

Supporting Information

Assessing Fish Consumption Beneficial Use Impairment (BUI) at Great Lakes

Areas of Concern: Toronto Case Study

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Running title: Toronto AOC Fish BUI Assessment

Table S1. Changes in advisory benchmarks of mercury and PCB between the 1980s and 2015-16 (OMOECC, unpublished data).

# meals/ month	Sensitive Population		General Population	
Years →	1977-1994	2015-2016	1977-1994	2015-2016
Mercury (ppm)				
0	>0.5	>0.5	>1.5	>1.8
2			1.0-1.5	1.2-1.8
4		0.25-0.5	0.5-1.0	0.6-1.2
8	0-0.5	0.16-0.25	0-0.5	0.4-0.6
12		0.12-0.16		0.3-0.4
16		0.06-0.12		0.15-0.3
32		<0.06		<0.15
PCB (ppb)				
0	>2000	>844		>844
1		422-844	>2000	422-844
2		211-422		211-422
4		105-211		105-211
8	0-2000	70-105	0-2000	70-105
12		53-70		53-70
16		26-53		26-53
32		<26		<26

Table S2. Published (2017-18) fish consumption advisories for the Toronto waterfront Area (OMOECC, 2017). Values are in meals/month, separate for the general and sensitive populations. Species with red arrow can be considered mostly non-migratory. Red boxes highlight restrictive advisories for the non-migratory species. Superscripts 1, 2, 3 and 13 are for advisories caused by mercury, PCB, dioxin-like PCB and mirex, respectively.

		Length • Longueur																			
		15 6"	20 8"	25 10"	30 12"	35 14"	40 16"	45 18"	50 20"	55 22"	60 24"	65 26"	70 28"	75+ 30+"							
Lake Ontario 4a – Toronto Waterfront Area • Lac Ontario 4a – Secteur riverain de Toronto																					
nearshore area from the west side of Humber Bay Park to the east side of Ashbridges Bay Park • zone littorale entre le secteur ouest du parc Humber Bay et le secteur est du parc Ashbridges Bay																					
→	Bluegill ^{1,2}	16																			
	Crapet arlequin ^{1,2}	16	12																		
→	Brown Bullhead ²	32	16	12	8	4															
	Barbotte brune ²	32	16	12	8	4															
	Brown Trout ^{2,3}		12	8	4		2			1				0							
	Truite brune ^{2,3}		12	8	4					0											
	Coho Salmon ²									0											
	Saumon coho ²									0											
→	Common Carp ^{2,3}					2				0											
	Carpe ^{2,3}									0											
	Freshwater Drum ^{1,2}									1											
	Malachigan ^{1,2}									0											
	Gizzard Shad ²					0															
	Alose à gésier ²					0															
	Lake Trout ^{2,13}			1						0											
	Truite de lac ^{2,13}									0											
	Lake Whitefish ²			1		0															
	Grand corégone ²					0															
→	Largemouth Bass ^{1,2}	32		16		8	4														
	Achigan à grande bouche ^{1,2}	16		12	8	4	0														
→	Northern Pike ^{1,2}							16					12		4						
	Brochet ^{1,2}							16				12	8		4						
→	Pumpkinseed ¹	16																			
	Crapet-soleil ¹	12																			
	Rainbow Smelt ²	1	0																		
	Éperlan arc-en-ciel ²		0																		
	Rainbow Trout ²		2		1	0															
	Truite arc-en-ciel ²					0															
	Redhorse Sucker ²								2	1											
	Suceur rouge ²								0												
→	Rock Bass ^{1,2}	16	12																		
	Crapet de roche ^{1,2}	16	12																		
	Round Whitefish ²				2	1	0														
	Ménomini rond ²					0															
	Walleye ^{1,2}									12	8	4									
	Doré ^{1,2}									4		0									
	White Bass ^{1,2}			0																	
	Bar blanc ^{1,2}			0																	
	White Perch ²	4	1																		
	Bar-perche ²	4	0																		
→	White Sucker ²	16	12	8		4			2												
	Meunier noir ²	16	12	8		4			0												
→	Yellow Perch ^{1,2}	32	16	12																	
	Perchaude ^{1,2}		16	4																	

Table S3. Simulated fish consumption advisories for the Toronto waterfront Area. Values are in meals/month, separate for the general and sensitive populations. Only 2009 onwards collected PCB and mercury measurements were considered. Non-migratory species have been highlighted in bold.

Fish type	Population	Fish length (cm)												
		15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75+
Bluegill	General	16	12											
	Sensitive	12	4											
Brown Bullhead	General	32	32	16	12	8								
	Sensitive	32	32	16	12	8								
Brown Trout	General		12	8	4	4	2	2	1	1	1	1		
	Sensitive		12	8	4	4	0	0	0	0	0	0		
Common Carp	General						0	0	0	0	0	0	0	0
	Sensitive						0	0	0	0	0	0	0	0
Freshwater Drum	General								1	1				
	Sensitive								0	0				
Largemouth Bass	General	16	16	12	12	12	8	8						
	Sensitive	16	16	12	8	4	4	0						
Northern Pike	General		16	16	16	16	12	12	8	8	8	8	8	4
	Sensitive		16	16	16	16	12	12	8	8	8	8	8	4
Redhorse Sucker	General							2	1					
	Sensitive							0	0					
Rock Bass	General	16	12											
	Sensitive	16	12											
White Sucker	General	16	12	8	4	4	4	2	2	2				
	Sensitive	16	12	8	4	4	4	0	0	0				
Yellow Perch	General	32	16	16										
	Sensitive	16	16	16										

Table S4. Comparison of simulated PCB related advisories for the sensitive population. Toronto AOC advisories: Green, “unrestricted”; yellow, similar to ref sites; red, more restrictive than ref sites

