

RE-DESIGNATION REPORT

Assessment of the Tainting of Fish and Wildlife Flavour (BUI #2) in the Detroit River Canadian Area of Concern

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BACKGROUND

The Detroit River Canadian Area of Concern (AOC) is comprised of the Canadian waters of the Detroit River proper. Its watershed is not part of the AOC, but has been identified as a potential source of impairment to the AOC (Green et al. 2010). The 1987 Great Lakes Water Quality Agreement (GLWQA) lists 14 beneficial uses impairments that need to be assessed before an AOC can be delisted (i.e., removed from the list of Great Lakes AOCs). The *Tainting of Fish and Wildlife Flavour* is one of the 14 potential Beneficial Use Impairments (BUI) identified by the GLWQA. It deals with impacts to the taste and odour of fish or wildlife resulting from anthropogenically-induced water quality issues (IJC 1991).

The Detroit River Stage 1 RAP Report designated the BUI 'Not Impaired' because there had been no reports of fish, waterfowl or wildlife tainting in the Detroit River AOC (MDNR/OMOE 1991). However, during its review of the Stage 1 Report the IJC questioned the conclusion with regards to fish due to insufficient information (Green et al. 2010). In response, the Michigan Department of Natural Resources in 1992 conducted a taste test using walleye from the Trenton Channel (known to be affected by sediment contamination) compared to walleye purchased from a seafood market. A subsequent taste test study was conducted in 1993 to compare the taste of Lake Huron walleye to Detroit River (Trenton Channel and east of Grosse Ile) and Lake Erie walleye. The results from each study indicated some level of taste impairment in Trenton Channel fish. As a result, the status of the BUI was changed to 'Impaired for Fish' in the 1996 RAP Update Report (MDEQ 1996).

In 2006, the DRCC re-assessed the status of the BUI and concluded that tainting of fish flavour on the Canadian side of the AOC required further assessment since the previous status was based on data that were not suitable for drawing conclusions for the Canadian side of the AOC (Leney and Haffner 2006). For example, the sample sizes for both studies were very low, fish were only collected from downstream U.S. locations, and the only species assessed by the study is highly migratory, spending much of its time in waters outside of the Detroit River. Furthermore, a survey of Detroit River anglers along the Detroit River Canadian shoreline conducted in 1996-97 by Health Canada suggested that tainting of fish flavour was not an issue. The vast majority of survey participants that ate fish from the Detroit River indicated that they did so because it "tastes good" and only 1% of respondents that fished the Detroit River did not eat their catch because of bad taste or smell (Dawson 2000).

The status of the BUI over the life of the Detroit River RAP is summarized in Table 1.

Table 1. Summary of the status of the Tainting of Fish and Wildlife Flavour BUI from 1991 to 2006.

	Stage 1 RAP 1991	IJC Review 1992	RAP Update 1996	DRCCC Update 1999	BUI Status Report 2006
<i>Fish</i>	Not Impaired	Requires further assessment	Impaired	Impaired	Requires Further Assessment
<i>Wildlife</i>	Not Impaired	Requires further assessment	Not Impaired	Not Impaired	Not Impaired

Since the results of the Health Canada survey are nearly 15 years old, the DRCC recommended in its Stage 2 RAP Report that the status be officially changed to 'Requires Further Assessment' until a screening level survey of Detroit River Canadian anglers was conducted to confirm the status of taste and odour of Detroit River fish

(Green et al. 2010). The delisting criterion for this BUI states that the *Tainting of Fish and Wildlife* BUI will no longer be considered impaired “when survey results confirm that there is no statistically significant tainting of fish flavour when compared to fish from upstream of the Detroit River” (Green et al. 2010).

Fish are considered to be an excellent indicator of local water quality conditions potentially related to tainting, as they spend their entire lives in nearby waters. Waterfowl, on the other hand, are highly migratory and spend only a short time in the AOC. Also, the extent of wildlife consumption in the Detroit River Canadian AOC is minimal and less frequent compared to the consumption of fish (Dawson, 2000). Dawson (2000) reported that only 8% of survey participants consumed aquatic wildlife (e.g., ducks, geese, turtles, frogs, snails) in the 12 months prior to the interview.

The purpose of this report is to summarize the results of the angler survey conducted in 2010 and to make a recommendation regarding the current status of GLWQA BUI #2, *Tainting of Fish and Wildlife Flavour*, for the Canadian side of the AOC only.

