

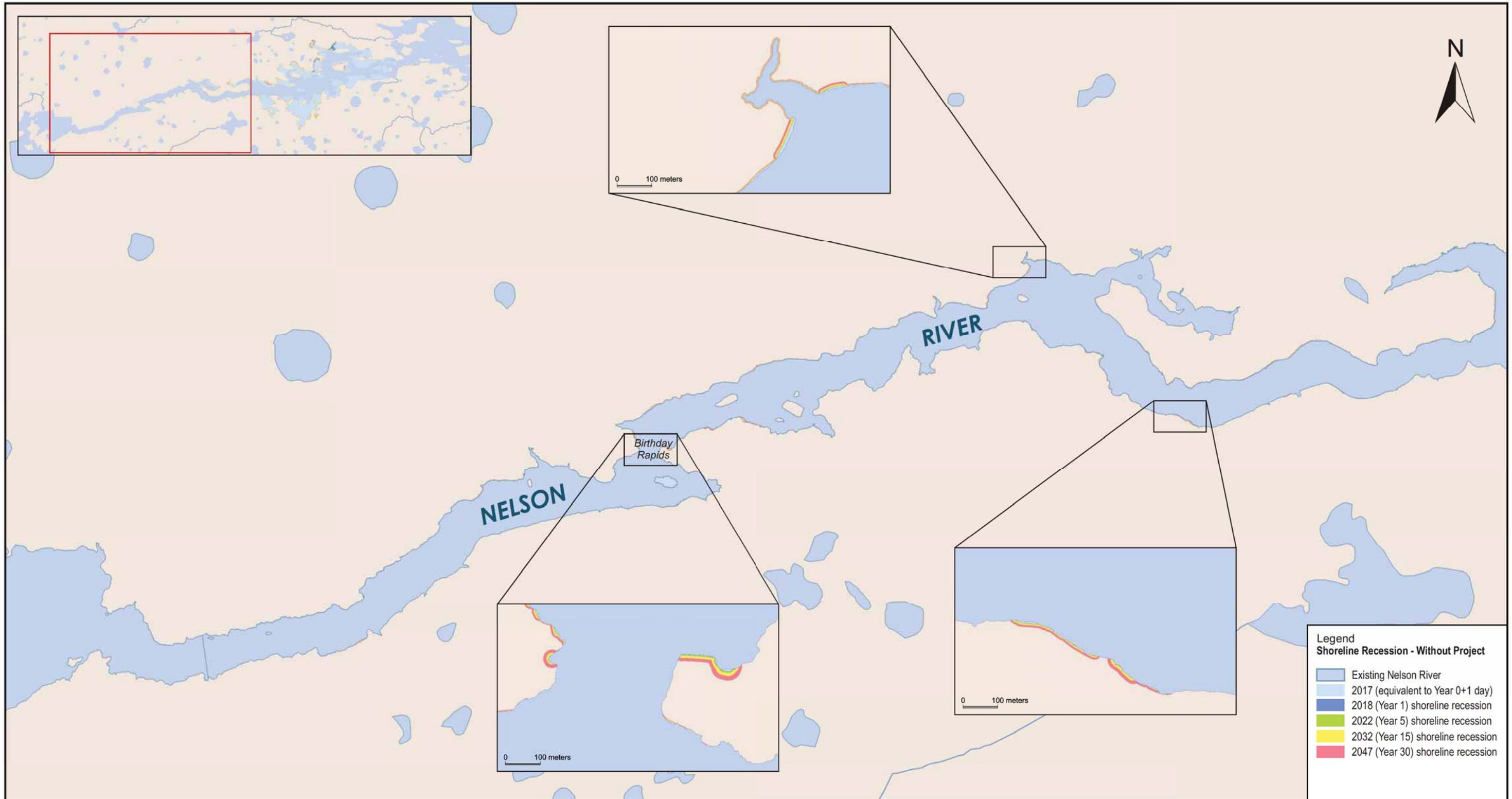


Keeyask Generation Project Environmental Impact Statement

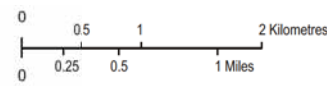
Supporting Volume Physical Environment



June 2012

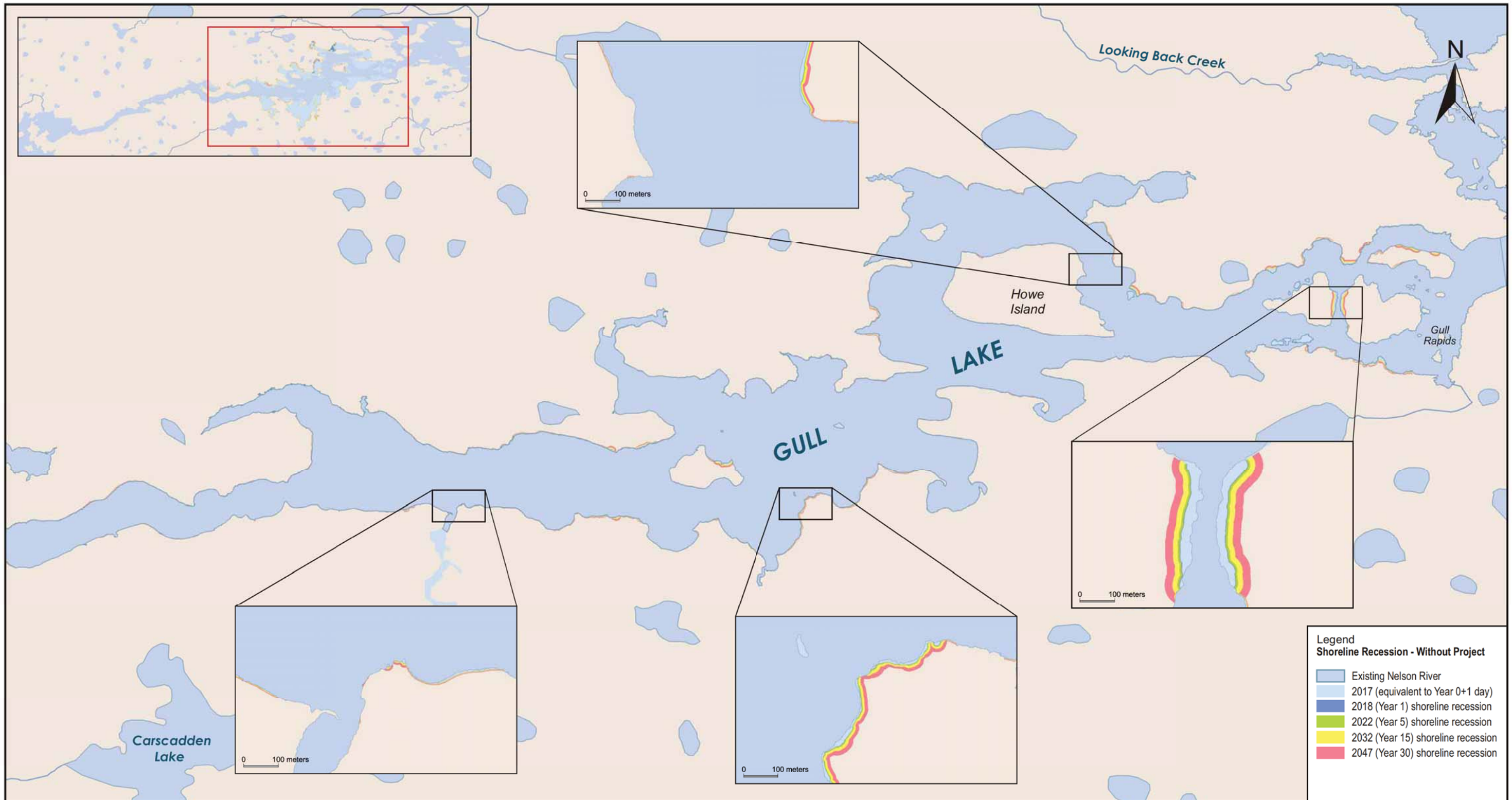


- Legend**
Shoreline Recession - Without Project
- Existing Nelson River
 - 2017 (equivalent to Year 0+1 day)
 - 2018 (Year 1) shoreline recession
 - 2022 (Year 5) shoreline recession
 - 2032 (Year 15) shoreline recession
 - 2047 (Year 30) shoreline recession

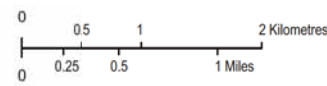


Projection: UTM NAD 83 Zone 15
 Data Sources: Nelson River and hydrography - ECOSTEM Ltd.; without-project shore erosion polygons - JDMA
 Created by: J.D. Mollard and Associates
 Date Created: 09 December 2009

Shoreline Recession in Western Upstream Area Years 1 to 30 Without Project (Existing Conditions Only)

