How the Beach Got Here!
History and Development of Sheridan Beach, Michigan City, Indiana

By
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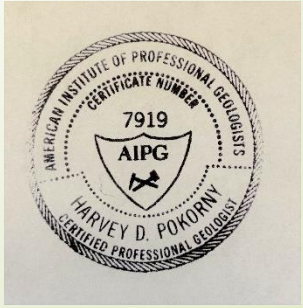
2022



Sheridan Beach, Facing SW, Michigan City, Indiana, Circa 2015

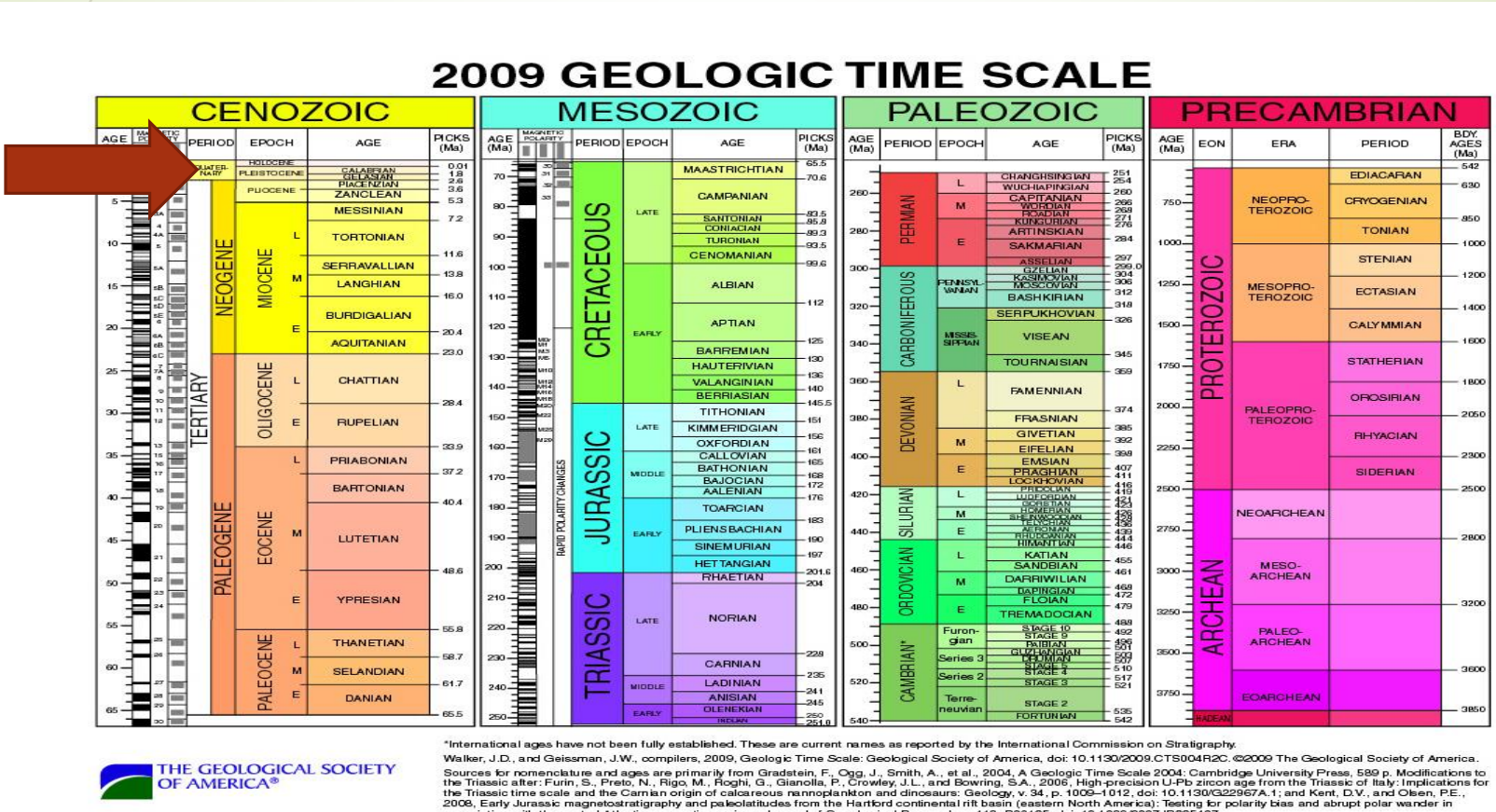
Michigan City Pier and Lighthouse (For Ed Pokorny, in Memoriam)

SUMMARY

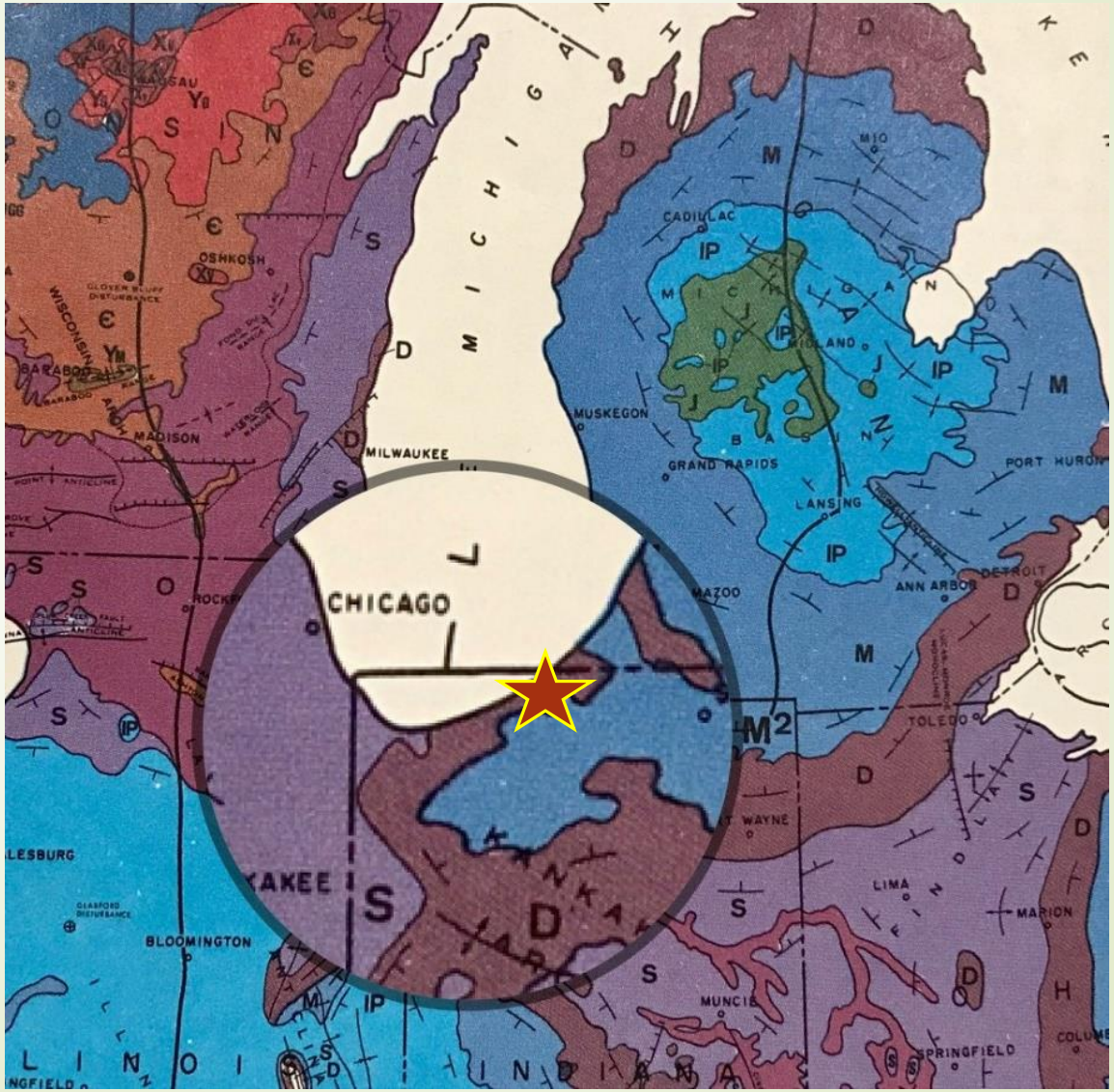
- Geologic History
- Post-Glacial Creation of Lake Michigan
- The Anthropocene
- Beach Creation
- ASTM Phase I Environmental Site Assessment Process for Historic Documentation, including:
  - Aerial Photos
  - Plat Maps
  - USGS Topo Maps
  - Geologic Literature
  - Personal Knowledge
- Platting the Beach-Historic Subdivision Plat Maps

Geologic Time

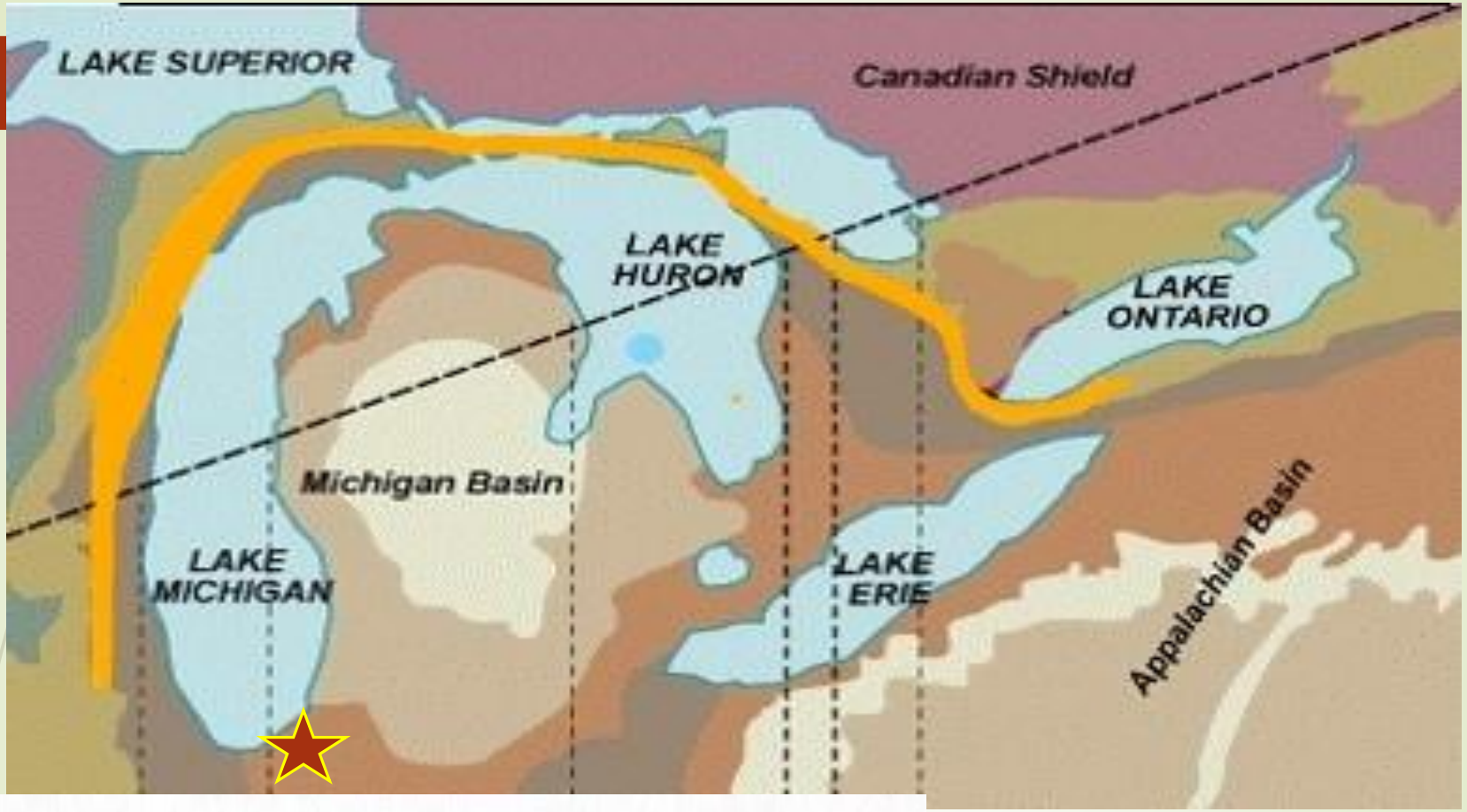
Date	Billion Years Ago	Event
1 Jan	13.8	Big Bang
22 Jan	12.85	First galaxies form
16 Mar	11	Milky Way Galaxy formed
2 Sep	4.57	formation of the Solar System
6 Sep	4.4	Oldest rocks known on Earth

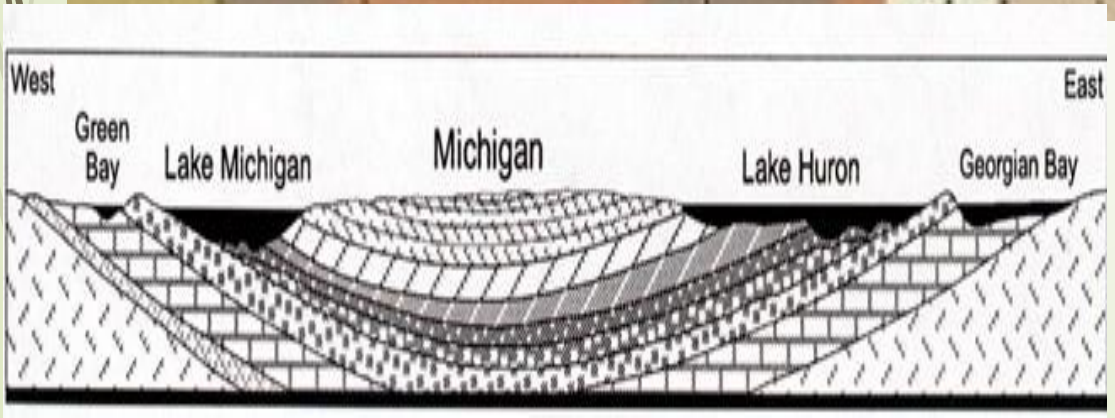


Bedrock Setting-SW Portion of Michigan Basin-Devonian Age Bedrock Beneath Recent Sediments



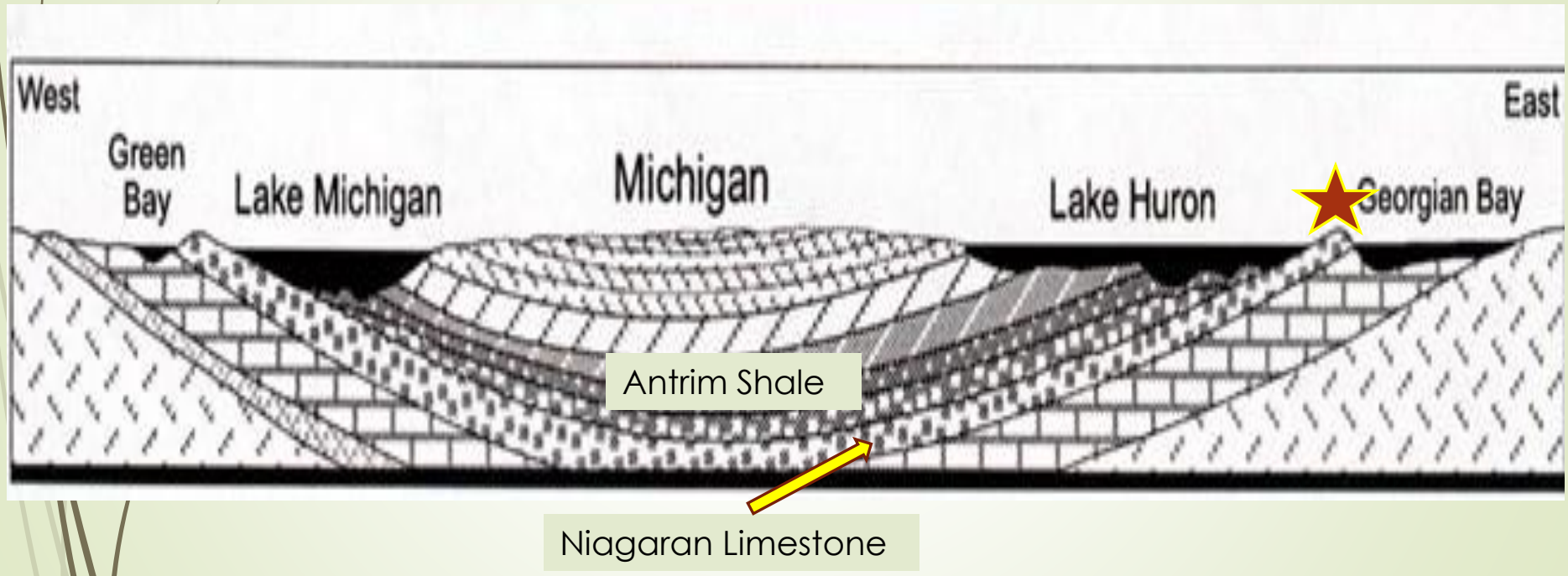
Bedrock Cross-Section; Yellow Indicates Silurian Age Niagara Escarpment





