

LOSS OF FISH & WILDLIFE HABITAT (BUI #14)



BACKGROUND

Habitat generally refers to the physical environment that is occupied by a plant or animal such as wetlands, forests, or grasslands. Suitable habitat is critical for supporting fish and wildlife survival, through all seasonal and life history stages (e.g., reproduction, feeding, overwintering) and is thus essential for overall ecosystem health.

The 2012 Canada-U.S. Great Lakes Water Quality Agreement (GLWQA) commits both countries to “maintain the chemical, physical, and biological integrity of the Waters of the Great Lakes”. Within the scope of the GLWQA’s Annex 1 (Areas of Concern; AOC), there are fourteen recognized beneficial uses of these waters which, if impaired locally, would indicate areas where the commitments were not being fully met. For a particular AOC, the nature of each identified Beneficial Use Impairment (BUI), whether it relates to an economic, human health, or environmental use provides information about the chemical, physical, or biological integrity of the aquatic ecosystem and together they are used to indicate the status of an AOC. The *Loss of Fish and Wildlife Habitat* BUI is one such indicator, intended to provide information about physical integrity in Great Lakes Areas of Concern (AOCs) and may link to other ecosystem issues such as changes in fish or wildlife community structure. The *Loss of Fish and Wildlife Habitat* BUI is one of the most common issues within AOCs (including the Niagara River) and is typically associated with the loss of riparian (shoreline) vegetation, coastal wetlands, or underwater fish habitat (IJC, 2019) due to the removal or alteration of naturally occurring habitat through shoreline hardening or infilling, destruction or draining of wetlands, removal of shoreline vegetation or dredging of deep-water shoals, etc. In the past, issues have been flagged with respect to water level fluctuations and associated impacts due to binational water controls (e.g., hydropower generation). It is recognized that these issues exist, but they are outside of the jurisdiction that the RAP can address (refer to www.ijc.org/en/nbc for more information). For the Canadian Niagara River AOC, the habitat-related issues are linked to the historical loss of riparian vegetation and coastal wetlands in the upper portion of the Niagara River.

The *Loss of Fish and Wildlife Habitat* BUI has been recognized since the completion of the RAP Stage 1 Report (1993) with the focus being primarily on habitat within watersheds draining to the Niagara River. The 1993 report indicated a “large loss in aquatic habitat in the tributary streams due to filling,

channelization, drainage, shoreline reconstruction and development” but indicated that fish habitat within the Niagara River itself was largely unchanged by human activity (NRRAP 1993). The subsequent RAP Stage 2 Report (1995) which outlined recommendations and broad goals for the improvement of the Niagara River ecosystem (including proposed delisting criteria to guide remediation activities) maintained the ‘Impaired’ *Loss of Fish and Wildlife Habitat* BUI status. In 2009, the Niagara River RAP released its Stage 2 Update report which described achievements since 1995, provided updated delisting criteria to reflect standards at the time, and applied the criteria to assess the status of the remaining impaired beneficial uses resulting in some BUI status changes (NRRAP 2009). The *Loss of Fish and Wildlife Habitat* BUI remained and delisting criteria and remedial actions were focused on issues in the Welland River watershed rather than the Niagara River. A BUI Status Assessment completed in 2014 showed that the delisting criteria were met through the completion of several projects by RAP partners aimed at fish barrier removals, habitat acquisition, restoration, and protection in the Welland River and its watershed (Fig. 1, NRRAP 2014). The 2012 revision of the GLWQA, and its clarification that BUIs apply to the “Waters of the Great Lakes”, has narrowed the focus of the Niagara River AOC to the main channel of the river. With a renewed focus on the Niagara River proper, and a recognition of current habitat issues within the revised bounds of the AOC, the *Loss of Fish and Wildlife Habitat* BUI remains. Ongoing progress aimed at addressing these issues require new BUI delisting criteria suited to assessing habitat status within the Niagara River proper.

Riparian habitat refers to the lands adjacent to streams and rivers. It is the interface between aquatic and terrestrial ecosystems. This transition area provides various benefits including serving as habitat for wildlife (e.g., birds, amphibians, reptiles), mitigating erosion, and functioning as a buffer to improve the water quality of runoff. Past practices along the Niagara River (i.e., urbanization, cutting trees or mowing to the edge of the river) have resulted in erosion, poor slope stability, and have encouraged the establishment of invasive plant species. Subsequent shoreline hardening to mitigate these effects ultimately results in the loss of important shoreline habitat for various species such as insects, birds and amphibians. As of 2020, it is estimated that approximately 75% of the entire Canadian side of the Niagara River shoreline is vegetated, but the width of the riparian buffer is limited in some areas of the Upper Niagara River (C. Burant, Niagara Parks Commission, pers. comm.). In a 2016 study, the Upper Niagara River’s Canadian shoreline edge has recently been characterized as having limited areas with gradual land to water interface including typical transition from upland to wetland vegetation; Gonder’s Flats being one exception (Yagi & Blott 2016). The Niagara Parks Commission (NPC), with support from Environment and Climate Change Canada (ECCC), has since begun naturalizing and improving riparian/shoreline habitat, including the planting of 50,000+ native plants and anchoring natural wood structures along 8 km of shoreline along the Upper Niagara River between 2018 and 2019. This is intended to provide new wildlife habitat as well as benefit fish through improved land-water interface, added shade and food (insects), and reduced soil erosion to improve water quality in the river.

