

APPENDIX G
Sheboygan, Manitowoc, and Ozaukee County, Wisconsin
Discovery Report

Discovery Report

Great Lakes Coastal Flood Study

Lake Michigan

Sheboygan County, Manitowoc County, and Ozaukee County, Wisconsin

Individual Report

Report Number 01

February 2013



U.S. Department of Homeland Security
Federal Emergency Management Agency Region V
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Appendix G – Sheboygan, Manitowoc, and
Ozaukee County Discovery Report February 2013

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Project Area Community List

This list includes all communities within the Project Area covered by this report for the Great Lakes Coastal Study under consideration for new Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) products and datasets, which may include Flood Insurance Studies (FISs) and Flood Insurance Rate Maps (FIRMs). Not all communities will receive new/updated FEMA Risk MAP products and datasets or FISs and FIRMs.

Sheboygan County*	Manitowoc County*	Ozaukee County*
Cedar Grove, Village of	Cleveland, Village of	Bayside, Village of
Oostburg, Village of	Manitowoc, City of	Mequon, City of
Sheboygan, City of	Manitowoc County (unincorporated areas)*	Ozaukee County (unincorporated areas)*
Sheboygan County (unincorporated areas)*	Two Rivers, City of	Port Washington, City of

*In Wisconsin, only those jurisdictions known to be responsible for administering floodplain ordinances and potentially affected by the upcoming Lake Michigan coastal flood study were included in this Discovery process. However, all coastal communities are encouraged to participate in the future Lake Michigan coastal flood study process and may request to be included in future correspondence regarding the Lake Michigan coastal flood study.

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Acronyms and Abbreviations

AAL	Average Annualized Loss
CAV	Community Assistance Visit
CBRS	Coastal Barrier Resources System
CID	Community Identification Number
CIS	Community Information System
CMAG	Coastal Management Assistance Grant
C-MAN	Coastal Marine Automated Network
CNMS	Coordinated Needs Management Strategy
CO-OPS	Center for Operational Oceanographic Products and Services
CRS	Community Rating System
DFO	Department of Fisheries and Oceans
FEMA	Federal Emergency Management Agency
FIPS	Federal Information Processing Standards
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GLCRG	Great Lakes Coastal Restoration Grant
Hazus-MH	Multi-Hazard Risk Assessment and Loss Estimation Software Program
HWM	High Water Mark
HUC8	Hydrologic Unit Code 8
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision based on Fill
MLI	Midterm Levee Inventory
NDBC	National Data Buoy Center
NFIP	National Flood Insurance Program
NGDC	National Geophysical Data Center
NID	National Inventory of Dams
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
Risk MAP	Risk Mapping, Assessment, and Planning
SFHA	Special Flood Hazard Area
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

I. Discovery Overview

The Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning, or Risk MAP, program, helps communities identify, assess, and reduce their flood risk. Through Risk MAP, FEMA provides information to enhance local mitigation plans, improve community outreach, and increase local resilience to floods.

During the Discovery phase of Risk MAP project development, FEMA:

- Gathers information about local flood risk and flood hazards
- Reviews mitigation plans to understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities
- Supports communities within the coastal area to develop a vision for the future
- Collects information from communities about their flooding history, development plans, daily operations, and stormwater and floodplain management activities
- Uses all information gathered to determine which areas require mapping, risk assessment, or mitigation planning assistance through a Risk MAP project
- Develops Discovery Map and Report that summarize and display the Discovery findings



The Discovery process involves coordination with Great Lakes stakeholders, data collection and analysis, community interviews, a Discovery Meeting with stakeholders affected by the study, and development of recommendations based on an analysis of data and information gathered throughout the process.

i. Great Lakes Coastal Flood Study

FEMA has initiated a coastal analysis and mapping study that may result in updated Flood Insurance Rate Maps (FIRMs) for coastal counties along the Great Lakes. The new coastal flood hazard analyses will utilize updated 1-percent-annual-chance (100-year) flood elevations obtained from a comprehensive storm surge study being developed by the U.S. Army Corps of Engineers (USACE).

The Great Lakes Coastal Flood Study (GLCFS) will incorporate modern analysis of historic storm and high water events and provide for updated flood risk information serving United States communities having shoreline along the Great Lakes. The storm surge study is one of the most extensive coastal storm surge analyses to date, encompassing coastal floodplains in the eight States with coastlines on the Great Lakes.



An updated coastal flood study is needed to obtain a better estimate of coastal flood hazards on the Great Lakes. The current, effective FIRMs are outdated primarily due to the age of data and the coastal methodologies used in producing them. Major changes in National Flood Insurance Program (NFIP) policies and methodologies have been implemented since the effective date of many flood insurance studies in the area, creating the need for an update that will reflect a more detailed and complete hazard determination.

The GLCFS includes a system-wide solution that provides a comprehensive analysis of storm and high water events within the Great Lakes Basin. This program is funded through the FEMA Risk MAP program. FEMA, USACE, Association of State Floodplain Managers (ASFPM), State partners, and FEMA contractors will collaborate in updating the coastal methodology and flood maps, and create new flood risk products. FEMA manages the NFIP, which is the cornerstone of the national strategy for preparing communities for flood-related disasters.

ii. Purpose of Great Lakes Discovery

The Great Lakes Discovery process included data collection, information exchange between all governmental levels of stakeholders, spatial data presentation, cooperative discussion with stakeholders to better understand the Great Lakes area, and a collaborative approach on the project planning. The process allowed FEMA to continue to vet the Great Lakes coastal study methodologies with a large stakeholder group, to discuss local priorities and data, to discuss mitigation strategies and coastal issues, and to move towards a project that will successfully identify the risks associated with Great Lakes flooding.

The Discovery process also helped FEMA to better identify the types of datasets or products that will be useful at the local level, especially as it relates to identifying new mitigation strategies and actions, and for use in local planning efforts. Products that may be available to communities as a result of this Great Lakes flood study include updated FIRMs and FISs, coastal flood risk products, calibrated models for storm surge and wave analysis on each of the lakes, and accurate depictions of water level and wave response on each lake occurring during hundreds of actual events. The type of product a community

receives is dependant not only on the coastal flood study analysis results, but also on the type of datasets, local and national, that are available.

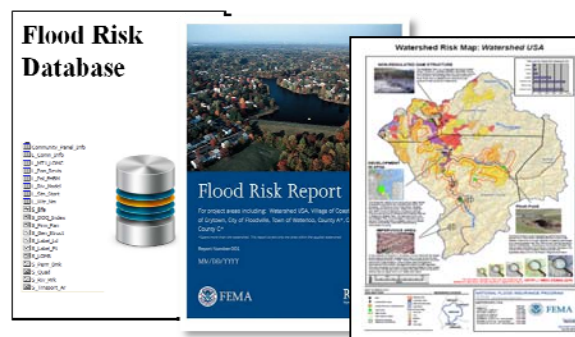
The following section describes the coastal flood risk products that a community may receive, as well as some products that are under development for the Great Lakes study areas.

iii. Coastal Flood Risk Products

As part of a Risk MAP project, FEMA will seek to provide State and community officials with three flood risk products to help them gain a better understanding of flood risk and its potential impact on communities and individuals. These products will also enable communities to move forward with informed mitigation actions to reduce identified risk. Delivery of the products discussed below will depend on available data, results of coastal analysis, local partnerships, and fiscal year funding.

The three products are:

- Flood Risk Database
- Flood Risk Report
- Flood Risk Map

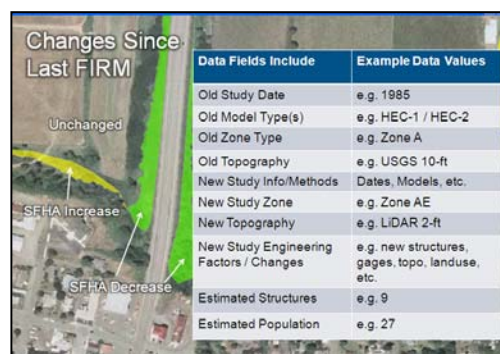


These products will summarize information captured in flood risk datasets that may be generated during a Risk MAP, or flood risk, study. The flood risk datasets could include regular and enhanced products. Standard flood risk datasets, also termed products, are listed below:

- **Changes Since Last FIRM (CSLF)**

The CSLFs serve the following purposes:

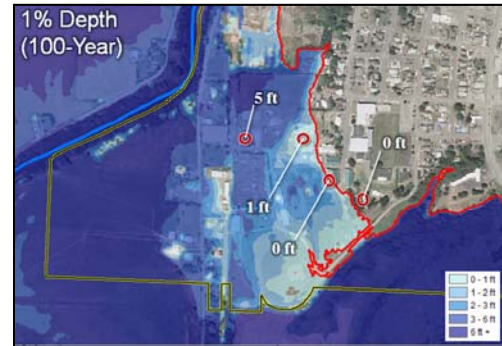
- Identify Areas and Types of Flood Zone Change:
 - Compares current effective (previous) with proposed (new) flood hazard mapping; and
 - Flood zone changes are categorized and quantified.
- Provide Study/Reach Level Rationale for Changes Including:
 - Methodology and assumptions; and



- Changes of model inputs or parameters (also known as Contributing Engineering Factors).

- **Flood Depth and Analysis Grids (1-percent-annual-chance event only)**

- Reflect total depth (i.e. stillwater and waves). Will be created for the 1-percent frequency event of the engineering studies performed and as appropriate for the data. Wave runup areas may not be applicable.
- Created using the regulatory mapping and associated zone breaks as input



- **Flood Risk Assessment (Hazus-MH)**

- Hazus-MH combines science, engineering and mathematical modeling with GIS technology to estimate losses of life and property, and shows those losses on a map.
- HAZUS-MH estimates impacts to the physical, social, and economic vitality of a community from earthquakes, hurricane, winds, and floods.
- Coastal flood risk assessments will be similar to riverine, but will use coastal depth grids as input for refined analysis.
- Hazus-MH analysis and data can support adoption of high regulatory standards for structures in high loss areas.
- Hazus-MH results can help to provide justification to find mitigation projects to protect citizens and properties from losses during future coastal flood events.



For more information about Hazus and data inputs, visit <http://www.fema.gov/hazus> or enter keywords "fema hazus" into an internet search engine.



In addition, FEMA is looking into the possibility of developing some unique Great Lakes coastal flood risk products that utilize datasets that have recently been collected or will be collected as part of the GLCFS:

- Storm Response Erosion Data: Dataset is expected to contain the results from erosion analysis in response to the 1-percent-annual chance flood event
- Shoreline Feature Data: Dataset was developed by the USACE in 2012 and contains primary and secondary land use tables, as well as coastline type, materials, and vegetation. The current dataset contains data at one-mile spacing. The dataset does not include field-based reconnaissance or sediment/subsurface soil collection.

The delivery of these standard flood risk products and the Great Lakes coastal flood risk datasets will be dependent on the location of the Risk MAP study and coastal analysis, data availability, fiscal year funding, and partnerships with local communities. Therefore, all communities may not receive flood risk products.

II. Stakeholder Communication and Coordination

Communication and coordination with Federal, State and local stakeholders is key to the success of the GLCFS. A large emphasis has been placed on identifying stakeholders early and often and working with those stakeholders continually throughout the study process, from Discovery all the way through flood map and flood risk product development. Through outreach, the goal is to increase understanding of the new coastal study methodologies and the tools and processes that will be available for risk-based community planning, and to increase flood hazard awareness within the Great Lakes coastal region.

i. Lake Michigan Discovery Stakeholder Coordination

Meetings, emails, telephone calls, and letters are essential to communicate effectively throughout the life of this Lake Michigan Coastal Flood Study project, which has begun with this Discovery process.

To kick-off this Discovery process, FEMA formed a group of core stakeholders, which included representatives from FEMA Region V, STARR (mapping partner to FEMA), USACE, NOAA, ASFPM, the State NFIP Coordinators, the State Hazard Mitigation Officers (SHMOs), and State Engineers. The core stakeholders reviewed the Discovery plan, objectives, and key outcomes for Lake Michigan Discovery with FEMA, provided suggestions for outreach and communication, and raised any concerns as it related to Lake Michigan and the coastal flood study process. Following this kick-off process, outreach, communication, and coordination with local stakeholders was initiated.

Discovery Meeting letter invitations were sent to local community and county stakeholders within the Sheboygan, Manitowoc, and Ozaukee County portions of the Lake Michigan Coastal Flood Study project. In addition, an email invitation was sent to a larger list of stakeholders including, but not limited to, the core stakeholders, other federal agencies, universities, watershed groups, Great Lakes associations, technical stakeholders, and emergency management agencies. Representatives from the local governments, including cities, townships, and villages were considered fundamental stakeholders in this process because they have been elected or appointed to represent the interests of the residents of this project area.

The Discovery Meeting invitations also included a Coastal Data Request Form (Attachment A). Communities were asked to provide information on data that they had available at the local level that may be of use during the flood study update and during the development of the coastal flood risk products discussed earlier in this report. The Coastal Data Request Form included data requests for:

- Base Map Data
- Coastal Data
- Historic Flood Data
- Risk Assessment
- Flood Mitigation Information
- Community Plans and Projects
- Other comments/concerns based on local knowledge

Coastal Data Request Forms were completed and returned to FEMA by the City of Two Rivers and the Village of Cleveland in Manitowoc County, and the City of Sheboygan in Sheboygan County. A summary of the responses to the Coastal Data Request Form can be found in Section IV, Summary of Data Analysis, of this report.

In addition to the hard copy letter invitations, and in order to improve the communication and data sharing leading up to the Discovery Meeting, FEMA offered local communities an opportunity to attend a pre-Discovery Meeting conference call, also termed an “Information Exchange Session”. The conference call information was included in the Discovery Invitation letters mailed to local community officials, and an email reminder was sent out as well. The session’s intent was to begin the process of learning about local data availability and what the critical issues are for the Great Lakes communities. Representatives from Bay-Lake Regional Planning Commission, the Village of Cleveland (Manitowoc County), the City of Two Rivers (Manitowoc County), Manitowoc County, Ozaukee County, and Wisconsin Department of Natural Resources (DNR) were in attendance. Stakeholders discussed their current data availability, as well as questions they had regarding the upcoming GLCFS process, areas of concern, and the Coastal Data Request Form.

The core stakeholder documents, “Information Exchange Session” documents, stakeholder contact list, and Discovery Meeting invitations can be found in Attachment B, Sheboygan, Manitowoc, and Ozaukee County Pre-Meeting Correspondence.

III. Discovery Meeting

The Discovery Meeting for the Sheboygan, Manitowoc, and Ozaukee County was held on August 16, 2012 in Cleveland, Wisconsin. All communities affected by coastal flooding in Sheboygan, Manitowoc, and Ozaukee Counties were invited to the Discovery Meeting. The purpose of this meeting was to facilitate discussion about study needs, mitigation project needs, desired compliance support, and local flood risk awareness efforts.



The objectives of the Discovery Meeting included:

- Continuation and expansion upon stakeholder engagement
- Discussion of data inputs from Federal, state and local stakeholders
- Identification of local coastal flood hazard needs and areas of concern
- Identification of flood risk products and datasets that best advance coastal mitigation action
- NFIP regulatory updates
- Discovery schedule and deliverables

The Discovery Meeting presentations included the following information:

- An overview of the GLCFS and schedule
- Review of the Discovery process and outcomes
- Discussion of coastal mapping and flood risk topics to be aware of
- Discussion of how the study may affect the communities, including compliance requirements
- Review of hazard mitigation opportunities and grant funding
- Encouragement and facilitated discussion regarding coastal study needs, mitigation project needs, desired compliance support, and local flood risk awareness efforts

Draft Discovery Maps for Sheboygan, Manitowoc, and Ozaukee County (Attachment C) were displayed and utilized during the meeting to facilitate the discussion regarding areas of coastal flood risk concern and areas of hazard mitigation interest. The draft Discovery Maps shown at the meeting included geospatial and tabular data that had been collected prior to the meeting,

Geospatial Data:

- Average Annualized Loss (AAL) data
- Coastal Barrier Resources System (CBRS)¹
- Coordinated Needs Management Strategy (CNMS)² Data- riverine only
- Proposed Transects
- Effective Special Flood Hazard Areas (SFHAs)
- Jurisdictional Boundaries
- Letters of Map Change (LOMCs)
- Levees
- Shoreline
- Streams
- USGS Gages
- Watershed Boundaries

Tabular Data:

- Declared Disasters
- Flood Insurance Data
- Potential Mitigation Actions (from local Hazard Mitigation Plans)
- Summary of Shoreline Data (Type and Coverage)

Participants at the Discovery Meeting were asked to cooperatively identify Areas of Concern and Areas of Mitigation Interest (AoMIs) within the Sheboygan, Manitowoc, and Ozaukee County Lake Michigan study area using the draft Discovery Maps and through general discussion during the meeting.

In addition to the draft Discovery Maps, figures showing the location of initially proposed draft transects around Sheboygan, Manitowoc, and Ozaukee County were available for review and comment immediately following the meetings. Stakeholders were encouraged to review the proposed draft transects and provide comments related to the location of the transects. The proposed draft transect maps that were available at the Discovery Meeting for Sheboygan, Manitowoc, and Ozaukee County can be found in Attachment D. A sample map is shown below as Figure 1.

¹ CBRS consists of the undeveloped coastal barriers and other areas located on the coasts of the United States that are identified and generally depicted on a series of maps. CBRS areas are ineligible for most new Federal expenditures and financial assistance.

² CNMS is FEMA's strategy for coordinating the management of mapping needs using modern geospatial technologies and current policies, requirements, and procedures. CNMS makes information related to mapping needs readily accessible and more usable. CNMS is only for riverine studies at this time. It is expected coastal needs will be captured in this system in the future.



Figure 1: Sample Proposed Transect Figure

All comments that were provided during the Sheboygan, Manitowoc, and Ozaukee County Discovery Meeting on the draft Discovery Maps and draft transect figures, as well as comments provided following the meeting, have been compiled into geospatial layers and associated tables. The GIS layers, titled “Stakeholder General Comments” and “Stakeholder Transect Comments”, can be found on the Final Discovery Map in Appendix R of the basin-wide Lake Michigan Discovery Report (Federal Emergency Management Agency, 2012). Each comment has a unique map identification number (if one exists) that correlates to its location on the Final Discovery Map. The identification of a comment (ID) categorized as a “Stakeholder General Comment” is represented by using the first three letters of the county name followed by a unique number (i.e. SHE – 1, SHE - 2). The identification of a comment (ID) categorized as a “Stakeholder Transect Comment” is represented by using the first three letters of the county name, followed by “TR”, followed by a unique number (i.e. SHE-TR-1, SHE-TR-2).

A summary of the transect comments collected and the resulting revisions to the draft transect layout can be found in this report in Section IV, Summary of Data Analysis, under the “Proposed Draft Transects” subsection.

Discovery meeting minutes, sign in sheets, PowerPoint presentation, marked up draft Discovery Maps, and correspondence documentation have been included in the Attachment F, Sheboygan, Manitowoc, and Ozaukee County Discovery Meeting Documents.

IV. Summary of Data Analysis

During this Discovery portion of the Lake Michigan Coastal Flood Study project, a massive collection of tabular and spatial data was conducted for all the coastal communities from Federal and State sources, as well as information collected through phone conversation, information exchange session conference calls, the Discovery Meeting, and the Discovery Coastal Data Request Forms sent to each coastal community. This section lists the types of data and their sources that were collected for the Sheboygan, Manitowoc, and Ozaukee County study area, including information collected during and after the Discovery Meeting. The data analysis that follows Table 1 is divided into two sections: one section listing the data that can be used for Risk MAP product development and the other section listing the information that helped the study team to form a better understanding of the Sheboygan, Manitowoc, and Ozaukee County Lake Michigan Project Area prior to moving forward with the coastal flood study.

Table 1. Data Collected for Sheboygan, Manitowoc, and Ozaukee County

Data Types	Deliverable/Product	Source	Date of Data Collection	Level
Average Annualized Loss Data (AAL)	Discovery Map	Federal Emergency Management Agency (FEMA)	June 2012	Nationwide
Bathymetry and Topography	Discovery Report	USACE	2012/2013	Lakewide
Census Blocks	Discovery Map	U.S. Census Bureau	June 2012	Countywide
Coastal Data Request Form	Discovery Report	Community and County Stakeholders	July 2012	Countywide
Contacts	Discovery Report	Local Community Websites, State/FEMA updates	June 2012	Countywide
Community Assistance Visits (CAVs)	Discovery Report	FEMA Community Information System (CIS)	July 2012	Countywide
Community Rating System (CRS)	Discovery Report	FEMA's "Community Rating System Communities and Their Classes"	July 2012	Nationwide
Comprehensive Plans	Discovery Report	Local Community Websites	July 2012	Countywide
Coastal Barrier Resources System (CBRS)	Discovery Map	U.S. Fish and Wildlife Service	July 2012	Nationwide
Coastal Structures	Discovery Map/Tabular Data	U.S. Army Corps of Engineers (USACE)	August 2012	Nationwide
Coordinated Needs Management Strategy (CNMS)	Discovery Map	FEMA	July 2012	Countywide
Critically Erosion Beach Areas	Discovery Report	Local Stakeholders	August 2012	Statewide

Table 1. Data Collected for Sheboygan, Manitowoc, and Ozaukee County

Data Types	Deliverable/Product	Source	Date of Data Collection	Level
Critical Facilities	Discovery Report	Local Mitigation Plan	July 2012	Countywide
Dams	Discovery Report	USACE, National Inventory of Dams, Flood Insurance Rate Map (FIRM) Database	July 2012	Countywide
Declared Disasters	Discovery Report	FEMA’s “Disaster Declarations Summary”	June 2012	Nationwide
Demographics, Industry	Discovery Report	U.S. Census Bureau, Local Mitigation Plans	June 2012	Countywide
Effective Floodplains	Discovery Map	FEMA Map Service Center and Mapping Information Platform	June 2012	Countywide
Flood Insurance Policies	Discovery Report	FEMA CIS	July 2012	Nationwide
Hazard Mitigation Plans and Status	Discovery Report	Local Mitigation Plans	July 2012	Countywide
Hazard Mitigation Assistance Program Grants	Discovery Report	FEMA’s “Hazard Mitigation Program Summary” Community Input	June 2012	Nationwide
Hazard Mitigation Projects	Discovery Report	Local Mitigation Plans	July 2012	Countywide
High Water Marks	Discovery Report	Effective Flood Insurance Study (FIS)	August 2012	Countywide
Historical Flooding	Discovery Report	Effective Flood Insurance Study (FIS), Local Mitigation Plans	July 2012	Countywide
Historical Storm Events	Discovery Report	Effective FIS, Local Mitigation Plans	July 2012	Countywide
Individual/Public Assistance	Discovery Report	FEMA’s “Public Assistance Subgrantee Summary”	June 2012	Nationwide
Letters of Map Change (LOMCs)	Discovery Map	FEMA’s Mapping Information Platform	July 2012	Countywide
Meteorological Gages	Discovery Map	National Oceanic and Atmospheric Administration (NOAA) Great Lakes Environmental Research Laboratory	July 2012	Regionwide
Oblique Imagery	Discovery Report	USACE	2012	Lakewide
Ordinance	Discovery Report	Local Community Websites	July 2012	Countywide

Table 1. Data Collected for Sheboygan, Manitowoc, and Ozaukee County

Data Types	Deliverable/Product	Source	Date of Data Collection	Level
Proposed Draft Transects	Discovery Map	FEMA	February 2013	Lakewide
Repetitive Loss	Discovery Report	FEMA CIS	July 2012	Countywide
Shoreline Classification	Discovery Map	USACE	July 2012	Regionwide
Stream Gages	Discovery Map	USGS	July 2012	Countywide
Water Level Gages	Discovery Map	NOAA Department of Fisheries and Oceans	July 2012	Regionwide
Wave Gages	Discovery Map	NOAA	July 2012	Regionwide

i. Data that can be used for future Coastal Flood Risk Products

During the Discovery process, the project team created a database of available flood hazard and flood risk assessment data. This database not only provides an inventory of available data, but helps identify gaps in the flood hazard data. State, county, and government geographic information system (GIS) websites can provide some of the pertinent data, but local knowledge of flooding and mitigation projects is critical to help accurately determine flood risks and mapping needs. Therefore, local and regional data were also used where available. The subsections below provide details on the data determined to be available within the project area.

