



**St. Clair River Area of Concern Survey
A Report on the Quality of Fish Taste and Smell**

**To Assess
the
Beneficial Use Tainting of Fish and Wildlife Flavor**

St. Clair River Canadian RAP Implementation Committee

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Acknowledgements

This report on fish tainting for the St. Clair River Area of Concern (AOC) would not have been possible without the cooperation of the Sarnia Bluewater Anglers. When we proposed to assess fish tainting for the St. Clair River by interviewing Salmon Derby participants, the Club gave their full cooperation. Appreciation is also extended to the Friends of the St. Clair River, who promote conservation, beautification and other environmental activities associated with the St. Clair River and assist in the development and implementation of the St. Clair River Remedial Action Plan (RAP). Appreciation is also extended to all members of the Friends of the St. Clair River (FOSCR) for their active involvement in undertaking, conducting and promoting the Angler survey. Ken Hall, of the FOSCR deserves special thanks for his efforts in championing, printing, distributing and advertising the survey. Students from Lambton College (Emily Harding, Cheyenne Rogers and Tony Murphy) conducted shoreline surveys and collated data also deserve recognition, as do Salmon Derby participants and concerned citizens who took the time to respond to the questionnaire. We also wish to thank local businesses, associations and clubs for offering their assistance to disseminate information and survey forms, in particular, Ed's Bait & Tackle Shop, Shaykin Baits, Harsen Island Cottage Association and Port Huron Angler's Club. Special thanks go to Melissa Medeiros of the Aamjiwnaang Band Council Office for her assistance and interest in trying to involve the Aamjiwnaang First Nation during the initial survey and to Aamjiwnaang Environmental Officer Sharilyn Johnston for conducting the subsequent survey of Aamjiwnaang First Nation, and to Kris Lee for involving the families of students of Wallaceburg High School.

Executive Summary

The 1995 St. Clair River Area of Concern Stage 2 report identified the beneficial use (BU) of tainting of fish and wildlife flavour as requiring further assessment based on anecdotal reports of tainting. To undertake further assessment two distinct effort were undertaken including a 1995 controlled subjective olfactory sensory evaluation of tainting in walleye (Myllyoja and Johnson, 1995) and a survey conducted between 1996 and 1997 to look at tainting in both fish and wildlife (Dawson 1999). While results from both the 1995 subjective olfactory sensory evaluation which revealed no noticeable difference in tainting when comparing fish caught from within and upstream of the AOC, and the 1996/97 survey in which 96 percent of shoreline anglers did not report fish tainting and no wildlife consumers identified tainting as part of the survey the beneficial use (BU) has never been redesignated from requiring further assessment. As these studies were more than 10 years old, the St. Clair River AOC Progress Report (2005) recommended a further study and in 2006 the Canadian RAP Implementation Committee (CRIC) subsequently agreed to revisit this BU to assess the current status of tainting of fish through a second survey.

This report presents the results of the 2007 St. Clair River Angler Survey on fish quality conducted during the Annual Sarnia Salmon Derby, a further online survey hosted by the Friends of the St. Clair River for two months and subsequent follow up survey of the Aamjiwnaang First Nation undertaken in the spring of 2008. These surveys used qualitative and semi-quantitative data collected from questionnaires to gather information on residency, frequency of angling, fish consumption, fish quality (taste and odour), preferred fish species, areas of avoidance and perceptions of changes needed to the St. Clair River to increase confidence in fish quality.

A total of 198 responses were received through the survey, with the majority of the participants from Canada (75%), while seven percent were from the United States. Both First Nations were invited to participate at a community-wide level, with a total of ten percent of the total survey respondents being from Walpole Island and eight percent from the Aamjiwaang First Nation.

Results from the survey found that, the majority (48 percent) of participants fish the St. Clair River more than 10 times per year and only 10 percent of the survey respondents reported that they make less than one fishing trip to the river each year Eighty five percent of interviewees reported that they consume their catch from the St. Clair River with thirty percent of interviewees indicated that all types of fish were consumed, and 48 percent listed several fish species consumed. The top five species of fish consumed from the St. Clair River based on survey results were, walleye, perch, bass, salmon/trout, and pike. Fifteen percent of interviewees reported walleye as the only species consumed.

