

Under the Weather: Economic Impacts of Unexpected Climate Changes

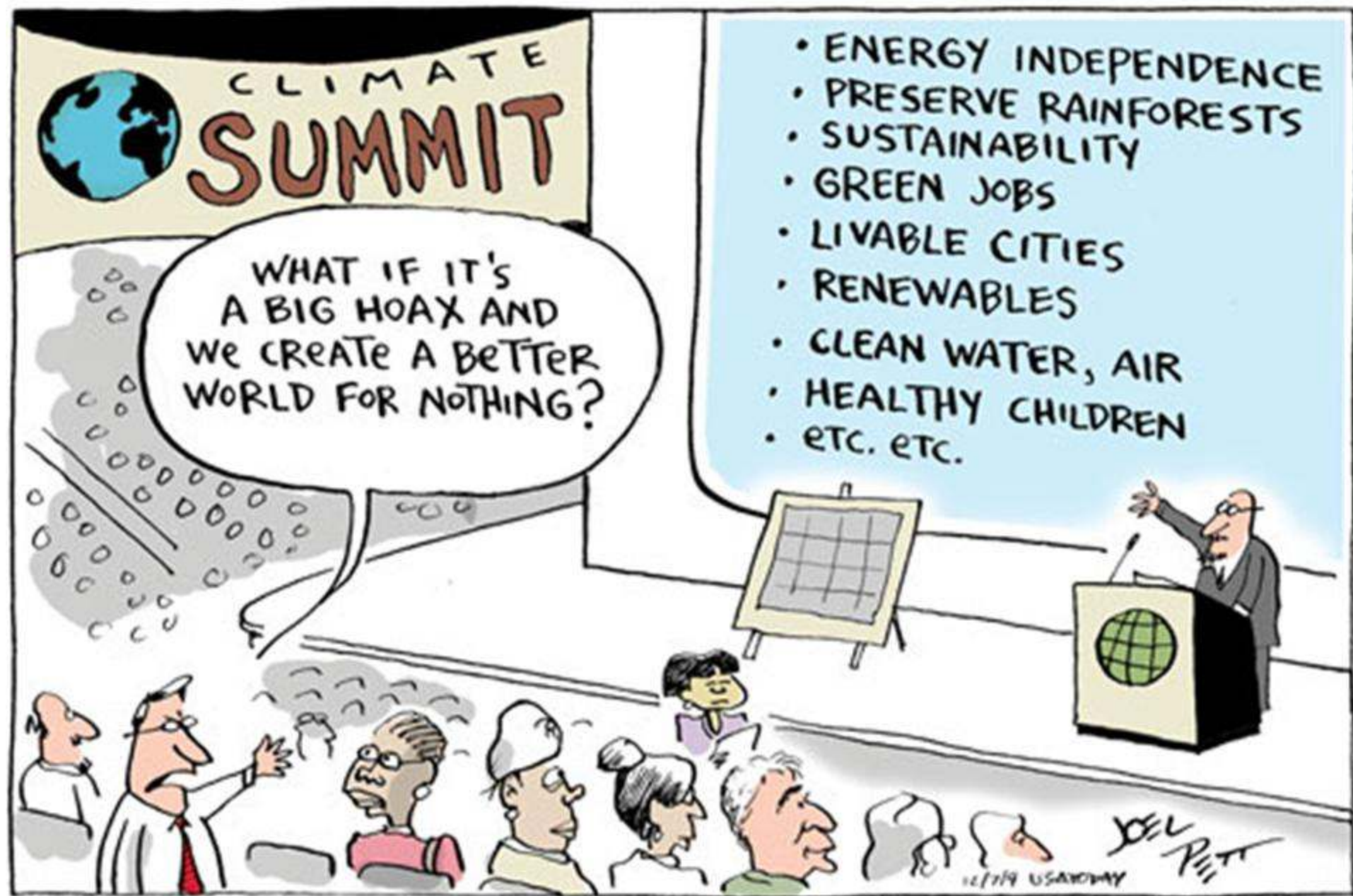
Moderator: Scott Erbisch, Marquette County Administrator

Robert Kulisheck, Chair, Charter Commission, Marquette

Carl Lindquist, Superior Watershed Partnership & Land Trust

Teresa Schwalbach, Marquette County





Under the Weather: Economic Impacts of Climate Change

Marquette County Climate Adaptation Task Force (CATF)