I.IV.i.1 Average Annualized Loss (AAL) Data

Average Annualized Loss (AAL) data provides a general understanding of the dollar losses associated with a certain frequency of flood events within a county and is used to get a relative comparison of flood risk. They are determined by FEMA’s Multi-Hazard Risk Assessment and Loss Estimation Program, otherwise known as Hazus-MH.

Hazus, a free risk assessment software application from FEMA, is the most widely used flood risk assessment tool available. Hazus can run different scenario floods (riverine and coastal) to determine how much damage might occur as a result. Hazus can also be used by community officials to evaluate flood damage that can occur based on new or proposed mitigation projects or future development patterns and practices, and it can run specialized risk assessments, such as what happens when a dam or levee fails.

Hazus-MH includes national datasets that can be supplemented with local data. If local detailed data are available, users may consider using this data to perform more refined

Hazus analyses. Hazus-MH is flexible and allows users to update Hazus-MH with local data or use a combination of both local and national. Augmenting the Hazus-MH provided data with local data can improve the accuracy and resolution of analysis results. Additional information about the Hazus-MH process and tool can be found at <http://www.fema.gov/protecting-our-communities/hazus>.

The Hazus-MH analysis used in this report is based on approximate flood boundaries and national datasets. The calculation is based on flood elevation estimates using the 10-meter Digital Elevation Model (DEM) on streams with drainage areas of at least 10 square miles.

The results shown in Table 2 include data for the entire county, as opposed to only the coastal project area. Information can also be obtained from the report titled FEMA *Hazus AAL Usability Analysis*, dated April 13, 2011 (Federal Emergency Management Agency, 2011). AAL data summarized at the census block level are shown on the draft Discovery Maps (Attachment C).

Table 2. Hazus AAL Data for Sheboygan, Manitowoc, and Ozaukee County

FIPS Code	County	Total Losses for Building and Content (in thousands of \$)
55071	Manitowoc County, WI	\$159,289
55089	Ozaukee County, WI	\$155,407
55117	Sheboygan County, WI	\$246,590

Source: FEMA

FIPS = Federal Information Processing Standards

I.IV.i.2 Coastal Recession

Coastal erosion is the recession of land and the removal of beach or dune sediments. It affects all of the beaches and coasts in the world, including those of Lake Michigan. Important factors in coastal erosion are the types of rock or soil being eroded, the presence or absence of beaches or human-made structures, and how the shore is oriented with respect to prevailing winds and waves, water levels, climatology, and groundwater and surface drainage.

Coastal erosion and recession along the Great Lakes shoreline is a significant issue in coastal communities in Wisconsin. According to the Wisconsin Coastal Management Program 2011-2016 Needs Assessment and Strategy, all fifteen of Wisconsin's coastal counties experience erosion. Wisconsin's Lake Michigan shoreline is generally vulnerable to shore erosion from the Illinois State line to the Sturgeon Bay Canal, a distance of 185 miles. From the Sturgeon Bay Canal around the northern tip of Door County to Green Bay, shore erosion is largely limited to bays and clay banks. Erosion rates are particularly high along sand plains and high bluffs composed of till. Short-term erosion rates of 3 to 15 feet per year have been recorded along sand plains and 2 to 6 feet per year along high bluff lines (Wisconsin Department of Administration, 2010).

Erosion impacts along Wisconsin's Great Lakes coasts are varied in severity and geology. The sandy bluffs of the mid Lake Michigan are more susceptible to continual slope failures than the gradual shoreline of southern Lake Michigan or the rocky shoreline of Door County. The State of Wisconsin Hazard Mitigation Plan identifies coastal erosion as one of thirteen hazards that have the highest probability of affecting the state and the greatest potential for mitigation. Flooding is listed as having a high probability and high potential for mitigation (Wisconsin Department of Administration, 2010).

Studies and reports relevant to Wisconsin's coastal hazards, and in particular erosion, were pulled from the Wisconsin Coastal Management Needs Assessment and Strategy and are listed below:

- SEH/Baker, 1997. "Lake Michigan Recession Rate Study Final Report". (Report prepared for the Wisconsin Coastal Management Council, Wisconsin Department of Administration).
- Wisconsin Coastal Management Program (WCMP), October 2007. "A Strategic Vision for the Great Lakes". (<http://www.doa.state.wi.us/docview.asp?docid=7039>)
- Springman, R. and S. M. Born, 1979. "Wisconsin's Shore Erosion Plan: An Appraisal of Options and Strategies" (<http://wisconsingeologicalsurvey.org/wofrs/WOFR1979-03.pdf>)
- State of Wisconsin Hazard Mitigation Plan (updated 2008) (<http://emergencymanagement.wi.gov/mitigation/planning.asp>)
- Bay Lake Regional Planning Commission (BLRPC) study, "Coastal Bluff Stability Study, Inventory & Description", September 1995. (<http://www.baylakerpc.org/about/publications>)
- Southeastern Wisconsin Regional Planning Commission (SEWRPC) study (1997), Technical Report No. 36, "Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin", 1995 (<http://maps.sewrpc.org/Publications/search.asp>)
- Coastal Processes Manual (1998) (<http://aqua.wisc.edu/publications/ProductDetails.aspx?productID=356>)
- Lake Michigan Potential Damages Study (1999) (<http://www.lre.usace.army.mil/greatlakes/hh/greatlakestudies/lakemichiganpotentialdamagesstudy/>)

Some historic studies and reports also include:

- Southeastern Wisconsin:
Shoreline Recession and Bluff Stability - 1977 to 1995 – Southeastern Wisconsin Regional Planning Commission (SEWRPC) 1997 reports changes in bluff recession and bluff stability on selected bluff slopes between two specific measurement dates, two decades apart, in Kenosha, Racine, Milwaukee and Ozaukee counties shoreline.
- Northeastern Wisconsin:

Recession and Slope Stability - 1977 – 1995 - Bay Lake Regional Planning Commission (BLRPC) (1996) reports changes in bluff recession and bluff stability on selected bluff slopes between four specific measurement dates 1977, 1980, 1988 and 1995 conducted by Bay Lakes Regional Planning Commission. The report covers nearly two decades of erosion studies in 23 shoreline reaches along 77 miles of the Lake Michigan coast in Sheboygan, Manitowoc, Kewaunee, and Door counties.

There are 11 Lake Michigan counties in Wisconsin that have maps depicting erosion rates. These counties include Marinette, Oconto, Brown, Door, Kewaunee, Manitowoc, Sheboygan, Ozaukee, Milwaukee, Racine, and Kenosha. These erosion maps were not obtained during this Discovery process. It was noted by stakeholders that the maps may be over 25 years old.

Wisconsin Coastal Management Needs Assessment and Strategy report also talks about methodologies used to determine setback requirements. The report noted that since the last Needs Assessment, members of the Coastal Hazard Work Group have led developments in determining setbacks. In particular, work group members have coordinated with Bayfield County zoning staff to develop a new setback ordinance for the counties. The outcome is currently a voluntary standard that will provide better protection of the county's shoreline (Wisconsin Department of Administration, 2010).

In addition, the Wisconsin Coastal Management Program (WCMP) funded a report titled "Managing Coastal Hazards in Wisconsin's Changing Climate." The report details coastal hazards and risk management on Wisconsin's shores and also provides recommendations. One recommendation is to restrict shore protection structures and encourage non-structural options. WCMP also funded the University of Wisconsin-Madison efforts to investigate lakebed down cutting in Lake Michigan. The work resulted in a better understanding of erosion of the near shore lakebed and increased public awareness of bluff recession (Wisconsin Department of Administration, 2010).

Additional information on erosion affecting Wisconsin can be found in the Wisconsin State Hazard Mitigation Plan.

I.IV.i.3 Federal Land

Federal lands data were obtained from the National Atlas at <http://nationalatlas.gov/mld/fedlanp.html>. This data is also available from the National Discovery Data Repository located on FEMA's Mapping Information Platform (MIP) at <https://hazards.fema.gov>. The map layer shows those lands owned or administered by the Federal Government, including the Bureau of Land Management, the Bureau of Reclamation, the U.S. Department of Agriculture Forest Service, the Department of Defense, the U.S. Fish and Wildlife Service, the National Park Service, and other agencies. Only areas of 640 acres or more are included.

For Sheboygan, Manitowoc or Ozaukee Counties, no federal lands over 640 acres were identified along the coastal areas.

I.IV.i.4 Jurisdictional Boundaries

Jurisdictional boundaries can be obtained from a derived set of TIGER line files available through the U.S. Census Bureau geography division. TIGER line files were last derived from the TIGER database in 1997. To find out more about TIGER line files and other Census TIGER database derived data sets visit

<http://www.census.gov/geo/www/tiger> .

Sheboygan, Manitowoc, and Ozaukee County jurisdictional boundaries can also be obtained from effective FIRM databases, dated April 2, 2009, August 2, 2011, and December 4, 2007, respectively.

I.IV.i.5 Local Data

As part of this Discovery process, communities were asked to fill out a Coastal Data Request Form and provide information on data that they had available at the local level that may be of use during the coastal flood study update, and during the development of the coastal flood risk products discussed earlier in this report. The Coastal Data Request Form (Attachment A) included data requests for base map data, coastal data, historic flood data, risk assessment information, mitigation information, and community plans and projects.

For Manitowoc County, Coastal Data Request Form were returned to FEMA by the City of Two Rivers and the Village of Cleveland. Two Rivers also sent along digital data, including topography (2-ft contours), building footprints, and aerial photography from an April 2010 flight.

For Sheboygan County, a Coastal Data Request form was completed and returned to FEMA by the City of Sheboygan. The City also provided digital data, including topographic data (2-ft contours) and a shoreline dataset.

The table in Attachment G compiles all the information collected for Sheboygan and Manitowoc County from the completed Coastal Data Request Forms. No information was provided via the Coastal Data Request Form from Ozaukee County communities at the time this report was generated.

The datasets that were provided have been included on FEMA's Mapping Information Platform (MIP) Discovery Data Repository at J:\FEMADISCOVERY_DATA_REPOSITORY\R05_DATA\ and can be accessed by FEMA authorized users. The MIP can be accessed from <https://hazards.fema.gov/>.

I.IV.i.6 Publicly Owned Land

State Parks and Public lands are scattered throughout the counties. During this Discovery process, the City of Two Rivers (Manitowoc County) noted the majority of coast along Manitowoc County is zoned conservancy and designated as Park Land and Open Space.

There were no additional Publicly-owned lands specifically identified along the shoreline of Sheboygan, Manitowoc, and Ozaukee Counties within the study area at the time this report was created (Federal Emergency Management Agency, 2011).

No statewide geospatial coverage dataset for publicly owned lands was identified during this Discovery process.

I.IV.i.7 Shoreline Information

A shoreline feature dataset was generated by USACE Detroit District (U.S. Army Corps of Engineers, 2012) using 2012 oblique photographs (see “Topography, Bathymetry, and Oblique Imagery” subsection in this report). The dataset captures shoreline types, land uses, coverage, and vegetation types along the entire Great Lakes shoreline, including Lake Michigan. The dataset includes identification of “artificial” shoreline, which may be indicative of local coastal flood protection structures. This dataset does not identify the level of protection of any coastal structures, and it does not validate whether or not a coastal structure exists. The current dataset contains data at one-mile spacing. The dataset does not include field-based reconnaissance or sediment/subsurface soil collection. The dataset can be downloaded from <http://www.greatlakescoast.org/> under the “Technical Resources” section.

From the USACE shoreline feature dataset, the approximate shoreline along Sheboygan, Manitowoc, and Ozaukee Counties that is covered by this Great Lakes Coastal Flood Study totals 94.2 miles.

The shoreline classification information for Sheboygan, Manitowoc, and Ozaukee County is summarized in Tables 3 through 6, including shoreline types, land uses, coverage, and vegetation types, respectively.

Table 3. Summary of Shoreline Types

County	Total Shoreline (mile)	Artificial Shoreline (mile)	Boulders, Bedrock (mile)	Cohesive Clays and Silts (mile)	Sand (mile)	Shingles, Pebbles, Cobbles (Mile)
Manitowoc County	37.4	8.7	--	--	28.7	--
Ozaukee County	27.9	6.5	--	--	15.2	6.2
Sheboygan County	28.8	12.4	0.6	--	14.0	1.8

Source: USACE 2012, Lake Michigan Shoreline Classification

Table 4. Summary of Shoreline by Land Use

County	Total Shoreline (mile)	Commercial/Industrial (mile)	Farm Land (mile)	Forested (mile)	High Density Residential (mile)	Low Density Residential (mile)	Moderate Density Residential (mile)	Park Land (mile)
Manitowoc County	37.4	8.7	--	--	1.2	14.5	4.3	8.7
Ozaukee County	27.9	3.7	--	--	0.6	20.8	0.9	1.9
Sheboygan County	28.8	8.1	0.6	0.6	1.9	13.9	1.9	1.9

Source: USACE 2012, Lake Michigan Shoreline Classification

Table 5. Summary of Shoreline Coverage

County	Total Shoreline (mile)	Bluff 2'-10' (mile)	Coastal Wetland	Dune 2'-10' (mile)	Flat Coast (mile)	High Bluff 10'+ (mile)	High Dune 10'+ (mile)
Manitowoc County	37.4	7.5	--	11.2	3.1	15.1	0.6
Ozaukee County	27.9	3.1	--	7.8		16.4	0.6
Sheboygan County	28.8	6.8	--	15.2	1.9	4.9	--

Source: USACE 2012, Lake Michigan Shoreline Classification

Table 6. Summary of Shoreline Vegetation Types

County	Total Shoreline (mile)	High Density Shrubs/Trees (mile)	Low Density Shrubs/Trees (mile)	Manicured Lawn (mile)	Moderate Density Shrubs/Trees (mile)	None (mile)	Unmaintained Non-Woody Vegetation (mile)
Manitowoc County	37.4	8.7	--	27.5	1.2	--	--
Ozaukee County	27.9	13.4	--	5.0	9.6	--	--
Sheboygan County	28.8	12.1	1.9	14.3	--	0.6	--

Source: USACE 2012, Lake Michigan Shoreline Classification

I.IV.i.8 Stream Lines/Hydrograph

Stream lines and water areas for Sheboygan, Manitowoc, and Ozaukee Counties were acquired from the effective FIRM databases, dated April 2, 2009, August 2, 2011, and December 4, 2007, respectively.

Stream lines for all counties are also available from USGS's National Hydrography Dataset (NHD). The NHD is a digital vector dataset used by Geographic Information Systems (GIS). It contains features such as lakes, ponds, streams, rivers, canals, dams and stream gages. The datasets are designed to be used in general mapping and in the analysis of surface-water systems. Data can be downloaded from <http://nhd.usgs.gov/data.html>.

The Wisconsin Department of Natural Resources (DNR) also maintains Wisconsin Rivers & Shorelines dataset, available by contacting the Wisconsin DNR Bureau of Technology Services or by visiting <http://dnr.wi.gov/maps/gis/appwebview.html>.

I.IV.i.9 Topography, Bathymetry, and Oblique Imagery

New Data Collected for Great Lakes Coastal Flood Study

As part of the GLCFS, Light Detection and Ranging (LiDAR) was collected to develop topographic and bathymetric data along the Lake Michigan shoreline. Topography is the configuration of natural and man-made features of a surface area and their relative position and elevations. Bathymetry is the underwater equivalent to topography.

LiDAR is an optical remote sensing technology that can measure the distance to, or other properties of, a target by illuminating the target with light, often using pulses from a laser. A narrow laser beam can be used to map physical features with very high resolution. Downward-looking LIDAR instruments fitted to aircraft and satellites are used for surveying and mapping. LiDAR can be used to create DTM (Digital Terrain Models) and DEM (Digital Elevation Models), which is a digital model or 3-dimensional representation of the terrain's surface.

The LIDAR data for this study was collected within a 1500 meter buffer (500 meters inland and 1000 meters seaward of the land/water interface). Where water clarity permitted, data was collected to cover all federal navigation projects. Flight lines were flown along the channel alignment to ensure the best possible coverage of inlets and structures.

For quality control purposes, one cross line was used every 25 miles along shore or more frequently to ensure 90 percent of all planned lines within the area were crossed by a cross line. In areas of the coast where natural or artificial barriers prevent aircraft operations, the cross line(s) were collected at the nearest possible location to the required interval, but no closer than five (5) miles to an adjacent planned cross line. Overlapping lines and datasets were compared to each other and to cross lines and the differences calculated.

At the time this report was generated, the quality control process was not yet completed on the LiDAR dataset. However, as part of that process, the vertical difference between the LiDAR and ground truth data will be calculated. Ground truth refers to a process in which a pixel on a satellite image is compared to what is there in reality. This is especially important in order to relate LiDAR data to real features and materials on the ground. The collection of ground truth data enables calibration of the LiDAR data, and aids in the interpretation and analysis of what is being sensed. Using this process, all systematic errors will be identified and eliminated and remaining errors should have a normal distribution. Differences between a DEM created from the LiDAR data representing bare ground and the ground truth data will be unbiased and within +/-15 cm (RMSE³) in flat

³ Root-mean-square-error is a measure of the differences between values predicted by a model or an estimator and the values actually observed.

terrain and within +/-30 cm (RMSE) in hilly terrain. Horizontal positions will be accurate to +/- 1.5m (RMSE). Data will be processed to 2ft contours.

The processing of the bathymetric data for this study will be performed based on the strongest return of each LiDAR pulse, assuming this depth represents the bottom. Data will be processed to produce bottom reflectance data from the LiDAR data.

As of the date of this report, the LiDAR data is expected to become available in the spring of 2013 for this study area. There is a delay in the schedule to collect new bathymetric data; therefore, existing bathymetric data may be used for the transect-based coastal flood hazard analysis. Existing high-resolution bathymetric and topographic data is currently available at <http://csc.noaa.gov> .

As part of the GLCFS, USACE collected oblique imagery for the entire Great Lakes coastline in 2012. Oblique imagery is captured at an angle, as compared to an overhead view provided by orthophotos, and allows users a 3-dimensional view of landscape, buildings, and other features. This dataset may be useful to communities during emergency response, planning, and identification of shoreline types and obstructions; and management of assets, critical facilities, and public properties along the Lake Michigan shoreline. The oblique imagery is current available via a web-based browser at <http://greatlakes.usace.army.mil/>.

Other Data Available:

The NOAA Coastal Services Center, Digital Coast, hosts a variety of digital coastal data, including bathymetric and topographic data, and is located at <http://www.csc.noaa.gov/digitalcoast> .

During the Information Exchange Session process, several communities and counties in Wisconsin noted there are aerial photographs, oblique photographs, and inland LiDAR available. Countywide LiDAR was collected for Ozaukee County in 2010, and for Sheboygan County in 2005.

I.IV.i.10 Transportation

The Bing Map service has been used as a basemap layer on the Discovery Map, and includes a transportation layer. For more information on Bing Map services and how they can be used in GIS, please visit <http://www.arcgis.com/home> and search for “Bing Maps”.

In addition, transportation data was obtained from the Sheboygan, Manitowoc and Ozaukee Counties effective FIRM databases, dated April 2, 2009, August 2, 2011, and December 4, 2007, respectively.

I.IV.i.11 Watershed Boundaries

U.S. Geological Survey (USGS) Hydrologic Unit Code 8 (HUC8) watershed boundaries were obtained from the National Atlas 2011 “Raw Data Download” (<http://nationalatlas.gov/atlasftp.html>).

Manitowoc County contains portions of two HUC-8 watersheds: Manitowoc-Sheboygan (04030101) and Lower Fox (04030204)

Ozaukee County contains portions of two HUC-8 watersheds: Manitowoc-Sheboygan (04030101) and Milwaukee (04040003).

Sheboygan County contains portions of two HUC-8 watersheds: Manitowoc-Sheboygan (04030101) and Milwaukee (04040003).

ii. Other Data and Information

Manitowoc County is bordered by Lake Michigan on the east, Kewaunee and Brown Counties on the north, Calumet County on the west, and Sheboygan County on the south. The 2010 county population was reported by the U.S. Census Bureau to be 81,442, a decrease from the population of 82,887 in 2000 (U.S. Census Bureau, 2010). Manitowoc County comprises a total land area of 595 square miles. The topography of the area ranges from flat marshland to rough and hilly lands. The more conspicuous features are the sand dune, marsh, and forest areas of Point Beach and the Kettle Moraine, which is a belt of irregular hills and depressions crossing the county from southwest to northeast. Manitowoc County lies entirely within the Lake Michigan watershed. The continuous rise in land elevation can be observed as one proceeds from the shores of Lake Michigan westward across the county.

Ozaukee County is located in southeastern Wisconsin and is bordered on the east by Lake Michigan; on the south by the Villages of River Hills, Brown Deer, and Bayside; on the west by Washington County and the Village of Germantown; and on the north by Sheboygan County. Ozaukee County has a land area of 235 square miles. The county seat is the City of Port Washington, which is located 24 miles north of the City of Milwaukee. The 2010 population of Ozaukee County was 86,395 (U.S. Census Bureau, 2010).

Sheboygan County is located in eastern Wisconsin, along the Lake Michigan shore, entirely within the Lake Michigan drainage basin. About three-quarters of the county is located in the Sheboygan River watershed; a small portion in the northeast is located in the Manitowoc River watershed; while the remainder, in the southwest, is located in the Milwaukee River watershed. The Sheboygan River enters the county from the north and flows south by southeast before emptying into Lake Michigan in the City of Sheboygan. Its many tributaries flow in broad lowland dendritic patterns. The North Branch Milwaukee River flows through the western portion of the county, with fewer tributaries than the

Sheboygan. Also located in the western portion of the county are numerous lakes, marshes and wooded areas, especially near the border with Fond du Lac County. Sheboygan County is located in the Eastern Ridges and Lowlands geographical province of Wisconsin, in the Central Lake Michigan Coastal and Southeast Glacial Plains ecological landscapes, where the topography is flat with few, low-lying features. The population of Sheboygan County was 115,507 in 2010 (U.S. Census Bureau, 2010).

I.IV.ii.1 Coastal Barrier Resources Systems

Coastal barriers are unique land forms that protect distinct aquatic habitats and serve as the mainland's first line of defense against damage from coastal storms and erosion. The Coastal Barrier Resources System (CBRS) defines a coastal barrier as a landform composed of unconsolidated shifting sand or other sedimentary material that is generally long and narrow and entirely or almost entirely surrounded by water. They are sufficiently above normal tides so that they usually have dunes and terrestrial vegetation. The CBRS boundaries were downloaded from U.S. Fish and Wildlife Service http://www.fws.gov/CBRA/Maps/Data_Disclaimer_Shapefiles.html and are dated June 15, 2010.

Manitowoc County has one designated unit of the coastal barrier along the Lake Michigan shoreline. Sheboygan and Ozaukee Counties have no designated units of coastal barriers along the Lake Michigan shoreline and/or within this study area.

I.IV.ii.2 Coastal Flood Protection Measures

Coastal structures along Lake Michigan will be reviewed in more detail during the engineering analysis portion of the Lake Michigan study and were not analyzed as part of this Discovery process. A summary of information collected regarding existing coastal structures and flood protection measures is described below.

FEMA's Midterm Levee Inventory (MLI) project compiled a database of structures that were designed to provide at least the minimum level of protection from the base flood level (1- percent-annual-chance flood). For this Discovery process, the November 2011 MLI Status Report published by FEMA was reviewed. The MLI Levee database shows no levee segments in Sheboygan, Manitowoc and Ozaukee Counties within the Great Lakes study area that provide protection from the 1-percent-annual-chance flood, however, as discussed below, other flood protection measures do exist.