Loss of Fish and Wildlife Habitat BUI delisting criterion	Status
1. Habitat quantity: The percentage by area of wetland cover within the AOC and the percentage by stream length of riparian buffers within the AOC are not significantly different when compared to suitable non-AOC reference sites.	Achieved
2. Habitat access for migratory fish: 75% of the potential barriers to fish movement on the Welland River (as identified through the Niagara River AOC Fish Barriers Project 2001 – Phase 1 Photo Library) must be removed or remediated restoring access to potential spawning habitat.	Achieved
3. Habitat impact (through adjacent land use): The percentage of woodland and wetland habitat by area in the AOC, and the percentage of stream length with (at least) a 30 metre (m) vegetated buffer in the AOC is not significantly different when compared to suitable non-AOC reference sites.	Achieved
4. Habitat quality: The percentage by area of wetland buffers (50, 120 and 240 m width) in the AOC and of core woodland areas (within 100 and 200 m of forest edge) in the AOC is not significantly different when compared to suitable non-AOC reference sites.	Achieved
5. Habitat fragmentation: The proximity, patch size, and patch density of key habitat types (forest and wetlands) in the AOC, is not significantly different when compared to suitable non-AOC reference sites.	Achieved
6. Unique Habitats: The existing areal extent of unique wildlife habitats (Wainfleet Bog complex, Niagara Gorge) is at least 80% secured and managed for long-term conservation purposes.	Achieved (see section 3.6)
7. Long-term Protection: Approval of Official Plan environmental policies for AOC municipalities that protect and enhance the natural heritage system, in conformity with the applicable Provincial or Regional natural heritage policies.	Achieved (see section 3.7)

Figure 1. The results of a 2014 BUI Status Assessment indicated that each of the habitat criteria were achieved. Sections refer to parts of the Assessment Report (NRRAP 2014).

Coastal wetlands are critical for spawning and rearing of young-of-the-year and forage fish. They are key to waterfowl nesting and stopovers and prevent erosion of the shoreline by slowing wave action. A nearshore vegetation assessment by the Ministry of Natural Resources and Forestry (MNRF) in 2015 indicated that approximately 75% of the historic coastal wetlands were lost on the Canadian side of the Niagara River (NPC in prep). Yagi & Blott (2016) indicated that existing patches of coastal wetlands in the Upper Niagara River were not linked to the shoreline, but rather occurred at the base of a vertical bank, or several meters out from shore. The loss of a graduated shoreline structure was attributed to several factors including infilling of former lowlands along the river (particularly at tributary mouths), shoreline armouring, and maintenance to remove large woody debris from the river edge. They recommended that coastal wetlands be constructed at suitable locations in the Upper Niagara River, particularly immediately downstream of each of the small tributaries entering the river. As a result, the Niagara Parks Commission, with support from the MNRF and ECCC, began restoring coastal wetland habitat at key locations along the Upper Niagara River where tributaries intersect the river (to maximize the capture of sediment and biotic drift). The coastal wetland restoration designs, informed by work

underway by New York State, vary slightly depending on the features and needs of each location. Generally, the restoration involves: cutting the riverbank to create a gentler, more stable slope; planting native vegetation (shrubs, aquatic and semi-aquatic vegetation); and installing rock and woody debris anchored to the riverbed to create a foothold for sediment to collect and wetlands to establish over time. Since 2016, over 865 meters of new coastal wetland habitat covering 2.9 hectares (7.2 acres) has been installed using over 250 Ash trees that had succumbed to the Emerald Ash Borer (an invasive insect), 400 recycled Christmas trees, and 560 tonnes of boulders (C. Burant, NPC, pers. comm.) As planned, the sites have already begun to establish with native aquatic vegetation and various wildlife species.

