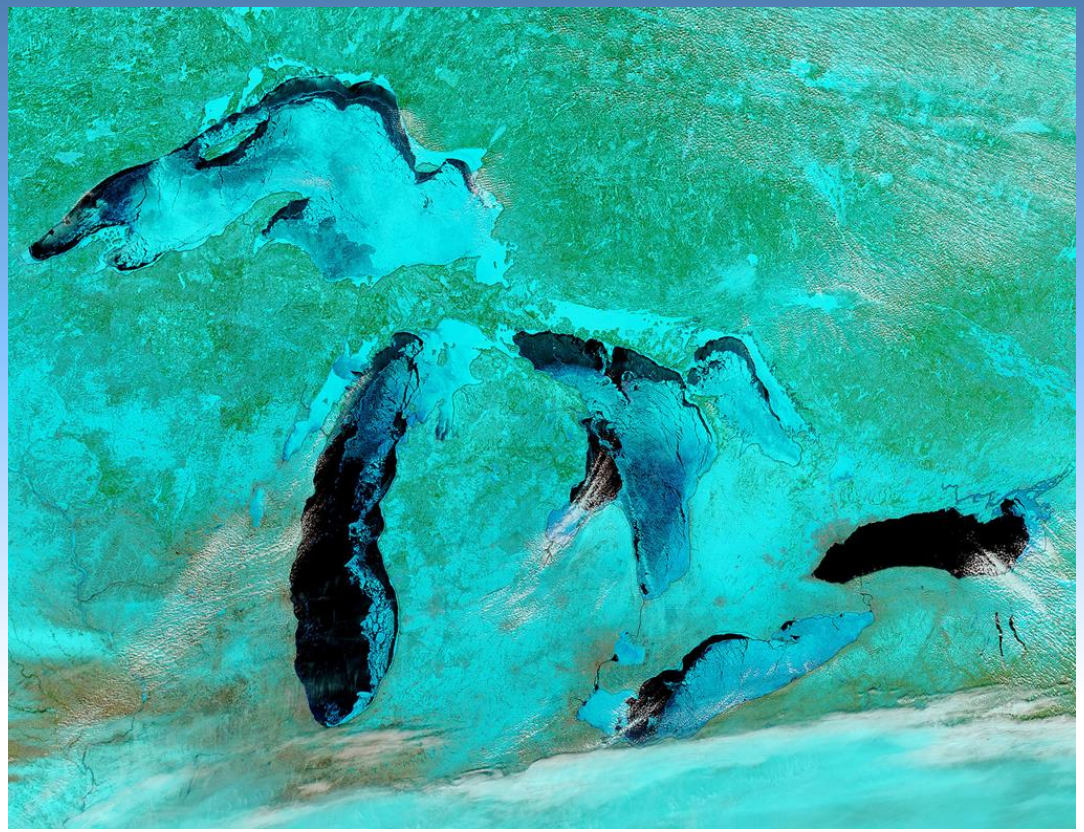
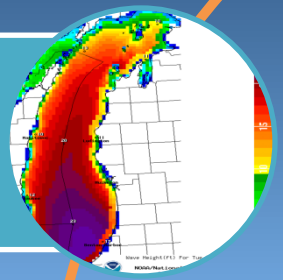
Municipal Adaptation and Resiliency: Cities at the Forefront



Heather Stirratt
Office of Ocean and Coastal Resource Management | Coastal Services Center

Outline

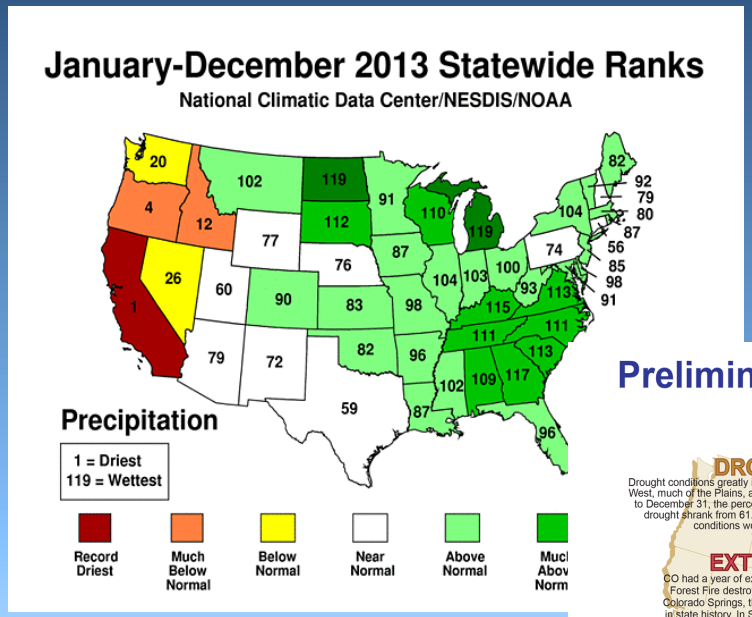
Coastal Preparedness, Response, Recovery, and Resilience