In the City of Sheboygan along Lake Michigan, riprap has been placed to reduce wave erosion (Federal Emergency Management Agency, 2009). In Manitowoc County, breakwaters were constructed in Lake Michigan for the protection of the harbors at the Cities of Manitowoc and Two Rivers. Dredging of the harbors is believed to prevent severe flooding in areas near the mouths of the Manitowoc and East and West Twin Rivers (Federal Emergency Management Agency, 2011). Flood protection measures taken in the Village of Cleveland include minor work along the Lake Michigan shoreline to protect against wave erosion.

The USACE Coastal & Hydraulics Laboratory (CHL), a member of the Engineer Research & Development Center (ERDC), has compiled an inventory of coastal structures called the Enterprise Coastal Inventory Database (ECID). The ECID application and database houses information on more than 900 coastal structures in the U.S. and uses a Google Earth interface for users to access information on the structures including project reports, aerial photographs, wave and water level and bathymetric data. The database and application are available at <http://chl.ercd.usace.army.mil/chl.aspx?p=s&a=Projects;246>. These maintained coastal structures protect harbors and shore-based infrastructure, provide beach and shoreline stability control, provide flood protection to varying degrees, and protect coastal communities, roadways and bridges, etc. These structures include seawalls, bulkheads, revetments, dikes and levees, breakwaters, groins, sills/perched beaches, and jetties and piers.

The major coastal structures along Lake Michigan found within Sheboygan, Manitowoc, and Ozaukee County are compiled in Table 7. It is important to note that these coastal structures do not necessarily protect areas from the 1-percent-annual-chance flood event. Many of these USACE coastal structures were built between 1860 and 1940. Low lake levels since the 1990's have accelerated deterioration of these navigation structures and USACE Detroit District launched an investigation to assess the effects of changes in Lake Michigan water levels on the performance and stability of these structures. An inventory of critical infrastructure protected by federally maintained navigation structures was conducted along with a condition assessment of the structures including an estimation of the risk associated with structure failure. Structures were rated on the following scale:

- A – Failure Unlikely
- B – Low Risk of Failure
- C – Medium Risk of Failure
- D – High Risk of Failure
- F – Failed

Table 7 also provides the condition assessment for each of the structures listed.

Table 7. USACE Coastal Structure Inventory

State	Location	Coastal Structure	USACE Condition Assessment	Structure Length (feet)
WI	Manitowoc Harbor	North Breakwater	B	2500
		North Stub Pier		74
		South Breakwater		2290
WI	Port Washington Harbor	North Breakwater	B	2537
		North Stub Pier		125
		South Breakwater		1006
WI	Sheboygan Harbor	North Breakwater	C	3833
		North Revetment		336
		North Stub Pier		120
		South Breakwater		2490

Table 7. USACE Coastal Structure Inventory

State	Location	Coastal Structure	USACE Condition Assessment	Structure Length (feet)
WI	Two Rivers Harbor	North Pier	A	1593
		North Revetment		382
		South Pier		752
		South Revetment		968

I.IV.ii.3 Community Assisted Visits

Statewide Community Assistance Visits (CAVs) are part of the evaluation and review process used by FEMA and local officials to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. Generally, a CAV consists of a tour of the floodplain, an inspection of community permit files, and meetings with local appointed and elected officials. During a CAV, observations and investigations focus on identifying issues in various areas, such as the community’s floodplain management regulations (ordinance), community administration and enforcement procedures, engineering or other issues within the FIRMs, other problems in the community’s floodplain management, and problems with the biennial report data. Any administrative problems or potential violations identified during a CAV are documented in the CAV findings report. The community is notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. The summary of CAV visits were extracted from FEMA’s Community Information System (CIS) at <https://portal.fema.gov> in December 2012. Table 8 shows the most recent CAV date by community within this study area. Communities with no prior CAVs have not been listed in the table.

Table 8. Summary of Community Assisted Visits in Sheboygan, Manitowoc and Ozaukee Counties.

County	Community	CAV Date	FIRM Date
Ozaukee	Ozaukee County (unincorporated areas)	8/17/1994	12/4/2007
Sheboygan	Sheboygan County (unincorporated areas)	6/30/1992	4/2/2009
Sheboygan	Sheboygan, City of	6/30/1992	4/2/2009
Manitowoc	Manitowoc, City of	6/11/2007	8/2/2011

CAV = Community Assisted Visit
 FIRM = Flood Insurance Rate Map

I.IV.ii.4 Community Rating System

The Community Rating System (CRS) is a voluntary incentive program to provide flood Insurance premium discounts to NFIP-participating communities that take extra measures to manage floodplains above the minimum requirements. A point system is used to determine a CRS rating. The more measures a community takes to minimize or eliminate exposure to floods, the more CRS points are awarded and the higher the discount on flood insurance premiums. The list of CRS communities is available on FEMA's Website site at <http://www.fema.gov/library/viewRecord.do?id=3629>, which was accessed in July 2012.

Ozaukee County has a current CRS Rating of 8 with a 10 percent flood insurance discount for Special Flood Hazard Areas (SFHAs) and 1,026 total points. No communities in Sheboygan or Manitowoc Counties were participating in the CRS program at the time of this report.

I.IV.ii.5 Comprehensive Plans

A comprehensive plan is a land use document providing framework and policy direction for land use decisions. Comprehensive plans usually include chapters detailing policy direction affecting land use, transportation, housing capital facilities, utilities, coastal and rural areas. Comprehensive plans identify where and how growth needs will be met.

The Manitowoc County Comprehensive Plan can be downloaded at <http://www.baylakerpc.org/community-assistance/comprehensive-planning>

In the Coastal Data Request Form completed by the City Two Rivers (Manitowoc County), it was noted that their comprehensive plan has special consideration for coastal areas. In particular, the majority of coastal areas along Lake Michigan is zoned as conservation land and designated as park land and open space.

In the Coastal Data Request Form completed by the Village of Cleveland (Manitowoc County), it was noted that within the community's comprehensive plan, they have a special consideration for coastal areas in that they plan to maintain open spaces along the coastline and restrict development in the 1-percent-annual-chance (100-year) floodplain.

The Ozaukee County Comprehensive Plan can be downloaded at <http://www.co.ozaukee.wi.us/smartgrowth/>

The Sheboygan County Comprehensive Plan is in the process of being updated. Details are provided at <http://www.baylakerpc.org/sheboygan-mpo>.

Local, community-level plans within Sheboygan County can be downloaded at <http://www.baylakerpc.org/community-assistance/comprehensive-planning>

I.IV.ii.6 Coordinated Needs Management Strategy (CNMS) and NFIP Mapping Needs

During FEMA's Flood Map Modernization program from 2003 to 2008, FEMA adhered to Procedure Memorandum No. 56 which states that, "Section 575 of the National Flood Insurance Program Reform Act of 1994 mandates that at least once every five years FEMA assess the need to review and update all floodplain areas and flood risk zones identified, delineated, or established under Section 1360 of the National Flood Insurance Act, as amended." This requirement was fulfilled through the Mapping Needs Assessment process. Other mechanisms such as the Mapping Needs Update Support System (MNUSS) and scoping reports were used to capture information describing conditions on the FIRMs and the potential for a map update.

FEMA's Coordinated Needs Management Strategy (CNMS) was initiated through FEMA's Risk MAP program in 2009 to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities. CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that provides support to data-driven planning and the flood map update investment process in a geospatial environment. The goal is to identify areas where existing flood maps are not up to FEMA's mapping standards. More information about the CNMS can be found at <http://www.fema.gov/library/viewRecord.do?id=4628>.

There are three classifications within the CNMS: "Valid," "Unverified," and "Unknown." New and updated studies (those with new hydrologic and hydraulic models) performed during FEMA's Map Modernization program were automatically determined to be "Valid" and the remaining studies went through a 17-element validation process with 7 critical and 10 secondary elements. Validation elements apply physical, climatological, and environmental factors to stream studies to determine validity. A stream study has to pass all of the critical elements and at least seven secondary elements to be classified as "Valid." The remaining streams are classified as "Unverified" or "Unknown". Studies for which flood hazard data are identified as having critical or significant secondary change characteristics are classified as "Unverified." Streams with a status of "Unknown" are those that have a study underway, will be evaluated in the future, or do not have sufficient information to determine whether they are "Valid" or "Unverified" (Federal Emergency Management Agency, 2010).

Table 9 summarizes the draft results of the county-wide validation analysis obtained from CNMS in June 2012.

Table 9. CNMS Status for Sheboygan, Manitowoc, and Ozaukee County

County	FIPS	Unknown (stream miles)	Unverified (stream miles)	Valid (stream miles)	Total (stream miles)
Manitowoc, WI	55071	153	25	102	280
Ozaukee, WI	55089	0	36	156	193
Sheboygan, WI	55117	173	5	101	279

I.IV.ii.7 Critical Facilities

Critical facilities are the facilities that can impact the delivery of vital services, cause greater damages to other sectors of a community, or put special populations at risk.

Hospitals, roads, schools, and shelters are all examples of critical facilities that play a central role in disaster response and recovery. Understanding which facilities are exposed, and the degree of that exposure, can help reduce or eliminate service interruptions and costly redevelopment. Incorporating this information into development planning helps communities get back on their feet faster.

Location of critical facilities with a county or community can be viewed from the NOAA Coastal Services Center, Critical Facilities Flood Exposure Tool at <http://www.csc.noaa.gov/criticalfacilities/>. Each county was found to have critical facilities located within the effective floodplain.

Additional information on critical features can be found in the Sheboygan, Manitowoc, and Ozaukee County Hazard Mitigation Plans, but were not compiled as part of this draft report.

I.IV.ii.8 Critically Eroded Beaches and Beach Nourishment/Dune Replacement Projects

The City of Two Rivers in Manitowoc County identified via the Coastal Data Request Form that there is a beach study underway in conjunction with the Wisconsin Department of Natural Resources (DNR). This project is part of the Great Lakes Restoration Initiative (GLRI), which is discussed in greater detail later in this section.

Sheboygan County noted that County Road LS had a bluff stabilization project that was completed to stabilize an area of lake bluff that was threatening the integrity of the road due to erosion.

No projects were identified in Ozaukee County study area.

I.IV.ii.9 Dams

The National Inventory of Dams (NID) is a congressionally authorized database that documents dams in the United States and its territories. The current NID, published in 2010, includes information on 84,000 dams that are more than 25 feet high, hold more than

50 acre-feet of water, or are considered a significant hazard if they fail. The NID is maintained and published by the USACE, in cooperation with the Association of State Dam Safety Officials, the States and territories, and Federal dam-regulating agencies. The database contains information about the dams' locations, sizes, purposes, types, last inspections, regulatory facts, and other technical data. The information contained in the NID is updated approximately every 2 years. The NID is available at the USACE Website <https://nid.usace.army.mil/>.

The NID identified 8 dams in Manitowoc County, 22 dams in Sheboygan County, and 11 dams in Ozaukee County.

Wisconsin Department of Natural Resources (DNR) inventory may also be consulted when developing future information on dams, however a listing of that information was not compiled during this Discovery process. The DNR Dam Safety program's mapping application allows the public to view the Wisconsin Dams database through <http://dnr.wi.gov/topic/Dams/data.html>.

I.IV.ii.10 Declared Disasters

The FEMA Disaster Declarations Summary is a summarized dataset describing all federally declared disasters. This information begins with the first disaster declaration in 1953 and features all three disaster declaration types: major disaster, emergency, and fire management assistance. The dataset includes declared recovery programs and geographic areas (County data not available before 1964; fire management records are considered partial because of the historical nature of the dataset).

The list of FEMA's disaster declarations is available on the FEMA Website at <http://www.fema.gov/data-feeds>. Table 10 lists the major disaster declarations that have been declared in Sheboygan, Manitowoc and Ozaukee Counties.

Table 10. Declared Disasters in Sheboygan, Manitowoc and Ozaukee County

Declared County/Area	Disaster Number	Declaration Date	Incident Type	Description
Manitowoc (County)	376	4/27/1973	Flood	Severe storms & flooding
Manitowoc (County)	496	3/23/1976	Flood	Severe storms, icing, wind & flooding
Manitowoc (County)	874	7/13/1990	Severe Storm(s)	Severe storms, tornadoes & flooding
Manitowoc (County)	1768	6/14/2008	Severe Storm(s)	Severe storms, tornadoes, & flooding
Manitowoc (County)	3163	1/24/2001	Snow	Snow
Manitowoc (County)	3249	9/13/2005	Hurricane	Hurricane Katrina evacuation*
Ozaukee (County)	192	4/21/1965	Tornado	Tornadoes, severe storms & flooding
Ozaukee (County)	376	4/27/1973	Flood	Severe storms & flooding

Table 10. Declared Disasters in Sheboygan, Manitowoc and Ozaukee County

Declared County/Area	Disaster Number	Declaration Date	Incident Type	Description
Ozaukee (County)	496	3/23/1976	Flood	Severe storms, icing, wind & flooding
Ozaukee (County)	775	10/7/1986	Flood	Severe storms & flooding
Ozaukee (County)	912	8/6/1991	Severe Storm(s)	Severe storms & hail
Ozaukee (County)	1180	7/7/1997	Severe Storm(s)	Severe storms & flooding
Ozaukee (County)	1526	6/18/2004	Severe Storm(s)	Severe storms & flooding
Ozaukee (County)	1768	6/14/2008	Severe Storm(s)	Severe storms, tornadoes, & flooding
Ozaukee (County)	3163	1/24/2001	Snow	Snow
Ozaukee (County)	3249	9/13/2005	Hurricane	Hurricane Katrina evacuation*
Sheboygan (County)	376	4/27/1973	Flood	Severe storms & flooding
Sheboygan (County)	431	4/26/1974	Tornado	Tornadoes
Sheboygan (County)	496	3/23/1976	Flood	Severe storms, icing, wind & flooding
Sheboygan (County)	775	10/7/1986	Flood	Severe storms & flooding
Sheboygan (County)	1238	8/12/1998	Severe Storm(s)	Severe storms & flooding
Sheboygan (County)	1526	6/18/2004	Severe Storm(s)	Severe storms & flooding
Sheboygan (County)	1768	6/14/2008	Severe Storm(s)	Severe storms, tornadoes, & flooding
Sheboygan (County)	3163	1/24/2001	Snow	Snow
Sheboygan (County)	3249	9/13/2005	Hurricane	Hurricane Katrina evacuation*

*Refers to the federal disaster aid that was made available to Michigan to supplement its efforts to assist evacuees from areas struck by Hurricane Katrina.

Additional information on disaster history can be found in the State of Wisconsin Hazard Mitigation Plan, Appendix A. This plan can be found at <http://emergencymanagement.wi.gov/mitigation/planning.asp>.

I.IV.ii.11 Flood Insurance Policies

A community’s agreement to adopt and enforce floodplain management ordinances, particularly with respect to new construction, is an important element in making flood insurance available to home and business owners. For this Discovery project, data on flood insurance policies were also gathered.

Table 11 summarizes the numbers and premiums of insurance policies, the total coverage, and the numbers and dollar amounts of paid losses in communities of Sheboygan, Manitowoc and Ozaukee Counties. The data were based on Community Summary Reports that were extracted from FEMA’s CIS website (<https://portal.fema.gov/famsVuWeb/home>) in July 2012.

Table 11. Summary of Flood Insurance Policies and Claims for Sheboygan, Manitowoc, and Ozaukee County

County	Community	CID	Number of Policies	Total Premium	Total Coverage	Number of claims since 1978	Dollar(\$) paid for claims since 1978
Manitowoc	Manitowoc, City of	550240	18	\$13,724	\$2,754,600	6	\$33,119
Manitowoc	Manitowoc County (unincorporated areas)	550236	47	\$28,647	\$8,672,400	14	\$54,302
Manitowoc	Two Rivers, City of	550243	14	\$7,165	\$1,390,500	1	\$2,206
Manitowoc	Cleveland, Village of	550237	5	\$4,112	\$1,459,000	4	\$1,632
Ozaukee	Ozaukee County (unincorporated areas)	550310	101	\$90,431	\$19,366,400	33	\$215,225
Ozaukee	Bayside, Village of	550270	30	\$14,517	\$8,638,200	22	\$77,911
Ozaukee	Port Washington, City of	550316	40	\$14,097	\$9,590,500	4	\$12,174
Ozaukee	Mequon, City of	555564	196	\$ 196,637	\$ 46,947,500	136	\$ 1,266,074
Sheboygan	Sheboygan County (unincorporated areas)	550424	79	\$52,150	\$17,739,700	12	\$67,196
Sheboygan	Cedar Grove, Village of*	550076	--	--	--	--	--
Sheboygan	Oostburg, Village of	550427	1	\$405	\$350,000	0	\$0
Sheboygan	Sheboygan, City of	550430	63	\$44,081	\$15,753,600	22	\$153,963

*Currently not participating in the NFIP

CID = Community Identification

Source: FEMA's CIS Summary Report "Insurance Reports"

I.IV.ii.12 Gage Data

The NOAA Coastal Services Center, Digital Coast, hosts a variety of digital coastal data, including gage data, and is located at <http://www.csc.noaa.gov/digitalcoast>.

Meteorological Stations:

The National Data Buoy Center (NDBC) is a part of the NOAA National Weather Service (NWS). NDBC designs, develops, operates, and maintains a network of data collecting buoys and coastal stations. NDBC provides hourly observations from a network of about 90 buoys and 60 Coastal Marine Automated Network (C-MAN) stations to help meet these needs. All stations measure wind speed, direction, and gust; atmospheric pressure; and air temperature. Water level is measured at selected stations. The historical and current data are available at the NDBC Website <http://www.ndbc.noaa.gov/>.

Table 12 shows the meteorological station identification number and location for the gages in the Lake Michigan's Sheboygan, Manitowoc and Ozaukee Counties Coastal Flood Study areas.

Table 12. NOAA Meteorological Stations on Lake Michigan in Sheboygan, Manitowoc and Ozaukee County

County	Station ID	Location	Owner	Data	Years of Historical Data
Manitowoc	C58W3	Two Rivers, WI	US Coast Guard	Meteorological Observation	N/A
Sheboygan	SGNW3	Sheboygan, WI	NBDC	Meteorological Observation	1983-Present
Ozaukee	PWAW3	Port Washington, WI	NWS	Meteorological Observation	2006-Present

In addition, the Great Lakes Environmental Research Laboratory is a part of NOAA focused on the Great Lakes. It maintains multiple datasets, including a collection of meteorological data for both the United States and Canada. The datasets can be found online at <http://www.glerl.noaa.gov>.

Stream Gages

The USGS National Water Information System Web Interface (<http://waterdata.usgs.gov/nwis>), provides real-time data for any given stream gage location. Table 13 shows the gage identification numbers and locations for the gages in the study areas of Sheboygan, Manitowoc, and Ozaukee Counties. USGS stream gage locations are shown on the draft Discovery Map.

Table 13. Stream Gage Stations in Sheboygan, Manitowoc and Ozaukee Counties

County	Gage ID	Begin Date	End Date	Gage Location
Manitowoc	4085281	19720725	19960930	East Twin River at Mishicot, WI
Manitowoc	4085425	19800308	19800916	Branch River near Branch, WI
Manitowoc	4085427	19720726	20000930	Manitowoc River at Manitowoc, WI
Manitowoc	408543802	19981201	19991201	Pine Creek at Newton, WI
Manitowoc	40854555	19981201	19991202	Meeme River at South Cleveland Rd near Cleveland, WI
Sheboygan	4085463	19800310	19801028	Pigeon River at Evergreen Park at Sheboygan, WI
Sheboygan	4085492	19930701	19940930	Elkhart Lake Outlet near Elkhart Lake, WI
Sheboygan	408570045	19940401	19970630	Otter Creek #3a at Ct Highway J near Plymouth, WI
Sheboygan	408570047	19940413	19950930	Otter Creek at Laack Farm near Plymouth, WI
Sheboygan	40857005	19901001	20000930	Otter Creek at Willow Road near Plymouth, WI
Sheboygan	4085813	19781001	19801007	Onion River at Hingham, WI
Sheboygan	4085845	19781001	19840328	Onion River near Sheboygan Falls, WI
Sheboygan	4086000	19160630	20000930	Sheboygan River at Sheboygan, WI
Sheboygan	40860041	19931001	19951031	Sheboygan River at Mouth at Sheboygan, WI

Table 13. Stream Gage Stations in Sheboygan, Manitowoc and Ozaukee Counties

County	Gage ID	Begin Date	End Date	Gage Location
Sheboygan	4086305	19981201	19991201	Batavia Creek at State Highway 28 at Batavia, WI
Sheboygan	40863075	19930401	19950930	North Branch Milwaukee River Nr Random Lake, WI
Ozaukee	4086360	19680326	19940930	Milwaukee River at Waubeka, WI
Ozaukee	4086487	19821001	19840621	Cedarburg Bog near Saukville, WI
Ozaukee	4086488	19821001	19841112	Mud Lake Outlet Channel near Decker Corners, WI
Ozaukee	4086489	19821028	19830818	Mud Lake Outlet Site 2 near Decker Corners, WI
Ozaukee	4086500	19300814	20000930	Cedar Creek near Cedarburg, WI
Ozaukee	4086600	19811101	20000930	Milwaukee River near Cedarburg, WI
Ozaukee	4087050	19741120	19800104	Little Menomonee River near Freistadt, WI

Water Level Station

NOAA’s Center for Operational Oceanographic Products and Services (CO-OPS) maintains several water level stations along Lake Michigan. CO-OPS’ primary motivation is the collection and dissemination of high quality and accurate measurements of lake level for scientific studies.

Great Lakes water levels constitute one of the longest high quality hydrometeorological data sets in North America with reference gage records beginning about 1860 with sporadic records back to the early 1800's. The station information and water level data are available at NOAA CO-OPS Website:

http://tidesandcurrents.noaa.gov/station_retrieve.shtml?type=Great Lakes Water Level Data&state=LakeMichigan . The monthly high and low water level data from the year 1918 to 2011 at Lake Michigan are available at the USACE Website: <http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/>.

Figure 2 depicts Historic Great Lakes Water Levels from 1918 to 2011 (U.S. Army Corps of Engineers, 2012).

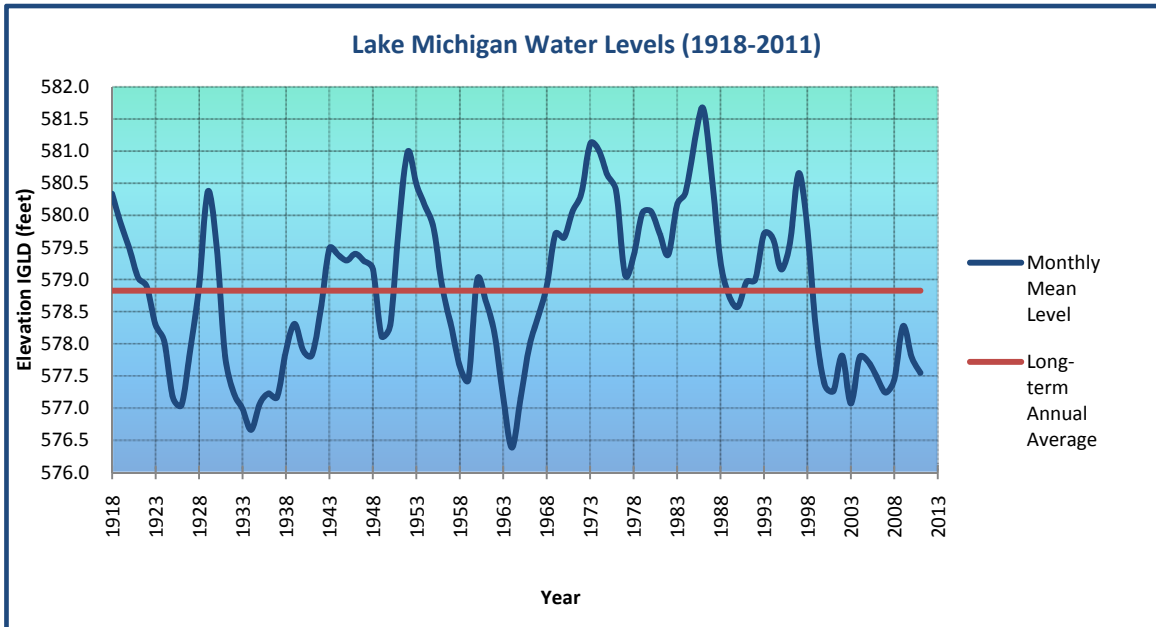


Figure 2: USACE Historic Great Lakes Water Level Data (1918-2011)

The Great Lakes Water Levels Report provides daily mean water levels of Lake Michigan for the past three months. The data are available at the USACE Website: <http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/currentconditions/greatlakeswaterlevels/>.