Sp	Location ↓	Length (cm) →	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75+
Bluegill	02a - Jordan Harbour		16												
	04a - Toronto Waterfront Area		16	12											
Brown Bullhead	01a - Upper Niagara River				16										
	02a - Jordan Harbour		16	12	8	8									
	02z - Martindale Pond				8	8									
	04 - Toronto Offshore Area			12	12	12									
	04a - Toronto Waterfront Area				16	12	8								
	06 - Northwestern Lake Ontario			0											
	06a - Frenchman Bay			12	12	8	8								
	06v - Lynde Creek Marsh		8	4											
	06w - Oshawa Harbour			8	8	8									
	06y - Westside Marsh			12	12	12									
	10 - Middle B of Q		16	16	12	8									
Common Carp	01a - Upper Niagara River							4	4	4	4	4	4	4	4
	02a - Jordan Harbour					16	12	12	8	8	4	4	4		
	02z - Martindale Pond								4	4	0	0	0	0	0
	04 - Toronto Offshore Area						12	8	4	4	0	0	0	0	0
	04a - Toronto Waterfront Area							0	0	0	0	0	0	0	0
	05z - Rattray Marsh							16	8	4	4	4	0		
	06a - Frenchman Bay								0	0	0	0	0	0	0
	06v - Lynde Creek Marsh										0	0	0	0	0
	06w - Oshawa Harbour				16	12	8	4	4	4	0	0	0	0	
	06x - McLaughlin Bay								4	4	4	4	4	4	4
Largemouth	01a - Upper Niagara River					16	16	8	4						
	02a - Jordan Harbour			16	16	16	16	16							
	04a - Toronto Waterfront Area		16	16	12	12	12	12	8						
	06a - Frenchman Bay		16	16	16	16	16								
Northern Pike	02z - Martindale Pond									8	4	4	4		
	04 - Toronto Offshore Area				8	8	8	8	8	8	8	8	8	8	8
	04a - Toronto Waterfront Area		16	16	16	16	12	12	8	8	8	8	8	8	4
	06x - McLaughlin Bay									8	8	8	8	8	8
	06z - Bowmanville Creek Marsh								16	12	8	8	4	4	
	11 - LB of Q/ELO									16	16	16	16	16	16
Rock Bass	01a - Upper Niagara River		16	16											
	04 - Toronto Offshore Area		16												
	04a - Toronto Waterfront Area		16	12											
	08 - Northeastern Lake Ontario		16	16											
White Sucker	01a - Upper Niagara River			16	16	12	8	8	4						
	02z - Martindale Pond						12								
	04 - Toronto Offshore Area		16	12	12	8	8	4	4	4	4				
	04a - Toronto Waterfront Area		16	12	8	4	4	4	0	0	0				
	06 - Northwestern Lake Ontario			16	16	16	12	12	12						
	06a - Frenchman Bay			16	16	12	8	4	4						
	06z - Bowmanville Creek Marsh							4							
Yellow Perch	01a - Upper Niagara River			16	16	16									
	04a - Toronto Waterfront Area		32	16	16										
	06a - Frenchman Bay		16	16	16										
	06v - Lynde Creek Marsh		16												
	06z - Bowmanville Creek Marsh		16	16											
	08 - Northeastern Lake Ontario		16	16											
	10 - Middle B of Q		16	16	16										

Table S5. Comparison of simulated mercury related advisories for the general population. Toronto AOC advisories: Green, “unrestricted”; yellow, similar to ref sites; red, more restrictive than ref sites.

Sp	Location ↓	Length (cm) →	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75+
Bluegill	02a - Jordan Harbour		12												
	02z - Martindale Pond		32												
	04a - Toronto Waterfront Area		32	12											
	10 - Middle B of Q		32												
Brown Bullhead	01a - Upper Niagara River			32	32										
	02a - Jordan Harbour		32	32	32	16									
	02z - Martindale Pond				32	32									
	04 - Toronto Offshore Area			32	32	32									
	04a - Toronto Waterfront Area		32	32	32	32	32								
	06 - Northwestern Lake Ontario			16											
	06a - Frenchman Bay			32	32	16	16								
	06v - Lynde Creek Marsh		32	32											
	06w - Oshawa Harbour		32	32	32	16									
	06x - McLaughlin Bay			16											
Common Carp	06y - Westside Marsh		32	32	32	32									
	10 - Middle B of Q		32	32	32	16									
	01a - Upper Niagara River								32	32	32	32	32	16	16
	02a - Jordan Harbour					32	32	32	32	32	16	16	16		
	02z - Martindale Pond							32	32	32	16	16	16	12	4
	04 - Toronto Offshore Area						32	32	32	32	32	32	32	16	8
	04a - Toronto Waterfront Area							32	32	32	32	32	32	32	16
	05z - Rattray Marsh							32	32	32	32	32	16		
	06a - Frenchman Bay								32	32	32	32	32	32	16
	06v - Lynde Creek Marsh										16	16	16	16	16
Largemouth Bass	06w - Oshawa Harbour		32	32	32	32	32	32	32	32	16	16	16	16	
	06x - McLaughlin Bay								32	32	32	32	16	16	4
	06y - Westside Marsh		32	32	32	32	32	32	32	32	32				
	10 - Middle B of Q			32	16	16	8								
	01a - Upper Niagara River					16	16	8	4						
	02a - Jordan Harbour			32	32	16	16	12							
	02z - Martindale Pond				32	16	12	4							
	04a - Toronto Waterfront Area		32	32	32	16	12	8	8						
	06a - Frenchman Bay		32	32	32	32	16								
	06x - McLaughlin Bay		32	32	32	32	32	16							
Northern Pike	06y - Westside Marsh		32	32	32	16	16								
	10 - Middle B of Q			32	16	16	8								
	02z - Martindale Pond						32	32	32	16	16	16	12		
	04 - Toronto Offshore Area				32	32	32	32	32	32	16	16	16	16	12
	04a - Toronto Waterfront Area		32	32	32	32	32	32	32	32	32	16	16	16	12
	06a - Frenchman Bay							32	32	32	32	32	16	16	12
	06w - Oshawa Harbour			32	32	32	32	16	16	16	16	16			
	06x - McLaughlin Bay									32	32	32	32	32	32
	06y - Westside Marsh										16	16			
	06z - Bowmanville Creek Marsh								16	16	16	16	16	12	
Rock Bass	10 - Middle B of Q								16	16	16	16	16	16	8
	11 - L B of Q/ELO									16	16	12	12	8	4
	01a - Upper Niagara River		32	16											
	02z - Martindale Pond			16	4										
	04 - Toronto Offshore Area		32												
	04a - Toronto Waterfront Area		32	32											
White Sucker	08 - Northeastern Lake Ontario		32	16											
	10 - Middle B of Q		16	12											
	11 - L B of Q/ELO		32	16											
	01a - Upper Niagara River			32	32	32	32	32	32						
	02z - Martindale Pond						16								
	04 - Toronto Offshore Area			32	32	32	32	32	32	16	16				
	04a - Toronto Waterfront Area		32	32	32	32	32	32	32	16	16				
Yellow Perch	06 - Northwestern Lake Ontario		32	32	32	32	32	32	16	16					
	06a - Frenchman Bay		32	32	32	32	32	32	32						
	06v - Lynde Creek Marsh		32												
	06w - Oshawa Harbour		32	32											
	06x - McLaughlin Bay		32												
	06y - Westside Marsh		32	32											
	06z - Bowmanville Creek Marsh		16	16											
	08 - Northeastern Lake Ontario		32	32											
	10 - Middle B of Q		32	32	16										
	11 - L B of Q/ELO		32	32	32										