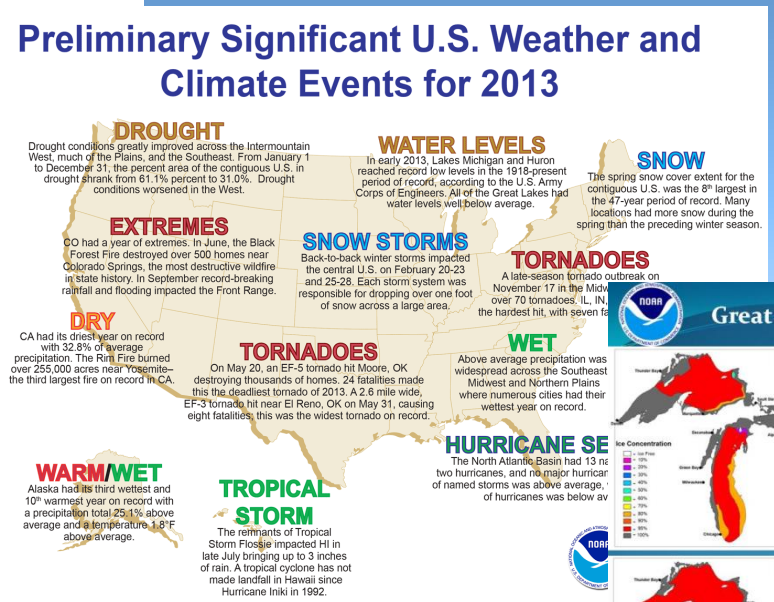


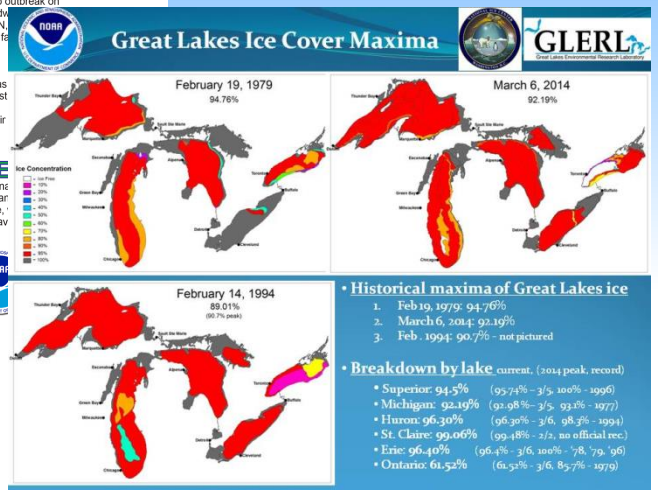
Strategic Partnerships

Opportunities for Collaboration

2013: Year in Review





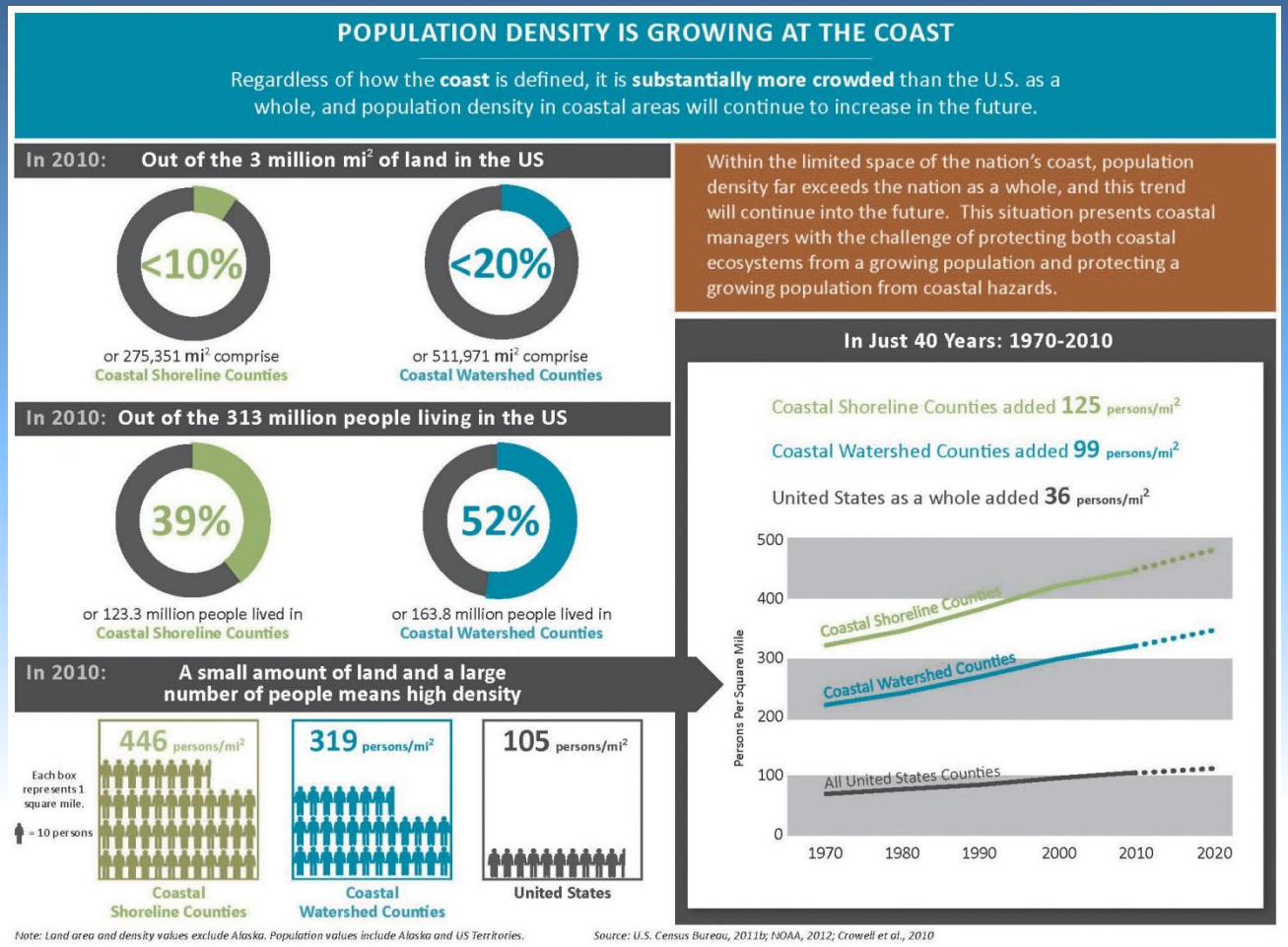


Coastal Communities: Vital to U.S. and International Economies

- $6.6 T – Contribution to GDP from Coastal Counties
- 51 million jobs
- Coastal habitats help reduce impacts of floods, storms, and climate change on coastal communities by absorbing water, wave energy, and other stressors.

Port Clinton, OH

Context Matters



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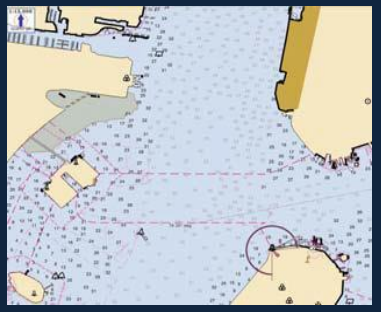
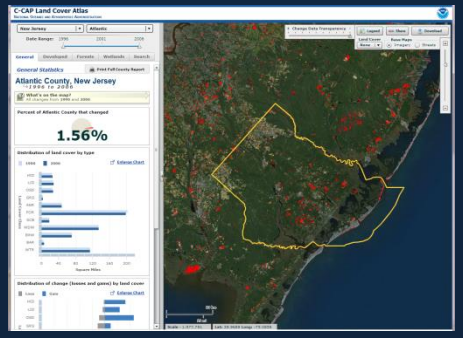
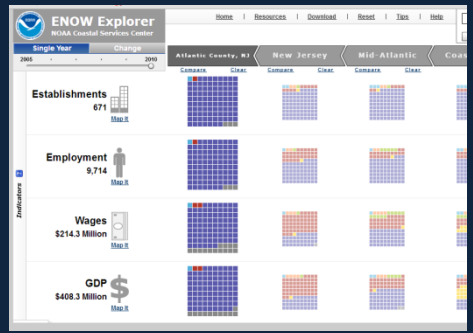
Preparedness, Response, Recovery, and Resiliency

Ensuring Safe, Efficient, and Environmentally Sound Marine Navigation

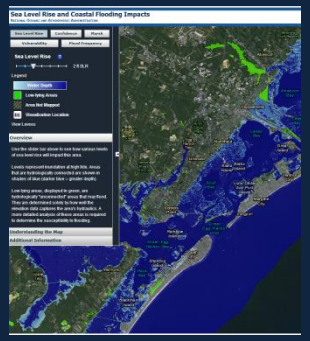


Supporting Community Livability





Promoting Resilience to Coastal Hazards



Needs Assessment

NOAA Technical Memorandum GLERL-153

LAURENTIAN GREAT LAKES BASIN CLIMATE CHANGE ADAPTATION

Dawn Nelson[1], Heather Elmer[2], Rebecca Held[1], Danielle Forsythe[1], and Shauna Casey[1]

in consultation with
Heather Stirratt[3], Dale Bergeron[4], Frank Lichtkoppler[5], Jesse Schomberg[6], and Marvourneen Dolor[7]

[1] University of Michigan School of Natural Resources, Cooperative Institute for Limnology and Ecosystem Research and NOAA, Great Lakes Environmental Research Laboratory
[2] Old Woman Creek Estuarine Research Reserve
[3] NOAA National Ocean Service (Great Lakes Regional Coordinator)
[4] Minnesota Sea Grant
[5] Ohio Sea Grant
[6] Minnesota Sea Grant
[7] St. Lawrence Seaway Development Corporation U.S. Department of Transportation

Edited by Dawn Nelson and Rebecca Held

March 2011

UNITED STATES DEPARTMENT OF COMMERCE
Gary Locke
Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Jane Lubchenco
Under Secretary for Oceans & Atmosphere
NOAA Administrator

Top Ten Needs Identified For the Great Lakes Basin

Note: These ten needs are a general overview ("10,000 foot level") of the approximately 300 needs addressed in the NOAA Technical Memorandum[i]