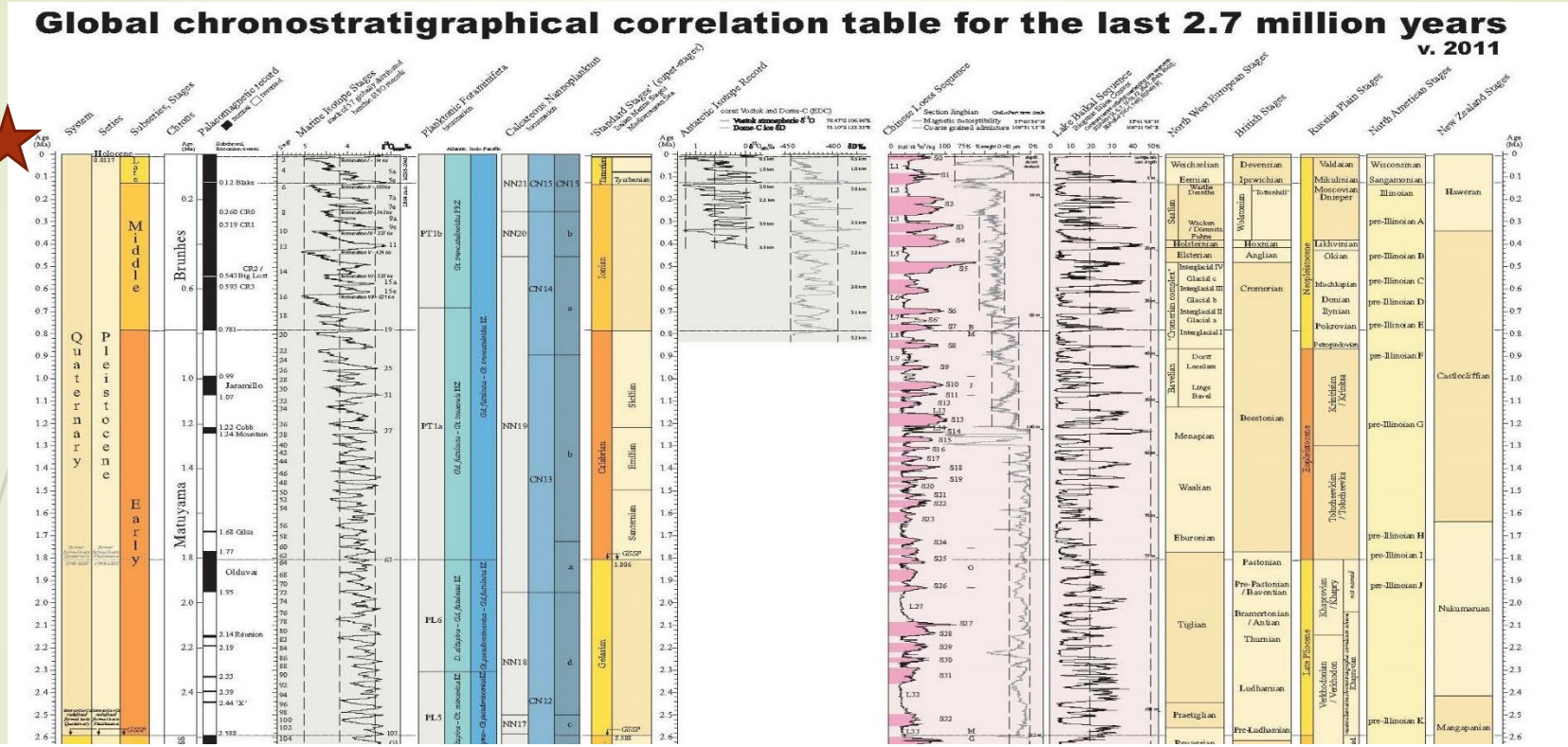
Bedrock Cross-Section:

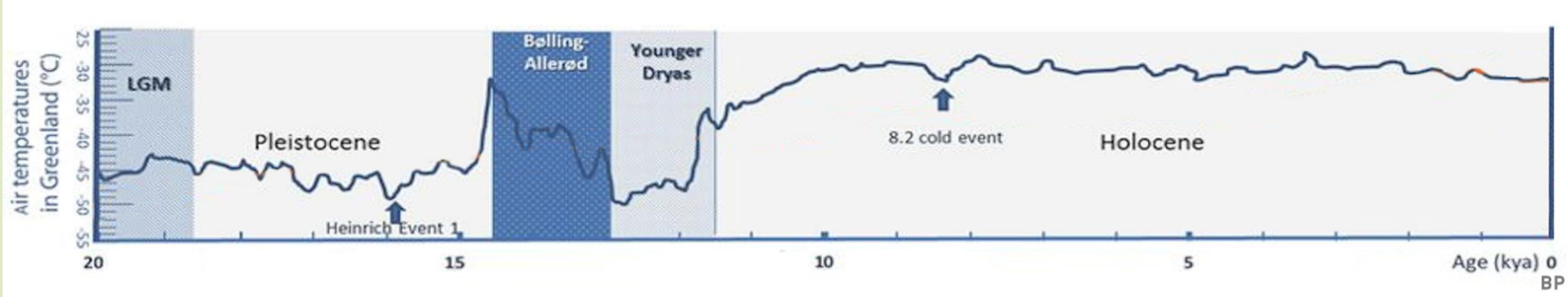
Silurian Age limestone controls Great Lakes topography; Flood meltwaters carved out final lake configurations by eroding less resistant formations (Antrim Shale).



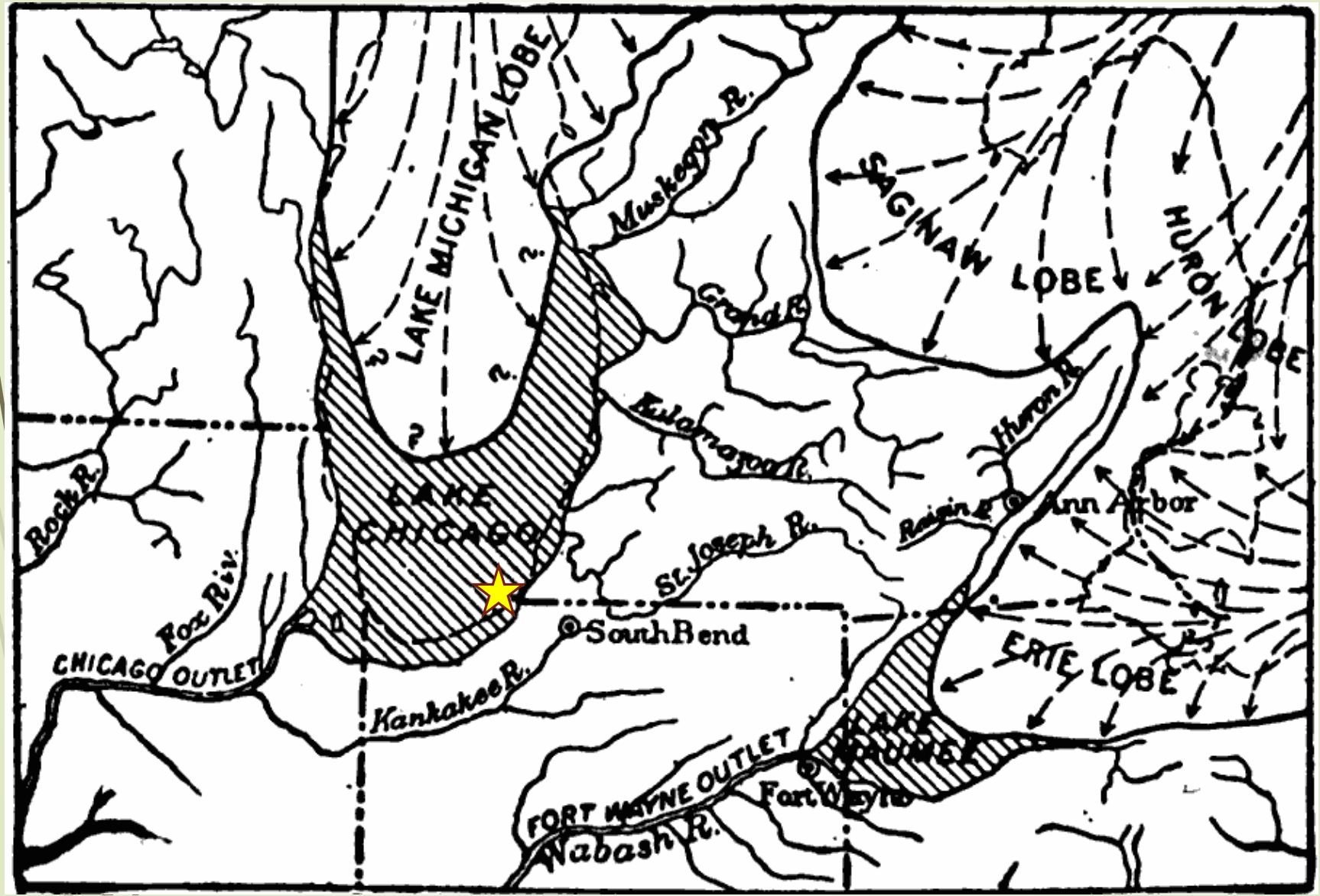
Glacial/Pleistocene Overview

Glacial Pulses on and off for the past 2.7 million years, the beginning of the Pleistocene Ice Age coinciding with the uplift of Panama in Central America, which cut off ocean circulation. Note the extreme Ice Age temperatures





End of Glacial Age - Active glacial retreat, massive flood discharge near the end of Pleistocene era. Conditions about 12,800 years ago.

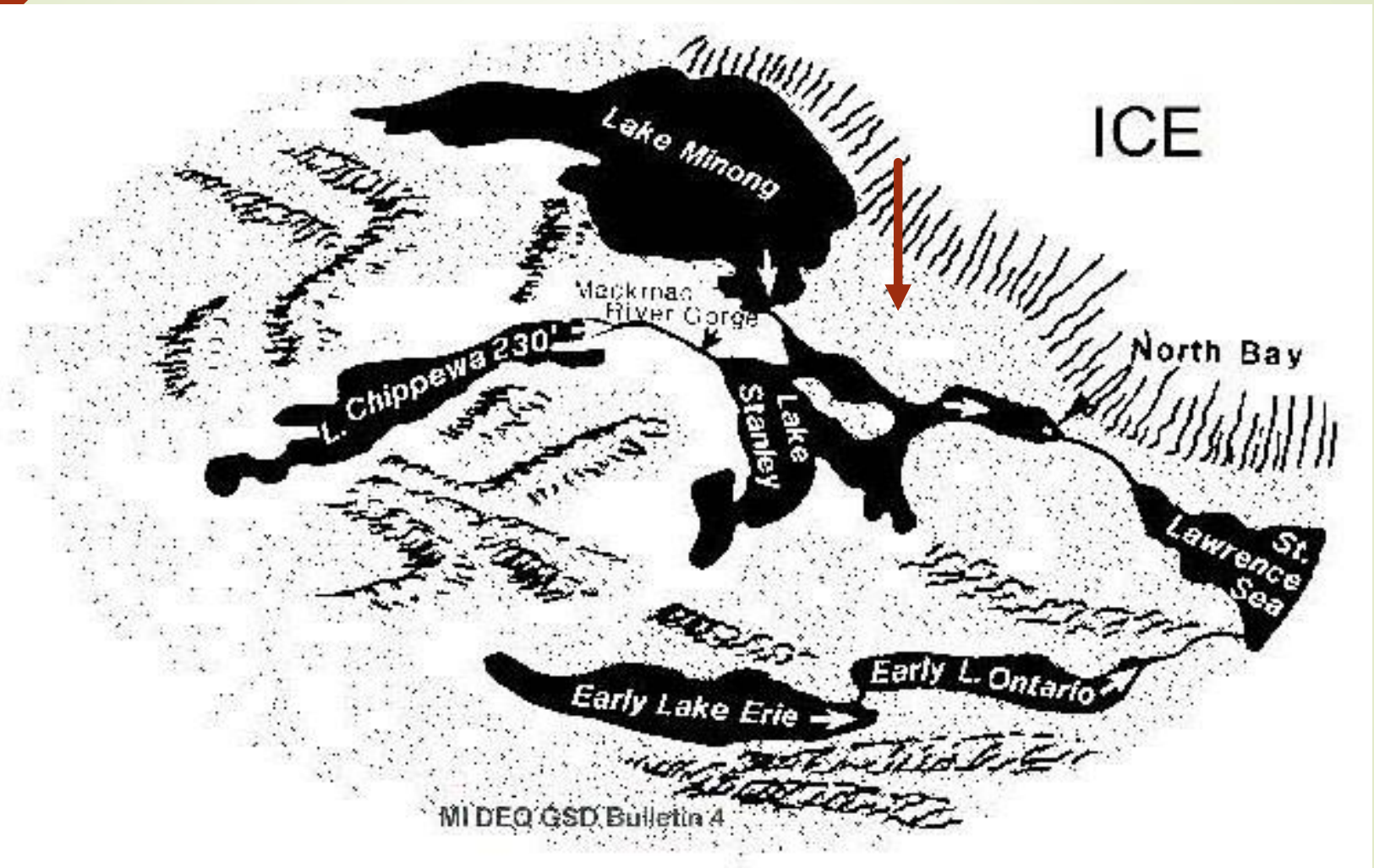


Post-Glacial Lake Development Chronology

By 11,000 years ago, the Great Lakes have been established

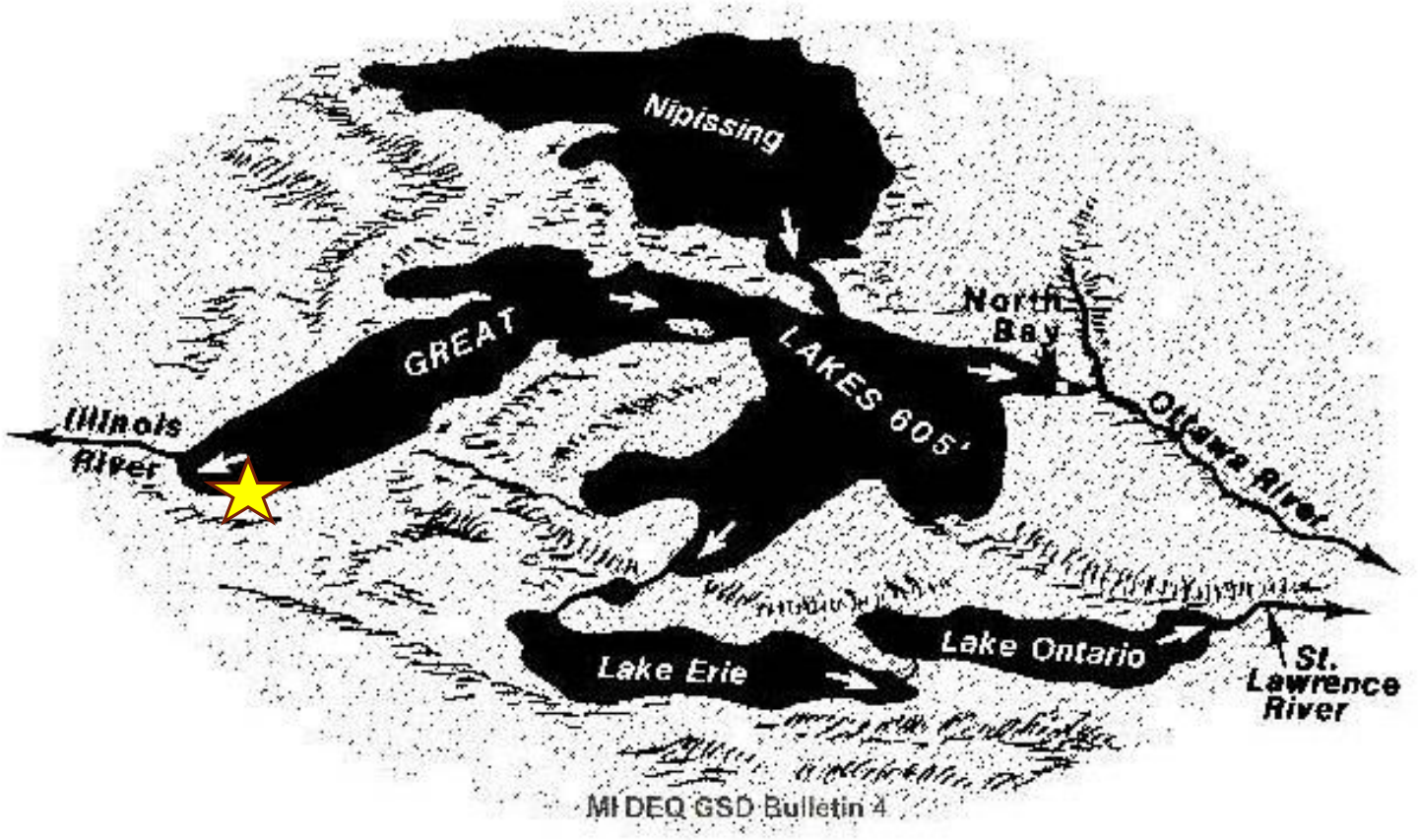
Michigan area 11,000 years ago

Post-Glacial Lake Development-Depressed topography to the north due to the great mass of the now-melted continental glacier. The land is still rebounding today.



