

Great Lakes Water Levels: an inter-agency briefing

Silver Spring, Maryland - November 20, 2013



Outline

1 Introduction

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- 2 Water level monitoring and data

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- 3 Drivers behind water level dynamics

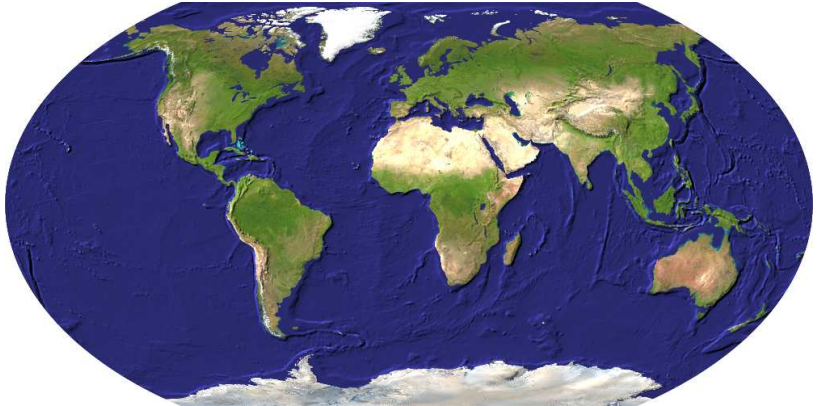
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Name	Country	Surface area		Volume	
		(km ²)	(mi ²)	(km ³)	(mi ³)
Michigan–Huron Superior	U.S. and Canada	117,702	45,445	8,458	2,029
Victoria	Multiple	69,485	26,828	2,750	660
Tanganyika	Multiple	32,893	12,700	18,900	4,500
Baikal	Russia	31,500	12,200	23,600	5,700
Great Bear Lake	Canada	31,080	12,000	2,236	536
Malawi	Multiple	30,044	11,600	8,400	2,000
Great Slave Lake	Canada	28,930	11,170	2,090	500
Erie	U.S. and Canada	25,719	9,930	489	117
Winnipeg	Canada	23,553	9,094	283	68
Ontario	U.S. and Canada	19,477	7,520	1,639	393

Table: Surface area and volume of the earth's largest fresh surface water bodies (ranked by surface area).

From: Gronewold, Fortin, Lofgren, Clites, Stow, and Quinn (2013). *Climatic Change*.

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From: NOAA National Ocean Service (CO-OPs).



Lake Superior Real-Time Water Level Gauging Stations

Click on **individual gauges** to access water level data



These maps were prepared in partnership with the National Oceanic & Atmospheric Administration (NOAA) and its Center for Operational Oceanographic Products and Services (CO-OPS).



St. Marys River Real-Time Water Level Gauging Stations

Click on **individual gauges** to access water level data



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Lake Michigan Real-Time Water Level Gauging Stations

Click on **individual gauges** to access water level data ?



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Lake Huron Real-Time Water Level Gauging Stations

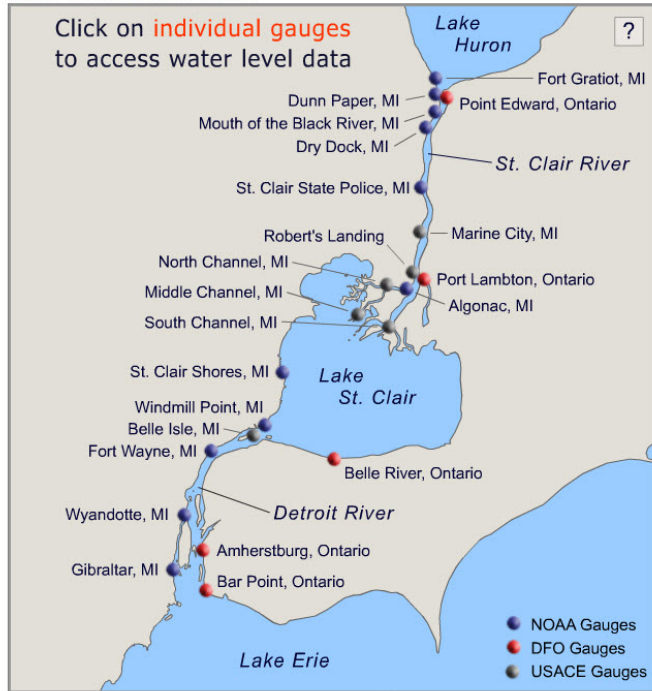
Click on **individual gauges** to access water level data ?



