

Assessment of ‘Degradation of Aesthetics’ (BUI #11) in the Detroit River Canadian Area of Concern

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EXECUTIVE SUMMARY

The *Degradation of Aesthetics* BUI was first identified as 'impaired' in the 1991 Detroit River Stage 1 Remedial Action Plan Report due to large volume of combined sewer overflows frequently discharging to the river, discoloured water from slaughter houses on the U.S. side, oil and grease, debris and other types of objectionable deposits. The status remained impaired since that time because there wasn't enough evidence on aesthetic condition, especially for the Canadian side of the River. A visual survey at 11 sites along the entire Canadian shoreline was conducted from July 2011 to October 2011 and March 2012 to July 2013. Aesthetic condition (for this report) refers to any visible issues that may indicate anthropogenic pollution problems leading to poor water quality. Researchers recorded the presence/absence of several variables that may indicate local pollution problems (e.g., colour, clarity, odour, debris). The results of this assessment indicate that there was no significant, persistent degradation of aesthetics on the Canadian side of the Detroit River AOC, except for turbidity. The Detroit River showed signs of turbidity (cloudy) during 76.3% of all sampling events while water was only clear 9% of the time and opaque (indicating severe turbidity) during 14.1% of the sampling events. However, based on weather evidence the authors suspect that the source turbidity is not local and probably from upstream sources outside of the AOC. There were very few occurrences of debris in the river (4 times or 2.6% of all site visits). No raw sewage, pollution or blood was observed at any time during the survey. Taken together, the results suggest that the *Degradation of Aesthetics* on the Canadian side of the Detroit River should be re-designated to '**NOT IMPAIRED**'.

Important Notes:

Approved for re-designation by DRCC and PAC on January 30, 2014.

Public review period June 5 – July 5, 2014; no comments received.

INTRODUCTION

Prior to European settlement, the Laurentian Great Lakes (including the connecting channels) were a source of clean, safe water abundant with fish and wildlife (Hartig 2003). Pollution of the Great Lakes became a serious problem as human populations grew in cities near the lakes and channels. The intensive and improper usage of water led to several waterborne disease epidemics in humans, loss of important habitat, fish and wildlife kills and the inability to access safe drinking water. Many of the severe water quality problems were linked to industrial pollution (e.g., oil spills, discharges from slaughter houses) and sewage pollution. It wasn't until the 1970s (due, in part, to public outcry over Lake Erie's declining condition) that changes to legislation in Canada and the United States were made to revise guidelines, penalize polluting industries and commit to investing in better sewage treatment. Since that time, many improvements to water quality have been made.

In 1987, the Great Lakes Water Quality Agreement of 1972 was amended by protocol and included the identification of Areas of Concern (AOCs) which were locations deemed as more degraded than other locations in the Great Lakes (including the Detroit River). It also included a list of 14 potential beneficial use impairments (BUIs) related to ways humans and wildlife may be impacted by changes in the chemical, physical and biological integrity of water in an AOC. The '*Degradation of Aesthetics*' BUI was first identified as 'impaired' in the 1991 Detroit River Stage 1 Remedial Action Plan (RAP) Report due to large volume of combined sewer overflows frequently discharging to the river, discoloured water from slaughter houses on the U.S. side (Fig.1A), oil and grease, debris and other types of objectionable deposits (Fig.1B) (MDNR/OMOE 1991). However, the 1991 Report noted that there was no quantitative method for determining aesthetic degradation and information was scarce. Aesthetic surveys carried out in 1999 and 2000 found that the Detroit River was clear, colourless and odourless during both wet and dry weather conditions and that most locations had natural or no debris. There were issues related to foam and oil films noted; however, their sources could not be identified (Leney & Haffner 2006). It was unclear whether or not the survey was conducted on the Canadian side of the River, therefore, the status of this BUI remained 'impaired' in the 2010 Stage 2 Report because there wasn't enough information on the aesthetic condition of the Canadian side of the AOC.



Figure 1. Aerial photographs of the Detroit River (U.S.) depicting unsightly discharges impacting the aesthetic condition of river water. (A) Blood from a nearby slaughterhouse outfall (ca. 1969); (B) Industrial discharge at McLouth Steel (ca. 1963).

Aesthetic condition in the context of this report refers to visible issues that may indicate anthropogenic pollution problems leading to poor water quality. For example, this study examined water clarity (turbidity), colour, and odour; presence/absence of debris (trash, oil, scum, sewage waste); presence/absence of foam; and presence/absence of vegetation. However, not all of these aesthetic indicators are linked to water pollution as there are natural sources or events (e.g., weather conditions) that lead to poor aesthetic condition that is beyond the scope of the RAP (Table 1).

Table 1. A description of each aesthetic indicator, its potential source, and how it may relate to potential pollution problems.