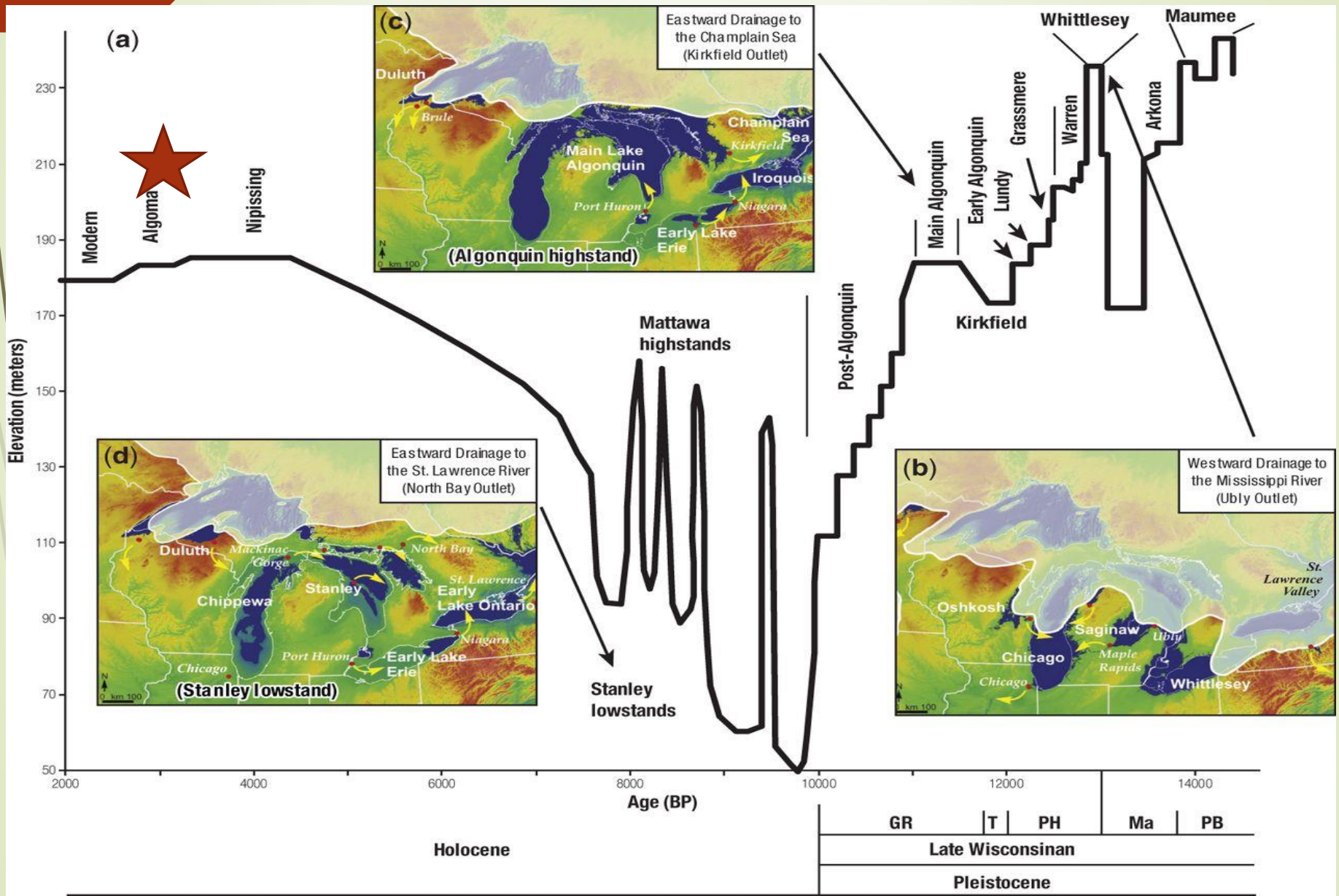
Michigan area 9,500 years ago

Great Lakes Drainage through Illinois River and Ottawa River at higher elevation.



Michigan area 4,500 to 3,500 years ago

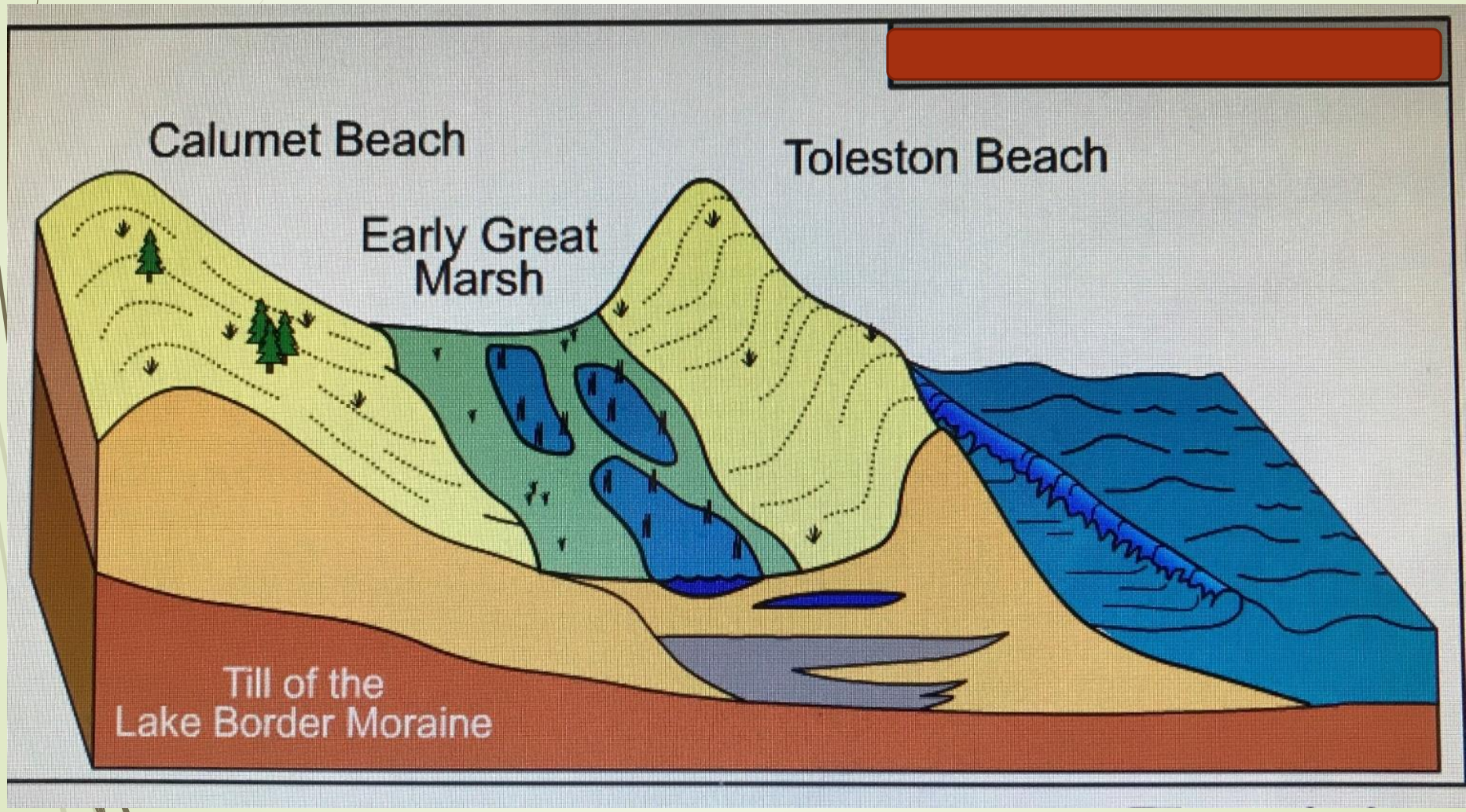
Lake Michigan/Huron Water Elevation Chronology (Updated 2014)



Post-Glacial Dune Formation (around 3,600 years ago) resulting from lowering lake levels combined with an abundance of sand. Note the Great Marsh extends to Beachwalk.

Map of northwestern Indiana showing major shorelines. Modified from Schneider and Keller (1970).

Dune Creation-~2,100 BC



Optically Stimulated Luminescence Sampling indicates dune formation approximately 3,500 years ago; Argyilan, 2014

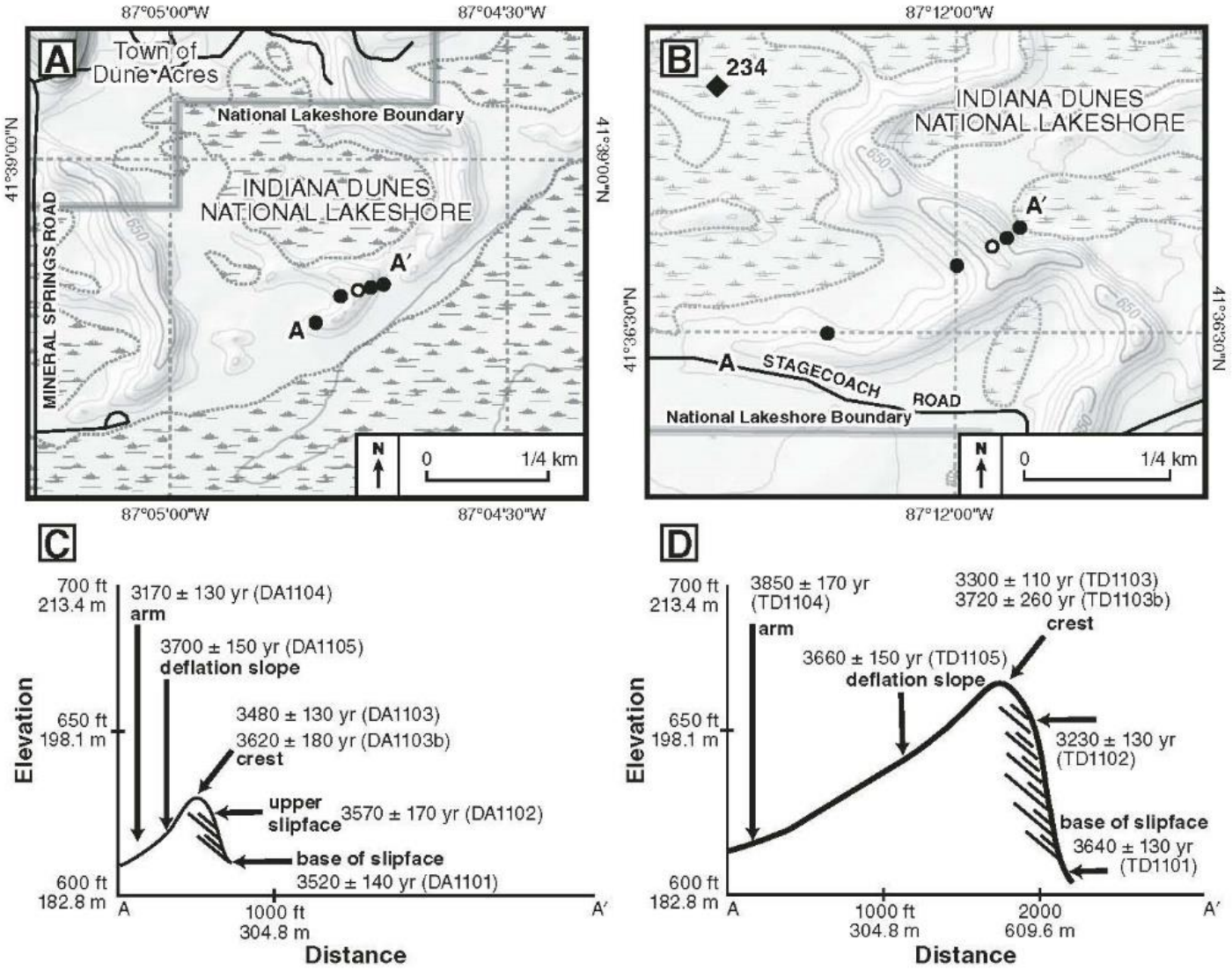
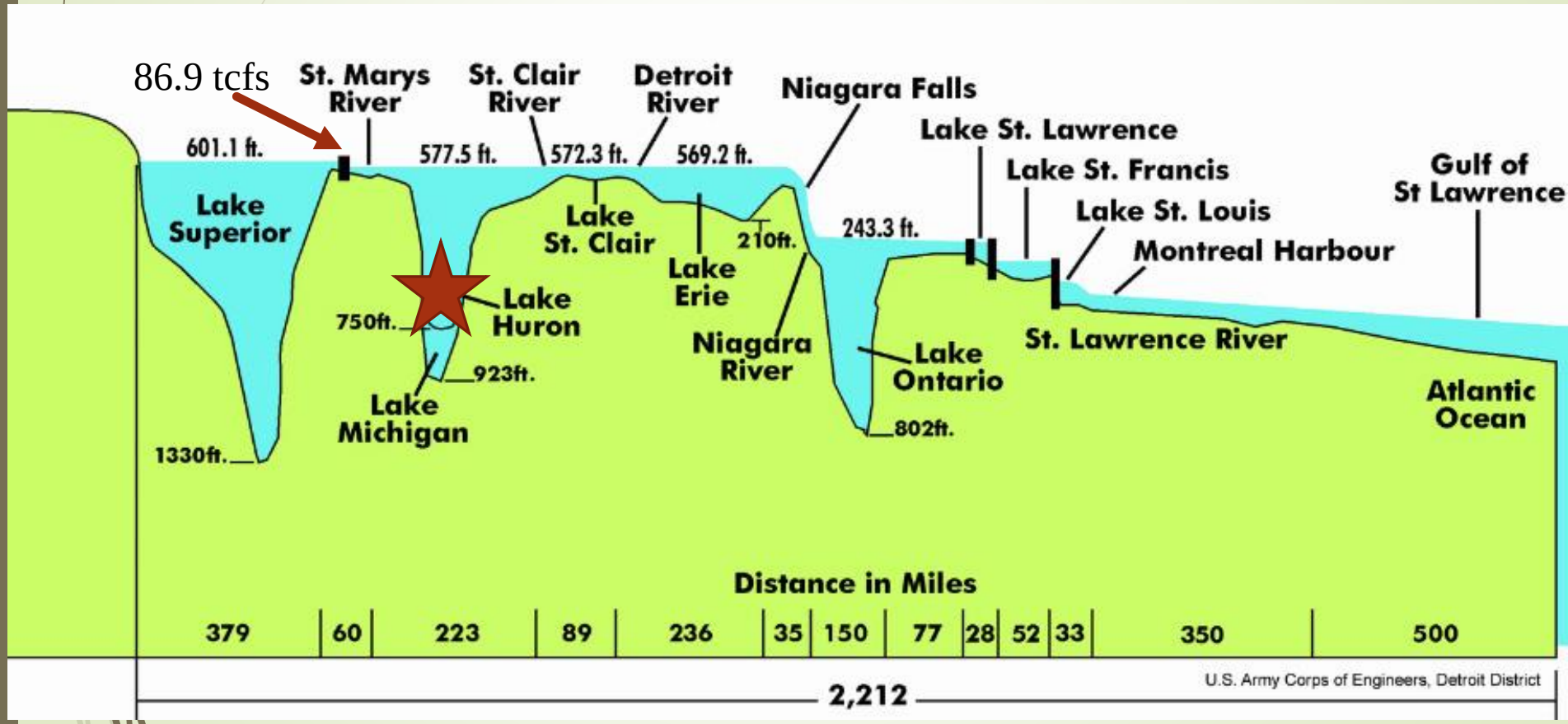