Table S6. Comparison of simulated mercury related advisories for the sensitive population. Toronto AOC advisories: Green, “unrestricted”; yellow, similar to ref sites; red, more restrictive than ref sites

Location ↓ Length (cm) →		15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75+
Bluegill	02a - Jordan Harbour	4												
	02z - Martindale Pond	16												
	04a - Toronto Waterfront Area	12	4											
	10 - Middle B of Q	16												
Brown Bullhead	01a - Upper Niagara River		16	16										
	02a - Jordan Harbour	32	16	12	8									
	02z - Martindale Pond			16	16									
	04 - Toronto Offshore Area		32	32	16									
	04a - Toronto Waterfront Area	32	32	16	16	12								
	06 - Northwestern Lake Ontario		8											
	06a - Frenchman Bay		16	16	12	8								
	06v - Lynde Creek Marsh	16	16											
	06w - Oshawa Harbour	32	32	16	8									
	06x - McLaughlin Bay		8											
	06y - Westside Marsh	32	16	16	12									
	10 - Middle B of Q	32	16	12	8									
Common Carp	01a - Upper Niagara River							16	16	12	12	12	8	8
	02a - Jordan Harbour				32	32	16	16	12	8	8	4		
	02z - Martindale Pond							16	12	8	8	4	4	0
	04 - Toronto Offshore Area					32	32	16	16	16	16	12	8	4
	04a - Toronto Waterfront Area						32	32	16	16	16	16	12	8
	05z - Rattray Marsh						32	16	16	16	12	12		
	06a - Frenchman Bay							16	16	16	16	16	12	12
	06v - Lynde Creek Marsh									8	8	8	8	8
	06w - Oshawa Harbour	32	32	16	16	16	16	12	12	8	8	8	8	
	06x - McLaughlin Bay							32	16	16	16	12	8	0
	06y - Westside Marsh	32	32	32	32	32	16	16	16	16				
Largemouth Bass	01a - Upper Niagara River				8	4	4	0						
	02a - Jordan Harbour		16	12	8	4	4							
	02z - Martindale Pond			16	8	4	0							
	04a - Toronto Waterfront Area	32	16	12	8	4	4	0						
	06a - Frenchman Bay	32	16	16	12	8								
	06x - McLaughlin Bay	32	32	32	16	16	12							
	06y - Westside Marsh	32	16	12	8	4								
Northern Pike	10 - Middle B of Q		16	8	4	4								
	02z - Martindale Pond					16	16	12	8	8	4	4		
	04 - Toronto Offshore Area			32	16	16	16	16	12	12	8	8	8	4
	04a - Toronto Waterfront Area	32	32	32	16	16	16	16	12	12	8	8	8	4
	06a - Frenchman Bay						16	16	16	12	12	8	8	4
	06w - Oshawa Harbour		16	16	16	12	12	8	8	8	4			
	06x - McLaughlin Bay								32	32	32	32	32	32
	06y - Westside Marsh									8	4			
	06z - Bowmanville Creek Marsh							8	8	8	4	4	4	
	10 - Middle B of Q							8	8	8	8	4	4	4
	11 - L B of Q/ELO								8	4	4	4	4	0
Rock Bass	01a - Upper Niagara River	12	8											
	02z - Martindale Pond		4	0										
	04 - Toronto Offshore Area	16												
	04a - Toronto Waterfront Area	16	16											
	08 - Northeastern Lake Ontario	12	8											
	10 - Middle B of Q	8	4											
White Sucker	11 - L B of Q/ELO	12	8											
	01a - Upper Niagara River		32	16	16	16	16	16						
	02z - Martindale Pond					8								
	04 - Toronto Offshore Area		32	32	16	16	16	12	12	8				
	04a - Toronto Waterfront Area	32	32	16	16	16	12	12	8	8				
	06 - Northwestern Lake Ontario		32	32	16	16	12	12						
	06a - Frenchman Bay		32	32	32	16	16	12						
Yellow Perch	06w - Oshawa Harbour			8										
	06z - Bowmanville Creek Marsh						4							
	01a - Upper Niagara River	16	12	8	8									
	02z - Martindale Pond		12	4										
	04 - Toronto Offshore Area	32												
	04a - Toronto Waterfront Area	16	16	16										
	06 - Northwestern Lake Ontario	16	16											
	06a - Frenchman Bay	32	16	16										
	06v - Lynde Creek Marsh	16												
	06w - Oshawa Harbour	16	16											
	06x - McLaughlin Bay	16												
	06y - Westside Marsh	16	16											
	06z - Bowmanville Creek Marsh	8	8											
	08 - Northeastern Lake Ontario	16	16											
	10 - Middle B of Q	16	12	12										
	11 - L B of Q/ELO	16	16	12										