Qualitative indicator	What can it mean?
Colour	<ul style="list-style-type: none"> • Blue or blue-green is the baseline and desired water colour. • Brown or grey water can indicate turbidity (suspended sediment). Turbidity can occur due to wind/wave/rain action (natural) and stormwater runoff (anthropogenic). • Black can indicate oil pollution. • Green can indicate algae blooms.
Clarity	<ul style="list-style-type: none"> • Poor water clarity can indicate turbidity in the water (suspended sediment). Turbidity can occur due to wind/wave/rain action (natural) and stormwater runoff (anthropogenic).
Odour	<ul style="list-style-type: none"> • Earthy, fishy smells are natural and not of concern unless there is a visible source such as a large fish kill or algal bloom. Decaying vegetation or insects (mayflies) can give off this odour. • Hydrocarbon (gasoline) odours can indicate anthropogenic pollution but the source may be air rather than water. • Musty or sewage smells can indicate pollution due to combined sewer overflows or untreated sewage.
Foam	<ul style="list-style-type: none"> • Natural foam is brown or tan (sometimes white) with an earthy or fishy smell. It indicates decaying plant material or fine sediments in the water and is not a pollution concern. • Unnatural foam is white, persists longer than natural foam and may have a perfume or soap smell. It can indicate a local pollution source.
Debris	<ul style="list-style-type: none"> • Unnatural debris includes garbage, sewage, oil or scum that can indicate anthropogenic pollution. • Natural debris includes dead insects, leaves, and sticks that pose no risk to the environment.
Vegetation	<ul style="list-style-type: none"> • Absence of vegetation can mean that there is an anthropogenic pollution source killing it or that turbidity is impeding plant growth. • Presence of vegetation, like algae, can indicate nutrient enrichment due to run-off or a local pollution source.

The Detroit River Canadian Stage 2 RAP Report states that the *Degradation of Aesthetics* BUI **will no longer be considered impaired when the waters are devoid of substances at levels that produce persistent objectionable deposits, turbidity, and/or colour** (Green et al. 2010). The purpose of this study was to use the above listed qualitative aesthetic indicators and public opinion to assess the aesthetic condition of the Canadian side of the Detroit River proper (not the tributaries).

DATA COLLECTION AND SAMPLING SITES

Public Perception

Recreational users (e.g., boaters, anglers) of the Detroit River are often those who know it best because they are on or near the water frequently. In 2010, during a survey of anglers on the condition of another BUI (*Tainting of Fish and Wildlife Flavour*), local anglers were asked their opinion of the aesthetic condition of the Detroit River. The angler survey was administered by volunteers along the Windsor Riverfront and through a mailout to participants of the Ministry of Natural Resources' Angler Diary Program (DRCC 2011). The survey consisted of 11 questions with the last three related to aesthetic condition (Appendix 1, questions 9-11). Furthermore, in April 2010, participants of an 'Earth Day' Environmental Fair voluntarily completed a survey about their opinion of the Detroit River's aesthetic condition. Questions asked were the same mentioned above. Results from both surveys were compiled and analyzed.

Aesthetics Condition Survey

Due to the subjective nature of the public attitude surveys in 2010, the DRCC decided to conduct a more comprehensive, routine visual inspection of various sites along the Canadian side of the Detroit River to assess this BUI. A survey was developed to examine aesthetic condition (indicators noted in Table 1) using a similar method to that used in the St. Clair River AOC as guidance. A total of 11 sites along the Canadian side of the Detroit River (Fig. 2) were examined. Most sites were approximately 5 km apart (where permitted) and were chosen to reflect various adjacent land uses as well as a mix of private/public sites (e.g., industrial, public park, residential). Site selection was difficult because some locations along the river were unsafe or had very limited access to conduct a survey. In fact, the Lou Romano Outfall site (#5 on map) was removed from the sampling schedule in 2012 due to safety concerns. Sites #3, 4, and 5 are located along the Windsor riverfront interceptor trunk sewer, thus can be influenced by the occurrence of combined sewer overflows (CSOs). Permission to access any private properties was obtained from landowners prior to conducting the survey. Due to the time

taken to obtain permission for site access, site sampling did not begin at the same time for all locations.

Recording of aesthetic conditions (for most sites) began on July 28, 2011 until October 4, 2011 and resumed again after the winter on March 23, 2012 until July 2012. Sampling was conducted every two weeks during the above noted sampling periods. There was an effort to record aesthetic conditions 24 hours after a rain event but this was not always possible, resulting in a mix of wet and dry weather conditions. Surveys were conducted early in the day (9 am) and generally took until the end of the day to complete (3 pm). At least three photos were taken during each site visit to accompany anecdotal data. All data was entered into a Microsoft Excel spreadsheet and results were analyzed together to show overall water conditions.