Anglers that consume St. Clair River fish were asked to comment on quality of fish taste and smell based on a range of excellent, good, fair and poor. Almost ninety-two percent (92%) of the survey respondents identified the taste of fish from the St. Clair River as either excellent or good and only two people (1.2%) reported poor tasting fish. As for fish smell over eighty-two percent (82%) of the respondents identified St. Clair River fish as either excellent or good, less than two percent (2%) identified the smell as poor.

When respondents who identified fish taste and smell as poor were asked to comment on the types of tastes and odours they found distasteful, one reported a fishy smell and another reported a chemical taste; One individual indicated a change in taste that couldn't be described as well as a change in fish texture.

Of the 30 interviewees that choose not to consume fish from the St. Clair River, most reported that they catch and consume fish from lower Lake Huron, far fewer reported fish consumption from

Lake St. Clair and the Detroit River. Three individuals reported that they avoid fish from all areas surrounding the AOC.

While many anglers do not avoid eating specific types of fish, many identified a variety of commonly avoided species such as, bottom feeding fish, followed by pike, bass and pan fish. Few participants provided a clear reason for this; however, those that chose to comment listed: "taste preference" ; "concern over contaminated sediments and uptake in bottom feeding fish" ; "concern for chemicals" ; "concern for safety of eating fish" and "too many bones and not enough meat" on species such as pike, bass and pan fish.

As part of the questionnaire, interviewees that consume fish from the St. Clair River were asked if they habitually avoid fishing in certain areas of the St. Clair River. Of the 150 interviewees that responded, 73 percent did not consciously avoid areas of the St. Clair River. Of the twenty-seven percent who avoid fishing in areas of the river, the most commonly avoided area was the lower river with the most common reason being an over abundance of aquatic plants. Also mentioned were concerns with Talford Creek, the Lambton Generating Station and associated warm water, and concern over sewage in the upper river.

One hundred and thirty interviewees responded when asked to comment on perceived changes needed to improve the quality of the St. Clair River fish. Even when they ranked the quality of fish taste and smell as excellent, many were compelled to provide input on required action. Most expressed ongoing concerns over chemical spills, discharge to the river by industry and a call for zero pollution while some indicated that no changes to the river would increase their confidence in fish quality. A general call for cleaner water was proposed by a subset of respondents, with many calling for greater control of sewage spills and a need to address sewage separation in Sarnia. There were roughly the same number of responses that wished to see larger fish populations, a greater diversity of natural structure in the river, control for non-native species and less fishing pressure.

Based on the weight of evidence provided through the results of this survey, and the two previous studies undertaken to evaluate the tainting of fish and wildlife flavour on the St. Clair River the recommendation to the Canadian RAP Implementation Committee is to designate this beneficial use as not impaired.

Introduction

Tainting of fish and wildlife flavour is a beneficial use (BU) that has been identified as “requiring further assessment” within the St. Clair River Area of Concern (AOC). Two previous studies have endeavoured to clarify whether the status is impaired or not impaired. In 1995, a controlled olfactory sensory evaluation of tainting in walleye showed no distinguishable difference between upstream fish and fish caught within AOC waters. A change in status to “not impaired” was recommended in the 1997 RAP Update, with confirmation based on a St. Clair River shoreline survey. A subsequent survey was completed in 1997 with results (Dawson 1999) showing that 96 percent of respondents did not report fish tainting, further the few reports of tainting that were identified in this survey did not comment on whether the tainting was a recent or past observation. A secondary portion of this survey included questions on wildlife consumption and whether any tainting was observed. Of 106 respondents in this category there was not one report of tainting of wildlife flavour. While these studies may not have been completely representative of all users of St. Clair River, including First Nations, conditions within the St. Clair River are thought to have improved since these reports were published.