Wave Gage/Buoy Stations:

The NDBC is a part of the NOAA NWS. NDBC designs, develops, operates, and maintains a network of data collecting buoys and coastal stations. NDBC provides hourly observations from a network of about 90 buoys and 60 C-MAN stations to help meet these needs. In addition to standard meteorological observation, all buoy stations, and some C MAN stations, measure sea surface temperature and wave height and period. Conductivity and water current are measured at selected stations. The historical and current data are available at NDBC Website <http://www.ndbc.noaa.gov/>.

I.IV.ii.13 Great Lakes Coastal Restoration Grants

The Great Lakes Restoration Initiative (GLRI) is a federal program that provides unprecedented funding for protection and restoration efforts on the five Great Lakes. State and local governments and non-profit organizations are eligible to receive grants from the U.S. Environmental Protection Agency (EPA) for projects addressing toxic substances, invasive species, non-point source pollution, habitat protection and restoration or accountability, monitoring, evaluation, communication and partnership building. The EPA has awarded nearly \$39 million in GLRI funds to more than 60 protection and restoration projects in Wisconsin (Information obtained from <http://dnr.wi.gov/topic/greatlakes/restore.html>)

In 2011, eight organizations in Wisconsin were awarded \$3,754,554 in grants by the EPA under the GLRI. A list of the projects funded in 2011 can be found at the Wisconsin Department of Natural Resources link <http://dnr.wi.gov/topic/greatlakes/restore.html> . Additional information can be found at the Great Lakes Restoration Initiative website at <http://www.glri.us/>

I.IV.ii.14 Hazard Mitigation Plans

Hazard Mitigation Plans are prepared to assist communities to reduce their risk to natural hazard events. The plans are used to develop strategies for risk reduction and to serve as a guide for all mitigation activities in the given county or community.

A local hazard mitigation plan is a long-term strategic/guidance document used by an entity to reduce future risk to life, property, and the economy in a community. A hazard mitigation plan has the following elements:

- A public participation process for bringing together diverse stakeholders in the jurisdiction(s) to provide an array of input into the plan
- A risk assessment to identify the hazards, determine the people and property subject to those hazards, and estimate vulnerability
- A mitigation strategy that contains goals, objectives, and an action plan to implement priority mitigation actions that reduce risk
- A maintenance process to ensure the plan is reviewed and updated
- An adoption requirement to ensure the support from participating jurisdictions

Local mitigation plans are required to be updated every 5 years to maintain eligibility for FEMA Hazard Mitigation Assistance (HMA) grant programs. The status of current hazard mitigation plans is shown in Table 14. The data was obtained from FEMA’s Plan Approval Status Report based on Regional reports for the end of June 2012.

Table 14. Hazard Mitigation Plan Status for Sheboygan, Manitowoc, and Ozaukee County

Jurisdiction	Approval Date	Expiration Date
Manitowoc County	9/23/2009	9/23/2014
Ozaukee County	3/18/2009	3/18/2014
Sheboygan County	11/7/2008	11/7/2013

During this Discovery process, it was noted by local stakeholders that the City and County of Sheboygan are in the process of updating their plan. Ozaukee County is also updating their plan.

Wisconsin Emergency Management has coordinated in the past with communities in developing and revising their hazard mitigation plans and updated the State of Wisconsin Hazard Mitigation Plan. Wisconsin Coastal Management Program (WCMP) participated in some of those efforts. In addition, Bay-Lake Regional Planning Commission produced a

report titled “A Guide to Hazard Mitigation Planning for Coastal Communities in Wisconsin,” which was funded by WCMP. The guide assists communities with addressing coastal hazards issues within their hazard mitigation plans.

The State of Wisconsin Hazard Mitigation Plan, as well as various local hazard mitigation plans, can be accessed by visiting <http://emergencymanagement.wi.gov/mitigation/planning.asp#state> .

I.IV.ii.15 Hazard Mitigation Grant Program

After a major disaster declaration, the Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

A variety of hazard mitigation projects have been submitted for FEMA’s HMGP. A summary of HMGP projects can be downloaded from <https://explore.data.gov/catalog/raw>.

I.IV.ii.16 Historical Flooding & High Water Marks

Coastal hazards are a serious threat to Wisconsin’s shoreline communities and have historically been an area of high priority for Wisconsin. Over the years, coastal erosion and flooding have caused millions of dollars in property damages in Wisconsin (Wisconsin Department of Administration, 2010).

In Manitowoc and Sheboygan County, the elevation of Lake Michigan during floods is an important factor. Wind setup and wave action can cause damage to shoreline property, especially during periods of high-lake stage. High northeast, east, southeast, or south winds during storms could cause high waves to form and run up shorelines, causing flooding and erosion. High waves erode shorelines if not protected by riprap or breakwater structures. Shoreline erosion is a problem in both counties, as evidenced by sloughing of the shoreline in some areas, particularly along Lake Michigan (Federal Emergency Management Agency, 2011).

In Ozaukee, most flood damage within the study area has been caused by high stages on the Milwaukee River and Cedar Creek. North of Port Washington, where the bluffs are as far as 500 feet from the water’s edge, flooding is possible from high lake stages and wave action. Numerous cottages are located between the bluffs and the lake. In October 1986, a record stage of 583.55 feet from the National Geodetic Datum of 1929 (NGVD29) was established on Lake Michigan. This daily mean value was only 0.15 feet below the predicted 100-year instantaneous level of 583.55 feet NGVD29 at the time of the March 18, 1991 FIS. Flood damage and erosion during the winter of 1986 north of Port Washington was extensive due to the high lake levels. The danger of flooding from Lake Michigan south of Port Washington is negligible, because there is little or no level land between the bluffs and the lake (Federal Emergency Management Agency, 2007).

During the June 18, 1996 through June 20, 1996 event in the City of Port Washington, Lake Michigan bluffs sustained severe damage in the form of mudslides that extended down to the water's edge. The mudslides destroyed the public beach and a bike trail through Lake Park (Federal Emergency Management Agency, 2007).

The State of Wisconsin Hazard Mitigation Plan also discusses historical flooding, flooding concerns, and potential mitigation actions. The plan can be downloaded at <http://emergencymanagement.wi.gov/mitigation/planning.asp>.

No additional information specific to Lake Michigan flooding or high water marks was identified during this Discovery process. If local stakeholders have additional available high water mark data, historical flooding information, or historic flooding photographs they are encouraged to submit them to FEMA Region V Mitigation Division.

I.IV.ii.17 Land Use

According to the Wisconsin 2011-2016 Needs Assessment and Strategy, in the State of Wisconsin, there are several areas that have setback, buffer, or other land use policies to direct development away from coastal hazard areas and that are more stringent than state mandated standards or that have policies where no state standards exists. Along Lake Michigan, this includes Sheboygan County, Manitowoc County, Ozaukee County, City of Mequon (Ozaukee County), and Racine County (Wisconsin 2011-2016 Needs Assessment and Strategy, 2010).

I.IV.ii.18 Letters of Map Change

A Letter of Map Change (LOMC) is a letter that reflects an official revision to an effective NFIP map. LOMCs are issued in place of the physical revision and republication of the effective FIRM. LOMCs include completed cases of Letters of Map Amendment (LOMAs) and Letters of Map Revision (LOMRs), including LOMRs based on fill (LOMR-Fs), and conditional LOMRs. The lists of LOMC cases were obtained from the FEMA Mapping Information Platform Website (<https://hazards.fema.gov/femaportal/wps/portal>) in June 2012.

Table 15 lists the number of LOMCs in the project area per county. No Conditional LOMAs or Conditional LOMR-Fs were included. The LOMCs are shown on the Discovery Maps. Clusters of LOMCs indicate a need for updated maps.

Table 15. Summary of LOMC cases in Sheboygan, Manitowoc and Ozaukee County

County	Number of Letters of Map Amendments	Number of Letters of Map Revisions – Based on Fill	Number of Letters of Map Revisions – Floodway Removal	Number of Letters of Map Revisions
Manitowoc	36	3	11	0
Ozaukee	192	34	16	0
Sheboygan	89	5	1	0

I.IV.ii.19 Locally Identified Mitigation Actions

Table 16 lists the potential mitigation actions and strategies as pulled from the Hazard Mitigation Plans for Sheboygan, Manitowoc, and Ozaukee Counties. Note that actions listed may not be specific to coastal flooding.

Table 16. Hazard Mitigation Actions for Sheboygan, Manitowoc, and Ozaukee County

Name of Plan	County	Plan Expiration Date	Hazard Mitigation Action
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Monitor natural features along Lake Michigan for deterioration that would allow for flooding or mudslides to impact properties along the shore
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Maintain maps indicating past incidences and areas most susceptible to future hazards
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Maintain current land use regulations that permit building of structures within vulnerable coastal locations
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Work with the Coast Guard to monitor conditions where drifting ice can damage shore structures and destroy vegetation, move sand or stones from beaches, or dump sand, rock, or other debris on beaches
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Construction of riprap to manage bluff erosion shifts due to the eroding force of the water where coastal areas lack bluff reinforcement.
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Prepare, adopt, and maintain proper land use planning methods through the county's comprehensive plan and stated implementation tools such as land use regulations (codes and ordinances) and stormwater management plans
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Enforce land use regulations that preserve natural resources adjacent to and in defined floodplains
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Maintaining a stormwater management plan that includes such remediation techniques as surface detention basins and in-street detention units

Table 16. Hazard Mitigation Actions for Sheboygan, Manitowoc, and Ozaukee County

Name of Plan	County	Plan Expiration Date	Hazard Mitigation Action
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Implement a rural drainage improvement program that would include ditch, bridge and culvert maintenance and improvements
Manitowoc County All Hazards Mitigation Plan, August 2008	Manitowoc County	9/3/2014	Implement floodproofing techniques such as elevation, relocation, barrier construction, and wet floodproofing for residents, businesses, and critical facilities
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Ensure that municipalities, builders and homeowners understand and follow safe building zoning regulations.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Review the county ordinance provision for setbacks and ensure that it is adequate.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Incorporate into local comprehensive planning process (including SMART growth, as applicable)
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Conduct a feasibility study (with a cost benefit analysis) for conducting LiDAR mapping flights for good digital terrain maps (DTM) to model the surface contours for flooding and other scenario modeling/projections
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Continue public outreach efforts for flood mitigation efforts
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Discuss potential regulatory and ordinance changes that would allow municipalities to condemn properties in flood areas.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Complete amendments/revisions to the Flood Insurance Rate Maps (FIRMs) as necessary
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Explore with the approximately 16 home owners in the Edgewater Drive area (Town of Grafton) the feasibility of a buyout or other flood mitigation program. Also, ensure that the road is of adequate height to escape flood damage.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Update, as necessary, the stormwater plan
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Update, as necessary, the water management plans. Continue marking stormwater drains.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	Ozaukee County	3/18/2014	Support the Pigeon Creek restoration mitigation project.
Sheboygan County All Hazards Mitigation Plan, February 2008	Sheboygan County	11/7/2013	Maintain information regarding, and coordination or, congregate care facilities.

Table 16. Hazard Mitigation Actions for Sheboygan, Manitowoc, and Ozaukee County

Name of Plan	County	Plan Expiration Date	Hazard Mitigation Action
Sheboygan County All Hazards Mitigation Plan, February 2008	Sheboygan County	11/7/2013	Protection of existing buildings and other structures
Sheboygan County All Hazards Mitigation Plan, February 2008	Sheboygan County	11/7/2013	Review and update floodplain zoning ordinances (as necessary)
Sheboygan County All Hazards Mitigation Plan, February 2008	Sheboygan County	11/7/2013	Land use planning

During the Discovery Meeting, communities were encouraged to identify Areas of Mitigation Interest (AoMI) that may be considered for future mitigation actions and incorporation into Hazard Mitigation Plan updates. No AoMIs were captured for during this Discovery process.

The Wisconsin State Hazard Mitigation Plan, Appendix C, identifies Hazard Mitigation projects already implemented in the state through FEMA mitigation programs, Community Development Block Grants (CDBGs), and the Department of Natural Resources (DNR) Municipal Flood Control Program. The plan, including Appendix C, can be downloaded by visiting <http://emergencymanagement.wi.gov/mitigation/planning.asp>

I.IV.ii.20 Ordinances

County and community regulations regarding development within known flood hazard areas can range from ordinances with minimum NFIP requirements to strong, pro-active ordinances that not only regulate and protect new and improved development in existing Special Flood Hazard Areas (SFHAs), but also seek to mitigate the growth of SFHAs caused by increased runoff from developed areas and the degradation of natural flood control areas, such as wetlands and forests.

Local regulations regarding development within known flood hazard areas can range from ordinances with minimum NFIP requirements to strong, pro-active ordinances that not only regulate and protect new and improved development in existing Special Flood Hazard Areas (SFHAs) but also seek to mitigate the growth of SFHAs caused by increased runoff from developed areas and the degradation of natural flood control areas, such as wetlands and forests.

Title 44 of the Code of Federal Regulations Sections 60.3(a)–(e) describes the NFIP floodplain ordinance levels and provides the minimum requirements for community participation in the NFIP. The proper ordinance level for each community is determined by

the type of flooding that is present within the community. Ordinance levels are shown in the table below:

<u>Ordinance Level</u>	<u>Description</u>
A	Floodplains have not been identified
B	Floodplains with no base flood elevations (BFEs)
C	Floodplains with BFEs or coastal flooding with no high-hazard areas (Zone V)
D	Floodplains with BFEs and floodways
E	Coastal high-hazard areas identified, but no floodways
D & E	Both floodways and coastal high-hazard areas

Ordinance level information is shown in Table 17 for each community.

Table 17. Program Status and Ordinance Level for Sheboygan, Manitowoc, and Ozaukee County

County	Community	CID	Program Status	Ordinance Level
Manitowoc	Manitowoc, City of	550240	Participating	D
Manitowoc	Manitowoc County (unincorporated areas)	550236	Participating	D
Manitowoc	Two Rivers, City of	550243	Participating	D
Manitowoc	Cleveland, Village of	550237	Participating	D
Ozaukee	Ozaukee County (unincorporated areas)	550310	Participating	D
Ozaukee	Bayside, Village of	550270	Participating	D
Ozaukee	Mequon, City of	555564	Participating	D
Ozaukee	Port Washington, City of	550316	Participating	D
Sheboygan	Sheboygan County	550424	Participating	D
Sheboygan	Cedar Grove, Village of	550076	Not Participating	N/A
Sheboygan	Oostburg, Village of	550427	Participating	D
Sheboygan	Sheboygan, City of (unincorporated areas)	550430	Participating	D

CID = Community Identification

I.IV.ii.21 Proposed Draft Transects

Transects are profiles along which coastal flooding analysis is performed. Transects are used to transform offshore conditions to the shoreline and are used to define coastal flood risks inland of the shoreline. They are placed to define representative profiles for a shoreline reach. The transect layout for coastal hazards analysis and subsequent floodplain delineation is determined by physical factors such as changes in topography, bathymetry,

shoreline orientation, and land cover data, in addition to societal factors such as variations in development and density. The base maps listed earlier in this section (i.e. LiDAR, bathymetry) were reviewed, or will be reviewed once available, to determine revisions to the draft placement for hazard modeling transects along the Lake Michigan shoreline.

The originally proposed draft transect layout is shown on the draft Discovery Map for Sheboygan, Manitowoc, and Ozaukee County (Attachment C) and includes an identification number per transect. Note that these identification numbers will change as the draft transects are revised in the future.

Stakeholders were provided with the proposed draft transect shapefiles (GIS digital data) upon request, and the proposed draft transects (Attachment D) were also reviewed by stakeholders during and after the Discovery Meeting. Input from local officials was requested regarding the placement. The detailed comments collected can be found in Attachment E, Stakeholder Comments from Discovery Process. The ID numbers in this table correspond to the location of the comment, which is shown on the Final Discovery Maps in Appendix R of the basin-wide Lake Michigan Discovery Report and is not an attachment within this county-based report (Federal Emergency Management Agency, 2013).

Below is a summary of the comments received and addressed for the proposed draft transects along the Lake Michigan shoreline in Sheboygan, Manitowoc, and Ozaukee County:

- Sheboygan County: Stakeholders provided approximate location of dunes, flat beach areas, high bluff areas, eroded bluff location, and areas of new development. These comments were considered during revised transect placement and the proposed draft transects were updated. Stakeholders did not provide specific comments regarding relocation or repositioning of transects.
- Manitowoc County: Stakeholders provided comments related to the position and location of transects along the Lake Michigan shoreline. Transects were revised to incorporate these comments.
- Ozaukee County: Stakeholders requested effective transects be incorporated. Transects were revised to include the two existing effective transects. County stakeholders also requested further discussion with FEMA occur regarding the potential to reposition and reduce the total number of transects along the shoreline.

All comments were reviewed and incorporated where possible and a revised proposed draft transect layout was created. This revised transect layout can be found on the Final Discovery Maps in Appendix R of the Lake Michigan basin-wide report (Federal Emergency Management Agency, 2013). Further discussion related to a possible reduction in the number of transects and re-evaluation of specific locations should be pursued with the Ozaukee County prior to the start of the coastal analysis phase. Therefore, the draft transects presented in this report remain subject to change pending future coastal analysis and further discussion with local stakeholders.

I.IV.ii.22 Pre-Disaster Mitigation Grant Program

The Pre-Disaster Mitigation (PDM) program is a nation-wide competitive grant program that was created to assist State and local governments, including Indian Tribe governments, with the funding to implement cost-effective hazard mitigation activities prior to disasters. The intent of this program is to reduce overall risk to people and property, while also minimizing the cost of disaster recovery. Grants awarded during past fiscal years can be downloaded from the Pre-Disaster Mitigation Archives at <http://www.fema.gov/pre-disaster-mitigation-grant-program/pre-disaster-mitigation-archives> .

I.IV.ii.23 Public Assistance (PA) Grant Program

The mission FEMA’s Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from declared disasters or emergencies.

Through the PA Program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The PA Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process.

Detailed project descriptions for completed PA projects can be downloaded from <https://explore.data.gov/catalog/raw> .

I.IV.ii.24 Regulatory Mapping

The effective mapping status for the communities in Sheboygan, Manitowoc and Ozaukee County study area is listed in Table 18.

Table 18. Effective Status of Sheboygan, Manitowoc and Ozaukee Counties

County	Community	CID	FIRM Date	Program Status
Manitowoc	Cleveland, Village of	550237	8/2/2011	Participating
Manitowoc	Manitowoc, City of	550240	8/2/2011	Participating
Manitowoc	Manitowoc County (unincorporated areas)	550236	8/2/2011	Participating
Manitowoc	Two Rivers, City of	550243	8/2/2011	Participating
Ozaukee	Bayside, Village of	550270	12/4/2007	Participating
Ozaukee	Mequon, City of	555564	12/4/2007	Participating
Ozaukee	Ozaukee County (unincorporated areas)	550310	12/4/2007	Participating
Ozaukee	Port Washington, City of	550316	12/4/2007	Participating
Sheboygan	Cedar Grove, Village of	550076	4/2/2009	Not Participating

Table 18. Effective Status of Sheboygan, Manitowoc and Ozaukee Counties

County	Community	CID	FIRM Date	Program Status
Sheboygan	Oostburg, Village of	550427	4/2/2009	Participating
Sheboygan	Sheboygan County (unincorporated areas)	550424	4/2/2009	Participating
Sheboygan	Sheboygan, City of	550430	4/2/2009	Participating

CID = community identification
 FIRM = Flood Insurance Rate Map

Effective FIRMs and FISs can be downloaded from FEMA’s Map Service Center (MSC) at <https://msc.fema.gov>.

I.IV.ii.25 Repetitive Loss/Severe Repetitive Loss

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP. There are currently over 122,000 repetitive loss properties nationwide.

Structures that flood frequently strain the National Flood Insurance Fund. In fact, the RL properties are the biggest draw on the Fund. FEMA has paid almost \$3.5 billion dollars in claims for RL properties. RL properties not only increase the NFIPs annual losses and the need for borrowing funds from Congress, they drain funds needed to prepare for catastrophic events. Community leaders and residents are also concerned with the RL problem because residents' lives are disrupted and may be threatened by the continual flooding.

Over the years, there have been a number of efforts aimed at addressing repetitive losses. Depending on individual circumstances, appropriate mitigation measures commonly include elevating buildings above the level of the base flood, demolishing buildings, and removing buildings from the SFHA as part of a flood control project. Sometimes, mitigation takes the form of a local drainage-improvement project that meets NFIP standards and removes a property or properties from RL or Repetitive Loss Target Group (RLTG) status.

The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to \$10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the NFIP. Additional information on this program and other related programs is available at <http://www.fema.gov/hazard-mitigation-assistance>.

Repetitive losses were reviewed in FEMA’s CIS “Community Disaster Detail – Flood Insurance” report. Table 19 details the total number of repetitive loss structures and total amount of repetitive loss payments in the coastal areas.

Table 19. Repetitive Loss

County	Community	CID	Total Repetitive Loss Structures	Total Repetitive Loss Payment
Manitowoc	Cleveland, Village of	550237	0	\$0
Manitowoc	Manitowoc, City of	550240	0	\$0
Manitowoc	Manitowoc County (unincorporated areas)	550236	0	\$0
Manitowoc	Two Rivers, City of	550243	0	\$0
Ozaukee	Bayside, Village of	550270	2	\$18,166
Ozaukee	Mequon, City of	555564	12	\$412,226
Ozaukee	Ozaukee County (unincorporated areas)	550310	1	\$28,832
Ozaukee	Port Washington, City of	550316	1	\$12,175
Sheboygan	Cedar Grove, Village of	550076	0	\$0
Sheboygan	Oostburg, Village of	550427	0	\$0
Sheboygan	Sheboygan County (unincorporated areas)	550424	0	\$0
Sheboygan	Sheboygan, City of	550430	1	\$10,177

CID = community identification

I.IV.ii.26 Socio-Economic Analysis

In Sheboygan County, the economy is primarily manufacturing oriented. In 2009, lake-related businesses provided 4.1 percent of the total jobs in Sheboygan County. This accounted for just over 2,300 jobs, \$30 million in wages, and \$66 million in goods & services. This represents a 5 percent decrease in lake jobs since 2005 (National Oceanic & Atmospheric Administration, 2009).

Manitowoc County is primarily sales and service oriented. In 2009, lake-related businesses provided 6 percent of the total jobs in Manitowoc County. This accounted for just over 2,000 jobs, \$35 million in wages, and \$71 million in goods & services. This represents a 2 percent decrease in lake jobs since 2005 (National Oceanic & Atmospheric Administration, 2009).

Ozaukee County is primarily production, transportation, and material moving, as well as sales and service oriented. In 2009, lake-related businesses provided 5.7 percent of the total jobs in Ozaukee County. This accounted for just over 2,100 jobs, \$25 million in wages, and \$53 million in goods & services. This represents a 1 percent increase in lake jobs since 2005 (National Oceanic & Atmospheric Administration, 2009).

