern, the advisories were considered conservative (overly protective of human health).

Fish consumption advisories (in meals per month) for Porcupine Lake published in the 2017-2018 edition of the Guide to Eating Ontario Fish (i.e., Advisory Year 2017) and formulated using the data collected in 2019 (i.e., Advisory Year 2019). Advisories that became more restrictive are highlighted in red/bold font.

Species	Population Type	Advisory Year	Contaminant	15-20 cm	20-25 cm	25-30 cm	30-35 cm	35-40 cm	40-45 cm	45-50 cm	50-55 cm	55-60 cm	60-65 cm	65-70 cm	70-75 cm	>75 cm
Northern Pike	General	2017	Mercury			32	16	8	4	4	4	4	2	2	2	0
		2019	Chromium						<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	2	2	2	2
	Sensitive	2017	Mercury			12	8	0	0	0	0	0	0	0	0	0
		2019	Mercury						0	0	0	0	0	0	0	0
Walleye	General	2017	Mercury						2	2	2	2	2			
		2019	Chromium				1	1	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>			
	Sensitive	2017	Mercury						0	0	0	0	0			
		2019	Mercury				0	0	0	0	0	0	0			
White Sucker	General	2017	Mercury					8	8	8	8					
		2019	Chromium					<b>1</b>	<b>1</b>	<b>1</b>						
	Sensitive	2017	Mercury					4	4	4	4					
		2019	Chromium					<b>0</b>	<b>0</b>	<b>0</b>						
Yellow Perch	General	2017	Mercury	16	16											
		2019	Chromium				<b>1</b>									
	Sensitive	2017	Mercury	4	4											
		2019	Chromium				<b>0</b>									

# Fish Chromium Levels

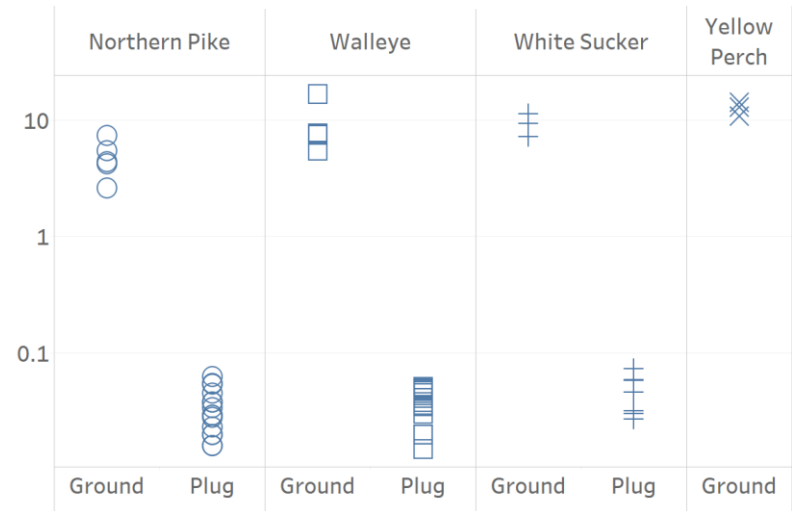
## Confirmatory analysis on remaining samples

**New update**

All remaining 2019 fish samples were analyzed for metals to confirm preliminary findings. This included samples collected as “plug” using a biopsy punch.

**Chromium levels were 10 to 100 times lower in “plug” samples compared to the “ground” samples prepared by homogenizing the fillets using a grinder.**

