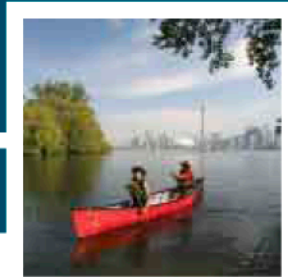


Great Lakes Economic and Environmental Review



Great Lakes History of Economic and Major Environmental Agreements



- **Great Lakes – St. Lawrence Seaway**
- **International Joint Commission (IJC)**
- **Water Diversions**
- **The Grand Canal**
- **Great Lakes Water Quality Agreement (GLWQA)**
 - **Overview of Areas of Concern (AOCs)**

The Great Lakes Basin

A Shared Treasure Worth Protecting



- A shared resource between Canada and the U.S.
- 20% of the world's surface fresh water
- Drinking water – 45 M people
- Rich biodiversity
- Vital role in supporting central Canada's economics



Great Lakes – St. Lawrence Seaway



St. Lawrence River, St. Lawrence Seaway and the Great Lakes, sometimes termed Hwy H2O, is a 3,700-kilometres (2,300 miles) marine highway that runs between Canada and the United States.

Some history

➤ 1895

The first joint Commission is formed to study the feasibility of a Seaway. This is followed by the International Joint Commission in 1909, but no further action on Seaway proposal followed.

Seaway history (cont)



➤ 1932

Fourth Welland Canal completed: 43.5 km (27 m) long, 7.6 m (25 feet) minimum depth. Eight locks raise ships a total of 99 m (326 feet). This was the first step in the completion of the modern Seaway.



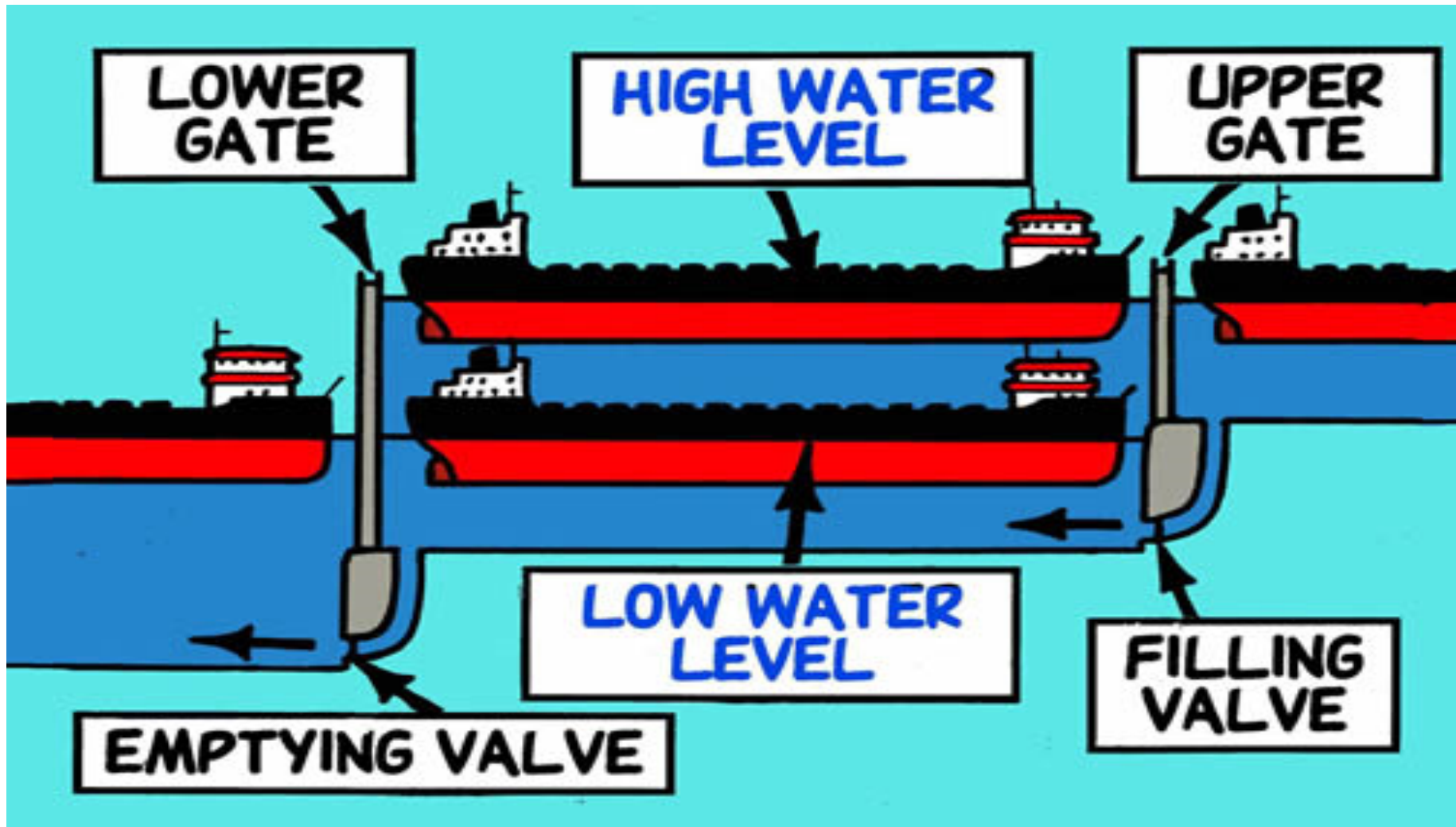
Seaway history (cont)