Figure 9. Topographic maps showing schematic profile views of optically stimulated luminescence sample locations for the parabolic dune studies at Dune Acres (A, C) and Tolleston Dunes (B, D) (vertical exaggeration 2×). From Argyilan et al. (2014)

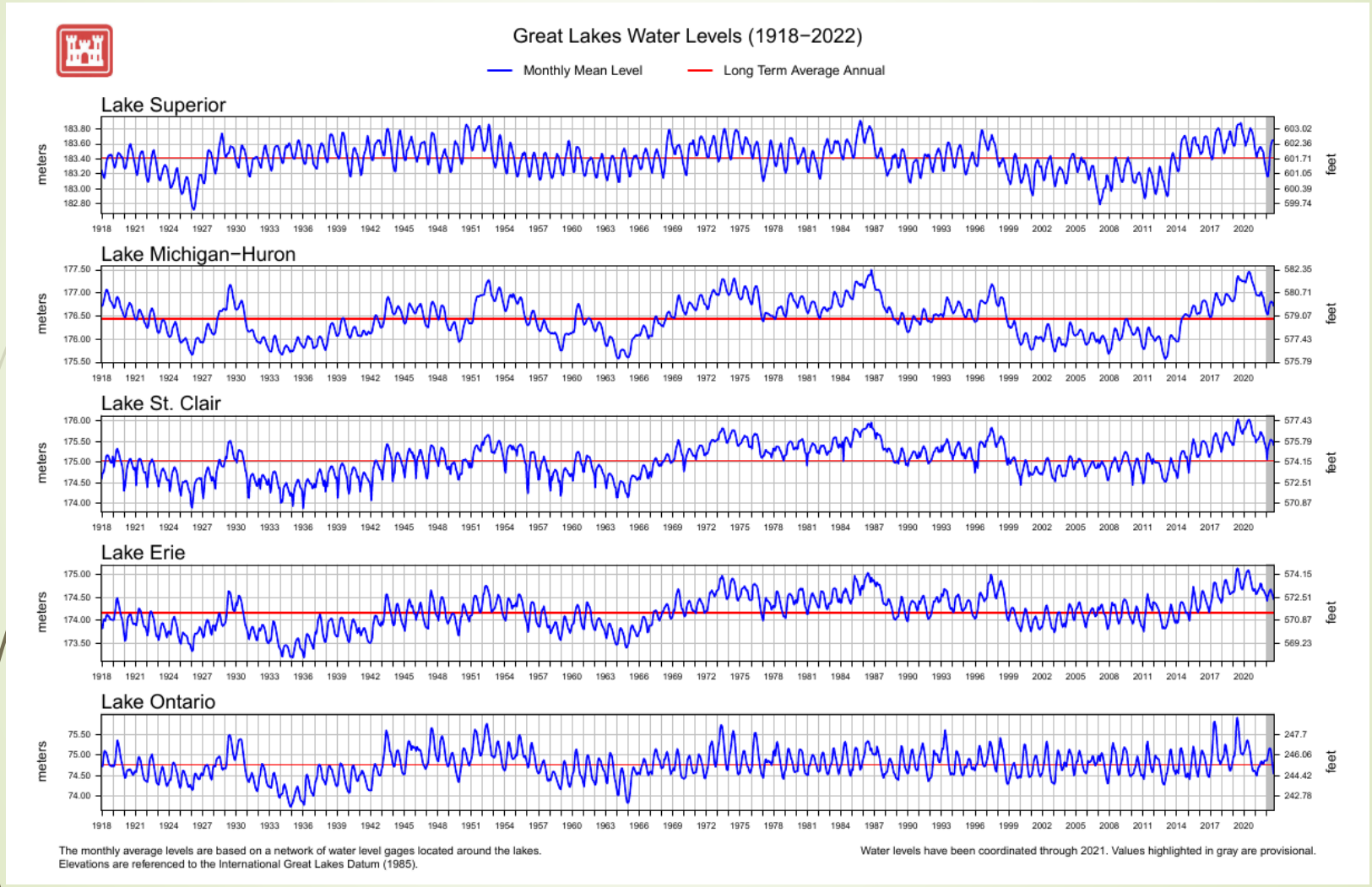
Anthropocene

- The Anthropocene is a proposed geologic epoch dating from the commencement of significant human impact on the Earth's geology and ecosystems, including, but not limited to, anthropogenic climate change. We have:
- Pushed extinction rates of animals and plants far above the long-term average. The Earth is on course to see **75% of species become extinct** in the next century if current trends continue.
- Increased levels of climate-warming CO2 in the atmosphere with fossil-fuel burning pushing levels from 280 parts per million before the industrial revolution to 420 ppm and rising today.
- Put so much plastic in our waterways and oceans that micro-plastic particles are now virtually ubiquitous, and plastics will leave an **identifiable fossil record** for future generations to discover.
- Left a permanent layer of airborne particulates in sediment and glacial ice **including radioactive nuclides from atomics.**

Elevations of the Great Lakes, the Headwaters of the St. Lawrence River Valley. One big river. Up to 90 trillion cubic feet per second is discharged from Lake Superior downriver every day. 320 feet drop over Niagara Falls.



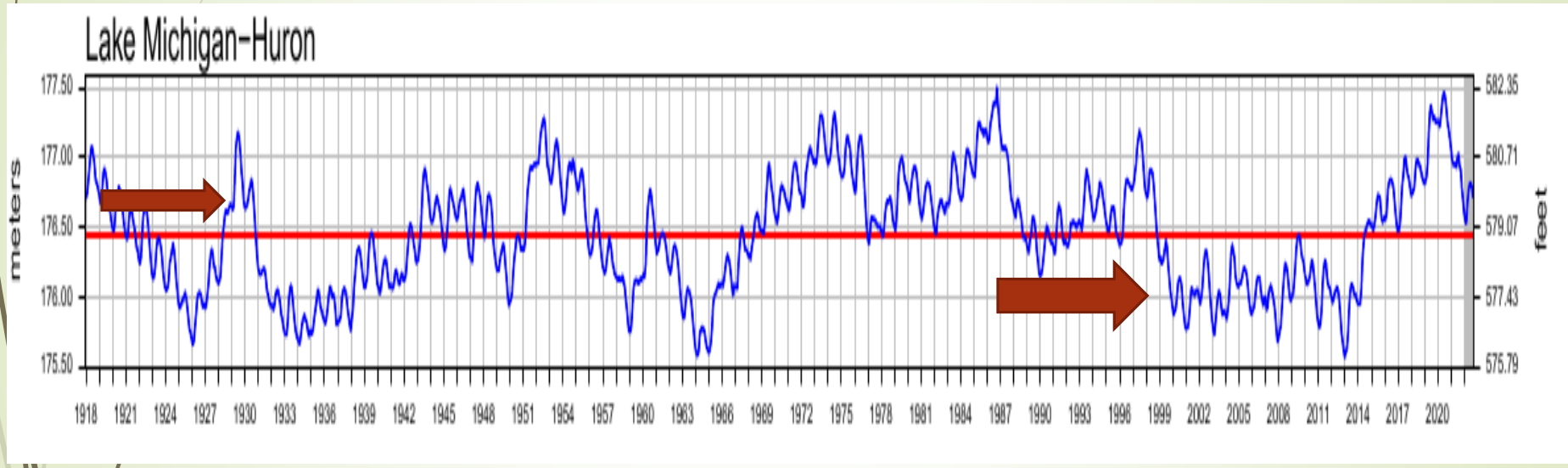
Recent Great Lake Water Elevations (1918-2021), USACE, Detroit District



Recent Lake Michigan/Huron Water Elevations (1918-2022), USACE, Detroit District

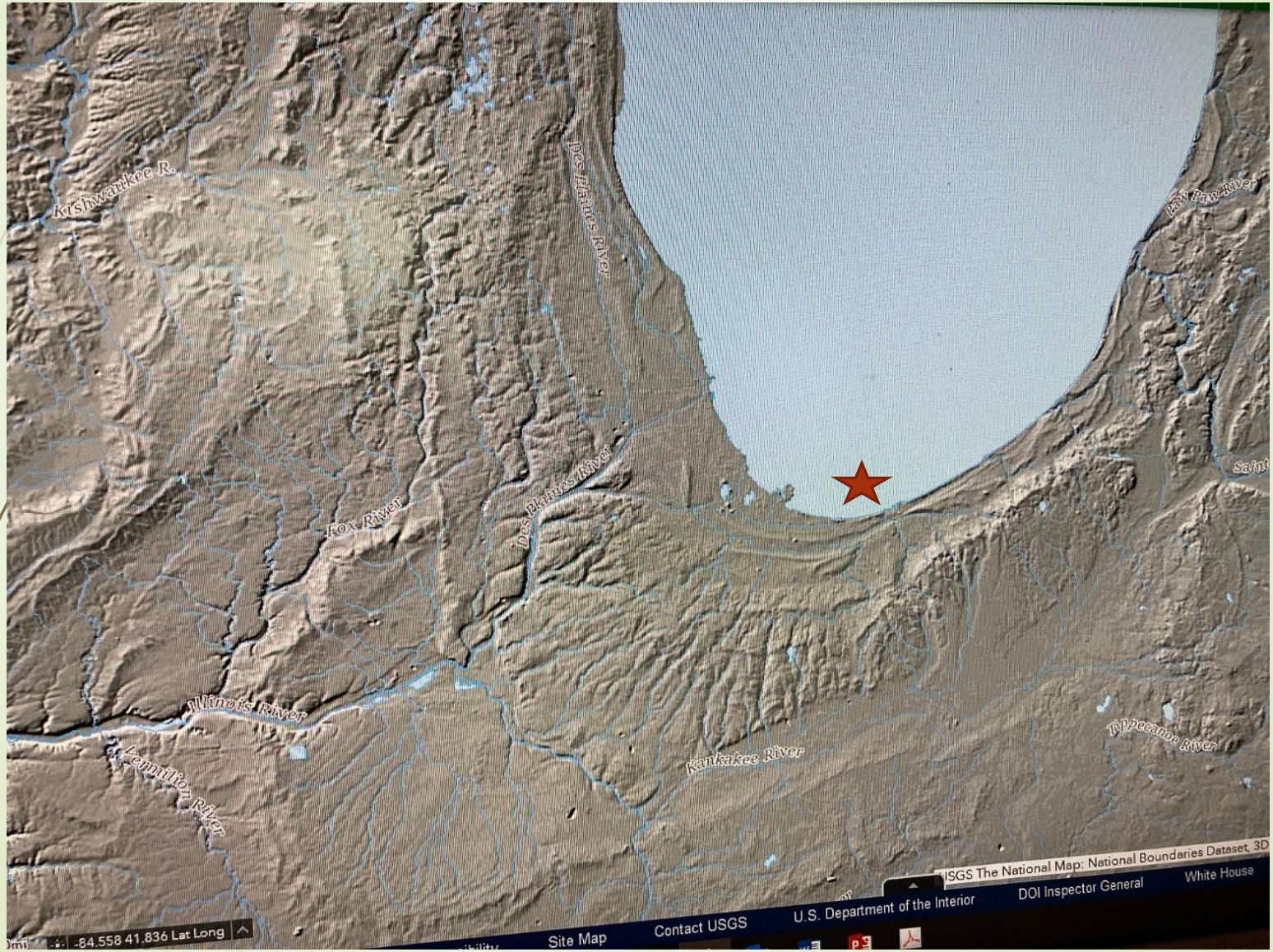
Lowstand=Beach Creation, Highstand=Beach Loss

Arrow to left is at 1928, when Sheridan Beach 4th Addition was platted; lake level went up, and Great Depression slowed lakeside development.



- ***2000-2014 low-stand resulted in lake-wide beach deposition, and up to 250' of lateral beach creation at Sheridan Beach.***

Enhanced Topography, USGS National Map



Erie Canal-Opened up the Great Lakes to East Coast Commerce in 1825, and Lake Ontario in 1829 with the Welland Canal; culminating in the St. Lawrence Seaway in 1959

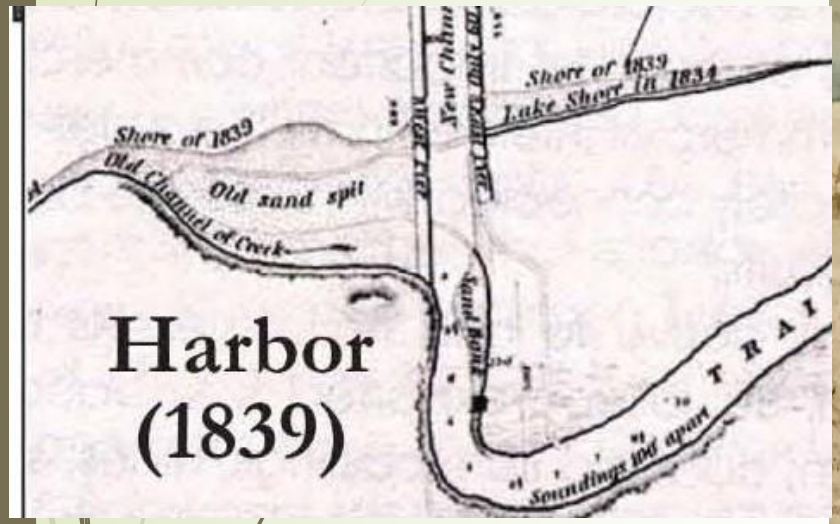
Logging was initial main commerce in Great Lakes Region

Michigan City-Sheridan Beach History

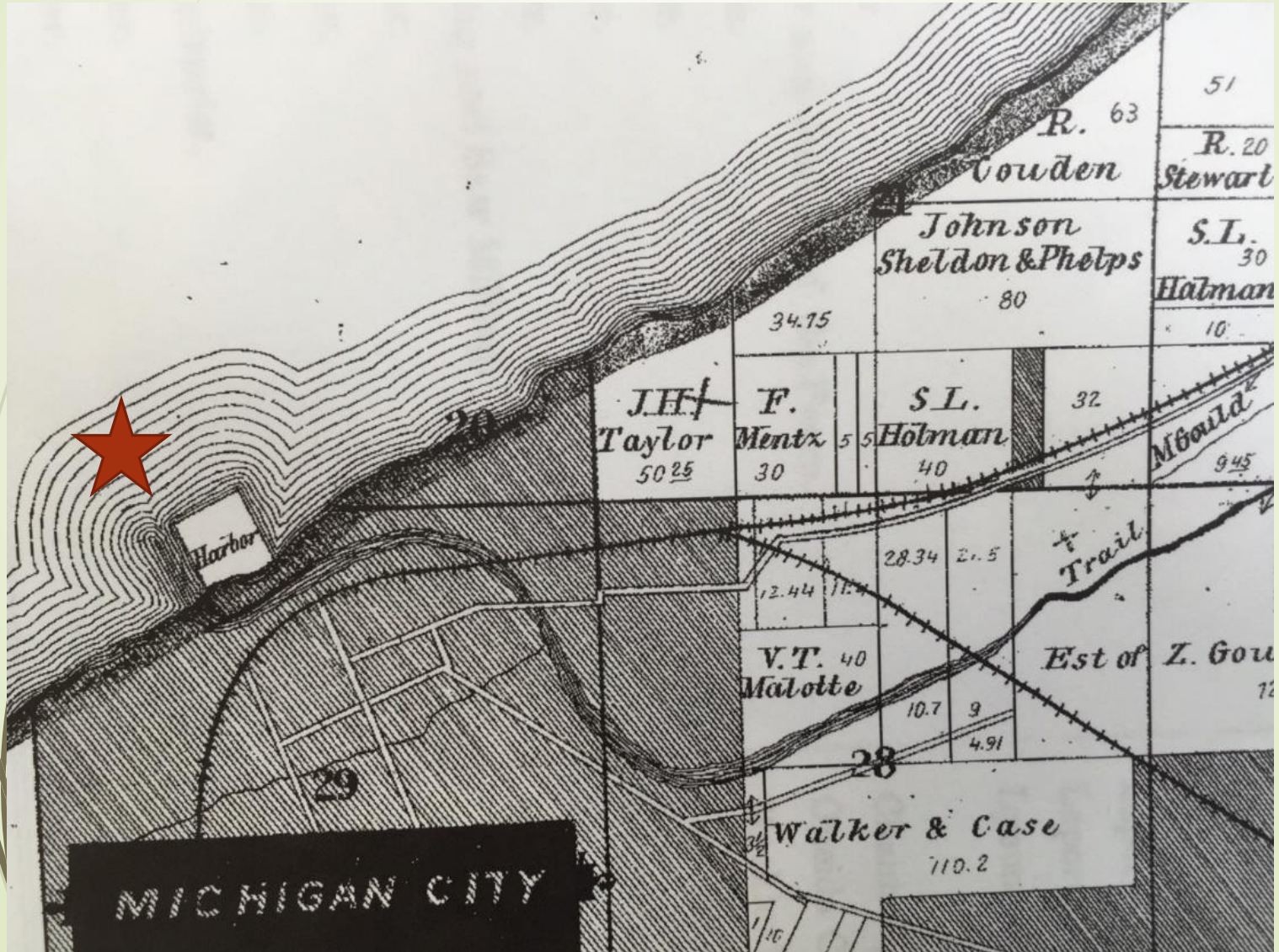
Historical Information:

- **1836-Michigan City Incorporated-Natural Harbor for Lumber Companies**
- **1837- 1873; $420,000 received from Federal government to help develop the harbor.**
- **1870– Onshore Lighthouse Moved Seaward to end of Harbor Entrance.**
- **1891-Washington Park constructed over shanty-town, a relic of the lumber trade**
- **1904 – Existing Lighthouse Completed**
- **1907- First of Four Subdivisions of Sheridan Beach**
- **1918- Sheridan Beach, Third Addition Platted.**
- **1928-Sheridan Beach, Fourth Addition Platted**

Michigan City Hand-Drawn First Plat and Harbor Circa 1837-1839. Note Channel Location on NIPSCO .