Chromium (ug/g) logarithmic scale



# Fish Chromium Levels

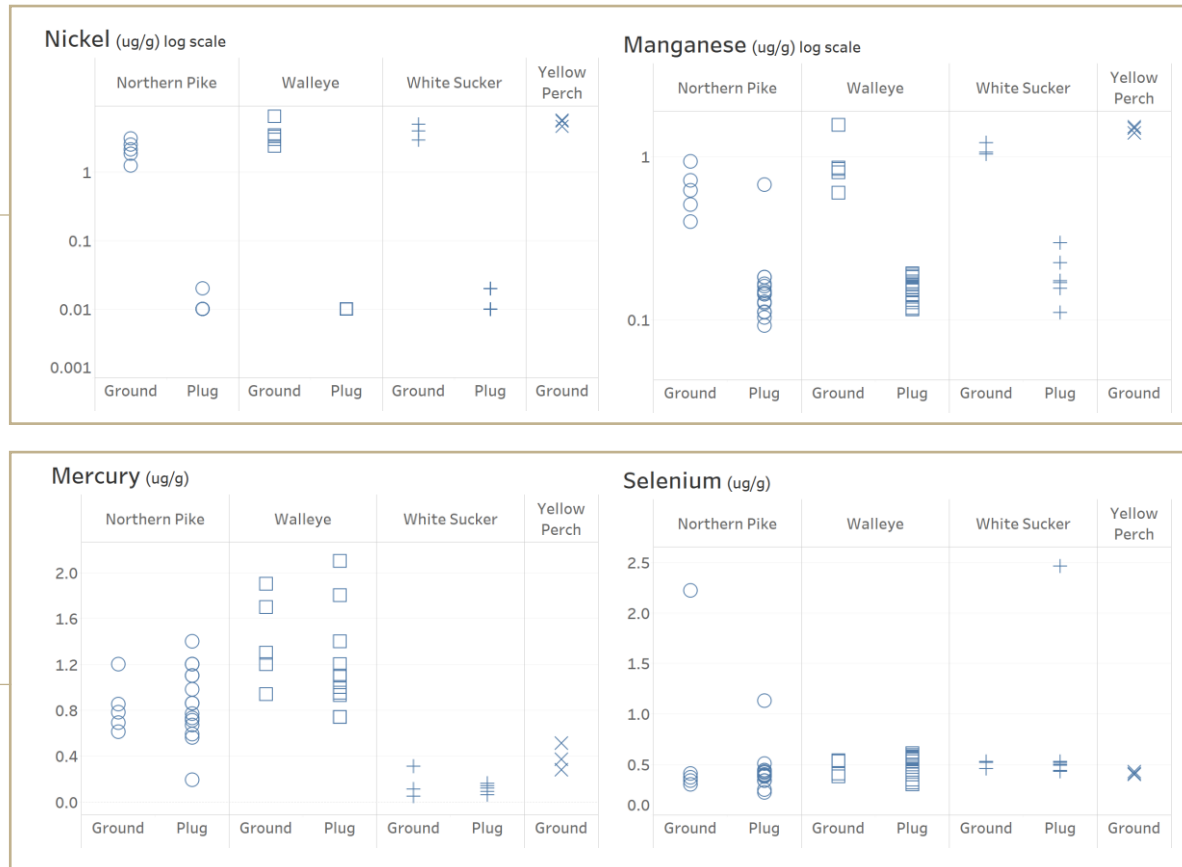
## Confirmatory analysis on remaining samples

**New update**

**Nickel and manganese levels were 2 to 650 times lower in “plug” samples compared to the “ground” samples.**

- Low chromium and nickel levels observed in unaffected samples were similar to low levels observed in the 1990s.

No difference in mercury, selenium and other metals between the “ground” and “plug” samples.



**Subsequent examination identified that the metal blade and container used for grinding fish made from stainless steel were a source of chromium, nickel and manganese.**



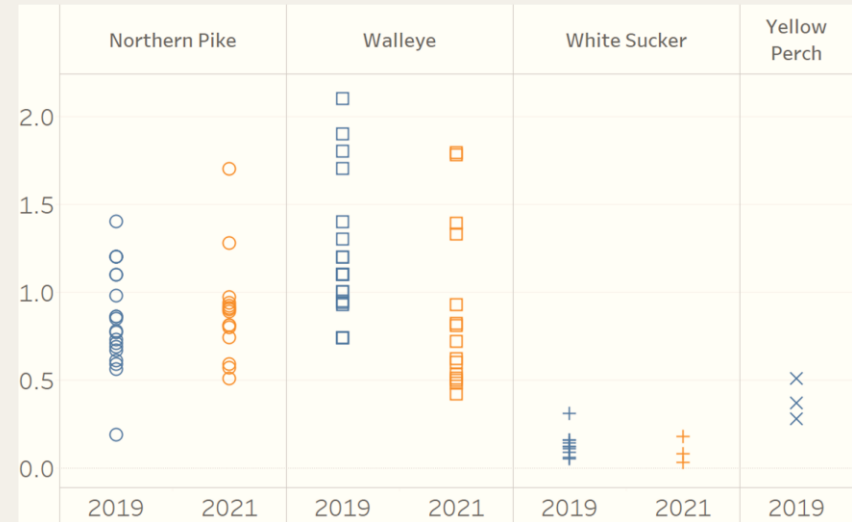
# Additional monitoring in 2021 (New update)

