

Factsheet - Re-designation of the Bird or Animal Deformities or Reproductive Problems 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 *bird or animal deformities or reproductive problems*. 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 bird or animal deformities or reproductive problems in the Detroit River has changed over time. The 1991 Stage 1 Remedial Action Plan (RAP) Report identified this BUI as not impaired because there were no documented bird or animal deformities at that time. In the 1996 RAP Update Report, the status was changed to unknown (requiring further assessment), and in the 1999 DRCC Update Report, it was suggested to be changed to impaired. In 2006, signs of reproductive problems were cited by Leney and Haffner (2006) and elevated concentrations of pollutants including PCBs, mercury and PAHs were found in water and sediment along the Detroit River. Some of these pollutants can biomagnify, and at sufficiently high concentrations, can adversely impact wildlife reproduction and development. In the 2010 Stage 2 Report, the BUI was officially identified as impaired.



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WHAT WAS DONE

Using wildlife that feed from the aquatic environment, researchers assessed contaminant concentrations and hatching success of Northern leopard frogs (2008 to 2013), Black-crowned night herons (2009 and 2011), Snapping turtles (2014 to 2016), Colonial waterbirds (2015 to 2019) and Tree swallows (2016 to 2019). Researchers conducted lab and field studies. In the lab, eggs of birds were incubated, and hatching success was evaluated. Eggs of frogs and turtles were also exposed to water and sediment collected within the AOC, and hatching success following these exposures was also evaluated. Field studies included monitoring nests of colonial water birds and tree swallows at sites along the river.

RESULTS

The results revealed:

- High hatching success (HS) that was similar between the Detroit River and reference sites for both Cormorant and Snapping turtle eggs.
- Hatching success for Northern leopard frog eggs following exposure to water and water and sediment were also high and similar to hatching success of sites outside the AOC.

The field studies revealed:

- Tree swallow and Black-crowned night heron hatching success at Detroit River sites were similar to upstream reference sites; with one exception in 2009 when lower hatching success was due to predation.
- Productivity estimates for Herring gulls at downstream surrogate Detroit River colonies were sufficiently high to maintain a stable population.
- In the majority of egg/tissue samples collected, the concentrations of PCBs and mercury in Northern leopard frogs (whole bodies), Snapping turtles (eggs) and birds (eggs and nestling livers) were below levels associated with adverse effects on reproduction. Three of the egg samples had mercury exceedances, however these were not found to reduce hatching success.

Based on the studies conducted, contaminant levels in aquatic life are not impairing reproduction for Northern leopard frogs, Black-crowned night herons, Snapping turtles, Colonial waterbirds and Tree swallows.

REFERENCES

K.D. Hughes, S.R. de Solla, G.C. Barrett & P. A. Martin, Environment and Climate Change Canada (ECCC). 2023. BUI #5: Wildlife Reproduction and Deformities Status Recommendation for DR AOC (Ontario). Windsor, Ontario, Canada.

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