Michigan City Plat – Circa 1847-Train has Arrived, breakwater and harbor constructed



Circa 1867-Small lots platted in area of Washington Park

1869 Trail Creek Entrance; beach creation to the east of the breakwater has commenced.

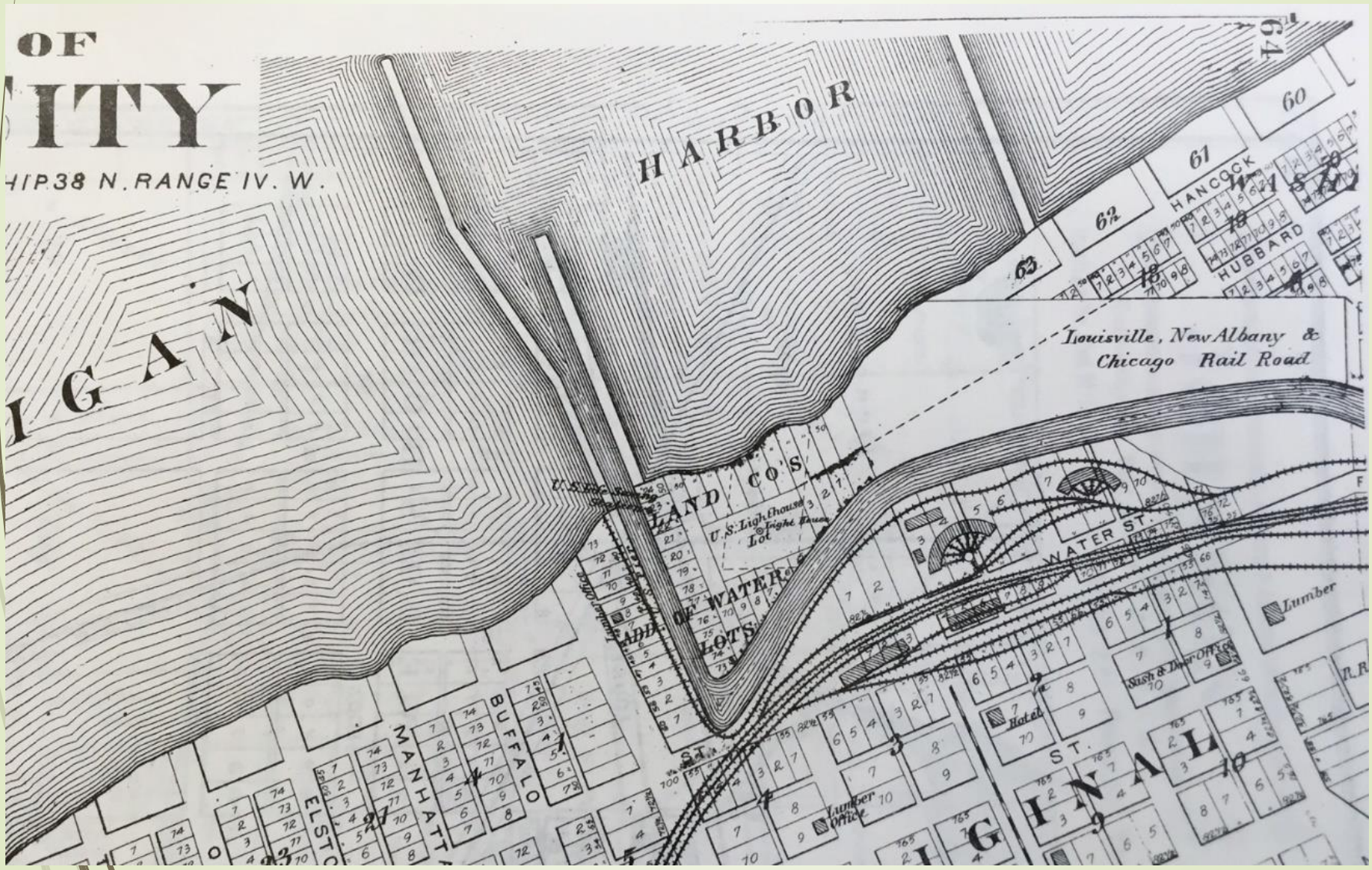
Circa 1869; Looking northwest towards Hoosier Slide from Trail Creek

The "Beach" did not Exist- 1869

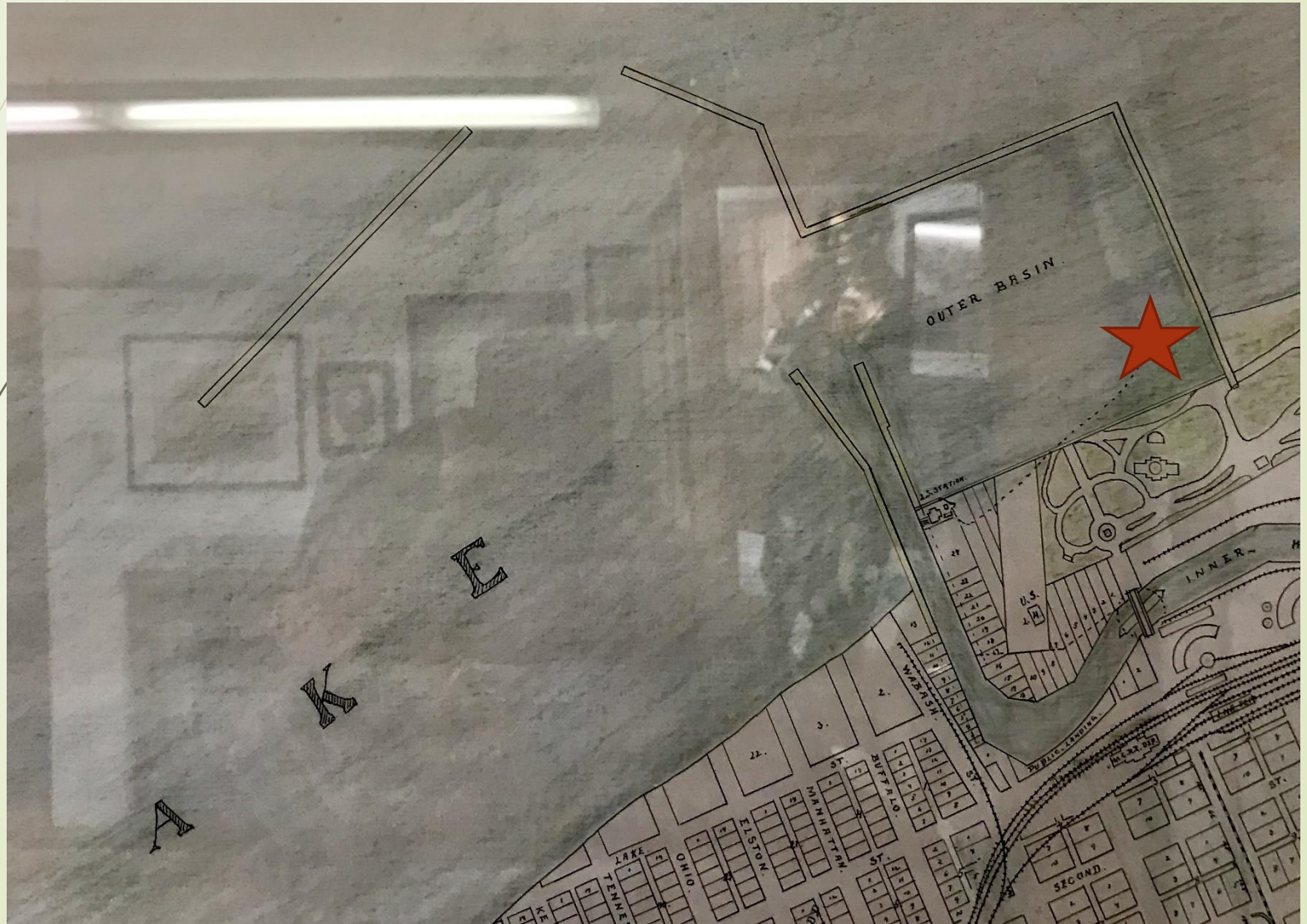
Michigan City 1869, Facing West

The Harbor 1890 (completely offshore), viewed from Hoosier Slide.

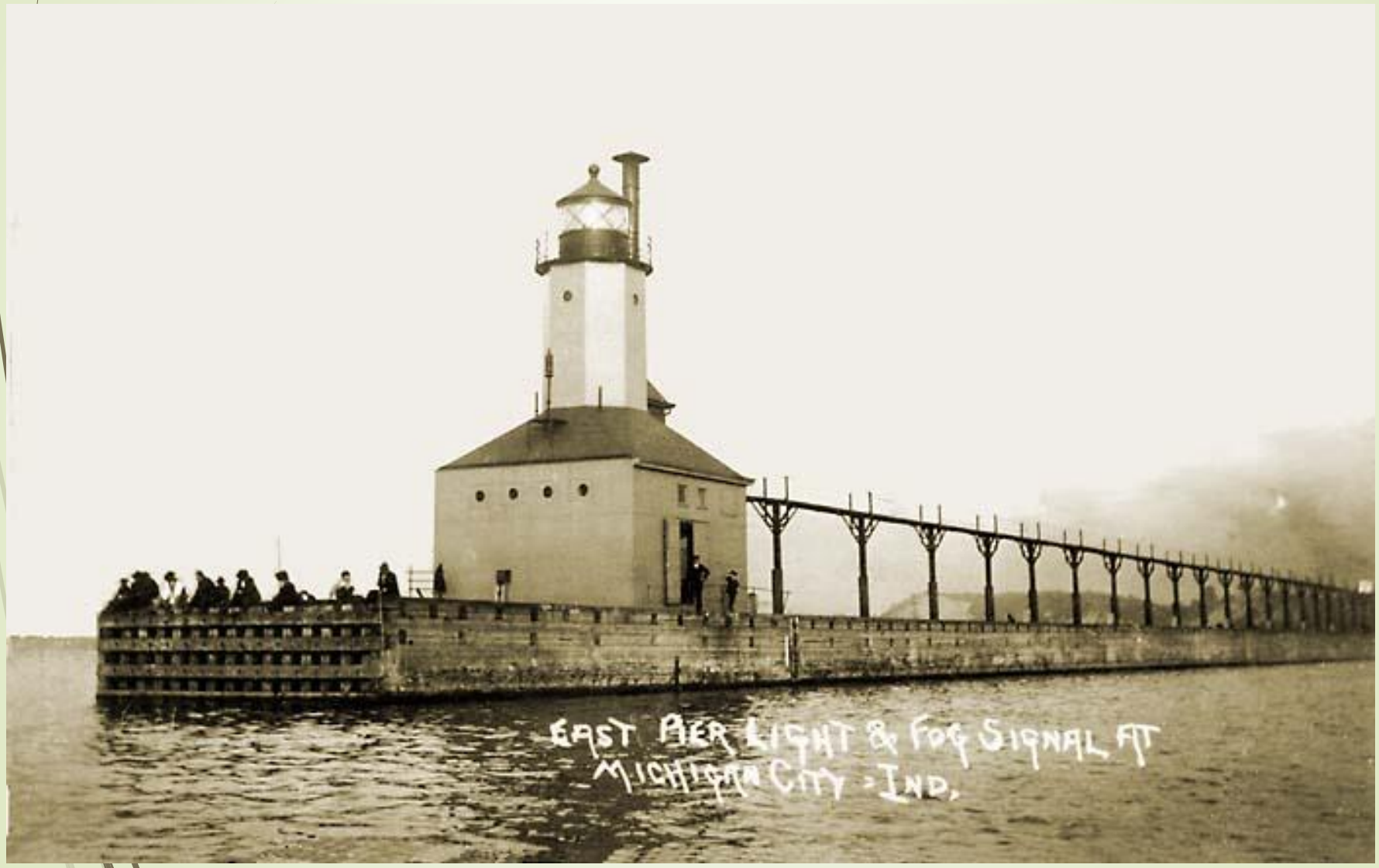
The Harbor 1890



The Harbor 1899, with First Appearance of Washington Park



The Lighthouse 1904



The Lighthouse 1906 (After Historic Storm)

Circa 1910 Beach View, Facing ENE; Beach creation proceeds rapidly upon completion of the lighthouse/breakwater.

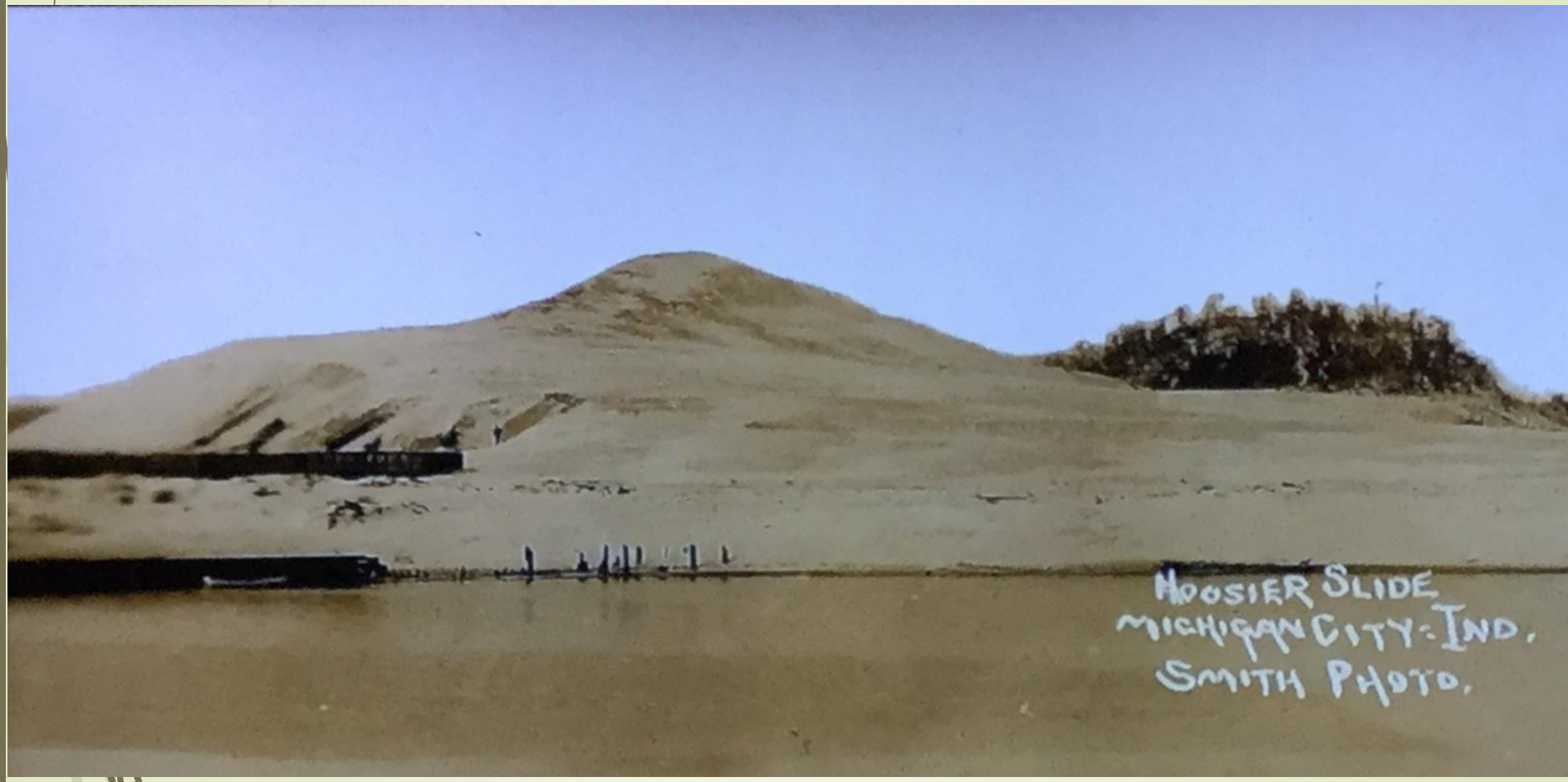
1915 Eastland Disaster in Chicago River- Memorial is at Historical Society

844*/2500 ;

The newly created MC beach was a favorite place for a summer swim.