- **Welcome:**

Scott Erbisch; Marquette County Administrator

- **Task Force Objectives:**

Robert Kulisheck; Chair Climate Adaptation Task Force

- **Troubling Trends:**

Carl Lindquist; Superior Watershed Partnership

- **Preparing for Extreme Weather Events:**

Teresa Schwalbach; Marquette County Emergency Management Coordinator

- **Question and Answer Period**



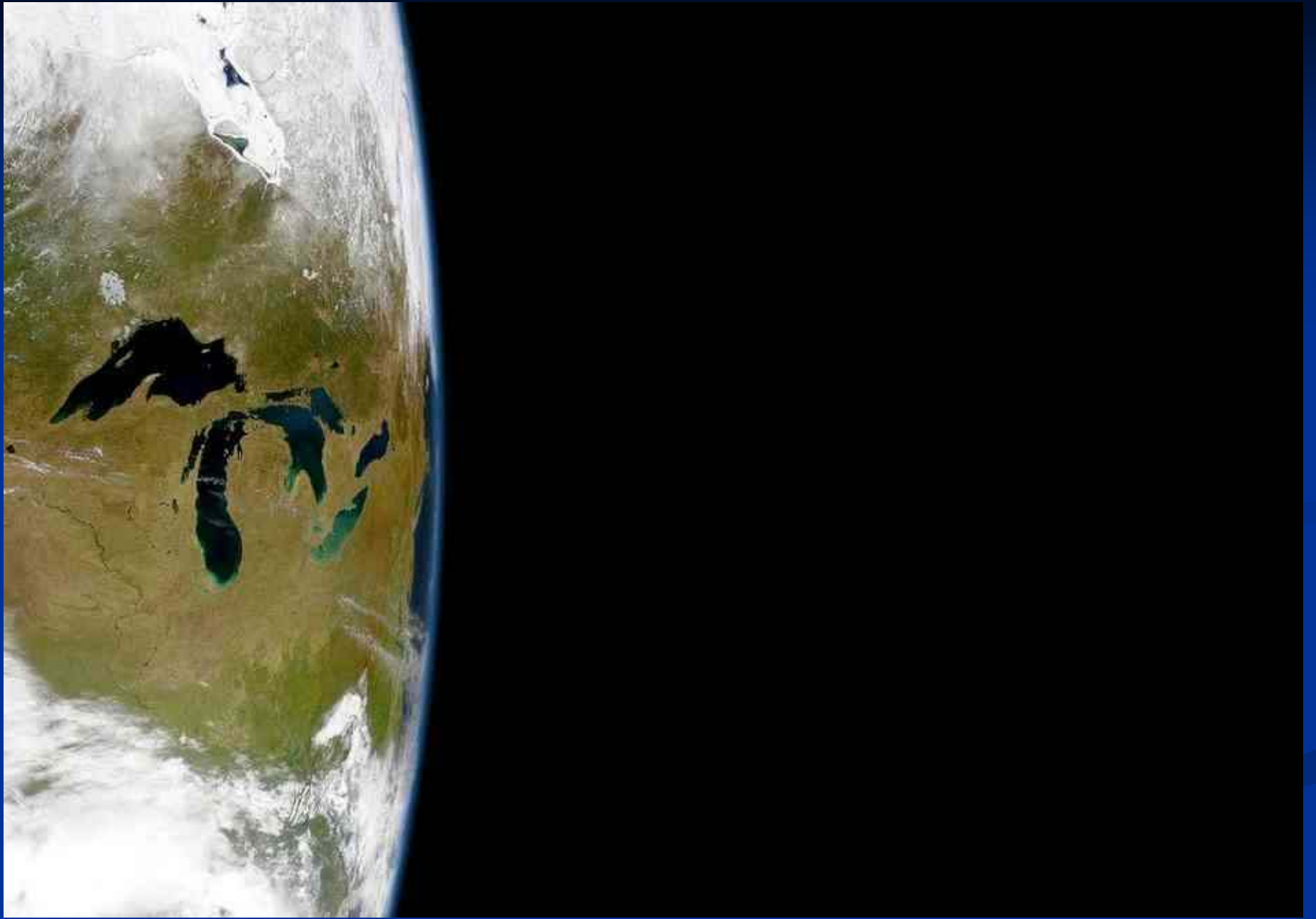
SUPERIOR
WATERSHED
PARTNERSHIP
AND LAND TRUST

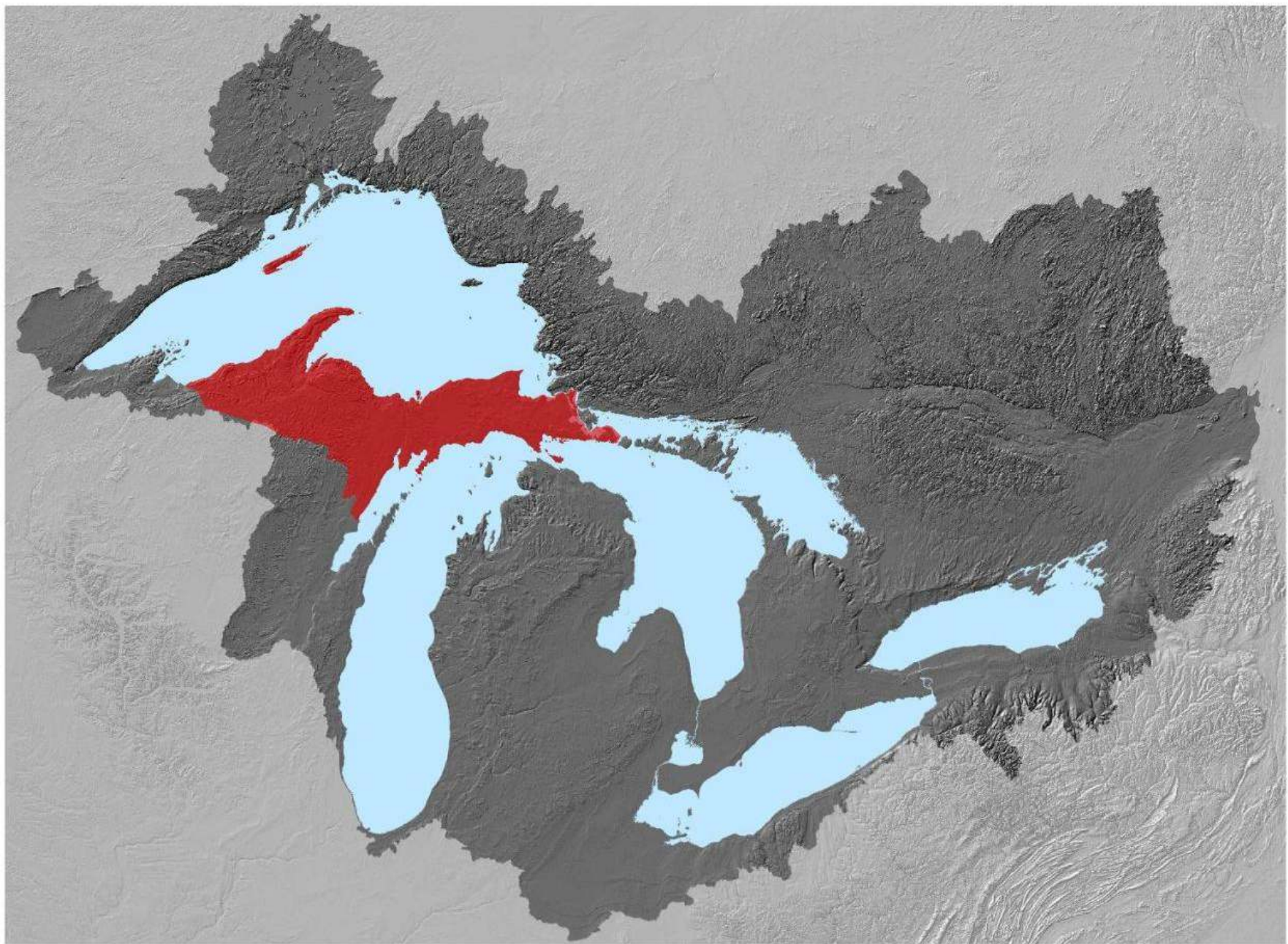


LAKE SUPERIOR, LAKE MICHIGAN, LAKE HURON

Great Lakes Protection, Restoration and Education

Real Work, Sound Science, Documented Results



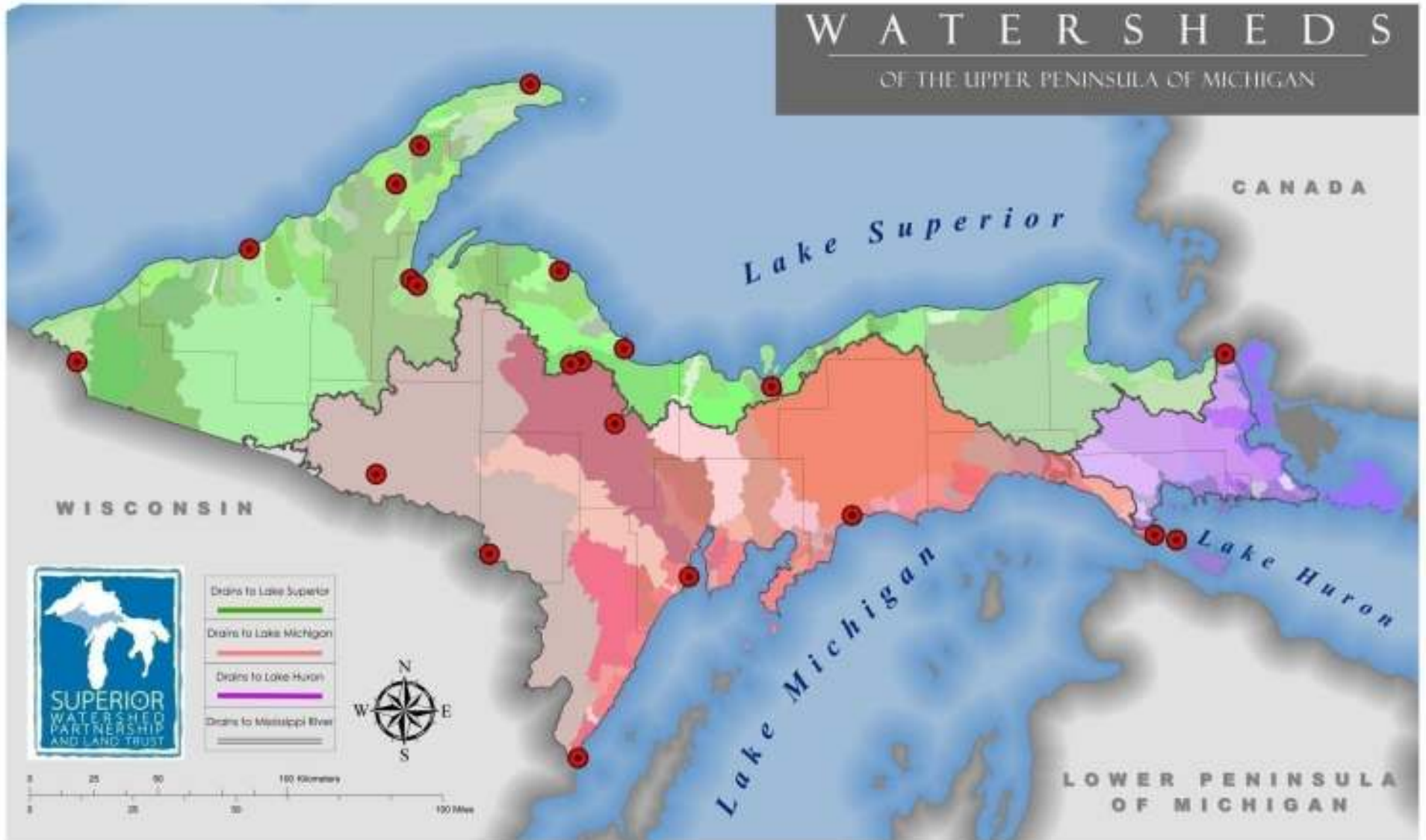


TOWNSHIPS AND CITIES OF THE UPPER PENINSULA OF MICHIGAN



W A T E R S H E D S

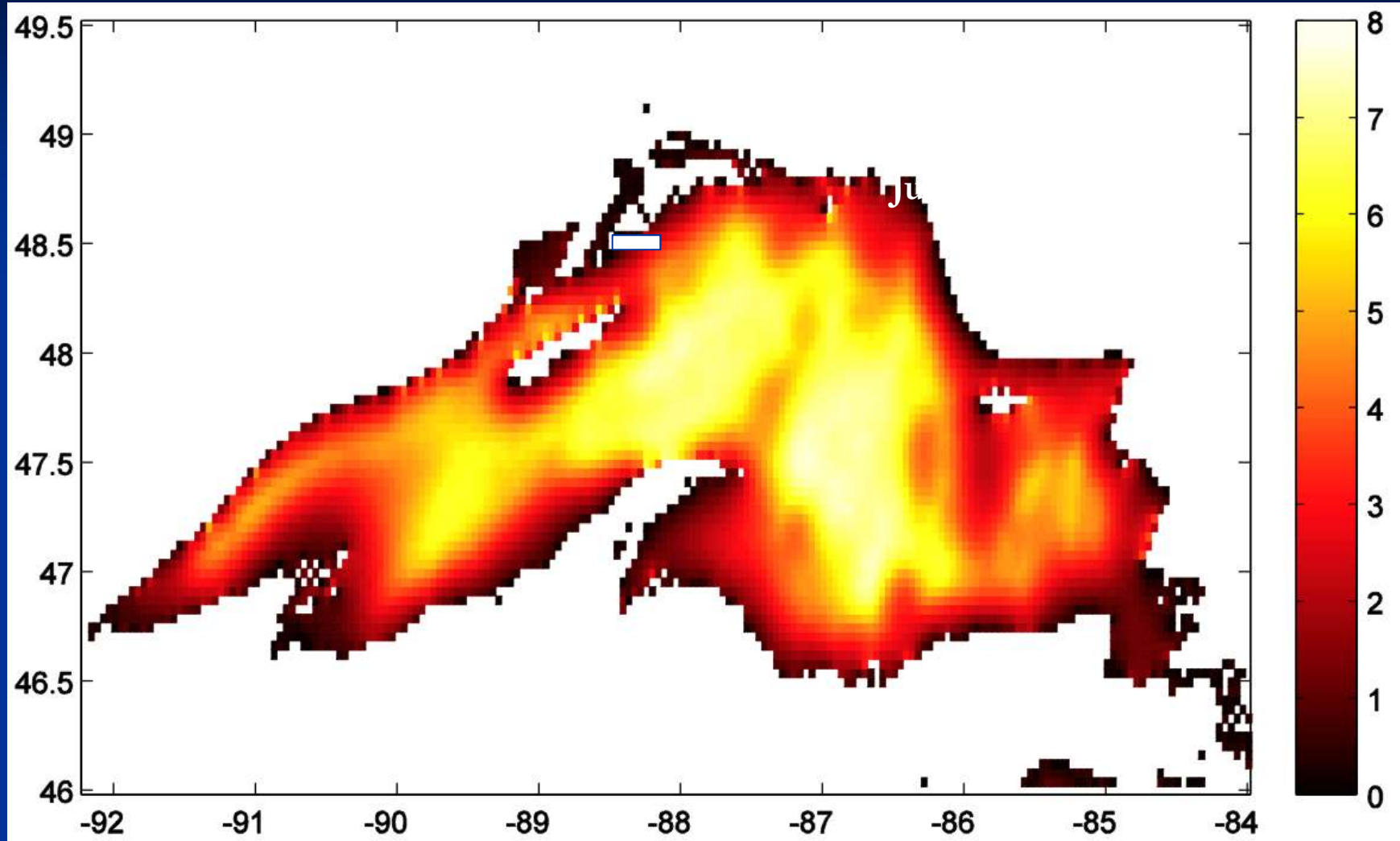
OF THE UPPER PENINSULA OF MICHIGAN





2012

2012



NOTICE:

