Factsheet - Re-designation of the Degraded Fish Populations Beneficial Use Impairment (BUI)



DETROIT RIVER CANADIAN CLEANUP

The Detroit River Canadian Cleanup implements the Remedial Action Plan on behalf of a community-based partnership working together to protect, restore, and enhance the Detroit River ecosystem. The federal, provincial, and municipal government, local industries, scientific researchers, local environmental organizations, and many dedicated citizens are key partners and play an important role in the cleanup process. The DRCC's member organizations provide leadership in identifying partnerships and funding opportunities to support and implement clean up goals.



BACKGROUND

Historical discharges of pollutants from industries, municipal wastewater plants, combined sewer overflows, and urban and rural runoff have contributed to impaired water quality and degraded the aquatic environment of the Detroit River. In 1987, the Detroit River was identified as an Area of Concern (AOC) under the Great Lakes Water Quality Agreement (GLWQA). This was based on the evaluation of 14 specific criteria, referred to as beneficial use impairments (BUI); one of which is *degraded fish and wildlife populations*. A Beneficial Use Impairment (BUI) is a condition that interferes with the ability of humans to use the aquatic environment or the ability of the aquatic environment to support aquatic life. All 14 BUIs must be considered not impaired before the Detroit River can be removed from the list of AOCs. Of the 14 BUIs the DRCC has thus far designated 10 as not impaired.

WHAT WAS THE PROBLEM?

The status of fish populations in the Detroit River has changed over time. The 1991 stage 1 Remedial Action Plan report cited the river providing habitat for over 60 species, including 32 using it to spawn, as justification for fish populations to be designated as "not impaired". However, the 1999 DRCC evaluation identified fish populations as "impaired" because of high levels of contamination (Mercury, PCBs, PAHs) and dwindling habitat due to shoreline hardening. The 2006 Status of the BUIs report noted improving conditions within the AOC, but BUI 3 remained impaired primarily due to large numbers of coarse fish species along with increased abundances of invasive species. The 2006 report also noted some signs of recovery with high Walleye (Sander vitreus) angler catch rates and the presence of spawning Lake Whitefish (Coregonus clupeaformis) and Lake Sturgeon (Acipenser fulvescens). Finally, the 2010 RAP Stage 2 report listed BUI 3 as impaired due to concerns of mercury, pesticides, PCBs, and PAHs contamination and reports that Sturgeon populations were 1% of historic levels. The 2010 report continued to note signs of recovery, including evidence of spawning Whitefish, Sturgeon and 34 other species; a strong 2003 Walleye year class; and surveys identifying over 54 fish species in the river.

Over the past 30+ years the perceived issues facing fish populations in the Detroit River and subsequent criteria for assessing BUI #3 have changed, making a conclusive assessment of the BUI's status elusive. A large impediment in assessing the BUI's status has been the lack of SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) criteria given real-world sampling challenges in the river. Without SMART criteria, subjective interpretation of assessments has led to conflicting conclusions about the fish































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community. In 2021, the DRCC revised BUI #3 criteria into a SMART framework which reflected the major concerns for Detroit River fish populations (Table 1). The revision of the criteria made this 2023 assessment of fish population possible.

WHAT WAS DONE

The fish population's status was assessed using the weight-of-evidence from a review of scientific literature and agency assessment reports. Results from the review are summarized in Table 1.

Table 1. Summary of the conclusions for each sub-criterion related to fish population portion of BUI #3

Sub-criterion #1: Fish communities in wetland coastal areas are comparable to fish communities in unimpaired coastal wetlands

Assessment: Sub-criterion has been met. Index of Biological Integrity (IBI) scores in the Detroit River AOC are comparable to the Walpole Island Delta, a non-AOC reference site (Midwood et al. 2020). Furthermore, fish community in wetland and coastal areas in the Detroit River are diverse and healthy (Lapointe et al. 2010, Francis et al. 2014; Currie & Victor 2020; Hilling et. al. 2021).

Sub-criterion #2: The number of adult Lake Sturgeon is greater than 750

Assessment: Sub-criterion has been met. The most recent US Fish and Wildlife Service estimates of the Detroit River Lake Sturgeon population size at 6,416 (Chiotti et al. In Review). Furthermore, researchers have physically handled over 618 adult Sturgeon with additional new individuals being handling each year.

Sub-criterion #3: There is no evidence of benthification of fish communities in the Detroit River.

Assessment: Sub-criterion has been met. The proportion of benthic fish species (33%) and catch rates of tolerant/invasive species did not experience significant changes from 1989 to 2018 and were lower in the Detroit River than in other AOCs with healthy fish populations (Currie and Victor, 2020).

Sub-criterion #4: Creel and Catch Per Unit Effort (CUE) surveys of walleye and bass indicate angler catch and efforts are at or above the long-term average.

Assessment: Sub-criterion has been met. Walleye (*Sander vitreus*) creel rates (CUE) from 2015 (0.359 fish/rod hr), 2009 (0.415 fish/rod hr), and 2002 (0.451 r fish/rod hr) are well above the long-term (1956-2015) average (0.265 fish/ rod hr). More recent (1996-2018) angler diary CUE fluctuates around the long-term average with increase since 2015. These findings are consistent with those of MDNR creel surveys (2015-0.227 fish/angler hr compared to 2002-2004 - 0.171 fish/angler). Smallmouth bass (*Micropterus dolomieu*) creel CUE from 2009 (0.207 fish/ rod hr) and 2002 (0.122 fish/ rod hr) are well above the long-term average (0.058 fish/ rod hr). The angler diary CUE fluctuates around the mean with recent years showing increases in CUE. These findings are consistent with those of MDNR creel surveys (2009 - 0.064 fish/angler hr compared to 2002-2004 - 0.0 fish/angler; Sztramko 1979; Sztramko 1980; Witzel 1981; Sztramko and Paine 1984; Soper and Locke 2010; MDNR personal communication 2015; Castle et al. 2018; OMNRF 2019).

Sub-criterion #5 There is evidence of ongoing and/or increased spawning activity for fishes since 2006































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Assessment: Sub-criterion has been met. There is direct evidence with the presence of spawning condition adults, and/or the presence of egg or larval fish of at least 42 species from 17 families. Furthermore, genetic evidence suggests that Yellow Perch, Walleye, and Lake Sturgeon are genetically diverse, and the river likely supports dynamic sub-population structures for these species.

RESULTS

The assessment of fish population status in the Detroit River found evidence supporting that all five sub criteria have been met (Table 1). In most cases, we found multiple, complimentary sources of information reaffirming the findings. Additionally, the recent 2020 recreational fishing survey in Ontario demonstrated that the fish populations in the Detroit River are indeed providing beneficial uses through recreational fishing opportunities that are comparable to many other locations across the Great Lakes. Overall, the entire weight-of-evidence gathered for this assessment provides strong evidence to support fish populations in the Detroit River are unimpaired. In fact, the findings suggest that the Detroit River supports healthy, diverse, and self-sustaining fish communities, inclusive of ecological sensitive species like Lake Sturgeon and Lake Whitefish, that are comparable or better than neighboring waterbodies and other locations across the Great Lakes.



REFERENCES

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M. Fabiano & S. Marklevitz, Ministry of Natural Resources and Forestry (ONMNRF). 2023. Detroit River Area of Concern: Fish Population Assessment Report 2022 Update. Windsor, Ontario, Canada.

For more information or to download the report, please visit www.detroitriver.ca.





























