

LAKE MANITOBA AND LAKE ST. MARTIN OUTLET CHANNELS PROJECT
RESPONSE TO IAAC TECHNICAL INFORMATION REQUESTS

Question IAAC-32

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Abbreviations and Acronyms

EIS	environmental impact statement
EMP	Environmental Management Program
ESCP	Erosion and Sediment Control Plan
LMOC	Lake Manitoba outlet channel
LSMOC	Lake St. Martin outlet channel
SMP	Sediment Management Plan

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EIS Guideline Reference: 7.1.7 Riparian, Wetland and Terrestrial Environments

EIS Reference: 6.4.7.3 Changes in Regional and/or Local Fluvial Geomorphology and Shoreline Geomorphology

Context and Rationale

Section 7.17 of the EIS guidelines requires the proponent to characterize the shoreline and banks that are likely to be affected by project activities.

Section 6.4.7.3 of the EIS identifies the waterbodies of which shorelines and banks may be affected by the project and describes potentially affected shorelines and banks at a high level. The EIS states that additional studies are planned as part of ongoing detailed design and include the collection of additional shoreline data to aid in detailed design and reduce changes to shoreline geomorphology where possible.

The results of the studies mentioned in the EIS and the mitigation associated with engineering design are important to predicting residual impacts of the project on fish and fish habitat.

Information Requests

- a) Present the results, or preliminary results of studies related to shoreline geomorphology.
- b) Present the results, or preliminary results, of the engineering designs intended to mitigate effects to shoreline geomorphology.
- c) Using study results, assess the potential effects of changes to hydraulic conditions and sediment transport on fish and fish habitat. Describe applicable mitigation measures and assess significance of residual effects. Discuss associated monitoring and follow up.

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a) Project Shoreline Geomorphology Studies

The Project design studies have included the collection of bathymetric and substrate data for lakes, rivers and channel inlet and outlet areas in the Project area, as well as studies focused on the potential effects of the Project on shoreline geomorphology. The data and maps generated by the bathymetric and substrate surveys are provided in Volume 2, Appendix 6F of the environmental impact statement (EIS). Additional shoreline geomorphology studies are ongoing as Project design advances, with preliminary results from the Lake Manitoba Outlet Channel (LMOC) studies indicating that the Watchorn Bay and Birch Bay shorelines are characterized by constructive wave environments that are dominated by depositional rather than erosive processes (J.D. Mollard and Associates Ltd. 2019). A preliminary review of historical imagery, wind and water level data at the channel inlet and channel outlet areas showed that negligible shoreline recession has occurred in the 69-year record of historical imagery. The main

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mechanisms for sediment transport at both locations appeared to be onshore and offshore transportation caused by wave action.

During more recent studies (J.D. Mollard and Associates Ltd. 2019) it was noted that ice processes may cause additional onshore movement of sediment, including the displacement of large boulders. Longshore drift (i.e., the transport or movement of materials such as sand in the direction of the shoreline by wave action in areas close to the shore) appears to be a minor process at the channel inlet and outlet locations. The studies noted that onshore sediment transport by wave action may result in the deposition of sediment in the inlet and outlet areas when the channel is not in use, if there were no mitigation measures in place. Nearshore substrate and structures may also be affected by ice-shove processes, which may include direct contact by floating ice and/or transport of boulders into the inlet and outlet areas.

A shoreline geomorphology assessment that included bathymetric studies and substrate sampling was conducted as part of the preliminary design for the Lake St. Martin Outlet Channel (LSMOC) at the channel inlet and outlet areas in Lake St. Martin and Sturgeon Bay. As noted in Volume 2, Section 6.4.7.3 of the EIS, these studies are ongoing and will continue as the detailed design of the Project advances.

b) Mitigation

Design of the channel inlet and outlet areas will include measures to minimize changes in shoreline geomorphology and reduce potential erosion and sediment transport. These measures could include:

- construction of rock-filled jetties to reduce changes in shoreline geomorphology and help prevent erosion.
- excavation of the inlet and outlet areas where suspension and transport of lakebed sediments is to be minimized or prevented (e.g., work areas may be isolated from the surrounding waterway by the use of cofferdams to complete in-water works “in the dry”), where possible.
- designing the channels to be non-erodible (i.e., designed to prevent significant movement of the bed material).

Additional information on the sediment transport studies conducted for the Project can be found in IAAC-12 and IAAC-44.

The Project Follow-up and Monitoring Program is being developed concurrently with the advancement of Project design. Additional information on mitigation that will be used to minimize the potential for the release and transport of sediment to the Project area waterways will be developed as the Project design advances and be incorporated into the Environmental Management Program (EMP) for the Project. The EMP includes a number of environmental plans, including an Erosion and Sediment Control Plan (ESCP) and a Sediment Management Plan (SMP). See IAAC-15 for more information on the Project EMP and associated environmental protection plans.

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c) Potential effects of changes to hydraulic conditions and sediment transport on fish and fish habitat

Although the Project will redirect a portion of high flows through the outlet channels, the Fairford and Dauphin rivers will continue to experience seasonal flow variability and high spring flows that are essential for flushing and channel forming processes (additional details can be found in IAAC-40). Due to reduced flooding, it is expected that changes to shoreline geomorphology in rivers and lakes will be less pronounced with the Project. Those changes are not anticipated to have an adverse effect on fish or fish habitat.

The new information on shoreline erosion processes that has become available since EIS filing (i.e., J.D. Mollard and Associates Ltd. 2019) does not change the assessment of effects on fish and fish habitat. This information suggests that the mechanism for sediment transport at the inlets and outlets of LMOC is onshore/offshore transportation caused by wave action. This action may result in the deposition of sediment in the inlet and outlet areas when the channel is not in use. Similar processes would occur in these areas without the Project. Periodic excavation of these sediments may be necessary but would have a minor local, short-term effect on aquatic productivity and are not anticipated to have a significant adverse effect on fish or fish habitat.

References

J.D. Mollard and Associates Limited. 2019. Lake Manitoba Outlet Channel Shoreline Morphology Review. Final Report. 15 November 2019 JDMA Project #2018-026 Hatch Document Number: E358159-1000-228-230-0001 Rev. 0.