1. Research and implementation of resilient land use and physical planning/design that incorporates local economic drivers, infrastructure management/monitoring, transportation, and land-sea interactions
2. Management, coordination, and adjustment of maps, models, and collected data to incorporate new information and to allow for regional, as well as downscaled forecasting, analysis, and assessment of climate change related events.[ii]
3. Regional needs coordination and relationship building between / among federal agencies, states, and local governments for the sake of efficient knowledge exchange through improved communication, decreased redundancy, and reduced regulatory/cross-jurisdictional conflicts
4. Increased climate change and NOAA literacy through "actionable science[iii][iv]" from federal agencies, education efforts, community outreach, tribal engagement, increased communication with stakeholders, and end-user / public participation
5. Biological/ecological research, assessment, and monitoring, as well as prioritization of ecosystem restoration, in order to mitigate environmental stressors and monitor ecosystem health
6. Decision maker trainings revolving around utilizing sector-specific, as well as general tools/strategies to implement clear and flexible ecosystem-based management programs that properly manage/protect resources (e.g. forests, fisheries, beaches, floodplains)
7. States, municipalities, and managers (land use planners, emergency managers, and extension agents) need current, comprehensible, near-term, and regionally relevant climate change data to incorporate into decision making (e.g. drafting ordinances, master plans, and evacuation plans.
8. Financial support, as well as political guidance and resource leverage for local climate adaptation efforts / projects[iv]
9. Engineering, design, and social research as it applies to data collection methods, modeling, forecast uncertainty, extreme event attribution, and community resiliency.[v]
10. Assessing the impacts of climate change on natural resource demands / budgets, and how those impacts will affect different sectors of the economy.[vi]

Coastal Resilience Guidebook (FY11)

Green Infrastructure and Economic Impact Study (FY12)

Lake Superior NERR Sentinel Site (FY13)

Economics of Green Infrastructure

Strategies for Climate Change

- Climate trends show more frequent, intense rain events
- Communities need to help adapting
- Pilot effort to show economic benefit of GI
- Technical support to pilots and methodology to share

FY14 Strategic Partnerships

A team of University of Michigan graduate students needs **your** input!

Who Are We?

We are a team of seven University of Michigan graduate students conducting a Master's Project focusing on climate adaptation with NOAA's Great Lakes Regional Collaboration Team, in partnership with the Great Lakes and St. Lawrence Cities Initiative (GLSLCI).

What Are Our Objectives?

1) Develop an online toolbox of municipal climate adaptation planning materials. The toolbox will include training modules, climate readiness self-assessment checklists, GIS maps and community-informed infographics.

2) Conduct case studies of Great Lakes municipalities to identify best practices for city and community engagement in climate change and disaster preparedness, as well as barriers to adaptation planning.

M SNRE UNIVERSITY OF MICHIGAN SCHOOL OF NATURAL RESOURCES AND ENVIRONMENT

How Can You Help?

Are you a municipal official in the Great Lakes region who would be willing to share with our Team the climate adaptation efforts of your community? Would you like to evaluate our toolkit materials?

Your time and assistance can contribute to the success of this project.

How Much Time Will it Take?

We estimate the total time commitment not to exceed ten hours over a four week period. Interviewees will also have the option to be featured on our project blog!

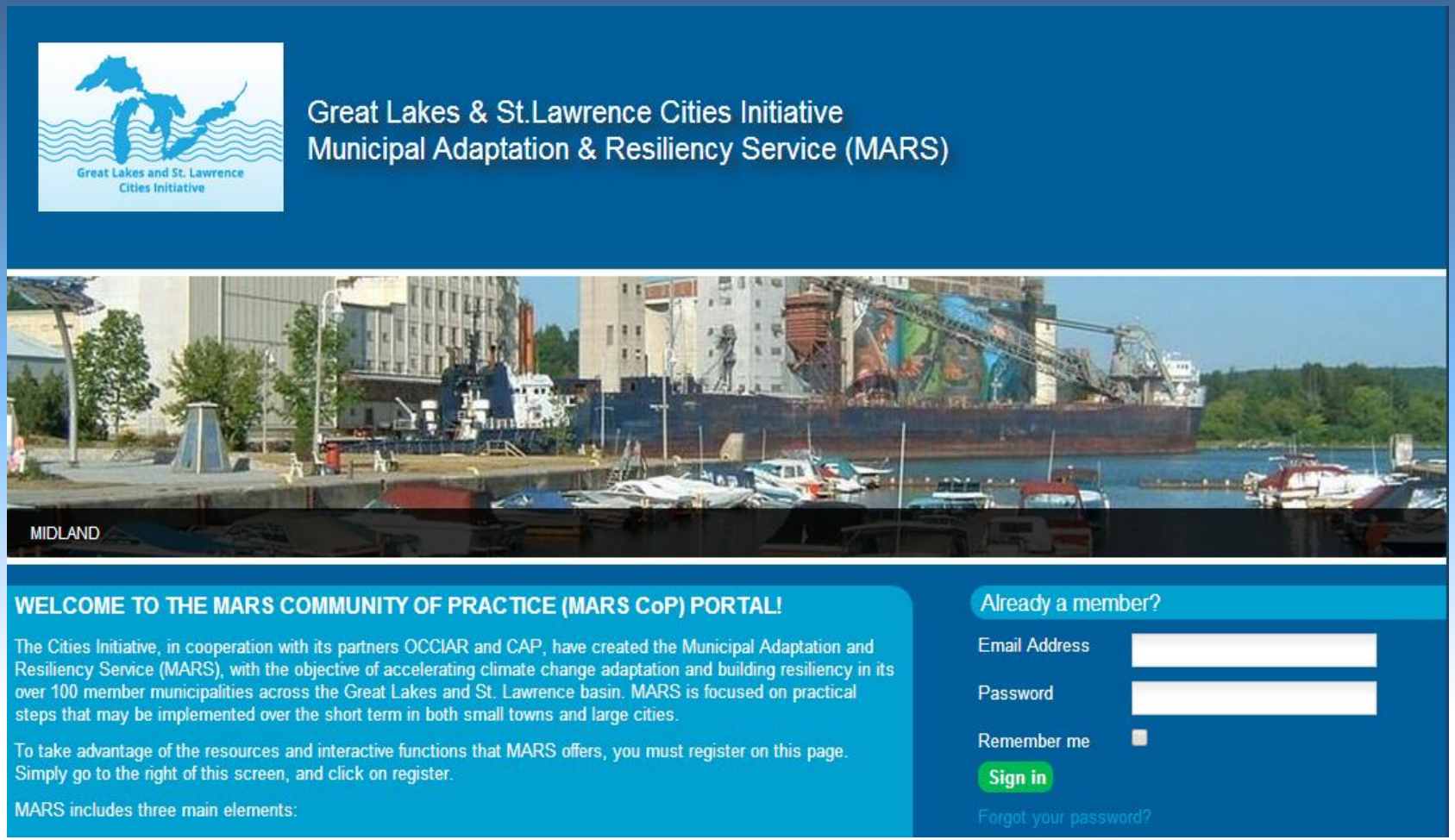
Participation in Our Project May Involve:

- ❑ Correspondence with us via email or telephone to schedule a meeting;
- ❑ An interview with our Team (questions will be sent in advance for your review);
- ❑ Providing feedback on training modules, infographics and other adaptation planning resources we develop;
- ❑ Assistance identifying participants for a focus group of local stakeholders.

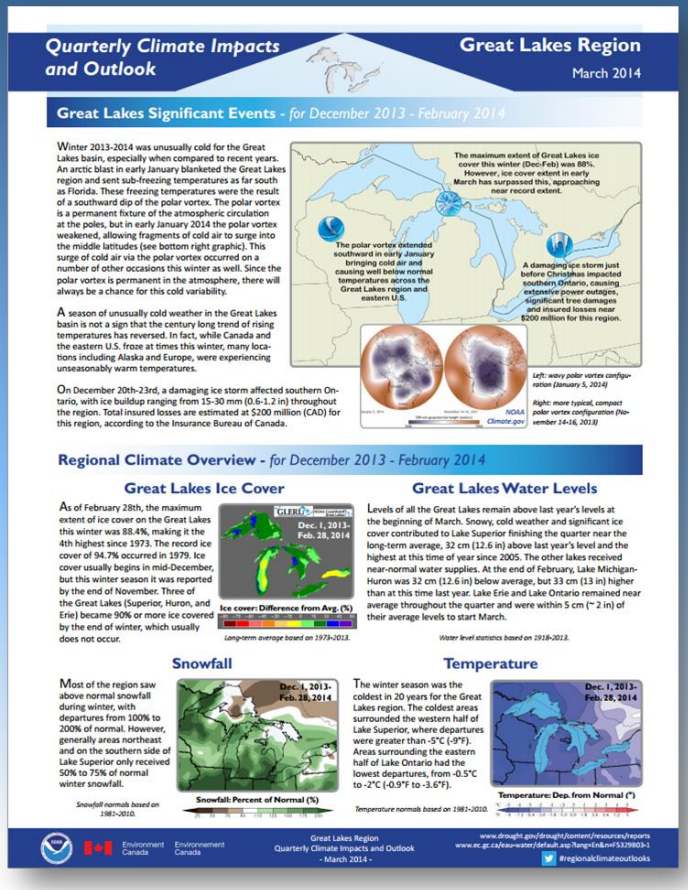
Interested? Please contact ClimateReadyGLCities@umich.edu for more information

