

**Huron County Integrated Assessment of Water Level Fluctuations  
Planning Team Final Report**

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## **Executive Summary**

Huron County is known as the place where the farm meets the beach, a rich agricultural county of 60,000 people in Ontario, Canada with 100 kilometers (62 miles) of shoreline on Lake Huron and a population that grows by more than 10,000 in summer with cottagers, tourists and campers. The county seat, the Town of Goderich, has a commercially important deep water harbour, the largest producing salt mine in the world, and the designation “Canada’s Prettiest Town”.

For a decade, ending only recently, the County experienced the full gamut of issues related to low water levels, with the Huron coast registering the lowest water levels in recorded history in January, 2013. The impacts were mixed, with low water revealing glorious stretches of sandy beach, an irresistible draw for tourists to the provincial parks and commercial tourist venues at the south end of the Huron County shoreline, and a slower rate of erosion for the 40km of steep bluffs. Negative impacts of low water include water quality deterioration (health risk to swimmers and drinking water sources as well as biodiversity and habitat health); impediments for boating/shipping infrastructure such as piers, marinas, harbours. “Toe erosion” of bluffs also occurs during low water situations.

In the last two years, water levels have rebounded, with near record precipitation. This has improved shipping and water quality, but beaches have shrunk and bluff erosion is threatening cottage and other waterfront structures. The Maitland Valley Conservation Authority has identified some 550 structures at “imminent risk” of being swept down 100 foot-high slopes if the bluff on which they are perched collapses. Should a cottage be occupied at the time of the slope slump, the risks of human tragedy are high, with very little that First Responders could do to provide aid. Heavy rain has impacts that start well inland with depletion of agricultural soil, as nutrients are swept into more than 130 streams at high speed, and exit through gullies and ravines into Lake Huron, with the fast, heavy flow also exacerbating erosion.

In Ontario, Huron County has been at the forefront of planning and preparing for social, environmental and economic change. Key participants include the staff of Huron County and its municipalities, the two Conservation Authorities; non-profit environmental organizations such as the Lake Huron Centre for Coastal Conservation; tourism and agricultural organizations; First Nations and residents/cottagers associations; and the field office staff of Provincial ministries such as Agriculture, Food and Rural Affairs; Environment and Climate Change; Natural Resources and Forestry; Municipal Affairs and Housing.

The potential next step for a Huron County Integrated Assessment is to develop a Terms of Reference and seek the participation of the County’s Water Protection Steering Committee, established in 2004. This committee includes representatives of key environmental, economic, social and governmental groups in the County, a composition ideal for an Integrated Assessment. Meetings with key local staff indicate that the Committee’s mandate is a good fit for the Integrated Assessment and interest in this project is high.

## Introduction

The past decades have seen unprecedented fluctuation in Great Lakes water levels, with significant economic, environmental and social impacts resulting from extreme low water levels as well as the most recent flooding and high water situation (1). Ontario municipalities along the Great Lakes shorelines have experienced the impacts of extreme water levels in recent decades, leading to research and policy work on adaptive management, disaster relief and planning activities by all levels of government. Research indicates there is no way to identify a long-term trend in water levels, other than to predict there will be extremes in both high and low levels combined with an increase in extreme weather events (14). This requires flexibility in consideration of practical policies, programs and initiatives to address the full range of potential local issues and circumstances into the future.

Recent studies of variable lake water levels, together with Climate Change impacts, conclude that:

- mean temperatures will continue to rise (world temperatures set a new record this year on July 13, 2015);
- extreme weather events are to be expected at increased frequency, making the previous 100 year storm standard an unreliable predictor;
- extremes of both high and low water levels in Lake Huron are to be expected over time and are difficult to predict;
- a central theme in environmental policy is the adaptive and emergency management for both high and low water situations, extreme weather events, and higher temperatures.

Whether dealing with floods, drought, erosion or water quality issues, communities are impacted across the spectrum of environmental, economic and social effects and challenges. When considered in the socio-demographic context of declining and aging population, dealing with community safety, tourism, infrastructure, health and social services and environmental issues is a challenge.

The University of Michigan (U-M) Graham Sustainability Institute's Integrated Assessment Center and Water Center are proposing an Integrated Assessment (IA) to consider the environmentally, socially, politically, and economically feasible policy options and management actions to adapt to Great Lakes water level variability. This Huron County IA Planning report provides an initial look at the issues, stakeholders, and governance in the Huron County portion of the Lake Huron coastline. It scopes out potential resources, processes and participants for an Integrated Assessment process.

The purpose of the Integrated Assessment (IA) is to develop information, tools, and partnerships to help decision makers address the challenges and opportunities posed by variability in Great Lakes water levels.

