



## Maitland Conservation

# QUICK FACTS about Lake Levels, Erosion & Shore Protection

March 2020

### Lakebed Erosion the invisible threat

Invisible underwater erosion of the lakebed has a significant impact on bluff erosion. When lakebed erosion occurs, it means that larger waves are able to reach the toe (base) of the bluff.

Lakebed erosion is usually most intensive close to the shore where breaking waves create turbulence. When lake levels are relatively low (most recently from 2000 - 2014), the zone of wave-breaking occurs further offshore, which erodes the lakebed and deepens waters approaching the shore. Now that high water levels have returned, the near-shore water depth is greater than it was during the previous period of high water levels (1974 - 1987). As a result, incoming waves are larger and break closer to the shore, reducing beaches and creating more toe erosion of the shoreline bluffs.

Lakebed erosion is an irreversible process. Eroded nearshore lakebed areas are not naturally restored the way a beach may be when sand transported offshore during storms is carried onshore again.

### Bluff Erosion

Erosion along the Lake Huron shoreline is a natural process that has been occurring since the Great Lakes formed over 10,000 years ago.

Erosion is viewed as a problem when development is located within an erosion prone area; however, it is an important process in the ecological life of the coast. Eroding bluffs provide building materials for beaches. Sediment or eroded "bluff stuff" drops to the base of the bluffs where it is sorted, and carried along the shore by wind and waves. These bluff sands help build and maintain beaches along the coast. Beach and dune systems need bluff erosion to exist and beaches and dunes play a role in protecting the shoreline from waves and erosion.

Bluff erosion is affected by geology, waves and weather. All three factors vary widely within Maitland Conservation's shoreline region. As a result, some stretches of shoreline are continually eroding, some areas erode more slowly and others have been stable for long periods of time.

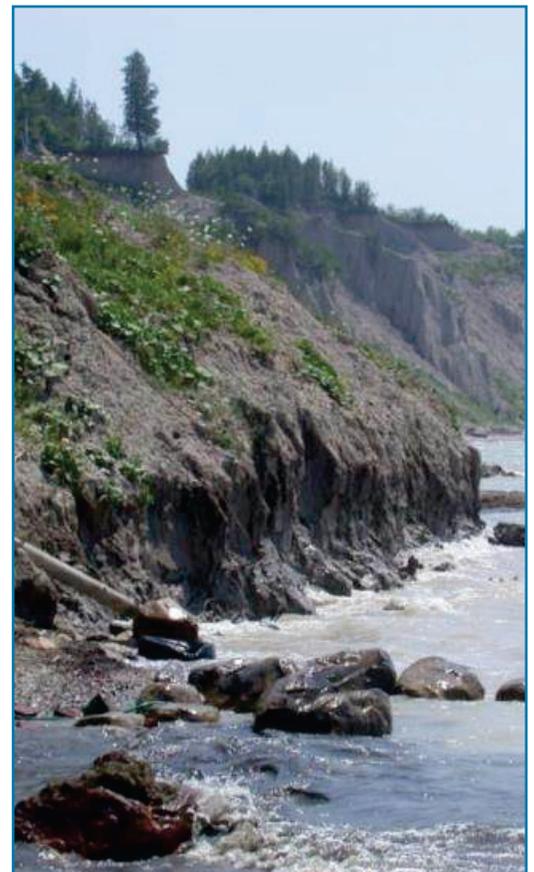
There are three factors that influence the rate of erosion:

1. direct erosion at the base of the bluff
2. surface water that flows over the bank eroding crevices into the soil,

which can evolve into rills and gullies

3. groundwater seepage from the bluff, which can lead to bluff failure

It is important to remember that erosion doesn't always happen in a regular pattern. A bluff described as having an average erosion rate of 30 cm per year may not erode 30 cm every year. The bluff may not erode for several years followed by a period of significant erosion.