BEACH CLOSED

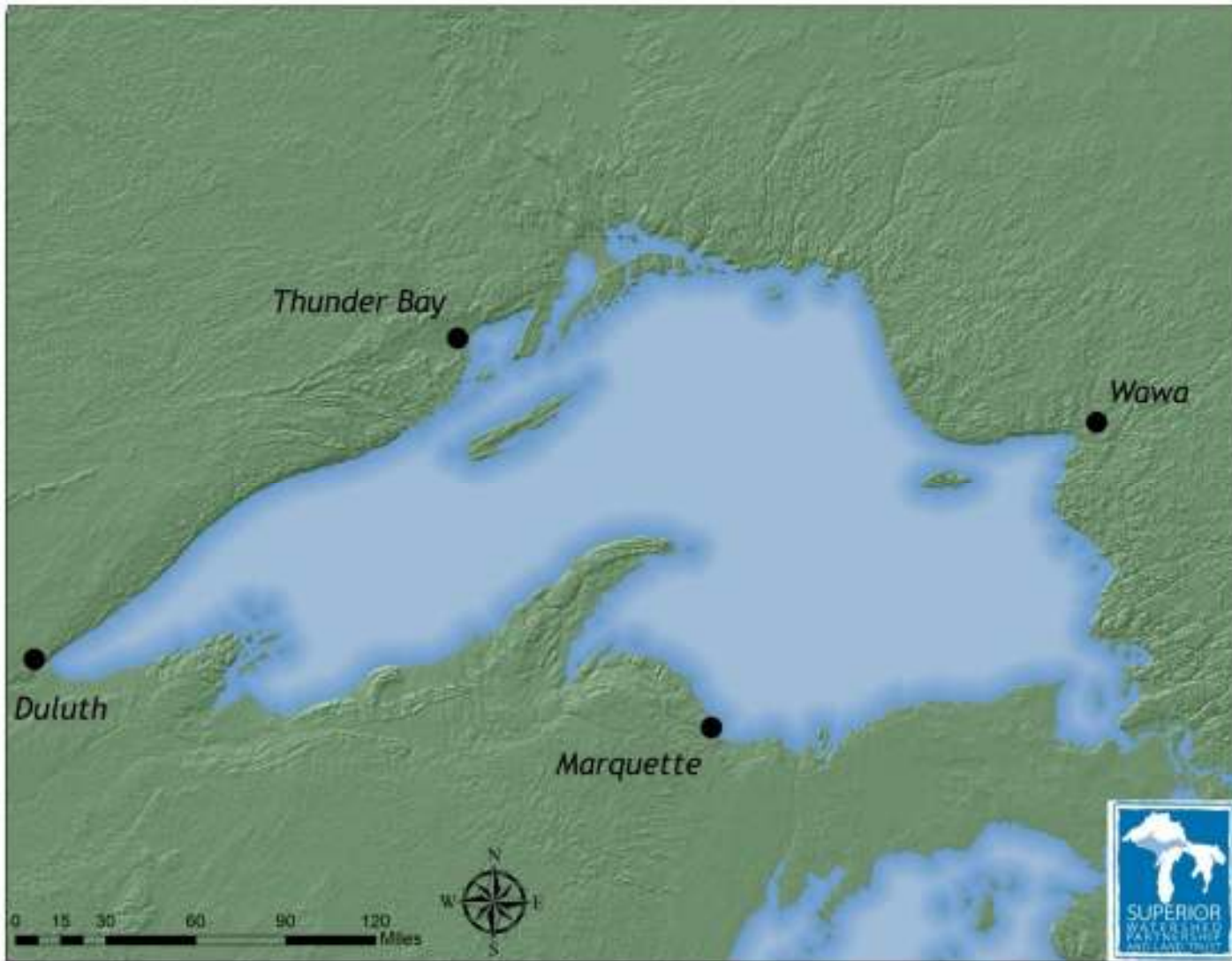


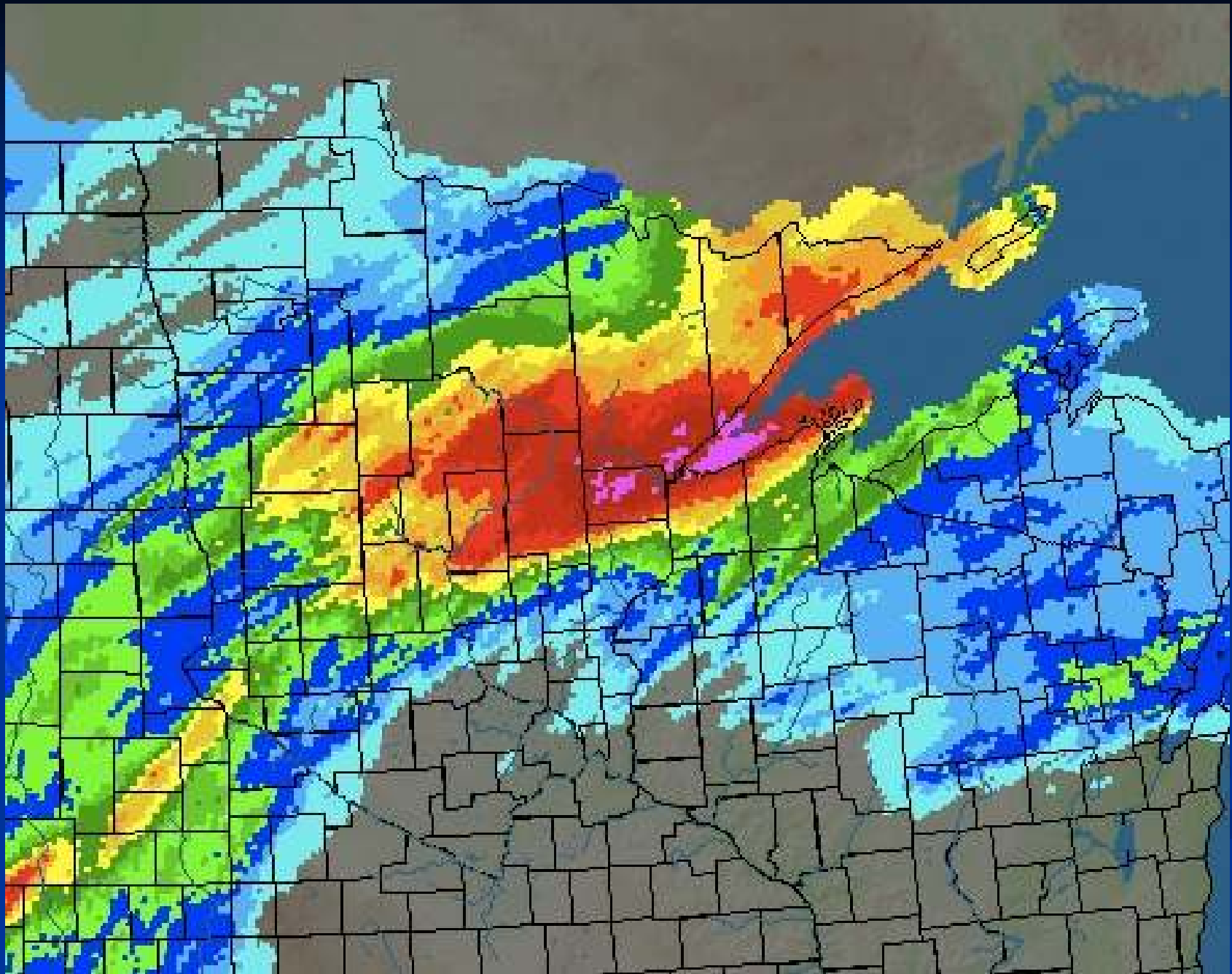
The City of Marquette in cooperation
with the Superior Watershed
Partnership have issued a

**NO BODY CONTACT
ADVISORY DUE TO RECENT
HIGH BACTERIA LEVELS.**

For more information: <http://www.deq.state.mi.us/beach/>
or call the City of Marquette: 228-0488



