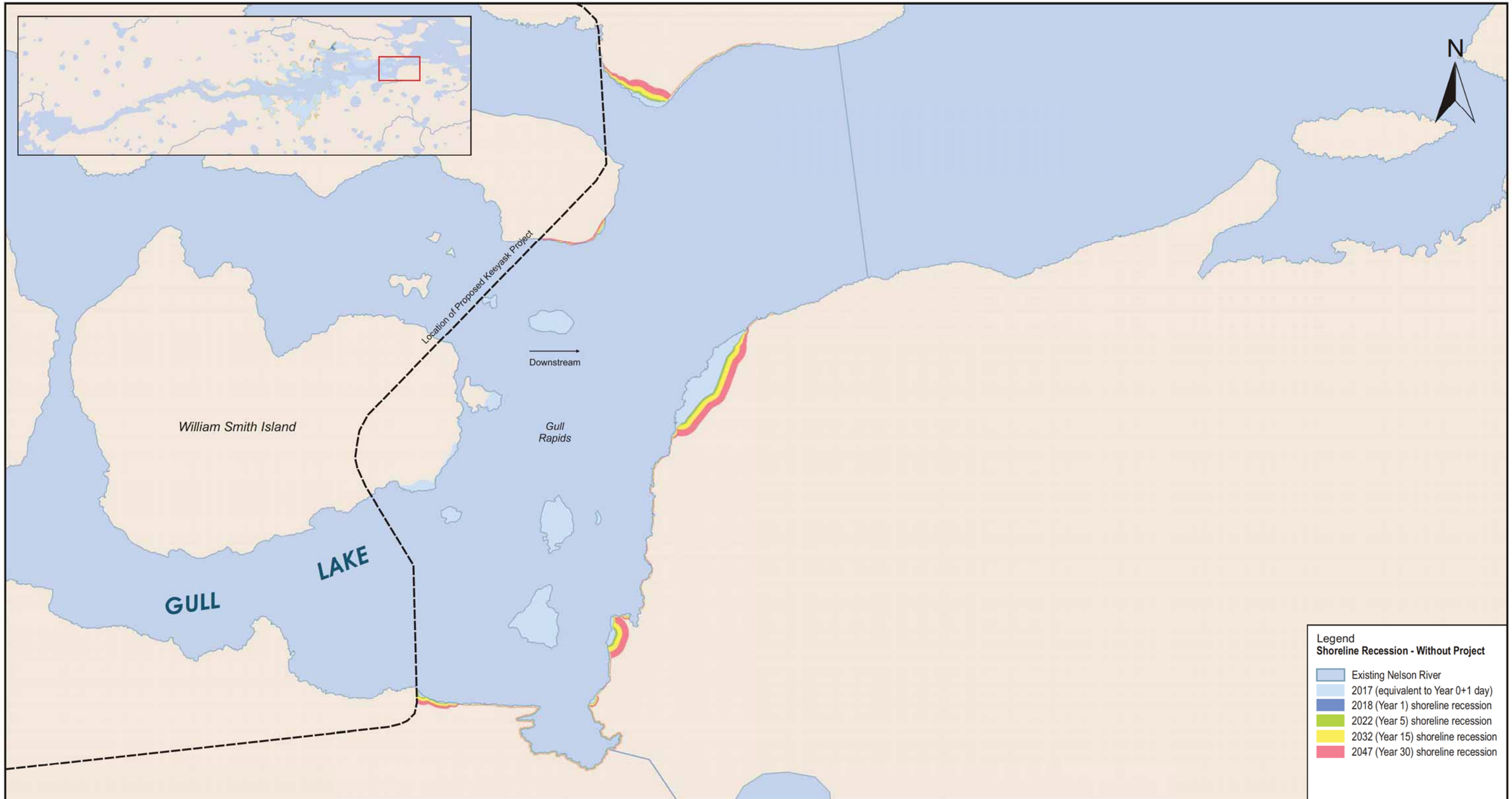


- Legend**
Shoreline Recession - Without Project
- Existing Nelson River
 - 2017 (equivalent to Year 0+1 day)
 - 2018 (Year 1) shoreline recession
 - 2022 (Year 5) shoreline recession
 - 2032 (Year 15) shoreline recession
 - 2047 (Year 30) shoreline recession



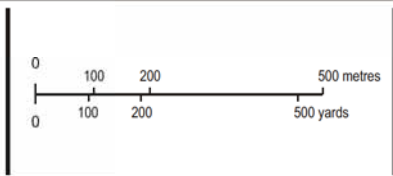
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 Data Sources: Nelson River and hydrography - ECOSTEM Ltd.; Dyke - MB Hydro; without project shore erosion polygons - JDMA
 Created by: J.D. Mollard and Associates
 Date Created: 09 December 2009

Shoreline Recession in Eastern Upstream Area Years 1 to 30 Without Project (Existing Conditions Only)



