Mistusinne Boat Launch Assessment

PRESENTER: ROSS PHILLIPS

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AGENDA

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Design Concepts

Comparison of Design Concepts

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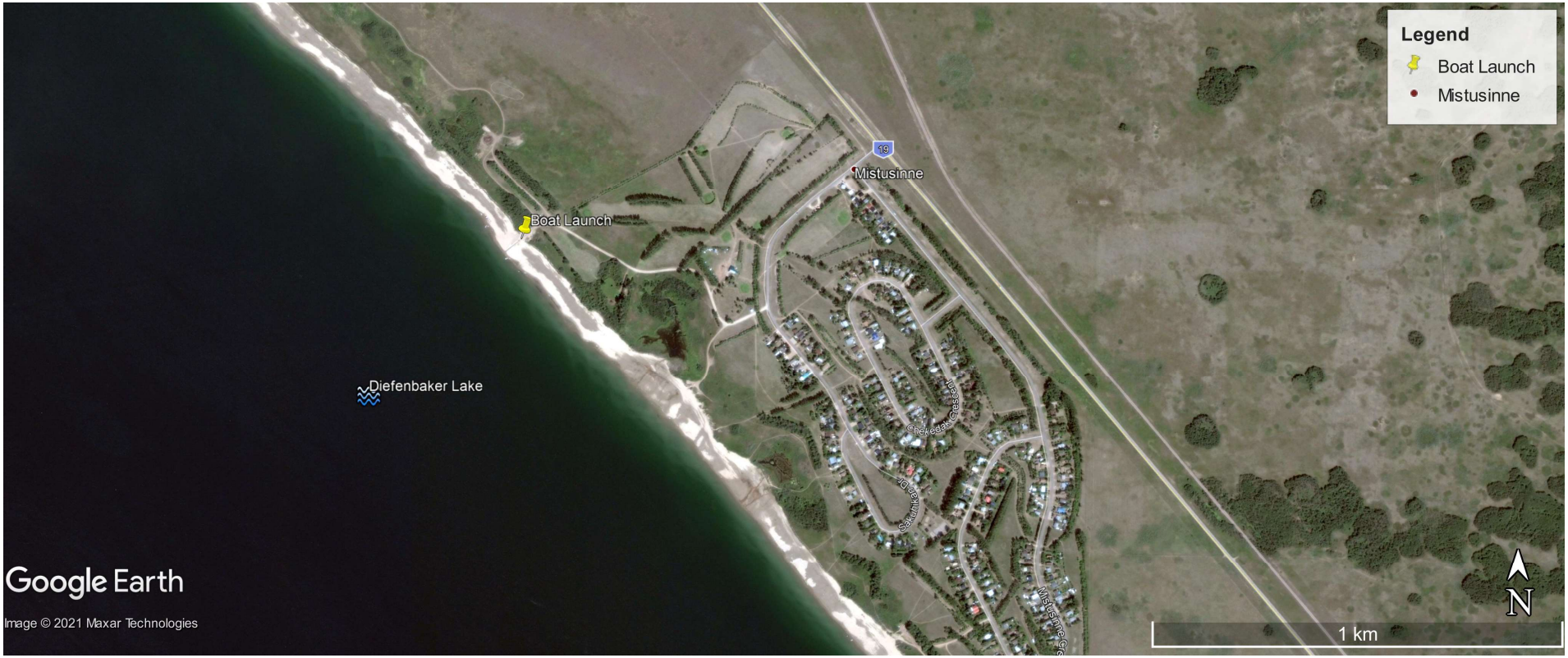
Boat Launch Relocation Sites

Recommendations

Site Location

MISTUSINNE BOAT LAUNCH UPGRADES ASSESSMENT



Site Location

MISTUSINNE BOAT LAUNCH UPGRADE ASSESSMENT

Site Location

MISTUSINNE BOAT LAUNCH UPGRADES ASSESSMENT

Design Objective

MISTUSINNE BOAT LAUNCH ASSESSMENT

- Determine design criteria at the Mistusinne boat launch/dock;
- Prepare and compare conceptual designs that address sediment accumulation issues, wave action, and increased user traffic; and,
- Identify potential sites for boat launch relocation.