Figure S1. Temporal trends of PCB in fish from the Toronto waterfront (LO4a) between 1972 and 2012 for (a) Brown Trout, (b) Common Carp, (c) Northern Pike, and (e) White Sucker. Sen's Slope estimates are indicated by a solid regression line when the trend is significant ($p < 0.05$) and indicated by a dashed line when trend is not significant ($p < 0.1$). Any Sen's Slope estimates with $p > 0.1$ are not indicated in the Figure. The Ontario PCB consumption advisory benchmarks are indicated with horizontal dashed lines. Majority of the results taken from Robinson et al. (2015).

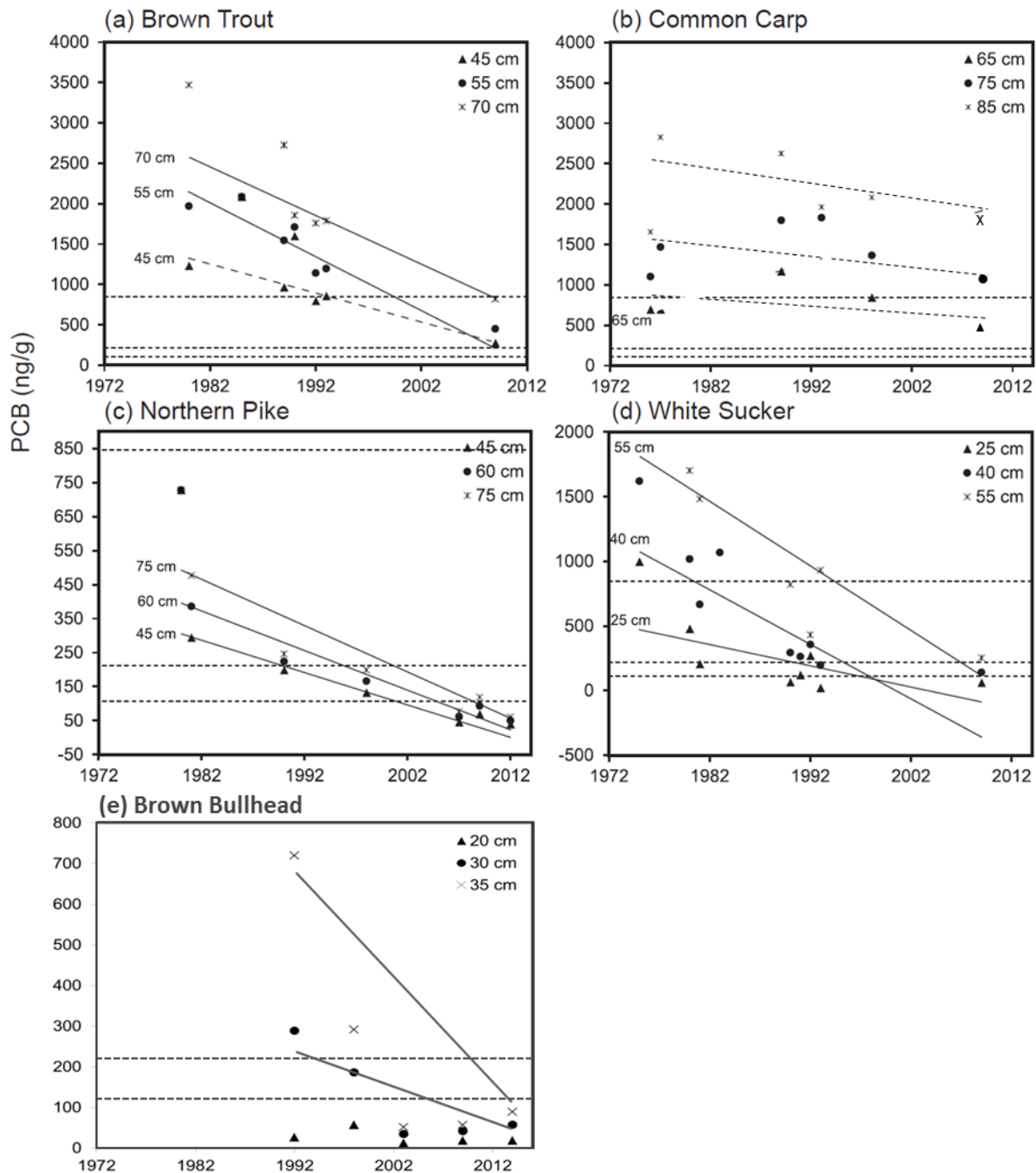


Figure S2. Temporal trends of mercury in fish from the Toronto Waterfront (LO4a) between 1972 and 2012 for (a) Brown Bullhead, (b) Common Carp, (c) Northern Pike, (d) Rainbow Smelt, (e) White Sucker, and (f) Yellow Perch. Sen's Slope estimates are indicated by a solid regression line when the trend is significant ($p < 0.05$) and indicated by a dashed line when trend is not significant ($p < 0.1$). Any Sen's Slope estimates with $p > 0.1$ are not indicated in the Figure. The Ontario consumption advisory benchmarks for mercury are indicated with horizontal dashed lines. The figure taken from Robinson et al. (2015).