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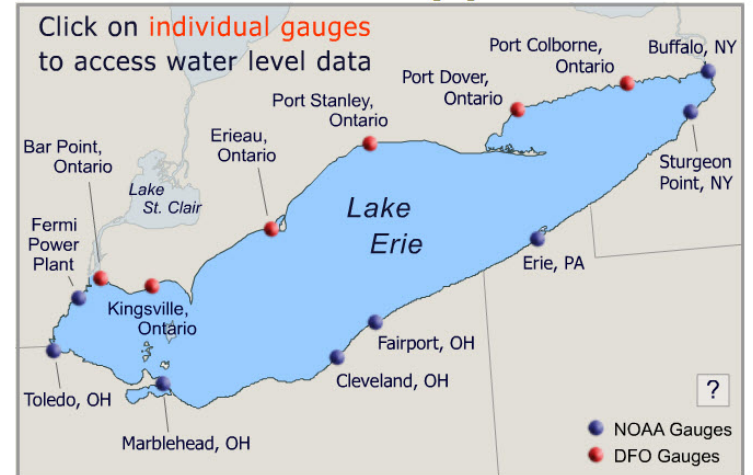
Real-Time Water Levels



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Lake Erie Real-Time Water Level Gauging Stations



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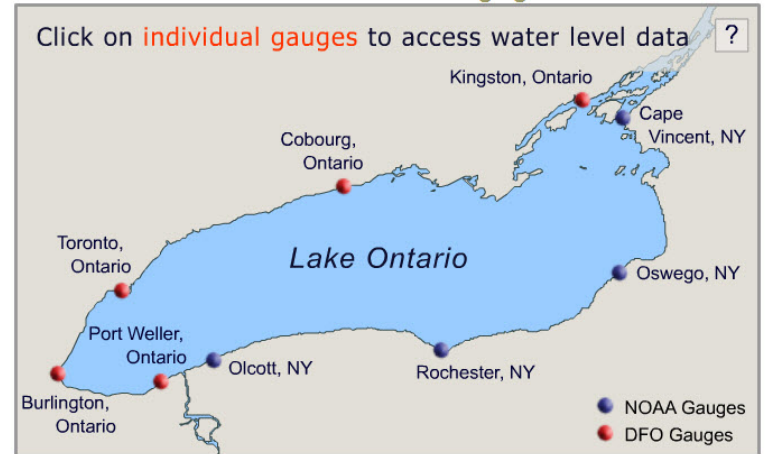
Niagara River Real-Time Water Level Gauging Stations



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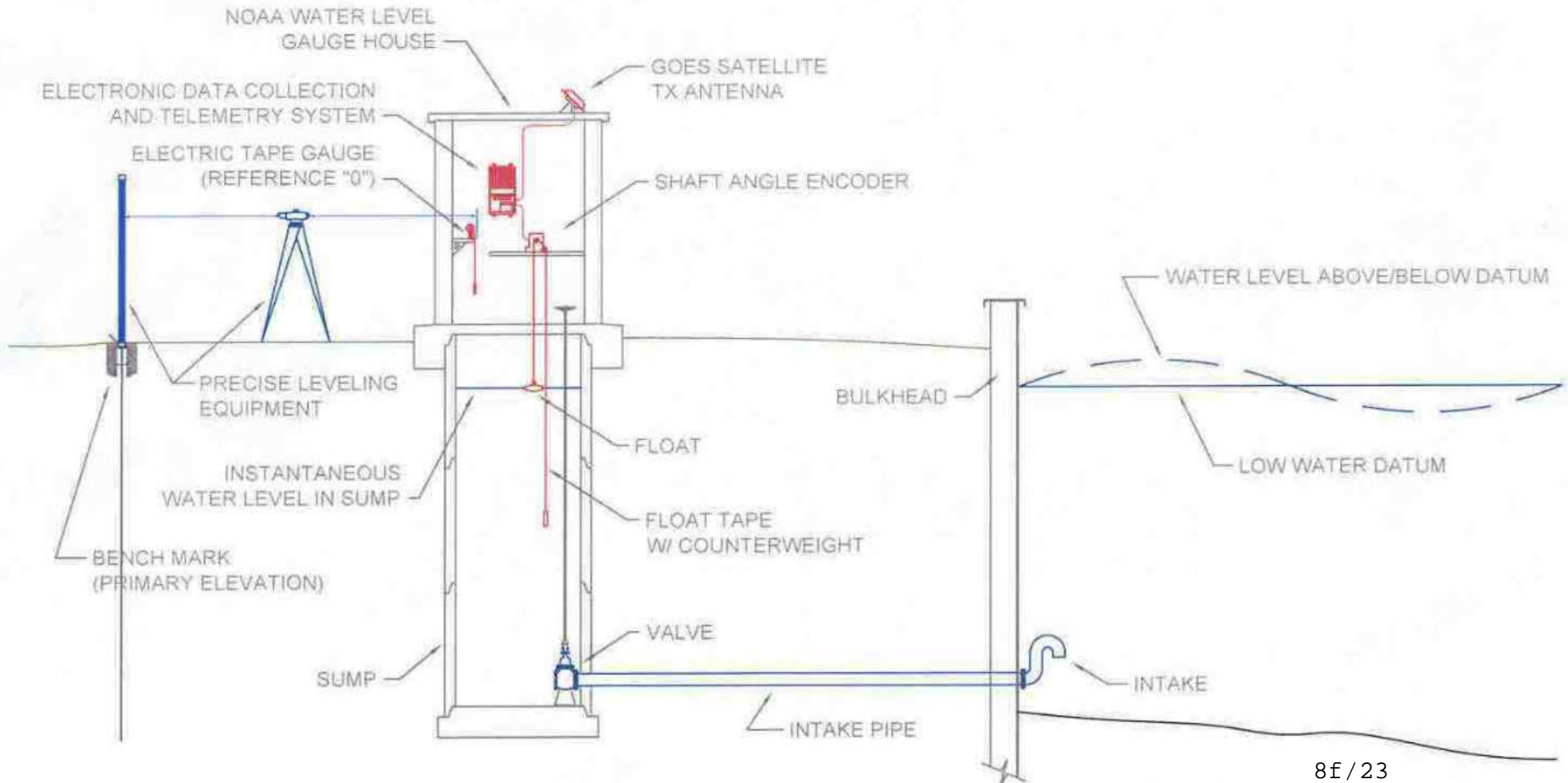
Lake Ontario Real-Time Water Level Gauging Stations