Design Criteria

MISTUSINNE BOAT LAUNCH ASSESSMENT

- Diefenbaker Full Supply Level (FSL) = 556.87 m
- Diefenbaker Lake Typical Water Level Range = 551.50 m to 555.30 m
- The Mistusinne boat launch is an exposed site with high wave energy.
  - 5-Year Significant Wave (SE) is 2.6 m high, period of 4.3 sec, with runup of 2.4 m.
  - 100-Year Significant Wave (NW) is 3.2 m high, period of 4.7 sec, with runup of 2.9 m.

Note: Runup is calculated on a 2(H):1(V) slope, such as a rock breakwater.

Design Concepts

MISTUSINNE BOAT LAUNCH ASSESSMENT

- Option #1: Sediment traps north and south of boat launch
- Option #2: Two breakwaters to create an enclosed area
- Option #3: Two breakwaters to create a narrow corridor
- Option #4: Dock on piles extending to an artificial island

Note: Floating breakwaters were considered but screened out as an option due to the exposure of the site and the large waves.

Design Concepts

OPTION 1

- Sediment traps north and south of boat launch.
- Sediment traps sized based on sediment transport study.

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OPTION 2

- Two breakwaters to create an enclosed area.
- Crest of break waters at the high-water level, plus 5-year runup, plus 1.0 m freeboard.

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Design Concepts

OPTION 3

- Two breakwaters to create a narrow corridor.
- Crest of break waters at the high-water level, plus 5-year runup, plus 1.0 m freeboard.

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Design Concepts

OPTION 4

- Dock on piles extending to an artificial island.
- Soffit of dock to sit above the full supply level, plus 100-year runup, plus 1.0 m freeboard.

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Comparison of Design Concepts

MISTUSINNE BOAT LAUNCH ASSESSMENT

Design Concept	Constructability	Permitting	Maintenance	Feasibility
Option #1 Sediment traps north and south of boat launch	• Excavation access via existing road to boat launch. • Excavation to occur during the low water period. • Sediment trap to be excavated using backhoe. • Excavated material to be hauled off site for disposal. A disposal site will need to be identified. • A sediment transport study is required to size the sediment traps. • Low Construction Complexity	• DFO approval required. • WSA approval required. • A fish and fish habitat assessment will need to be conducted for DFO review. • DFO approval could require constructing fish habitat compensation works, water quality monitoring during construction, and constructing outside the Restricted Activity Period (RAP).	• Regular sediment removal is likely needed on an annual basis. • Maintenance activities will require DFO and WSA approvals.	• This design addresses sedimentation issues, but it does not address damage to infrastructure by wave action. • Regulatory permitting will be difficult and may not be successful..

Comparison of Design Concepts

MISTUSINNE BOAT LAUNCH ASSESSMENT

Design Concept	Constructability	Permitting	Maintenance	Feasibility
Option #2 Two breakwaters to create an enclosed area	• Construction access via existing road to boat launch. • Construction to occur during the low water period. • Placement of riprap or steel sheetpile breakwaters by excavator and barge. • Top of breakwater to be at the high-water level, plus 5-year runup, plus 1.0 m freeboard. • Short term dredging is required to clear the enclosed area of sediment. • Supply of large riprap is limited in this region. • Moderate Construction Complexity	• DFO approval required. • WSA approval required. • A fish and fish habitat assessment will need to be conducted for DFO review. • DFO approval could require constructing fish habitat compensation works, water quality monitoring during construction, and constructing outside the Restricted Activity Period (RAP). • DFO and WSA may require study on how breakwaters may affect the sediment transport regime of the shoreline.	• Maintenance of breakwaters may be required every 5 to 10-years. • Regular sediment removal is expected, though, not as frequent as in Option 1. • Maintenance activities will require DFO and WSA approvals.	• This design addresses the sedimentation and wave action issues. • This design results in a change to the sediment transport regime of the surrounding shoreline that regulators may not view favorably. • Regulatory permitting is expected to be more difficult than Option 1, and may not be successful. • This option requires regular sediment removal and may require maintenance of breakwaters every 5 to 10-years.