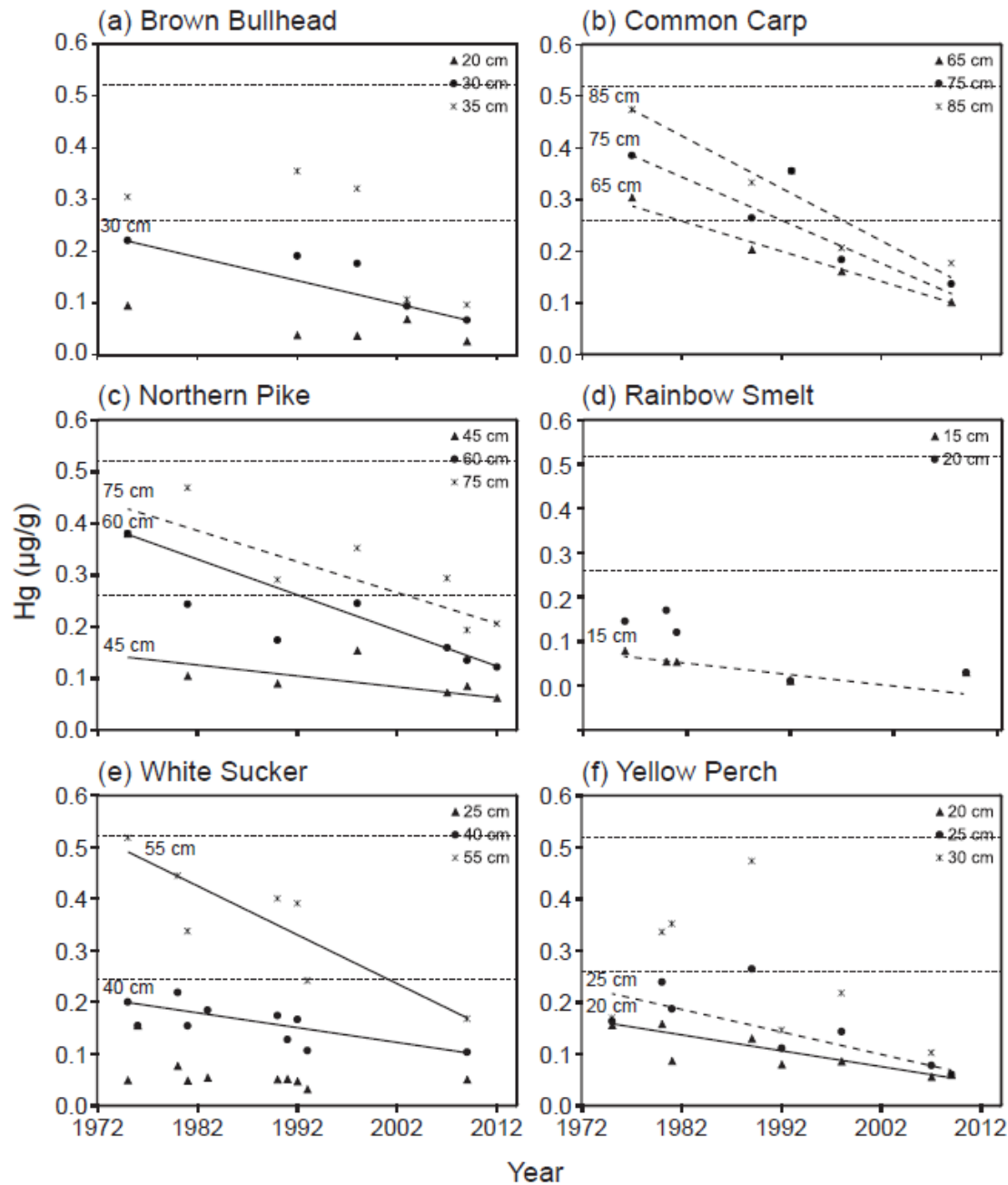


Figure S3. Map of Lake Ontario tributaries in the GTA monitored for fish contaminant levels: Etobicoke Creek, Mimico Creek, Humber River, Don River and Rouge River. Yellow points indicate sites where forage fish have been collected and analyzed at least once since the 1970s.