➤ Recent photo of Welland Canal



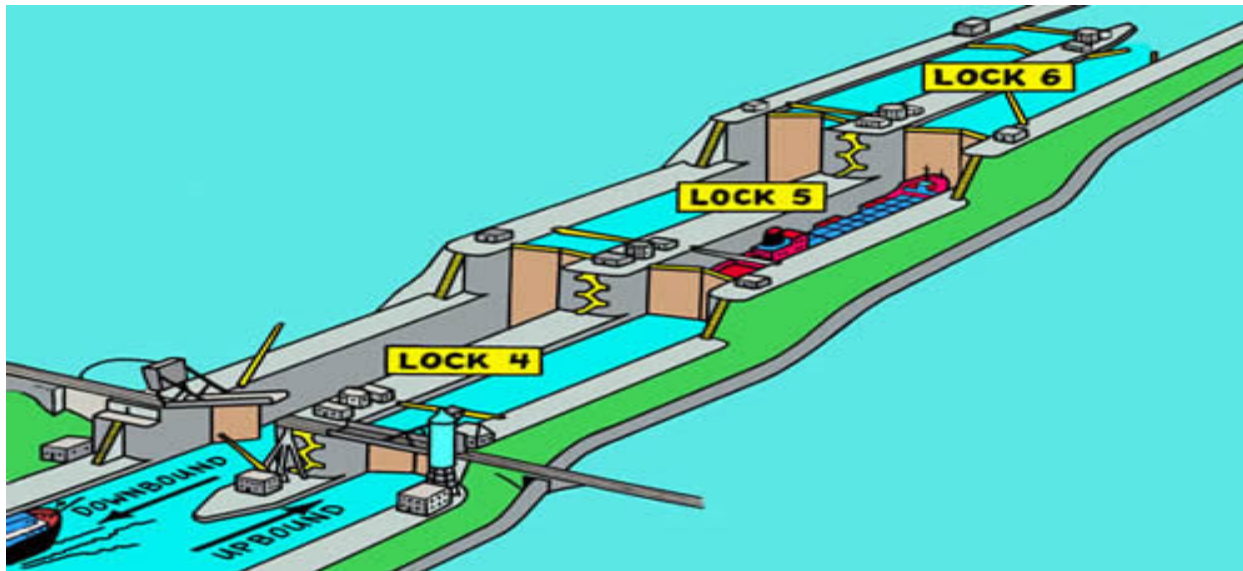
Example of a lock



Seaway Locks



This lift system and accommodate ships to 225.5 metres in length (740 feet) and 23.8 metres (78 feet) in the beam. Ships can be twice as long and half as wide as a football field and carry cargoes the equivalent of 25,000 metric tonnes. Passage through a lock takes about 45 minutes.



