The Great Lakes Charter Annex Agreement:
Water Diversions, Levels & Conservation
Threats to the Great Lakes
Water Diversions
In to/Out of (Inter) Basin Diversions
In the Basin (Intra) Diversions
Pipeline
Tanker
Man-made Channel
Bottled Water
Why The Concern?
Evolution of the Great Lakes
Warning: The Aral Sea Lesson
Key Point #1:
Only 1% of Great Lakes water is renewed each year.
## Current Interbasin Diversions

- **In to/Out of Great Lakes basin**

<table>
<thead>
<tr>
<th>EXISTING DIVERSIONS</th>
<th>OPERATIONAL DATE</th>
<th>AVERAGE ANNUAL FLOW</th>
<th>Gallons Per Day$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cubic Feet Per Second</td>
<td></td>
</tr>
<tr>
<td>1. Interbasin Diversions (Divisions in/out of the Great Lakes Basin)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Lake—Ontario (into Lake Superior Basin)</td>
<td>1939</td>
<td>1,590</td>
<td>1.02 billion</td>
</tr>
<tr>
<td>Ogoki—Ontario (into Lake Superior Basin)</td>
<td>1943</td>
<td>3,990</td>
<td>2.58 billion</td>
</tr>
<tr>
<td>Chicago—Illinois (out of Lake Michigan Basin)</td>
<td>(1848) 1900</td>
<td>3,200</td>
<td>2.07 billion</td>
</tr>
<tr>
<td>Forestport, New York (out of Lake Ontario Basin)</td>
<td>1825</td>
<td>50</td>
<td>32.3 million</td>
</tr>
<tr>
<td>Portage Canal, Indiana (into Lake Michigan Basin)</td>
<td>1860</td>
<td>40</td>
<td>25.9 million</td>
</tr>
<tr>
<td>Ohio &amp; Erie Canal, Ohio (into Lake Erie Basin)</td>
<td>1847</td>
<td>12</td>
<td>7.8 million</td>
</tr>
<tr>
<td>Akron, Ohio (out of and into Lake Erie Basin$^3$)</td>
<td>1998</td>
<td>7.5</td>
<td>4.8 million</td>
</tr>
<tr>
<td>Pleasant Prairie, Wisconsin (out of and into Lake Michigan Basin)</td>
<td>1990</td>
<td>5</td>
<td>3.2 million</td>
</tr>
</tbody>
</table>
# Current Intrabasin Diversions - between Great Lakes

<table>
<thead>
<tr>
<th>2. Intrabasin Diversions (Diversions between two Great Lake watersheds)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Welland Canal (Lake Erie to Lake Ontario)</td>
<td>(1829) 1932</td>
<td>9200</td>
<td>5.9 billion</td>
</tr>
<tr>
<td>NY State Barge Canal “Erie Canal” (Niagara River to Lake Ontario)</td>
<td>(1825) 1918</td>
<td>700</td>
<td>452 million</td>
</tr>
<tr>
<td>Detroit (Lake Huron to Detroit River)</td>
<td>1975</td>
<td>145</td>
<td>937 million</td>
</tr>
<tr>
<td>London (Between Lake Huron and Lake Erie via the Thames river and Lake St. Clair)</td>
<td>1967</td>
<td>110</td>
<td>711 million</td>
</tr>
<tr>
<td>Raisin River (St. Lawrence River to Raisin River)</td>
<td>1968</td>
<td>25</td>
<td>162 million</td>
</tr>
<tr>
<td>Haldimand (Lake Ontario to Lake Erie)</td>
<td>1997</td>
<td>2</td>
<td>1.3 million</td>
</tr>
</tbody>
</table>

2. 1 Cubic Feet Per Second=646,316,883 Gallons Per Day.
3. Information from Ohio Department of Natural Resources.
Key Point #2:

“There’s an accidental balancing. It’s not good planning. It just happened.”

Ralph Pentland
Lake Levels in Lake Superior

Lake Superior Levels

Record Highs
Record Lows
Long-Term Means
Daily Levels

Levels in meters (ICLD85)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Sep 4, 2007

Great Lakes Environmental Research Laboratory/NOAA
Lake Levels in Lake Michigan-Huron

![Lake Michigan-Huron Levels Graph]

- Record Highs
- Record Lows
- Long-Term Means
- Daily Levels

Levels in meters (GLD85)

- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec

Sep 4, 2007

Great Lakes Environmental Research Laboratory/NOAA
Hydrograph for Lake Michigan-Huron
Climate Change Projections

Table 15  Projected changes in mean annual lake levels for 2050, at a time of 2°C global warming (Mortsch et al., 2006; Hebb and Mortsch, 2005).