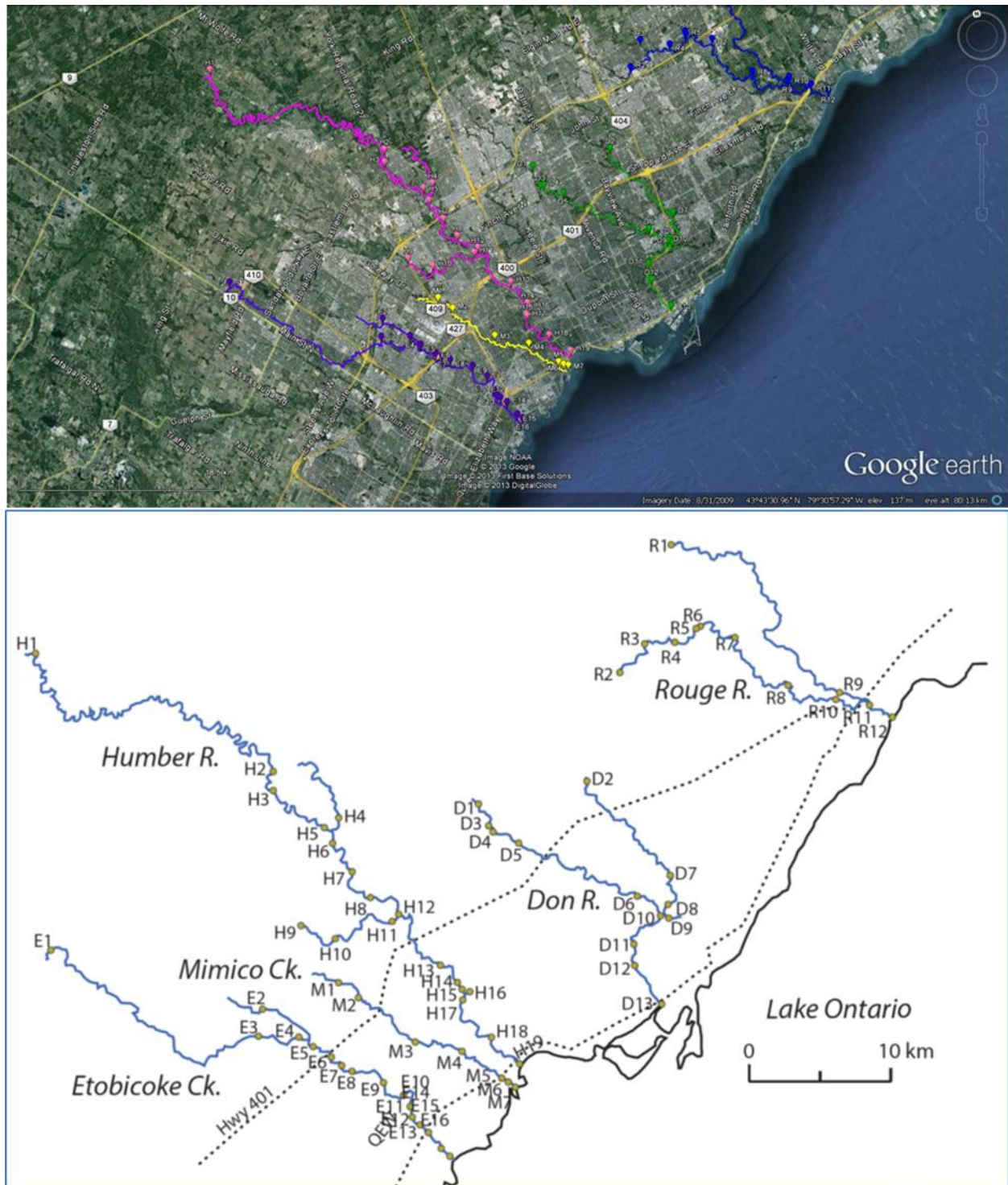


Figure S4. Temporal trends in PCB in forage fish from five Lake Ontario tributaries in the GTA. Split panels were used for the Humber and Don Rivers due to large variance in PCB concentrations among some sites.

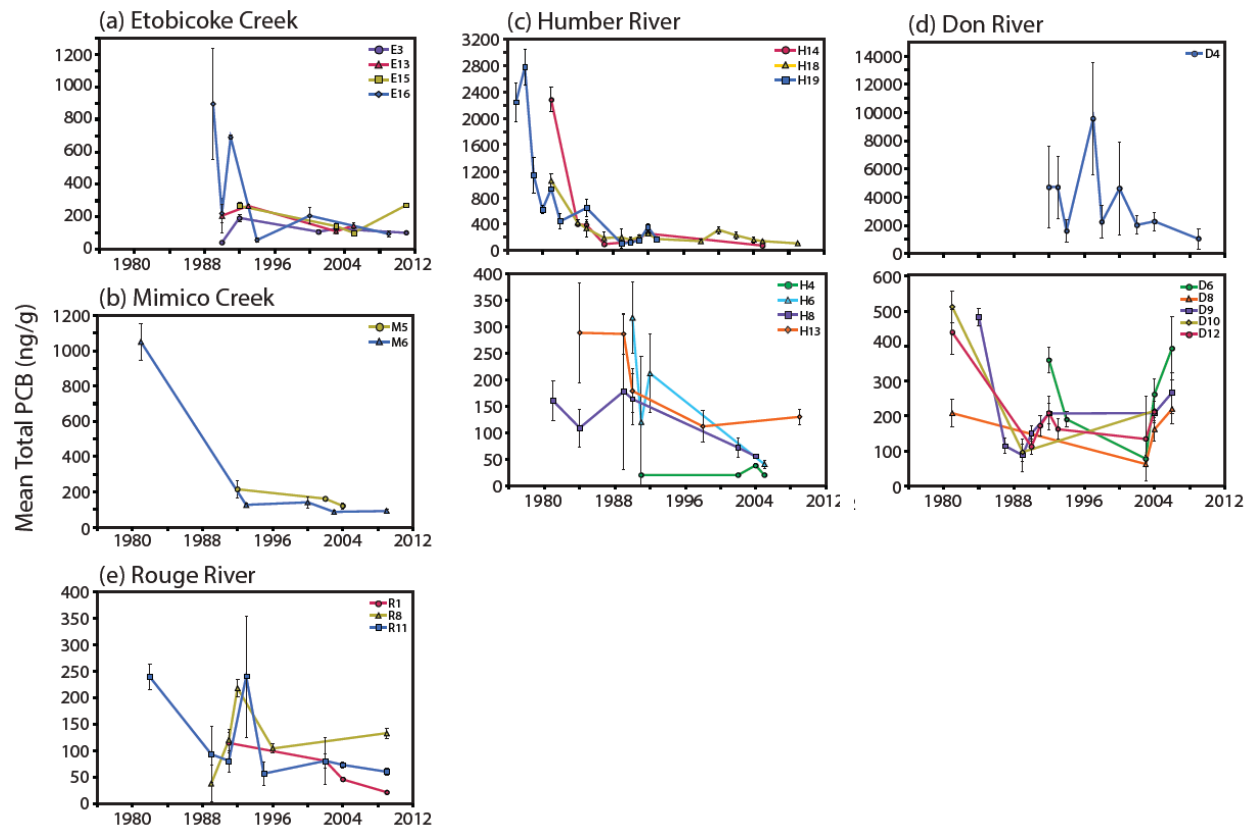
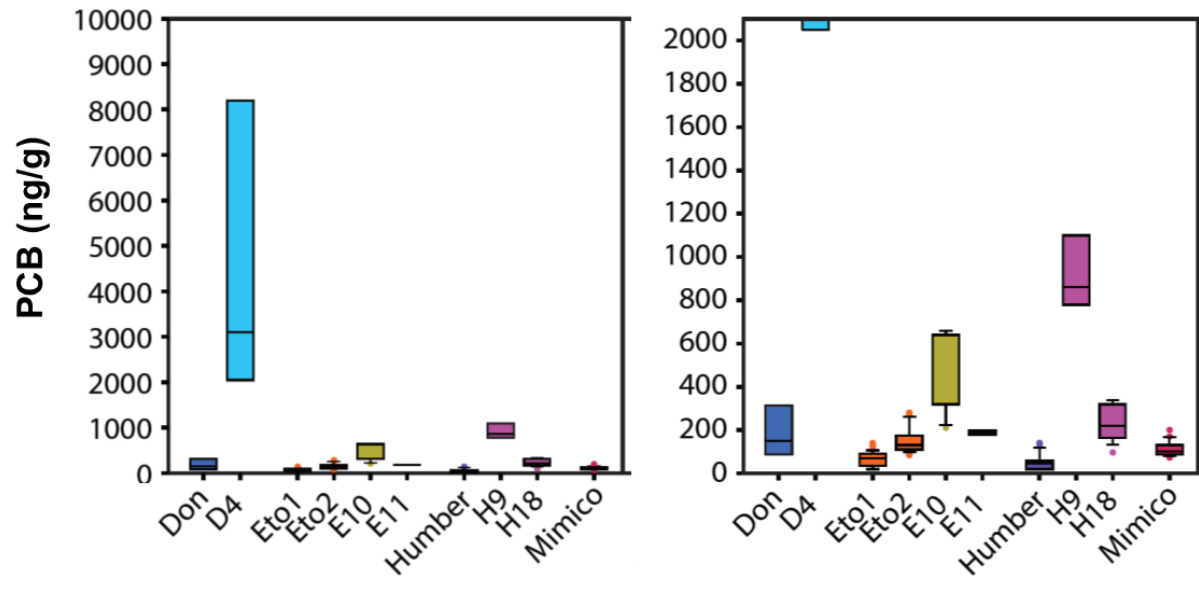