In addition to the anecdotal information collected for this report, the DRCC contacted the Windsor Utilities Commission (WUC) to obtain turbidity values of Detroit River water collected from the drinking water intake during the time period specified above. Historical weather information (e.g., rainfall amount) used in some analyses was obtained through the Weather Network's (www.theweathernetwork.com) online database using corresponding sampling dates.

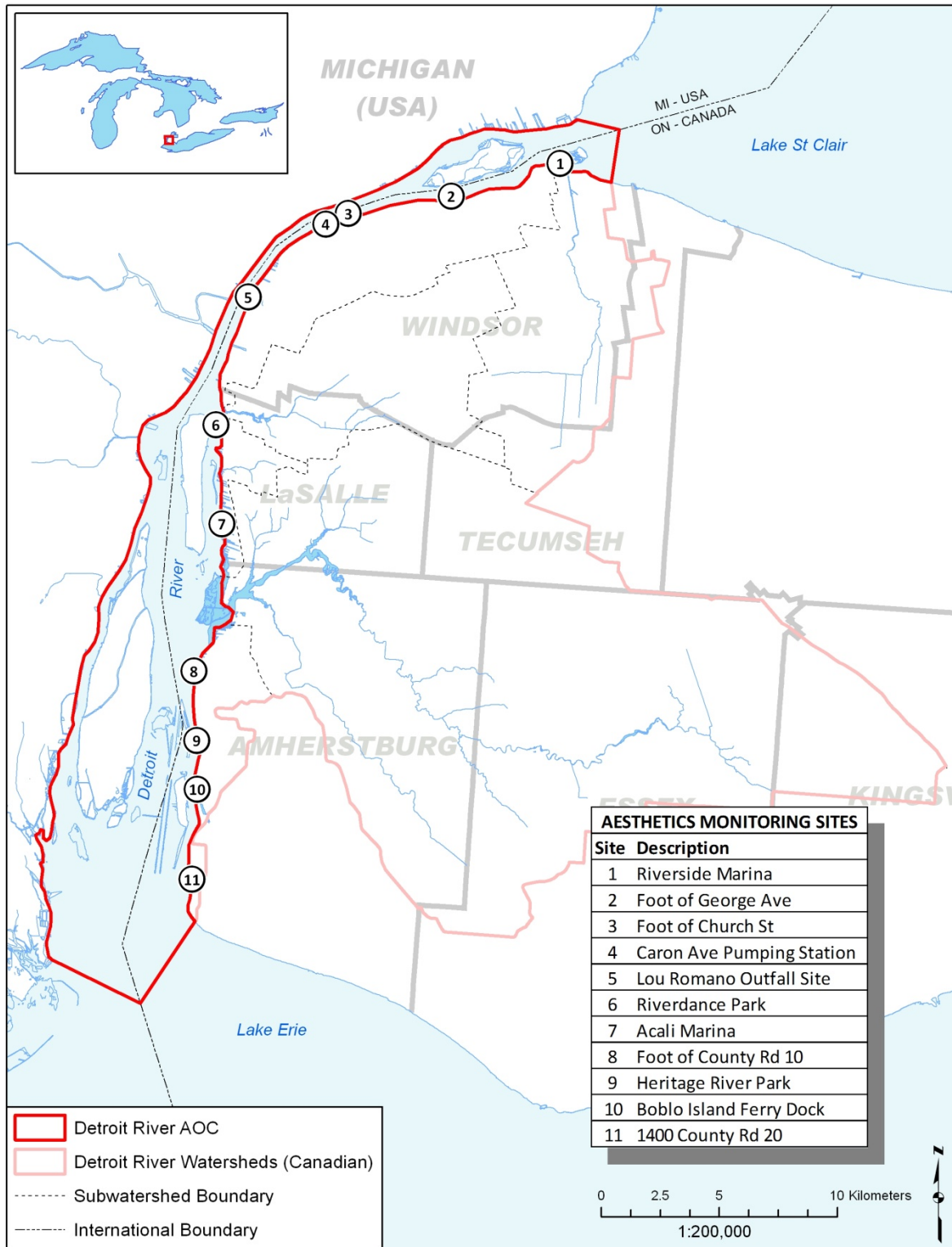


Figure 2. A map of the 11 aesthetics condition sampling sites in the Detroit River AOC.

RESULTS & DISCUSSION

Public Perception

In 2010, 128 Canadian anglers answered a survey related to another BUI that included 3 aesthetics questions (Appendix 1). Overall, most anglers rated the Detroit River's appearance as satisfactory or better (5% - Excellent; 52% - Good; and 35% - Fair) while 7% noted it as poor (2 people did not answer). The most common type of deposit noted was natural (e.g., dead fish, weeds) and garbage/trash; however, oily film, foam, and scum were also reported by some anglers (Table 2).

Table 2. Occurrence of "objectionable deposit" reported by anglers surveyed in 2010.