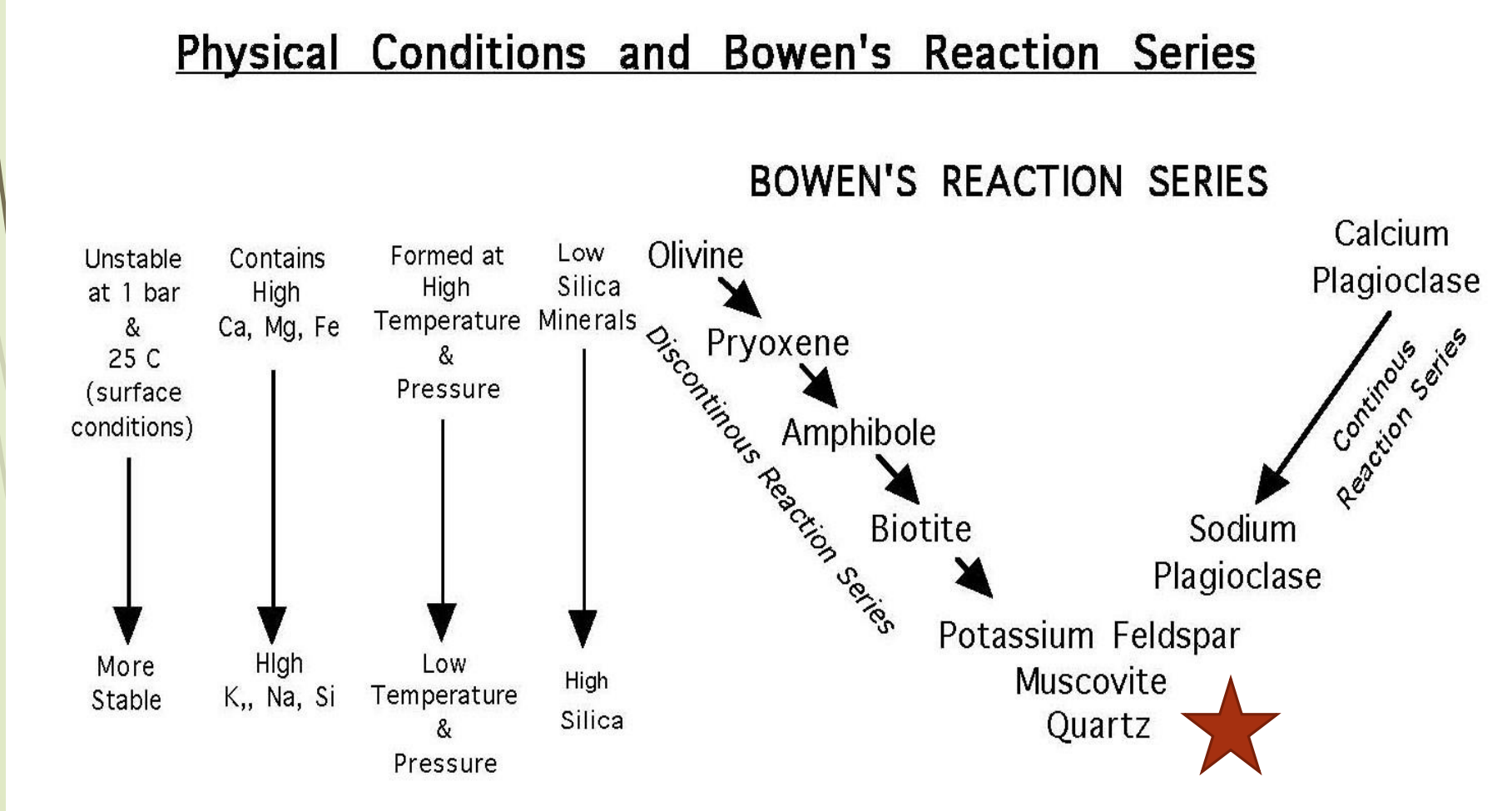
Hoosier Slide circa 1900

Hoosier Slide (now NIPSCO) circa 1920 – Dune Sand Mined for Foundry Sand and Glass through 1960s- Average 97% Quartz



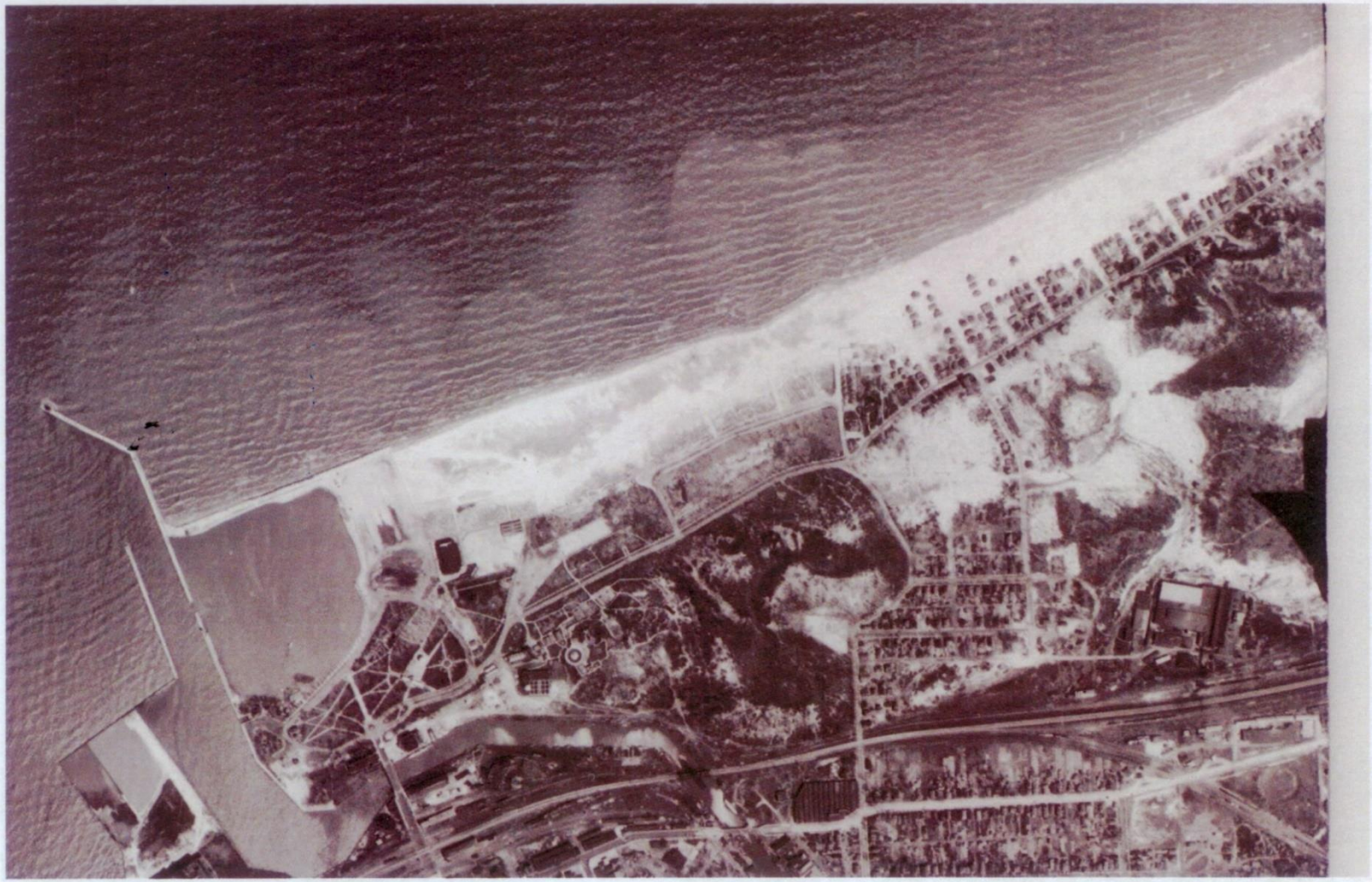
Quartz sand detritus from Pleistocene glacial/ meltwater pulses; clean sand is final result of physical weathering of pre-existing bedrock .

(S.S. Goldich)



1939 Aerial Photo; note houses on beach.

1939 Aerial Photograph ***Michigan City IN***

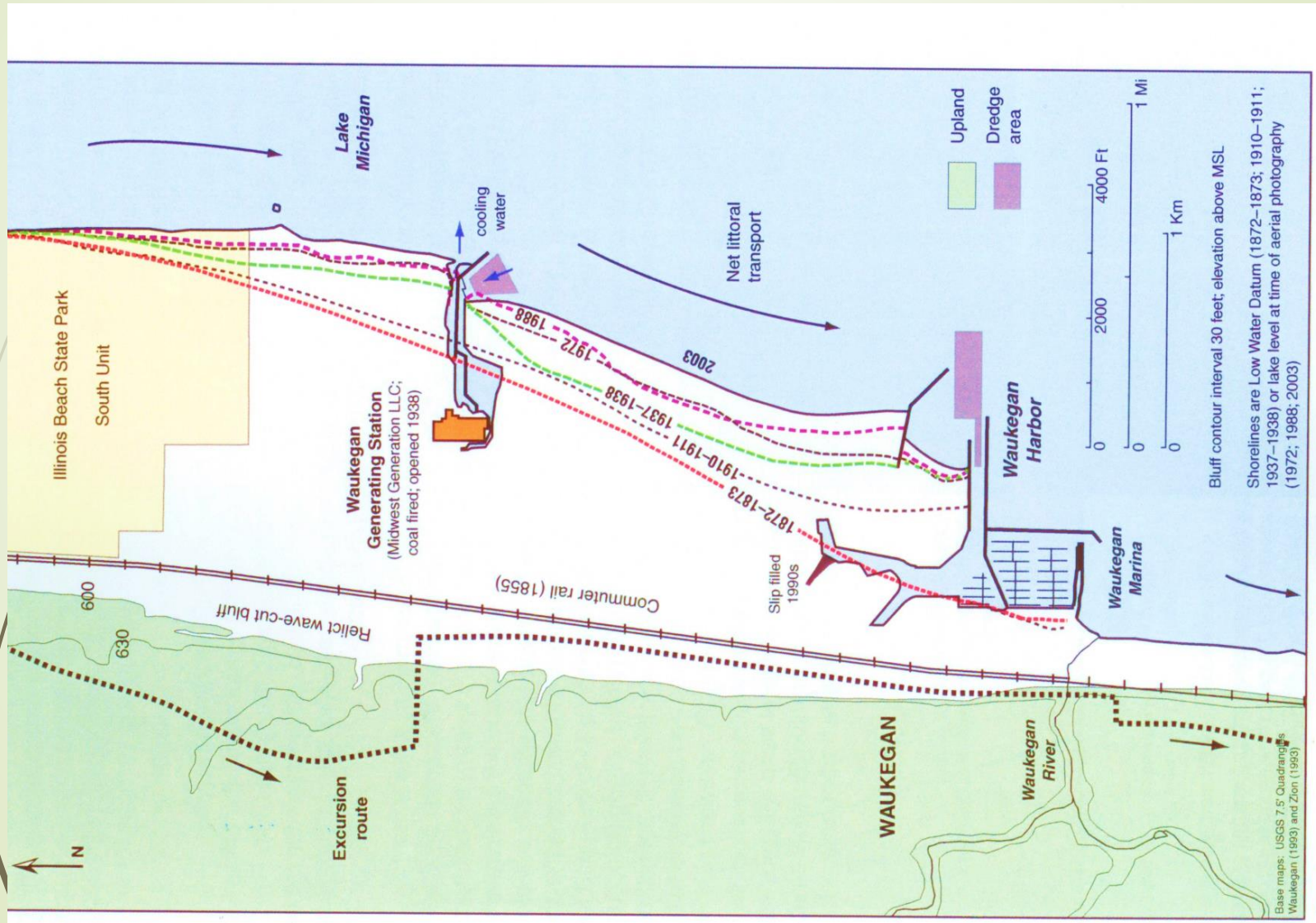


Aerial, lighthouse/harbor on west.

Zoom-in on 1939 Aerial Photograph, arrow position is opposite Shawmut Avenue

Beach Depositional Process

(Waukegan Harbor Example) Sand stays in suspension in moving water until it encounters an obstruction (pier, jetty, etc.). This causes beaches to form adjacent and upstream to these obstructions



Beach accretion since 1872 updrift of Waukegan Harbor has formed approximately 420 acres of coastal land (after Chrzastowski and Trask 1995).

1962 USGS Topograpic Map

2014 LIDAR image; showing influence of pier on longshore current.

Light detection and ranging (LiDAR) data were acquired from the U.S. Army Corps of Engineers through an agreement with the National Park Service. LIDAR is the newest methodology to map surface structures, enabling us to see through blocking veneer, such as tree canopy and shallow water. Note the obvious effect of the breakwater on the offshore sand deposition.

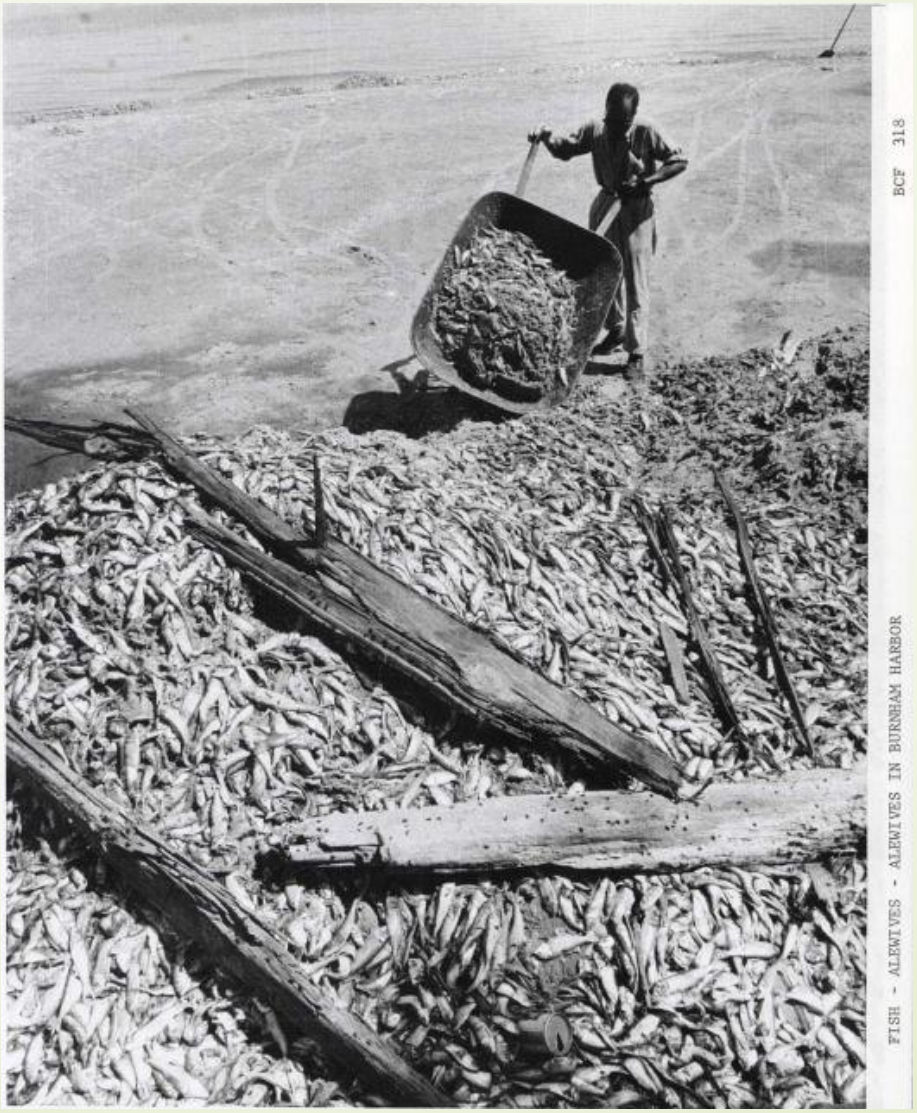
Facing East, offshore from Billy's Beach (Drone Footage, 2020); most land north of Lakeshore Drive created as a result of pier construction.