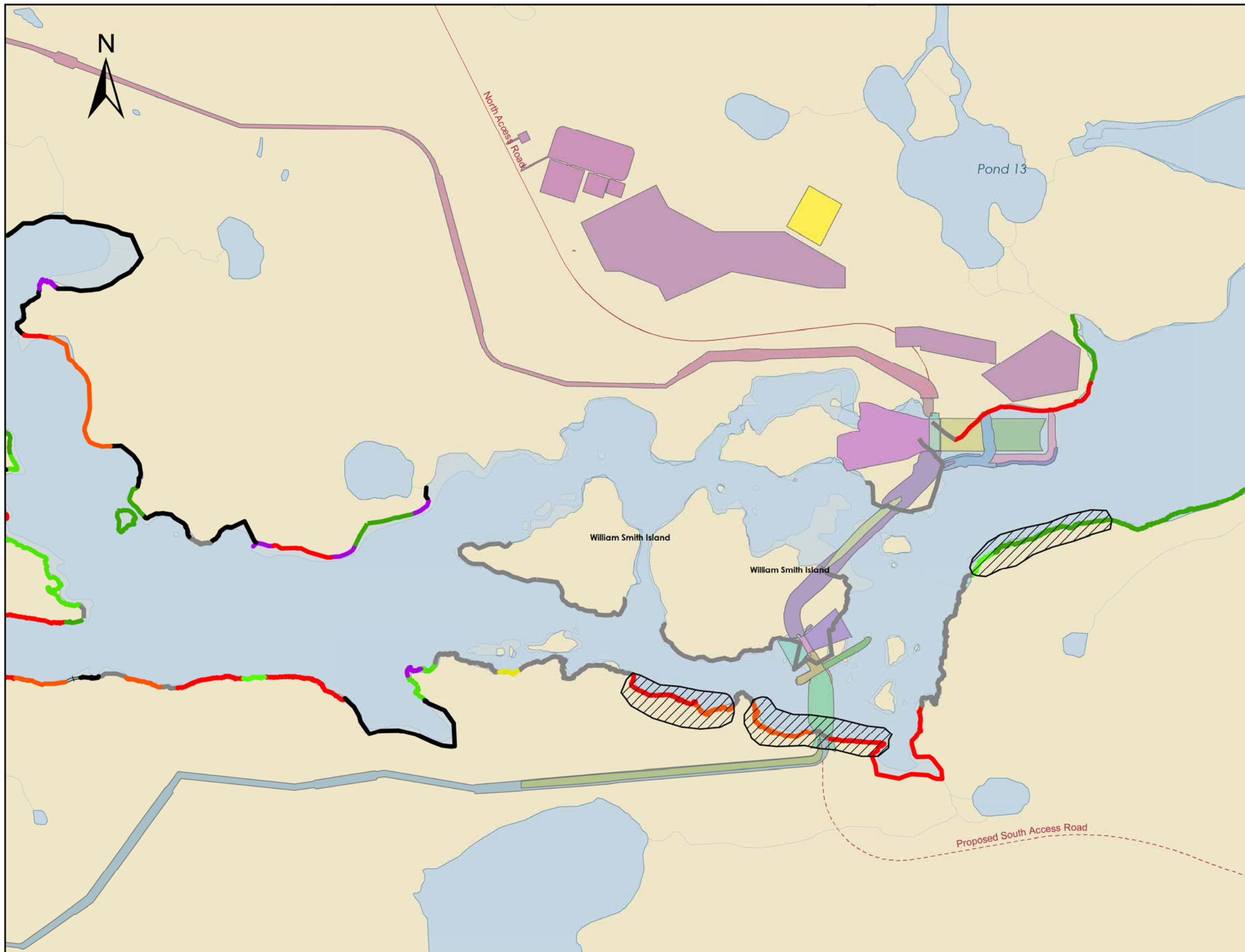
Legend
Shoreline Recession - Without Project

- Existing Nelson River
- 2017 (equivalent to Year 0+1 day)
- 2018 (Year 1) shoreline recession
- 2022 (Year 5) shoreline recession
- 2032 (Year 15) shoreline recession
- 2047 (Year 30) shoreline recession



Projection: UTM NAD 83 Zone 15
 Data Sources: Nelson River and hydrography - ECOSTEM Ltd.; without-project shore erosion polygons - JDMA
 Created by: J.D. Mollard and Associates
 Date Created: 09 December 2009

**Shoreline Recession in Eastern Area Downstream of the Keeyask Project
 Years 1 to 30 Without Project (Existing Conditions Only)**



Legend

— Bedrock	— Clay with Gravel	— Peat
— Boulders	— Clay with Rock	— Peat with Cobbles
— Clay	— Clay with Till	— Peat with Cobbles & Boulders
— Clay with Boulders	— Cobbles	— Sand
— Clay with Cobbles	— Gravel	— Sand with Cobbles
		— Pre-Construction_4855
		▨ Potential Source of Sediment