Objectionable Deposit	# of times noted
Trash/Litter	41
Natural debris	37
Scum	12
Oil/Oily film	7
Turbidity	6
Foam	4
Feces/Sewage	3

The survey of 49 participants during an 'Earth Day' Environmental Fair in 2010 showed that 31 people (63%) noted some objectionable deposits on the Detroit River. The most common type of deposit noted was garbage/trash/litter but turbidity, scum and odour were also noted (Table 3). Overall, most of the participants rated the Detroit River's appearance as fair (55%). Nobody rated it as 'Excellent', 12% noted it was 'Poor', and 31% deemed it to be 'Good' (1 person did not answer).

Table 3. Occurrence of "objectionable deposit" reported by Earth Day participants in 2010.

Objectionable Deposit	# of times noted
Trash/Litter	22
Natural debris	0
Scum	7
Oil/Oily film	0
Turbidity	3
Foam	0
Feces/Sewage	1

The survey of recreational users and general public indicated that there may be a potential aesthetic issue in the Detroit River but responses did not provide a clear indication of problem areas or timing (wet or dry weather, year). The results of these surveys led to a more comprehensive investigation of the Detroit River's aesthetic condition, described in the following section.

Aesthetics Condition Survey

Aesthetic condition refers to visible issues that may indicate anthropogenic pollution problems leading to poor water quality. This study examined the colour, clarity (turbidity), and odour of water; presence/absence of debris (trash, oil, scum, sewage waste); presence/absence of foam; and presence/absence of vegetation for the Canadian side of the Detroit River. Please refer to Table 1 for a summary of what each indicator can tell us about the quality of Detroit River water and its aesthetic condition.

Water colour and clarity (turbidity)

Water colour can indicate local pollution sources such as oil (black), blood (red) or other environmental problems such as algal blooms (green) or severe runoff (brown). The colour of the Detroit River is influenced by the weather. On a clear, sunny day is typically blue or blue-green (teal) and on an overcast day it is grey (Fig. 3). However, it is generally known that the Canadian side of the Detroit River is more turbid than the U.S. side due to the hydrodynamics of the river and upstream sediment runoff sources located outside of the AOC (e.g., Thames River). In addition to water colour, poor water clarity can indicate turbidity (from suspended sediments) which can occur due to wind/wave/rain action (natural) or from stormwater runoff (anthropogenic).

The colour indicator in the survey was very subjective and difficult to interpret without the use of a more rigorous scientific approach or equipment (e.g., colour meter). The colour of water was typically blue-grey (indicating some turbidity) and often grey or brown (more turbid) (Fig. 4). There was no discoloured water from anthropogenic sources (e.g., black oil or red blood) which was one of the reasons the BUI was listed as impaired in the 1991 Stage 1 RAP Report. Furthermore, it is important to note that while careful attention was made to ensure



Figure 3. Sample photos showing the colour of the Detroit River (blue-green/teal) on a sunny day, clear day.



Figure 4. Example photos showing the differences in colour due to turbidity along the Canadian shoreline.

consistency in sampling, the aesthetics survey was conducted by two different people in 2011 and 2012 resulting in possible differences in judgement of colour. For example, turbid (or cloudy) water may have been recorded as grey by one person and brown by another.

In order to discern between slightly turbid water and water that may indicate a more serious environmental problem, the results were divided into 4 different categories: clear (observer can easily see an object through water), turbid (observer's view of object underwater is difficult but still possible), opaque (observer cannot see object through the water), and turbid + brown (indicating a more serious turbidity problem) (Table 4). Our results indicate that the Detroit River showed signs of turbidity (cloudy) during 76.3% of all sampling events while water was only clear 9% of the time and opaque (indicating severe turbidity) during 14.1% of the sampling events.

Table 4. Water condition (clarity and colour) at each site during the sampling period.

SITE	n	Clear	Turbid	Opaque	Turbid + brown
Riverside Marina	15	1	13	1	8
George Avenue	15	3	10	2	6
Church Street	15	0	12	3	9
Caron Avenue Pumping Station	15	0	12	3	8
Prospect Avenue	11	0	9	2	8
Riverdance Park	15	0	9	6	6
Acali Marina	13	3	8	2	3
County Road 10	15	1	14	0	10
Heritage River Park	12	3	9	0	4
Boblo Island Ferry Dock	15	1	11	3	5
1400 County Road 20	14	2	12	0	6

Turbidity is an indication of sediment runoff and not necessarily contamination. However, there are other (non-aesthetic) issues with turbidity: high levels of turbidity *may* impact the ability to properly treat drinking water and it may disturb aquatic habitat by inhibiting the amount of light that can penetrate water thus impeding the growth of submerged aquatic vegetation. For these reasons, researchers examined the presence/absence of vegetation in the river (see 'Vegetation' section) and also contacted the Windsor Utilities Commission for turbidity values measured at the A.H. Weeks Drinking Water Treatment Plant for dates corresponding to our sampling events. Turbidity in excess of 5.0 NTU (Nephelometric Turbidity

Unit) becomes visible to the naked eye and as such a majority of consumers may object to its presence in tap water (MOE 2006). The results provided to the DRCC showed that turbidity at the water intake (not the tap) ranged from 4.4 NTU to 64.8 NTU (Figures 5 & 6, red line). Those values indicate that raw Detroit River water was often turbid and would have been visible by the researcher during site visits.