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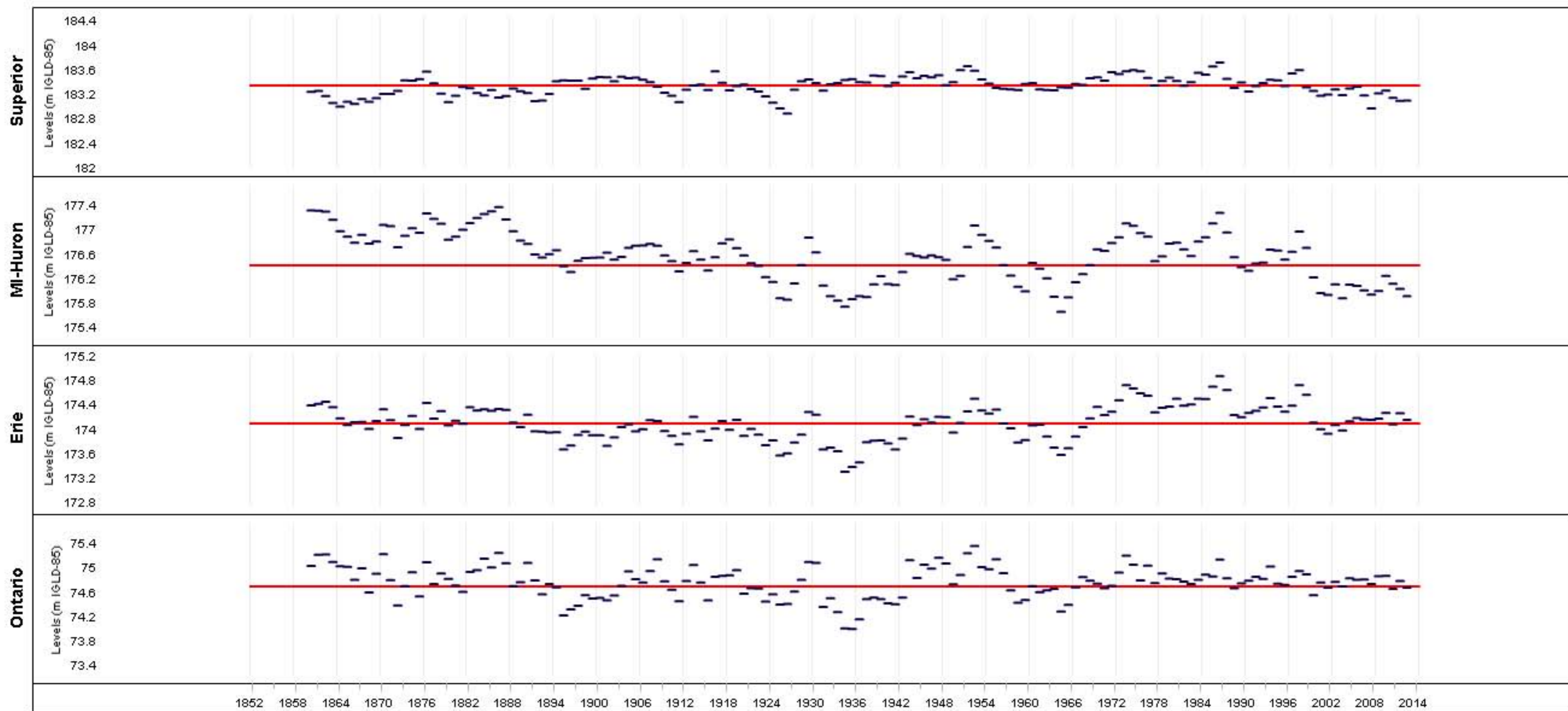