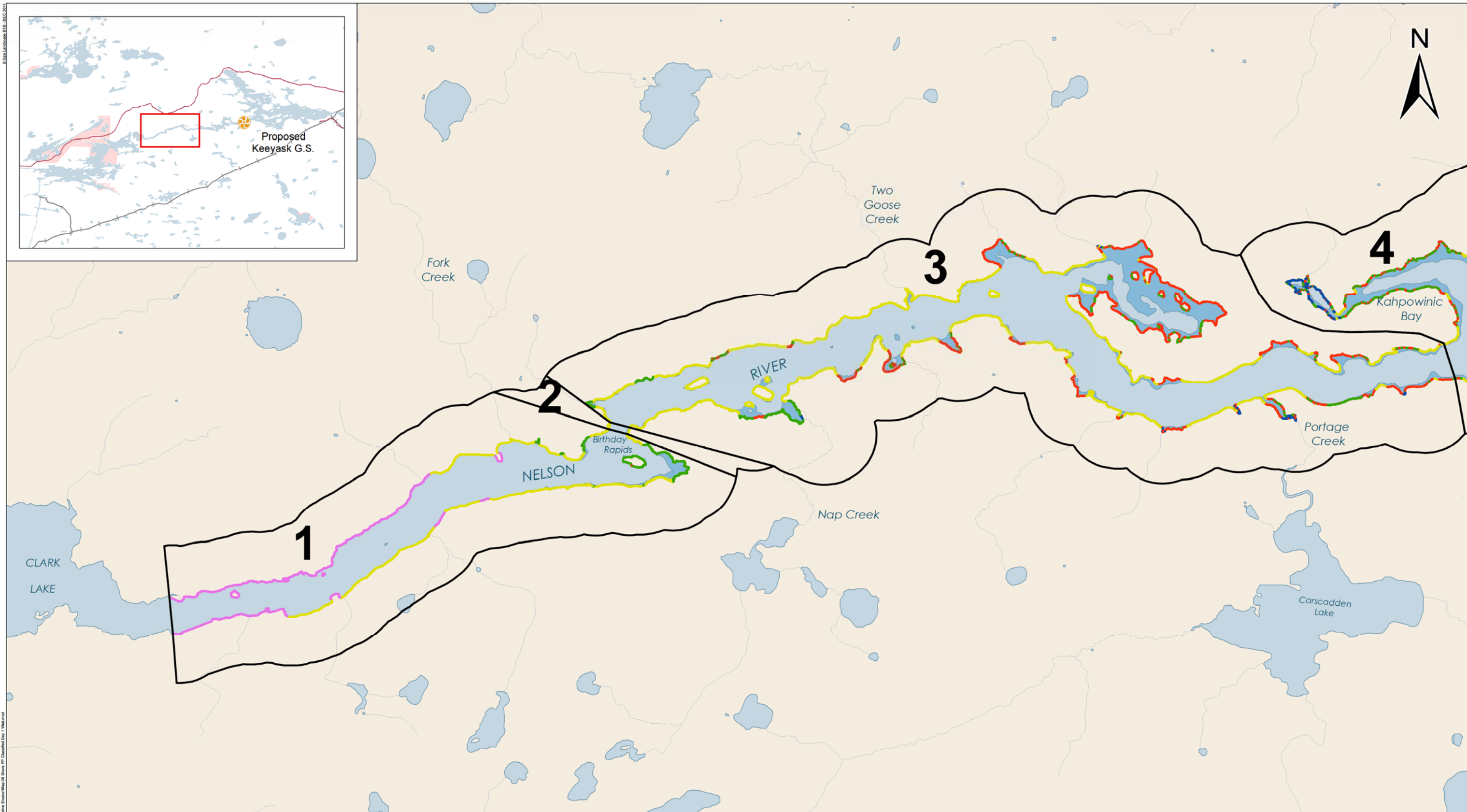
Projection: NAD 83 Zone 15N
 Data Source: Manitoba Hydro

0 0.5 1 Kilometres
 0 0.3 0.6 Miles

Potential Locations of Shoreline Erosion During The Construction Phase

Shoreline Materials and Pre-construction 95% Flow (4855cms)





DATA SOURCE:
 Reaches - North/South Consultants Inc.; Shoreline material and reservoir - ECOSTEM Ltd. and J D Mollard and Associates Limited; Existing water (gull-95perc-4327cms-rev3) and Infrastructure - Manitoba Hydro; Water - NTS; Roads and rail - Manitoba Conservation; First Nation Reserves - Natural Resources Canada.

CREATED BY:
 ECOSTEM Ltd.