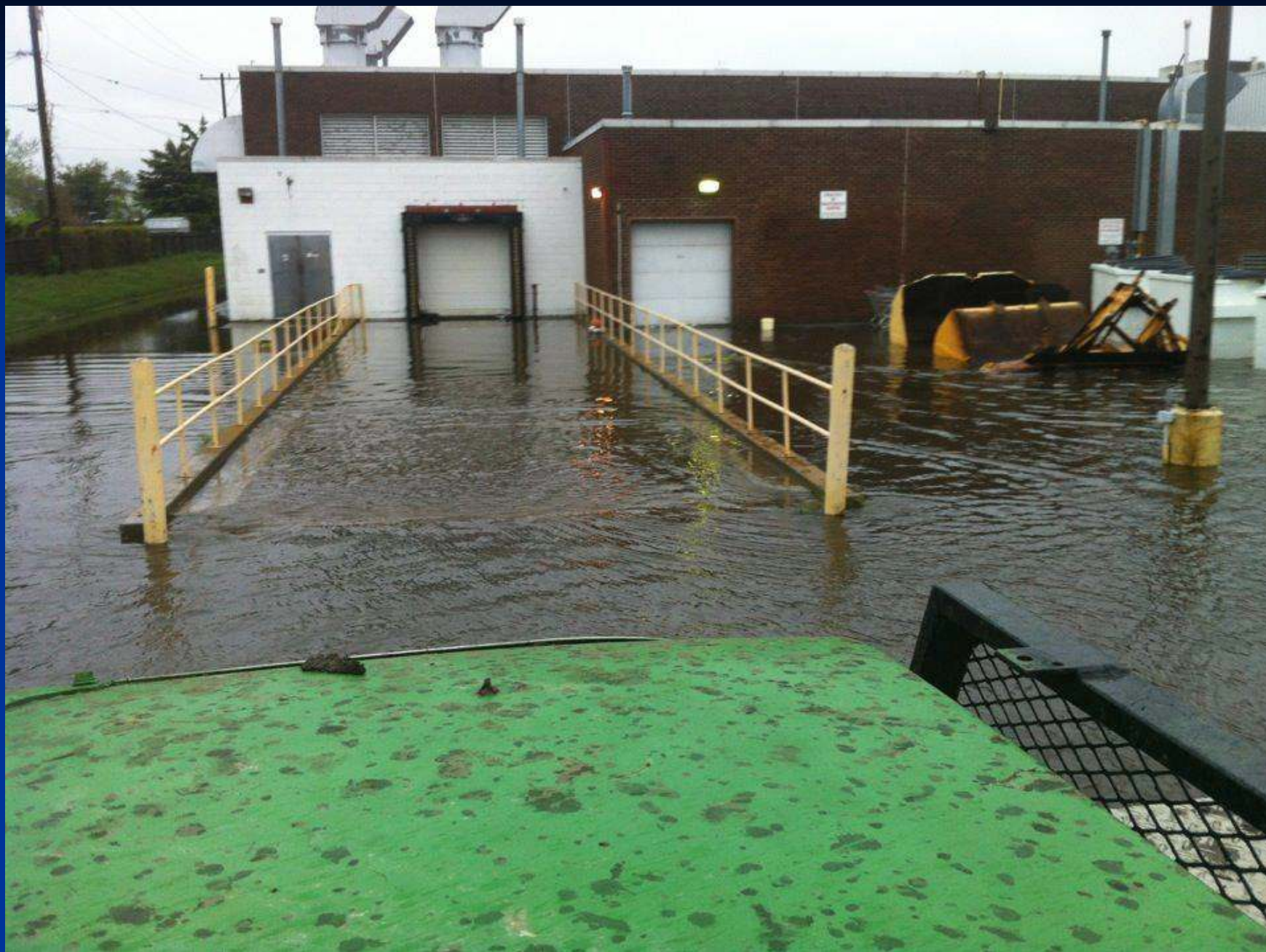
NOAA



Thunder Bay, ON





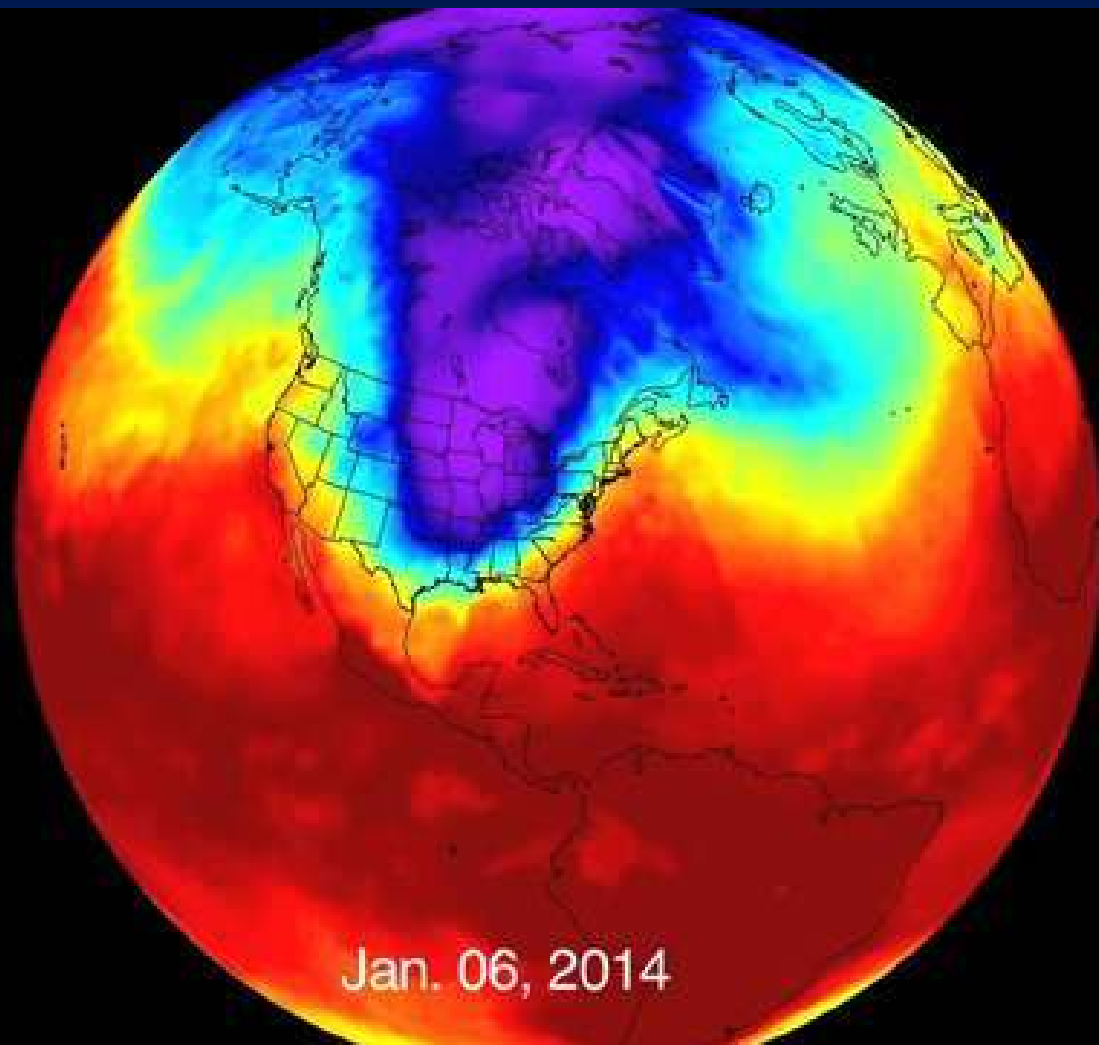




Wawa, ON







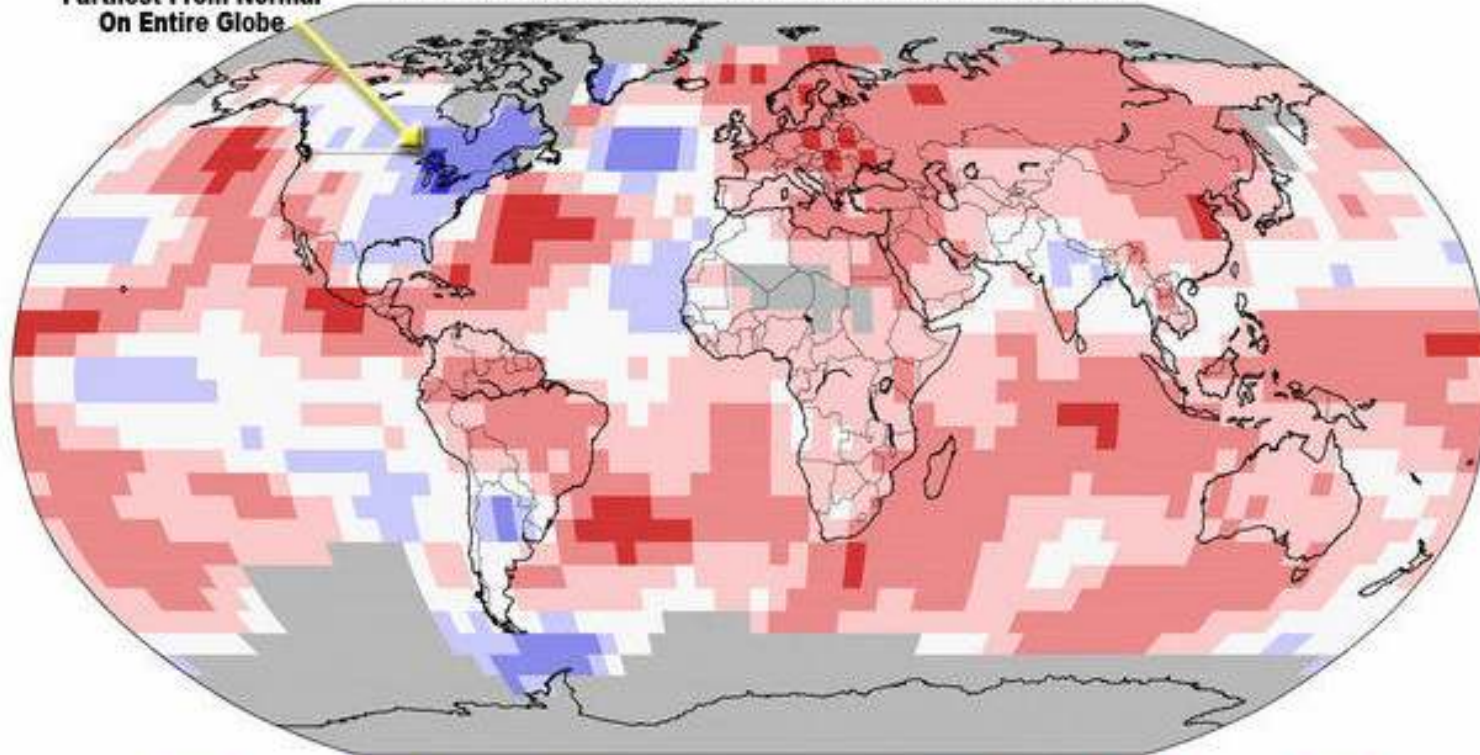
Jan. 06, 2014

Global Temperature Anomaly - March 2014

NOAA's National Climatic Data Center

Data Source: GHCN-M version 3.2.2 & ERSST version 3b

Dark Blue Showing Michigan's
March Temperatures
Farthest From Normal
On Entire Globe



Record
Coldest

Much
Cooler than
Average

Cooler than
Average

Near
Average

Warmer than
Average

Much
Warmer than
Average

Record
Warmest



Tue Apr 15 07:56:11 EDT 2014

This graphic shows the temperature departure from normal for March 2014. You can see the darkest blue area signifies the departures farthest from normal. Michigan had the largest departures from normal of any region on the globe. (National Climatic Data Center)

March 11, 2012



February 2014











ACCELERATING CLIMATE ADAPTATION

Assisting Great Lakes communities with climate adaptation.