http://climatevictors.blogspot.com/

MARS Portal


Great Lakes and St. Lawrence Cities Initiative
Great Lakes & St.Lawrence Cities Initiative
Municipal Adaptation & Resiliency Service (MARS)
MIDLAND
WELCOME TO THE MARS COMMUNITY OF PRACTICE (MARS CoP) PORTAL!
The Cities Initiative, in cooperation with its partners OCCIAR and CAP, have created the Municipal Adaptation and Resiliency Service (MARS), with the objective of accelerating climate change adaptation and building resiliency in its over 100 member municipalities across the Great Lakes and St. Lawrence basin. MARS is focused on practical steps that may be implemented over the short term in both small towns and large cities.
To take advantage of the resources and interactive functions that MARS offers, you must register on this page. Simply go to the right of this screen, and click on register.
MARS includes three main elements:
Already a member?
Email Address
Password
Remember me
Sign in
Forgot your password?

Tools, Products, Services…OH MY!



Quarterly Climate Impacts and Outlook

Great Lakes Region

March 2014

Great Lakes Significant Events - *for December 2013 - February 2014*

Winter 2013-2014 was unusually cold for the Great Lakes basin, especially when compared to recent years. An arctic blast in early January blanketed the Great Lakes region and sent sub-freezing temperatures as far south as Florida. These freezing temperatures were the result of a southward dip of the polar vortex. The polar vortex is a permanent fixture of the atmospheric circulation at the poles, but in early January 2014 the polar vortex weakened, allowing fragments of cold air to surge into the middle latitudes (see bottom right graphic). This surge of cold air via the polar vortex occurred on a number of other occasions this winter as well. Since the polar vortex is permanent in the atmosphere, there will always be a chance for this cold variability.

A season of unusually cold weather in the Great Lakes basin is not a sign that the century long trend of rising temperatures has reversed. In fact, while Canada and the eastern U.S. froze at times this winter, many locations including Alaska and Europe, were experiencing unseasonably warm temperatures.

On December 20th-23rd, a damaging ice storm affected southern Ontario, with ice buildup ranging from 15-30 mm (0.6-1.2 in) throughout the region. Total insured losses are estimated at $200 million (CAD) for this region, according to the Insurance Bureau of Canada.

The maximum extent of Great Lakes ice cover this winter (Dec-Feb) was 88%. However, ice cover extent in early March has surpassed this, approaching near record extent.

The polar vortex extended southward in early January bringing cold air and causing well below normal temperatures across the Great Lakes region and eastern U.S.

A damaging ice storm just before Christmas impacted southern Ontario, causing extensive power outages, significant tree damages and insured losses near $200 million for this region.

Left: wavy polar vortex configuration (January 5, 2014)

Right: more typical, compact polar vortex configuration (November 14-16, 2013)

NOAA Climate.gov

Regional Climate Overview - *for December 2013 - February 2014*

Great Lakes Ice Cover

As of February 28th, the maximum extent of ice cover on the Great Lakes this winter was 88.4%, making it the 4th highest since 1973. The record ice cover of 94.7% occurred in 1979. Ice cover usually begins in mid-December, but this winter season it was reported by the end of November. Three of the Great Lakes (Superior, Huron, and Erie) became 90% or more ice covered by the end of winter, which usually does not occur.

GLERL

Dec. 1, 2013-Feb. 28, 2014

Ice cover: Difference from Avg. (%)

Long-term average based on 1973-2013.

Great Lakes Water Levels

Levels of all the Great Lakes remain above last year's levels at the beginning of March. Snowy, cold weather and significant ice cover contributed to Lake Superior finishing the quarter near the long-term average, 32 cm (12.6 in) above last year's level and the highest at this time of year since 2005. The other lakes received near-normal water supplies. At the end of February, Lake Michigan-Huron was 32 cm (12.6 in) below average, but 33 cm (13 in) higher than at this time last year. Lake Erie and Lake Ontario remained near average throughout the quarter and were within 5 cm (~ 2 in) of their average levels to start March.

Water level statistics based on 1918-2013.

Snowfall

Most of the region saw above normal snowfall during winter, with departures from 100% to 200% of normal. However, generally areas northeast and on the southern side of Lake Superior only received 50% to 75% of normal winter snowfall.

Dec. 1, 2013-Feb. 28, 2014

Snowfall: Percent of Normal (%)

Snowfall normals based on 1981-2010.

Temperature

The winter season was the coldest in 20 years for the Great Lakes region. The coldest areas surrounded the western half of Lake Superior, where departures were greater than -5°C (-9°F). Areas surrounding the eastern half of Lake Ontario had the lowest departures, from -0.5°C to -2°C (-0.9°F to -3.6°F).

Dec. 1, 2013-Feb. 28, 2014

Temperature: Dep. from Normal (°)

Temperature normals based on 1981-2010.

Environment Canada | Environnement Canada

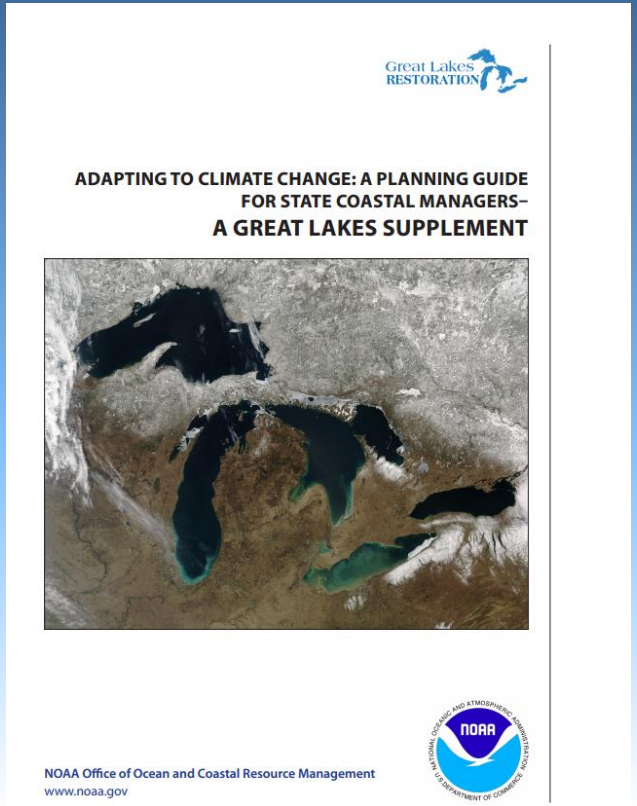
Great Lakes Region Quarterly Climate Impacts and Outlook - March 2014 -