COORDINATE SYSTEM: UTM NAD 1983 Z15N	DATE CREATED: 01-MAY-12	REVISION DATE: 01-MAY-12
VERSION NO.: 1.0	QA/QC: APPROVED	

Legend

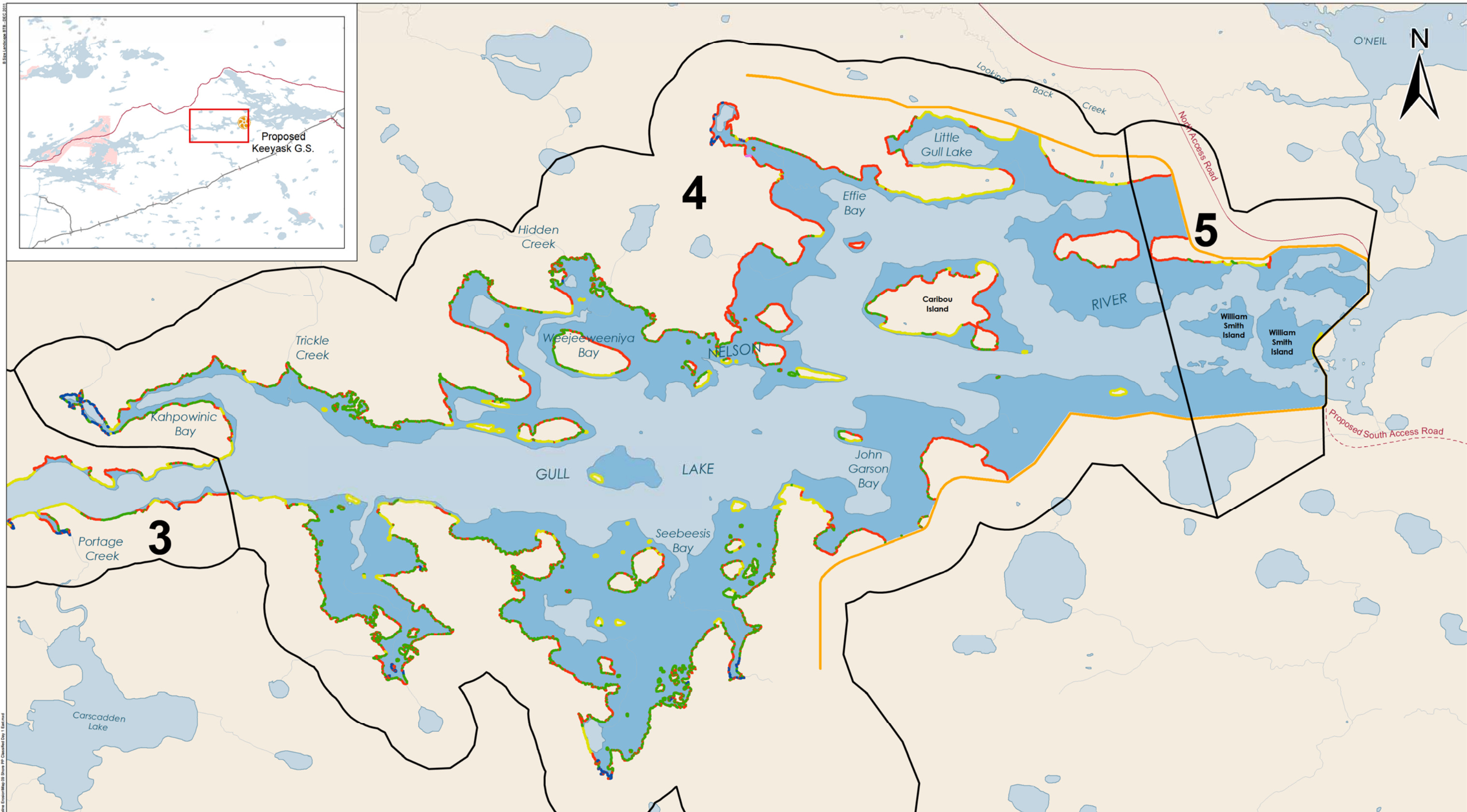
Shoreline Material Type

- Bedrock Outcrop
- Mineral
- Peat
- Floating Peat
- Saturated Peat
- Existing Water Surface Area
- Reservoir Day 1 (159 m)

Post Project Reach

- 1 = Riverine Shore Zones Upstream of Birthday Rapids
- 2 = Riverine Shore Zones at Birthday Rapids
- 3 = Riverine Shore Zones Downstream of Birthday Rapids to the Inlet of Gull Lake
- 4 = Lake Shore Zones in Gull Lake

**Shoreline Material At Day 1
 in Western Upstream Reaches**



DATA SOURCE:
Reaches - North/South Consultants Inc.; Shoreline material and reservoir - ECOSTEM Ltd. and J D Mollard and Associates Limited; Existing water (gull-ee-95perc-4327cms-rev3) and Infrastructure - Manitoba Hydro; Water - NTS; Roads and rail - Manitoba Conservation; First Nation Reserves - Natural Resources Canada.