[READ MORE](#)



LAKE SUPERIOR CLIMATE ADAPTATION, MITIGATION and IMPLEMENTATION PLAN

For Communities in the Lake Superior Watershed of Michigan's Upper Peninsula

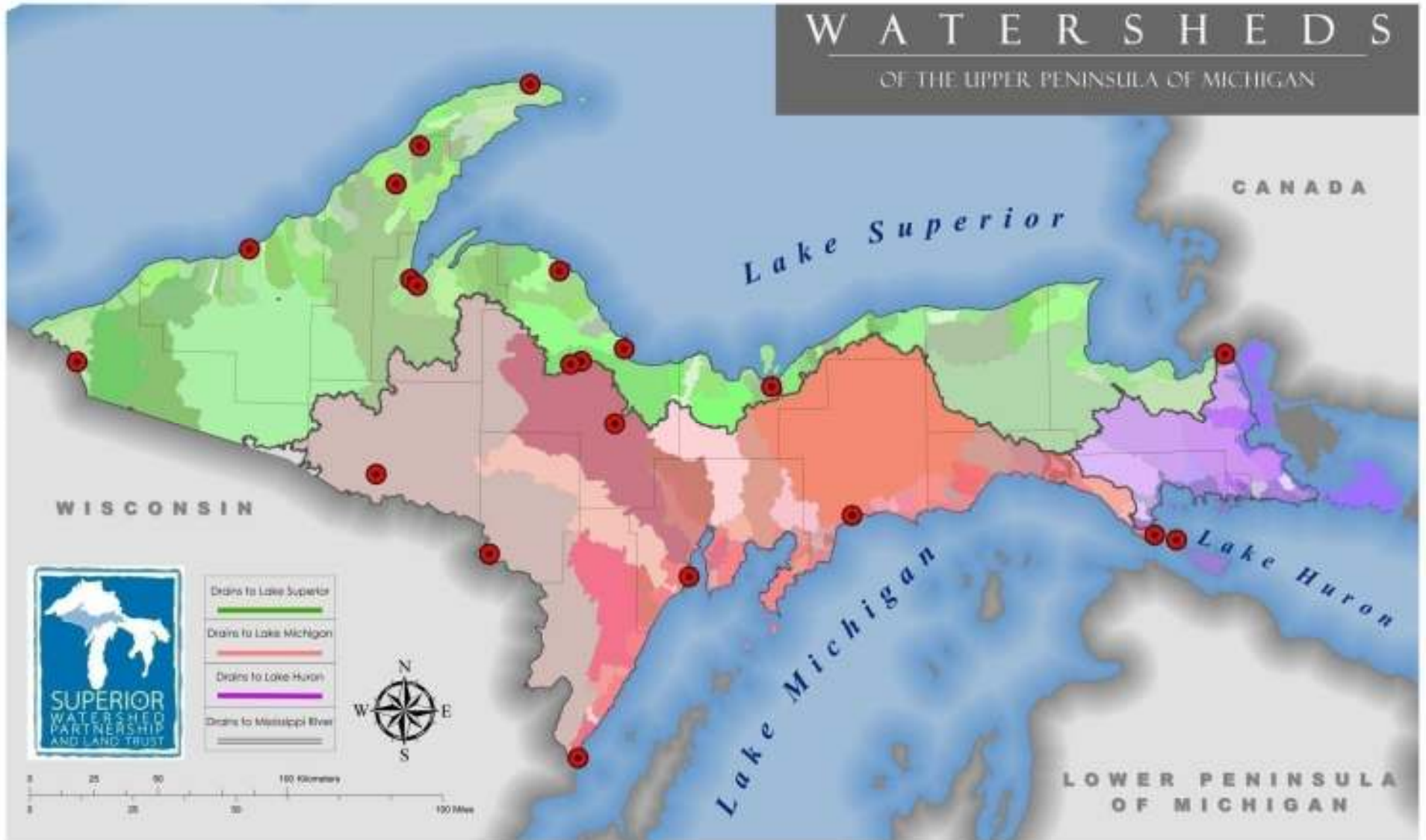


Developed by the
Superior Watershed Partnership

In cooperation with Climate Solutions University,
Pictured Rocks National Lakeshore, US Forest Service,
Great Lakes Integrated Science Assessments,
Headwaters Economics and the Great Lakes
and St. Lawrence Cities Initiative

W A T E R S H E D S

OF THE UPPER PENINSULA OF MICHIGAN



Socioeconomics and Climate Change in the Great Lakes Region

This interactive shows how the social and economic characteristics of the Great Lakes Region are impacted by regionally specific changes in climate. It was developed in partnership with the [Great Lakes Adaptation Assessment for Cities](#) at the University of Michigan. [Related Research »](#)

Economy

Many sectors of the economy can be affected by climate change. Here we show three sectors likely to be affected; we describe which industries employ the most people; and we show historic climate changes.

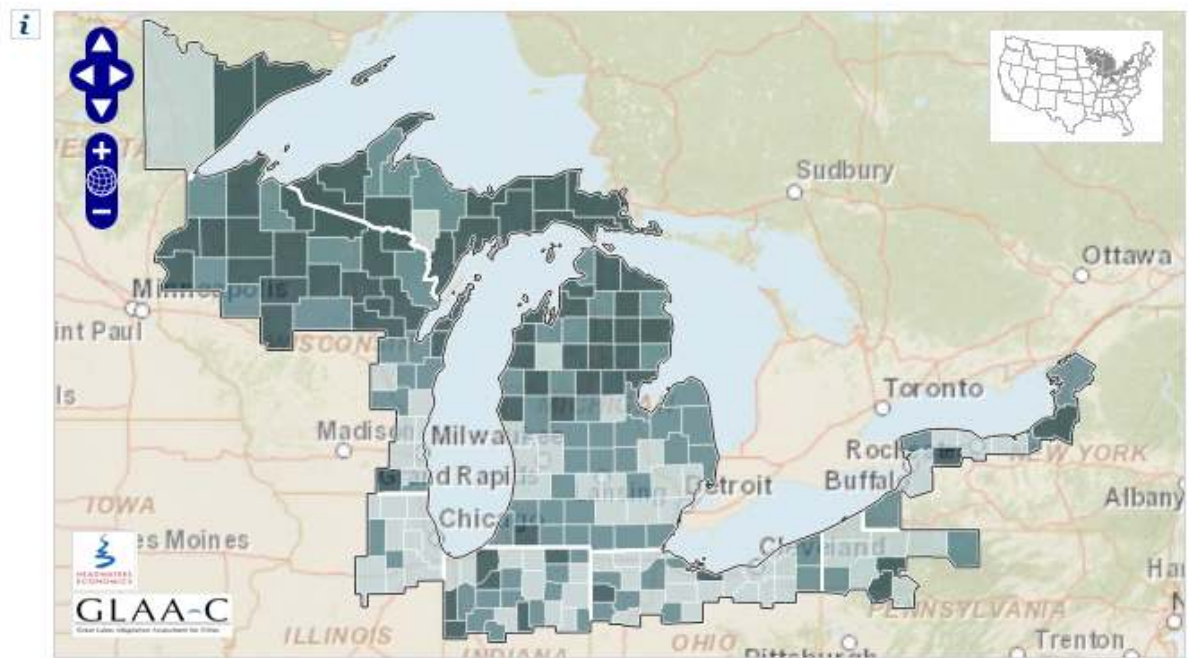
Marquette, MI

Job-Dependence on Climate-Vulnerable Sectors: Farming, Timber, and Tourism

- Most Dependent
- Moderately Dependent
- Least Dependent

Infrastructure

Vulnerable Populations



Climate Adaptation, Mitigation and Implementation Plan

FOR MARQUETTE COUNTY, MICHIGAN



Provided by the Superior Watershed Partnership

Produced in cooperation with
Climate Solutions University and the
Michigan Forest Policy Institute