National Water Level Observation Network Great Lakes Data Acquisition System



Water level dynamics:

Water level dynamics: long-term



■ Lakewide period of record average (1918-present)
 ■ Master gauge annual average (1880-present)

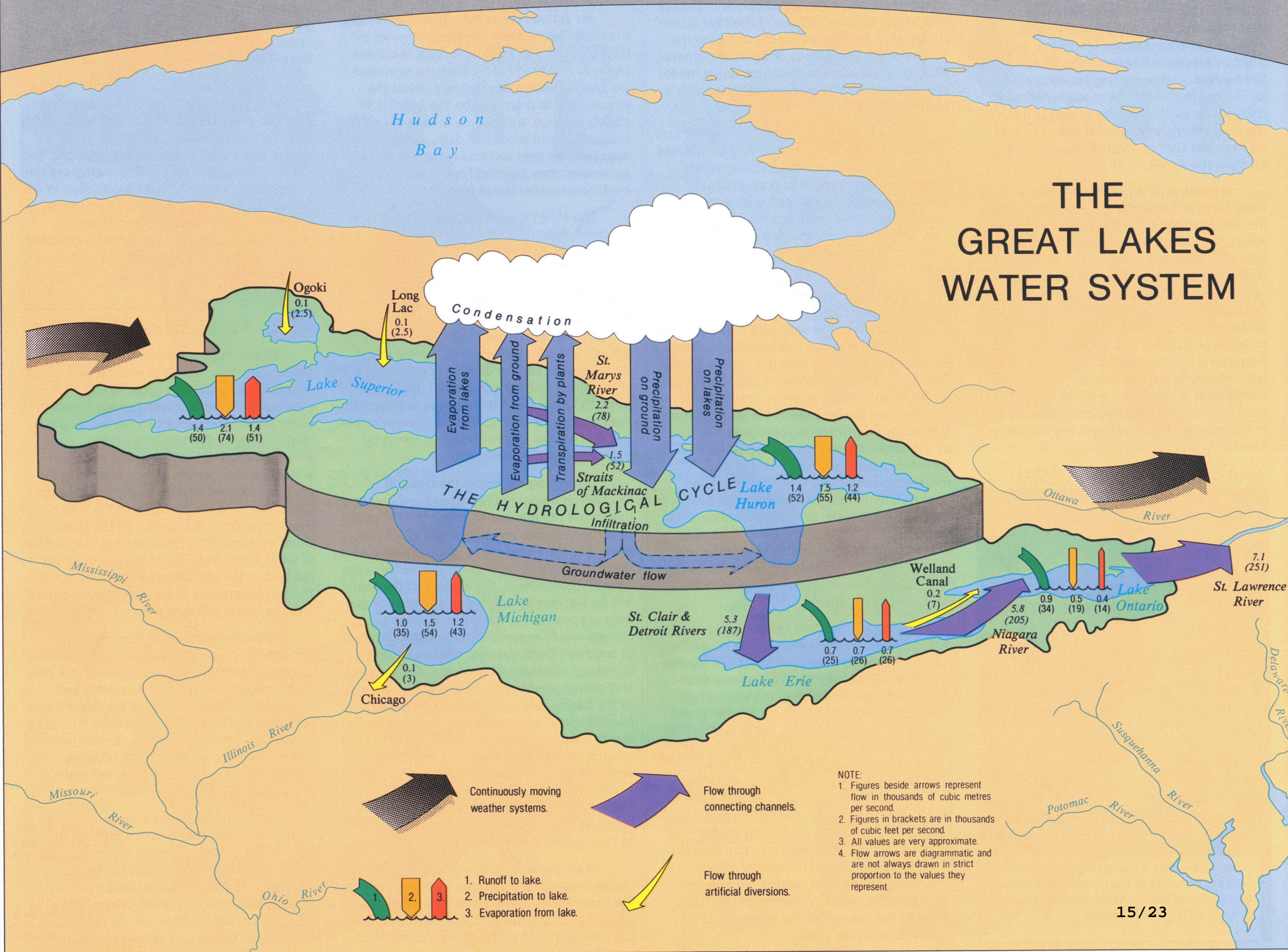
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Water level drivers:

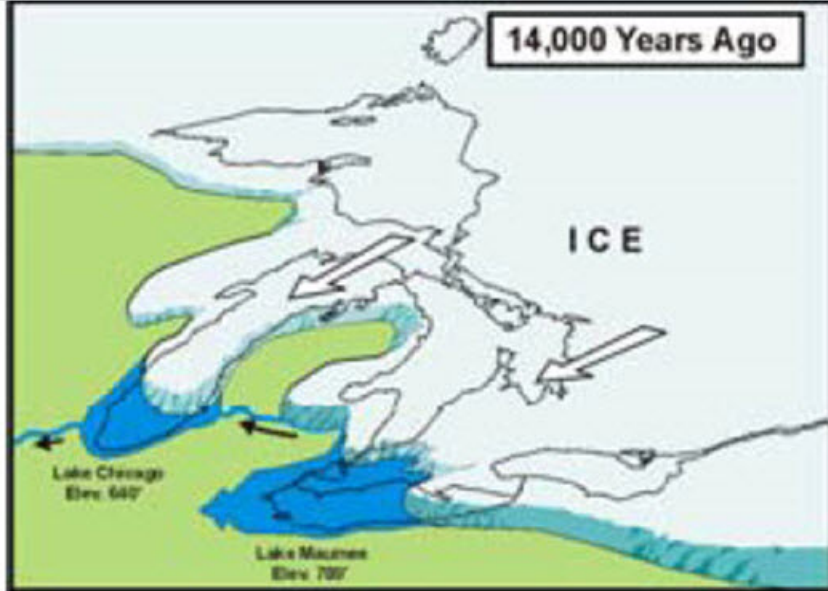
Water level drivers: hydrologic cycle

THE GREAT LAKES WATER SYSTEM

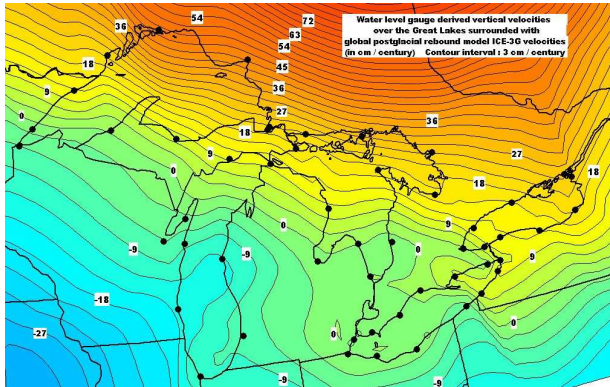


NOTE:
 1. Figures beside arrows represent flow in thousands of cubic metres per second.
 2. Figures in brackets are in thousands of cubic feet per second.
 3. All values are very approximate.
 4. Flow arrows are diagrammatic and are not always drawn in strict proportion to the values they represent.

Water level drivers:



Water level drivers: isostatic rebound



From: Mainville and Craymer (2005), *GSA Bulletin*.



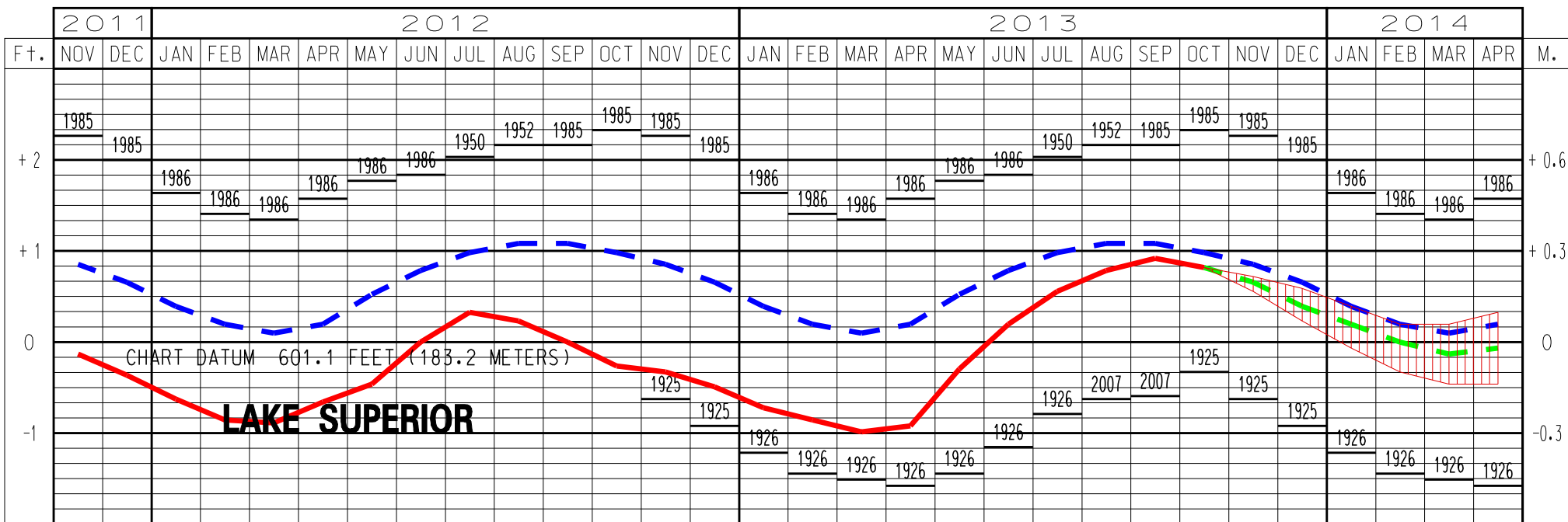
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Water level projections:

Water level projections: seasonal

LAKE SUPERIOR WATER LEVELS – NOVEMBER 2013



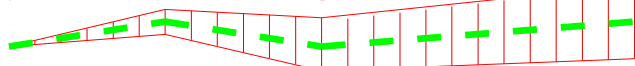
LEGEND

LAKE LEVELS

RECORDED



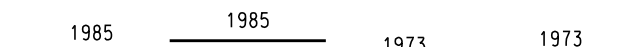
PROJECTED



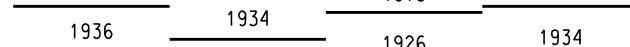
AVERAGE **



MAXIMUM **

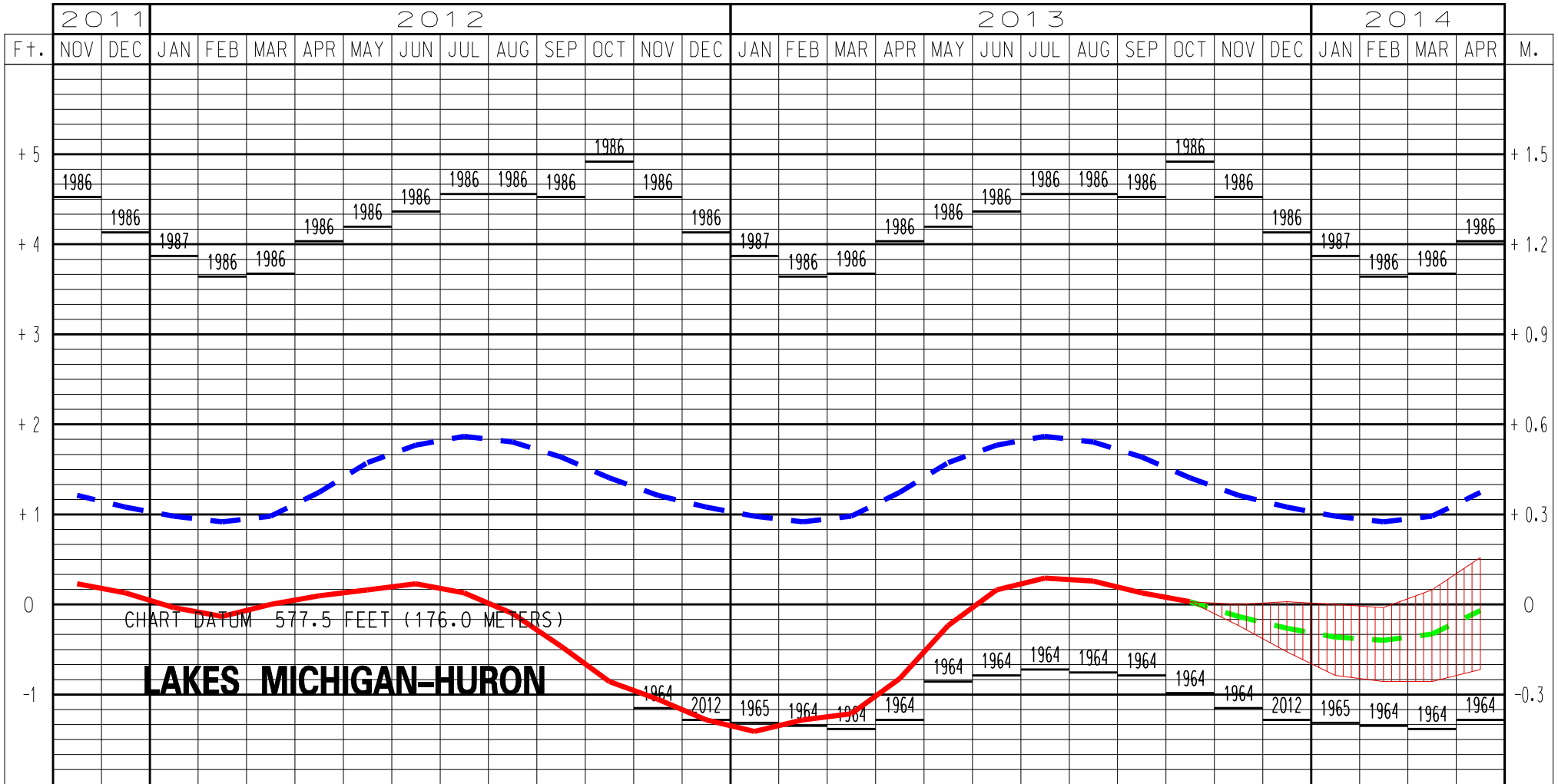


MINIMUM **