The Niagara River is a connecting channel shared by the United States and Canada, with separate (yet complementary) Remedial Action Plans and targets on both sides of the AOC. This document is focused only on issues and efforts on the Canadian side on the Niagara River AOC; however, there was an attempt to ensure alignment with the habitat restoration efforts and approaches utilized by U.S. RAP partners. For more information about the recent restoration efforts on the Canadian side of the Niagara River, go to www.ourniagarariver.ca. For information about the efforts on the U.S. side of the Niagara River, visit www.epa.gov/great-lakes-aocs/about-niagara-river-aoc.

BUI DELISTING CRITERIA REVIEW & RECOMMENDATIONS

The delisting criteria are locally-developed, AOC-specific goals used to measure progress and assess the condition of each of the BUIs of an AOC. The delisting criteria should be specific, measurable, and feasible. The Niagara River's (Ontario) BUI delisting criteria were last formally reviewed and updated as part of the Niagara River RAP Stage 2 Update (2009). In 2012, the scope of the GLWQA was revised by Canada and the U.S., and specifically states that the BUIs apply to the "Waters of the Great Lakes", including the connecting channels (IJC 2012). This change led to a need to review the delisting criteria to ensure they were aligned with the GLWQA's Annex 1 on Areas of Concern, while being realistic, feasible, and scientifically-defensible. A recent review by staff from ECCC and MECP (as part of a COA Task Team in 2017) indicated that some BUIs may need to be updated and/or revised, including those related to the *Loss of Fish and Wildlife Habitat* BUI. As a result of the suggestions, the NRRAP Committees agreed at a November 2018 meeting that the delisting criteria for the remaining five Niagara River BUIs should be reviewed by the Coordinating Committee (or a suitable expert working group) and potential revisions be brought forward to the Implementation and Public Advisory Committees for discussion.

To review and revise the *Loss of Fish and Wildlife Habitat* BUI delisting criteria, an expert Technical Work Group was formed in 2019 which consisted of representatives from the Niagara Parks Commission, Niagara Peninsula Conservation Authority, New York State Department of Environmental Conservation, Ontario Ministry of Natural Resources and Forestry, Ontario Ministry of the Environment,

Conservation and Parks, and Environment and Climate Change Canada—led by the RAP Project Manager. The Technical Work Group agreed that revisions were required because:

- existing criteria were not consistent with the revised geographic scope of the Niagara River Remedial Action Plan program as per the 2012 GLWQA;
- only one habitat criterion specifically mentioned the Niagara River while all the other criteria were focused on targets for the watershed (which were met in 2014; Fig. 1);
- none of the existing (2009) habitat criteria referred to the recently identified habitat issues along the Niagara River (shoreline erosion and loss of coastal wetlands) nor the projects underway to improve this critical habitat.

The proposed revisions to the delisting criteria are substantially different from the 2009 version to address the recently identified habitat needs within the revised geographic scope of the AOC, align goals with changes under the 2012 GLWQA, and ensure targets are scientific, measurable, and feasible. The proposed revised criteria focus on the Niagara River’s coastal wetland and riparian habitat, as these are the most critical for improving habitat the AOC (Yagi & Blott 2016). In drafting the proposed revised delisting criteria (shown below), the Technical Work Group considered a binational approach so that goals on both sides of the Niagara River were aligned, linked to relevant work underway to improve habitat, and based on well-established scientific literature (i.e., *How Much Habitat Is Enough?*, ECCO 2013). Refer to Figure 1 for the 2009 delisting criteria.

The Loss of Fish and Wildlife Habitat BUI will no longer be impaired when...

1. 5-7 identified coastal wetland habitat projects on the Canadian side of the Upper Niagara River are complete;
2. at least 75% of the Niagara River (Canadian) shoreline is naturally vegetated;
3. there is a 5-metre wide ‘no mow’ vegetated buffer along the publicly managed Canadian shoreline of the Upper Niagara River; and
4. the existing areal extent of unique wildlife habitat (i.e., Niagara Gorge) is at least 80% secured and managed for long-term conservation purposes.

Description of delisting criteria and application guidance

A description of the main components of the proposed revised criteria including the rationale for the changes, explanation of terminology, and how components are to be applied are provided below.

Criterion 1: Coastal Wetland Habitat

The importance of coastal wetland projects was identified for several years. Beginning in 2015, the Ontario Ministry of Natural Resources and Forestry in collaboration with the Niagara Parks Commission initiated the identification of opportunities for coastal wetland creation along the Upper Niagara River.