It is generally believed that turbidity is worse during rain events (due to runoff) or strong winds because this is when sediments are stirred up. Therefore, we examined turbidity against rainfall amounts and wind speed. There was no consistent relationship between high turbidity units and weather conditions (Fig. 5: precipitation and Fig. 6: wind speed) during our sampling events. The results suggest that the persistent turbidity observed in the Detroit River is not likely due to local runoff or weather conditions but probably somewhere outside of the A

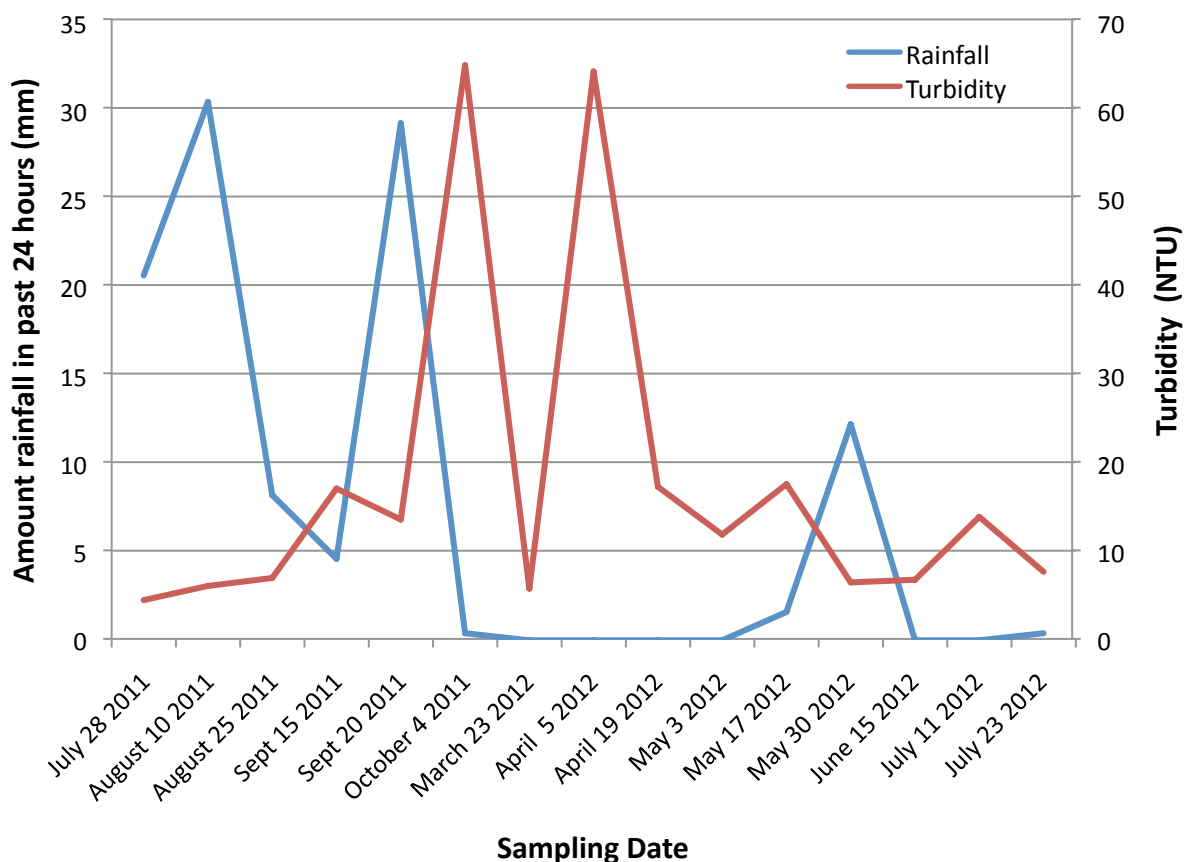


Figure 5. The amount of rainfall in past 24 hours of sampling date (from Weather Network) and turbidity values recorded on each sampling date at the A.H. Weeks Drinking Water Treatment Plant intake.