Beach Grass Introduction

- *Ammophila arenaria* is a species of grass known by the common name of European beach grass, imported into the U.S. in the 19th century.
- We believe this grass was introduced into the Michigan City biota circa 1940.
- Stabilization of the dunes by this grass contributed to berm dune retention and eventual creation of undeveloped parkland.
- Beware of Phragmites Australis, the latest invasive species introduced circa 1910 (Common Reed).

Beachfront Phragmites Australis- North Chicago

1967-- 5 Billion Alewives Die; Beach Eco-System Impact/ Coho Salmon Introduced

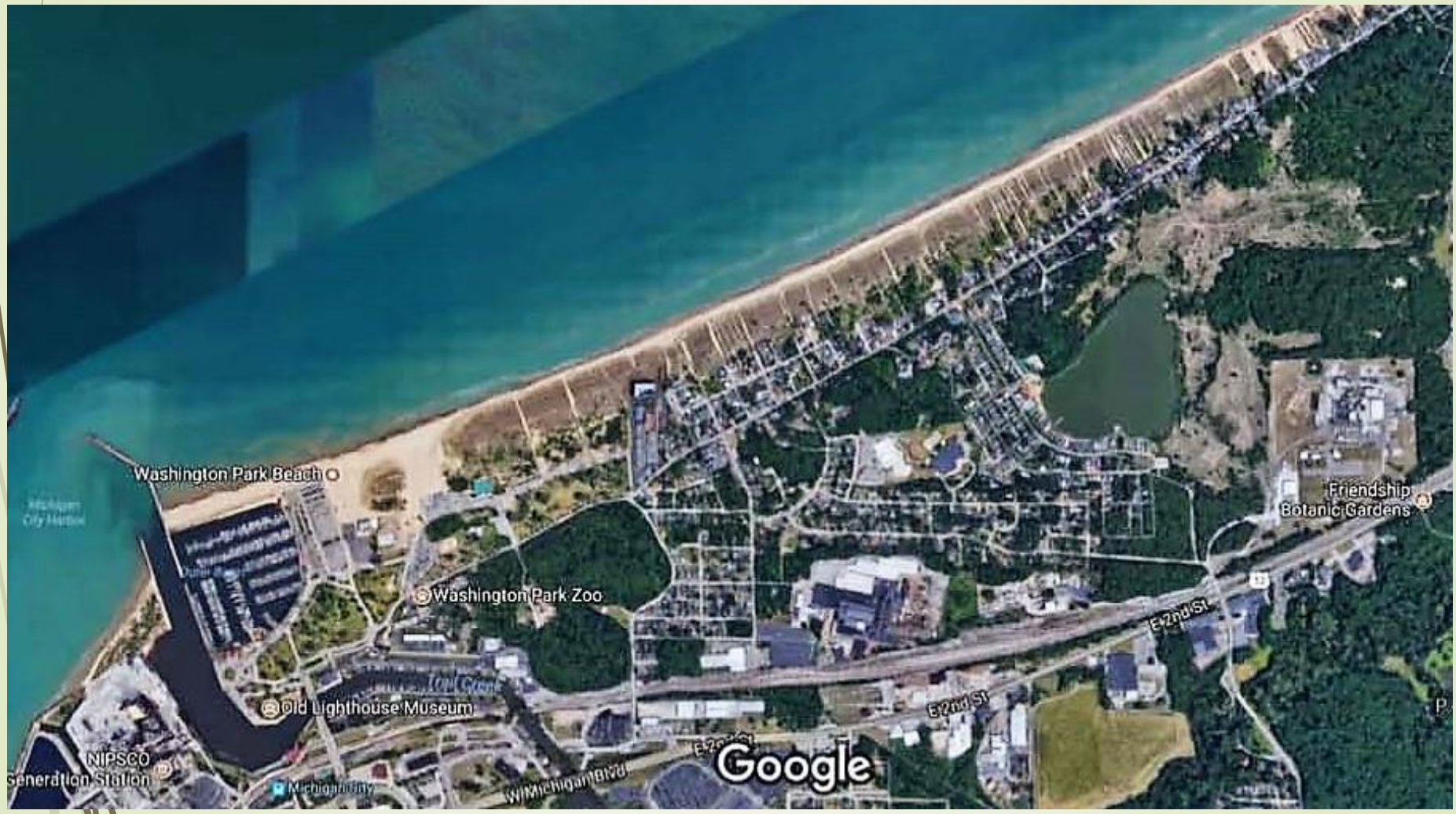


Sheridan Beach-2016; Facing East from Stop 5 towards Beachwalk. In 1992, this boardwalk was constructed on the beach.

Sheridan Beach- January 2020; Facing northeast from Stop 7. What low lake levels give, high lake levels taketh away.

Sheridan Beach-2016

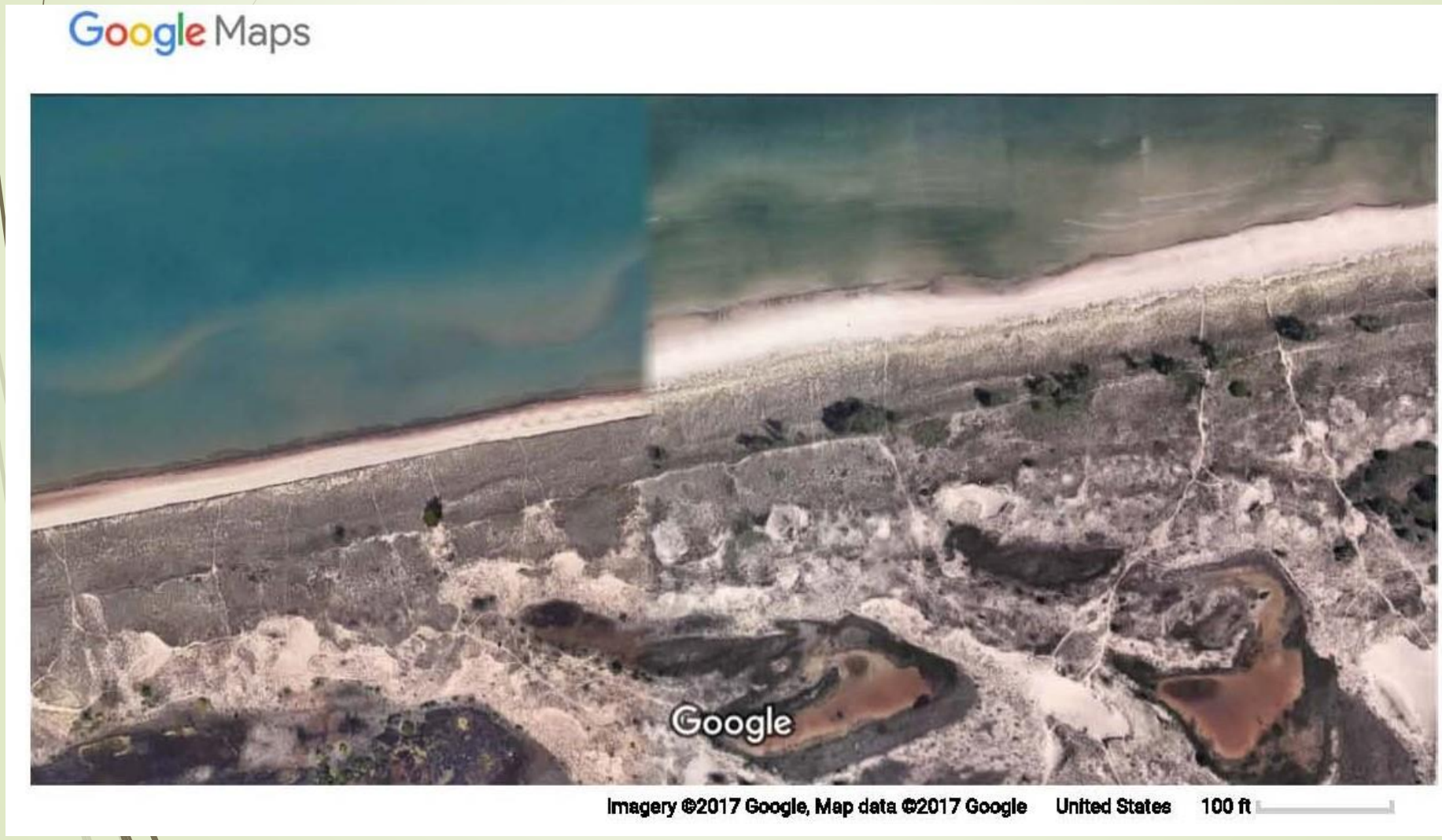
Sheridan Beach-2017, drastic loss of beach when lake level rose.