As a result, seven potential locations were noted as the most feasible options for restoration and enhancement of coastal wetland habitat (Fig. 2, #1-7). The design concepts and implementation of these coastal wetland habitat projects were based on restoration efforts on the American side of the Niagara River AOC. The U.S. projects (Fig. 2, #8-21) are being implemented through separate U.S. Remedial Action Plan actions and are not included as part of this delisting criterion. As of 2019, four of the seven proposed Canadian projects have been completed and one more is planned for construction in the summer of 2020. Since 2016, over 865 meters of new coastal wetland habitat covering 2.9 hectares (7.2 acres) has been installed using over 250 Ash trees that had succumbed to the Emerald Ash Borer (an invasive insect), 400 recycled Christmas trees, and 560 tonnes of boulders (C. Burant, NPC, pers. comm.) As planned, the sites have already begun to establish with native aquatic vegetation and various wildlife species.

For the purpose of this delisting criterion, “complete” means that the activities related to the construction of the coastal wetland project are done, not necessarily follow-up monitoring to assess wetland function. It is expected that natural processes will continue to build upon the constructed elements and that these wetlands will continue to evolve and improve.

Criterion 2: Riparian Habitat (length)

This criterion refers to the percent length of riparian habitat along the entire Canadian side of the Niagara River. The term ‘naturally vegetated’ follows *How Much Habitat is Enough? Third Edition* (ECCC 2013) and was not specifically defined in that document. For the RAP, the term ‘naturally vegetated’ means that shoreline is not hardened or negatively altered and is comprised of vegetation that is not mowed lawn (e.g., wildflowers, tall grasses, trees, shrubs), though not necessarily dominated by native species. While it is not a requirement for the AOC program, the RAP Team acknowledges that planting native species is important and preferable but is not a requirement to meet this delisting criterion. There are efforts underway by partners such as the Niagara Parks Commission to increase the percentage of native species within the riparian area of the Canadian side of the Niagara River shoreline through its Urban Forestry Management Strategy. Between 2018 and 2019, 8 km of shoreline along the Upper Niagara River has been naturalized and improved through the planting of 50,000+ native plants and anchoring natural wood structures.

To assess this criterion, a geographic information system (GIS) desktop exercise could be used to quantify and confirm the length of Canadian shoreline that is vegetated.



Figure 2. Map of the completed and planned coastal wetland habitat sites along the Upper Niagara River. Locations #1-7 are Canadian projects, #8-21 are American projects. Last updated Sept. 2020

Criterion 3: Riparian Habitat Buffer (width)

This criterion only applies to areas of the Canadian Upper Niagara River shoreline (from Fort Erie to the top of Niagara Falls) that are managed by the Niagara Parks Commission. While the scientific literature suggests a minimum 30-meter naturally vegetated riparian buffer along streams, this guideline is not feasible for the Niagara River due to the location of the Niagara Parkway (within 10-20 meters of the river). Therefore, following the advice of the Niagara Parks Commission, the RAP Team proposes a 5-meter wide vegetated riparian buffer along the Upper Niagara River which is realistic, feasible, and would still provide many of the ecological benefits previously mentioned in the Background section (i.e., habitat, filter runoff, prevent erosion).

While it is not a requirement for the AOC program, the RAP Team acknowledges that planting native species is important and that there are efforts underway by partners such as the Niagara Parks Commission to increase native species within the riparian area through its Urban Forestry Management Strategy (NPC in prep). Therefore, the intent of this criterion is not necessarily to increase native plant species, but rather to increase the width of the riparian area in the feasible locations¹ along Upper Niagara River by discouraging mowing to the edge of the Niagara River shoreline.

To assess this criterion, a GIS desktop exercise could be used to quantify the amount of riparian habitat width along the Upper Niagara River Canadian shoreline and confirm adherence to the NPC's 'no-mow' practices.

Criterion 4: Protection of unique habitat

This criterion is the only one from the last official set of *Loss of Fish and Wildlife Habitat* BUI delisting criteria (NRRAP 2009) that applies to the current geographic scope of the Niagara River AOC. More importantly, it refers to a key guiding principle in *How Much Habitat Is Enough?*, "Conserve it first" because protecting existing habitat is more efficient and effective than restoration (ECCC, 2013). Therefore, the rationale for the criterion is to acknowledge the existing protection of the unique habitat in the Niagara River corridor, specifically the Niagara Gorge (not including the tablelands).

In 2014, a BUI status assessment report indicated that the criterion was met based on a GIS mapping exercise which showed 100% of the Niagara Gorge secured and managed for long-term conservation purposes (NRRAP 2014). Nonetheless, the RAP Team noted that capturing the long-term conservation of the unique Niagara Gorge was important and recommended that the criterion remain in the updated version of the delisting criteria.

¹ Approximately 20% of the Canadian shoreline cannot be vegetated due to necessary hard infrastructure (i.e., the break-wall, marina and coal docks in Fort Erie, power generation in Niagara Falls) (C. Burant, Niagara Parks Commission, pers. comm. 2020).

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