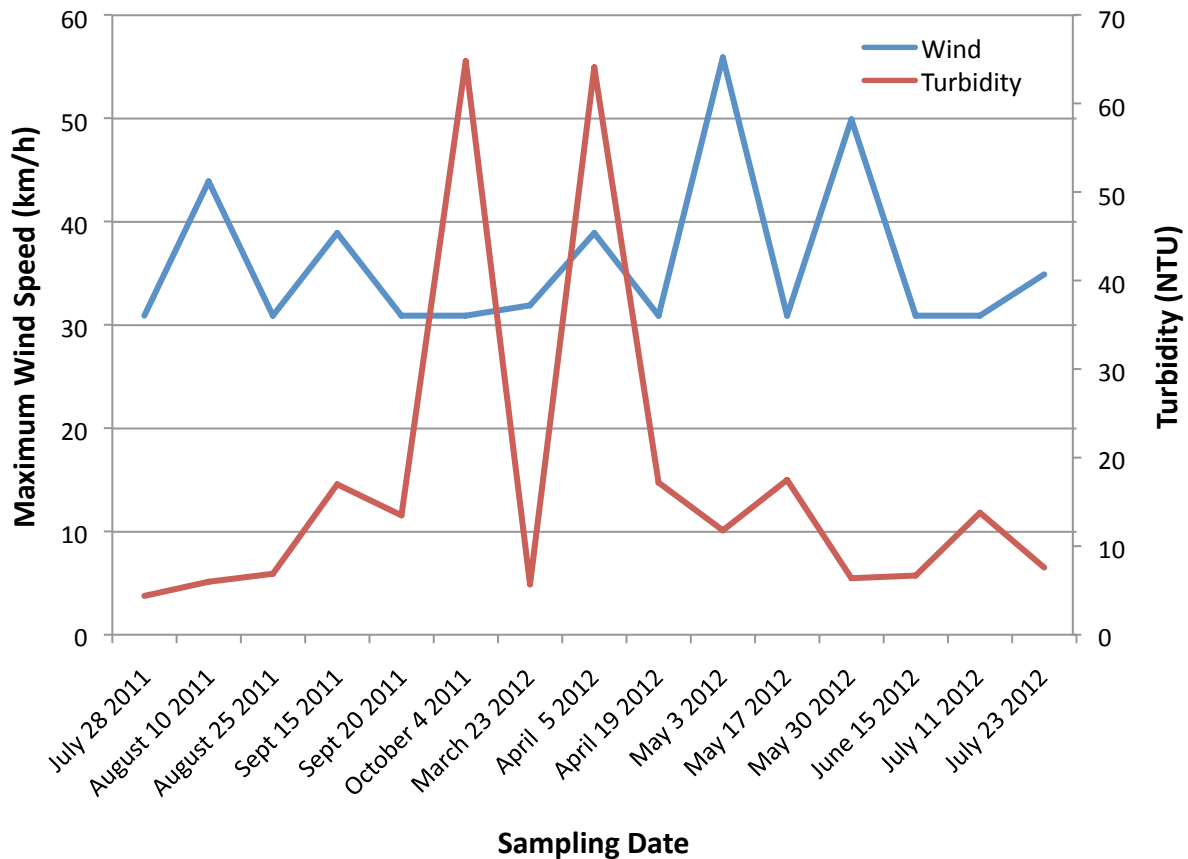


Figure 6. Maximum wind speed recorded at the Windsor Airport (from Weather Network) and turbidity values recorded on each sampling date at the A.H. Weeks Drinking Water Treatment Plant intake.

Odour

Nearby odours can provide clues into potential pollution sources such as oil or raw sewage. Odours (i.e., fishy, hydrocarbon, and musty) in the air at 5 different sampling sites were occasionally noted (Table 5). However, odours in the air may not be related to water pollution; therefore, a careful visual inspection was conducted whenever an odour was noted. It was confirmed by the observer that the fishy smell at the Riverside site was likely due to nearby decomposing vegetation and/or mayflies as they were visible onsite. A hydrocarbon smell was noted at 3 sites. At two of the sites, visual inspection confirmed the source was exhaust from heavy equipment being used onsite (Lou Romano Outfall) and a nearby boat ferry (Boblo Island Ferry Dock). There was only one site visit whereby a hydrocarbon odour was noted but there was no visual evidence of gasoline or any possible source. A musty smell was recorded at the Caron Avenue site during 60% of the visits. The source of the odour was confirmed as coming

from the Caron Avenue Pumping Station, adjacent to the sampling site (Paul Drca, pers. comm.). The pumping station forces sewage water toward the Lou Romano Water Reclamation Plant for treatment and the odour comes from this process. There were no odours recorded that suggested raw sewage pollution in the river, even after a rainfall event.

Table 5. Occurrence of odours noted at each site during the sampling period. Additional comments are provided for those sites with occurrences.