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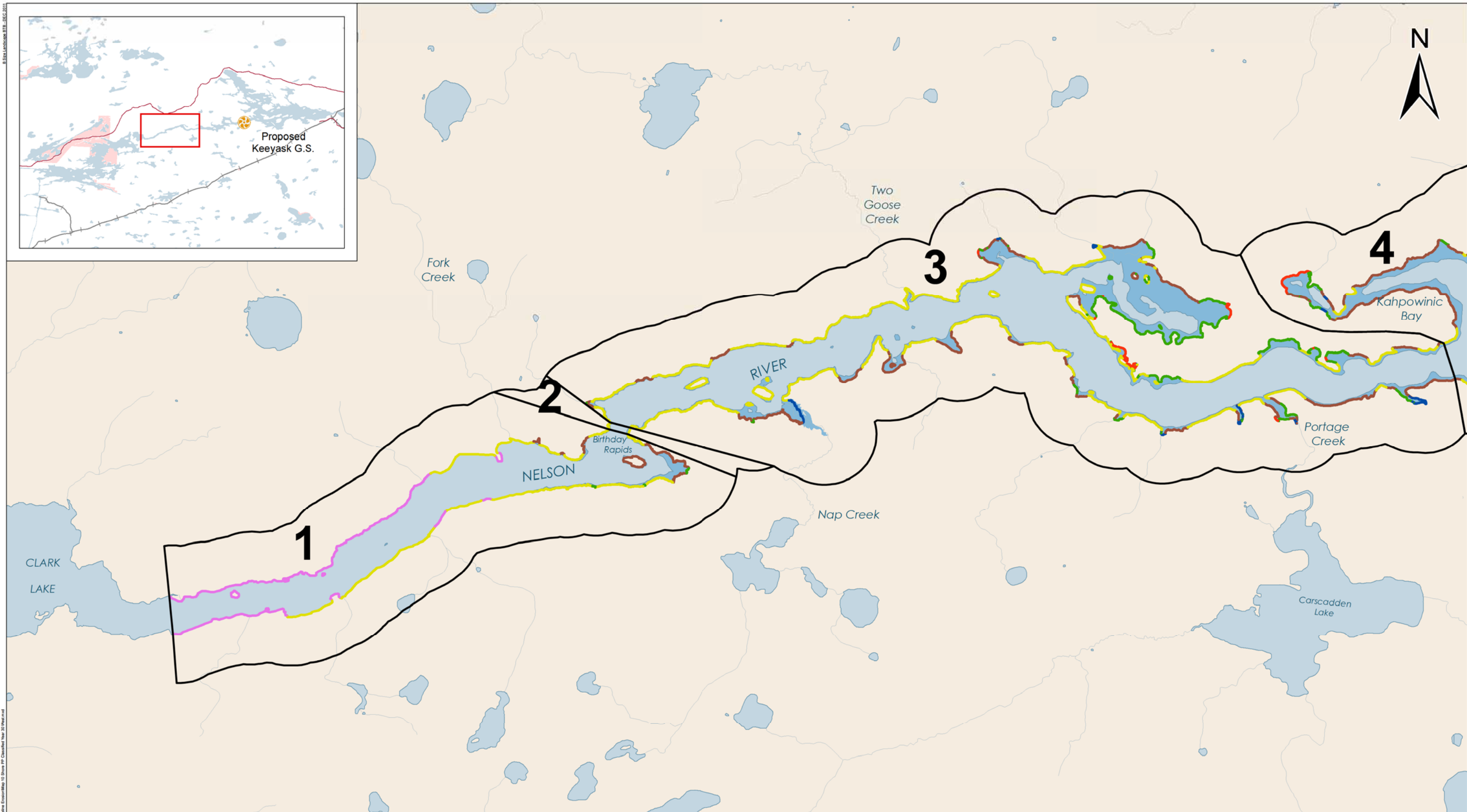
Legend

- Shoreline Material Type**
- Bedrock Outcrop
 - Peat
 - Saturated Peat
 - Existing Water Surface Area
 - Mineral
 - Floating Peat
 - Keyeyask Principal Structures
 - Reservoir Day 1 (159 m)

Post Project Reach

- 3 = Riverine Shore Zones Downstream of Birthday Rapids to the Inlet of Gull Lake
- 4 = Lake Shore Zones in Gull Lake
- 5 = Riverine Shore Zones Immediately Upstream of Keeyask G.S.

**Shoreline Material At Day 1
in Eastern Upstream Reaches**



DATA SOURCE: Reaches - North/South Consultants Inc.; Shoreline material and reservoir - ECOSTEM Ltd. and J D Mollard and Associates Limited; Existing water (gull-95perc-4327cms-rev3) and Infrastructure - Manitoba Hydro; Water - NTS; Roads and rail - Manitoba Conservation; First Nation Reserves - Natural Resources Canada.		
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	VERSION NO.: 1.0	QA/QC: APPROVED