METHODS

The DRCC conducted a survey of Detroit River on-water and Canadian shoreline anglers. The survey was focused on the Canadian side of the Detroit River, however, its geographic extent also included the U.S. side of the River (see below). A copy of the questionnaire is attached (Appendix 1). Since the delisting criterion for this BUI focuses on taste in the context of the Huron-Erie corridor, the Detroit River survey was designed to be similar to the fish tainting survey delivered in the St. Clair River AOC, thereby allowing for comparison of results between the two AOCs.

Two different survey delivery methods were utilized: (1) by mail through the Ontario Ministry of Natural Resources’ (OMNR) Angler Diary Program, and (2) volunteer shoreline angler interviews in known fishing locations along the Canadian shoreline. For the mail method, the survey was sent with a letter and a self-addressed stamped envelope to all (American and Canadian) Detroit River participants of the OMNR Angler Diary Program in April 2010. The Angler Diary Program relies on volunteer anglers to collect and submit details on their fishing trips, providing the OMNR with important information used for management of the fishery. Participants of the local Angler Diary Program included American and Canadian anglers that fish on either side of the Detroit River. For the interview method, three volunteers were recruited to interview anglers along the Detroit River Canadian shoreline in Windsor (from Lakeview Park Marina to West Windsor) from May 2010 to October 2010 (Fig. 1). The interview surveys captured both shoreline anglers and boat anglers. Volunteers conducted interviews on weekdays between 8 am-12 noon and 4 pm-8 pm. Sampling (interview) locations and times of day were chosen based on data from an OMNR 2009 Summer Creel Survey (OMNR 2010). Before proceeding with the survey questions, volunteers asked the angler if he/she had already completed the survey in order to avoid duplicate sampling.

Surveys were collected and compiled by the DRCC as they were received. The results were analyzed using JMP statistical software (v.5.0; SAS, Cary, NC, U.S.A). The results of the St. Clair River AOC fish tainting are included as part of this report for anecdotal comparison.

Please note that although the survey included questions related to Detroit River aesthetics, these data were not considered for the purpose of this report.