SITE	n	# of times noted	COMMENTS
Riverside Marina	15	1	Fishy; after rainfall event (29.2 mm)
George Avenue	15	0	N/A
Church Street	15	0	N/A
Caron Avenue Pumping Station	15	9	Musty smell from the pumping station process—does not affect water. One incidence of fishy smell on same date as the Riverside marina site.
Prospect Avenue	11	2	Hydrocarbon odour—site is near an aggregate dock with heavy equipment and across from Zug Island (U.S.).
Riverdance Park	15	0	N/A
Acali Marina	14	0	N/A
County Road 10	15	0	N/A
BruMon Marina	12	0	N/A
Boblo Island Ferry Dock	15	1	Hydrocarbon smell—ferry barge parked next to the site.
1400 County Road 20	14	1	Hydrocarbon smell but no visual indication of source.

Debris (“objectionable deposits”)

Debris can be from natural and unnatural sources. Natural debris in this survey was considered to be any type of vegetation (twigs, branches, leaves) or dead insects, fish while anthropogenic debris was noted as sources due to human causes (e.g., trash, oil, scum, sewage waste). There was no oil, scum, or human waste observed at all during the 2011-2012 sampling period. The presence of these pollution indicators was the main reasons the BUI was listed as impaired since the Detroit River was first listed as an AOC. There have been several noteworthy upgrades to wastewater infrastructure over the last two decades including upgrades to the Lou Romano, Little River and Amherstburg Wastewater Treatment Plants, the construction of a Windsor Riverfront Retention Treatment Basin and numerous sewer separation projects. Wastewater treatment plants are no longer a significant source of contamination as they once

were, with the exception of extreme weather events. There are also more stringent regulations for discharges to the River compared to the 1970s and 1980s. The results suggest that these important infrastructure projects continue to improve local water quality conditions. Therefore, municipalities adjacent to the Detroit River (Windsor and Amherstburg) should continue their ongoing sewer separation and address remaining CSOs.

Very few occurrences of trash (one cup, one milk carton, one condom, and cigarette butts) (Fig. 7) were noted 4 times during the survey, representing only 2.6% of all sampling events (Table 6). Natural debris such as dead mayflies, flower petals, sticks and leaves (Fig. 8) were much more prevalent—noted during 43.6% of all site visits—but are not indicative of anthropogenic pollution. For example, mayflies are aquatic insects that are indicative of good water quality (as they are not tolerant of water or sediment pollution) and are an important food source for fish. They have a short adult life cycle; after emerging from the water, adults generally live for up to 3 days and they die shortly after laying their eggs in the water. It is very common to see many dead mayflies near healthy waterbodies in late June-early July when they were recorded in this survey.

Table 6. Occurrence of anthropogenic debris noted at each site during the sampling period. Additional comments are provided for those sites with occurrences.

SITE	n	# of times noted	COMMENTS
Riverside Marina	15	2	One cup and one milk carton on two separate occasions; no rain on either date.
George Avenue	15	1	One condom (Fig. 7); after a rain event (12.2 mm)
Church Street	15	0	-
Caron Avenue Pumping Station	15	0	-
Prospect Avenue	11	1	Cigarette butts and bottle caps on shore; after rainfall event (20.6 mm)
Riverdance Park	15	0	-
Acali Marina	14	0	-
County Road 10	15	0	-
Heritage River Park	12	0	-
Boblo Island Ferry Dock	15	0	-
1400 County Road 20	14	0	-



Figure 7. Photo of debris found once during survey after a heavy rainfall.