Seaway history (the opening)



- **1954** Completion of the Seaway navigation project links the Great Lakes to global markets.

On April 25, 1959 the icebreaker "D'Iberville" begins the first through transit of the St. Lawrence Seaway.

Gross shipping weight for this first navigation season amounts to 22 million tonnes.

- **1979**

The gross tonnage of ships passing through the Seaway reaches 80 million tonnes.

- **1996**

Total of two billion tonnes of cargo, valued at more than \$300 billion.

Discussion



➤ 1993

The Seaway's draft is increased from 7.87 m to 7.95, enabling ships to carry more cargo per voyage

➤ 2004

- The Seaway's draft is increased 8.03m (26.5 feet) enabling ships to carry up to 300 tonnes of additional cargo per voyage.



In-class discussion/consideration

Seaway history (cont)



- **Welland Canal 5? Hope sinks for Seaway expansion**

Sault Ste. Marie



- A Brookfield Renewable Energy Group Hydropower Plant
- B Parks Canada Lock
- C Fishery Remedial Works
- D St. Marys Rapids
- E Compensating Works
- F U.S. Government Plant
- G U.S. Navigation Locks
- H Cloverland Electric Cooperative Hydropower Plant

Economic Numbers



Marine shipping in Canada and the U.S. on the Great Lakes/Seaway System:

- Supports 227,000 jobs
- Supports \$34.6 billion in economic activity annually
- Generates \$14.5 billion in wages and salaries annually
- Contributes \$4.7 billion in federal, state/provincial and local taxes every year
- Moves 164 million tonnes of essential raw materials and finished products annually
- Saves cargo shippers \$3.6 billion in transportation every year



(Source: St. Lawrence Seaway Management Corporation
ANNUAL REPORT 2011–2012)