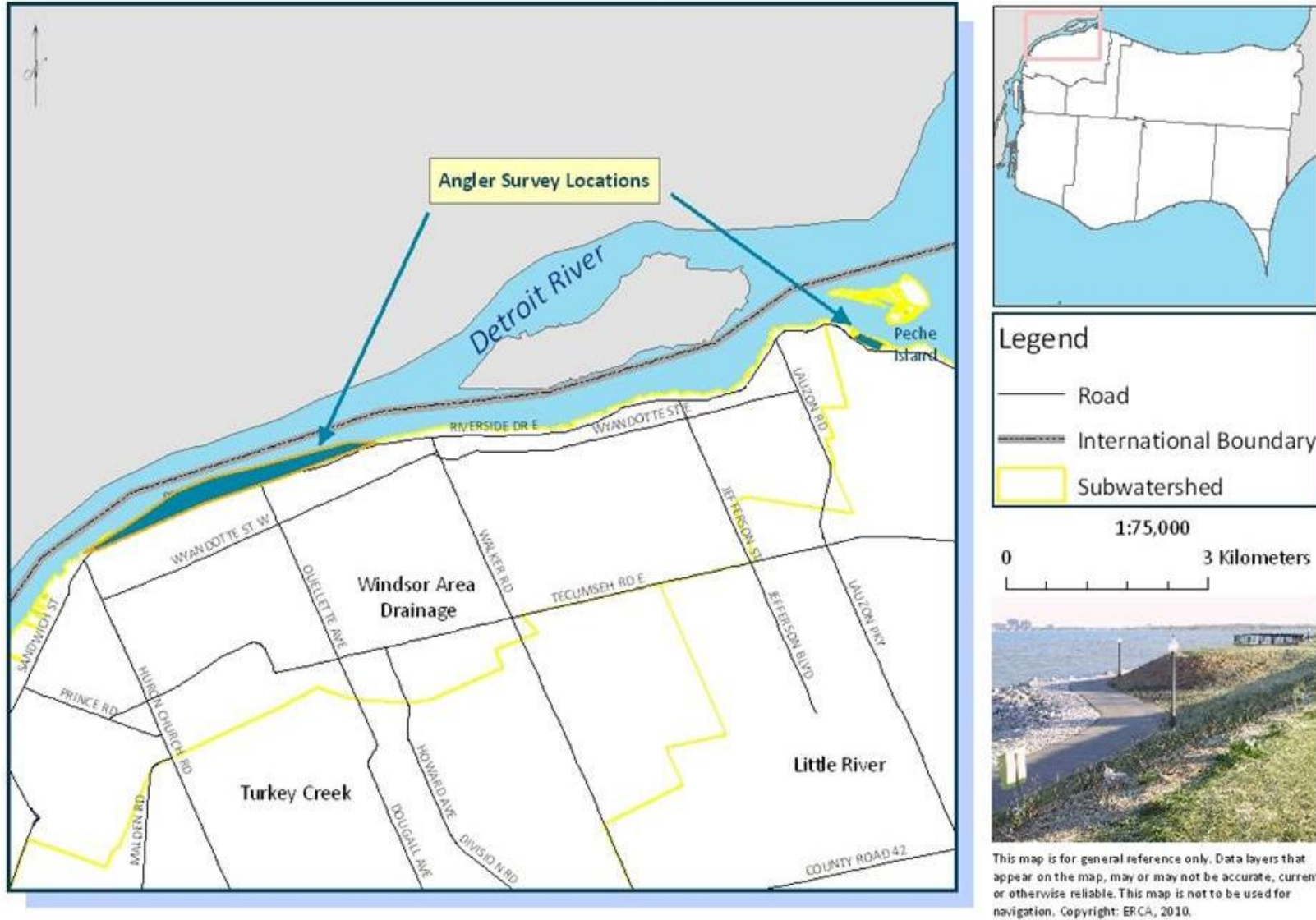


Figure 1. Map of the locations in Windsor where shoreline and some on-water anglers were interviewed by volunteers. Source: Essex Region Conservation Authority (2010).

RESULTS

A total of 156 anglers (on-water and shoreline) were interviewed as part of this assessment. The majority of participants (75%) indicated their citizenship was Canadian, 24.4% were American, and 0.6% (1 respondent) lived in another country. Only the answers from participants that fished the Detroit River were considered for the assessment.

When asked how many times a year they fished the Detroit River, more than half of the anglers (57.7%) noted that they make more than ten trips to the Detroit River per year. Many anglers reportedly fished the Detroit River two to four times a year (16%), four to six times per year (12.8%), and seven to ten times per year (9.6%). Few anglers fished the River less than once per year (3.8%) (Fig. 2).

Anglers were asked about their consumption of Detroit River fish. Eighty-five percent (n=133) indicated that they eat their catch from the Detroit River. Species most often targeted and consumed were walleye and yellow perch followed by panfish (e.g., crappie, sunfish, and rock bass) (Fig. 3), while bottom feeding species such as freshwater drum [known locally as sheepshead] and brown bullhead were generally not targeted or consumed (Fig. 4). This result is not specific to the AOC, but rather, is a general trend among Canadian anglers. Studies indicate that anglers tend to prefer certain species, as opposed to strictly avoiding certain species. For example, the majority of Canadian anglers target and keep yellow perch, walleye, and panfish (sunfish, crappie) (OMNR 2009; DFO 2008) which corresponds to the results of our survey. Our results also correspond to those from the St. Clair River AOC survey, which found that 83% of survey participants consumed St. Clair River fish, notably walleye and yellow perch (Briggs et al. 2008).

Detroit River fish consumers were asked to rate as well as describe the taste and odour of their catch (Fig. 5). Ninety percent of Detroit River fish consumers rated the taste of fish as 'Excellent' or 'Good' while 10% rated the taste as 'Fair'. No one reported that the taste of Detroit River fish was 'Poor'. In comparison, 81% of St. Clair River fish consumers rated their catch as 'Excellent' or 'Good' and 5% rated fish taste as 'Poor' (Briggs et al. 2008).

Eighty-three percent of anglers that eat Detroit River fish rated the smell of their catch as 'Excellent' or 'Good' (Fig. 4). Seventeen percent of Detroit River fish consumers rated the smell of fish caught from the Detroit River as 'Fair'. No one reported that the smell of Detroit River fish was 'Poor'. In contrast, only 69% of St. Clair River fish consumers rated the smell of their catch as 'Excellent' or 'Good' and 6% noted that the smell was 'Poor' (Briggs et al. 2008).