- In September 2021, additional fish sampling was conducted at Porcupine Lake to confirm the 2019 results.
- 15 Northern Pike, 15 Walleye and 3 White Sucker were collected. No Yellow Perch were caught.
- Samples were prepared using a “knife” method previously confirmed not to contaminate samples with metals.
  - The knife method allows processing of sufficient tissue for multiple contaminant analysis without use of a grinder.
- All 33 samples were analyzed for mercury and metals (including chromium).
- Contaminant analyses were conducted at the ministry laboratories in Toronto.
  - All laboratory test methods follow rigorous quality assurance and quality control processes to ensure that the results are accurate and reproducible.
  - Analysis methods are accredited by the Canadian Association for Laboratory Accreditation (CALA).
- In the interim, the precautionary fish consumption advisories issued in 2020 remain in place to protect public health.

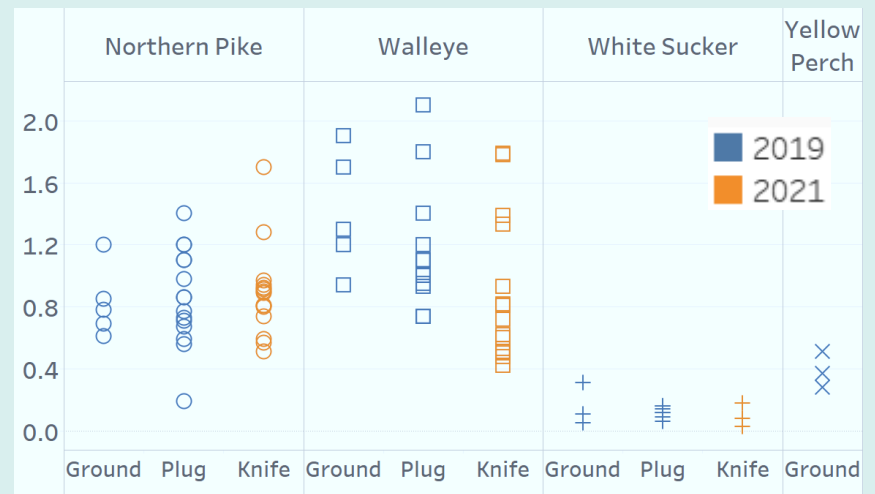
# Fish Mercury Levels (2019 & 2021 – **New update**)

Levels of mercury in 2021 fish samples were similar to those observed in 2019.

Mercury ( $\mu\text{g/g}$  wet weight)



There was no impact of fish preparation method on mercury levels.



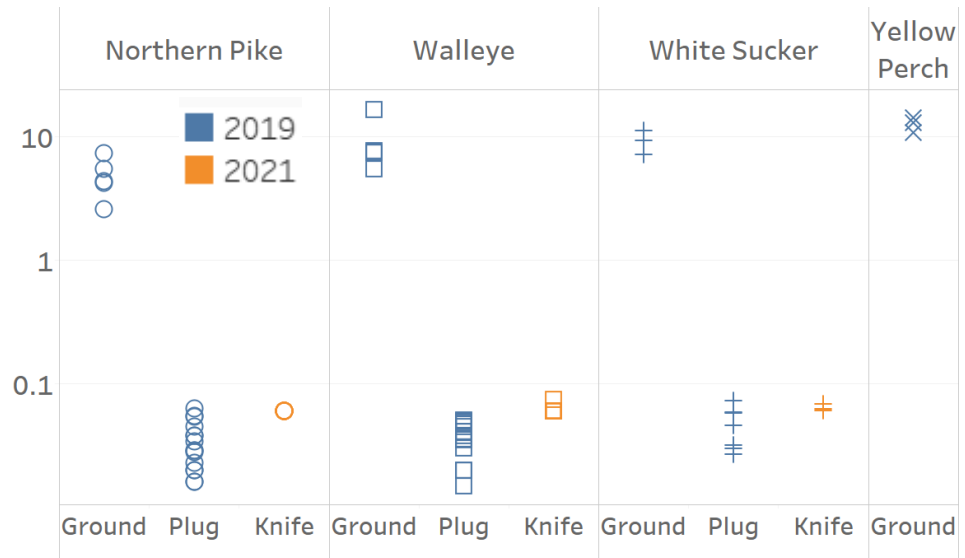
# Fish Chromium Levels

New update

Chromium levels in all 33 samples collected in 2021 were either below the detection limit of the method or very low.