The more homes and people located in a floodplain, the greater the potential for harm from flooding. Impacts are likely to be even greater when additional risk factors (age, income, capabilities) are involved, since people at greatest flood risk may have difficulty

evacuating or taking action to reduce potential damage. Approximately 7 percent of the population in Sheboygan County is inside a FEMA floodplain. Manitowoc County has 8 percent and Ozaukee County has 10 percent inside the floodplain (National Oceanic & Atmospheric Administration, 2009).

I.IV.ii.27 State-Level Datasets, Programs, and Information

Needs Assessment and Strategy:

As part of this Discovery process, information related to Great Lakes datasets, reports, programs, and grants was extracted from the Wisconsin Coastal Management Program (WCMP) 2011-2016 Needs Assessment and Strategy, completed November 2010 (Wisconsin 2011-2016 Needs Assessment and Strategy, 2010).

Studies and reports relevant to Wisconsin's Coastal Hazards include:

- SEH/Baker, 1997. "Lake Michigan Recession Rate Study Final Report". (Report prepared for the Wisconsin Coastal Management Council, Wisconsin Department of Administration).
- Wisconsin Coastal Management Program (WCMP), October 2007. "A Strategic Vision for the Great Lakes". (<http://www.doa.state.wi.us/docview.asp?docid=7039>)
- Springman, R. and S. M. Born, 1979. "Wisconsin's Shore Erosion Plan: An Appraisal of Options and Strategies" (<http://wisconsingeologicalsurvey.org/wofrs/WOFR1979-03.pdf>)
- State of Wisconsin Hazard Mitigation Plan (updated 2008) (<http://emergencymanagement.wi.gov/mitigation/planning.asp>)
- Bay Lake Regional Planning Commission (BLRPC) study, "Coastal Bluff Stability Study, Inventory & Description", September 1995. (<http://www.baylakerpc.org/about/publications>)
- Southeastern Wisconsin Regional Planning Commission (SEWRPC) study (1997), Technical Report No. 36, "Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin", 1995 (<http://maps.sewrpc.org/Publications/search.asp>)
- Coastal Processes Manual (1998) (<http://aqua.wisc.edu/publications/ProductDetails.aspx?productID=356>)
- Lake Michigan Potential Damages Study (1999) (<http://www.lre.usace.army.mil/greatlakes/hh/greatlakestudies/lakemichiganpotentialdamagesstudy/>)

Hazards Research and Monitoring:

WCMP funded the University of Wisconsin-Madison efforts to investigate lakebed down cutting in Lake Michigan. The work resulted in a much clearer understanding of erosion of the near shore lakebed and increased public awareness of bluff recession.

The WCMP also funded projects that resulted in oblique photographs of Wisconsin's coasts. The photographs were geolocated. Older oblique photos were digitized and

geolocated, and a GIS database built to allow comparison between the sets. The work resulted in a database that allows users to analyze change to the state's shoreline.

Wisconsin Great Lakes Strategy: Restoring and Protecting Our Great Lakes:

This guidance document, developed by the Wisconsin Department of Natural Resources Office of the Great Lakes, was updated in 2009 and reflects changes in priorities and actions since last updated in 2006. The Wisconsin Great Lakes Strategy addresses eight of the nine priorities identified by the Council of Great Lakes Governors for the restoration and protection of the Great Lakes. The goals of the Strategy are to:

- translate the recommendations from the Great Lakes Regional Collaboration into Wisconsin specific actions,
- be a vehicle for coordinating efforts and developing shared priorities,
- serve as a menu for securing and allocating resources, and
- promote developing projects for implementation and position Wisconsin to compete for federal restoration and protection funding.

The Strategy focuses on resources and ecosystems impacted by the Great Lakes. This includes tributary and groundwater connections, species dependent on the Great Lakes and their tributaries, and land use influences on water quality and quantity.

Wisconsin's Great Lakes Beach Monitoring and Notification Program:

This program is coordinated through the Wisconsin Department of Natural Resources Bureau of Watershed Management. With funding from the U.S. Environmental Protection Agency (EPA) under the authority of the BEACH Act, the Wisconsin Department of Natural Resources implements the program with assistance from other federal, state, and local government partners. The program goal is to monitor Great Lakes beaches to improve public notification of advisories and reduce beach visitors' risk of exposure to disease-causing microorganisms. As of 2008, 123 of Wisconsin's 192 Great Lakes beaches are now being monitored. Since the introduction of the sanitary survey by the U.S. EPA, the state has increasingly utilized sanitary surveys, local, and nonprofit partners since 2007. Sanitary surveys may provide valuable information about potential pollution sources and assist stakeholders with implementing remediation measures.

Additional information on the Wisconsin Great Lakes areas can be found from the below resources:

- Wisconsin Initiative on Climate Change Impacts:
<http://www.wicci.wisc.edu/report/Coastal-Communities.pdf>
- International Joint Commission:
 - A series of publications are available on the Great Lakes, including Groundwater in the Great Lakes Basin, the Impact of Urban Areas on Great Lakes Water Quality, Great Lakes Priority Issues, Emerging Issues of the Great Lakes, and Lake Levels. This information can be downloaded from http://ijc.org/en/activities/main_princ.htm

- Great Lakes Water Institute – Wisconsin Aquatic Technology and Environmental Research: <http://www.glwi.uwm.edu/>

V. Risk MAP Projects and Needs

This section provides information about the planned next steps for the Lake Michigan GLCFS, including information about the upcoming coastal analysis, potential for mitigation technical assistance within the project area, potential for changes in compliance as a result of the coastal flood study, future communications, and how unmet needs will be addressed.

i. Future Coastal Study

Information and data collected as part of this Discovery effort and provided in this report will be utilized in the upcoming coastal flood study for Lake Michigan.

A summary of the GLCFS project, as well as project updates, can be found at <http://www.greatlakescoast.org/> under the “Great Lakes Coastal Analysis & Mapping” section.

The following work is expected to be performed for Lake Michigan as part of the GLCFS, pending congressional funding. The scope of work described in this section is therefore subject to change and may not be performed within all Lake Michigan communities.

All engineering and mapping analysis performed as part of this study will follow guidance provided within FEMA’s Draft *Guidelines and Specifications for Coastal Studies Along the Great Lakes*, issued on May 8, 2012 (Federal Emergency Management Agency, 2012). The upcoming study is expected to include the following tasks: creation of bathymetric and topographic data, base map acquisition, coastal flood hazard analysis, and risk assessment product development. A summary is provided below and additional detail may be found in FEMA’s basin-wide Lake Michigan Discovery Report (Federal Emergency Management Agency, 2013).

Engineering & Mapping:

Coastal flood hazard analyses for the coastal communities of the United States located along the Lake Michigan shoreline will be performed. This analysis will include the creation of bathymetric and topographic map data inventory, base map acquisition, and coastal flood hazard analysis.

Draft coastal flood maps (or workmaps) will be produced for the study area. The workmaps will include the 1-percent- and 0.2-percent-annual chance flood hazard areas, Coastal High Hazard (VE Zone) and Coastal A Zone (AE Zone), Base Flood Elevations (BFEs), and Limit of Moderate Wave Action (LiMWA) boundary. The LiMWA boundary

identifies the 1.5-foot wave height line and alerts property owners that although their property is in a Zone AE area, it may also be affected by waves 1.5 feet or higher. Communities will be provided with an opportunity to review the workmaps after the coastal analysis is complete and prior to FIRM production.

National Flood Insurance Program Integration:

Regulatory FIRM files may be updated through the FEMA’s Physical Map Revision (PMR) process using the results from the work performed in the Engineering and Mapping task described above.

The final production and distribution of updated FIRMs will be dependent on the results of the coastal analysis, discussions with the communities, and congressional funding. Therefore, it cannot be identified at this time the exact communities that will receive updated FIRMs that may require adoption. The risk assessment products and their distribution, discussed below, are also dependent on the results of the coastal analysis and further community discussions and are subject to change.

Risk Assessment Products:

Depending on available data, results of coastal analysis, local needs identified, local partnerships, and fiscal year funding, the coastal flood risk products such as Flood Risk Map, Flood Risk Report, Changes Since Last FIRM (CSLF), Flood Depth and Analysis Grids, and Hazus-MH analyses may be generated for identified coastal communities. Optional Flood Risk Assessment products such as coastal wave height grids, erosion risk determination, and wave hazard severity area datasets have not yet been funded. Table 20 summarizes the products projected for the coastal communities in this project area.

Table 20. Potential Flood Risk Products

County	State	Flood Risk Map and Flood Risk Report	Changes Since Last FIRM	Flood Depth and Analysis Grids	Optional Flood Risk Assessment Products
Sheboygan	WI	✓	✓	✓	TBD
Manitowoc	WI	✓	✓	✓	TBD
Ozaukee	WI	✓	✓	✓	TBD

ii. **Potential for Mitigation Assistance**

As part of a Risk MAP project, Mitigation Planning Technical Assistance (MPTA) may be available to help communities plan for and reduce risks by providing communities with specialized assistance. MPTA includes risk assessment, mitigation planning, and traditional hazard identification (flood mapping) activities. Technical assistance through MPTA can be performed at any time during the hazard mitigation planning process.

Determining which communities receive MPTA is dependent on identification of a need, the willingness of a community to partner with FEMA, local resources and data availability, and federal funding availability. Unfortunately, not every community will be able to receive MPTA as part of a Risk MAP project. Forming a partnership between FEMA and a local community is an essential part of initiating a MPTA project. Assistance will be prioritized after all data and information is collected and assessed by FEMA in coordination with the local communities to determine where MPTA resources would be beneficial. Communities should alert FEMA of any resources that are available at the local level, and of actions they are interested in implementing in partnership with FEMA. Technical assistance activities should be based on the needs of the community and assist with already established capabilities.

Some technical assistance activities could include (but are not limited to):

- Advising in the creation of initial Hazard Mitigation Plans
- Advising in the update of existing Hazard Mitigation Plans
- Training to improve a community's capabilities for reducing risk
- Assistance in incorporating flood risk datasets and products into potential and effective community legislation, guidance, regulations, procedures, etc.
- Assistance with the creation, acquisition and incorporation of GIS data into potential and effective maps, planning mechanisms, emergency management procedures, etc.
- Facilitating the identification of data gaps and interpret technical data to identify risk reduction deficiencies that should be corrected.

While the need for technical assistance did not specifically come up during the Discovery process for Sheboygan, Manitowoc, and Ozaukee County, the need for assistance through MPTA may exist. It is recommended additional discussion occur between FEMA and these stakeholders as this coastal flood study moves forward to see if MPTA would be an appropriate and beneficial option.

Continued discussion regarding FEMA partnership with local communities to assist in developing new mitigation actions and moving those actions forward will be essential as this coastal project moves forwards.

iii. **Compliance**

FEMA uses a number of tools to determine a community's compliance with the minimum regulations of the NFIP. Among them are Community Assisted Contacts (CACs), Community Assistance Visits (CAVs), the Letter of Map Change (LOMC) process, and Submit-for-Rates. These tools help assess a community's implementation of their flood damage reduction regulations and identify any floodplain management deficiencies and violations.

If administrative problems or potential violations are identified, the community will be

notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. FEMA or the state will work with the community to help them bring their program into compliance with NFIP requirements. In extreme cases where the community does not take action to bring itself into compliance, FEMA may initiate an enforcement action against the community.

After coastal analysis is completed for this study, communities may be faced with adopting new regulations related to coastal high hazard areas. An understanding of regulations associated with coastal areas will be important so that communities remain compliant. During this Discovery process, stakeholders were provided with information regarding NFIP requirements that are associated with coastal hazard zones, as well as information about new FEMA guidance related to moderate wave action.

These compliance topics, including coastal Special Flood Hazard Areas (SFHAs), building requirements in VE Zones, and Limit of Moderate Wave Action (LiMWA), are discussed in detail at <http://www.greatlakescoast.org> and in the basin-wide Lake Michigan Discovery Report (Federal Emergency Management Agency, 2013).

iv. **Communication**

Throughout this Discovery process, community representatives and local stakeholders indicated the need to be kept informed about the results of Discovery, the upcoming coastal flood study, and opportunities for public input throughout the study process.

Throughout this study process, Federal, State, and local stakeholders will be kept informed via email, phone calls, letters, newsletters, and meetings as appropriate. A dedicated email account was created (GreatLakesFloodStudy@STARR-Team.com) to distribute project information, meeting reminders, and summaries.

Stakeholder involvement will continue to be important through the remainder of the project. The GLCFS website <http://www.greatlakescoast.org> is an excellent resource where stakeholders can obtain the most update-to-date information about the status of the Great Lakes flood study projects, data collection, upcoming meetings, new technical reports, the latest methodologies, factsheets, and additional information.

FEMA encourages stakeholders to remain involved throughout the study process and will seek to identify partnership opportunities during the study process.

v. **Unmet Needs**

During this Discovery process, stakeholders provided FEMA with a wide variety of information. Some of the information, while valuable, may not be able to be utilized in the upcoming coastal study. In addition, some questions may be unresolved as of the end of

this Discovery process. This section seeks to summarize those unmet needs and to provide the steps that may be taken to address them in the future.

During the Discovery Meetings and throughout the Discovery process, Lake Michigan stakeholders were concerned about what to expect in terms of extent of new SFHA boundaries, the possible introduction of VE Zones, the number of property owners who would be affected, and the additional NFIP requirements and flood insurance costs that may go along with a flood map revision. FEMA acknowledged this concern, adding that upcoming engineering and mapping tasks include the distribution of workmaps and other flood risk products designed to give local stakeholders an opportunity to review and comment on flood risk data before the data is carried into NFIP FIRM maps.

In addition, comments related to the proposed draft transects were provided during the Discovery Meeting by local stakeholders. It was suggested the effective transects along Lake Michigan be used where available. In addition, stakeholders provided information about shoreline features, including location of high bluffs, dunes, and flat beach. Draft transects were updated to incorporate comments where possible, however, it should be noted that the transects proposed in this report remain subject to change pending future coastal analysis and discussions regarding overall transect reduction. Stakeholders will be made aware of revised transect locations via the future workmaps that will be provided to local communities for review as the study moves forward.

VI. Close

Federal, State, and local stakeholders that were involved in this Discovery process contributed valuable information about Lake Michigan, including information and data that may be utilized in the upcoming Lake Michigan coastal flood study. The data and opportunities presented in this report will be considered as the study process moves forward and will assist the project team as the Lake Michigan coastal flood study proceeds. FEMA encourages continued participation and engagement from stakeholders throughout this coastal flood study.

The ultimate goal of this Discovery process and the future coastal flood study is to provide updated flood risk information to local stakeholders and to increase awareness of those flood risks, which in turn leads to actions that reduce risk.

VII. References

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VIII. Attachments

Discovery data and information, as well as this report and appendices, have been stored digitally on FEMA's Mapping Information Platform (MIP) Discovery Data Repository at J:\FEMA\DISCOVERY_DATA_REPOSITORY\R05_DATA\ and can be accessed by FEMA authorized users. The MIP can be accessed from <https://hazards.fema.gov/>. A username and password is required to access certain data within the MIP. The final Discovery Report and appendices are also available for download from <http://www.greatlakescoast.org/>.

Attachments in this report include:

- Attachment A. Coastal Data Request Form
- Attachment B. Sheboygan, Manitowoc, and Ozaukee County Pre-Meeting Correspondence
- Attachment C. Draft Discovery Maps
- Attachment D. Proposed Draft Transect Figures
- Attachment E. Stakeholder Comments from Discovery Process
- Attachment F. Sheboygan, Manitowoc, and Ozaukee County Discovery Meeting Documents
- Attachment G. Coastal Data Request Form Compilation

ATTACHMENT A
COASTAL DATA REQUEST FORM



FEMA

Community Discovery Coastal Data Request Form

Thank you for taking the time to complete this questionnaire. We are interested in obtaining coastal-specific data for your community. It will provide important information to help FEMA understand coastal flood risk issues in your community and to work with you in increasing your community's resilience to coastal flooding through implementation of the Risk MAP program. In addition, this form can be used as a way to prepare for the upcoming Discovery Meeting, as the topics on this form will be discussed throughout the meeting.

Once you have completed the questionnaire, please return the form:

Via e-mail: GreatLakesFloodStudy@starr-team.com
By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, IL 60606

Please provide as much information as possible. If you have any questions about the Discovery process or about completing this questionnaire, please contact:

Laura Keating, Laura.Keating@starr-team.com, 925-296-8048

Contact Information	
Community/Organization	
Name:	
Title:	
Address:	
E-mail:	
Phone:	
Contact Preference	<input type="checkbox"/> Email <input type="checkbox"/> Phone <input type="checkbox"/> Mail



FEMA

Base Map Data		<i>Please select available data type</i>	
	Topography (e.g., LiDAR or contour data)	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Property information (e.g., Building footprints, parcel data, tax assessor's data)	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
Coastal Data			
	Coastal structures (e.g., seawalls, levees, jetties, groins, etc.)	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Coastal features (i.e., dunes and bluffs)	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Shoreline change data	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Locations of beach nourishment or dune restoration projects	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Areas of significant beach or dune erosion	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Mean high water	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Mean lake level	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
Other Data			
	Hydraulic structures (e.g., bridges, culverts, levees, dams) with inspection status, if available	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Elevated roads	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Critical facilities	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Other known hazards with geographical boundaries, i.e., landslide hazard areas, storm surge inundation zones, wildfire hazard areas, etc.	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>
	Other relevant data	<input type="checkbox"/> <i>Hard copy</i>	<input type="checkbox"/> <i>Digital</i>



Please provide the following information about the community:

Historical Flood Data		
Are you aware of any coastal flooding issues not represented on effective FIRMs:	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please explain and provide inundation areas of historic flooding events if available.
Risk Assessment		
Does your community have HAZUS-based loss estimates from average annualized loss?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please describe:
Does your community have other risk assessment data?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please describe:



FEMA

<i>Flood Mitigation Information</i>		
<p>Does your community have a hazard mitigation plan?</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, what is the status of the hazard mitigation plan?</p> <p><input type="checkbox"/> being reviewed <input type="checkbox"/> it has been adopted <input type="checkbox"/> it is currently being updated <input type="checkbox"/> it is planned for updates</p>
<p>Does the plan reflect any coastal flood hazards?</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, please explain:</p>
<p>Does the hazard mitigation plan indicate any data deficiencies for flood hazards that could be addressed through a flood study, especially near coastal zones?</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, please explain:</p>
<p>Does your community have on-going mitigation projects, such as acquisition, elevation, flood control, soil stabilization, natural systems restoration, floodproofing, etc.</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, please describe the projects and their locations:</p>



FEMA

Any specific coastal mitigation projects?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please explain:
Does your community have experience with coastal flood disasters and flood disaster recovery?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please explain:
Does your community coordinate floodplain management programs with programs for the management and planning of open space? If possible, any coastal specific?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please explain:



FEMA

<p>Have you had any prior proactive mitigation actions and planning efforts that resulted in reduced losses? If possible, any coastal specific?</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, please describe:</p>
<p>Has your community applied and granted Individual Assistance/Public Assistance grants for declared disasters?</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, please describe and provide the locations of these grants projects:</p>
<p>Has your community applied for FEMA Hazard Mitigation Grants program or other mitigation funds (USACE, NRCS, USGS, state Hazard Mitigation officer, etc.) in the past?</p>	<p><input type="checkbox"/> yes <input type="checkbox"/> no</p>	<p>If yes, please describe and provide the locations of on-going/planned/finished grants projects/structures:</p>



FEMA

How would you rank the community's ability to implement mitigation actions and to communicate flood risk to citizens?		<input type="checkbox"/> high <input type="checkbox"/> medium <input type="checkbox"/> low
<i>Community Plans and Projects</i>		
Does your community have a comprehensive plan?	<input type="checkbox"/> yes <input type="checkbox"/> no	If you answered yes and you have a hazard mitigation plan, was your hazard mitigation plan coordinated with the comprehensive plan? <input type="checkbox"/> yes <input type="checkbox"/> no
Does your community's comprehensive plan have a special consideration for coastal areas?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please explain elements/regulations that affect coastal area development.
Does your community have a coastal zone management plan?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please provide a digital or hard copy of the plan.
Does your community have planning staff or a planning/zoning commission and other measures, such as ordinances, administrative plans, or other programs contributing to effective administration of floodplain zoning, building codes, open space preservation, and coastal zone management?	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please explain this group's role in floodplain management and provide examples of the types of programs in place:



FEMA

Does your community have areas of recent or planned development/re-development and areas of high growth or other natural land changes (e.g., wildfires or landslides):	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please describe:
Are there any locations of other ongoing studies or projects and studied areas that have been modified since the effective map and require an updated study (e.g., highway improvement, seawall improvement, etc.)	<input type="checkbox"/> yes <input type="checkbox"/> no	If yes, please describe:
Any other comments/concerns based on local knowledge:		

ATTACHMENT B
SHEBOYGAN, MANITOWOC, AND OZAUKEE COUNTY
PRE-MEETING CORRESPONDENCE

Core Stakeholder Pre-Meeting Documents

Information Exchange Session Documents

CEO/FPA Mailing List

Hard Copy Discovery Meeting Invitations

Email Discovery Meeting Invitation

Keating, Laura

From: Keating, Laura [KeatingLE@cdmsmith.com]
Sent: Thursday, June 21, 2012 3:26 PM
To: 'Alan Lulloff'; Caufield, Brian A.; 'Eric Kuklewski'; 'Gregory Mausolf'; 'Heather Stirratt'; Hillier, Timothy; 'Holly Davis'; 'Jennifer Day'; 'Julia McCarthy'; 'Julie Tochor'; 'Kate Barrett'; 'Kathleen Angel'; 'Katie McMahan'; 'Laura Keating'; 'Lee Traeger'; 'Mary Weldel'; 'Meg Galloway (WDNR)'; 'Megan Hart'; 'Michelle Hase (WDNR)'; 'Miles Winkler (WDNR)'; Randhawa, Jaspreet; 'Ronald Wencil'; 'Roxanne Gray'; 'Tambrete Phillips'; 'Tanya Lourigan (WDNR)'; 'Tom Smith'; 'Wayne Lasch'; 'Ken Hinterlong'; 'michael.friis@wisconsin.gov'; 'Christopher.Olds@Wisconsin.gov'; 'Susan.Boldt@Wisconsin.gov'; 'Gary.Heinrichs@Wisconsin.gov'; 'Roberts, Stacey'; Luce, Janet K
Cc: Hinterlong, Ken
Subject: RE: FEMA Invitation to Lake Michigan Discovery Kickoff Meeting WebEx for Wisconsin Core Stakeholders
Attachments: CEO_FPA_Discovery_Invitation_List_Great_Lakes_Study_WI.xlsx; GLCFS_LiMWA Fact Sheet.pdf; Draft_Transects_LakeMichigan_WISCONSIN_JUNE2012.zip; Email_Invitations_Lake_MI Stakeholder_List_modified 6-18.xls

Good Afternoon,

Thank you for attending the Wisconsin Core Stakeholder Lake Michigan pre-Discovery Kickoff meeting last week.

If you were unable to attend, but would like to learn more about the Great Lakes Coastal Discovery process, please feel free to contact myself or Ken Hinterlong of FEMA Region V directly (Ken.Hinterlong@fema.dhs.gov).