The St. Clair River Canadian RAP Implementation Committee (CRIC) which was established in the fall of 2005 discussed the need for a new assessment to determine the current status of this BU. It was decided by the CRIC and supported by the Binational Public Advisory Committee (BPAC) to develop a survey to seek input from individuals most able to provide an accurate perspective on this BU; the general public representing consumptive users, sport fish anglers and First Nations.

Methods

This study was designed to determine if St. Clair River fish currently have noticeable tainting associated with anthropogenic chemicals discharged to the river (rather than natural factors) and if taintings are markedly different from fish taken from outside the AOC. A 2007 St Clair River Angler questionnaire was developed by Environment Canada with input from partner agencies, the BPAC and the Friends of the St. Clair River (FOSCR). Questionnaires were printed, and a shoreline survey conducted. Anglers participating in the Bluewater Anglers 2007 Salmon Derby were requested to answer a set of questions relating to fish quality. The Derby typically attracts approximately 1000 anglers from the United States and Canada and was viewed as an opportunity to survey consumptive users and sport fish anglers to better understand their perceptions of fish quality. Both Walpole Island and Aamjiwnaang First Nations were contacted to ensure participation of both First Nations.

To facilitate the gathering of public input on fish quality, the 2007 questionnaire asked participants a total of 6 questions, some having multiple parts (Appendix 1). The 2007 questionnaire was informed by a previous Health Canada funded study that examined fishing and fish consumption along the St. Clair River (Dawson, 1999). The questions on the 2007 questionnaire touched on topics related to residency of anglers, the frequency of fish trips to the St. Clair River, the types of fish eaten, the quality of both fish taste and smell, avoidance of fish types and areas, and changes to the St. Clair River that would increase angler confidence in fish quality.

Six Lambton College students were contracted by the FOSCR to conduct the shoreline surveys at the City of Sarnia weigh-in station between April 27th and May 6th 2007. Additional surveys were completed through the FOSCR website and members of the Bluewater Anglers. Numerous media releases and interviews were conducted to garner public interest and participation, including: Sarnia Observer, Sarnia This Week, Wallaceburg News the Port Huron Times Herald and CHOK Radio in Sarnia.

RESULTS

Survey Participants

At the completion of all aspects of the survey, 198 individuals were interviewed. Survey participants were asked where they lived in order to provide a demographic overview. Seventy five percent (N=148) of participants were from Canada and eight percent (N=14) resided in the United States. The response rate from the two First Nations in the St. Clair River area were Walpole Island with ten percent (N=20) of the survey respondents and Aamjiwnaang First Nations with eight percent (N=16). It should be noted that both First Nations were invited to participate through the distribution of surveys to their respective communities, however, Walpole Island Heritage Centre decline the invitation and the Aamjiwnaang First Nation liaison was unable to find individuals that fish the St. Clair River on a regular basis. A follow up with the survey in the spring of 2008 within the Aamjiwnaang First Nation community resulted in the completion of 14 additional questionnaires being completed however of these 14 additional interviewees, only 3 indicated that they ate fish from the St. Clair River.

Table 1. Demographic summary of interviewees participating in the St. Clair River survey.

| Residency | Total | % |
|-----------------------------|-------|----|
| Canada | 148 | 75 |
| US | 14 | 7 |
| Walpole Island First Nation | 20 | 10 |
| Aamjiwnaang First Nation | 16 | 8 |

Angling Effort

When asked how many fishing trips are made to the St. Clair River on an annual basis, approximately 10 percent (N=19) reported that they make less than one trip per year. Thirteen percent (N=24) make between one and three fishing trips, 15 percent (N=28) make four to six fishing trips and 13 percent (N=23) make between seven and ten fishing trips. The majority (48 percent, N=87) reported that they fish the St. Clair River more than 10 times per year (Table 2).