**Chromium levels were 10 to 100 times lower in samples preparing using the “plug” and “knife” methods compared to the “ground” samples prepared by homogenizing the fillets using a grinder.**

Chromium ( $\mu\text{g/g}$  wet weight) logarithmic scale



# Fish Consumption Advisories (to be updated online in 2022)

Revised fish consumption advisories are much less restrictive than the interim advisories issued in 2020. Revised advisories are also less restrictive or similar to the advisories issued before the 2019 sampling. All revised advisories are due to mercury.

Revised advisories will be published online at [Ontario.ca/fishguide](https://Ontario.ca/fishguide) in 2022.

Fish consumption advisories (in meals per month) for Porcupine Lake published in the 2017-2018 edition of the Guide to Eating Ontario Fish (i.e., Advisory Year 2017), interim advisory published in 2020 based on partial 2019 data (i.e., Advisory Year 2020), and revised advisories using 2021 data (ie, 2022). Advisories that became less/more restrictive are highlighted in green/orange.

Species	Population Type	Advisory Year	Contaminant	15-20 cm	20-25 cm	25-30 cm	30-35 cm	35-40 cm	40-45 cm	45-50 cm	50-55 cm	55-60 cm	60-65 cm	65-70 cm	70-75 cm	>75 cm	
Northern Pike	General	2017	Mercury			32	16	8	4	4	4	4	2	2	2	0	
		2020	Chromium						2	2	2	2	2	2	2	2	
		2022	Mercury						8	4	4	4	4	4	4	4	2
	Sensitive	2017	Mercury			12	8	0	0	0	0	0	0	0	0	0	0
		2020	Mercury						0	0	0	0	0	0	0	0	0
		2022	Mercury						0	0	0	0	0	0	0	0	0
Walleye	General	2017	Mercury						2	2	2	2	2				
		2020	Chromium				1	1	1	1	1	1	1				
		2022	Mercury				8	4	4	4	2	2	0	0			
	Sensitive	2017	Mercury						0	0	0	0	0				
		2020	Mercury				0	0	0	0	0	0	0				
		2022	Mercury				0	0	0	0	0	0	0	0			
White Sucker	General	2017	Mercury					8	8	8	8						
		2020	Chromium					1	1	1							
		2022	Mercury					32	32	16	8						
	Sensitive	2017	Mercury						4	4	4	4					
		2020	Chromium						0	0	0						
		2022	Mercury						16	16	12	8					
Yellow Perch	General	2017	Mercury	16	16												
		2020	Chromium			1											
		2022	Mercury	16	16	8											
	Sensitive	2017	Mercury	4	4												
		2020	Chromium			0											
		2022	Mercury	4	4	4											

# Summary

- Fish sampling was conducted in 2019 to update information on contaminant levels and provide a baseline for potential future changes in the watershed.
- Preliminary 2019 data were used in the fish advisories published in 2020.
  - Elevated chromium levels were responsible for the more stringent advisories.
  - Chromium levels were 10 to 100 times lower in “plug” samples compared to the “ground” samples prepared by homogenizing the fillets using a grinder. Subsequent examination identified that the metal blade and container used for grinding fish made from stainless steel were a source of chromium, nickel and manganese.
  - The fish grinding process has since been updated to prevent any recurrence.
- MECP undertook additional fish contaminant monitoring in September 2021 to confirm the 2019 results.
  - Levels of mercury in 2021 fish samples were similar to those observed in 2019. There was no impact of fish preparation method on mercury levels.
  - Chromium levels in all 33 samples collected in 2021 were either below the detection limit of the method or very low.
- Revised fish consumption advisories are much less restrictive than the interim advisories issued in 2020. All revised advisories are due to mercury.
- Revised advisories will be published online at [Ontario.ca/fishguide](https://Ontario.ca/fishguide) in 2022.