Political Stakeholders



Great Lakes Diversions

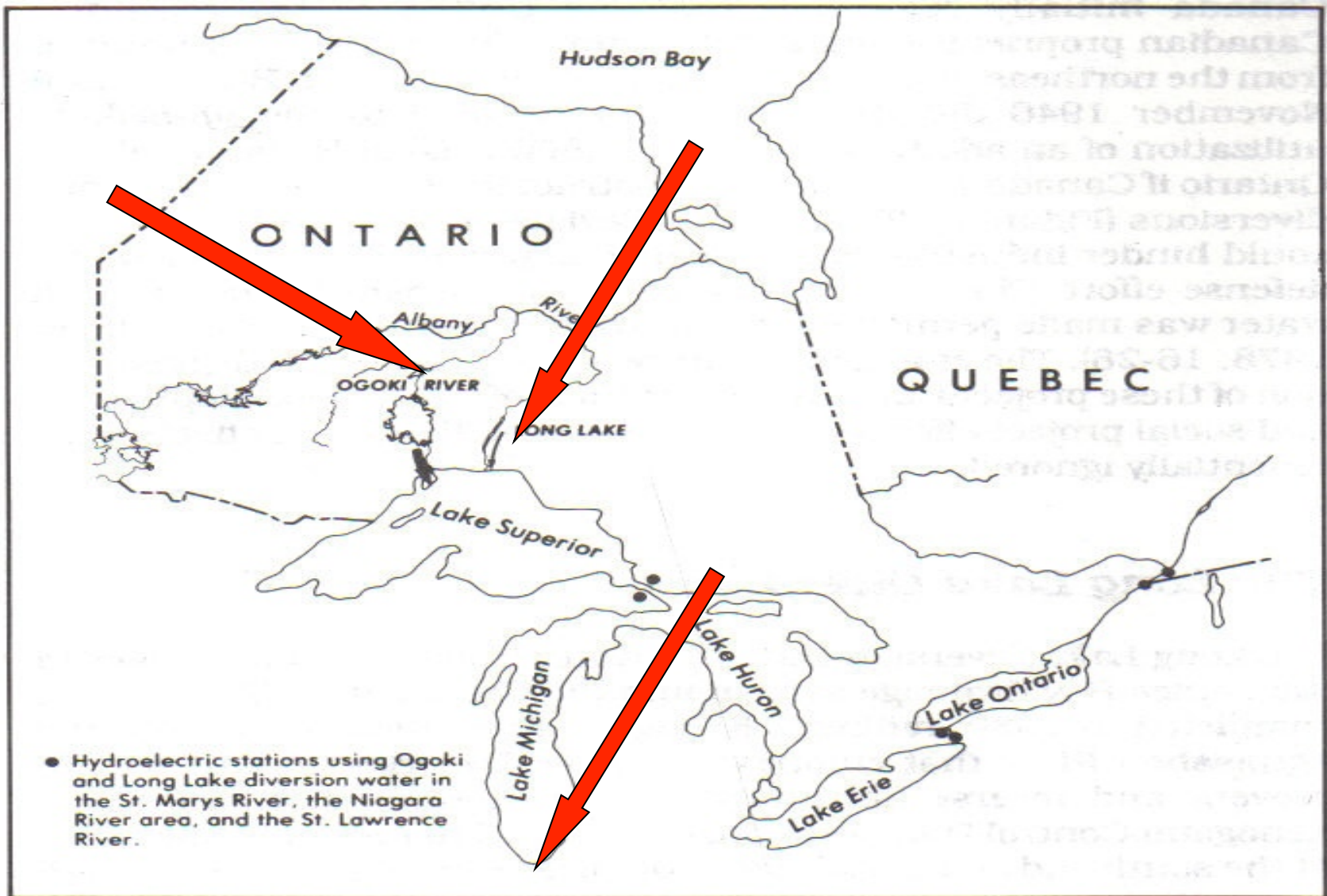
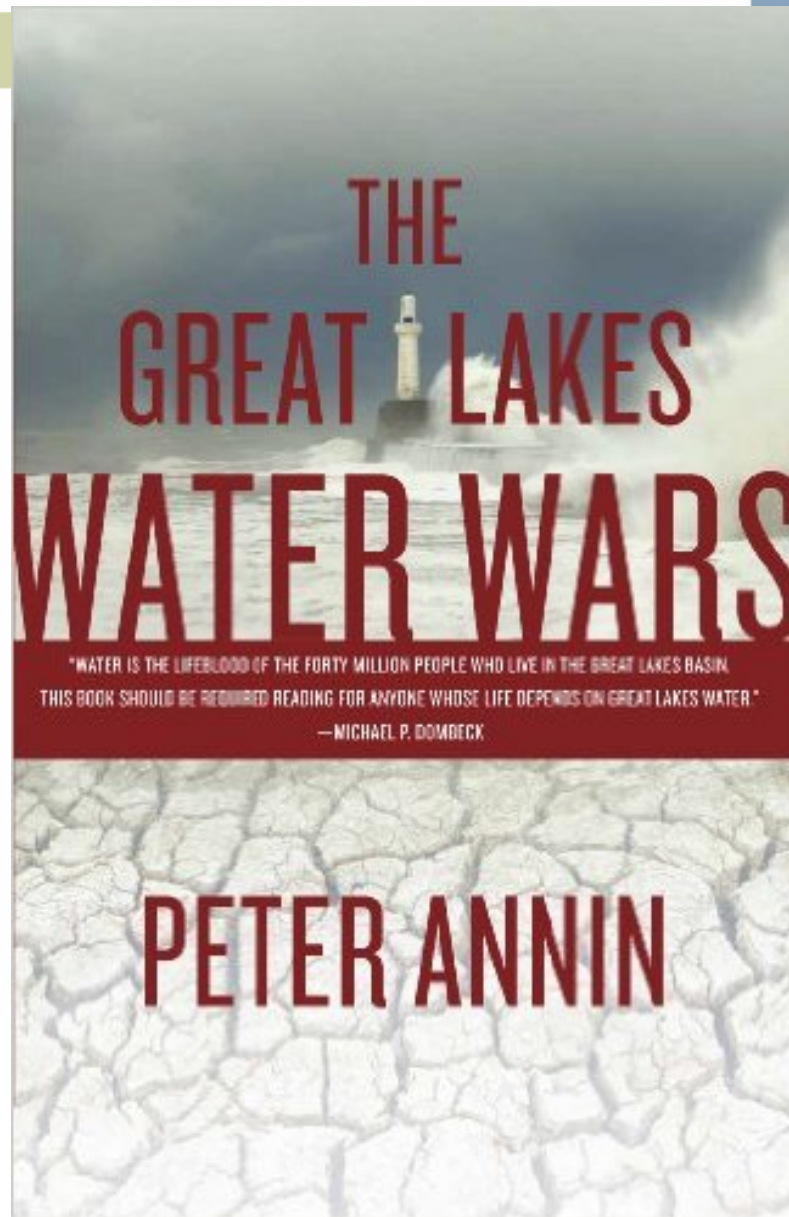