Adapting to Climate Change and Variability

Marquette, Michigan

September 2013

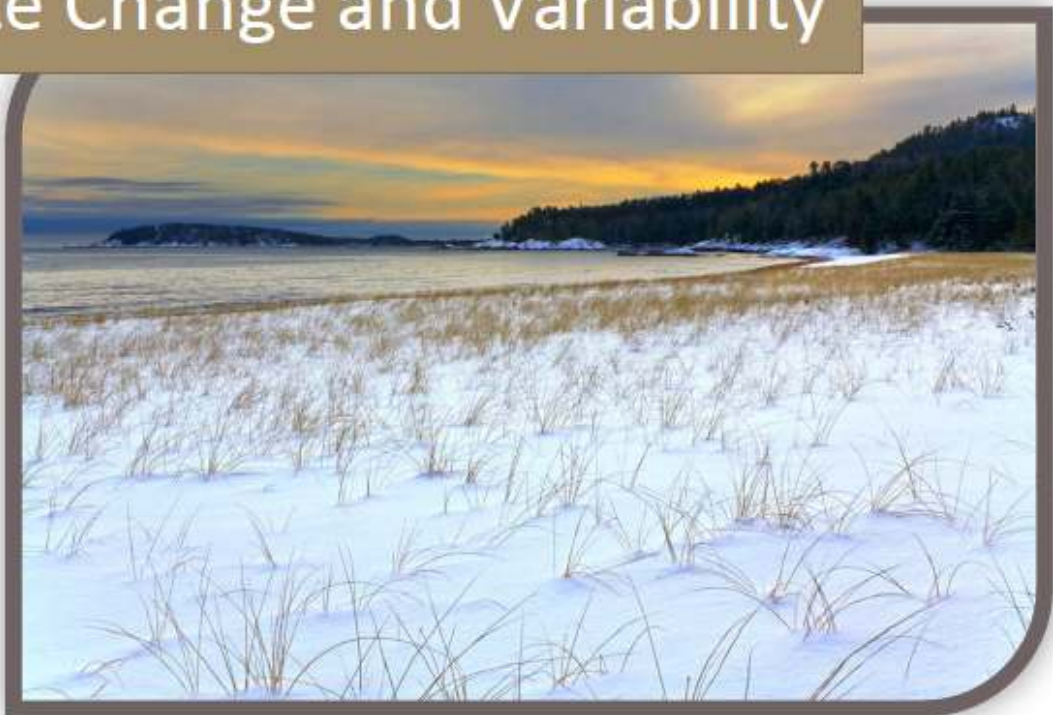


Fig. 8: Goals and Actions for the Lake Superior Watershed Region

GOALS AND ACTIONS FOR THE LAKE SUPERIOR WATERSHED REGION							
Sector	Goals	Actions	Time Frame	Action Type	Applicable to...		
					Region	Counties	Towns
All Sectors		• Hold meetings with public officials in communities to discuss how they can make climate readiness a routine part of future planning processes.	ST	Outreach	✓	✓	✓
		• Implement monitoring or data collection activities to develop a baseline against which to compare future changes.	ST	Action	✓	✓	✓
Lake Superior (and other water bodies)	Protect the Lake Superior shoreline from damage due to fluctuating lake levels, increased lake storm action, habitat loss, and poorly regulated human development.	• Determine projected changes in water levels and storm surge extents in the area.	ST	Research	✓		
		• Identify and map critical habitat to be protected along the Lake Superior shoreline.	ST	Research	✓	✓	✓
		• Identify beach/dune areas along shore in need of habitat restoration and resilience work. Secure funding to accomplish work.	ST	Research	✓	✓	✓
		• Expand existing programs and create new programs to restrict spread of invasive species in Lake Superior, including zebra and quagga mussels, sea lamprey, and spiny waterflea.	ST	Action	✓	✓	
		• Implement at least one habitat restoration project in each county, incorporating climate change impacts.	ST	Action	✓	✓	
		• Re-establish and maintain physical stability of streams. Protect river corridors and floodplains to accommodate river adjustment and floodplain processes.	ST	Action	✓	✓	✓
		• Remove barriers to aquatic organism passage.	ST	Action	✓	✓	
		• Devise grey water storage and reuse systems to recycle and utilize water resources more efficiently.	ST	Action	✓	✓	✓
		• Research current set-back ordinances and other zoning standards regarding shoreline development. Present recommendations to appropriate governing boards.	ST	Research	✓		
		• Establish shoreline protection zones for new development.	LT	Policy		✓	✓
• Establish and enforce shoreline setback requirements.	LT	Policy		✓	✓		



CLIMATE ADAPTATION TASK FORCE

A Resource For Communities in the Upper Peninsula of Michigan

Objectives:

The Climate Adaptation Task Force (CATF) was formed to help prepare local leaders and the general public to think proactively about the effects of climate change and to develop strategies that will make the Upper Peninsula more resilient and effective when dealing with the consequences of climate change.

Assumptions:

- 1 This effort is intended to encourage community leaders to think in a proactive fashion about how climate change may affect Marquette County and the Upper Peninsula region.
- 2 The intent is to identify long-term trends that may have potential positive and/or negative impacts on the local environment.
- 3 This effort does not require that all participants agree on the basic underlying causes of climate change. Rather, it proceeds on the assumption that climate change is occurring and that it will have an impact on the local area.

CLIMATE ADAPTATION PLANS:

- Climate Adaptation, Mitigation & Implementation Plan for Lake Superior Communities
- Marquette County Climate Adaptation Plan (DRAFT)
- City of Marquette Climate Adaptation Plan
- Michigan Climate and Public Health Adaptation Plan

OTHER CLIMATE RESOURCES:

CONCEPTUAL WETLAND MITIGATION PLAN

for the
CITY OF MARQUETTE
McCLELLAN AVENUE EXTENSION PROJECT



Submitted by the
City of Marquette
Engineering Department
850 West Baraga Avenue
Marquette, Michigan 49855
(906) 228-0440
www.mqtcty.org

In cooperation with the

Superior Watershed Partnership
and Land Trust
2 Peter White Drive,
Presque Isle Park
Marquette, Michigan 49855
(906) 228-6095
www.superiorwatersheds.org

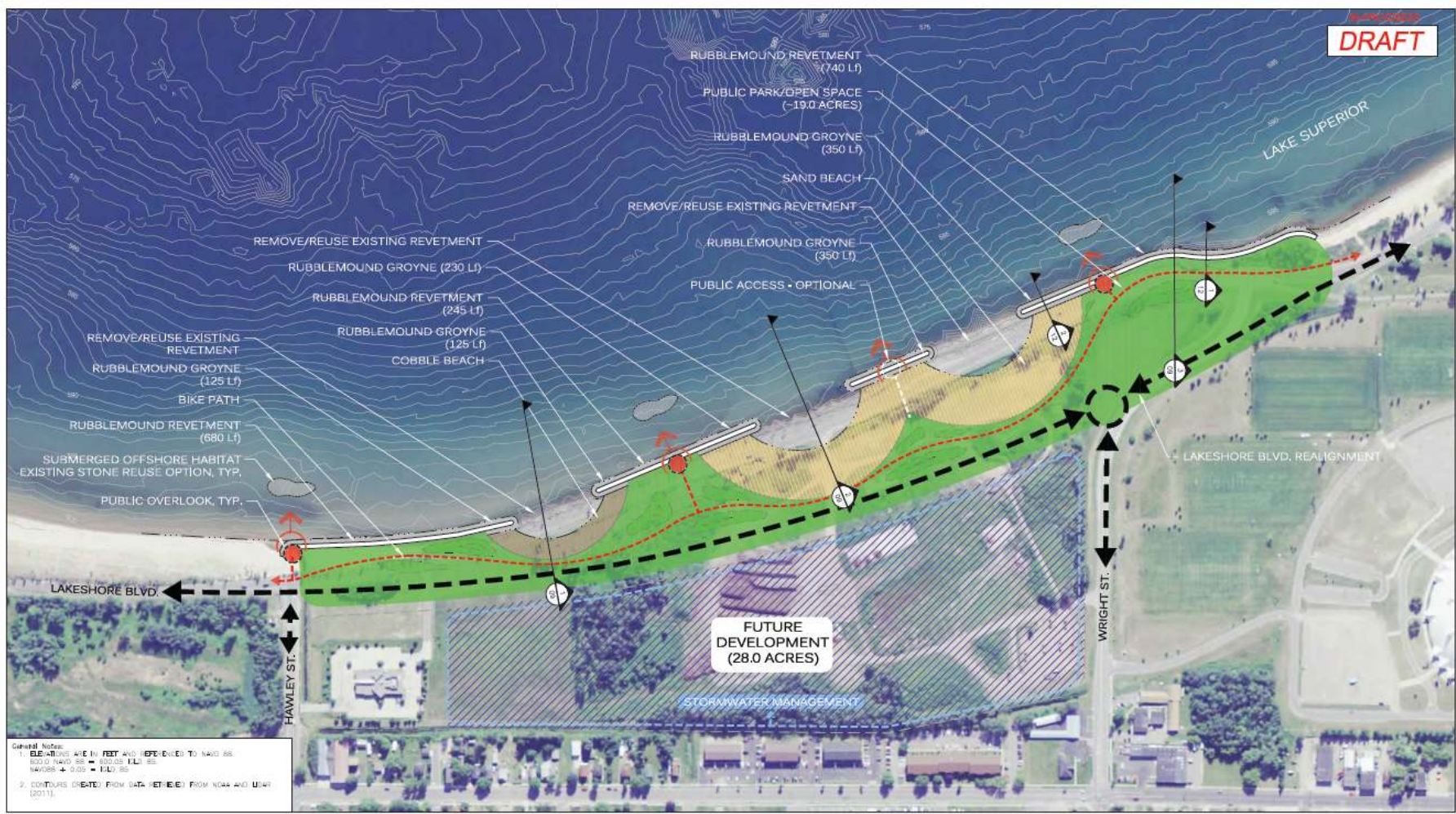
December 2010







DRAFT



General Notes:
 1. ELEVATIONS ARE IN FEET AND REFERENCED TO NAVD 83.
 800.0 FAVD, 88 = 800.05 ILL, 88
 NAVD83 + 0.00 = ILL, 88
 2. CONTOURS DERIVED FROM DATA RETRIEVED FROM NOAA AND USACE (2011).

SHORELINE RESTORATION - ALTERNATIVE 3 LANDWARD BEACH DEVELOPMENT

MARQUETTE SHORELINE RESTORATION	
Figure Number: 12035-CD-05	Project Number: 12035.100
Description: ALTERNATIVE 3 - LAYOUT	Date: 02/04/2013

Baird

PROJECT NO. 12035-CD-05, SHEET NO. 05, DATE 02/04/2013, SCALE 1"=40'



NOTICE:

BEACH CLOSED



The City of Marquette in cooperation
with the Superior Watershed
Partnership have issued a

**NO BODY CONTACT
ADVISORY DUE TO RECENT
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or call the City of Marquette: 228-0488





TAKE THE STORMWATER CHALLENGE!

Cleaner stormwater means a cleaner Lake Superior



The City of Marquette includes four major watersheds that naturally drain to Lake Superior (Dead River, Whetstone Brook, Orianna Creek and the Carp River). But did you know that underneath the city there is a system of stormwater pipes that also drain directly to the lake (see map)?