Please find below and attached some information that we discussed during the call:

1. Contact List with local official (CEO/FPA) information for the Wisconsin coastal communities and counties along Lake Michigan coastline. This is the list of local stakeholders who will receive a hard copy coastal Discovery Invitation, and will be invited to attend the Information Exchange Sessions. They will also be encouraged to identify and invite other local stakeholders who would benefit from the Discovery Meeting. **If you have specific contacts you would like us to add, please let me know.**
2. Great Lakes Coastal Flood Study Contact List. This is a comprehensive list of various Lake Michigan stakeholders, including technical resources, other federal agencies, associations, universities, etc. Utilizing this list as a basis, we will be providing an email invitation to the Discovery Meetings. Invitees may then forward on the invite to others in the Great Lakes region. Please note, this list is being continually updated throughout the Great Lakes study process.
3. Limit of Moderate Wave Action (LiMWA) Fact Sheet
4. Draft transects (.shp) for Wisconsin portion of Lake Michigan.

These additional items will follow:

1. Meeting Minutes
2. Draft Data Request Form, which includes requests for coastal flood risk data and information from local officials. The collection of this information in advance of the Discovery Meetings will help us to cater our message during the meeting to local flood risk concerns and local flood risk reduction opportunities.

Thank you again for your participation in the process. We look forward to working closely with you in the upcoming months.

Laura

Laura Keating, CFM
STARR

direct/fax: 925-296-8048
cell: 617-319-2472

-----Original Appointment-----

From: Keating, Laura

Sent: Wednesday, June 06, 2012 4:21 PM

To: Keating, Laura; 'Alan Lulloff'; Caufield, Brian A.; 'Eric Kuklewski'; 'Gregory Mausolf'; 'Heather Stirratt'; Hillier, Timothy; 'Holly Davis'; 'Jennifer Day'; 'Julia McCarthy'; 'Julie Tochor'; 'Kate Barrett'; 'Kathleen Angel'; 'Katie McMahan'; 'Laura Keating'; 'Lee Traeger'; 'Mary Weldel'; 'Meg Galloway (WDNR)'; 'Megan Hart'; 'Michelle Hase (WDNR)'; 'Miles Winkler (WDNR)'; Randhawa, Jaspreet; 'Ronald Wencil'; 'Roxanne Gray'; 'Tambrete Phillips'; 'Tanya Lourigan (WDNR)'; 'Tom Smith'; 'Wayne Lasch'; 'Ken Hinterlong'; michael.friis@wisconsin.gov; Christopher.Olds@Wisconsin.gov; Susan.Boldt@Wisconsin.gov; Gary.Heinrichs@Wisconsin.gov; 'Roberts, Stacey'

Cc: Luce, Janet K

Subject: FEMA Invitation to Lake Michigan Discovery Kickoff Meeting WebEx for Wisconsin Core Stakeholders

When: Friday, June 15, 2012 7:00 AM-8:30 AM (GMT-08:00) Pacific Time (US & Canada).

Where: Call-in: 866-710-4609 Passcode: 9577577 and WebEx

Good Afternoon,

As you may know, the Federal Emergency Management Agency (FEMA), in cooperation with the U.S Army Corps of Engineers (USACE), the Association of State Floodplain Managers (ASFPM), and other partners, is conducting a comprehensive study of flood hazards for Lake Michigan coastal communities and along the United States shoreline in other areas of the Great Lakes system. Data from this study will eventually be used to revise Flood Insurance Rate Maps (FIRMs) for coastal communities throughout the region.

As part of the Great Lakes Coastal Flood Mapping and Outreach initiative, STARR (which stands for Strategic Alliance for Risk Reduction) has been contracted by FEMA to perform Discovery for all Lake Michigan coastal communities within Wisconsin, Illinois, Indiana, and Michigan. In addition, STARR will perform Discovery for St. Clair, Macomb and Wayne Counties along Lake St. Clair in Michigan. The Discovery process allows us to engage the communities and other local stakeholders to initiate risk discussions and increase visibility of flood risk information.

You have been identified as a Core Stakeholder for the Lake Michigan Discovery Project in the State of Wisconsin. FEMA and STARR would like to hold a one-hour Kickoff Meeting via WebEx/conference call to introduce you to the Discovery process, including identifying Discovery goals and objectives for the Lake Michigan coastal communities in the State of Wisconsin. We will also review the Lake Michigan Discovery Meeting Plan and discuss State-specific requirements.

In the past few months, STARR may have already contacted you to participate in a Lake Michigan Technical Workshops. Discovery is another part of the project, and we require your input and feedback to ensure study success. The community-based Discovery Meetings are held following Technical Workshops. Below are the tentative Lake Michigan Discovery Meeting dates for the State of Wisconsin:

Counties	Venue	Address	Date, Time
Marinette	Oconto County Courthouse,	301 Washington Street,	Oconto, Wednesday

Oconto	Conference Room 1003 & 1004	WI 54153	08/15/2012; 9.30 - 11.30 AM
Kewaunee Door Brown	Neville Public Museum	210 Museum Place Green Bay, WI 54303	Wednesday 08/15/2012; 2:00 - 4:00 PM
Sheboygan Manitowoc Ozaukee	Lakeshore Technical College	Wells Fargo Conference Room, 1290 North Avenue, Cleveland, WI 53015	Thursday 08/16/2012; 9.00 - 11:00 AM
Milwaukee Racine Kenosha	MMSD Commission Room	260 W. Seeboth, Milwaukee, WI	Thursday 08/16/2012; 3:00 - 5:00 PM

Please let me know if the proposed time on this meeting invitation (**9am Central**) is acceptable. We are trying to determine the best time for everyone to participate in the Lake Michigan Discovery Kickoff Meeting WebEx for the State of Wisconsin.

I look forward to discussing this project with you during the Discovery Kickoff Meeting. Please do not hesitate to contact me if you have any questions.

Sincerely,

Laura Keating, CFM
STARR

Laura.Keating@starr-team.com

Phone/fax: 925-296-8048

WebEx information:

Participant Join URL: <http://e-meetings.verizonbusiness.com/nc/join.php?i=743676568&p=website&t=c>

Meeting number: 743676568

Meeting passcode: website



Project Name:	Lake Michigan Discovery Project
Meeting:	Lake Michigan Pre-Discovery Kickoff Meeting for Wisconsin Core Stakeholders
Date and Time:	Friday, June 15, 2012 at 9am CDT
Place:	Call in: 866-710-4609 Passcode: 9577577 Participant Join URL: http://e-meetings.verizonbusiness.com/nc/join.php?i=743676568&p=website&t=c Meeting number: 743676568 Meeting passcode: website
Facilitator:	FEMA, STARR

Core Stakeholder Pre-Discovery Kickoff Meeting Agenda

Great Lakes Coastal Flood Study Overview

- Objectives
- Status
- Schedule

Hazard Mitigation Resources, Strategies, and Actions

- Introduction to Mitigation Action Form

Discovery Process Overview

- Scope and Schedule
- Discovery Meeting Outcomes
- Introduction to Discovery-phase Data Collection Activities
- Final Discovery Products

Coastal Focus – Information to be Aware Of

- Coastal Flood Risk Datasets
- Transects
- Erosion
- LIMWA
- Coastal Zone Mapping

Next Steps

- Community contact lists, draft transects, meeting minutes
- Stakeholder Input

Questions/Comments

Keating, Laura

Subject: FEMA's Great Lakes Coastal Flood Study: Discovery Information Exchange Session for Sheboygan, Manitowoc, and Ozaukee Counties

Location: Call in number: 1-866-398-2885 Participant Code: 197462 and WebEx

Start: Tue 7/24/2012 8:00 AM
End: Tue 7/24/2012 9:00 AM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Keating, Laura

Required Attendees: Hinterlong, Ken; Keating, Laura

Optional Attendees: vandemjv@co.sheboygan.wi.us; mrochmm@co.sheboygan.wi.us; kotte@cedargrovewi.com; awrubblevillageboard@gmail.com; roger.oonk@oostburg.org; mayor.vanakkeren@ci.sheboygan.wi.us; ssokolowski@ci.sheboygan.wi.us; paultittl@co.manitowoc.wi.us; timryan@co.manitowoc.wi.us; chuhn@clevelandwi.gov; ssimons@clevelandwi.gov; mayornickels@manitowoc.org; rschwarz@manitowoc.org; lbrocher@two-rivers.org; vicber@two-rivers.org; rob@brooks-realestate.com; aholschbach@co.ozaukee.wi.us; shuebner@ci.port-washington.wi.us; rtetzlaff@ci.port-washington.wi.us; mayor@ci.mequon.wi.us; mlloyd@ci.mequon.wi.us; Holly.Davis@atkinsglobal.com; Randhawa, Jaspreet

Good Afternoon,

You are receiving this meeting invitation because you have been identified as a **Lake Michigan** local community stakeholder. You should have recently received an invitation in the mail from the Federal Emergency Management Agency (FEMA), regarding the **Great Lakes Coastal Flood Study** effort, inviting you to attend a Discovery Meeting in August, as well as this information exchange session, scheduled for **Tuesday, July 24th at 10am CT**. More information about the **Great Lakes Coastal Flood Study** may be found at <http://www.greatlakescoast.org>.

While the WebEx and call-in information was provided in the letter, I wanted to also provide this information to you via email to serve as a reminder. Below is the call-in and WebEx information:

Date/Time: Tuesday, July 24, 2012; 10:00 - 11:00 am CT
Link to WebEx: <http://e-meetings.verizonbusiness.com/nc/join.php>
Meeting Number: 445288484
Call in number: 1-866-398-2885
Participant Code: 197462

This informal session will begin the process of learning about your available local coastal data, hazard mitigation strategies, and what the critical flooding issues are in your community so that we can then work with you to determine how to best utilize that information during FEMA's Great Lakes study. A data request form is attached to help facilitate the discussion. We encourage open discussions throughout this meeting and will use the information to better cater our upcoming Discovery Meetings as well. Attendees of this conference call, as well as the Discovery Meetings, may include, but certainly are not limited to, community leaders, emergency managers, GIS specialists, engineers, outreach specialists, and local planners.

We look forward to speaking with you on Tuesday, and appreciate your participation in this process. If you have any questions, or are not able to attend this session but would like to learn more, please do not hesitate to contact me directly. My information can be found below.



LAKE MICHIGAN
Discovery Coasta...

Thanks,
Laura

Laura Keating, CFM
STARR
direct/fax: 925-296-8048
cell: 617-319-2472



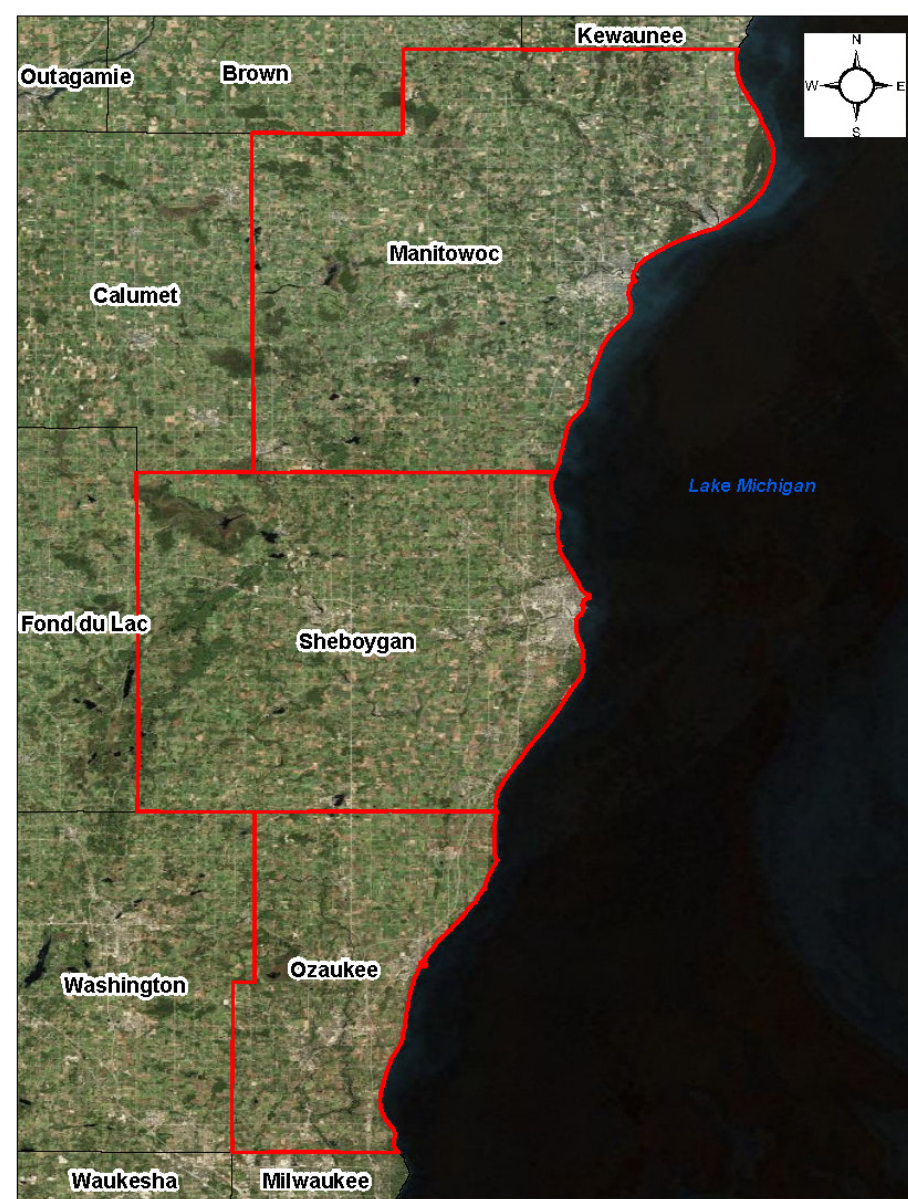
FEMA

Information Exchange Session for Lake Michigan Discovery

Manitowoc, Sheboygan, and
Ozaukee Counties

July 24, 2012

10am - 11am



RiskMAP

Increasing Resilience Together



Great Lakes

Coastal Flood Study

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

greatlakescoast.org



Purpose of Information Exchange

- Introduction to Risk MAP
- Introduction to Great Lakes Flood Study and Discovery
- Learn more about your areas of concern, coastal flood risk, and coastal mitigation
- Bring the right people to the table early
- Identify data gaps



RiskMAP

Increasing Resilience Together



*Great Lakes
Coastal Flood Study*

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

greatlakescoast.org



Risk MAP (Mapping, Assessment, and Planning) Vision



Goals

1. Address gaps in flood hazard data
2. Increase risk awareness to encourage risk reduction
3. Risk-based Mitigation Planning resulting in risk reduction actions
4. Enhanced digital platform to improve communication and sharing of risk data
5. Align programs and develop synergies



RiskMAP

Increasing Resilience Together

Great Lakes
Coastal Flood Study

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

greatlakescoast.org



Overview of Great Lakes Coastal Flood Study



- Latest models, data, and technology
- Deliver updated flood maps and flood risk datasets
- Equip Federal Agencies, eight States and hundreds of coastal communities with data and planning tools to facilitate actions to enhance resiliency of the Great Lakes ecosystem



Hazard Mitigation Resources, Strategies & Actions



- Recent community hazard mitigation experiences?
 - *Public Works*
 - *Building Standards*
 - *Community Planning and Hazard Mitigation Plan Update*
 - *Communication Processes, GIS, etc.*
- New option to document ideas and actions through the FEMA Mitigation Action Form



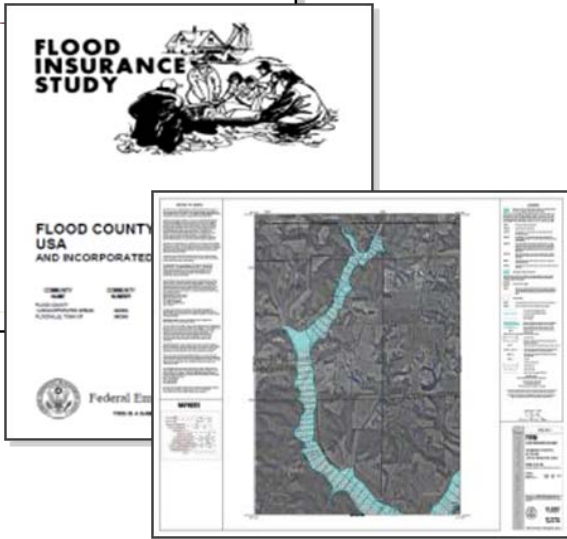
Products and Datasets: Regulatory and Non-regulatory



Traditional Regulatory Products

DFIRM Database

- Flood_Hazard_Data
- Political_Boundaries
- Public_Land_Survey_System
- TopoData
- Community_Panel
- L_Comm_Info
- L_MT1_LOMC
- L_Pan_Revis
- L_Pol_FHBM
- L_Riv_Model
- L_Stn_Start
- L_Wtr_Nm
- S_Bfe
- S_DOQ_Index
- S_Firm_Pan
- S_Gen_Struct
- S_Label_Id
- S_Label_Pt
- S_LOMR
- S_Perm_Bmk
- S_Quad
- S_Riv_Mrk
- S_Trnsport_Ar

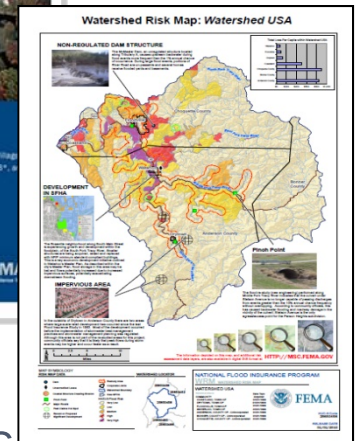
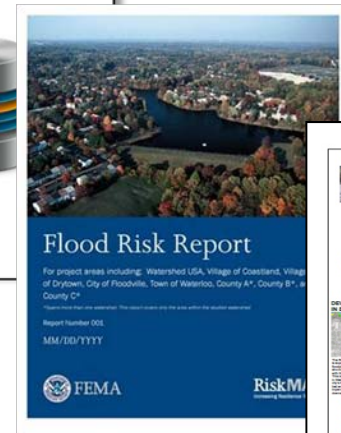


Subject to statutory due-process requirements

Non-Regulatory Products

Flood Risk Database

- Community_Panel_Info
- L_Comm_Info
- L_MT1_LOMC
- L_Pan_Revis
- L_Pol_FHBM
- L_Riv_Model
- L_Stn_Start
- L_Wtr_Nm
- S_Bfe
- S_DOQ_Index
- S_Firm_Pan
- S_Gen_Struct
- S_Label_Id
- S_Label_Pt
- S_LOMR
- S_Perm_Bmk
- S_Quad
- S_Riv_Mrk
- S_Trnsport_Ar



Not subject to statutory due-process requirements



Products and Datasets: Coastal Products in Development



Erosion



Red Lantern Restaurant, Lake Michigan, IN

Lake Levels



Lake Michigan Shoreline
[Reference](#)

Shoreline Feature Dataset



Upper Peninsula Shoreline
[Reference](#)



Risk MAP Overview: Shoreline Features Database



Shoreline Material
Sand
Cohesive
Cobble
Diamicton*
Shingle
Bedrock
Artificial

Primary Land Use
High Density Residential
Moderate Density Residential
Low Density Residential
Commercial/Industrial
Park Land
Farm Land
Forested

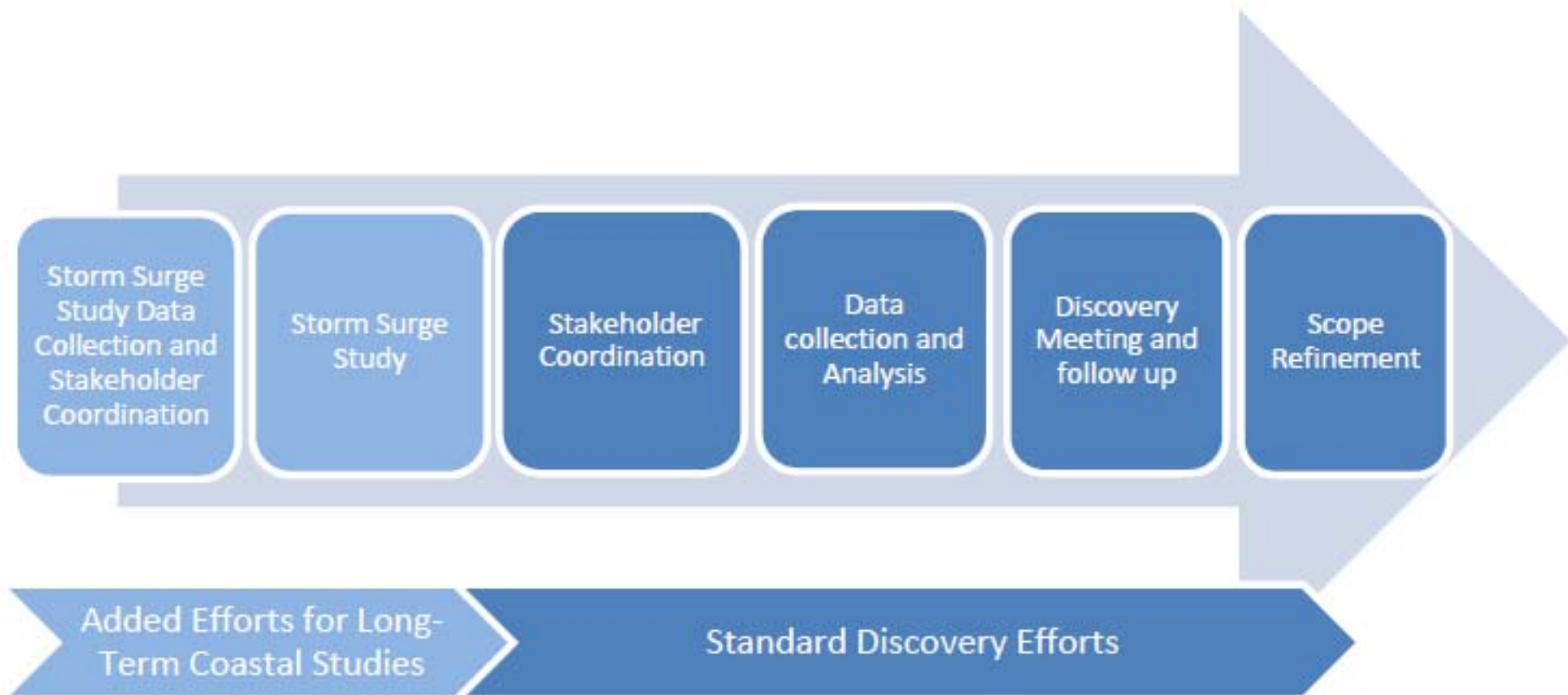
Primary Coast Type
High Dune, 10'+
Dune, 2' - 10'
High Bluff, 10'+
Bluff, 2' - 10'
Coastal Wetland
Flat Coast

Primary Vegetation
None
High Density Shrubs/Trees
Moderate Density Shrubs/Trees
Low Density Shrubs/Trees
Manicured Lawn
Native Vegetation

- Contains primary and secondary Land Use tables – same for coast type and vegetation.
- Current project collects data at one-mile spacing, for scoping and cost
- Current project does not include field-based reconnaissance or sediment/subsurface soils collection



Great Lakes Coastal Flood Study Discovery Process Overview



Great Lakes Coastal Flood Study Discovery Meeting



Discovery Meeting Venue	Discovery Meeting Address	Discovery Meeting Date, Time
Lakeshore Technical College	Wells Fargo Conference Room, 1290 North Avenue, Cleveland, WI 53015	Thursday 08/16/2012; 8.30 - 10:30 AM CT



Draft Discovery Meeting Agenda

- Why are we here?
- Coastal mapping and flood risk topics to be aware of
- How does this apply to my community?
 - NFIP compliance, hazard mitigation opportunities, and grant funding
- Interactive Session
 - Utilization of Coastal Flood Risk Products for Planning and Mitigation, Identification of Existing Local Coastal Data, View and Discuss Local Coastal Areas of Concern Using the Discovery Map, Discuss Mitigation Action Opportunities and Introduce the Mitigation Action Form
- Wrap Up

Draft Transect Map Station: Talk to technical staff about draft transects and view draft transects in GIS

Mitigation Resources, Strategies, and Actions Station: Talk with FEMA and State staff about areas of concern and potential mitigation actions to help reduce risk. Fill out Mitigation Action Form.