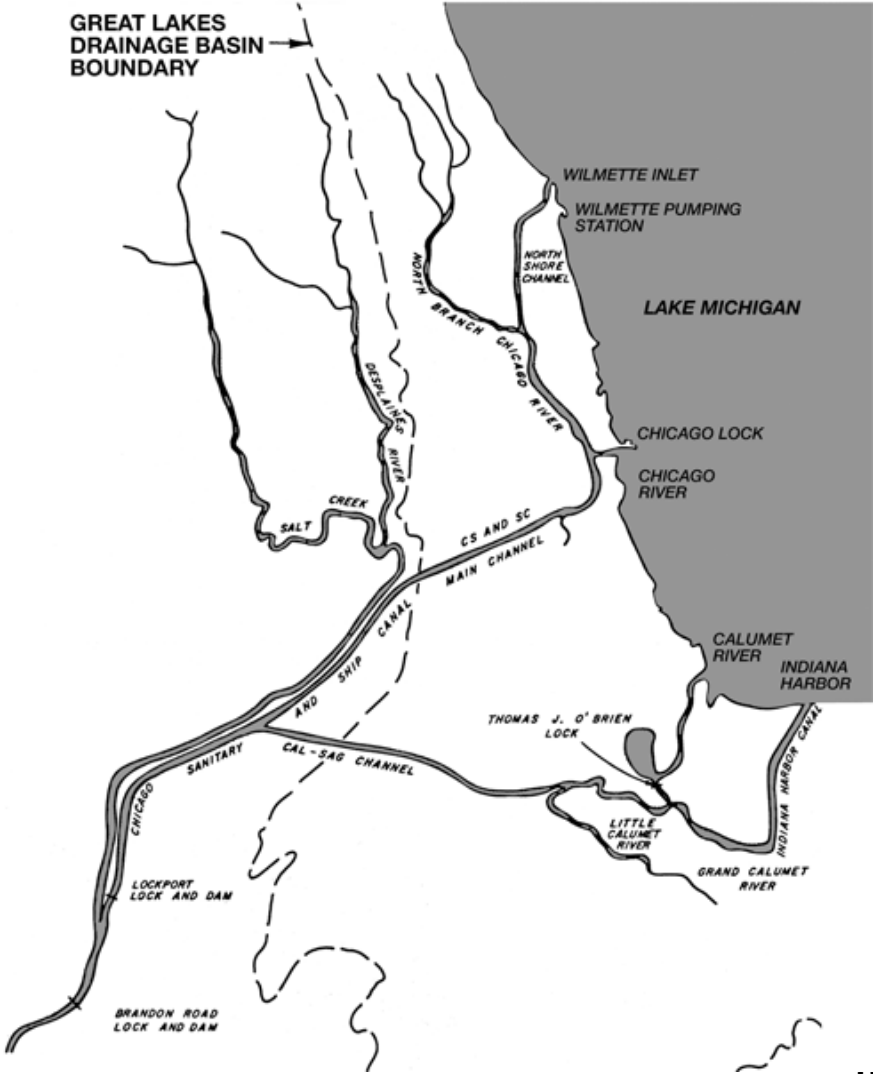
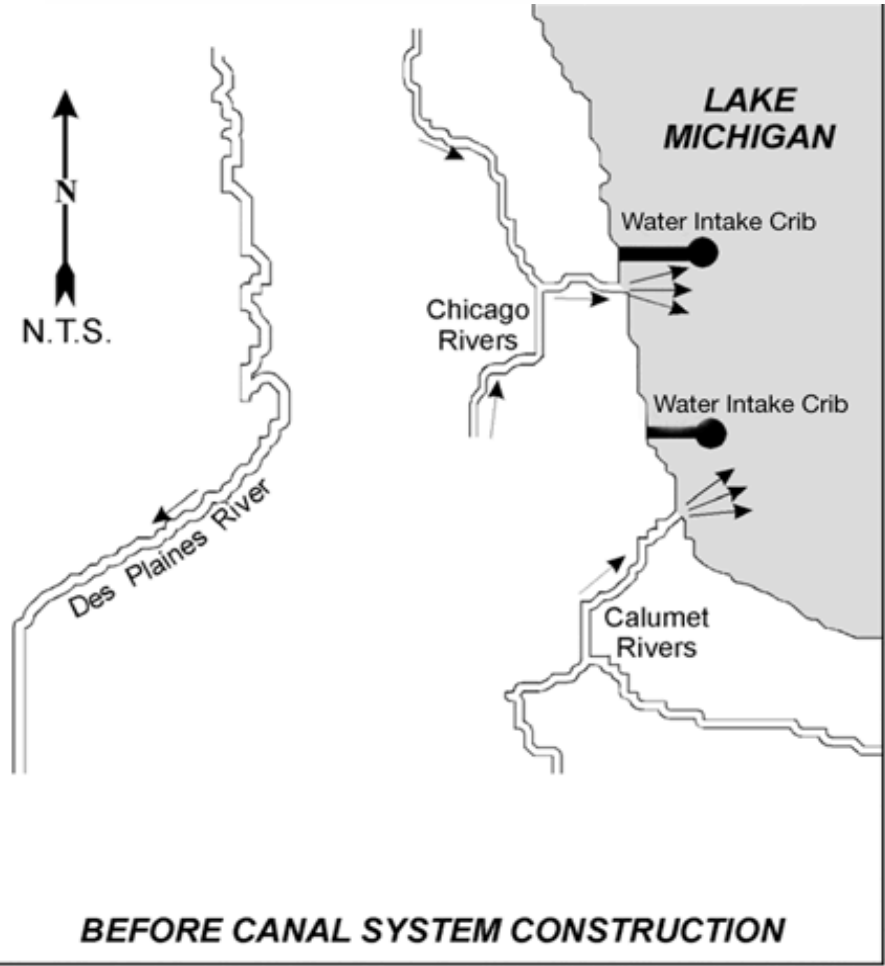
Figure 9: Hydroelectric Stations Using Ogoki and Long Lake Diversion Water



