Coastal Processes

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

www.losl.org

1 What is the Coastal Processes Technical Work Group doing?

This Group is studying the impacts of alternative water level regulation plans on:

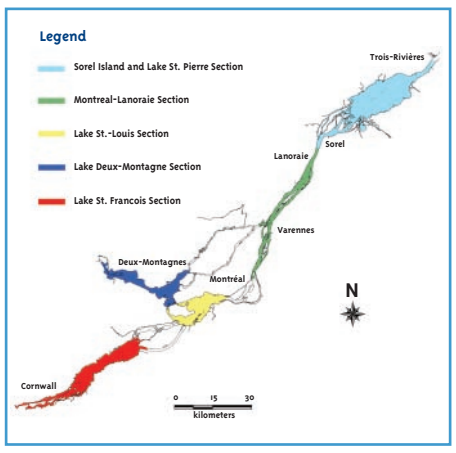
- Shoreline erosion
- Flooding
- Impacts to existing shore protection structures, and
- Impacts to barrier and recreational beaches

Photo - Baird & Associates

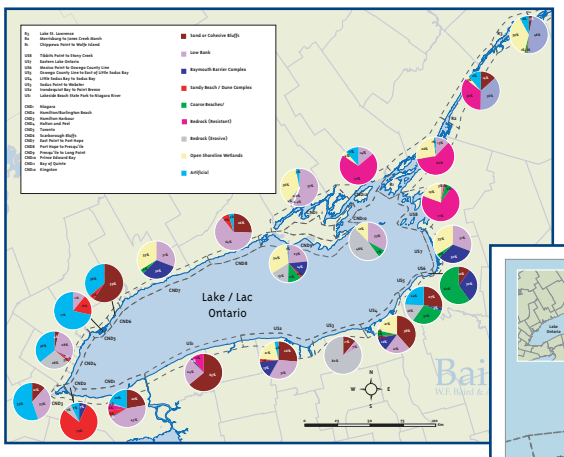
2 What areas are we evaluating?

Within the two separate geographical areas of the study:

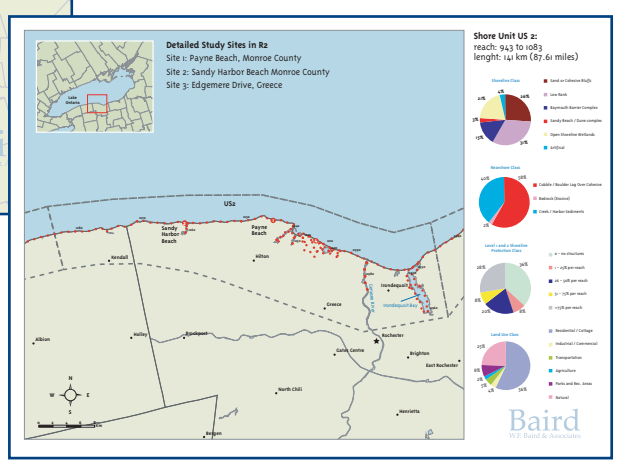
- Lake Ontario and the St. Lawrence River upstream of the Moses-Saunders Power dam (Lake and Upper River) and
- The St. Lawrence River from Moses-Saunders Power Dam to Trois-Rivieres (Lower River).



Twenty-seven sites with a variety of shore types and development were studied in detail. This guided developement of evaluation methods for all of the shoreline.



Shoreline Class



Irondequoit Bay to Point Breeze

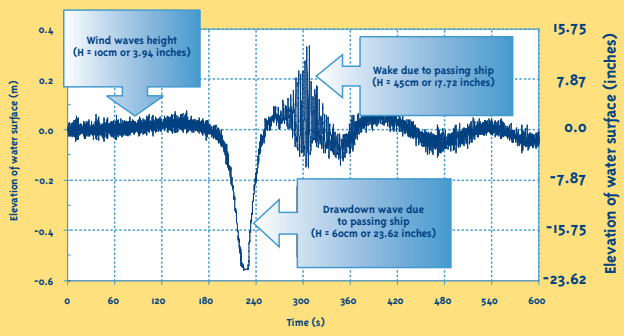
3 How are we evaluating impacts?

Initially existing and new data were collected on:

- Waves,
- Shoreline composition,
- Bathymetric data, and
- Land uses.

This information was integrated into erosion and flooding models to define how the shoreline responds to fluctuating water levels.

Plot showing relative magnitudes of wind waves and ship waves



Data collected by Pacific International Engineering at the St. Lawrence River, October 2002

4 What are our findings to date?

- Shoreline erosion is highest during storm periods in the fall, winter, and spring. In the summer, damaging storms are less severe and frequent.
- Shoreline flooding damages are significant on both the Lake and the lower River.
- Flood damages on the lower River are most severe in the Lac St. Pierre/Sorel area.
- Sediment eroded from the bluff shorelines plays an important role in stabilizing sandy beaches and dune environments. Without erosion, the quality of beach and dune environments will degrade.
- In the lower St. Lawrence River, shoreline erosion is primarily ship-wave driven. Water levels play a role in erosion, but regulation of Lake Ontario has a minor influence relative to large seasonal fluctuations in River flows and levels.
- Lake level regulation scenarios that increase water levels on the Lake or River could necessitate modification to the crest elevations of shore protection structures to ensure the same level of protection.
- The water levels resulting from the current operation of the Moses Saunders Power Dam have reduced shoreline erosion rates on Lake Ontario.
- Erosion of Lake Ontario bluffs and shoreline is generally reduced for lake level regulation scenarios that result in low lake levels. However, even during low lake levels erosion of the lake bottom occurs near the shoreline, which allows for deeper water and bigger waves during the next high water period.