Great Lakes Coastal Flood Study Discovery Products



■ Final Discovery Report

- Single, comprehensive report for all of Lake Michigan, with appendices for each coastal community by county
- Includes pre-discovery data, meeting agenda, sign-in sheets, discussion topics, decisions made, etc.

■ Final Discovery Maps

- Including feedback from participants
- Visual representation of meeting outcomes



Who Should Attend the Discovery Meeting?



- **Community Officials**
 - CEO and Floodplain Administrators (FPAs)
 - Planners, GIS Specialists, Engineers, Outreach Specialists, Emergency Managers, and Community Leaders
- **State Representatives**
 - State Hazard Mitigation Officer (SHMO), National Flood Insurance Program (NFIP) Coordinators, Cooperating Technical Partners (CTPs)
- **Other Federal Agencies (NOAA, USACE, USGS)**
- **Regional Planning Agencies**
- **Great Lakes Organizations**



Great Lakes Coastal Flood Study Discovery Study Area

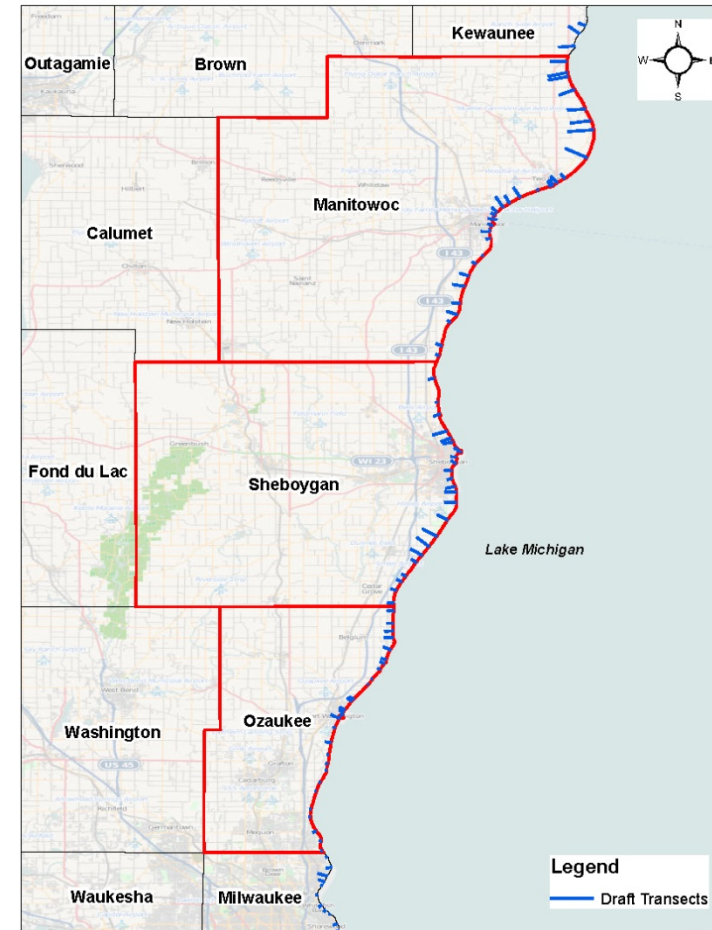


Lake Michigan coastal communities in Manitowoc, Sheboygan, and Ozaukee Counties:

Manitowoc County
Cleveland
Manitowoc (City)
Two Rivers


Sheboygan County
Cedar Grove
Oostburg
Sheboygan


Ozaukee County
Bayside
Mequon
Port Washington



Data Request Form Overview

- Contact Information
- Base Map Data
- Coastal Data
- Other Data
- Historic Flood Data
- Risk Assessment
- Flood Mitigation Information
- Community Plans and Projects
- Any Other Comments/ Concerns Based on Local Knowledge





RiskMAP
Increasing Resilience Together

Community Discovery Coastal Data Request Form

Thank you for taking the time to complete this questionnaire. We are interested in obtaining coastal-specific data for your community. It will provide important information to help FEMA understand coastal flood risk issues in your community and to work with you in increasing your community's resilience to coastal flooding through implementation of the Risk MAP program. In addition, this form can be used as a way to prepare for the upcoming Discovery Meeting, as the topics on this form will be discussed throughout the meeting.

Once you have completed the questionnaire, please return the form:

Via e-mail:
By mail:
Or by fax:

Please provide as much information as possible. If you have any questions about the Discovery process or about completing this questionnaire, please contact:

Contact Information	
Community/Organization	
Name:	
Title:	
Address:	
E-mail:	
Phone:	
Contact Preference	<input type="checkbox"/> Email <input type="checkbox"/> Phone <input type="checkbox"/> Mail

FEMA Region V
Lake Michigan Discovery
Community Discovery Coastal Data Request Form Page 1 of 7



Review of Data Collected To Date

- Draft Transects
- Shoreline Classification Dataset
- Hazard Mitigation Plans
- Hazard Mitigation Grants Program (HMGP) projects
- Pre-Disaster Mitigation Program projects
- Declared Disasters
- Repetitive loss claims by community



Next Steps and Opportunity to Get Involved



- Assessment of data and information provided
- Identification of best practices:
 - Do you have an example of a local coastal mitigation best practice?
- Discovery meeting involvement:
 - Are you be interested in participating in Discovery Meeting facilitation?

THANK YOU FOR YOUR PARTICIPATION!



Who to Contact

- For more information: <http://www.greatlakescoast.org/>
- Send completed questionnaires to:
 - GreatLakesFloodStudy@starr-team.com
- FEMA Region V
 - Ken Hinterlong @ ken.hinterlong@fema.dhs.gov
 - Lee Traeger @ Lee.Traeger@fema.dhs.gov
- STARR
 - Laura Keating @ laura.keating@starr-team.com
 - Jaspreet Randhawa @ Jaspreet.Randhawa@starr-team.com



Questions?



Community CEO/FPA List - Manitowoc County, Wisconsin - July 2012

County/City/Township	First/ Last Name	Title	Address	Address	ZIP	Phone	Email
Manitowoc County	Paul R. Tittl	Chairperson, County Board of Supervisors	County Courthouse	1010 South 8th Street, Manitowoc, WI	54220	920.683.4065	paultittl@co.manitowoc.wi.us
	Timothy Ryan	Director of Planning and Zoning	County Courthouse	1010 South 8th Street, Manitowoc, WI	54220	920.683.4186	timryan@co.manitowoc.wi.us
Cleveland, Village	Cindy Huhn	Village President	Village Hall	Post Office Box 87/1150 West Washington Avenue, Cleveland, WI	53015	920.693.8181	chuhn@clevelandwi.gov
	Steve Simons	Director of Public Works (FPA)	Village Hall	Post Office Box 87/1150 West Washington Avenue, Cleveland, WI	53015	920.693.8236	ssimons@clevelandwi.gov
Manitowoc, City	Justin M. Nickels	Mayor	City Hall	900 Quay Street, Manitowoc, WI	54220	920.686.6980	mayornickels@manitowoc.org
	Rick Schwarz	Building Inspector (FPA)	City Hall	900 Quay Street, Manitowoc, WI	54220	920.686.6940	rschwarz@manitowoc.org
Two Rivers, City	Lee W. Brocher	City Council President	City Hall	Post Office Box 87/1717 East Park Street, Two Rivers, WI	54241	920.793.5532	lbrocher@two-rivers.org
	Vicky Berg	Zoning Administrator and Inspections Assistant (FPA)	City Hall	Post Office Box 87/1717 East Park Street, Two Rivers, WI	54241	920.793.5566	vicber@two-rivers.org

Community CEO/FPA List - Ozaukee County, Wisconsin - July 2012

County/City/Township	First/ Last Name	Title	Address	Address	ZIP	Phone	Email
Ozaukee County	Robert Brooks	Chairperson, County Board	County Courthouse	Post Office Box 994/121 West Main Street, Port Washington, WI	53074	262.284.9411	rob@brooks-realestate.com
	Andy Holschbach	Director, Land and Water Management Department (FPA)	County Courthouse	Post Office Box 994/121 West Main Street, Port Washington, WI	53074	262.284.9411	aholschbach@co.ozaukee.wi.us
Port Washington, City	Scott A. Huebner	Mayor	City Hall	Post Office Box 307/100 West Grand Avenue, Port Washington, WI	53074	262.284.2600	shuebner@ci.port-washington.wi.us
	Randy Tetzlaff	Director of Planning and Development (FPA)	City Hall	Post Office Box 307/100 West Grand Avenue, Port Washington, WI	53074	262.284.2600	rtetzlaff@ci.port-washington.wi.us
Mequon, City of	Curt Gielow	Mayor	City Hall	11333 North Cedarburg Road, Mequon, WI	53092	262.236.2944	mayor@ci.mequon.wi.us
	Mark Lloyd	Deputy Director of Public Works (FPA)	City Hall	11333 North Cedarburg Road, Mequon, WI	53092	262.236.2957	mlloyd@ci.mequon.wi.us

Community CEO/FPA List - Sheboygan County, Wisconsin - July 2012

County/City/Town/Village	First/ Last Name	Title	Address	Address	ZIP	Phone	Email
Sheboygan County	Roger L. TeStroete	Chairperson, County Board	Administrative Building	508 New York Avenue, Room 311, Sheboygan, WI	53081		testrlt@co.sheboygan.wi.us
	Matt Mrochinski	County Code Administrator (FPA)	Administrative Building	508 New York Avenue, Sheboygan, WI	53081	920.459.36060	mrochmm@co.sheboygan.wi.us
Cedar Grove, Village	Mark Post	Village President	Village Office	22 Willow Avenue, Cedar Grove, WI	53013	920.668.6523	kotte@cedargrovetwi.com
	Paul Dekker	Superintendent of Public Works	Village Office	22 Willow Avenue, Cedar Grove, WI	53013	920.668.6523	kotte@cedargrovetwi.com
Oostburg, Village	Allen Wrubbel	President	Municipal Office	Post Office Box 700227/927 Center Avenue, Oostburg, WI	53070	920.564.3214	awrubblevillageboard@gmail.com
	Roger Oonk	Director of Public Works (FPA)	Municipal Office	Post Office Box 700227/927 Center Avenue, Oostburg, WI	53070	920.564.3844	roger.oonk@oostburg.org
Sheboygan, City	Terry Van Akkeren	Mayor	City Hall	828 Center Avenue, Suite 301, Sheboygan, WI	53081	920.459.3317	mayor.vanakkeren@ci.sheboygan.wi.us
	Steve Sokolowski	Manager of Planning and Zoning (FPA)	City Hall	828 Center Avenue, Suite 301, Sheboygan, WI	53081	920.459.3382	ssokolowski@ci.sheboygan.wi.us



FEMA

July 12, 2012

The Honorable Terry Van Akkeren
Mayor, City of Sheboygan
828 Center Avenue, Suite 301
Sheboygan, Wisconsin 53081

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mayor Van Akkeren:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

The goal of Risk MAP is to support actions that make communities safer from flooding. The Risk MAP program wants to achieve continued improvement of flood hazard information for the National Flood Insurance Program (NFIP); to promote increased awareness and understanding of flood risk; to increase community engagement; and to identify and support actions that local stakeholders can take to reduce natural hazard risks. For additional information on the Risk MAP Program, please visit http://www.fema.gov/plan/prevent/fhm/rm_main.shtm.

The first phase of the Risk MAP process is Discovery. Through Discovery, input provided by communities will help FEMA to better understand local coastal flood risk data and needs, and characterize local conditions that contribute to coastal flood risk.

Your Discovery Meeting is scheduled to occur:

Date/Time:	Thursday, August 16, 2012; 8:30 - 10:30 am CT
Location:	Lakeshore Technical College, Wells Fargo Conference Room
Address:	1290 North Avenue Cleveland, Wisconsin 53015

Please save this date on your calendar. At the meeting, we will review the coastal flood risk data we have gathered to date and discuss your community's coastal floodplains, mitigation plan and projects, coastal flood risk concerns, and coastal floodplain management activities. This discussion will allow us to better identify your community's coastal flood hazard needs and subsequent Risk MAP regulatory and non-regulatory products and datasets that can be delivered during the Risk MAP project. We will also discuss how the coastal flood risks and needs are related to mapping, risk assessment, Hazard Mitigation planning, and grant programs available to eligible communities. To best facilitate this discussion, we would like to request your help in inviting community leaders, emergency managers, GIS specialists, engineers, outreach specialists, and local planners to the meeting. Please RSVP to FEMA's study contractor (STARR) Scott Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 3, 2012**. Please reference the Discovery Meeting date and time in your RSVP.

So that we can better prepare for the upcoming Discovery Meeting, we are asking local communities to participate in an Information Exchange conference call and WebEx. This call will provide an overview of FEMA's Risk MAP program and the Discovery process, and will allow us to review with you our request for the exchange of coastal flood risk and hazard mitigation data, and to learn more about your community's coastal flood hazard risks and needs, in advance of the Discovery Meeting. The partnership and exchange of data between FEMA, the State, and your community is vital to the success of identifying flood risks and needs that may impact your citizens.

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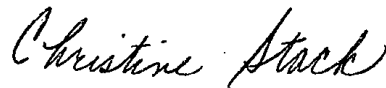
Date/Time: Tuesday, July 24, 2012; 10:00 - 11:00 am CT
Link to WebEx: <http://e-meetings.verizonbusiness.com/nc/join.php>
Meeting Number: 445288484
Call in number: 1-866-398-2885
Participant Code: 197462

If you or another community representative is unable to attend the Information Exchange conference call, we ask that you fill out and return the enclosed data request form by **August 3, 2012**. This is the same data request form that will be discussed during the conference call. The completed form can be sent to:

Via e-mail: GreatLakesFloodStudy@starr-team.com
By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

We look forward to working with you to reduce the risks associated with coastal flooding and increase your community's resiliency for the long term. To learn more about Discovery, please visit <http://www.fema.gov/library> and search keywords "Discovery brochure" or contact Ken Hinterlong, FEMA Region V Senior Engineer, at (312) 408-5529, or by email at ken.hinterlong@fema.dhs.gov. We look forward to discussing this with you during the Information Exchange call and/or seeing you at the upcoming Discovery Meeting.

Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Steve Sokolowski, Manager of Planning and Zoning, City of Sheboygan
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources



FEMA

July 12, 2012

Mr. Michael Vandersteen
Chairperson, County Board, Sheboygan County
Administrative Building
508 New York Avenue, Room 311
Sheboygan, Wisconsin 53081

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mr. Vandersteen:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

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Mr. Michael Vandersteen
July 12, 2012
Page 2

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 3, 2012**. Please reference the Discovery Meeting date and time in your RSVP.

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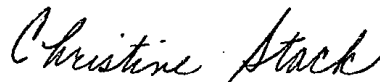
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Call in number: 1-866-398-2885
Participant Code: 197462

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Via e-mail: GreatLakesFloodStudy@starr-team.com
By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

We look forward to working with you to reduce the risks associated with coastal flooding and increase your community's resiliency for the long term. To learn more about Discovery, please visit <http://www.fema.gov/library> and search keywords "Discovery brochure" or contact Ken Hinterlong, FEMA Region V Senior Engineer, at (312) 408-5529, or by email at ken.hinterlong@fema.dhs.gov. We look forward to discussing this with you during the Information Exchange call and/or seeing you at the upcoming Discovery Meeting.

Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Matt Mrochinski, County Code Administrator, Sheboygan County
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources



FEMA

July 12, 2012

Mr. Mark Post
Village President, Village of Cedar Grove
Village Office
22 Willow Avenue
Cedar Grove, Wisconsin 53013

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mr. Post:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

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Mr. Mark Post
July 12, 2012
Page 2

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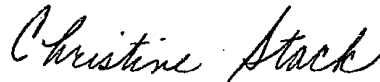
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By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

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Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Paul Dekker, Superintendent of Public Works, Village of Cedar Grove
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources



FEMA

July 12, 2012

Mr. Allen Wrubbel
President, Village of Oostburg
927 Center Avenue
Oostburg, Wisconsin 53070

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mr. Wrubbel:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

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Mr. Allen Wrubbel
July 12, 2012
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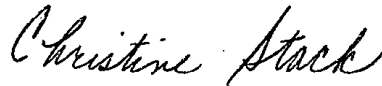
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Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

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cc: Roger Oonk, Director of Public Works, Village of Oostburg
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resource



FEMA

July 12, 2012

The Honorable Justin Nickels
Mayor, City of Manitowoc
City Hall
900 Quay Street
Manitowoc, Wisconsin 54220

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mayor Nickels:

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The Honorable Justin Nickels
July 12, 2012
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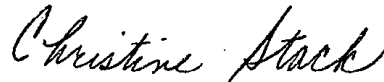
Date/Time: Tuesday, July 24, 2012; 10:00 - 11:00 am CT
Link to WebEx: <http://e-meetings.verizonbusiness.com/nc/join.php>
Meeting Number: 445288484
Call in number: 1-866-398-2885
Participant Code: 197462

If you or another community representative is unable to attend the Information Exchange conference call, we ask that you fill out and return the enclosed data request form by **August 3, 2012**. This is the same data request form that will be discussed during the conference call. The completed form can be sent to:

Via e-mail: GreatLakesFloodStudy@starr-team.com
By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

We look forward to working with you to reduce the risks associated with coastal flooding and increase your community's resiliency for the long term. To learn more about Discovery, please visit <http://www.fema.gov/library> and search keywords "Discovery brochure" or contact Ken Hinterlong, FEMA Region V Senior Engineer, at (312) 408-5529, or by email at ken.hinterlong@fema.dhs.gov. We look forward to discussing this with you during the Information Exchange call and/or seeing you at the upcoming Discovery Meeting.

Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Rick Schwarz, Building Inspector, City of Manitowoc
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources



FEMA

July 12, 2012

Mr. Lee Brocher
City Council President, City of Two Rivers
City Hall
1717 East Park Street, Post Office Box 87
Two Rivers, Wisconsin 54241

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mr. Brocher:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

The goal of Risk MAP is to support actions that make communities safer from flooding. The Risk MAP program wants to achieve continued improvement of flood hazard information for the National Flood Insurance Program (NFIP); to promote increased awareness and understanding of flood risk; to increase community engagement; and to identify and support actions that local stakeholders can take to reduce natural hazard risks. For additional information on the Risk MAP Program, please visit http://www.fema.gov/plan/prevent/fhm/rm_main.shtm.

The first phase of the Risk MAP process is Discovery. Through Discovery, input provided by communities will help FEMA to better understand local coastal flood risk data and needs, and characterize local conditions that contribute to coastal flood risk.

Your Discovery Meeting is scheduled to occur:

Date/Time:	Thursday, August 16, 2012; 8:30 - 10:30 am CT
Location:	Lakeshore Technical College, Wells Fargo Conference Room
Address:	1290 North Avenue Cleveland, Wisconsin 53015

Please save this date on your calendar. At the meeting, we will review the coastal flood risk data we have gathered to date and discuss your community's coastal floodplains, mitigation plan and projects, coastal flood risk concerns, and coastal floodplain management activities. This discussion will allow us to better identify your community's coastal flood hazard needs and subsequent Risk MAP regulatory and non-regulatory products and datasets that can be delivered during the Risk MAP project. We will also discuss how the coastal flood risks and needs are related to mapping, risk assessment, Hazard Mitigation planning, and grant programs available to eligible communities. To best facilitate this discussion, we would like to request your help in inviting community leaders, emergency managers, GIS specialists, engineers, outreach specialists, and local planners to the meeting. Please RSVP to FEMA's study contractor (STARR) Scott

Mr. Lee Brocher
July 12, 2012
Page 2

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 3, 2012**. Please reference the Discovery Meeting date and time in your RSVP.

So that we can better prepare for the upcoming Discovery Meeting, we are asking local communities to participate in an Information Exchange conference call and WebEx. This call will provide an overview of FEMA's Risk MAP program and the Discovery process, and will allow us to review with you our request for the exchange of coastal flood risk and hazard mitigation data, and to learn more about your community's coastal flood hazard risks and needs, in advance of the Discovery Meeting. The partnership and exchange of data between FEMA, the State, and your community is vital to the success of identifying flood risks and needs that may impact your citizens.

The Information Exchange conference call is scheduled to occur:

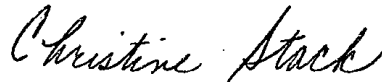
Date/Time: Tuesday, July 24, 2012; 10:00 - 11:00 am CT
Link to WebEx: <http://e-meetings.verizonbusiness.com/nc/join.php>
Meeting Number: 445288484
Call in number: 1-866-398-2885
Participant Code: 197462

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By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

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Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Vicky Berg, Zoning Administrator, City of Two Rivers
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources



FEMA

July 12, 2012

Mr. Paul R. Tittl
Chairperson, County Board of Supervisors, Manitowoc County
County Courthouse
1010 South 8th Street
Manitowoc, Wisconsin 54220

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Mr. Tittl:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

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Your Discovery Meeting is scheduled to occur:

Date/Time:	Thursday, August 16, 2012; 8:30 - 10:30 am CT
Location:	Lakeshore Technical College, Wells Fargo Conference Room
Address:	1290 North Avenue Cleveland, Wisconsin 53015

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Mr. Paul R. Tittl
July 12, 2012
Page 2

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 3, 2012**. Please reference the Discovery Meeting date and time in your RSVP.

So that we can better prepare for the upcoming Discovery Meeting, we are asking local communities to participate in an Information Exchange conference call and WebEx. This call will provide an overview of FEMA's Risk MAP program and the Discovery process, and will allow us to review with you our request for the exchange of coastal flood risk and hazard mitigation data, and to learn more about your community's coastal flood hazard risks and needs, in advance of the Discovery Meeting. The partnership and exchange of data between FEMA, the State, and your community is vital to the success of identifying flood risks and needs that may impact your citizens.

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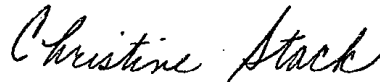
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Meeting Number: 445288484
Call in number: 1-866-398-2885
Participant Code: 197462

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By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

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Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Reed Gaedtke, Code Administrator, Manitowoc County
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources



FEMA

July 12, 2012

Ms. Cindy Huhn
President, Village Board, Village of Cleveland
Village Hall
1150 West Washington Avenue, Post Office Box 87
Cleveland, Wisconsin 53015

Re: Invitation to Attend Community Meetings Regarding Lake Michigan Coastal Flood Risk

Dear Ms. Huhn:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. Please see enclosed Risk MAP Flood Risk Products Fact Sheet. More information about the Great Lakes Coastal Flood Study may be found at <http://www.greatlakescoast.org>.

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Ms. Cindy Huhn
July 12, 2012
Page 2

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 3, 2012**. Please reference the Discovery Meeting date and time in your RSVP.

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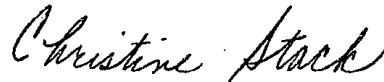
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Participant Code: 197462

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Via e-mail: GreatLakesFloodStudy@starr-team.com
By mail: Scott Banjavcic
CDM Smith/STARR
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606

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Sincerely,



Christine Stack
Division Director
Mitigation Division, FEMA Region V

Enclosures: Risk MAP Flood Risk Products Fact Sheet
Community Discovery Coastal Data Request Form

cc: Steve Simons, Director of Public Works, Village of Cleveland
Gary Heinrichs, Wisconsin Department of Natural Resources
Katie McMahan, Wisconsin Department of Natural Resources
Meg Galloway, Wisconsin Department of Natural Resources

Keating, Laura

From: Banjavcic, Scott
Sent: Tuesday, August 07, 2012 9:13 AM
To: Keating, Laura
Subject: FW: Test Message - Text Format: Invitation to Community Meetings Re: Lake Michigan Coastal Flood Risk

-----Original Message-----

From: Great Lakes Coastal Flood Study [mailto:Great_Lakes_Coastal_Flood_Study@mail.vresp.com]
Sent: Friday, July 27, 2012 11:51 AM
To: Banjavcic, Scott
Subject: Test Message - Text Format: Invitation to Community Meetings Re: Lake Michigan Coastal Flood Risk

Dear State of Wisconsin Lake Michigan Coastal Flood Study Stakeholders:

The Federal Emergency Management Agency (FEMA) is conducting a comprehensive study of flood hazards for Lake Michigan and the rest of the United States Great Lakes through FEMA's Risk Mapping, Assessment, and Planning (MAP) Program. Data from this study will eventually be used to convey coastal flood hazard risk through revised Flood Insurance Rate Maps (FIRMs), also known as regulatory products, and new risk planning and assessment products and datasets, also referred to as non-regulatory products and datasets. More information about the Great Lakes Coastal Flood Study may be found at <http://cts.vresp.com/c/?OPP/82c700126e/TEST/325458b8b1>.