Figure S5: PCB concentrations in forage fish from the Lake Ontario tributaries in the GTA. The left panel shows the full scale of PCB values; the right panel is on a truncated scale to better illustrate differences among the sites. The measurements were collected by Ontario Ministry of the Environment and Climate Change between 2000 and 2012.



An example of fish consumption survey

(drafted for the Spanish Harbour Area of Concern)

Notes on this draft survey (shall be removed once the survey is finalized):

The goal of this survey is to collect the information necessary from the Spanish Harbour Area of Concern in Recovery in order to help inform the fish consumption beneficial use impairment assessment for this AOC. In addition, the survey should:

- Provide defensible results
- Engage a target audience
- Be easily understood by the target audience
- Be replicable for other AOCs
- Provide information to tailor outreach and guidance for fish consumption

The following survey has been drafted to answer a number of broad questions which include:

- Is fish consumption, or are fish consumption habits, compromised because of the AOC?
 - Do people eat fish from the AOC or not?
 - If not, is it because of the impairment or is it unrelated?
- Are there stricter fish consumption advisories on the fish species people eat from the AOC compared to other Lake Huron locations as a result of contaminants of concern?
 - What fish species do people normally eat from the AOC?
- What are people's fish eating habits and is this an issue?
 - How often do people eat fish caught within the AOC?
 - How do people prepare and cook the fish they catch within the AOC?

Spanish Harbour Area of Concern in Recovery

Draft Fish Consumption Survey – 2018

Introduction

Do you fish in the Spanish Harbour Area of Concern (AOC), which includes Spanish River between the towns of Espanola and Spanish, and Spanish Harbour itself out to the western end of Kirke and Green Islands (as shown by the orange shaded area in the map below)? If so, the Spanish Harbour Remedial Action Plan Team (Ontario Ministry of the Environment and Climate Change and Environment and Climate Change Canada) is interested in finding out more about your fish consumption habits.

Spanish Harbour was identified as an AOC in 1987 because of impacts to water quality due to historic local industrial activities. Since 1999, all actions that were recommended to restore water quality and the environmental health of this area have been completed. Ongoing monitoring shows that the environmental conditions of the area continue to improve. Fish consumption advisories due to local contaminants have become less restrictive overtime and, overall, advisories for the North Channel and Spanish Harbour AOC are similar to other locations in Lake Huron.

The information collected in this survey will remain confidential and will be used to help guide decisions on the status of the Spanish Harbour AOC as well as to improve the Guide to Eating Ontario Fish. Survey participants can choose to enter into a draw for a chance to win [to be determined, e.g. one of five \$100 Canadian Tire gift certificates].

Thank you for your participation.



Please answer the questions below to the best of your abilities.

Section 1: About you (to understand demographics and safe contaminant intakes)

Age _____ years

Sex ☐ Male ☐ Female ☐ Prefer not to say

Weight _____ kgs OR _____ lbs



Section 2: Eating Fish from the Spanish Harbour AOC

1. Do you eat fish from Spanish Harbour AOC?

- ☐ Yes
- ☐ No



2. Prior to taking this survey, were you aware of the AOC designation of Spanish Harbour?

- ☐ Yes
- ☐ No → Skip to the next section

3. Do fish contaminant levels in Spanish Harbour AOC affect your fish consumption habits?

- ☐ Yes
- ☐ No → Skip to the next section

If yes, how do your concerns about fish contaminant levels in Spanish Harbour AOC affect your fish consumption habits? (check all that apply)

- ☐ I avoid eating fish from the area
- ☐ I eat less fish caught from the area
- ☐ I don't eat certain fish caught from the area
- ☐ Other _____

Section 3: Preferences in Eating Fish

4. Please identify how often you eat fish caught from the Spanish Harbour AOC on average over the course of a year. Please consult the picture guide provided at the end of this questionnaire to help in identifying fish species.

