Water Levels Advocacy Strategy

The purpose of this document is to develop a strategy for GBA to advocate to government and others on action we recommend is taken to manage the Great Lakes water levels to the extent possible and practical. It will not address specific actions GBA might recommend on adaption strategies to deal with issues arising out of extreme high or extreme low water levels, such as best practices on managing septic systems, docks, low lying buildings, navigation etc.; or full understanding, and any mitigation measures that can be taken, on wetlands health and coastal flora and fauna. However, these impacts can be highlighted to illustrate the importance of mitigating extreme high and extreme low water levels to the extent possible and practical.

What we know

Water level fluctuation cycles

We have historic information on water levels fluctuations for all the Great Lakes going back very accurately about 150 years and then less accurately as one moves further back in time. These tell us that there is a natural cycle of highs and lows which have historically had some degree of predictability. These cycles also show that water levels have usually stayed within a healthy range for Lake Michigan-Huron (M-H) and hence Georgian Bay wetlands, which should be our primary environmental concern relating to water level impacts. They also show, however, that on a regular basis the approximate 6-foot fluctuation between highs and lows takes us out of that healthy 4-foot range and causes both damage to our wetlands, and financial and other impacts on our members. Environmental and members interests are therefore aligned in avoidance of extreme highs and extreme lows in water levels.

Influences on Water Levels in M-H

In order to illustrate the relative importance/weight of the factors that determine water levels in M-H, please find below the average M-H inflow/outflows in 000's cu. ft. per second (ft3/sec):

Source	In	Out
Overlake Precipitation	110	
Run-off	94	
In/Out-flow	(St Mary's) 75	(St Clair) 189
Evaporation		87
Chicago Diversion		3
TOTAL	**279**	**279**

In addition, there is glacial isostatic adjustment - the uneven shifts of the earth's crust since the last period of continental glaciations ended – which raises Georgian Bay (and consequently lowers water levels) by around 4 inches every 100 years.

These inflows and outflows are accurately measured by scientists on both sides of the border and it is unlikely that there are any major inaccuracies in the information that is published. However, one strategy for GBA could be for the 2020 "virtual" H_2O to convene a meeting (webinar?) of senior scientists involved in both water levels data gathering and forward predictions to discuss whether there are any:

- data gaps that need to be plugged; and/or
- improvements needed to the current resources available to gather data.

Such a gathering could also:

- provide GBA members who attend with a better understanding of the primary drivers of water levels in M-H and what happened recently to increase water levels from the extreme lows of 2013 to the current extreme highs; and
- compare the various predictions on future water levels that look at historic trends and climate change impacts, which is what GBA members will primarily be interested in.

Human Interferences

From north to south, the primary human interferences in the system are:

Name	**Description/Effect and the average flow rate in 000's ft3/sec**		**Governed By**
Long Lac/Ogoki	Diverts most of the natural flow that used to go to James Bay to Lake Superior	6	Ontario Power Generation (OPG) + agreement with 6 FN bands
Control works on the St. Mary's River	Connecting channel between Lake Superior and M-H. Hydro dams, locks, compensating works, fish runs.	75	International Lake Superior Board of Control
Chicago Diversion	Diverts water from the Lake Michigan watershed into the Upper Mississippi River basin at Chicago	3	US Army Corps of Engineers (USACE)
St Clair River	Historical dredging for commercial shipping channels, shore hardening, shifts in sand bars and changes in conveyance.	189	None – no controls
Welland Canal	Bypasses Niagara Falls and diverts water from Lake Erie to Lake Ontario	9	St. Lawrence Seaway Management Corp.

Niagara River	Minor works in the river and a diversion for hydro power – possible adjustment of Black Rock Channel – impact on water levels unknown.	205	International Niagara Board of Control and USACE
Moses Saunders Dam	From Lake Ontario to St Lawrence River. Hydro Dam. Shipping interests re: limiting St Lawrence River flow rate + impact of Ottawa River. No flooding of Montreal.	262	International Lake Ontario - St. Lawrence River Study Board

Strategy

Water Levels Advocacy

1. Continue to gather data and opinions on future projections from GBF, GBGLF, USACE, IJC, and ECCC. Balance historical trends with emerging information on climate change impacts.
2. Push for one coordinated control board that governs all the above human interferences and current/future control structures and regimes.
3. Once 2 is achieved, then coordinated action on measures to mitigate extreme highs and lows can be instigated, but unlikely to be either practical or possible beforehand.