# Lake Huron Lake Levels

The water level in Lake Huron rises and falls seasonally. Usually the level is higher in the summer and lower in the winter. In addition, the lake level fluctuates on a long term basis. This fluctuation is a natural process that occurs in response to wet or dry conditions that may last for several years. Generally, water levels rise when the amount of rain and snow on the lake and runoff from tributary streams is higher than evaporation. Levels drop when rain and snow are below normal and evaporation is above normal. (IJC, 2013).

High lake levels have an impact on natural processes such as erosion and flooding. Based on the latest information from US and Canada, the water level of Lake Huron is expected to continue rising in 2020.

In Jan. and Feb. 2020, the level of Lake Huron reached record highs for those months. Typically the lake experiences a seasonal decline in September and October. Unfortunately in 2019 the level increased slightly during this period due to high rainfall amounts along

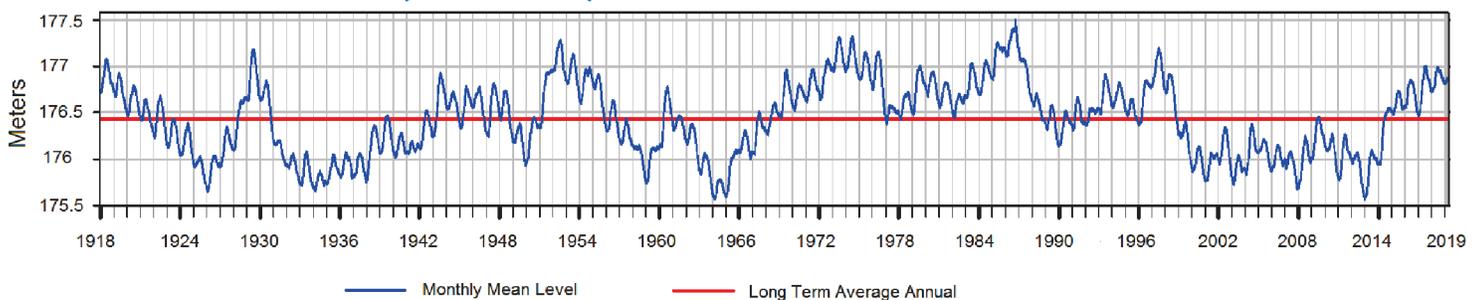
the Michigan side of the Lake Michigan – Lake Huron watershed.

Forecasts are showing that the lake level in March is expected to be approximately 30 cm (12 inches) higher than during the same period in 2019.

Current conditions on Lake Huron, combined with high wind and wave events, may result in significant bluff erosion in some areas.

The graphic below provides an overview of recorded lake levels from 1918 to the present.

## Lake Huron Water Levels (1918 - 2019)



## Shore Protection

Recent storm damage has many landowners thinking about possible shore protection in their area. It is important to remember that attempts at shore protection such as breakwaters, revetments and groynes are expensive, disrupt natural shoreline processes and may cause problems for your neighbours.

Natural processes can impact the function of shore protection structures. For example, freeze thaw expansion and cracking of armour stone can greatly shorten the usefulness of rip rap revetments.

Lakebed erosion undermines the

foundations of shore protection structures and subjects these structures to greater wave energy during storms. Lakebed erosion is one cause of the relatively short lives of many shore protection structures. (University of Wisconsin Sea Grant Institute)

If you're considering shore protection work please note:

- Landowners must hire a coastal engineer to design the shore protection and to determine if the work will impact neighbouring properties.
- Existing walls (stone, gabion baskets etc.) may be replaced provided the proposed work is

similar in size and footprint. However, an engineer will still be required to provide input on the design and installation of the replacement wall.

- The replacement of groynes will not be permitted. Groynes intercept sand and degrade natural beaches.
- Prior to undertaking any work contact your municipality and Maitland Conservation to ensure your plans meet development policies. In some areas a Public Lands Permit from the Ontario Ministry of Natural Resources and Forestry may be required.