Table 2. Summary of annual fishing trips to the St. Clair River.

| Annual Fishing frequency  | Number of Interviewees | % |
|--|------------------------|----|
| <1 x/yr | 19 | 10 |
| 1-3 x/yr | 24 | 13 |
| 4-6 x/yr | 28 | 15 |
| 7-10 x/yr | 23 | 13 |
| >10 x/yr | 87 | 47 |
| No response | 3 | 2 |

Specifics on Species Eaten from the St. Clair River

Eighty-five percent (N=167) of participants reported that they consume the fish they catch from the St. Clair River. When asked to identify their preferred species, all but eleven of the fish consumers interviewed provided comments. Survey results show that 30 percent of interviewees had an indiscriminate preference and stated that all types of fish are consumed. Many interviewees (45 %; N=89) provided a list of up to six species consumed. The top five species of fish consumed – in terms of greatest number of participants reporting – were, 1) walleye, 2) perch, 3) bass, 4) salmon/trout, and 5) pike. Approximately 14 percent (N=22) reported walleye as the only species

consumed; however, walleye was listed as a preferred species by over 50 percent of participants (Table 3).

Table 3. Most common fishes consumed by St. Clair River anglers.

| | N | % |
|------------------|----|------|
| Walleye/Pickerel | 95 | 61 |
| Perch | 56 | 36 |
| Salmon/trout | 53 | 34 |
| Bass | 29 | 19 |
| Pike | 4 | 2 |
| Crappie | 3 | 2 |
| Carp | 1 | 0.60 |
| Catfish | 1 | 0.60 |
| Bluegill | 1 | 0.60 |
| Panfish | 1 | 0.60 |
| All types | 30 | 19 |

Quality of St. Clair River Fish

Anglers that consume St. Clair River fish were asked to comment on quality of fish taste and smell (Table 4). Almost ninety-two percent of the survey respondents identified the taste of fish from the St. Clair River as either excellent or good and only two people or 1.2% reported poor tasting fish. As for fish smell over 82% of the respondents identified St. Clair River fish as either excellent or good and less than 2% identified the smell as poor (six participants chose not to provide comment on fish smell). Survey participants were then asked to comment on the types of tastes and odours in fish that they found distasteful in fish caught over the past three years. Of the three who reported poor quality of smell only one provided comment and stated that St. Clair River fish had a “fishy” smell. Of the two participants that responded that both taste and smell of fish is poor in the St. Clair River, one indicated that chemicals had changed the taste of fish and the other did not provide a reason for there poor rating of taste and smell but did identify that they made less than one fishing trip per year to the St. Clair River.

Table 4. Summary of survey participant responses on quality of fish taste and smell.

| | Excellent | Good | Fair | Poor |
|-------|------------|------------|-----------|----------|
| Taste | 61 (36.3%) | 93 (55.3%) | 12 (7.2%) | 2 (1.2%) |
| Smell | 42 (26%) | 91 (56.2%) | 26(16%) | 3 (1.8%) |

The survey also identified if anglers who do not consume St. Clair River fish, choose to eat fish from areas adjacent to the AOC. Results are provided – in terms of greatest number of participants reporting – in Table 5. Of the 30 respondents that chose not to consume fish from the St. Clair River, most reported that they catch and consume fish from lower Lake Huron. Far fewer reported fish consumption from Lake St. Clair and the Detroit River. Six individuals reported that they avoid fish from all areas surrounding the AOC.

Table 5. Areas adjacent to the St. Clair River where anglers consume fish.

| | Yes | No |
|--------------------|-----|----|
| Lower Lake | | |
| Huron | 9 | 4 |
| Lake St. Clair | 2 | 10 |
| Detroit River | 1 | 10 |
| All adjacent areas | 3 | 6 |

Do Angers Avoid Eating Specific Types of Fish?

While approximately 60 % of the anglers identified that they avoid eating certain types of fish, only 17 participants (10%), provided a clear reason why they do this. Respondents did list “taste preference” (N=6), “bottom fish feed on garbage” (N=2) and are more likely to contain high contaminant concentrations because of their association with bottom sediments (N=5). Some also thought that pike, bass and pan fish are too bony (N=4) and do not contain enough meat. One indicated avoidance of fish caught during certain times of the day and one avoided eating “shallow lake fish” caught in the river during the summer, owing to parasites.