Comparison of Design Concepts

MISTUSINNE BOAT LAUNCH ASSESSMENT

Design Concept	Constructability	Permitting	Maintenance	Feasibility
Option #3 Two breakwaters to create a narrow corridor	• Construction access via existing road to boat launch. • Construction to occur during the low water period. • Placement of riprap or steel sheetpile breakwaters by excavator and barge. • Top of breakwater to be at the high water level, plus 5-year runup, plus 1.0 m freeboard. • Short term dredging is required to clear the enclosed area of sediment. • Supply of large riprap is limited in this region. • Moderate Construction Complexity	• DFO approval required. • WSA approval required. • A fish and fish habitat assessment will need to be conducted for DFO review. • DFO approval could require constructing fish habitat compensation works, water quality monitoring during construction, and constructing outside the Restricted Activity Period (RAP). • DFO and WSA may require study on how breakwaters may affect the sediment transport regime of the shoreline.	• Maintenance of breakwaters may be required every 5 to 10-years. • Regular sediment removal is expected, though, not as frequent as in Options 1 and 2. • Maintenance activities will require DFO and WSA approvals.	• This design addresses the sedimentation and wave action issues. • This design results in a larger change to the sediment transport regime of the surrounding shoreline than Option 2 that regulators may not view favorably. • Regulatory permitting is expected to be more difficult than Options 1 and 2, and may not be successful. • This option requires regular sediment removal and may require maintenance of breakwaters every 5 to 10-years.

Comparison of Design Concepts

MISTUSINNE BOAT LAUNCH ASSESSMENT

Design Concept	Constructability	Permitting	Maintenance	Feasibility
Option #4 Dock on piles extending to an artificial island	• Construction access via existing road to boat launch. • Construction to occur during the low water period. • Piles to be driven above the water level by land-based equipment and below the water level by barge-based equipment. • Geotechnical investigation required for design of piles and artificial island. • Soffit of dock to be constructed to an elevation of the full supply level, plus 100-year runup, plus 1.0 m freeboard. • Artificial island to be constructed via barge. • High Construction Complexity.	• DFO approval required. • WSA approval required. • A fish and fish habitat assessment will need to be conducted for DFO review. • DFO approval could require constructing fish habitat compensation works, water quality monitoring during construction, and constructing outside the Restricted Activity Period (RAP).	• Inspections required every 5 years to inspect structural soundness of the dock and piles.	• This design addresses the sedimentation and wave action issues. • The design will need to incorporate similar design and safety features to a bridge for vehicle traffic. • This design results in a minor change to the sediment transport regime of the surrounding shoreline when compared with Options 2 and 3. Regulators may view this more favorably than those two breakwater options. • Regulatory permitting is expected to be difficult and may not be successful. • This option does not require regular maintenance unless deficiencies are identified in scheduled inspections of the dock and piles.

