

St. Mary's River Aquatic Habitat Feasibility Study

Presented to:

Canadian Consulting Engineer
80 Valleybrook Drive
Toronto, Ontario M3B 2S9

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MORRISON HERSHFIELD



PROJECT OUTLINE

75-WORD SUMMARY

Environment Canada retained Morrison Hershfield ('MH') as prime consultant to complete a feasibility study for creating and/or augmenting rapids, aquatic habitats, wetlands, and tributary watersheds on the St. Mary's River ('River'). The project presented unique challenges which required innovative design concepts as well as internal and external coordination to produce sound restoration solutions. The area is highly visible and accessible by the community and the solutions provide more aesthetic, nature trail and informative signage opportunities.

PROJECT OVERVIEW

Environment Canada (EC) plays a key role in delivering on the commitments of the *Canada- U.S. Great Lakes Water Quality Agreement*. The binational agreement was amended in 2012, and in doing so, both countries reaffirmed their commitment to restore Areas of Concern (AOC). There are currently 9 AOCs in Canada, 25 in the United States, and 5 that are shared by both countries; including the St. Marys River (SMR). Part of EC's responsibility involves restoring Beneficial Use Impairments (BUIs) within the SMR AOC through the development and implementation of a Remedial Action Plan (RAP). One of the notable BUIs was the Loss of Fish and Wildlife Habitat, and the Stage 2 RAP proposed remedial actions to address it.

The primary objective of this study was to determine the feasibility of creating and/or augmenting rapids, aquatic habitats, wetlands, and tributary watersheds within the study area of the SMR. The overall objective was to create, enhance, and/or restore aquatic habitat within the AOC. The focus of this study was on the feasibility of the restoration efforts and needs based on geomorphological processes, fish communities and

fish habitat (ecology) and economic considerations, as well as constructability.

There were three broad areas within the SMR AOC where geomorphological assessments and ecological studies have been conducted in order to identify areas where restoration efforts are feasible and generally include:

- Area 1 - Canadian sections of the Big Rapids and Whitefish Island.
- Area 2 - Brookfield Power tailrace and areas immediately downstream along the SMR waterfront boardwalk, including confluence with Fort Creek; and
- Area 3 - Examination of 8 major tributaries which flow into the SMR.

Within each of the broad areas listed above, the empirical physical measurements to determine the geomorphic and ecological feasibility of restoration were determined. Following field data collection for each of these areas, analyses was carried out to determine how habitats could be created and/or enhanced from their existing conditions and which options were more feasible than others considering a variety of factors. The potential approaches for restoration were all assessed in order to identify and determine the constructability aspects including techniques, methods and materials and from this, general costs were ascertained and the sites prioritized with respect to ecosystem benefits and overall costs.

A total of five conceptual designs were developed. The designs were evaluated on their physical, ecological and economic viability and on their overall benefit to the SMR study areas and to the AOC. While more detailed information across a variety of disciplines is required to fully assess what recommendations can be successfully implemented, this study evaluated the baseline conditions using a weighting system for each of the sites.



The results of this feasibility study can be used to support future discussions, studies, and projects with respect to creating and/or restoring habitat in a manner that realizes the greatest ecological and economical gains based on what is physically feasible, and thus enhance available habitat usage, create new spawning opportunities, restore natural geomorphological features and diversify in-water habitat structure for fish species and aquatic organisms indigenous to the SMR and its tributaries. Doing so will contribute to restoring the Loss of Fish and Wildlife Habitat BUI.

PROJECT INNOVATIONS

The primary objective of this study was to determine the feasibility of creating and/or augmenting rapids, aquatic habitats, wetlands, and tributary watersheds within the study area. The overall objective was to create, enhance, and/or restore aquatic habitat. The focus of this study was on the feasibility of the restoration efforts and needs based on geomorphological processes, fish communities and fish habitat (ecology) and economic considerations, as well as constructability.

The project presented unique challenges which required innovative design concepts as well as internal and external coordination to produce sound restoration solutions for some relatively undeveloped areas. Project success stemmed from detailed project planning, a multi-disciplinary approach and an experienced team of professionals with a thorough understanding of the challenges being faced to restore once very productive areas of the Great Lakes system.

As part of the study process, MH encouraged First Nations representatives to contribute feedback and historical information about the study areas in order to gain an understanding for the restoration plan. We created and fostered a strong relationship with representatives which reduced the helped facilitate stakeholder approvals.

Typically projects of this nature have a smaller study area to focus on and do not require the level of research, field work and consultation. MH created a sound strategy for managing the project as well as developing a project plan that included the client and key stakeholders, which held all parties accountable to stay in line with the objectives of the study and keep the project on schedule and budget.