	Rarely	Once a month	2-3 times a month	Once a week	Twice a week	3-5 times a week	Daily
Brown Bullhead							
Channel Catfish							
Chinook Salmon							
Cisco (Lake Herring)							
Coho Salmon							
Northern Pike							
Pink Salmon							
Rainbow Trout							
Rock Bass							
Smallmouth Bass							
Walleye							
White Sucker							
Yellow Perch							
Other _____							

5. Would the eating habits you identified in the above question change if contaminant levels in the Spanish Harbour were not a concern?

- ☐ Yes
- ☐ No → Skip to the next question

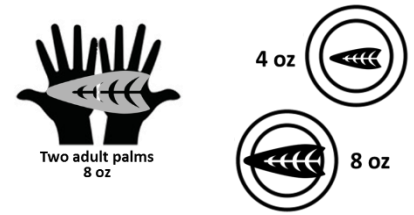
If yes, how often would you eat the fish on average over the course of a year if you had no concerns about contaminant levels?

	Rarely	Once a month	2-3 times a month	Once a week	Twice a week	3-5 times a week	Daily
Brown Bullhead							
Channel Catfish							
Chinook Salmon							
Cisco (Lake Herring)							
Coho Salmon							
Northern Pike							
Pink Salmon							
Rainbow Trout							
Rock Bass							
Smallmouth Bass							
Walleye							
White Sucker							
Yellow Perch							
Other _____							

Section 4: Fish Eating Habits

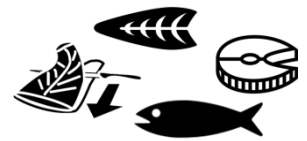
6. **On average, about how much fish do you eat in a single meal?** (for example, a fillet that is the size of a dinner plate or the width of two adult hands is approximately 8 oz or 230 g)

- ☐ Less than 4 oz / 115 g
- ☐ 4 oz / 115 g
- ☐ 6 oz / 170g
- ☐ 8 oz / 230 g
- ☐ 12 oz / 340 g
- ☐ More _____



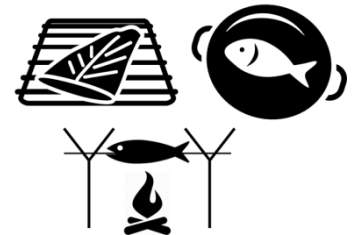
7. **What parts of the fish do you eat?** (check all that apply)

- ☐ Fillet without skin
- ☐ Fillet with skin
- ☐ Steak with fat
- ☐ Steak with fat trimmed/removed
- ☐ Whole fish
- ☐ Eggs/Organs
- ☐ Other _____



8. **Which method do you use to cook or prepare fish?** (check all that apply)

- ☐ None (raw fish)
- ☐ Baking/broiling
- ☐ Frying
- ☐ Grilling
- ☐ Steaming
- ☐ Smoking
- ☐ Other _____



Section 5: Advisories

9. Do you have access to a copy of the 2017-2018 *Guide to Eating Ontario Fish*?

- ☐ Yes
- ☐ No, but I use an old version of the Guide
 - ☐ No, I don't have access to the 2017-2018 Guide
 - ☐ No, I don't know how to access
- ☐ I am unaware of the Guide → Skip to the next question



10. Where did you obtain the copy of the Guide you use?

- ☐ Internet
- ☐ Friend/relative
- ☐ Government office
- ☐ Tourism office
- ☐ Liquor store
- ☐ Other _____
- ☐ Trade Show
- ☐ Provincial Park
- ☐ Walmart
- ☐ Canadian Tire
- ☐ Beer Store



11. Do you check the consumption advice in the Guide prior to eating the fish you catch in the Spanish Harbour?

- ☐ Yes
- ☐ No → Skip to the next question

[illegible]

12. Do you follow the consumption advice in the Guide?

- ☐ Always
- ☐ Usually
- ☐ Sometimes
- ☐ Never

If not always, why not? (check all that apply)

- ☐ I don't always have access to the Guide when I am fishing
- ☐ I don't understand how to use the Guide
- ☐ I choose not to follow the consumption advice in the Guide
- ☐ I think the consumption advice in the Guide unnecessarily restricts eating fish
- ☐ I think the consumption advice in the Guide should recommend eating less fish
- ☐ I don't think the consumption advice in the Guide is relevant to me
- ☐ I don't catch enough fish
- ☐ I don't eat enough fish
- ☐ Other

13. Has the information in the Guide led to a change in your fish eating habits?

- ☐ Yes
☐ No

If yes, in what way(s)? (check all that apply)

- ☐ I am more selective on what type of fish I eat from certain areas
☐ I reduced the number of fish I eat from certain areas
☐ I changed the method of cooking fish
☐ I follow advice in the Guide
☐ Other _____

Section 6: Additional Comments

Section 7: Personal Information (optional; to enter into a draw)

Name _____
Address _____
Phone _____
Email _____

Thank you for your participation!

Picture guide (example) to help in identifying type of fish

Brown Bullhead 	Channel Catfish 	Chinook Salmon 
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References

- OMOECC. 2017-2018 Guide to Eating Ontario Fish. Toronto, Ontario, Canada: Ontario Ministry of the Environment and Climate Change, 2017.
- Robinson JM, Neff MR, Bhavsar SP. Assessment of contaminant levels in fish from the Toronto waterfront area. *Journal of Great Lakes Research* 2015; 41: 228-237.