The central IA question is: *What environmentally, socially, politically, and economically feasible policy options and management actions can people, businesses, and governments implement in order to adapt to current and future variability in Great Lakes water levels?*

## Outcomes of the Planning Grant

### *Focus Area*

The focus area is the Huron County, Ontario, Canada shoreline of Lake Huron. The Town of Goderich is the County Seat and a center of marine activity, both industrial and recreational. It has the only seaway depth port on the east side of Lake Huron. The Huron County shoreline contains the only bluffs on Lake Huron with erosion a significant local issue. Huron County, population 60,000 is a rich agricultural region with tourism and manufacturing contributing to the local economy. The 100 kilometres of Lake Huron shoreline is a prime attractor for tourism and recreation activities. Summer theatre, farm-based promotions and local festivals complete the attractions.

### *Impacts*

- “The last 10 years have been a master class in the impacts of low water levels”, according to local authorities. Water levels from 1999 to 2014 declined on average by about 0.53 m. Issues include impacts on piers, marinas, water quality, municipal water supply.
- There is also past history with low water levels affecting waterway transportation for commercial shipping, recreation and tourism, marinas, and municipal water supply and infrastructure.
- Water levels have recently rebounded, and combined with record precipitation are now hastening erosion rates and other high water level issues.
- A major environmental concern is coastal bluff erosion, which has the potential to lead to massive slope failures (slumps). Erosion is a natural, cyclic process of dynamic coasts and has beneficial impacts to downshore areas, renewing dunes and beaches. However, it can also result in damage to cottages and potential hazards to human life. In the 1960’s, when the majority of cottages were built along the 50 km of Huron bluff, they were set well back from the buff edge, but erosion over the ensuing years has caught up with them.
- Steve Jackson, flood and erosion safety coordination officer for the Maitland Valley Conservation Authority, commented that so far they have been “lucky to not have had any loss of life or serious injury,” but that also makes people not take the danger seriously. Technical advice on lakeshore erosion and slope stability problems associated with living along Lake Huron is available from staff of both Conservation Authorities.
- Increasing frequency of extreme storms predicted by scientists as a function of climate change impacts the quality of Huron County’s superb agricultural lands, when hard rain leaches nutrients and top soil is washed into more than 130 streams and driven into Lake Huron.
- The erosion of these waterways from high flows has created ravines and gullies. Cottages and other structures along the gullies are also threatened by erosion.

### *Interdisciplinary topics/drivers*

- Meetings with local authorities suggest that there is a need to consider options for existing development threatened by bluff erosion, as well as future planning. The Maitland Valley Conservation Authority (MVCA) has identified 550 cottages and other recreational structures currently at “imminent risk” from bluff erosion.
- The Ausable Bayfield Conservation Authority (ABCA) started a review of its Shoreline Management Plan this summer.

- Local Emergency Management Annual Exercises (required by Provincial legislation) indicate limited ability for first responders to come to the aid of cottagers/ campers/ hikers involved in any bluff slump because of the dangerous nature of the slopes.
- Financial/ economic implications of bluff erosion include:
  - threat to significant investment made by cottagers (lake front cottages start at about \$400,000);
  - municipalities depend on the average \$8,000 annual property tax per cottage property;
  - local businesses and services depend on cottagers.
- There has been consideration of various engineered structures to address low water situations, particularly with respect to pressure by Georgian Bay cottagers for structures to hold back water in the Lake Huron/Michigan system (1). However, these have been approached with caution because of potential adverse down coast impacts to important touristic areas, such as Grand Bend (one of Ontario's best beaches) and the Pinery Provincial Park. There could be negative economic as well as environmental impacts. In addition, structures built to mitigate low water situations can exacerbate high water situations. For example, cottagers who bulldoze the dunes in front of their cottages to obtain a better view in low water situations can find there is nothing preventing their cottages from being flooded in high water situations. There is an enhanced appreciation of coastal dynamics and dune/erosion cycles in recent years, which merit further study.

### **Description of Contributors**

#### *Maitland Valley Conservation Authority (MVCA)*

Contact; Steve Jackson, Flood and Erosion Safety Services Coordinator.

Formed in 1951, the MVCA covers the watershed, or drainage area, of the Maitland, Nine Mile and Eighteen Mile Rivers, along with smaller watersheds - includes about 50 kilometres of Lake Huron.

#### *Ausable Bayfield Conservation Authority (ABCA)*

Contact: Alex Scott, Water and Planning Manager; Geoff Cade, Supervisor of Water and Planning. The ABCA jurisdiction stretches 57 kilometres along Lake Huron from the north end at Lot 30, Concession 1, Goderich Ward of Central Huron, to the south end at the community of Port Franks, in the Municipality of Lambton Shores. This diverse shoreline can be divided into three areas; the bluffs north of Grand Bend, The Dune region south of Grand Bend, and three river mouths at the communities of Bayfield, Grand Bend, and Port Franks. The ABCA website has indicators for low water and flooding status.