Legend

Shoreline Material Type

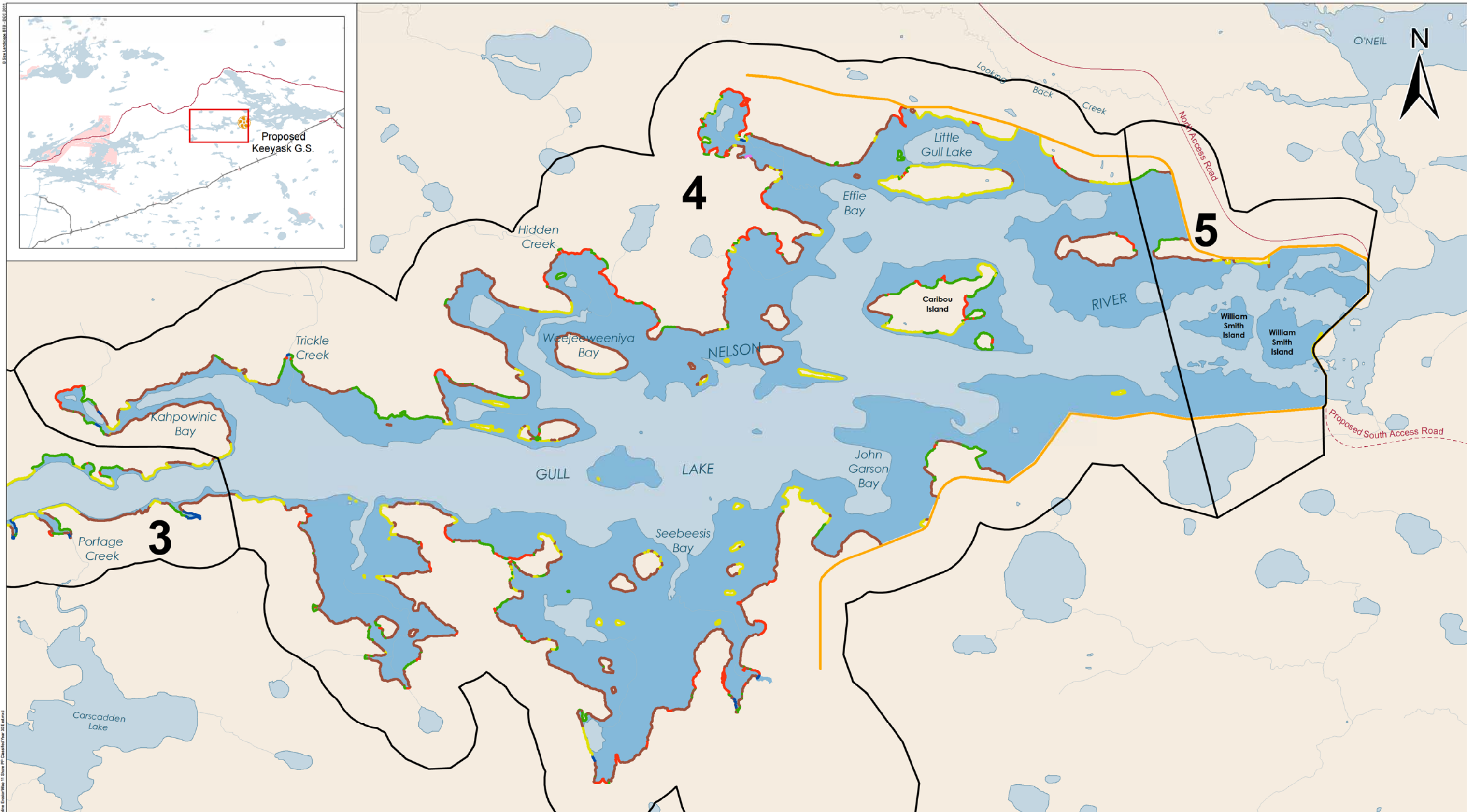
- Bedrock Outcrop
- Mineral
- Mineral With Peat Overburden
- Peat
- Floating Peat
- Saturated Peat

Post Project Reach

- 1 = Riverine Shore Zones Upstream of Birthday Rapids
- 2 = Riverine Shore Zones at Birthday Rapids
- 3 = Riverine Shore Zones Downstream of Birthday Rapids to the Inlet of Gull Lake
- 4 = Lake Shore Zones in Gull Lake

- Existing Water Surface Area
- Reservoir Year 30 (159 m)

Shoreline Material At Year 30 in Western Upstream Reaches



File Location: Z:\Workspaces\Keyask_GS\GIS\Figures\Physical_Environment\Shoreline_ReachMap_11_Show_PP_Calendar_Near_30_Year.mxd



DATA SOURCE: Reaches - North/South Consultants Inc.; Shoreline material and reservoir - ECOSTEM Ltd. and J D Mollard and Associates Limited; Existing water (gull-ee-95perc-4327cms-rev3) and Infrastructure - Manitoba Hydro; Water - NTS; Roads and rail - Manitoba Conservation; First Nation Reserves - Natural Resources Canada.		
CREATED BY: ECOSTEM Ltd.		
COORDINATE SYSTEM: UTM NAD 1983 Z15N	DATE CREATED: 01-MAY-12	REVISION DATE: 01-MAY-12
		VERSION NO.: 1.0
QA/QC: APPROVED		

Legend

Shoreline Material Type

- Bedrock Outcrop
- Mineral
- Mineral With Peat Overburden
- Peat
- Floating Peat
- Saturated Peat
- Keyask Principal Structures

Post Project Reach

- 3 = Riverine Shore Zones Downstream of Birthday Rapids to the Inlet of Gull Lake
- 4 = Lake Shore Zones in Gull Lake
- 5 = Riverine Shore Zones Immediately Upstream of Keyask G.S.

- Existing Water Surface Area
- Reservoir Year 30 (159 m)

Shoreline Material At Year 30 in Eastern Upstream Reaches