Only 14 people provided further comments on the taste or smell of fish; seven of those anglers noted that fish tasted or smelled 'fishy'. Only three anglers described tastes or odours that may be related to the quality of the Detroit River. Their comments were "sheepshead had a mild muddy taste in the 2006-2008 season", "chemical smell from yellow perch", and "smells like garbage". Two anglers noted that catfish and pike smelled bad, respectively, but did not elaborate. A record of the Detroit River anglers' comments is attached in Appendix 2.

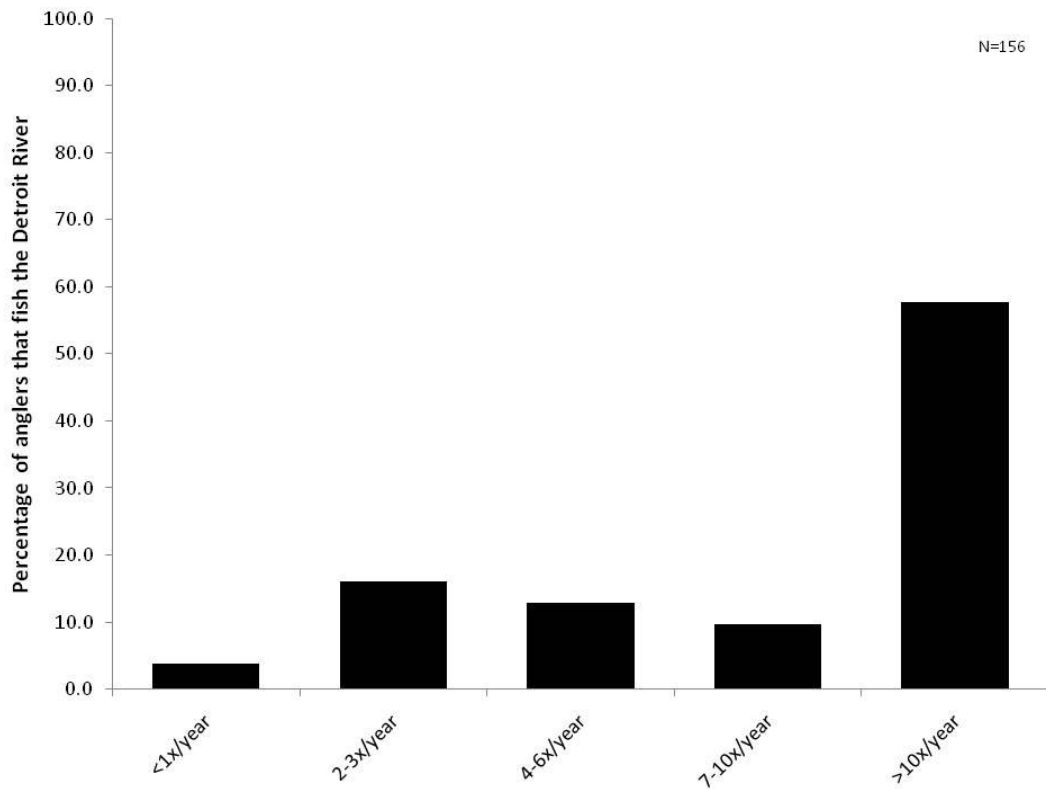


Figure 2. The percentage of anglers that fish the Detroit River less than once per year, 2-3 times per year, 4-6 times per year, 7-10 times per year, and more than 10 times per year.