www.drought.gov/drought/content/resources/reports

www.ec.gc.ca/eau-water/default.asp?lang=En&n=5329B03-1

#regionalclimateoutlooks

http://www.drought.gov/drought/content/resources/reports



Great Lakes RESTORATION

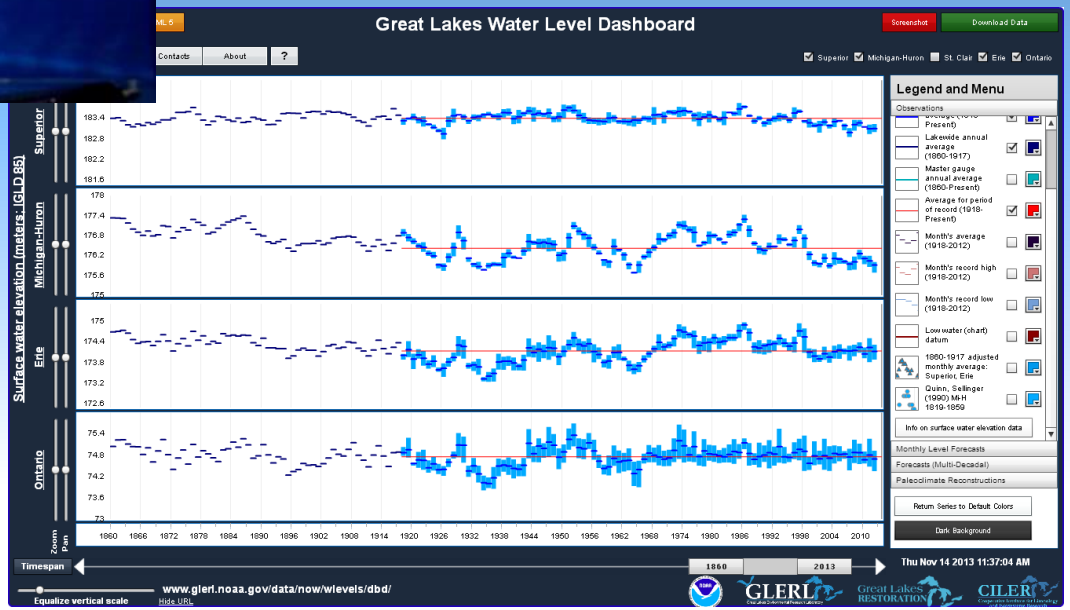
ADAPTING TO CLIMATE CHANGE: A PLANNING GUIDE FOR STATE COASTAL MANAGERS– A GREAT LAKES SUPPLEMENT