** Average, Maximum and Minimum for period 1918-2012

LAKES MICHIGAN-HURON WATER LEVELS - NOVEMBER 2013

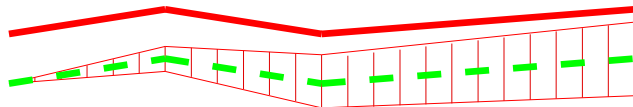


LEGEND

LAKE LEVELS

RECORDED

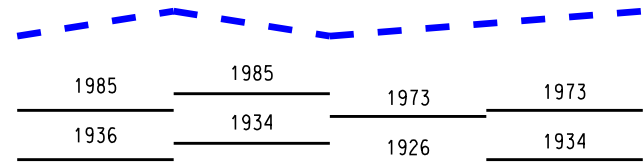
PROJECTED



AVERAGE **

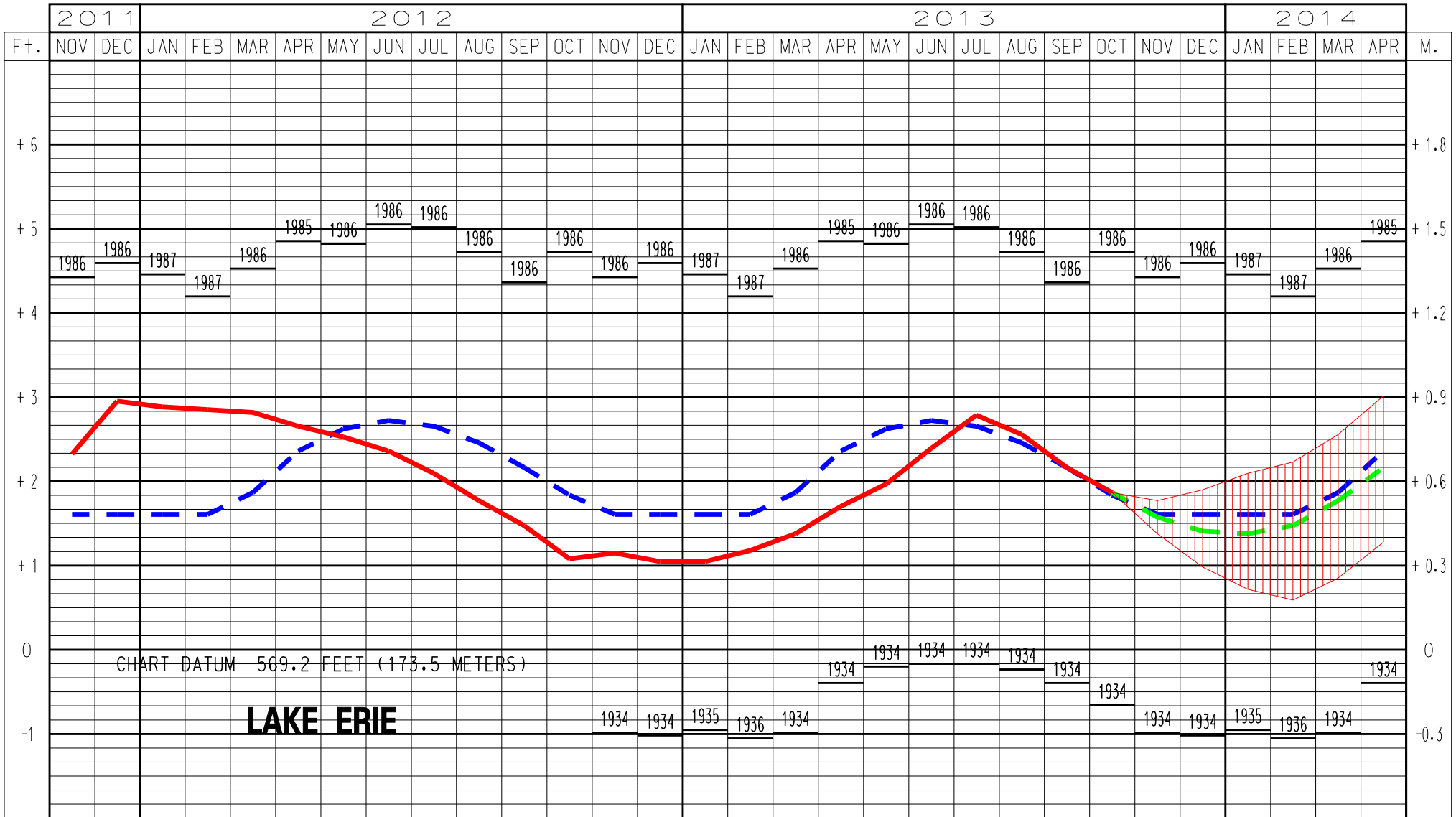
MAXIMUM **

MINIMUM **

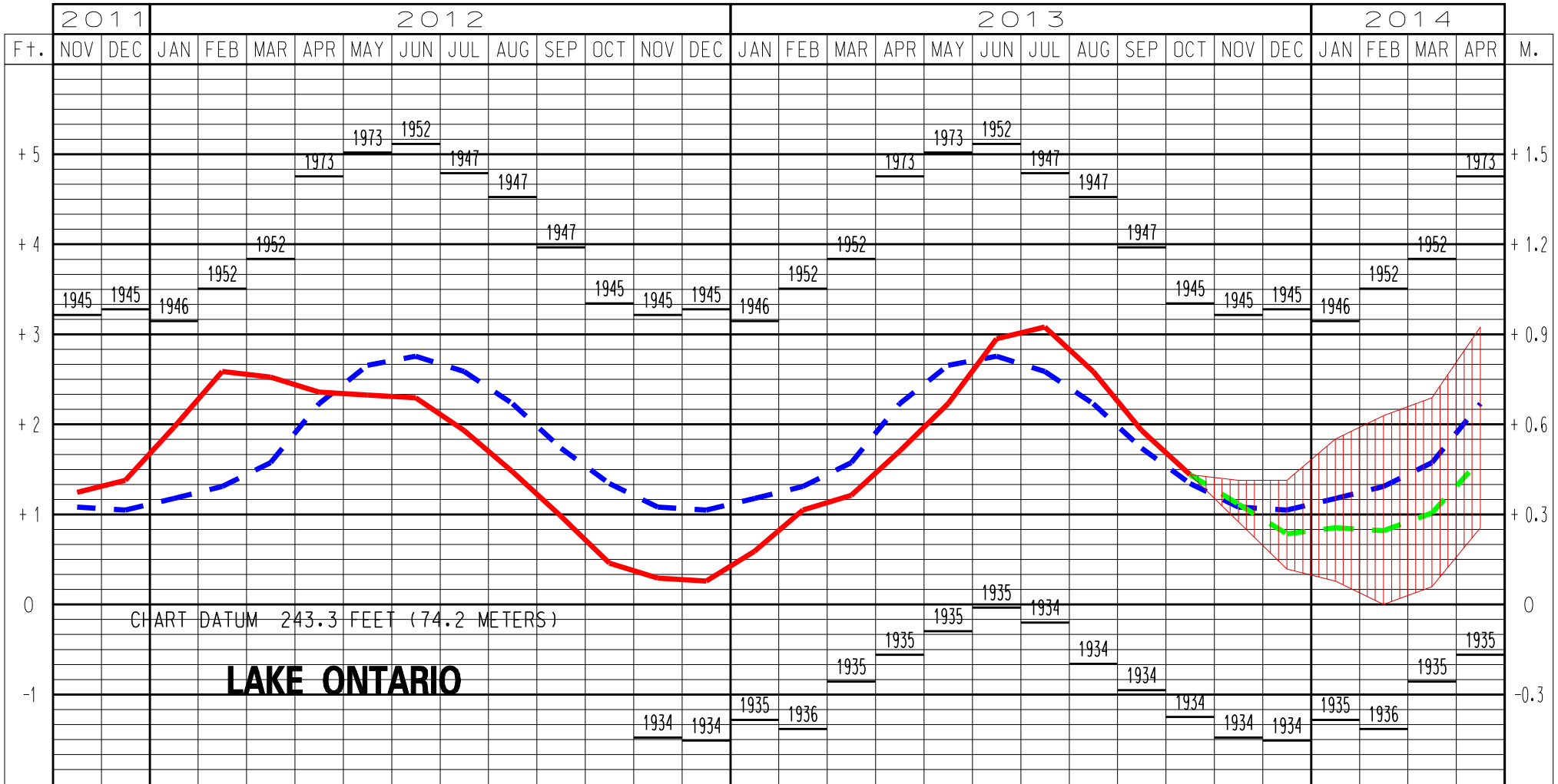


** Average, Maximum and Minimum for period 1918-2012

LAKE ERIE WATER LEVELS – NOVEMBER 2013



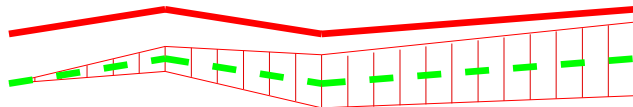
LAKE ONTARIO WATER LEVELS - NOVEMBER 2013



LEGEND LAKE LEVELS

RECORDED

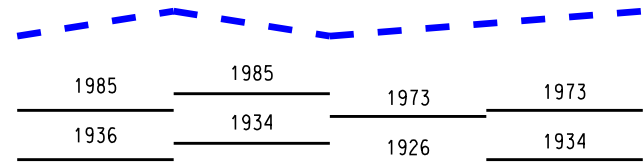
PROJECTED



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