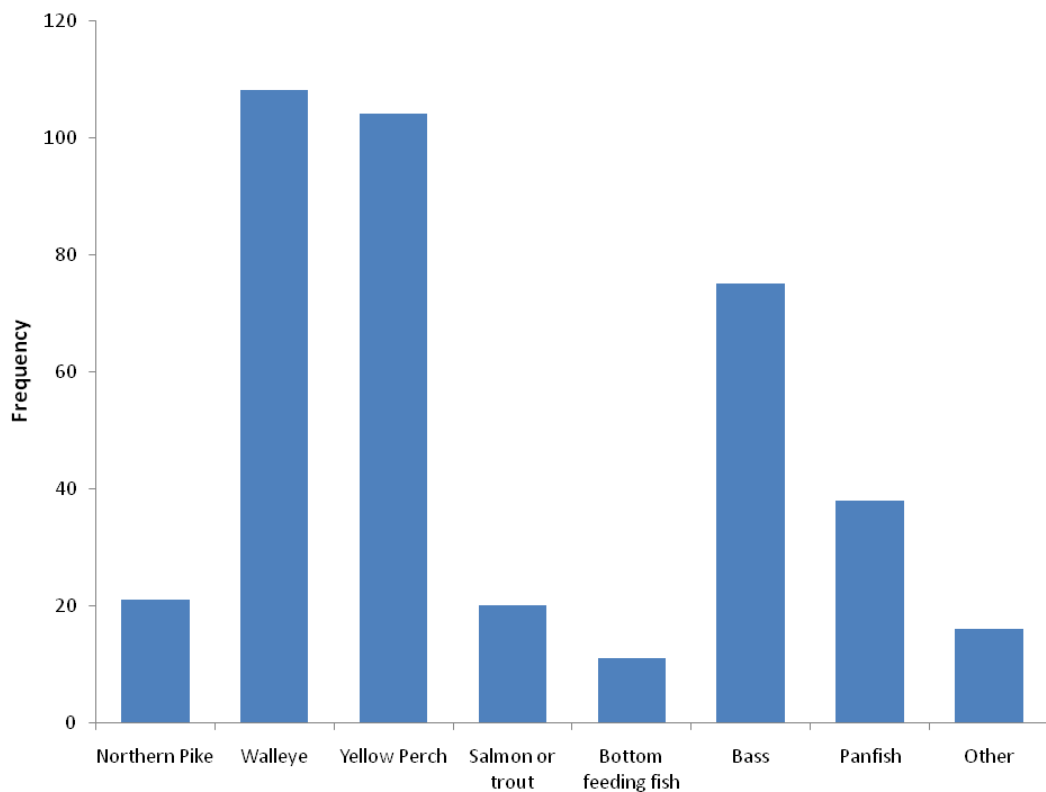


Figure 3. The number (frequency) of Detroit River anglers that reported consuming a particular fish species.

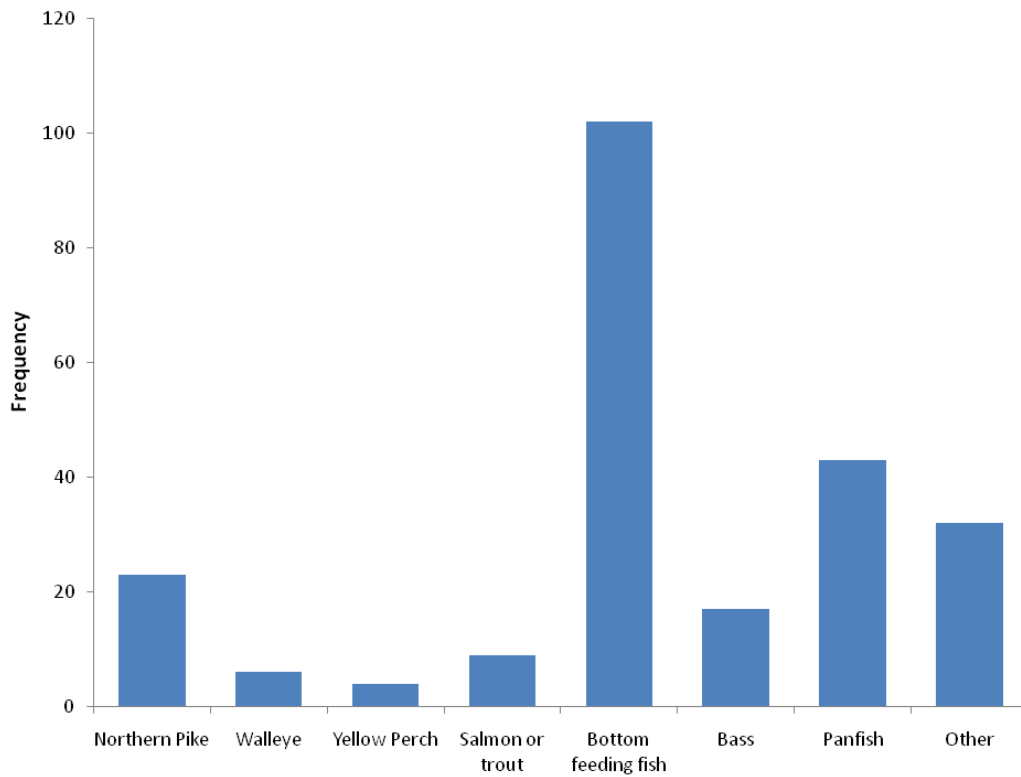


Figure 4. The number (frequency) of Detroit River anglers that avoided consuming particular fish species.