NOAA Office of Ocean and Coastal Resource Management

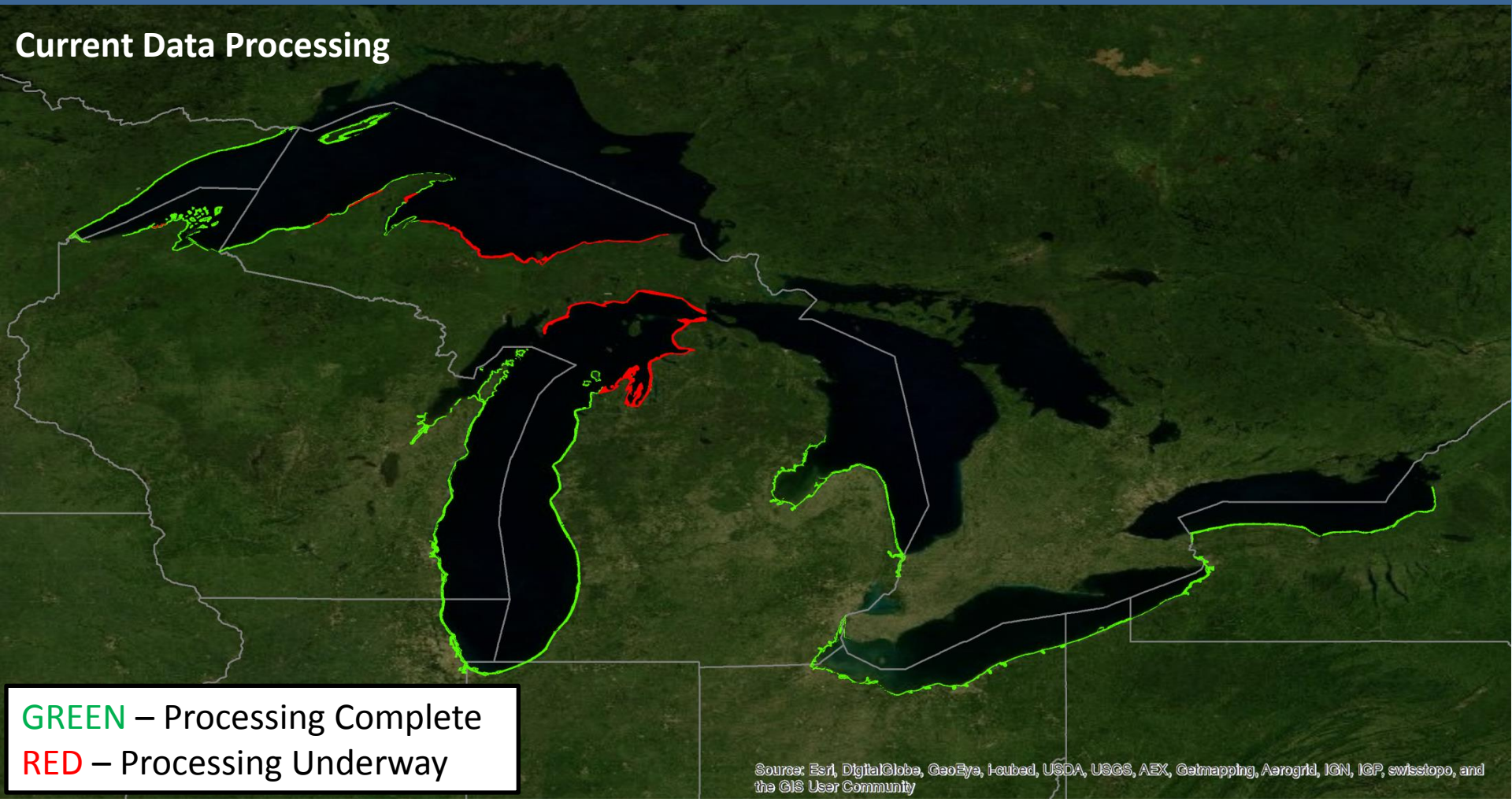
www.noaa.gov

http://coastalmanagement.noaa.gov/climate/docs/adaptationgreatlakes.pdf

Highlight: Lake Levels

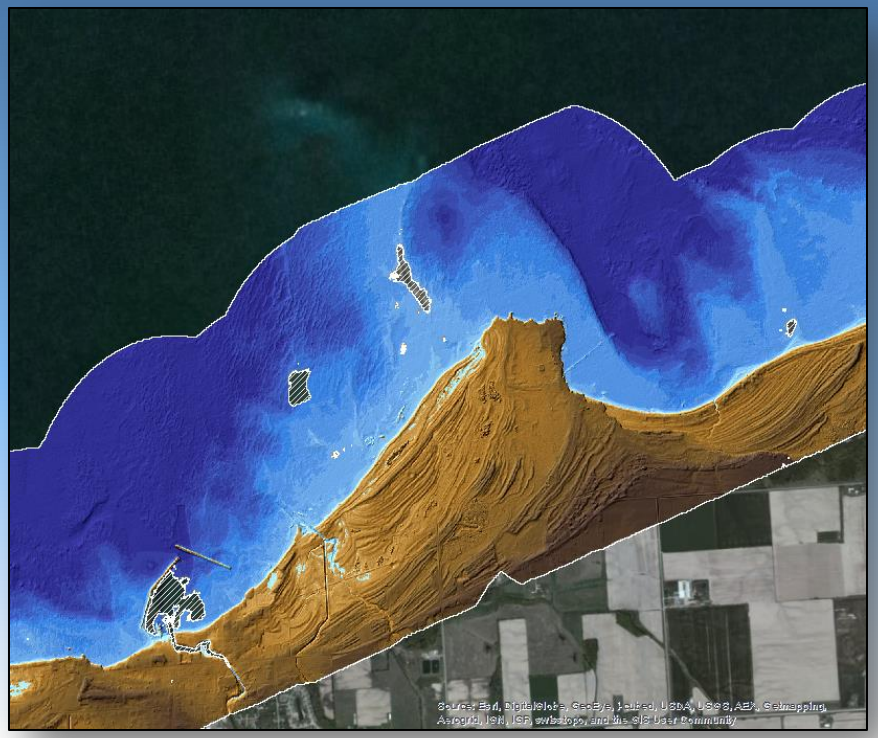


Lake Level Viewer in Development



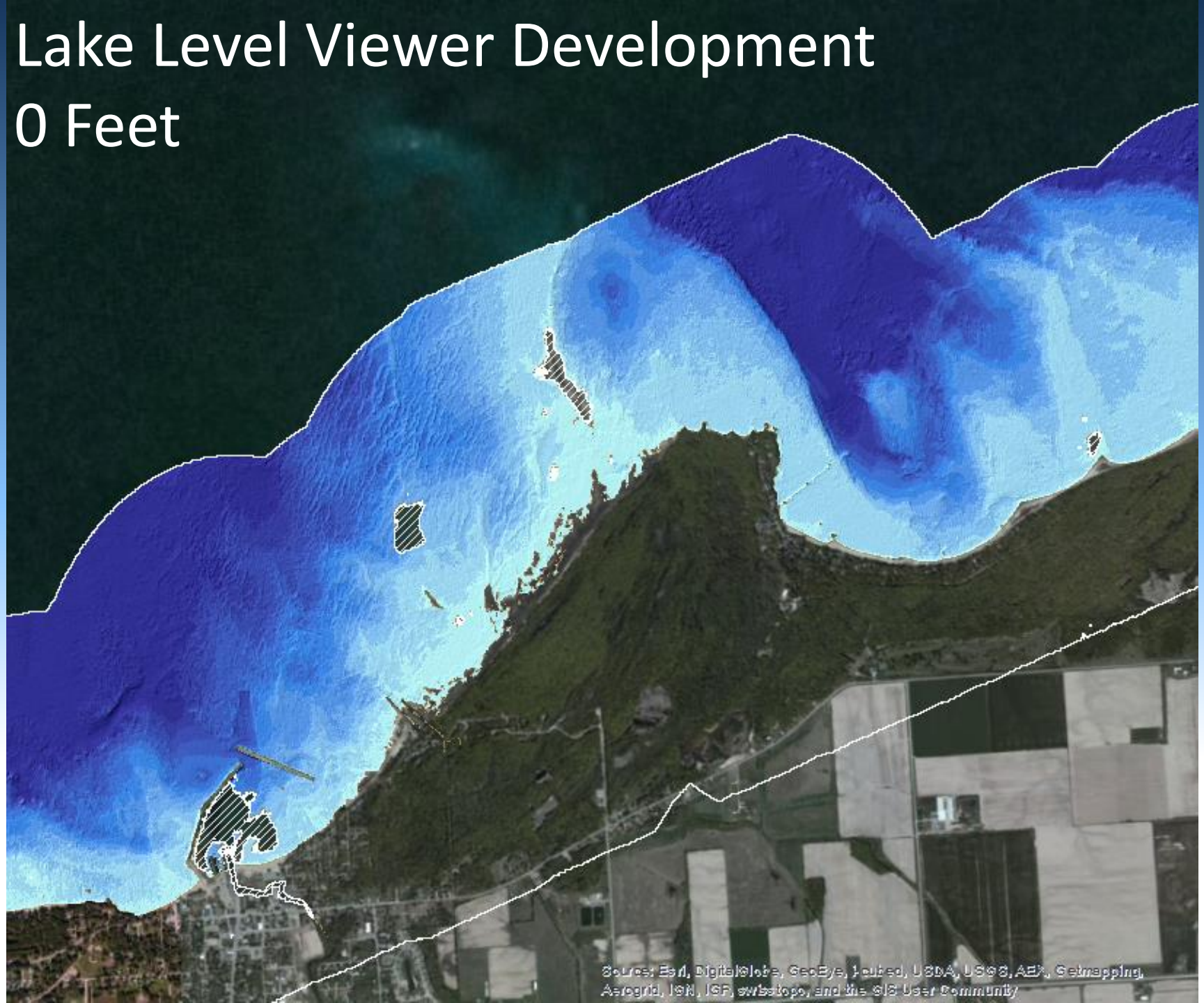
Lake Level Viewer Development

- Beta release is scheduled for late July 2014
- Final release (Version 1) to be delivered late Summer 2014
- Future FY15 GLRI Funds:
  - Navigational Channel Bathymetry data from USACE & NOAA OCS
  - Fill in existing bathymetry gaps

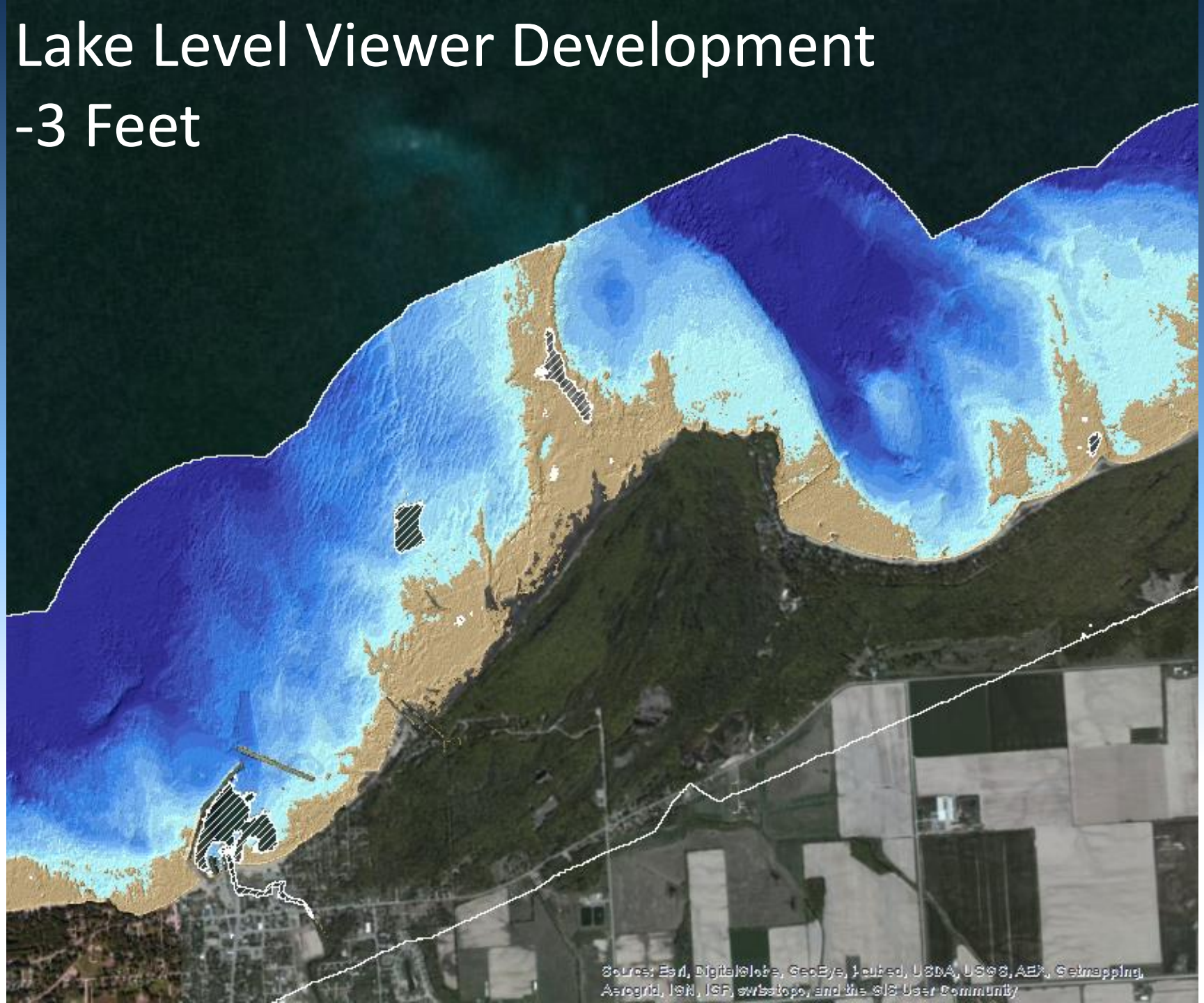


Holland Cover, NY (Lake Ontario)