Issues on Advocacy Objectives

1. **Data gathering and balancing divergent opinions.**
    - There are opinions that government is being negligent in their data gathering and publications, but there is no clear evidence that this is the case;
    - There are different opinions as to how much impact climate change has had and will have on water levels, but it is too early to be able to determine the extent of any impact, as the Great Lakes have not yet exceeded historic highs or lows to any significant extent. In addition, there have been previous eras when water levels have fluctuated rapidly between extreme highs and lows.
    - One thing we do know for sure is that there is a great deal of uncertainty on future water levels in the Great Lakes system and, arguably, no one really knows what is going to happen.

    Conclusion: GBA needs to be careful to only consider hard facts in determining its water levels strategy and advocacy efforts. Well researched theories and projections are not unimportant, but need to be accorded an appropriate status within our strategy.

It would be prudent, given the divergent opinions on the current status of data and its accuracy, to convene an H_2O conference as above to hear from leading experts and scientists on these topics.

At such a conference the existing technologies and methodologies for collecting data and ensuring accuracy could be reviewed. GBA would be in a position to propose the deployment of water levels monitoring buoys throughout the system as a more efficient, accurate and cost-effective way of gathering water levels data, determine the reception of such a deployment by the experts gathered (for instance are they already being used?), and thereby gauge the prospect of improving the data gathering using this technology.

2. One coordinated control board for all the Great Lakes

- This is not a new advocacy position for GBA, but one we have been requesting for many decades.
- Persuading governments to treat the entire Great Lakes as one system has consistently been stymied by the competing interests of the various current control boards and regimes that dictate any changes made to the various human interferences to the natural flow to/from and between the lakes.
- These different control regimes are set out in the table above which illustrates why achieving one coordinated control board has been and will be very challenging. However, it is the right thing to do to sensibly manage the system.
- The IJC is the obvious body to take charge of the system. At present they have limited control through participation in uncoordinated control boards and, in some case, no control – i.e. Long Lac/Ogoki and the Chicago diversion.
- The implementation of one coordinated control board for all the Great Lakes happens to be an issue upon which all the GB based organizations who work on water levels agree.

Conclusion: The fact that this advocacy is challenging should not deter us from pursuing it, but it will need to be done in concert with (all?) other stakeholders throughout the system to have any chance of success.

3. **Coordinated action on measures to mitigate extreme highs and lows**

- There are some who are calling for specific action now to alleviate high water levels. An example of successful efforts to get action has been the powerful lobby groups on Lake Ontario, primarily in the US. Lake Ontario levels are now down substantially from last year thanks to a sustained effort to release water down the St Lawrence River whenever the International Lake Ontario - St. Lawrence River Study Board was able to do that.
- However, in contemplating adjustments to intra basin flows, the following must be borne in mind:
    - The ~2 year lag time for changes at the top of the system to impact the bottom (Superior to Ontario) makes it difficult to manage lake levels through flow adjustments;
    - Interim changes in precipitation and evaporation could mean that any adjustments made could lead to increasing subsequent extreme highs and lows rather than reducing them, so great care would be needed;
    - Unless one has accurate forward projections on the lake levels for all lakes then the risks on making adjustments are increased. It seems that that level of accuracy is not possible, and unpredictable climate change impacts are further reducing the accuracy of forward projections; and
    - The risk diminishes as one moves down the system with Lake Superior adjustments being the highest risk (Long Lac/Ogoki + St Mary's – impacts all the other lakes) and Lake Ontario adjustments the lowest (Moses Saunders Dam - only impacts the St Lawrence River).

Conclusion: The complexities of the system make it imperative that one coordinated control board is in place for all the Great Lakes, before attempting to make any adjustments to mitigate extreme high and low water levels.