Relative Cost of Design Concepts

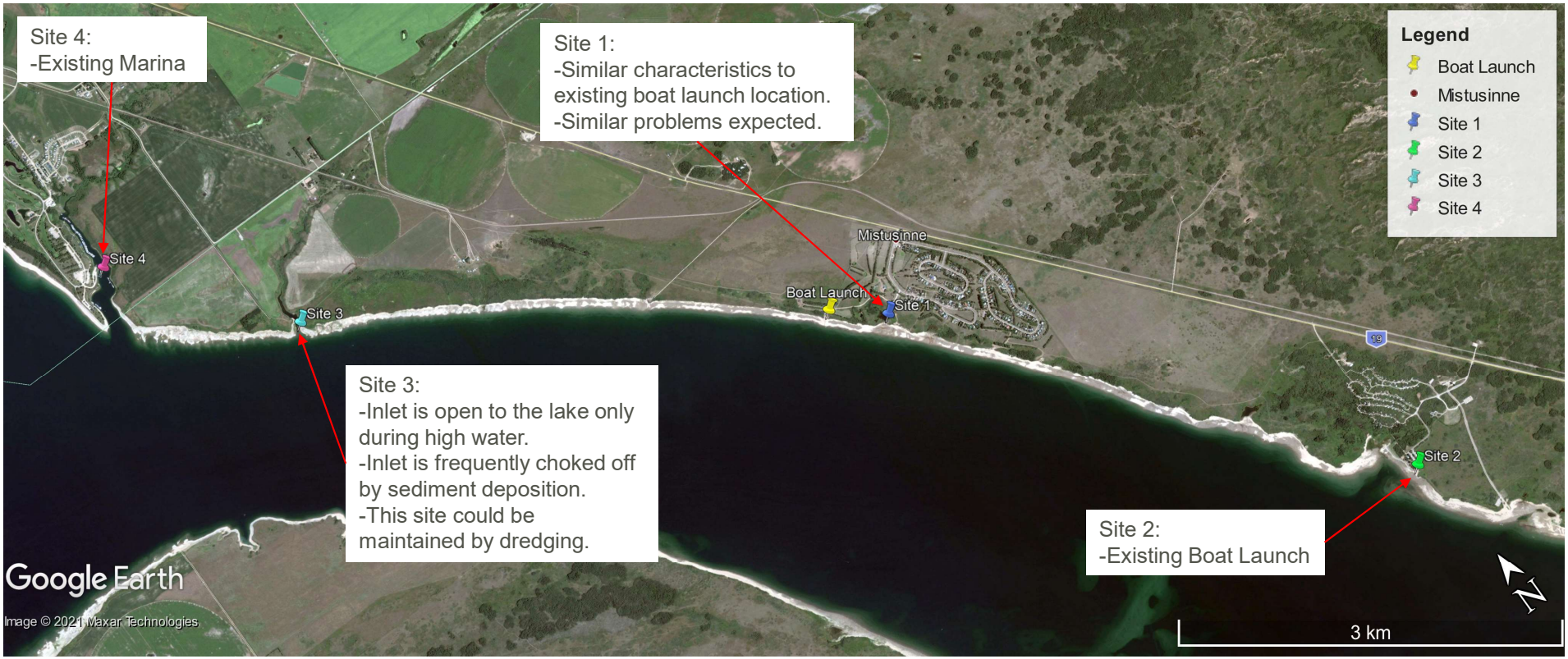
MISTUSINNE BOAT LAUNCH ASSESSMENT

Design Concept	Relative Qualitative Estimated Cost
Option #1 Sediment traps north and south of boat launch	Low
Option #2 Two breakwaters to create an enclosed area	Moderate
Option #3 Two breakwaters to create a narrow corridor	High
Option #4 Dock on piles extending to an artificial island	High

Notes: **1**) No allowance is included for fish habitat offsetting.
2) No allowance included for required studies or impact assessments.

Boat Launch Relocation Sites

MISTUSINNE BOAT LAUNCH ASSESSMENT



Conclusions and Recommendations

MISTUSINNE BOAT LAUNCH ASSESSMENT

- Site is very exposed from the NW and SE directions with high waves and significant sediment transport.
- Design options that protect against wave action requires breakwater protection from the north and south.
- All design concepts have high combined up-front capital costs and maintenance costs. All designs are expected to be challenging to permit with regulators.
- No viable alternative site was identified for relocation of the boat launch.
- Golder recommends that the existing Mistusinne boat launch be used when lake water levels are high enough and that other nearby boat launches be used when lake water levels are low.

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Thank you!