Each time it rains (or snow melts) water from roads, roofs, sidewalks and yards enters the nearest storm drain and makes its way to an outlet at Lake Superior. It's important to keep our stormwater runoff as clean as possible especially since most stormwater outlets are located near our public beaches.



Did you know that there are over 3,300 storm drains in the City of Marquette and they ALL drain to Lake Superior!





City of Marquette Storm Drain Underground Stormwater Drainage System (not to scale) Storm Water Outlet

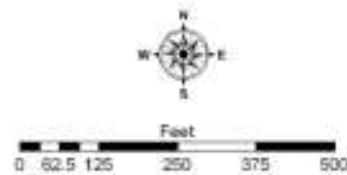
City of Marquette, Michigan

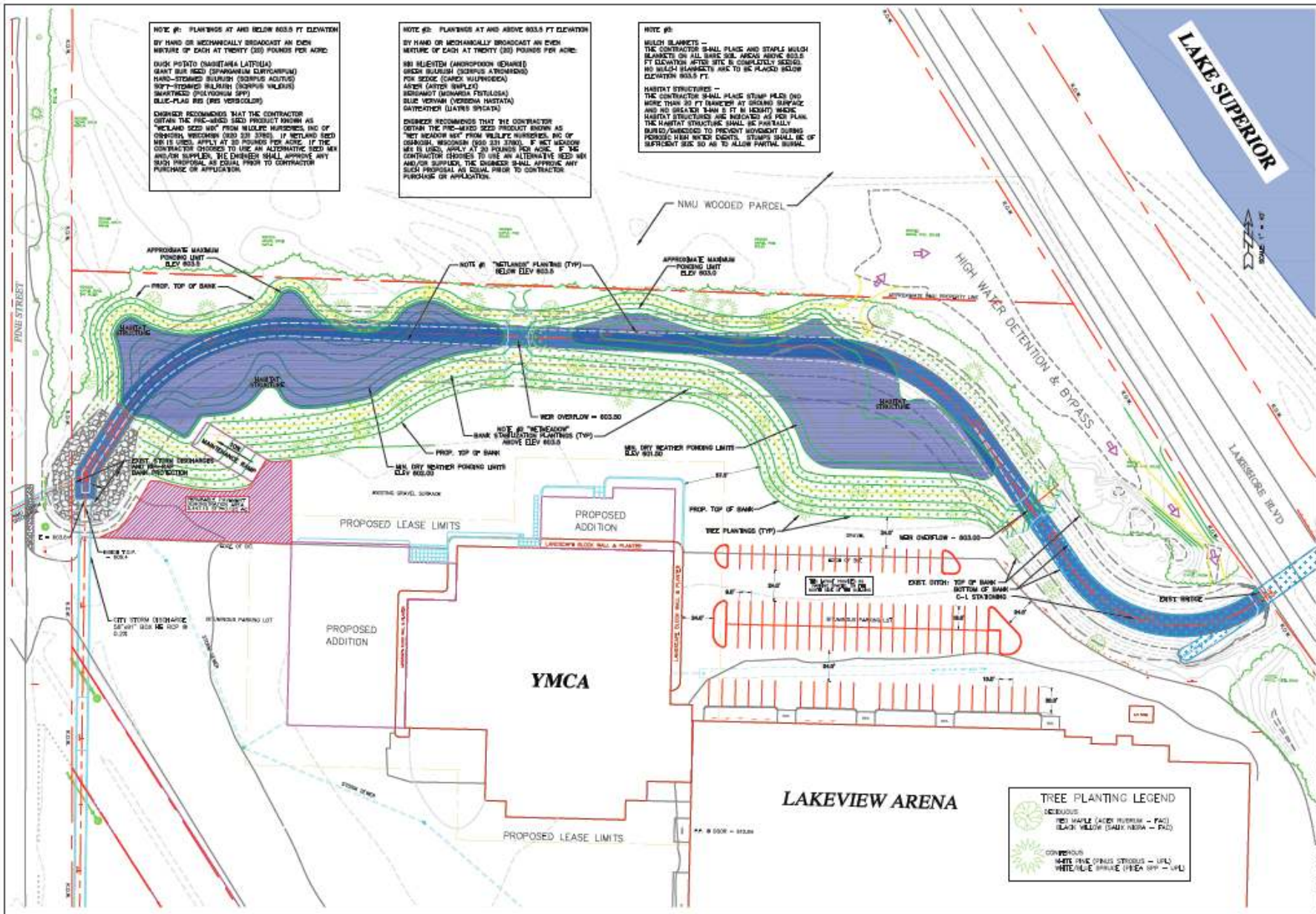
Making Lake Superior Beaches Safer through Implementation of Green Practices to Mitigate Storm Sewer Impacts Identified by Great Lakes Sanitary Surveys



Legend

-  Stormwater Drainage Ditch
-  Wetlands/ Buffer Project





NOTE #1: PLANTINGS AT AND BELOW 803.5 FT ELEVATION
 BY HAND OR MECHANICALLY BROADCAST AN EVEN MIXTURE OF EACH AT TWENTY (20) POUNDS PER ACRE:
 DARK POINT (SAGITTARIA LATIFOLIA)
 SMART BLUE SEED (SPARGANGLER SURFICUM)
 HARD-STEMMED BULRUSH (SCIRPUS AGUTUS)
 SOFT-STEMMED BULRUSH (SCIRPUS VALLIS)
 SMARTWEED (POLYGONUM SP.)
 BLUE-FLAG IRIS (IRIS VERSICOLOR)
 ENGINEER RECOMMENDS THAT THE CONTRACTOR OBTAIN THE PRE-MIXED SEED PRODUCT KNOWN AS "WETLAND SEED MIX" FROM WILLYE HURDRESS, INC. OF OSWEGO, WISCONSIN (800 231 3700). IF WETLAND SEED MIX IS USED, APPLY AT 20 POUNDS PER ACRE. IF THE CONTRACTOR CHOOSES TO USE AN ALTERNATIVE SEED MIX AND/OR SUPPLIER, THE ENGINEER SHALL APPROVE ANY SUCH PROPOSAL AS EQUAL PRIOR TO CONTRACTOR PURCHASE OR APPLICATION.

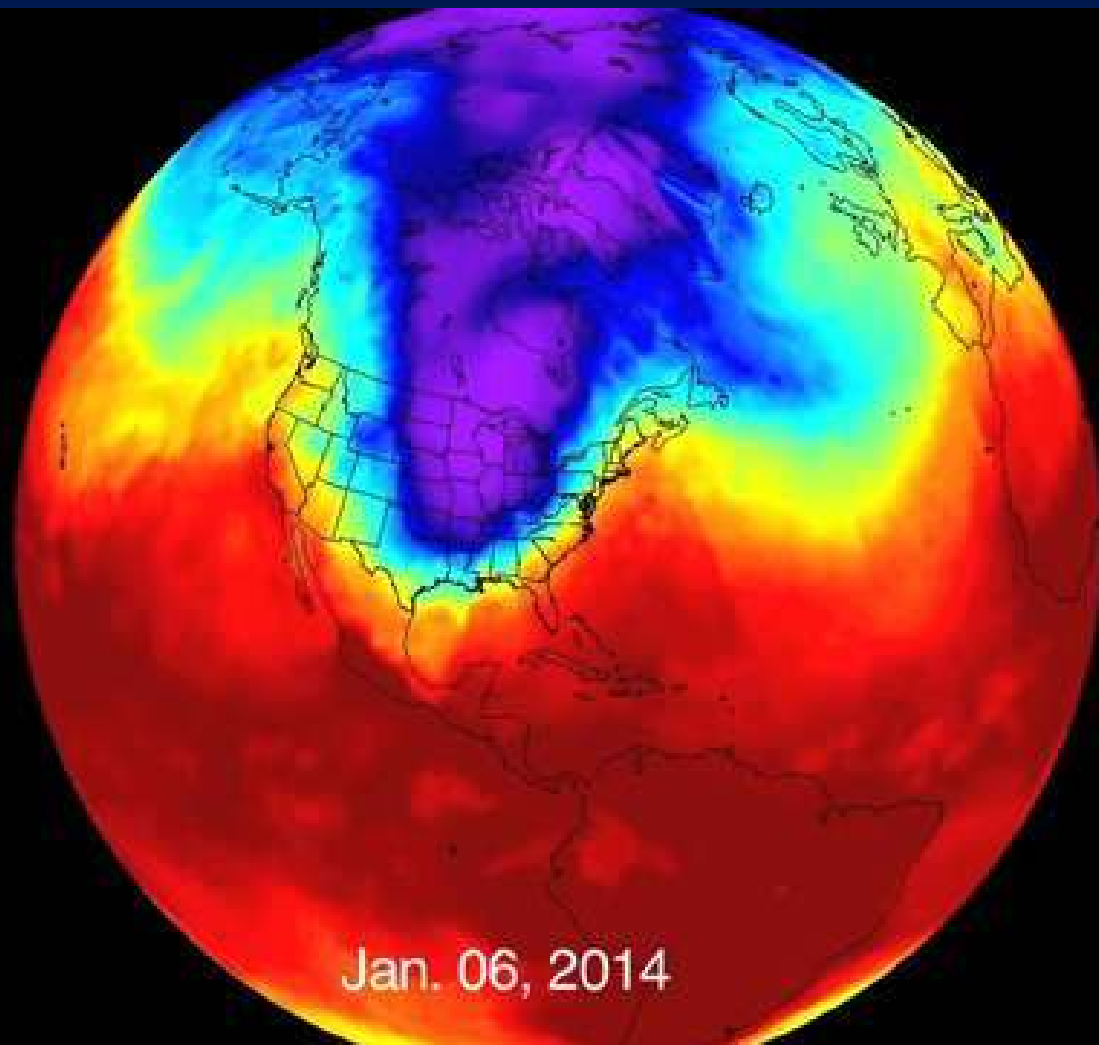
NOTE #2: PLANTINGS AT AND ABOVE 803.5 FT ELEVATION
 BY HAND OR MECHANICALLY BROADCAST AN EVEN MIXTURE OF EACH AT TWENTY (20) POUNDS PER ACRE:
 RED SILVERTOP (AMORPHOPUM SEMINUM)
 GREEN SILVERTOP (AMORPHOPUM SEMINUM)
 FOX SEDGE (CAREX VULPINOIDEA)
 ARISEN (ASTOR SPICATUS)
 BURNING BUSH (EUROSA FETIDIOSA)
 BLUE WORMWORM (VERIDEMA HASTATA)
 SATYRATHER (LAIRES SPICATA)
 ENGINEER RECOMMENDS THAT THE CONTRACTOR OBTAIN THE PRE-MIXED SEED PRODUCT KNOWN AS "NET SEASON MIX" FROM WILLYE HURDRESS, INC. OF OSWEGO, WISCONSIN (800 231 3700). IF NET SEASON MIX IS USED, APPLY AT 20 POUNDS PER ACRE. IF THE CONTRACTOR CHOOSES TO USE AN ALTERNATIVE SEED MIX AND/OR SUPPLIER, THE ENGINEER SHALL APPROVE ANY SUCH PROPOSAL AS EQUAL PRIOR TO CONTRACTOR PURCHASE OR APPLICATION.