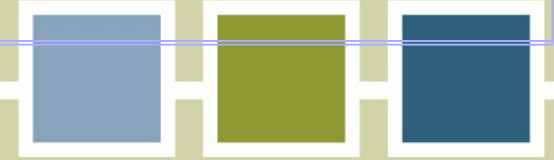




Lake Michigan Diversion at Chicago



History of the Northwest projects



To ease fears that energy shortages in the United States would hinder industrial production of material for the World War II defense effort

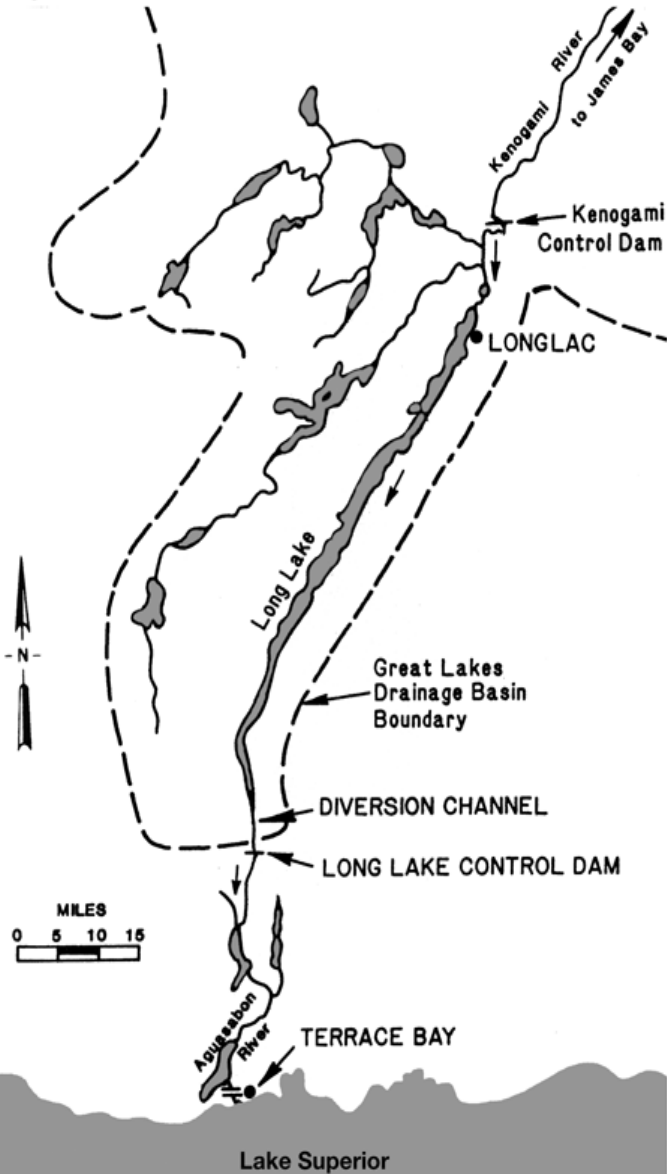
a) Long Lake Diversion

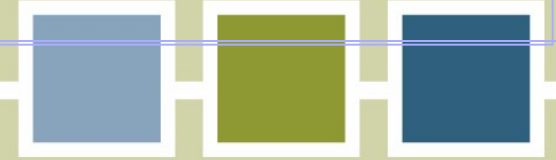
Move water from the Albany River/ James Bay system into the Great Lakes

Kenogami River now flows south into the Aguasabon River into Lake Superior

Early function was interbasin pulpwood transportation and power generation in the St. Mary's, Niagara and the St. Lawrence Rivers.

Long Lac Diversion





In 1940, the United States agreed to use $143 \text{ m}^3 / \text{s}$ of water at Niagara Falls in Ontario, if Canada would rapidly construct the Ogoki diversion and continue with Long Lake.

b) Ogoki Diversion

To divert northeastward flowing Ogoki River southward through Lake Nipigon and into the Great Lakes system.

To provide an average $113 \text{ m}^3 / \text{s}$ flow increment of water for power production at generating stations on the Nipigon,

St. Mary's,

Niagara and

St. Lawrence Rivers.



Purpose of the Projects

To ease fears that energy shortages in the United States would hinder industrial production of material for the World War II defense effort

a) Long Lake Diversion

Move water from the Albany River/ James Bay system into the Great Lakes

Kenogami River now flows south into the Aguasabon River into Lake Superior

Early function was Interbasin pulpwood transportation plus Power generation in the St. Mary's, Niagara and the St. Lawrence Rivers.



Summary of Basin Diversions



The Chicago diversion from Lake Michigan into the Mississippi River system is the only major diversion out of the Great Lakes Basin.

The Long Lac and Ogoki diversions into Lake Superior from the Albany River system in northern Ontario are the only major diversions into the Basin. The Long Lac and Ogoki diversions contribute 6 percent of the supply to Lake Superior.



(More water is diverted into the Great Lakes Basin through the Long Lac and Ogoki diversions than is diverted out of the Basin at Chicago and by several small diversions in the United States.)