Table 6. St. Clair River participant reporting of fish avoidance.

| | N |
|---------------------|----|
| Bottom feeding fish | 74 |
| Pike | 28 |
| Bass | 25 |
| Pan fish | 12 |
| Yellow perch | 6 |
| walleye | 7 |
| Salmon/trout | 4 |

Avoidance of St. Clair River Areas

As part of the questionnaire, respondents that consume fish from the St. Clair River were asked if they habitually avoid fishing in certain areas of the St. Clair River (Table 7). Of the 150 interviewees that responded, most (73 percent; N= 109) did not consciously avoid areas of the St. Clair River.

Of the twenty-seven percent (N= 41) of interviewees who avoid fishing in areas of the St. Clair River, with the most commonly avoided area being the lower river; mostly due to aquatic vegetation. Concern over the Lambton Generating Station and the associated warm water was mentioned along with a fear of sewage in the upper river. Four (4) interviewees chose not to specify where on the river they avoided fishing but provided the following reasons: sewage; sores on fish; too dirty, and “you don't want to know.” One respondent indicated that the middle/lower area was avoided but gave no reason. One also indicated avoidance of the middle and lower river below Talford Creek.

Table 7. Summary of concerns of fish consumers who avoid fishing in areas of the St. Clair River.

| | Upper | Middle | Lower | Unspecified location |
|---|-------|--------|-------|----------------------|
| Too many aquatic plants | - | - | 12 | |
| Oily taste in fish | - | - | 4 | |
| Power Generating Station and warm water | - | 2 | 1 | |
| Sewage | 1 | - | - | 1 |
| Fear of contaminants in fish | 1 | 2 | 3 | 1 |
| River smells bad | - | 1 | - | |
| Tumours | | | | 1 |
| No comment | 6 | - | 4 | 1 |

Perceptions on Changes Needed to the St. Clair River to Increase Angler Confidence

Although most people identified the taste and smell of St. Clair River fish as either excellent or good one hundred and thirty interviewees provided a response when asked to comment on the perceived needs in the St. Clair River to improve the quality of fish.

Most expressed ongoing concerns over chemical spills, discharge to the river by industry and a call for zero pollution while some indicated that no changes to the river would increase their confidence in fish quality. A general call for cleaner water was proposed by a subset of respondents, with many calling for greater control of sewage spills and a need to address sewage separation in Sarnia. There were roughly the same number of responses that wished to see larger fish populations, a greater diversity of natural structure in the river, control for non-native species and less fishing pressure.

Table 8. Perceived changes to the St. Clair River that would increase confidence in the quality of fish.

| Perceived changes needed | Number of responses |
|---|---------------------|
| Stop spills | 34 |
| Less industry or zero pollution | 16 |
| Cleaner water | 16 |
| Control sewage spills and address sewage separation | 12 |
| More fish, natural structure, less fishing | 11 |
| High fines to plants that pollute and more strict regulations | 3 |
| More monitoring and reports on testing | 6 |
| Boat traffic | 1 |
| Closure of Dunn Paper Plant | 1 |
| More four-stroke engines | 1 |
| No changes | 29 |

Conclusion

The results of this study identify that tainting of fish through taste and smell is not a concern expressed by over 85% of those interviewed during this survey of St. Clair River fish quality. Most fish consumers when asked to comment on fish quality reported either good and/or excellent smell and taste. Through the survey only two participants reported poor fish taste and three participants reported poor fish smell, when asked to comment on specific tastes and odours within the last three years. Reasons provided by respondents identifying either poor taste or smell included that fish from the St. Clair River have a fishy smell, another indicated that fish texture and taste had changed but could not describe the change in taste while only one respondent that consumed St. Clair River fish, associated poor fish taste and smells with chemicals in the St. Clair River.