NOTE #3:
 MULCH BLANKETS -
 THE CONTRACTOR SHALL PLACE AND STAPLE MULCH BLANKETS ON ALL BARE SOIL AREAS ABOVE 803.5 FT ELEVATION AFTER SITE IS COMPLETELY SEDED. NO MULCH BLANKETS ARE TO BE PLACED BELOW ELEVATION 803.5 FT.
 HABITAT STRUCTURES -
 THE CONTRACTOR SHALL PLACE STAMP PILES (NO MORE THAN 30 FT DIAMETER) AT GROUND SURFACE AND NO DEEPER THAN 2 FT IN HEIGHT. MULCH HABITAT STRUCTURES ARE REQUIRED AS PER PLAN. THE HABITAT STRUCTURES SHALL BE PARTIALLY BURIED/SUBMERGED TO PREVENT WINDDRAFT DURING PERIODS OF HIGH WINDS. STAMPS SHALL BE OF SUFFICIENT SIZE TO ALLOW FAVORABLE BURN.

CITY OF MARQUETTE - SUPERIOR WATERSHED PARTNERSHIP
 LAKEVIEW STORM DRAIN PROJECT
 EPA GRANT GLOOE01105-0
 WETLANDS PLANTING AND LANDSCAPING

DATE	1/22/14
REV.	2
BY	2
CHKD.	2
APP'D.	2
DATE	1/22/14
REV.	2
BY	2
CHKD.	2
APP'D.	2

TREE PLANTING LEGEND
 DECIDUOUS
 RED MAPLE (ACER RUBRA - FAC)
 BLACK WILLOW (SALIX NIGRA - FAC)
 CONIFEROUS
 WHITE PINE (PINUS STROBUS - LPL)
 WHITE PINE (PINUS STROBUS - LPL)



Jan. 06, 2014

Green



President Barack Obama speaks at the Turner-Fairbank Highway Research Center in McLean, Va., July 15, 2014.

Photo by Stephen Crowley/New York Times/Redux

Obama announces funds to prepare country for climate change

07/16/14 08:40 AM - UPDATED 07/16/14 10:20 AM

By Jane C. Timm

Facebook Twitter + 0 save share group 63

FEMA Will Require States to Examine Climate Risks in Disaster Planning

Two of the top three states to receive FEMA disaster grants through 2012 are led by governors who aren't convinced that climate change poses a threat.

By Katherine Bagley, InsideClimate News

Oct 1, 2014



The Federal Emergency Management Agency is about to make a significant shift in the way it handles climate change.

FEMA will soon require states to examine the impacts of global warming on their communities as a condition for receiving federal disaster preparedness funding.

GREAT WATERSHEDS
SUPERIOR EXPERIENCES



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GREAT LAKES & ST. LAWRENCE CITIES INITIATIVE

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2014 League Convention

Join hundreds of municipal officials who will gather from every corner of the state to a northern Michigan gem nestled on the sparkling shore of Lake Superior. [Read More...](#)



SUPERIOR
WATERSHED
PARTNERSHIP
AND LAND TRUST

Emergency Preparedness

*WHAT it is and WHY
it's so important*

Teresa Schwalbach, PEM
Marquette County
Emergency Management



Emergency Management System in Michigan

1. The Emergency Management Act, Public Act 390, PA of 1976, created the Emergency Management and Homeland Security Division within the Michigan State Police.
2. Each county is mandated to have an emergency management program in place.



Emergency Management Coordinator

Role:

To coordinate emergency management activities within the county or municipality.



Emergency Coordinator Responsibility

- **Five Phases of Emergency Management**

Mitigation
Preparedness
PLANNING
Response
Recovery



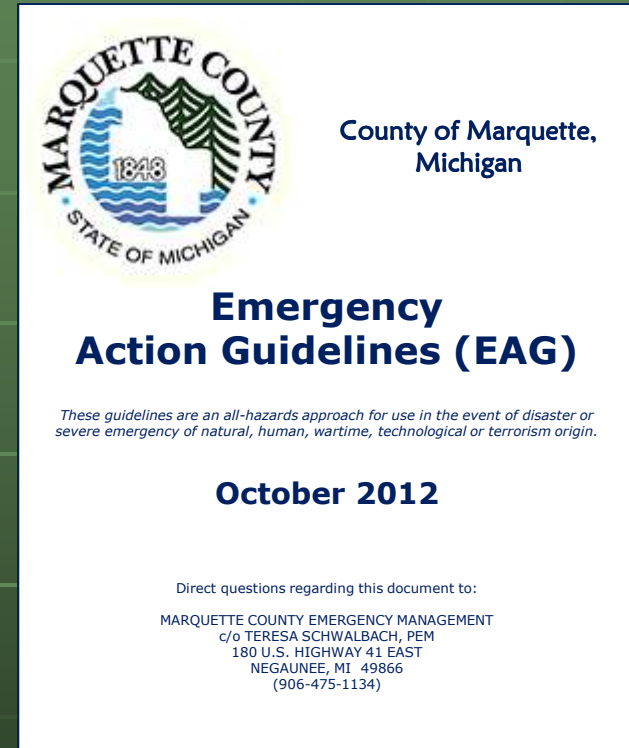
Developing A Emergency Plan

- Where do you start?
 - *First...coordinate*
 - Meet with Emergency Management Coordinator
 - EMC will provide resources needed to develop plan
 - Meet with department heads
 - Meet often – *(face to face)*



Developing An Emergency Plan

- *Second...collaborate*
 - Develop site emergency team (*EM, police, fire, EMS, etc.*).
 - Conduct a Hazard Analysis.
 - Perform a Capability Assessment.
 - Design/Develop the plan.
 - Exercise/"test" the plan.



Then What?

- *Third...communicate*

- Ask the Emergency Coordinators how to exercise the plan. (*get their buy-in*).
- Test ("exercise") your plan.
- Schedule activities to accommodate the participants.
- Exercise should be realistic.
- Not a pass/fail conclusion.
- Goal is to **"Learn So You Improve"**



Why Test Your Plan?

- ***By testing ("exercising") the plan, we...***
 - Will know what your role is ahead of time.
 - Get to know the people who will be involved. *(EM, police, fire, EMS)*
 - Identify deficiencies in the plan and correct them.
 - Exercises are very beneficial for both and a must. *(Emergency personnel will be ready and so will your personnel).*



Updating Your Plan

Plan is updated every 4 years.

- Update data on a regular (annual) basis.
- Make sure everyone has a current emergency plan. (*New employee packets*)
- Make sure everyone knows what their role is.



Why Have A Plan?

- The Emergency Operations Plan is **vital in an emergency.**
 - *You'll know who/where to evacuate.*
- Real time web site info and FAQ's help the public.
- Having the right people from both public and private sector is **important!**
- Good rapport with local, state and federal officials/agencies help significantly.
- With ever changing weather climate change, planning for the unexpected is a must.



EM Resources

- Coordination
- Collaboration
- Communication

- Public works
- Human services
- Elected officials
- Business
- Police
- Fire
- Utilities
- Schools
- Public health
- Nursing/Adult Homes
- Neighborhoods
- Hospitals
- Volunteer groups
- Forestry
- Public transportation
- Non-profits
- Railroads
- Hazmat sites
- State agencies
- Federal agencies
- National Guard
- Animal services
- Economic development
- Media



Marquette County EOC



EOC

Site where...

- Decision makers gather to assess the severity of the situation and implement the EAG, as appropriate.
- Activate response and recovery operations.
- It is the “**hub**” for getting necessary resources to emergency responders.
- It is **NOT** the public information center.



EOC

- **When EOC is activated...**

- Decision makers are contacted.
- Report to EOC in a timely manner.
- Obtain ID at front desk and sign in.
- Retrieve annex box and start set up.
- Executive-Command Section will brief everyone on situation.



Emergency Response to Climate Change

Will Climate Change affect response efforts?.....Possibly.

- It could be more lengthy (freeze).
- Volunteers. (burn out).
- Resources will become exhausted.

For example.....



2003 Silver Lake Flood

Cause:

- Extensive Rain
- Quick Snow melt



2009 Black Falls Fire

Cause:

- Dry/High Fire Danger.
- Heavy Winds.
- Downed electrical pole started the fire.



Freeze 2014

Cause:

- Unseasonable cold temperatures.
- Extensive frost depth.



Almost Finished!

- No matter what the weather, preparation is necessary.
- Coordination between agencies is key.
- Turf wars do not work during an event. Work it out prior to the event!
- ***Don't ever assume it won't happen to your community, it will!***



Questions?



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E-Mail: tschwalbach@mqtco.org