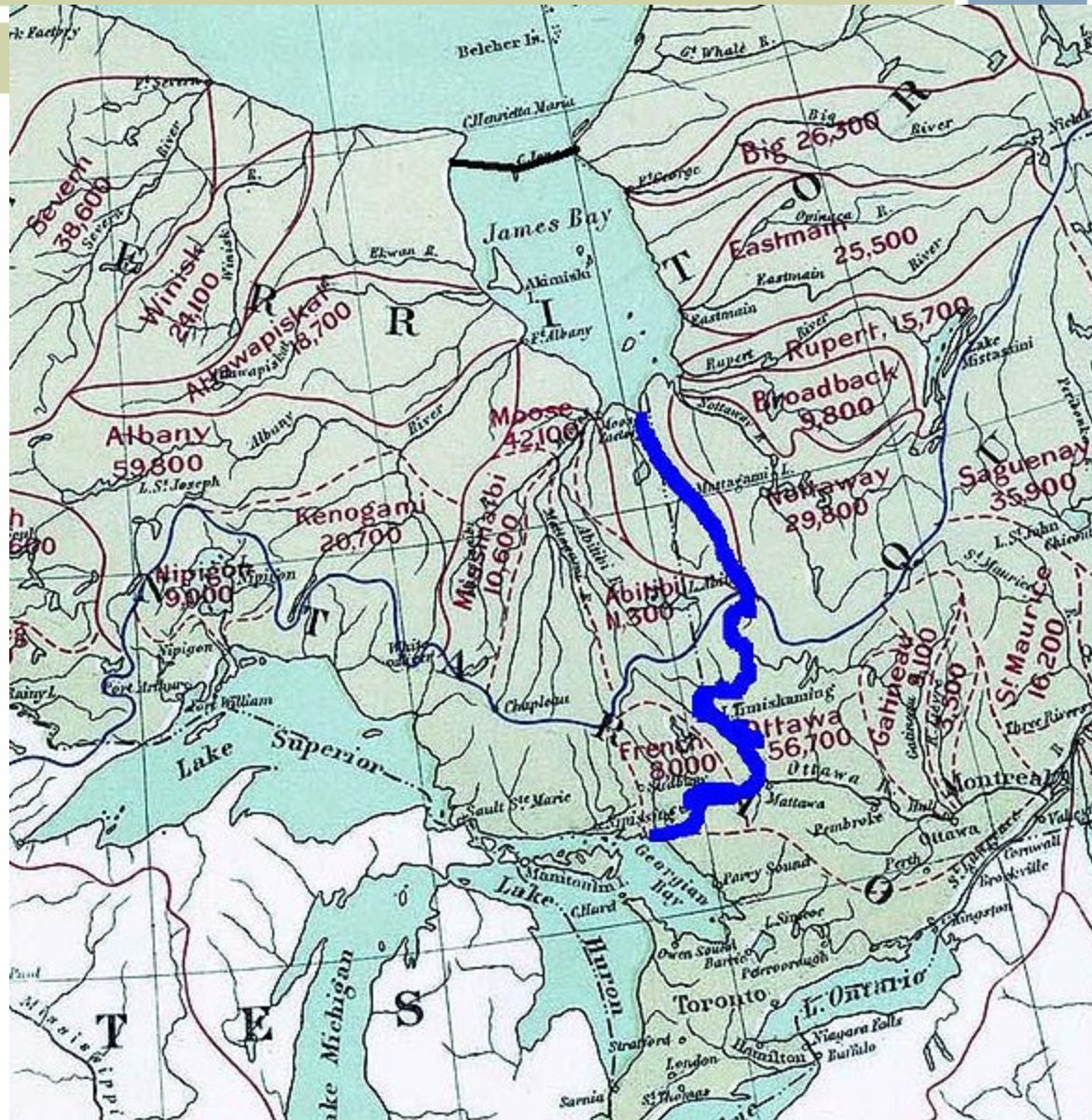
The Grand Canal



The Great Recycling and Northern Development (GRAND) Canal:

- First proposed in 1959, this enterprise continues to be on the drawing board
- Revived in 1985. The project briefly captured the imagination of Quebec premier Robert Bourassa and other public figures.
- Estimated in 1994 to cost \$100-billion and \$1-billion a year to operate — envisaged nuclear reactors and hydro dams to pump water uphill, and nine inter-basin transfer locations.

The Grand Canal



Discussion?



- **Merits of the proposal?**



- **Problems?**