The Conservation Authorities are organized on a watershed basis. They have the responsibility to implement Provincial regulations for natural and hazardous areas in order to:

- prevent the loss of life and property due to flooding and erosion, and
- conserve and enhance natural resources.

This is done through implementation of Provincial regulations affecting areas in and near rivers, streams, floodplains, wetlands, slopes and the Lake Huron shoreline. They work with municipalities to review development applications to ensure they meet local and provincial environmental standards. Projects may need an MVCA or ABCA permit, approval under The Planning Act, or both.

They also have GIS and satellite mapping, water level data analysis, erosion mapping with land-use policies. They work with municipalities and local stakeholders on shoreline management plans. ABCA has started an update of its Shoreline Management Plan.

#### *Lake Huron Centre for Coastal Conservation*

Contact: Geoff Peach, Project Director

A charitable non-profit organization, [The Lake Huron Centre for Coastal Conservation](#) was founded in 1998 with the goals of protecting and restoring Lake Huron's coastal environment and promoting a healthy coastal ecosystem. While many environmental advocacy groups address local issues within the region, the Coastal Centre is the only grassroots organization focused on protecting the coastal environment lake-wide. It also recognizes that its work has to include the economic and social dimensions of sustainability. It believes that coastal communities cannot have a healthy economy unless they have a healthy environment.

The Centre has mapping for the Lake Huron shoreline from Sarnia to Tobermory and has published studies and papers on dynamic coastal processes, climate change impacts, phragmites and ecosystem issues. It works with individual municipalities on coastal stewardship plans, undertakes public education and “works with municipalities to take the murkiness out of science”.

#### *Huron County Planning Department*

Contact: Suzanna Reid, Planner, Planning and Development Department

The County of Huron has comprehensive and strategic land-use planning authority under the Provincial Planning Act. The Provincial Policy Statement, 2014 includes the new requirement that municipalities include provision for climate change impacts in their land-use planning. Local municipalities are required to “be consistent with” provincial and county planning provisions in their local plans and zoning by-laws. In 2004, the County established a Water Protection Steering Committee to consider water quality issues.

*Wayne Caldwell*, Director of the School of Environmental Design and Rural Development and a Professor in Rural Planning, University of Guelph. He has provided advice on stakeholder groups and approaches to integrated assessment processes in Huron County.

### **Internet searches for relevant background information**

- International Joint Commission
- Ontario Ministry of Agriculture and Food
- Ontario Ministry of Environment and Climate Change
- Environment Canada
- Canadian Hydrographic Service (CHS), Meteorological Service of Canada (Environment Canada), and Fisheries and Oceans (Canada).

#### *Potential for Transferability*

- Opportunity to partner with Dave Hunt on his Michigan planning grant area bluff erosion issues. Review the City of Sept. Iles, Quebec, erosion case study (the City is dealing with existing threatened development on bluffs).

- Sharing of case studies on adaptive management approaches and tools, common issues, lake level tools (e.g. flooding) relevant to other areas of Great Lakes.

#### *Feasibility*

- High interest and feasibility for Huron County IA process
- Local resources include studies and policy papers relevant to extreme water levels, and detailed mapping, which could be available to contribute to an Integrated Assessment exercise. Staff from the Conservation Authorities, Centre for Coastal Conservation, and Huron County Planning Department have all indicated an interest in participating in an Integrated Assessment exercise.

#### **Additional Considerations**

As the Huron County IA is a Canadian initiative, the legislative and regulatory environment in Ontario will be clearly described so that outcomes, analysis, tools, approaches and case studies can be considered for possible application by American jurisdictions in their respective regulatory contexts.

The Ausable Bayfield Conservation Authority is starting an update to its Shoreline Management Plan, with the process to run concurrently with this proposed Integrated Assessment. Conservation Authority staff have indicated an interest in discussing possible interconnections and opportunities for each process to inform the other.

#### **Key Findings: Integrated Assessment Process**

Having identified Huron County water level issues, local resources, local stakeholders and potential interest in an Integrated Assessment, the next step would be to develop a process model.

Approach: An Integrated Assessment of water level fluctuations on the Huron County coastline of Lake Huron would build on existing resources, local committees, organizations and stakeholder participation.

#### *Introduction:*

While fluctuations in Great Lakes water levels occur on a lake-wide and system-wide basis, the impacts and issues vary from one community to another, as do the potential adaptive policies and actions that could be adopted to mitigate adverse effects.