<table>
<thead>
<tr>
<th>Lake</th>
<th>Warm and dry: CGCM2 A21</th>
<th>Not as Warm and Dry: CGCM2 B23</th>
<th>Warm and Wet: HadCM3 A1F1</th>
<th>Not as Warm and Wet: HadCM3 B22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior</td>
<td>-0.36 m</td>
<td>-0.20 m</td>
<td>-0.33 m</td>
<td>-0.12 m</td>
</tr>
<tr>
<td>Michigan-Huron</td>
<td>-1.18 m</td>
<td>-0.73 m</td>
<td>-0.98 m</td>
<td>-0.29 m</td>
</tr>
<tr>
<td>Erie</td>
<td>-0.81 m</td>
<td>-0.55 m</td>
<td>-0.67 m</td>
<td>-0.15 m</td>
</tr>
<tr>
<td>Ontario</td>
<td>-0.47 m</td>
<td>-0.25 m</td>
<td>-0.32 m</td>
<td>-0.08 m</td>
</tr>
</tbody>
</table>

- Lake Michigan-Huron - lowering of between 0.29 (1ft) to 1.18 metres (4ft).
Key Point #3:
Climate change will significantly reduce the renewable supply of water to the Great Lakes.
Impacts of Lower Water Levels

- **Wetlands** - fish, wildlife habitat, erosion
- **Economy** - shipping, hydropower, tourism
- **Residents** - property values, recreation, First Nations
- **Water quality** - dredging, higher temperatures
History of Out-of-basin Diversion Proposals

- **1959** - GRAND Canal Scheme
- **1964-68** - NAWAPA Proposal
- **1981** - Powder River Coal Slurry Pipe
- **1997** - The Nova Group - tankers to Asia
- **Current** - Waukesha & New Berlin, WI
Growing Shortage of Water in U.S. and elsewhere
Growing Shortage of Water in U.S. and elsewhere
History of In-basin Diversion Proposals

- **1996** - York Region (Huron to Ontario)
- **2000** - Waterloo long-term water strategy
- **Future** - York, London, Hamilton, Guelph?

**Rapid population growth:**
York Region - doubling by 2031
Waterloo - 60% growth by 2031
Key Point #4:
Arid regions outside and communities inside the basin will become increasingly thirsty for Great Lakes water due to climate change and growing populations.
The Great Lakes Charter Annex Agreement - Background

- Great Lakes Charter, 1985
- Nova Group proposal, 1997
- IJC - Water Use and Diversions Reference
- Great Lakes Charter Annex 2001
The Great Lakes Charter Annex Agreement - General

- Implementing agreements signed December 13, 2005
- Regional agreement, NOT an international treaty
- Essentially an anti-diversion agreement
- Also encourages water conservation
Steps to Implement and Status

Active Bill
Passed One Chamber
Passed Two Chambers
Enacted into law
## How Much Protection Would it Offer?

<table>
<thead>
<tr>
<th>TYPE OF DIVERSION</th>
<th>LEGAL RULE</th>
<th>LEVEL OF PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Distance Out-of-basin</td>
<td>Ban</td>
<td>Strong</td>
</tr>
<tr>
<td>Short Distance Out-of-basin</td>
<td>Allows if meets narrow exceptions</td>
<td>Could be Stronger</td>
</tr>
<tr>
<td>In-basin Transfer</td>
<td>Allows if meets broader exceptions</td>
<td>Weak</td>
</tr>
<tr>
<td>Bottled Water Exports</td>
<td>Exemption</td>
<td>Non-existent</td>
</tr>
</tbody>
</table>
Key Point #5:
The Annex agreement is in essence an economic protectionist agreement - it remains to be seen if in-basin water management will become more sustainable.
Water Conservation
The Many Benefits of Water Conservation

- Eliminates the need for diversions
- Protects ecosystems
- Uses less energy
- Saves money
- Part of livable communities
- Better adapted to drought
Annex Water Conservation Framework

- Regional water conservation objectives

- Individual jurisdiction water conservation objectives and measures
Practising Water Conservation

- Low flow toilets, showerheads, aerators
- Water efficient appliances (front-loading washers)
- Lawn-care (responsible watering, xeriscaping)
- Agricultural irrigation (water efficiency)
- Reducing industrial water use (recycling water)
- Detecting and repairing leaks
- Educating children and adults (curriculum, social marketing)
Key Point #6:
A cultural change is needed - governments must facilitate this change with financial and legal incentives (rebate programs, realistic pricing, building codes etc.).
What Can You Do?

• Personal actions

• Express your political voice - push governments to make it easier for citizens to conserve
  – Write to your mayor/councillors
  – Write to your MPPs
  – Join citizen/environmental group that promotes water conservation

• Provincial comment opportunities
Key Point #7:
Great Lakes citizens will have to push governments to show leadership on water conservation.
Summary

1. Only 1% of Great Lakes water is renewed each year.
2. “There’s an accidental balancing. It’s not good planning. It just happened.” Ralph Pentland
3. Climate change will significantly reduce the renewable supply of water to the Great Lakes.
4. Arid regions will become increasingly thirsty for Great Lakes water due to climate change and growing populations.
5. The Annex agreement is in essence an economic protectionist agreement - it remains to be seen if in-basin water management will become more sustainable.
6. We need to move from a myth of abundance to a culture of conservation - governments must facilitate this change.
7. Great Lakes citizens will have to push governments to show leadership on water conservation.
Homework!

The Great Lakes Water Wars
by Peter Annin

Water
by Marq de Villiers

Websites:
www.great-lakes.net
www.waterwars.worldpress.com

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