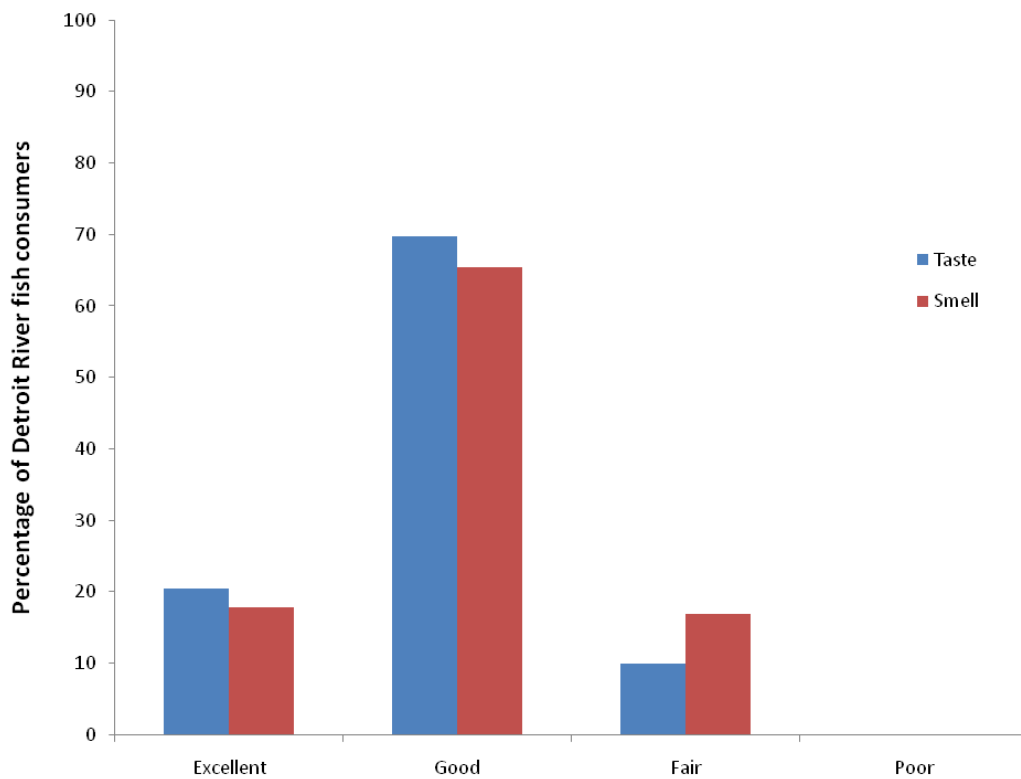


Figure 5. The percentage of Detroit River fish consumers that rated the taste or smell of their catch as either 'Excellent', 'Good', 'Fair', or 'Poor'. No anglers rated the taste or smell as 'Poor'. Please note that samples sizes differ for taste and smell responses ($N_{\text{taste}} = 132$, $N_{\text{smell}} = 124$).

CONCLUSIONS

In summary, 85% of Detroit River anglers participating in this survey indicated that they consume Detroit River fish (mostly walleye and yellow perch). The majority of participants rated the taste and smell of Detroit River fish as 'Excellent' or 'Good'. No participants rated the taste or smell of Detroit River fish as 'Poor'. Similarly, the 1996-97 Health Canada Survey indicated that more than two-thirds of survey participants consumed Detroit River fish because it "tastes good" while only 1% of participants explained that they did not eat their catch because it tasted or smelled bad (Dawson 2000).

In addition to the numerical results, limited comments on taste and odour were provided. Some respondents explained that fish smelled or tasted "fishy" which is not a result of water quality issues in the Detroit River. One angler noted that freshwater drum (sheepshead) caught in 2006-2008 tasted muddy after cooking; however, freshwater drum is a bottom-feeding species that many anglers generally avoid eating. Another participant noted that yellow perch had a chemical smell. These types of comments were very infrequent and likely due to an isolated incident rather than a persistent problem in the AOC.

