



Wasaga Beach Shoreline Investigation Summary

Nottawasaga Valley Conservation Authority

P/N 16-2971 | February 21, 2017

County of Simcoe
Town of Wasaga Beach

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Wasaga Beach Shoreline Investigation Display Board

Wasaga Beach Shoreline Investigation

NVCA

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1.0 Introduction

As a part of the '*Mapping of Dynamic Beach, Flood Hazard Limit, Nearshore Bathymetry and Biodiversity for the Wasaga Beach and Collingwood Shoreline*' project under the Lake Simcoe/South-Eastern Georgian Bay Clean-Up Fund (LSSGBCUF), Skelton Brumwell & Associates is assisting with the shoreline investigation in the Town of Wasaga Beach.

Orthoimagery interpretation has revealed changes in the extent of shoreline area along Wasaga Beach from 1984 to 2015. Ecological and anthropogenic factors are both contributing to changes in the shoreline area.

2.0 Methods and Findings

Orthoimagery from the years 1984, 1994, 2007, and 2015 were interpreted, digitized and analyzed using GIS (ESRI ArcMap) to determine the shape and extent of the shoreline area. Photo scale was quite large for both the 1984 and 1994 photos, with a large increase in quality for the 2007 and 2015 photos. The effect on the water level determination is likely small because of the clear contrast between the water and sand, however the ability to accurately delineate the vegetated boundary and areas of disturbance was limited.

The digitized beach area was delineated from the waterline inshore to the edge of wooded vegetative communities or developed area. Fluctuations were noted in both the waterline and the vegetated/disturbed area limits. The areas recorded in **Table 1** represent the areas of the beach area observed in the aerial photos. The beach area does not correspond with annual average water level for the study years so it can be assumed that the greatest changes in area are attributable to vegetative and development patterns (Great Lakes Environmental Research Laboratory, 2017).

Table 1 Change in Shoreline Area, 1984-2015

Year	Shoreline Area (ha)	Change (ha)	Average Water Level
1984	172.24		176.90masl
1994	217.19	+ 44.95	176.68masl
2007	130.31	- 86.88	175.94masl
2015	83.85	- 46.46	176.59masl

3.0 Impacts on Wasaga Beach Shoreline Area

3.1 Ecological Processes

Fairly significant vegetation has occurred on the peninsula, forming the western bank of the Nottawasaga River in the period of study. It is possible that the installed car park on the peninsula has introduced seed stock through vehicle transport and that wind erosion and water collection has been altered to facilitate woody species of plants. The increasing extent of vegetated areas in the nearshore zone has resulted in an overall reduction in the shoreline area with the highest level of vegetation existing in 2015.

Although water levels have naturally fluctuated in the Great Lakes over the past centuries, there is a recent and persistent trend of low water levels. Low water levels impact the dynamics of waves and currents, in addition to altering the transport of sediment. The Great Lakes Environmental Research Laboratory (2017) data indicates that 2007 was one of the lowest recorded water levels in the Michigan-Huron basin with all monthly averages well below the historical average. Conversely, 1984, 1994 and 2015 levels were above the historical average for every month. This is reflected in the location of the waterline as well as the amount of beach above water. Due to the shallow nature of the beach, small changes in water level can produce large differences in area above water.

3.2 Anthropogenic Impacts

Shoreline hardening and the impacts of urbanization and recreational development have influenced shoreline form and functions. Shoreline hardening involves the construction of walls that protect waterfront property and improve human access to the waterfront. Nearshore coastal processes that drive erosion and sediment transport are impacted by shoreline hardening, leading to changes in the form of the shoreline. Wasaga Beach remains an area of the Great Lakes shoreline that has not been substantially hardened. Channel reinforcement exists along the course of the Nottawasaga in the Nancy Island area does exist.

Urbanization and development in the nearshore area has impacted the shoreline, in the form of vegetative community changes and dredging for recreational watercrafts. Dredging of recreational boating areas and alterations to public and private beach yards interferes with the natural dynamics of the shoreline. The area of shorelines that have been most affected have

been the western and eastern shores outside the Ontario Parks system. Beaches within the Ontario Parks system appear to be the most stable within Wasaga Beach.

4.0 Conclusions

Characterizing changes in the shoreline area of Wasaga Beach will contribute to a better understanding of the shore, which will improve coastal management. Wasaga Beach is a dynamic coastal system which is impacted by water level fluctuations symptomatic of the entire upstream portion of the Great Lakes Basin. However, shoreline development and vegetative processes appear to be the major driver of change. Development patterns have had impacts on both the shorelines areas in the form of small scale dredging activity and construction, which produce both direct and indirect vegetative alterations. Understanding and management of these processes is important to the ecological health of the shoreline over the long term.

5.0 References

Great Lakes Environmental Research Laboratory (2017) Great Lakes Water Level Dashboard. Available at: <https://www.glerl.noaa.gov/data/dashboard/GLWLD.html> (Accessed: 10/02/17).

6.0 Disclaimer of Responsibilities to Third Parties

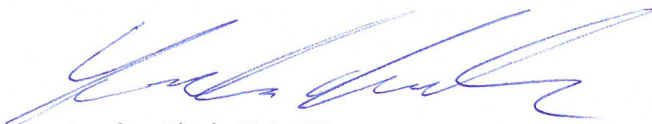
This report was prepared by Skelton, Brumwell & Associates Inc. for the account of Nottawasaga Valley Conservation Authority (NVCA).

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All of which is respectfully submitted,
SKELTON, BRUMWELL & ASSOCIATES INC.

per:



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Landscape Architect Intern

Appendix A

Wasaga Beach Shoreline Investigation Display Board

Wasaga Beach Shoreline Investigation

METHODS

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ECOLOGICAL PROCESSES

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REFERENCE

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