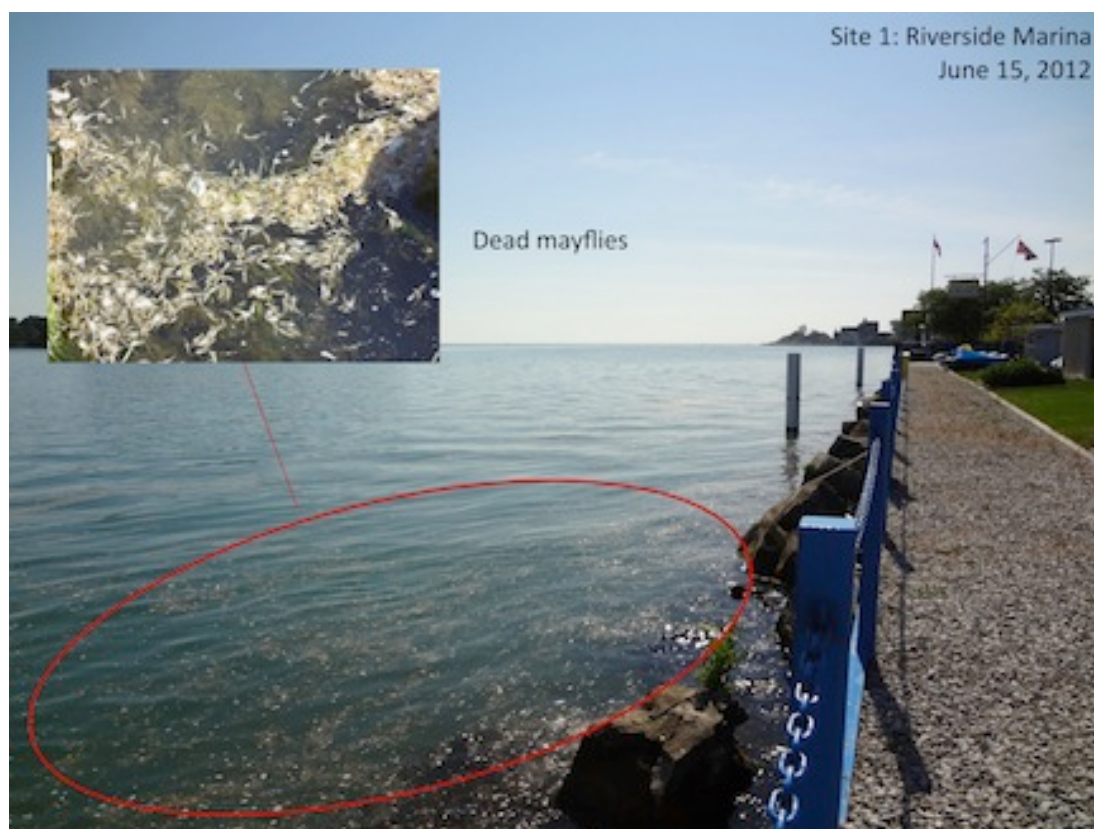


Figure 8. Example photo showing large amounts of dead mayflies along the shoreline at Riverside Marina (Site 1). These occurrences are seasonal.

Foam

Foam along the Canadian shoreline of the Detroit River was recorded at 33% (52) of all site visits during the sampling period. Foam on the surface of water occurs through the mixing of air and water (e.g., caused by wind). There are natural and anthropogenic sources of surface foam on water which can be identified by the colour and odour of foam. Natural foam is more prevalent during the spring and fall when flower petals, leaves, and other vegetation decompose in water and is usually white and has an earthy/fishy smell (Manitoba Water Stewardship 2000). Natural foam can also be caused by the mixing of silt (sediments) in water and is usually brown or tan. Unnatural foam usually comes from soaps or excess phosphates in the water possibly from sewer overflows or improper dumping into storm drains. This type of foam is also white but has a perfume or soap smell and persists in the water longer than natural foam (Manitoba Water Stewardship 2000; IDEM 2001).

When present, the colour of the foam in Detroit River water was recorded. Foam visible in the Detroit River was usually white and sometimes brown (Fig. 9); no perfume or soap smells were ever noted and usually paired with floating vegetation. Our results suggest that foam in the Detroit River is naturally-occurring and most likely due to decaying vegetation or fine sediments in the water.

Vegetation

The absence of vegetation in the water can indicate that there is an anthropogenic source of pollution nearby or turbidity impeding plant growth (by limiting the penetration of light into the water). The presence of certain types of vegetation, like algae, can indicate nutrient enrichment due to run-off or a local pollution source.

Vegetation was frequently seen in the nearshore area of the Detroit River despite the turbid conditions of the water. The most common type of vegetation seen was attached to rocks near the surface of the water or submerged under water. Unfortunately, the authors did not identify plant species or the amount of vegetation present. There were no occurrences of algal blooms recorded at any of the sampling sites. Our results suggest that aquatic vegetation does not seem to be impacted by turbidity and there are no persistent sources of nutrient enrichment in the area.



Figure 9. Example photographs showing different types of foam occurrences on the Detroit River. Top: foam collecting along the shoreline with decaying vegetation. Bottom: sparse foam present throughout the nearshore area.

CONCLUSION

The Stage 2 RAP Report states that this BUI will no longer be considered impaired “when the waters are devoid of substances at levels that produce persistent objectionable deposits, turbidity, and/or colour” (Green et al. 2010). Taken together, the results of this assessment indicate that there is no significant, persistent degradation of aesthetics on the Canadian side of the Detroit River AOC, except for turbidity. While there were some minor occurrences of debris and foam, the presence of turbidity was the only aesthetic indicator that was noted as persistent in the Detroit River (regardless of weather conditions). It is important to note that not all of the aesthetic indicators examined in this study, namely turbidity, are linked to water pollution as there are natural sources and/or events (e.g., decaying vegetation, weather conditions, dead insects) that can lead to poor aesthetic condition that is beyond the scope of the RAP. The main reason this BUI was originally identified as ‘impaired’ was because of large volumes of raw sewage frequently discharging into the river, discoloured water from oil and slaughterhouses in the river. Our findings show that these are no longer an issue on the Canadian side of the Detroit River. There was no occurrence of raw sewage, pollution or blood at any time during the survey.

On January 30, 2014 the DRCC and the Canadian Public Advisory Council approved the recommendation to change the status of BUI to **‘NOT IMPAIRED’**.

ACKNOWLEDGEMENTS

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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
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