The results of this assessment indicate that there are no significant issues related to the taste or odour of fish from the Detroit River. The results are consistent with those from a survey conducted in 1996-1997 along the Canadian side of the Detroit River and a more recent 2007 survey conducted upstream in the St. Clair River.

RECOMMENDATION

Based on this updated information, it is recommended that the *Tainting of Fish and Wildlife Flavour* BUI be re-designated to **not impaired** for the Canadian side of the Detroit River AOC.

REFERENCES

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Detroit River Angler Survey

Fish Quality and River Aesthetics



The Detroit River Canadian Cleanup (DRCC) requires public input on the flavour of fish from the Detroit River and the river's aesthetics due to human influences. The DRCC also seeks to understand the public's perception of the quality of the Detroit River. The information provided will help the DRCC assess the status of the Detroit River's beneficial uses. Please take the time to fill-out the survey below. For more information, please visit www.detroitriver.ca.

1. Where do you live?

- Canada ☐
 United States ☐

2. Do you fish the Detroit River?

- ☐ Yes ☐ No (If 'No', skip to question 9)

3. How often do you fish the Detroit River?

- ☐ Less than once/year ☐ 1-3 times/ year
☐ 4-6 times/year ☐ 7-10 times /year
☐ More than 10 times/year

4. Do you eat fish from the Detroit River?

- ☐ Yes ☐ No

If 'Yes', which ones? (Check all that apply)

- ☐ Northern pike ☐ Walleye
☐ Yellow perch ☐ Salmon and trout
☐ Bottom feeding fish ☐ Bass
☐ Panfish (crappie, sunfish, rock bass)
☐ Other: _____

If 'No', please give a reason why. Skip to question 8.

5. How do you rate the quality of fish caught?

- TASTE:** ☐ Excellent ☐ Good ☐ Fair ☐ Poor
SMELL: ☐ Excellent ☐ Good ☐ Fair ☐ Poor

6. In the last three (3) years, have you noticed any objectionable tastes or odours in the fish caught from the Detroit River?

- ☐ Yes ☐ No

If 'Yes', please describe the tastes and/or odours you have noticed (disliked):

7. Do you avoid eating certain fish species from the Detroit River?

- ☐ Yes ☐ No

If 'Yes', which ones? (Check all that apply)

- ☐ Northern pike ☐ Walleye
☐ Yellow perch ☐ Salmon and trout
☐ Bottom feeding fish ☐ Bass
☐ Panfish (crappie, sunfish, rock bass)
☐ Other: _____

8. Do you eat fish caught from these other areas?

- Lower Lake Huron ☐
 St. Clair River ☐
 Lake St. Clair ☐

9. In the last two (2) years, have you noticed any objectionable deposits, unnatural colour, turbidity, odour, scum, or floating material in the Detroit River?

- ☐ Yes ☐ No (If 'No', skip to question 11)

If 'Yes', please describe what you noticed:

Where? ☐ Upper (Lake St. Clair to Fighting Island)
☐ Lower (south of Fighting Island to Lake Erie)

10. How often have you noticed objectionable deposits?

- ☐ Less than once/year ☐ 1-3 times/ year
☐ 4-6 times/year ☐ 7-10 times /year
☐ More than 10 times/year ☐ Always/Constantly

11. Please rate the overall appearance of Detroit River water.

- ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Please send the completed survey to:

Detroit River Canadian Cleanup
 311-360 Fairview Avenue West, Essex Ontario, N8M 1Y6
 Funding support provided by Environment Canada

APPENDIX 2

Record of Taste/Odour Comments

- Walleyes have a very 'strong' taste if not eaten within 6 months of being frozen. I only keep walleyes less than 5 lbs, and trim away all dark meat of each filet.
- Sometimes a fish will have a stinky odor after it has been cleaned, but not very often.
- A few sheepshead in the 06-08 seasons had a slightly off taste - described as mild-muddy. Unable to eliminate this taste by cooking, or altering fileting methods.
- Fishy or fishy smell (reported by 7 Detroit River fish consumers)
- Catfish smell at times
- Smell like garbage
- Pike smells bad
- Chemical smell from yellow perch