Planning for an integrated assessment, therefore, must address the varying mix of environmental, social and economic interests and circumstances on a local basis, but do it within a consistent policy and program context that is applicable across the Great Lakes area.

The objective is to develop a site-specific description of issues arising from both high and low water extremes, together with potential actions and options that could be taken by governmental, environmental, business and residential stakeholders.



*Process:*

1. Establish an **analysis team** with expertise in integrated assessment approaches. The University of Michigan's Graham Sustainability Center and Water Centre will award contracts and funding to dedicated "analysis teams" to undertake Integrated Assessments of selected areas of Great Lakes shorelines.
2. Establish an **Integrated Lake Levels Steering Committee** that includes the full range of stakeholders from government, environment, economy and society. Working with an advisory/steering body that is integrated will ensure that all perspectives are recognized and included. **Committee Role:** Provide direction, advice, and a forum for discussion and information about issues and conflicting interests.
3. With meetings to start in November 2015, the goal is to complete by April 2016, the Phase I Integrated Assessment report, including: review lake levels and climate change studies, local issues resulting from extreme lake level variability, a menu of adaptation tools, approaches, regulatory and policy levers. Identify (for further analysis and public consultation) actions and tools that governments, agencies, business and local residents can take.

*Stakeholder Participation*

A potential candidate for the Huron County's integrated steering committee is the **Huron County Water Protection Steering Committee**, a multi-stakeholder group with representatives from Provincial, County and Municipal governments, Conservation Authorities, agriculture, manufacturing and tourism associations and citizen groups. With 25 members, it meets four times a year and has several subcommittees to pursue projects. The Water Protection Steering Committee was established in 2004 in part to address water quality issues created by low water levels in Lake Huron, but more generally to address concerns about source water contamination. County residents have completed more than 1,800 stewardship projects using funds received from the Clean Water Project.

*Local commitment*

Huron County staff has indicated that the Water Levels Integrated Assessment exercise would be a good fit for the Water Protection Steering committee. The County and CA staff contacted were supportive and indicated interest in participating in the project, as was the Huron Centre for Coastal Conservation.

*Timing*

The Water Protection Steering Committee has a meeting scheduled in November, which fits with the timeline of the Integrated Assessment. It is expected that the IA process would require one-day meetings in each January, February and March, with a final report due in April, 2016.

**Phase II, May to October 2016**

A public consultation process to provide stakeholder input on Phase I report, "analysis of the

various policies and adaptive actions that meet local objectives identified in collaboration with community partners". In this phase there would be consideration of **implementation issues and options** for the policies and adaptation strategies identified in Phase I, including the all important issue of funding, timing and who does what.

## APPENDICES

### *A. Potential next steps:*

- September 3 Planning Grant meeting – opportunity to discuss possible cross-pollination with David Hart re bluffs work in Michigan. Identify useful connections from other Planning Grants.
- Develop Huron County IA Terms of Reference
- Meet with key staff (Huron County, CAs and HCCCC) in September to discuss formal approval of participation of Water Protection Steering Committee for Integrated Assessment and review and confirm support for IA Terms of Reference.
- Discuss relationship (if any) of Huron County Lake Levels IA with concurrent process of Shoreline Management Plan development by the Ausable Bayfield Conservation Authority.
- Review Huron County Committee work since 2004 related to low water lake levels.
- Research case studies on bluff erosion, i.e. Scarborough, Ontario; Sept. Iles, Quebec; Wisconsin. Presentation for Lake Huron IA Committee.
- Research adaptive management approaches/tools
- Research Ontario regulatory environment and programs (climate change, water levels, emergency management, disaster relief, municipal planning and development tools, etc.

### *B. Shoreline Regulations in Ontario*

Homeowners along the lakeshore have provincial regulations to consider when building or renovating. In 2006, the Provincial Government passed Ontario Regulation 164/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation) that could impact on cottage and homeowners who live near a lake, river or wetland and want to renovate or build. Conservation Authorities were given the responsibility for enforcing this regulation.

Ontario Regulation 164/06 prevents or restricts development in areas where the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by development. This regulation assists Conservation Authorities to fulfill their mandate to prevent the loss of life and property due to flooding and erosion, and to conserve and enhance natural resources. The regulation applies to the Lake Huron shoreline including bluffs, gullies and beaches.

If a landowner is planning to do any work near the shoreline they may require a permit from their local Conservation Authority. A building permit does not replace a Conservation Authority permit. Regulated activities along the shoreline include:

- Site grading on a bluff or beach
- Placement or removal of fill
- Alteration of the shoreline
- Development on a bluff or dynamic beach
- Shore protection structures

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