LEVEL OF COMPLEXITY AND PROJECT CHALLENGES

A total of five conceptual designs were developed, narrowed down from 11 potential sites which spanned an area of over 55 km of river. The implementation of enhancement and restoration opportunities within the watershed was a complex and long-term process, requiring the cooperation of many agencies, including the international community as well as local community groups and First Nations.

With the scale of this project one of the more challenging aspects was the need for political and community support. This support was essential for the projects to be successfully implemented as many different stakeholders have a variety of goals and visions for the watershed and prioritization of objectives from a wide range of concerned parties can be difficult. This feasibility study has been completed with the aim of ensuring the involvement of interested agencies, First Nations, and international working groups as a means to encourage both public and community organizations to work cooperatively.

Often with projects of this magnitude, the high costs associated with design and implementation through to construction may deter agencies and organizations from getting involved and supporting the initiative. However, having heavily developed areas along the banks of the SMR, most notably Hydro operations and Essar Steel, provides the opportunity for multiple stakeholders to collaborate on the project and diversify the fund allocations rather than focusing on funding the



project from a single entity. This project helped to identify potential funding sources and outline ways to get them involved with restoration efforts in the future.

CONTRIBUTION TO SOCIAL AND/OR ECONOMIC BENEFITS

The Whitefish Island conceptual design scored ranked as the most feasible option. Whitefish Island is relatively undisturbed when compared with the highly altered and developed industrial areas in its immediate vicinity. As the traditional lands of the Batchewana First Nation, who own and manage the lands as well as it being a National Historic Site (Parks Canada), this area offers an excellent natural setting providing great opportunity to re-create and enhance conditions to replicate those which historically existed.

From a physical standpoint, the works generally involved removing previously constructed weir-type structures with channel bed and banks being restored to natural condition, thereby improving geomorphic function through improved flow and sediment transport capability. The physical structure of the existing berms used to define the lower portion of the channel are replaced with more natural materials, further restoring the site to a more natural condition. The removal of a large beaver dam in order to restore flow to an existing riffle feature, and the creation of a cascade will further improve geomorphic form and flow properties within the site.

Economically this option proves to be very cost effective. The overall benefit would be significant as the location of Whitefish Island is in an area identified as impaired and a number of BUIs identified by the RAP could be addressed with the design and historical functions of Whitefish Island could be restored. The area is highly visible and accessible by the community which provides more aesthetic, nature trail and informative signage opportunities.

CONTRIBUTION TO ENVIRONMENTAL BENEFITS

Ecologically, the conceptual design would result in a significant improvement to the existing conditions. While diverse wetlands exist at the west to middle of Whitefish Island, and critical spawning and nursery areas are prevalent within the Whitefish Channel, there is opportunity to further enhance these areas. Opportunities which could create and diversify habitat, naturalize engineered features, remove barriers which alter habitats to restore natural function and allow for unobstructed fish passage, as well as re-introduce wetland habitats and create a more functional and productive transition area from Whitefish Island to the SMR at its east limits. These restoration opportunities could be designed to help fulfill many of the BUIs outlined in the RAP and can result in a significant increase in spawning and nursery habitats for a diverse array of fish species, benthic invertebrates as well as improve habitat for wildlife and create protected waterfowl nesting sites.

MEETING CLIENT'S NEEDS

Environment Canada (EC) plays a key role in delivering on the commitments of the *Canada- U.S. Great Lakes Water Quality Agreement* binational agreement. Amended in 2012, both countries reaffirmed their commitment to restore Areas of Concern (AOC). There are currently 9 AOCs in Canada, 25 in the United States, and 5 that are shared by both countries; including the St. Marys River (SMR). Part of EC's responsibility involved restoring Beneficial Use Impairments through the development and implementation of a Remedial Action Plan. One of the notable BUIs was the Loss of Fish and Wildlife Habitat, and the proposed remedial actions to address it.

The primary objective of this study was to determine the feasibility of creating and/or augmenting rapids, aquatic habitats, wetlands, and tributary watersheds within the study area of the SMR. The overall objective was to create, enhance, and/or restore aquatic habitat within the AOC. The focus was on the restoration efforts and needs

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based on geomorphological processes, fish communities and fish habitat (ecology) and economic considerations, as well as constructability.

The potential approaches for restoration were assessed in order to identify and determine constructability aspects including techniques, methods and materials. General costs were determined and the sites prioritized with respect to ecosystem benefits and overall costs.

The results of this feasibility study is being used to support future discussions, studies, and projects with respect to creating and/or restoring habitat in a manner that realizes the greatest ecological and economical gains