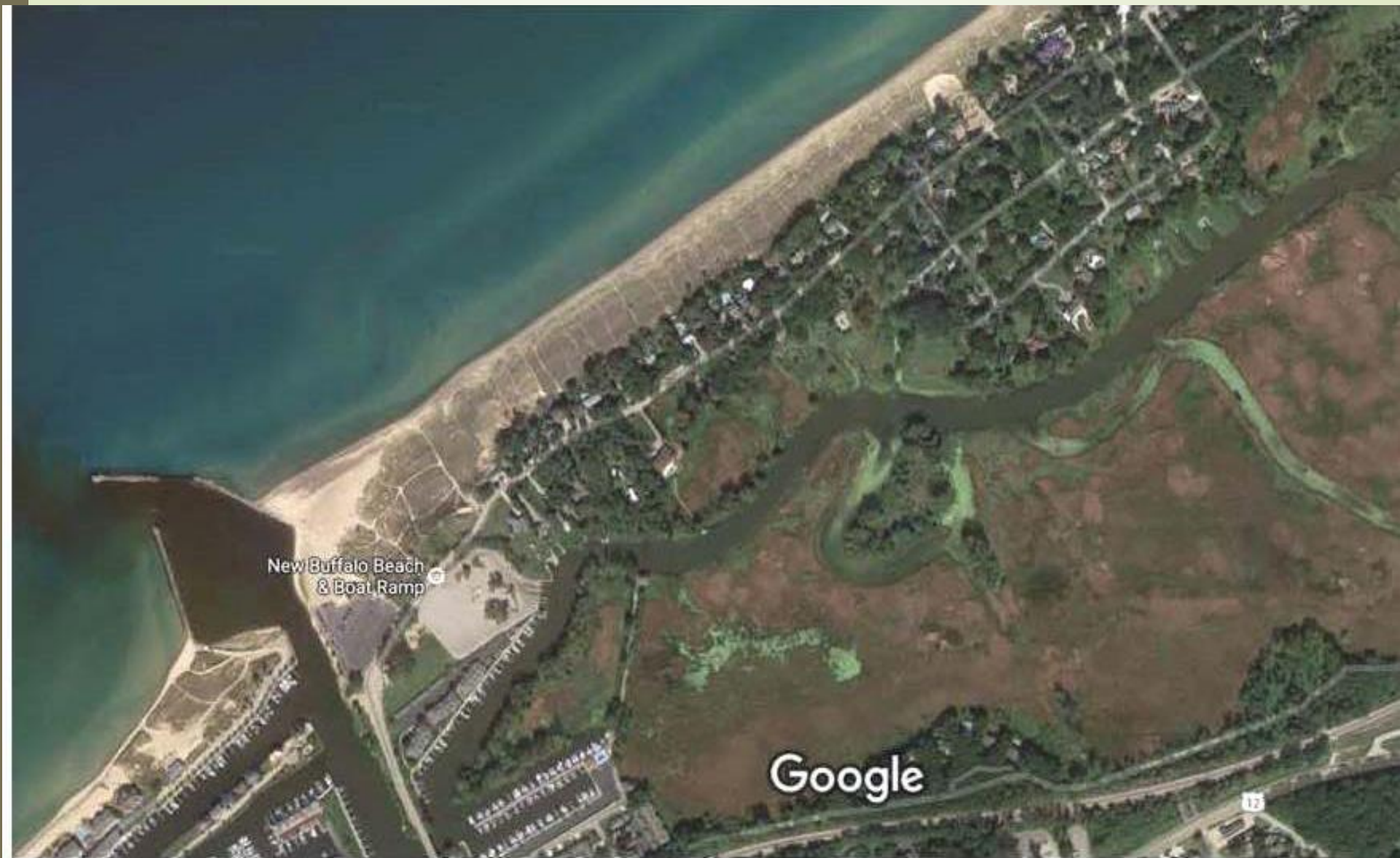
Sheridan Beach-2019

West Beach Time Lapse

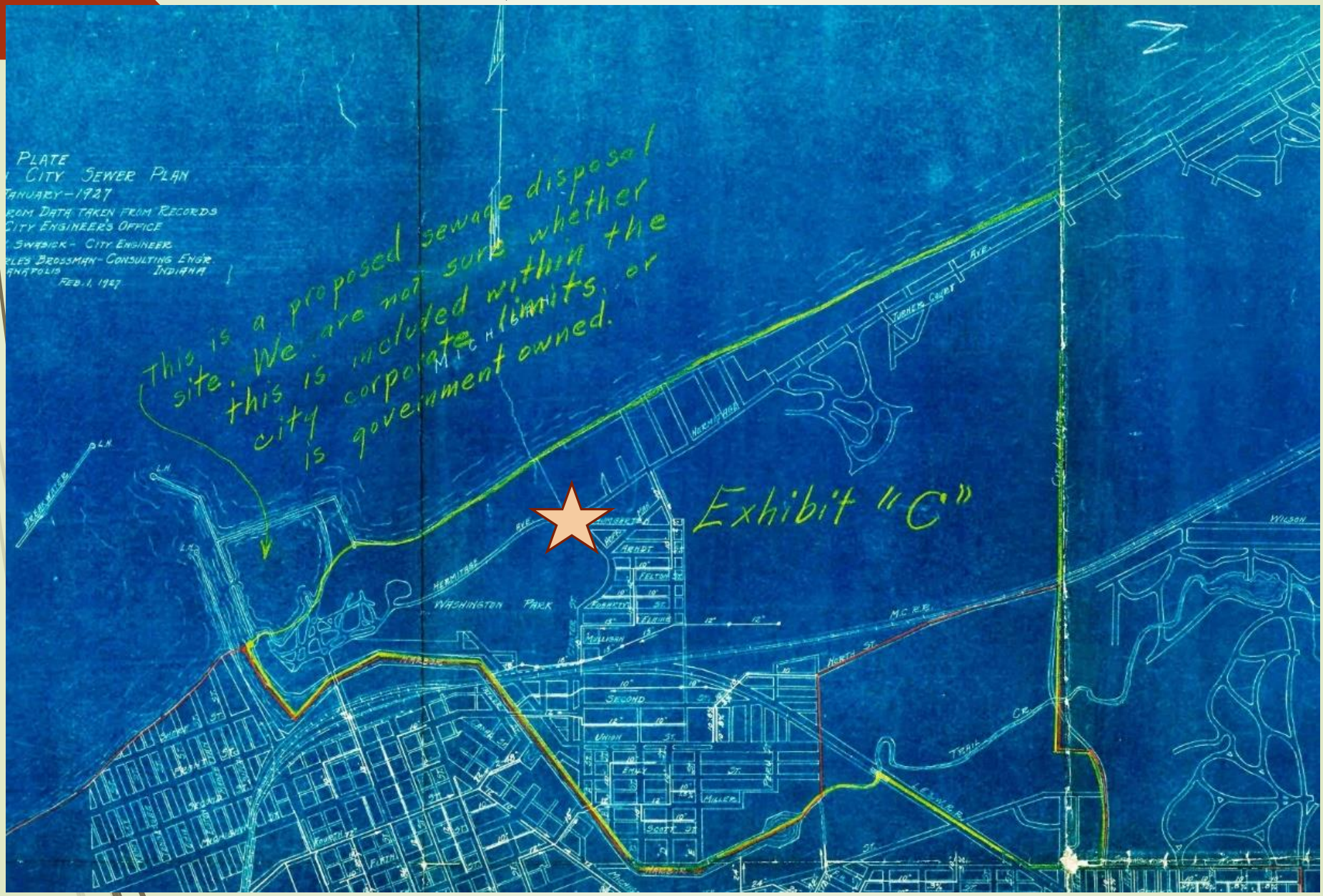
2017 2016



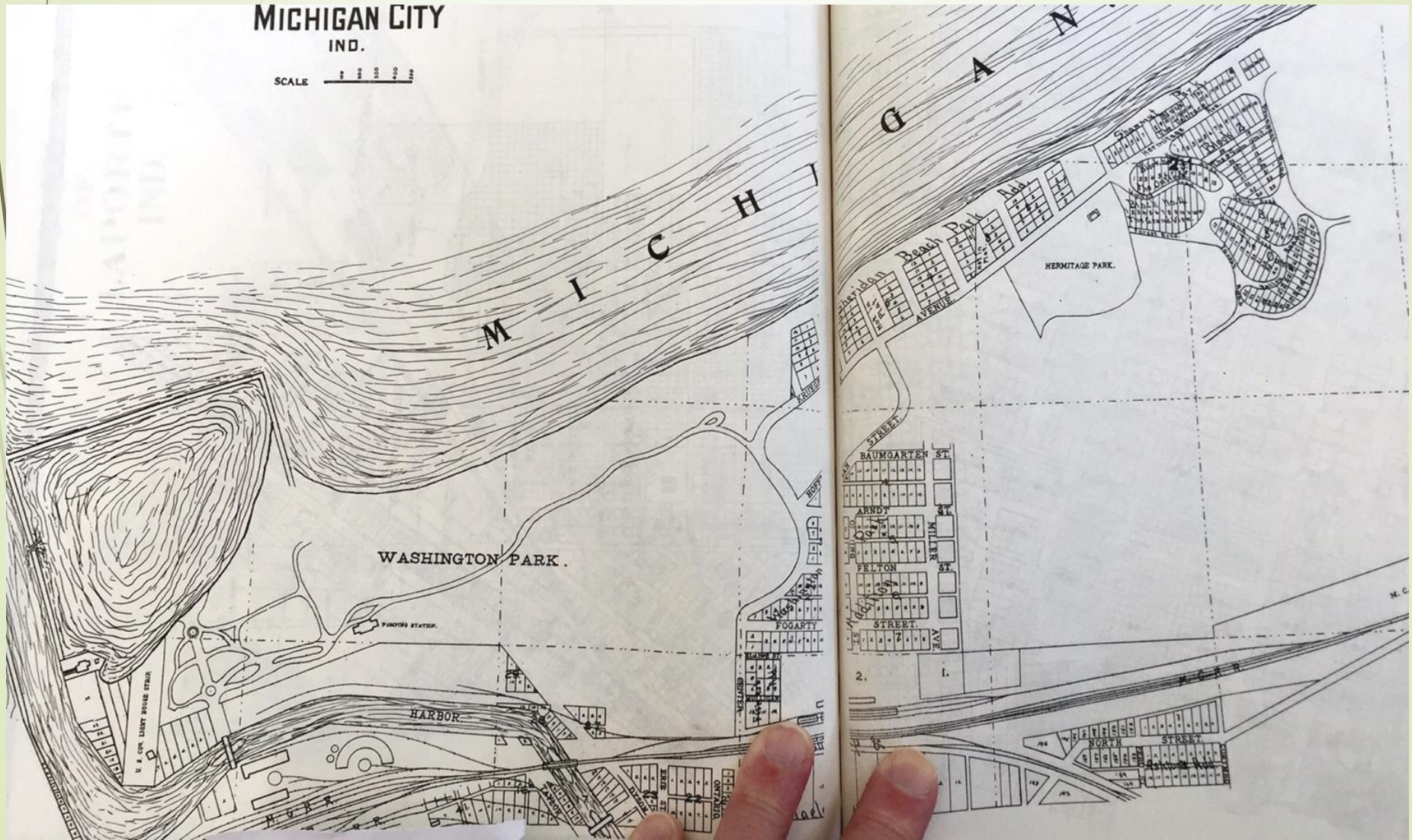
New Buffalo-2016; Sheridan Beach analogue in Michigan



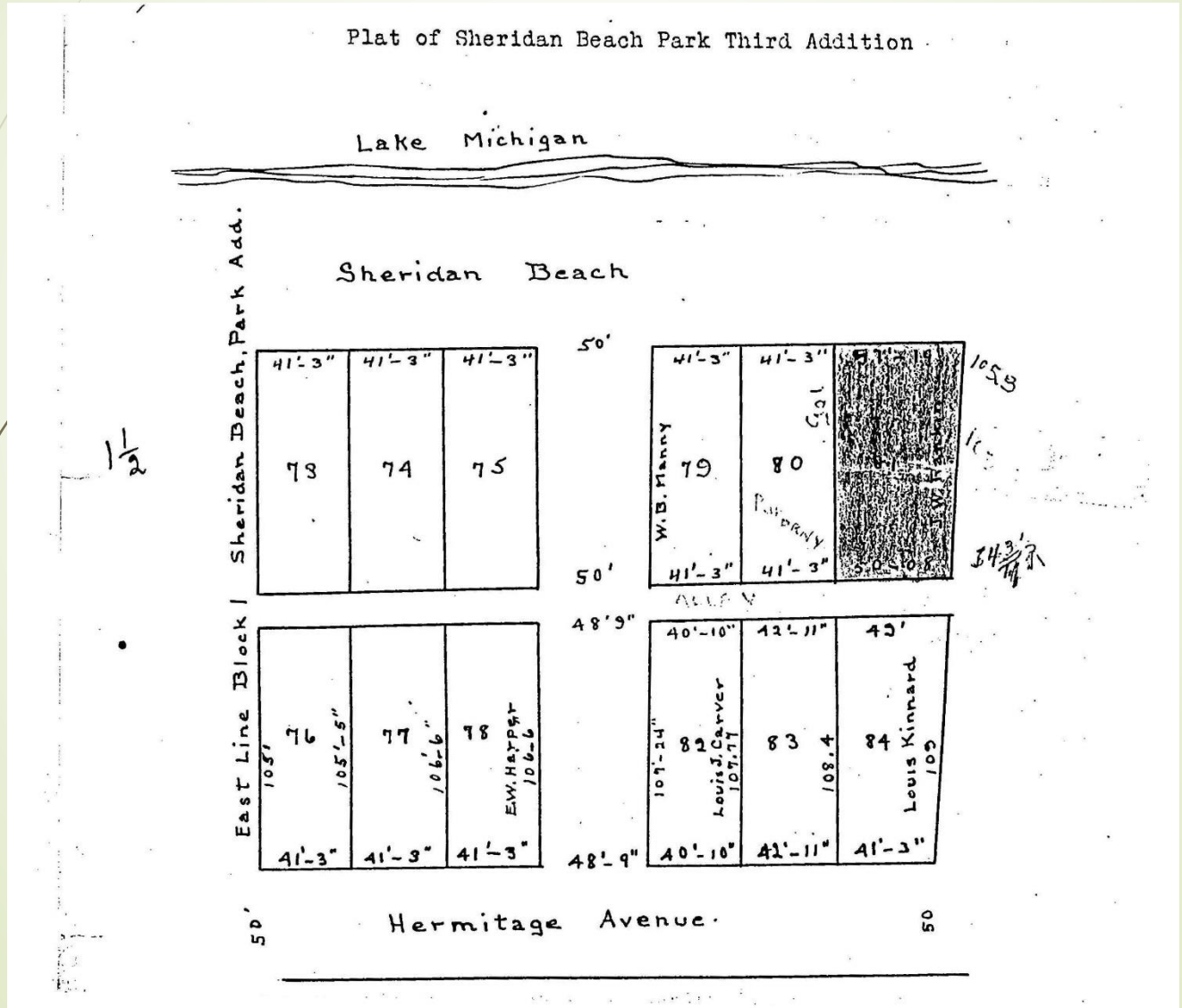
Circa 1905 Plat Map; predates Sheridan Beach, note boat basin still offshore.



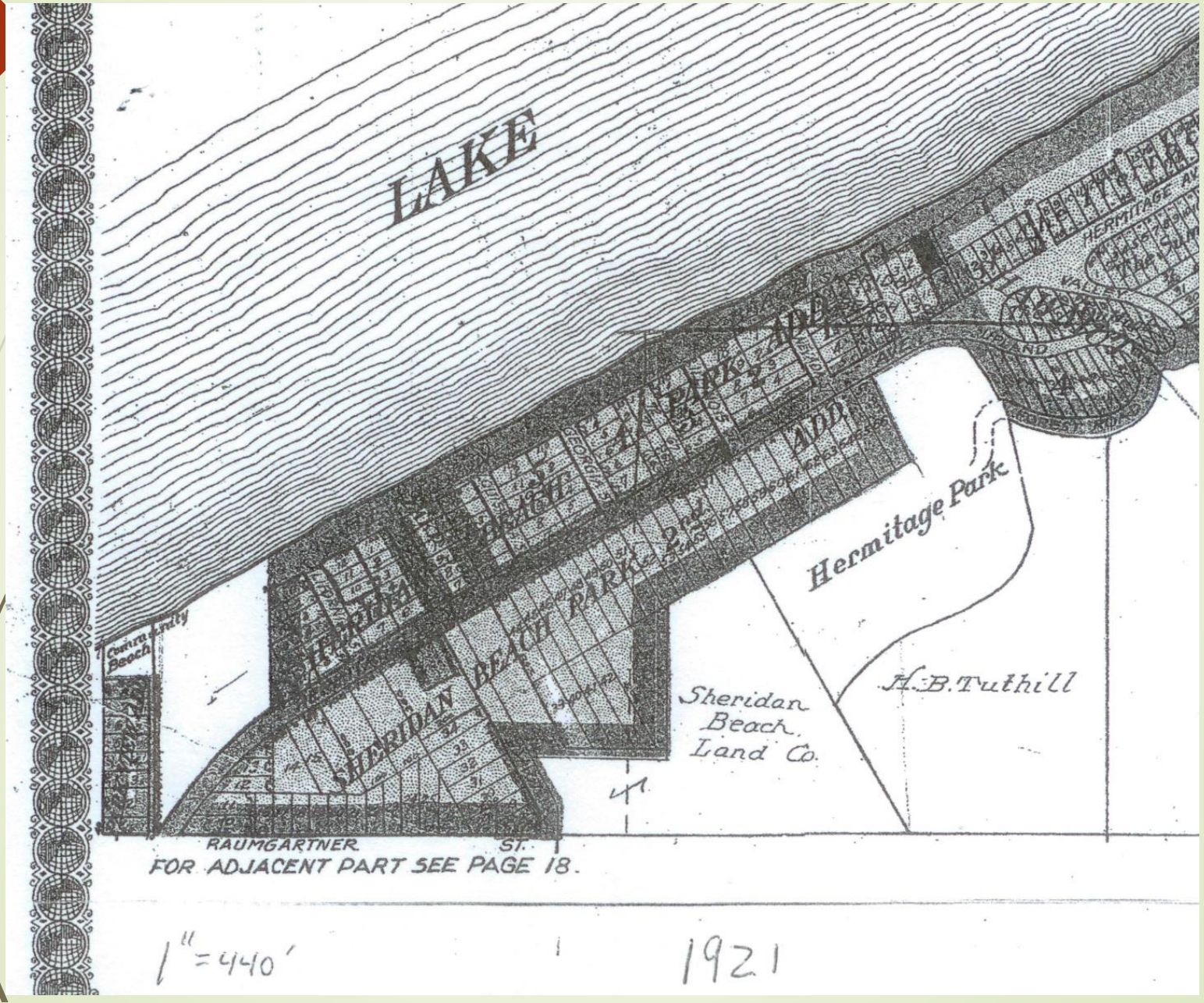
Plat of First Filing Sheridan Beach Park Addition; Circa 1907, new beach creation allows for sale of land by Michigan City.



July 12, 1918 Plat Map-Sheridan Beach Park, 3rd Addition

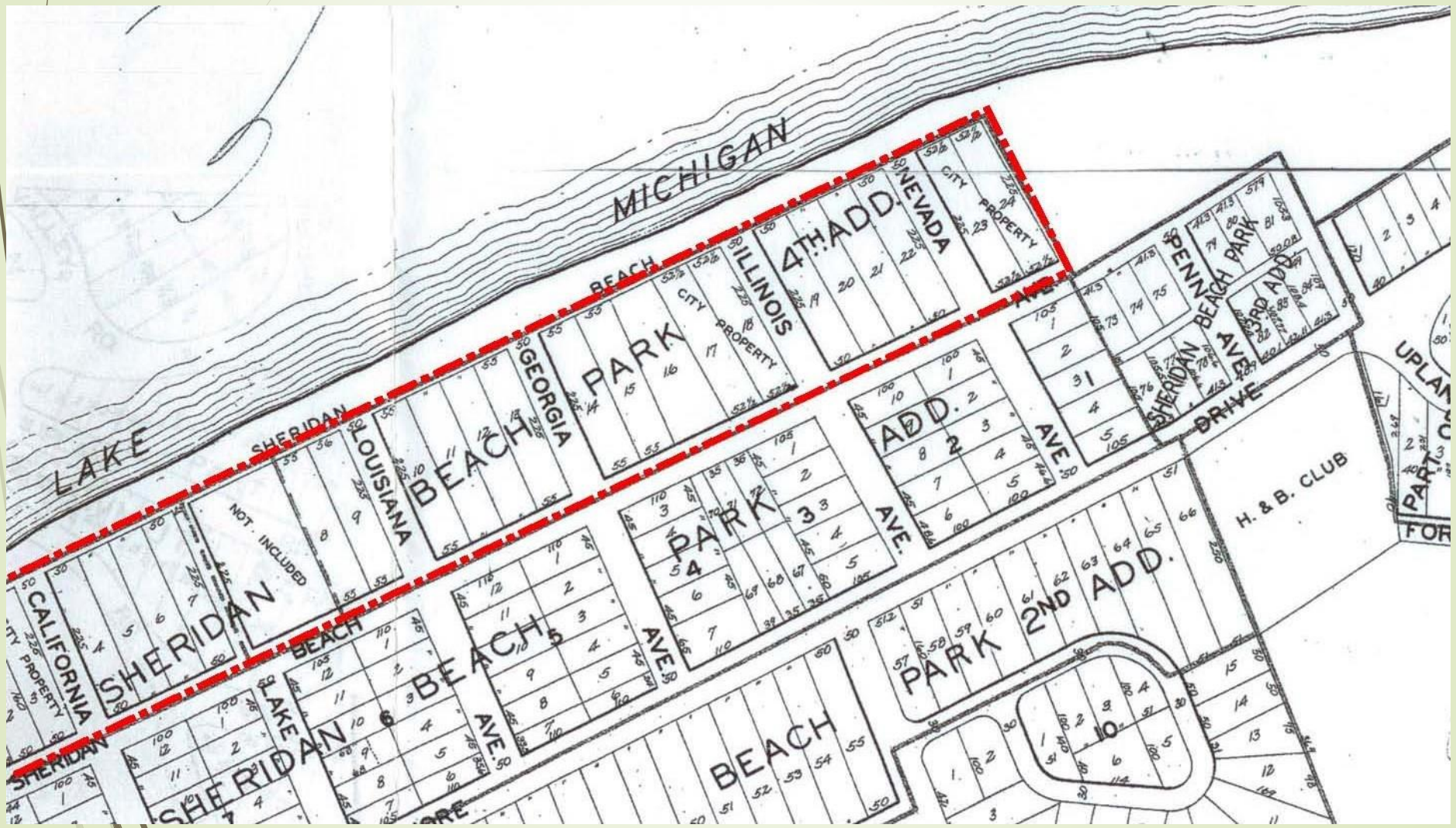


1921 Plat Map



Modern Plat (Circa 1928);

Beach expansion created by the pier resulted in creation of new land and a new subdivision (4th Addition). A rise in lake level soon after coupled with the Great Depression slowed development.



A Note about References

- Copyright Laws have made Recent Changes/ Updates/Revisions In Geologic Nomenclature Much More Unavailable to Independent Research-Pay to Play; Use your public library.
- The Public Domain is rapidly diminishing
- A Big Kudos to State Geological Survey Data

References

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