



INTERNATIONAL  
**Upper Great Lakes**  
STUDY

LAKE SUPERIOR REGULATION:  
ADDRESSING UNCERTAINTY IN UPPER  
GREAT LAKES WATER LEVELS



FINAL REPORT TO THE INTERNATIONAL JOINT COMMISSION  
MARCH 2012

# The Study

- The International Upper Great Lake Study (IUGLS) Technical Working Groups (TWGs)
  - Municipal, Domestic and Industrial Water Uses
  - Commercial Navigation
  - Eco-System
  - Coastal Zone
  - Hydropower
  - Recreational Boating /Tourism/Cruise Ship
  - Others
- The RB/T/CS TWG evaluated the magnitude of economic impact through a combination of questionnaire responses and collection of physical data from slips

# Recreational Boating, Tourism & Cruise Ships Technical Working Group

## Goal:

1. To collect both available data and new information through surveys of boat owners, marinas, charter boats operators and other water-dependent tourism businesses – including sport and commercial fishing
2. Integrate this information to report on the size and economic importance of this sector and its sensitivity to water levels in the upper Great Lakes

# The Study

- Can obtain an economic loss value estimated for the three water level drop scenarios.





# Methods

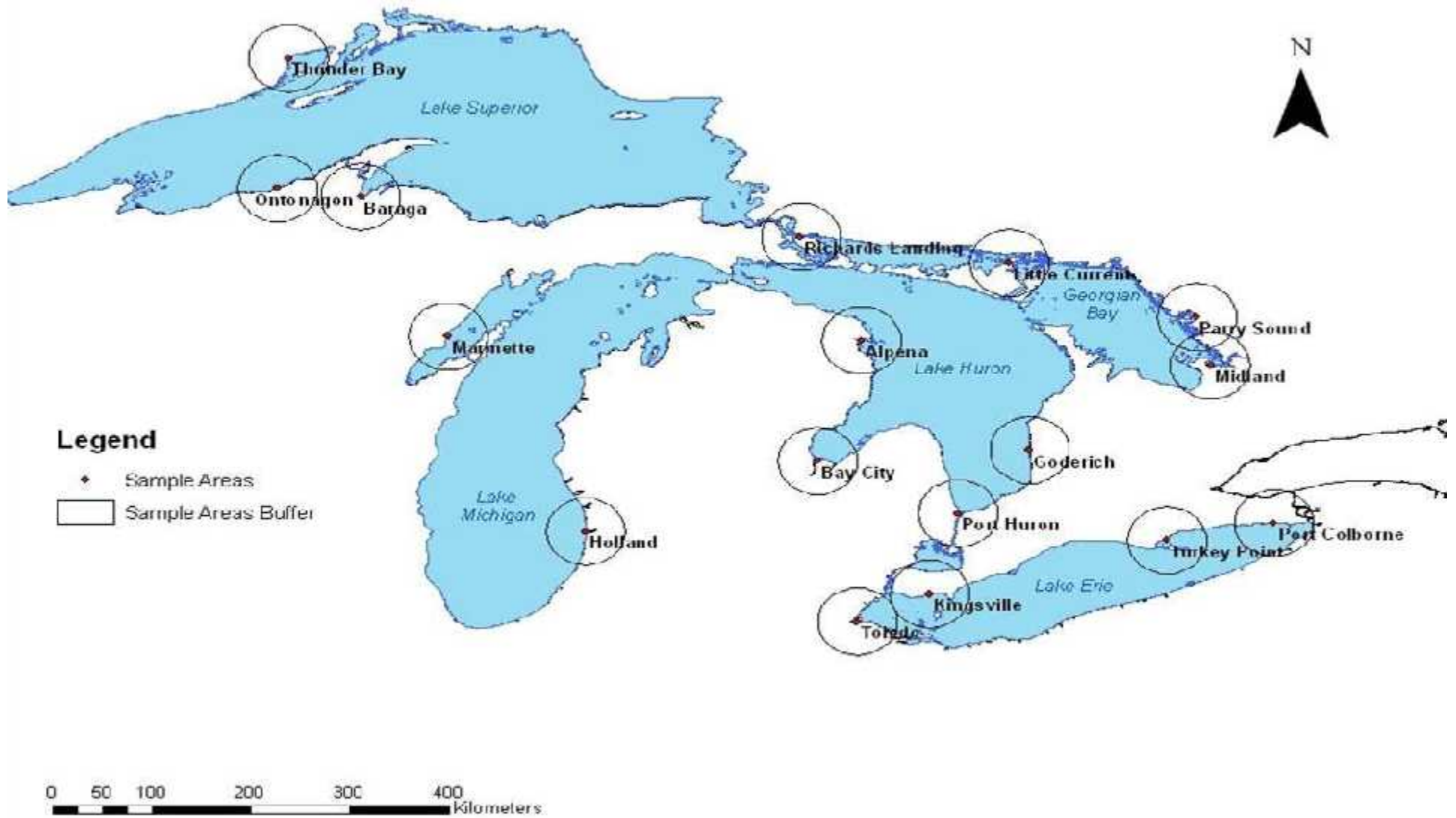
Gathered data in two areas:

1. Empirical Data: Depth Measurements at Marinas
  - To gauge losses based on water level change
2. Attitudinal Data:
  - Marina Operators (business) completed a questionnaire to assess baseline experience and likely damages and adaptations to hypothetical fluctuations in water levels



# Methods

Recreational Boating Sample Sites





# Attitudinal Data: The Questionnaire

## Businesses:

- Interviewed marina owners/operators, those with the most experience



# Empirical Data: Depth Measurements

Marinas  
Identified

148

Marinas  
Surveyed

88



Slips

13965

Slips  
Measured

9457



Slips were not measured if over 2.7 meters (~ 9 ft). With three foot drop that would leave 6 feet of depth which is a typical sailboat keel depth.





# Rec Boating Coping Zones

Coping Zone	Lake	Minimum (M)	Maximum (M)
A	Lake Superior	183.18	183.64
	Lake MI/Huron	176.11	177.24
	Lake Erie	173.61	174.8
B	Lake Superior	183.03	183.79
	Lake MI/Huron	175.9	177.39
	Lake Erie	173.46	174.95
C	Lake Superior	<183.03	>183.79
	Lake MI/Huron	<175.96	>177.39
	Lake Erie	<173.46	>174.95

← Preferred Level

← Difficult to access

← Unusable, exceeds adaptation

# Combined Cost

- Summing the cost values of physical slip loss, damages and adaptations provides a closer estimate of the true economic impact of declining water levels.

		1 Foot Drop (Zone A)	2 Foot Drop (Zone B)	3 Foot Drop (Zone C)
Lake Erie	max	\$381,354	\$1,050,251	\$2,774,917
	min	\$281,217	\$629,731	\$1,838,273
Lake Michigan/Huron	max	\$1,450,985	\$3,244,719	\$11,610,577
	min	\$823,490	\$2,811,110	\$6,865,423
Lake Superior	max	\$1,624	\$415,314	\$1,155,115
	min	\$1,624	\$115,674	\$308,782
Total	max	\$1,833,963	\$4,710,284	\$15,540,609
	min	\$1,106,331	\$3,556,515	\$9,012,478



# Caveats

- No individual cottage owner or small lodges captured – this is a sampling
- Merely attitudinal and not actual
- Chanel depth not accounted for
- Some substitute smaller boats when levels are down

# Tourism Study - Methodology

- Initially, little information on impacts of water levels on tourism;
- 4 study areas polled through web and personal interviews
  - Thunder Bay – 48 survey responses
  - Midland-Wasaga Beach – 41 survey responses
  - Port Huron-Sarnia – 48 survey responses
  - Sandusky-Toledo – 30 responses
- Tourist-dependant businesses including lodges, hotels, waterfront restaurants, resorts, parks, other.

# Tourism Study - Results

- May-October 2009 – 30cm higher than now
- No strong consensus on state of the levels (44% no opinion) and **seeming lack of awareness**
  - GB – 37% said 0.3M lower and 29% said unsure
- 26% said they have been affected by past levels but no strong trends on higher or lower
- Low water level impacts included reduced customers, reduced revenue and increased operating expenses
- High water levels impacts included reduced customers, increased customers, reduced/increased total sales and reduced operating expenses



# What is Needed - Adaptation

- Recognize the changes that are occurring;
- There is uncertainty about the future (lake levels and other);
- But that should not impede climate –sensitive decision making at local and regional levels;
- Adaptation is a process – its risk management;
- There are resources that can raise the level of knowledge and aid in adaptation planning;

# What is Needed - Adaptation

- And finally

Changing Great Lakes water levels is one area of risk within a larger, broader suite of climate risks that must be managed at the local level.