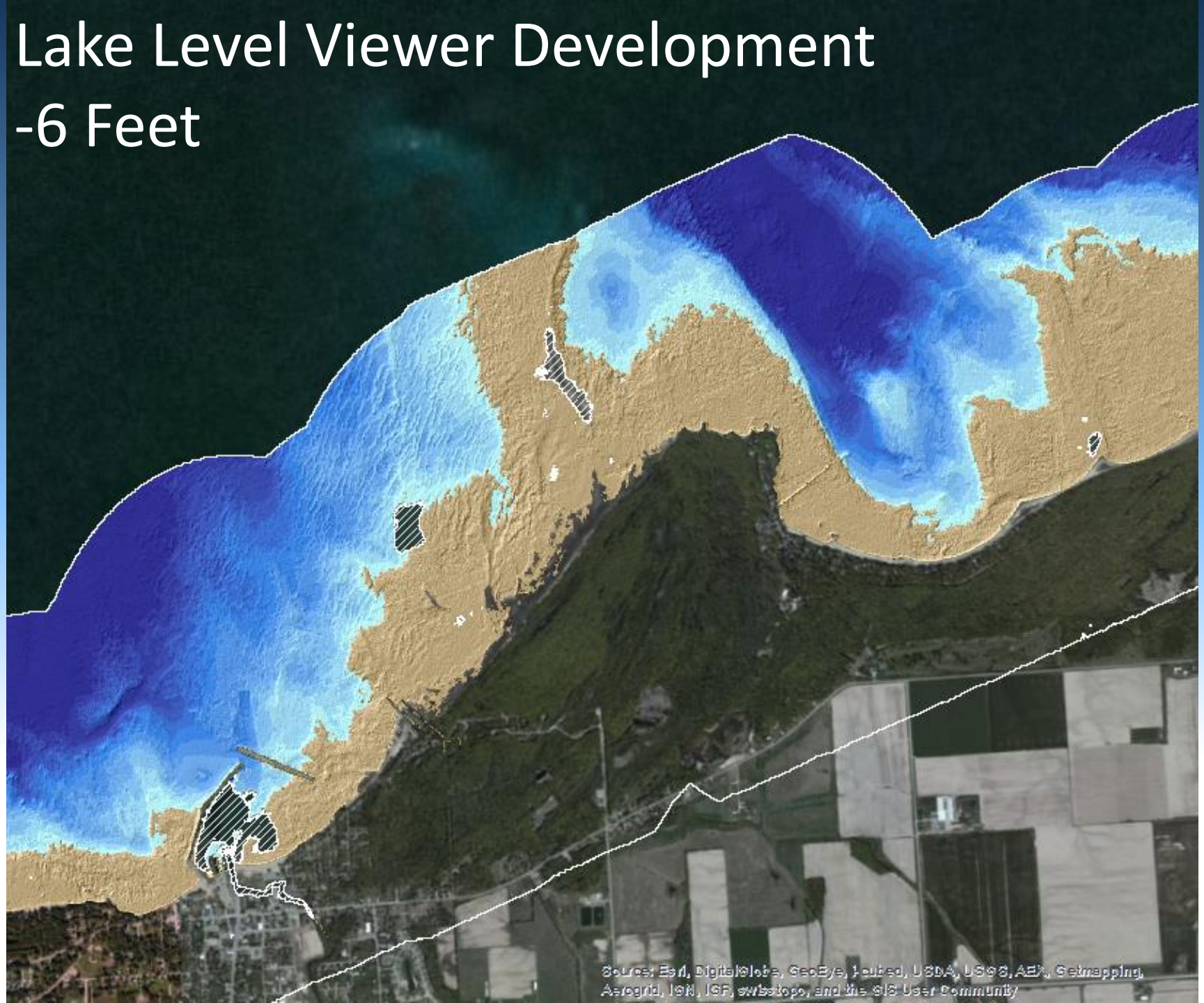
Lake Level Viewer Development
0 Feet



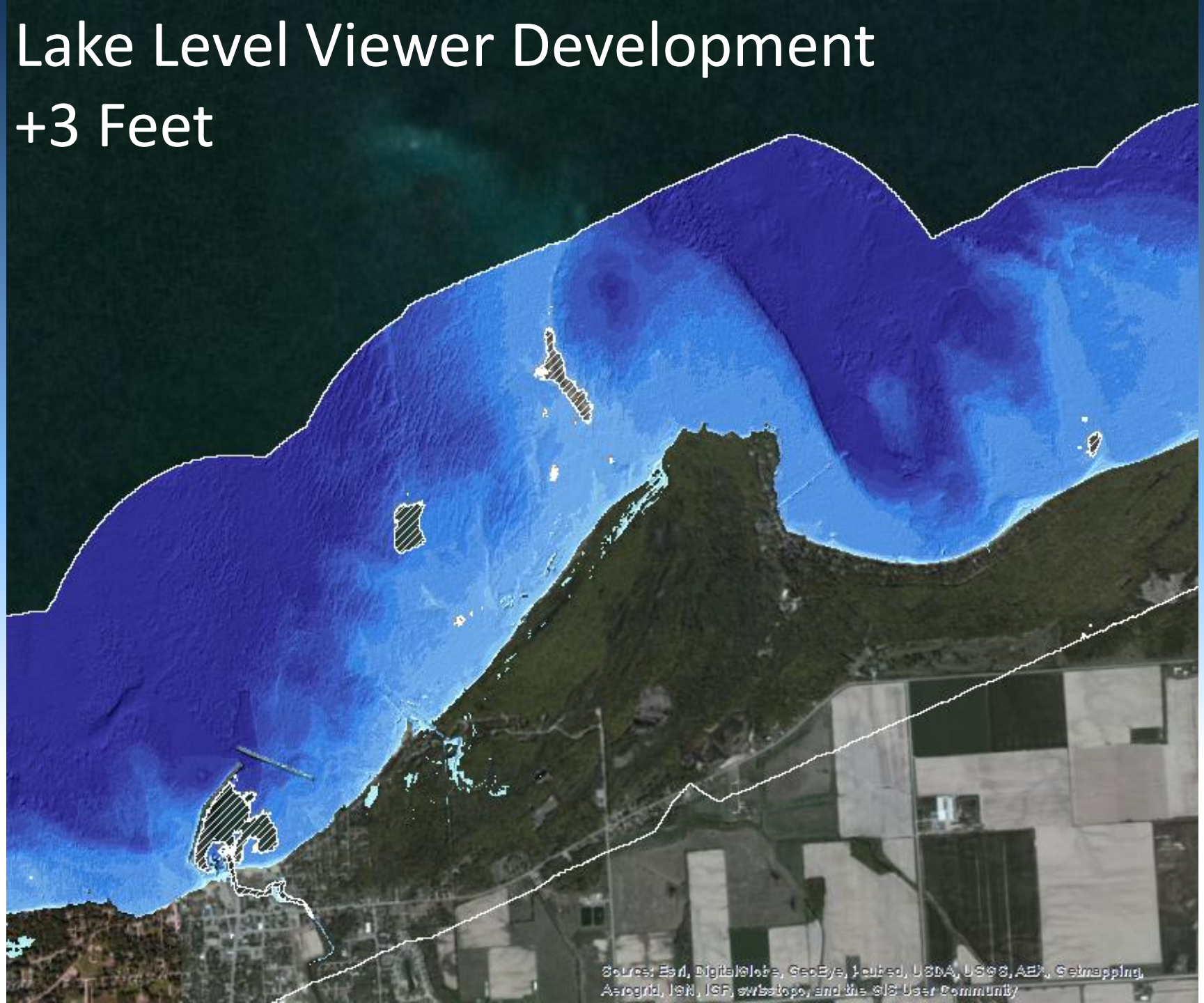
Lake Level Viewer Development
-3 Feet



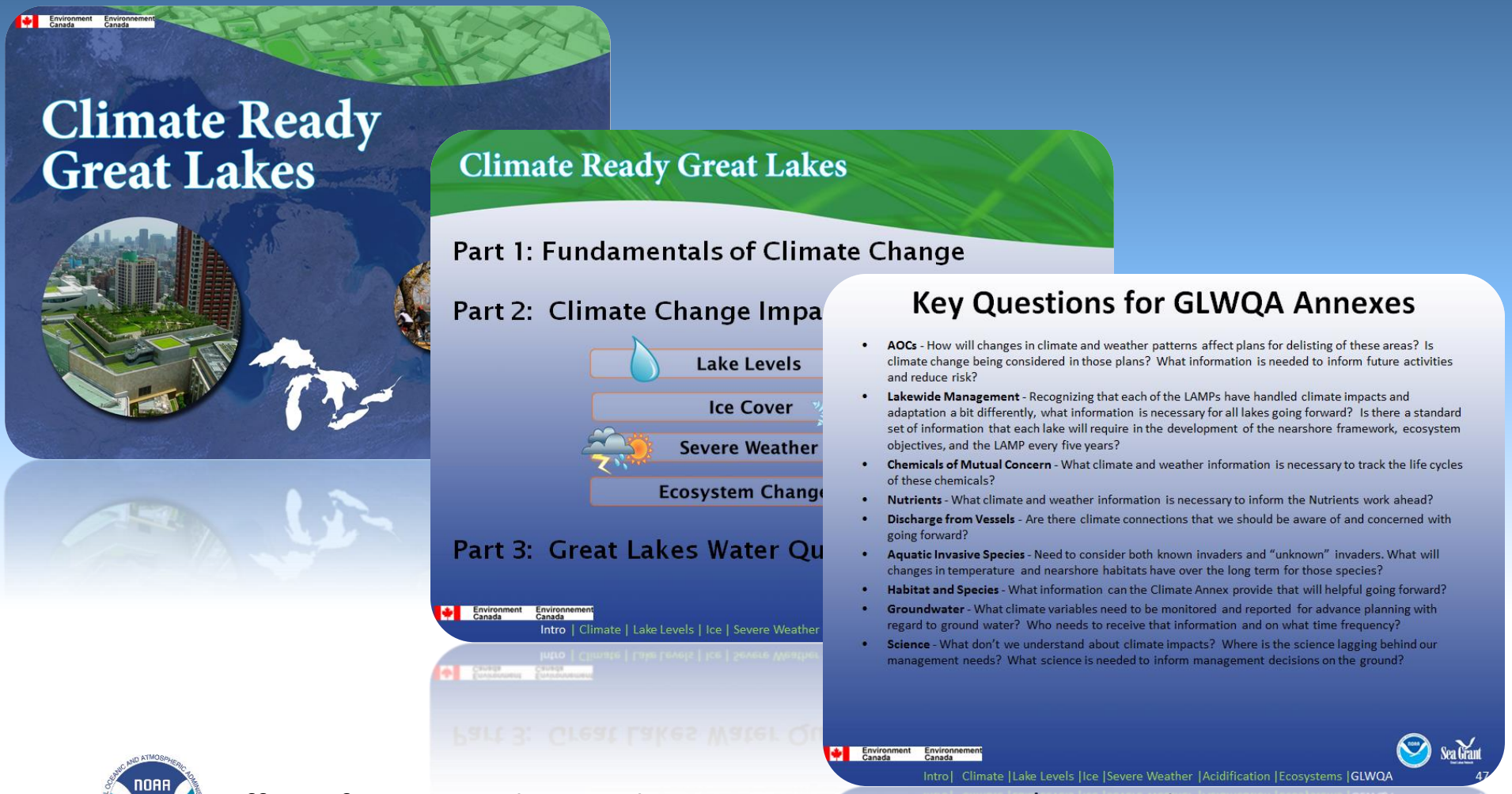
Lake Level Viewer Development
-6 Feet



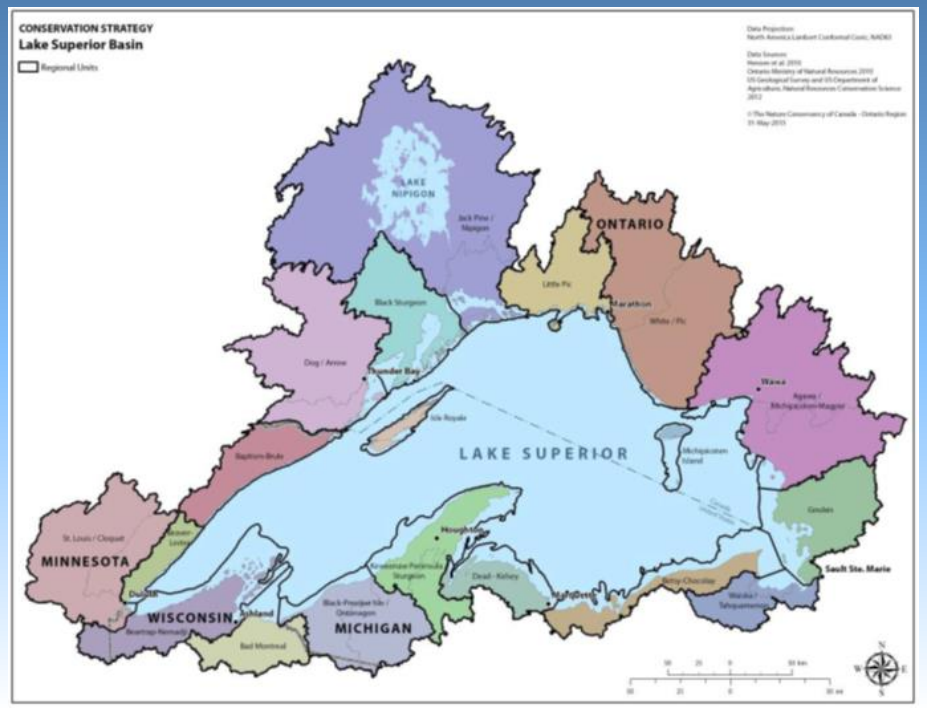
Lake Level Viewer Development
+3 Feet

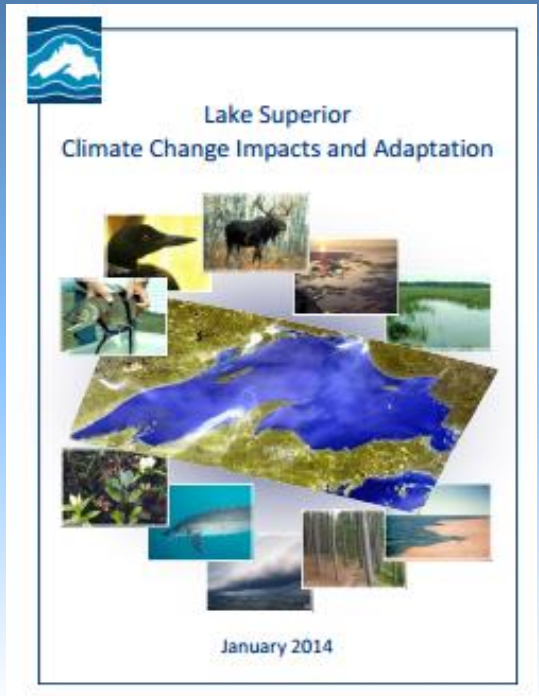


Collaboration Opportunities: GLWQA Climate Impacts Annex 9



Collaboration Opportunities: Lakewide Management Action Plans





http://www.natureconservancy.ca/en/where-we-work/ontario/our-work/lake-superior-assessment.html

Office of Ocean and Coastal Resource Management | Coastal Services Center

Resources

NOAA Climate

http://www.climate.gov/

Coastal Climate Adaptation

http://collaborate.csc.noaa.gov/climateadaptation/default.aspx

Lake Level Viewer

http://www.csc.noaa.gov/digitalcoast/

Coming Soon!

NOAA GLERL Water Level Dashboard

http://www.glerl.noaa.gov/data/now/wlevels/dbd/portal.html

Regional Climate Outlook

http://www.drought.gov/drought/content/resources/reports