This is the third assessment that has now been undertaken on the tainting of fish and wildlife flavour beneficial use. Combining the results from this survey along with the 1995 controlled subjective olfactory sensory evaluation of tainting in walleye in which no identifiable tainting was identified (Myllyoja and Johnson, 1995), a 1996/97 survey of over 291 respondents in which only 4% voiced concern over fish tainting and no mention of tainting of wildlife flavour from those that consumed wildlife (Dawson 1999) the conclusion would be that the Beneficial Use on tainting of fish and wildlife flavour in the St. Clair River is 'not impaired.'

REFERENCES

Dawson. J. 2000. Fish stories: a profile of fishing and fish consumption in the St. Clair River Area. Health Canada, Project Number K341813.

Myllyoya, R. and Johnson, G. 995. St. Clair River remedial action plan fish tainting evaluation; draft Report

O.M.E.E. and M.D.N.R. 1995. St.Clair River Area of Concern Water Use Goals Remedial Measures and Implementation Strategy, Stage 2 Remedial Action Plan

Appendix 1

St. Clair River Anglers Survey

Fish Quality and River Aesthetics



**Friends of the
St. Clair River**

St. Clair River Anglers Survey: Fish Quality and River Aesthetics



Friends of the St. Clair River (FOSCR) requires public input on fish tainting and river aesthetics in order to determine the current status of these beneficial uses of the River. This survey seeks to determine if St. Clair River fish currently have noticeable taints associated with human influences on the river, rather than natural factors, and to understand public perception of the current aesthetic condition of the St. Clair River. **PLEASE** help us collect this important data.

1. In which nation do you reside?

- Canada (Local to the St. Clair River Visitor)
Aamjiwnaang First Nation
Walpole Island First Nation
U.S. (Local to the St. Clair River Visitor)
Other

FISH QUALITY

2. How often do you fish the St. Clair River?

<1X/year 1-3X/year 4-6X/year 7-10X/year >10X/year

3. Do you eat fish from the St. Clair River? Yes No

a) If you answered 'yes', what types of fish do you eat?

b) How do you rate the quality of fish caught?

| | | | | |
|--------------|------|------|------|-----------|
| TASTE | Poor | Fair | Good | Excellent |
| SMELL | Poor | Fair | Good | Excellent |

c) If you rated fish quality as 'poor', what tastes and/or odours have you noticed over the last three (3) years that you disliked?

d) If you answered 'no', do you eat fish caught from these other areas?

| | | |
|-------------------------|-----|----|
| Lower Lake Huron | Yes | No |
| Lake St. Clair | Yes | No |
| Detroit River | Yes | No |

Why?

4. Do you avoid eating any specific types of fish in the St. Clair River?

| | |
|-------------------------|--|
| Northern Pike | Walleye |
| Bass | Salmon & Trout |
| Yellow Perch | Panfish (Crappie, Bluegill, Rock Bass) |
| Bottom feeding fish | |
| Other (please specify): | |

Why?

5. Are there specific areas of the St. Clair River where you avoid eating the fish you catch?

No Yes (Where: Upper Middle Lower)

Why?

6. What changes to the St. Clair River would increase your confidence in the quality of fish?

RIVER AESTHETICS

7. Would you say that the aesthetics/appearance of the St. Clair River has improved over the last 10 years?

Yes No Don't Know

What is this based on?

8. How would you rate the appearance of St. Clair River water?

Degraded Poor Fair Good Excellent

9. Have you noticed any objectionable deposits, unnatural colour or turbidity, unnatural odour or unnatural scum/floating material in the last two years?

Yes No

If YES, what was the appearance of this substance?

Where did it occur? Upper Middle Lower

How often does it occur?

< 1 X/year 1-3 X/year 4-6 X/year 7-10 X/year
>10X /year Always/Constantly

Thank you for your participation.

Please return completed survey to:

Ken Hall
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Sarnia, ON N7S 1K8

Survey conducted by Friends of the St. Clair River with funding support from Environment Canada