The goal of Risk MAP is to support actions that make communities safer from flooding. The Risk MAP program wants to achieve continued improvement of flood hazard information for the National Flood Insurance Program (NFIP); to promote increased awareness and understanding of flood risk; to increase community engagement; and to identify and support actions that local stakeholders can take to reduce natural hazard risks. For additional information on the Risk MAP Program, please visit <http://cts.vresp.com/c/?OPP/82c700126e/TEST/0cb914bbf5>.

The first phase of the Risk MAP process is Discovery. Through Discovery, input provided by local stakeholders will help FEMA to better understand local coastal flood risk data and needs, and characterize local conditions that contribute to coastal flood risk.

We would like to invite you to attend one of the following Discovery Meetings being held in Wisconsin for Lake Michigan. Although each Discovery Meeting will give the same overall message, each meeting will be catered to the coastal communities within the counties listed below:

Marinette County and Oconto County (Discovery Meeting) Wednesday, August 15, 2012 8:30 - 10:30 am CT Oconto County Courthouse Conference Room 1003 & 1004
301 Washington Street
Oconto, WI 54153

Kewaunee County, Door County and Brown County (Discovery Meeting) Wednesday, August 15, 2012 2:00 - 4:00 pm CT Neville Public Museum 210 Museum Place Green Bay, WI 54303

Sheboygan County, Manitowoc County and Ozaukee County (Discovery Meeting)

Thursday, August 16, 2012

8:30 - 10:30 am CT

Lakeshore Technical College

Wells Fargo Conference Room

1290 North Avenue

Cleveland, WI 53015

Milwaukee County, Racine County and Kenosha County (Discovery Meeting)

Thursday, August 16, 2012

2:00 - 4:00 pm CT

Milwaukee Metropolitan Sewerage District (MMSD), Commission Room 260 W. Seeboth Street Milwaukee, WI 53204

Please save this date on your calendar. At the meetings, we will review the coastal flood risk data we have gathered to date and discuss local coastal floodplains, mitigation plan and projects, coastal flood risk concerns, and coastal floodplain management activities. This discussion will allow us to better identify local coastal flood hazard needs and subsequent Risk MAP regulatory and non-regulatory products and datasets that can be delivered during the Risk MAP project. We will also discuss how the coastal flood risks and needs are related to mapping, risk assessment, hazard mitigation planning, and grant programs available to eligible communities.

Please RSVP to FEMA's study contractor (STARR) Scott Banjavcic at

(312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com by

August 10, 2012. Please reference the Discovery Meeting date and time in your RSVP.

A Community Coastal Data Request Form was recently mailed to local community officials, along with the Discovery Meeting invitation.

This form is also available online at:

<http://cts.vresp.com/c/?OPP/82c700126e/TEST/aa53784db9> .

If you have data or information that you would like to provide to FEMA or discuss with us in advance of the Discovery Meetings, please contact Laura Keating of STARR at (925) 296-8048 or by email at GreatLakesFloodStudy@starr-team.com .

We look forward to working with you to reduce the risks associated with coastal flooding and increase resiliency for the long term. To learn more about Discovery, please visit <http://cts.vresp.com/c/?OPP/82c700126e/TEST/644d377ebd> and search keywords "Discovery brochure" or contact Ken Hinterlong, FEMA Region V Senior Engineer, at (312) 408-5529, or by email at ken.hinterlong@fema.dhs.gov . We look forward to seeing you at the upcoming Discovery Meeting.

For additional information on the Great Lakes Coastal Flood Study, please visit:

<http://cts.vresp.com/c/?OPP/82c700126e/TEST/c4c492e324> .

- <http://cts.vresp.com/c/?OPP/82c700126e/TEST/67378908c0>

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<http://cts.vresp.com/c/?OPP/82c700126e/TEST/f94889858b>

Like [GreatLakesCoast](#) on Facebook

Click to view this email in a browser

<http://hosted.verticalresponse.com/290205/82c700126e/TEST/TEST/>

If you want to "Unsubscribe" from this list and no longer receive emails regarding the Great Lakes Coastal Flood Study, please click on the following link:

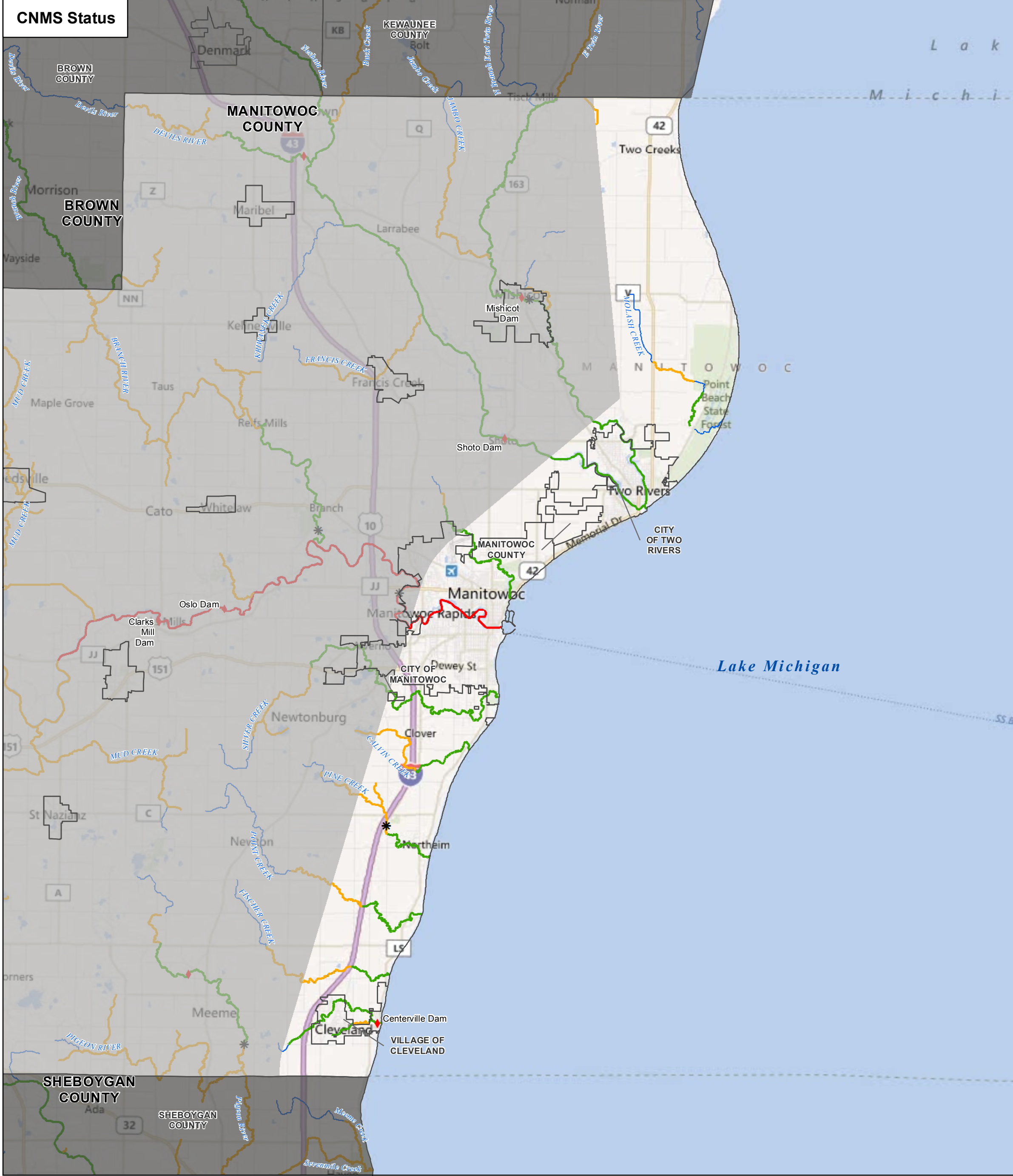
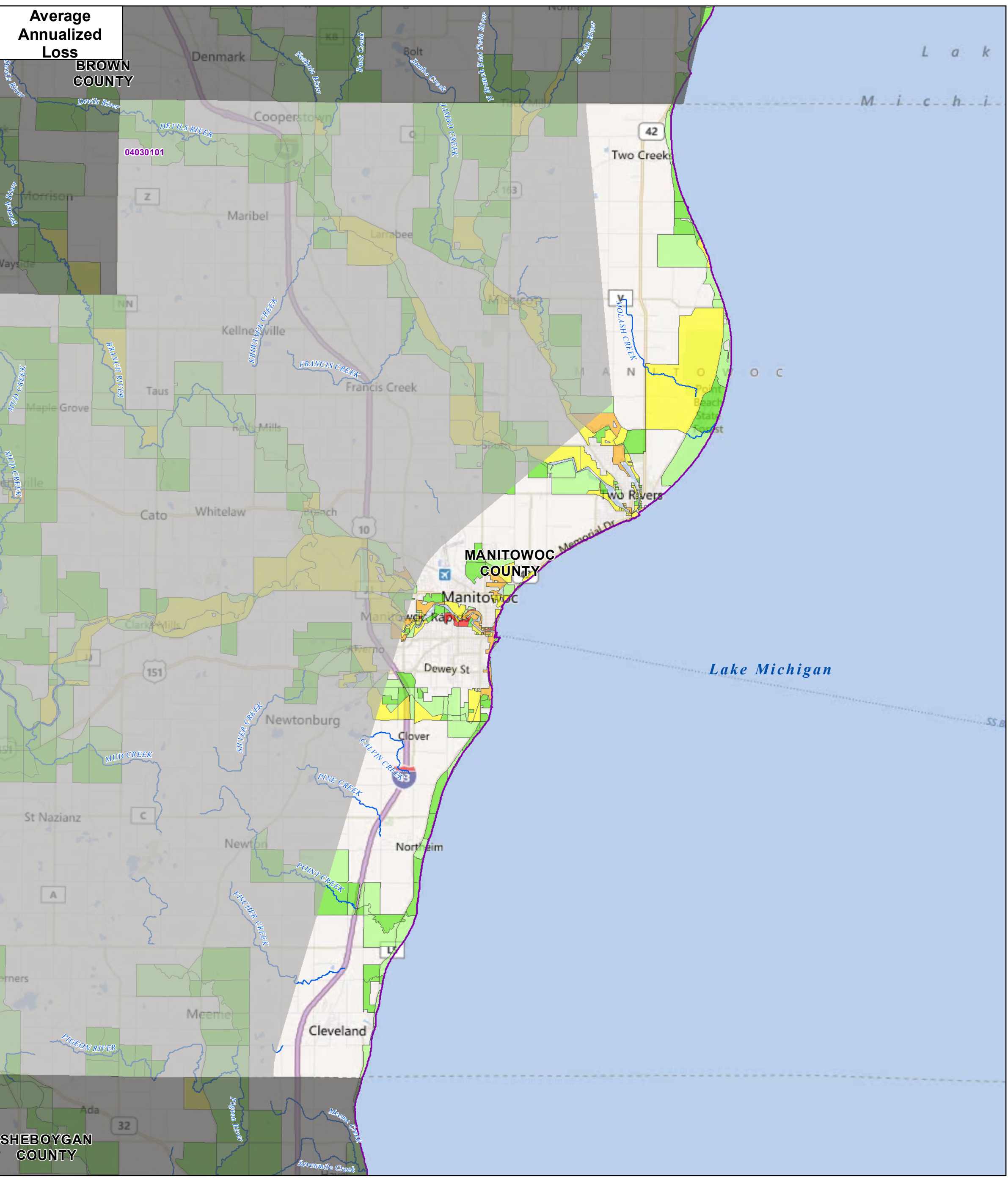
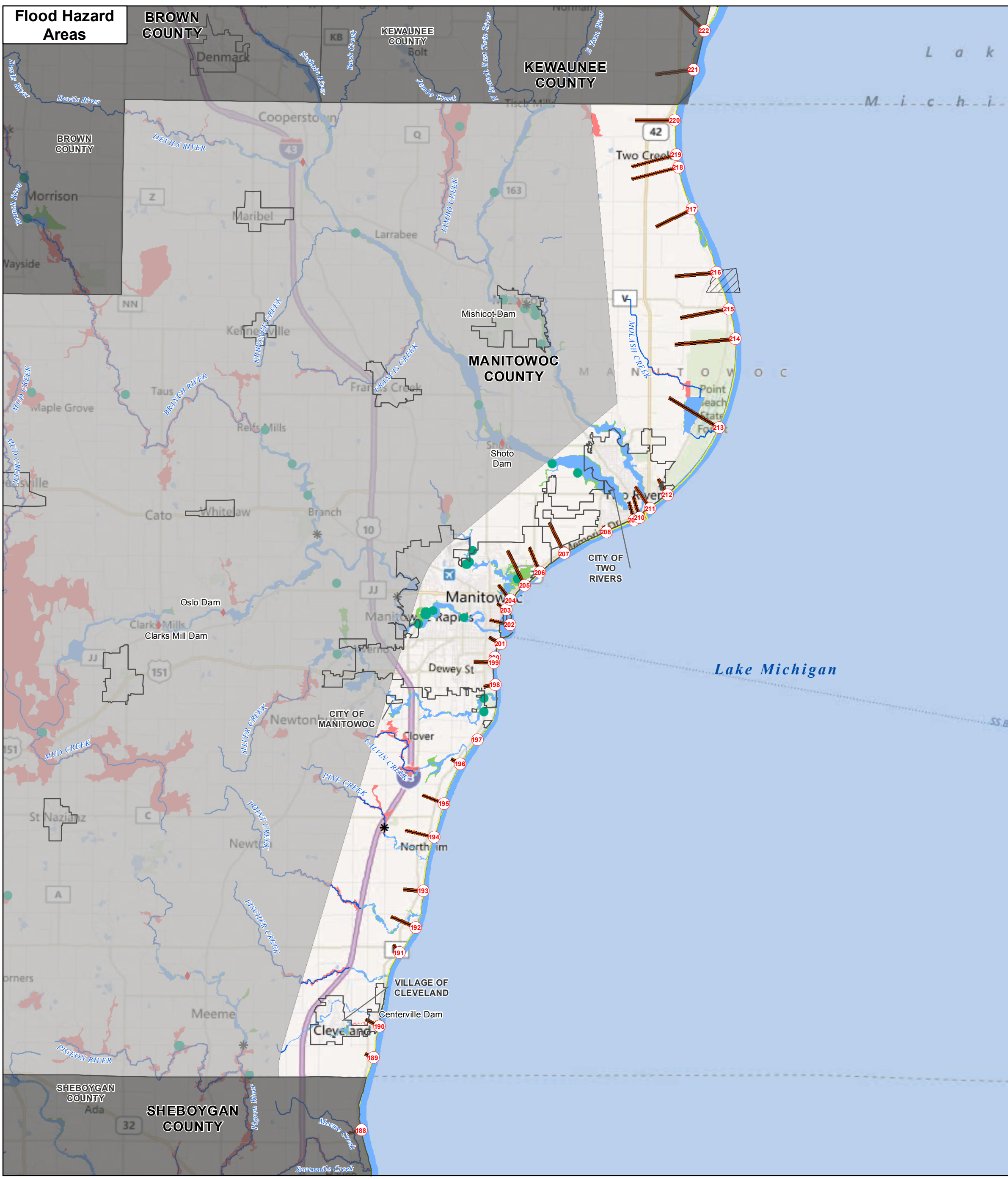
<http://cts.vresp.com/u?82c700126e/TEST/TEST>

This message was sent by Great Lakes Coastal Flood Study using VerticalResponse

Great Lakes Coastal Flood Study
2809 Fish Hatchery Road, Suite 204
Madison, WI 53713
US

Read the VerticalResponse marketing policy:
http://www.verticalresponse.com/content/pm_policy.html

ATTACHMENT C
SHEBOYGAN, MANITOWOC, AND OZAUKEE COUNTY
DRAFT DISCOVERY MAPS



Declared Disasters						
Lake	State	Declared County/Area	Declaration Date	Disaster Type	Incident Type	Description
Lake Michigan	WI	Manitowoc (County)	4/27/1973	DR	Flood	SEVERE STORMS & FLOODING
Lake Michigan	WI	Manitowoc (County)	3/23/1976	DR	Flood	SEVERE STORMS, ICING, WIND & FLOODING
Lake Michigan	WI	Manitowoc (County)	7/13/1990	DR	Severe Storm(s)	SEVERE STORMS, TORNADOES & FLOODING
Lake Michigan	WI	Manitowoc (County)	6/14/2008	DR	Severe Storm(s)	SEVERE STORMS, TORNADOES, AND FLOODING
Lake Michigan	WI	Manitowoc (County)	1/24/2001	EM	Snow	SNOW
Lake Michigan	WI	Manitowoc (County)	9/13/2005	EM	Hurricane	HURRICANE KATRINA EVACUATION

Summary of Flood Insurance Policies and Claims									
Lake	State	County	Community	OID	No. Policies	Total Premium	Total Coverage	Number of claims since 1978	Dollar (\$) paid for claims since 1978
Lake Michigan	WI	Manitowoc	Manitowoc County	550236	47	\$28,647	\$8,672,400	14	\$54,302
Lake Michigan	WI	Manitowoc	Manitowoc, City of	550240	18	\$13,724	\$2,754,600	6	\$33,119
Lake Michigan	WI	Manitowoc	Two Rivers, City of	550243	14	\$7,165	\$1,390,500	1	\$2,206
Lake Michigan	WI	Manitowoc	Cleveland, Village of	550237	5	\$4,112	\$1,459,000	4	\$1,632

Mitigation Action		
Name of Plan	Plan Expiration Date	Identified Hazard Mitigation Action
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Monitor natural features along Lake Michigan for deterioration that would allow for flooding or mudslides to impact properties along the shore
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Maintain maps indicating past incidences and areas most susceptible to future hazards
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Maintain current land use regulations that permit building of structures within vulnerable coastal locations
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Work with the Coast Guard to monitor conditions where drifting ice can damage shore structures and destroy vegetation, move sand or stones from beaches, or dump sand, rock, or other debris on beaches
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Construction of riprap to manage bluff erosion shifts due to the eroding force of the water where coastal areas lack bluff reinforcement.
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Enforce land use regulations that preserve natural resources adjacent to and in defined floodplains
Manitowoc County All Hazards Mitigation Plan, August 2008	9/23/2014	Implement floodproofing techniques such as elevation, relocation, barrier construction, and wet floodproofing for residents, businesses, and critical facilities

MAP SYMBOLOGY

- LEGEND**
- Dams
 - LOMCs
 - * USGS Gages
 - Transsects
 - Shoreline
 - Streams
 - Watersheds (HUC 8)
 - Coastal Barrier Resource System
 - Coastal Discovery Area
 - Surrounding Counties
 - Municipal Boundaries
- EFFECTIVE SFHA**
- A
 - AE
 - 0.2% PCT ANNUAL CHANCE FLOOD
- AAL DATA**
Total Average Annualized Losses per Census Block
- Less than \$10,000
 - \$10,001 - \$100,000
 - \$100,001 - \$1,000,000
 - \$1,000,001 - \$5,000,000
 - Greater than \$5,000,000
- Coordinated Needs Management Strategy (CNMS) Validation Status**
- Unverified
 - Unknown
 - Valid

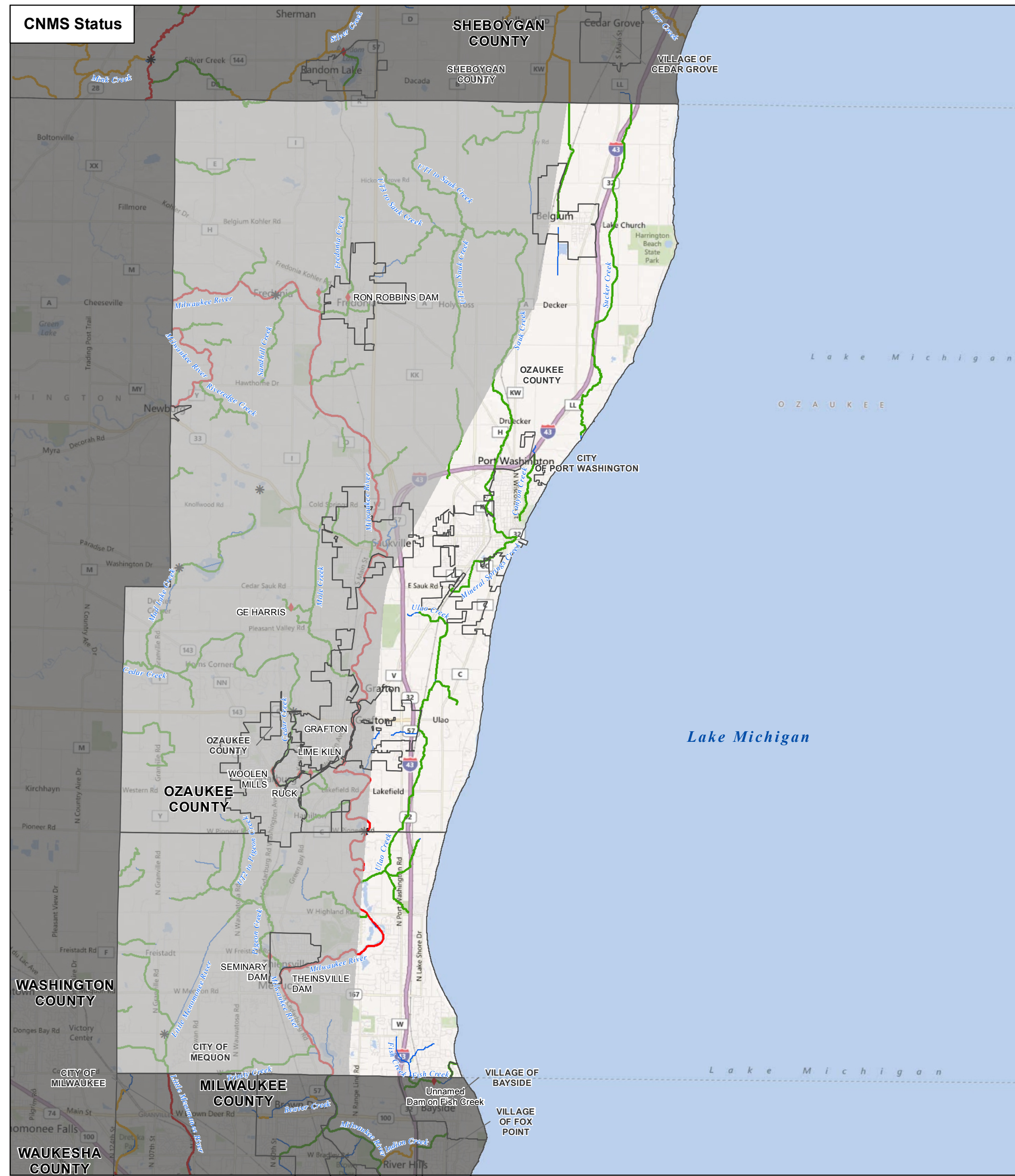
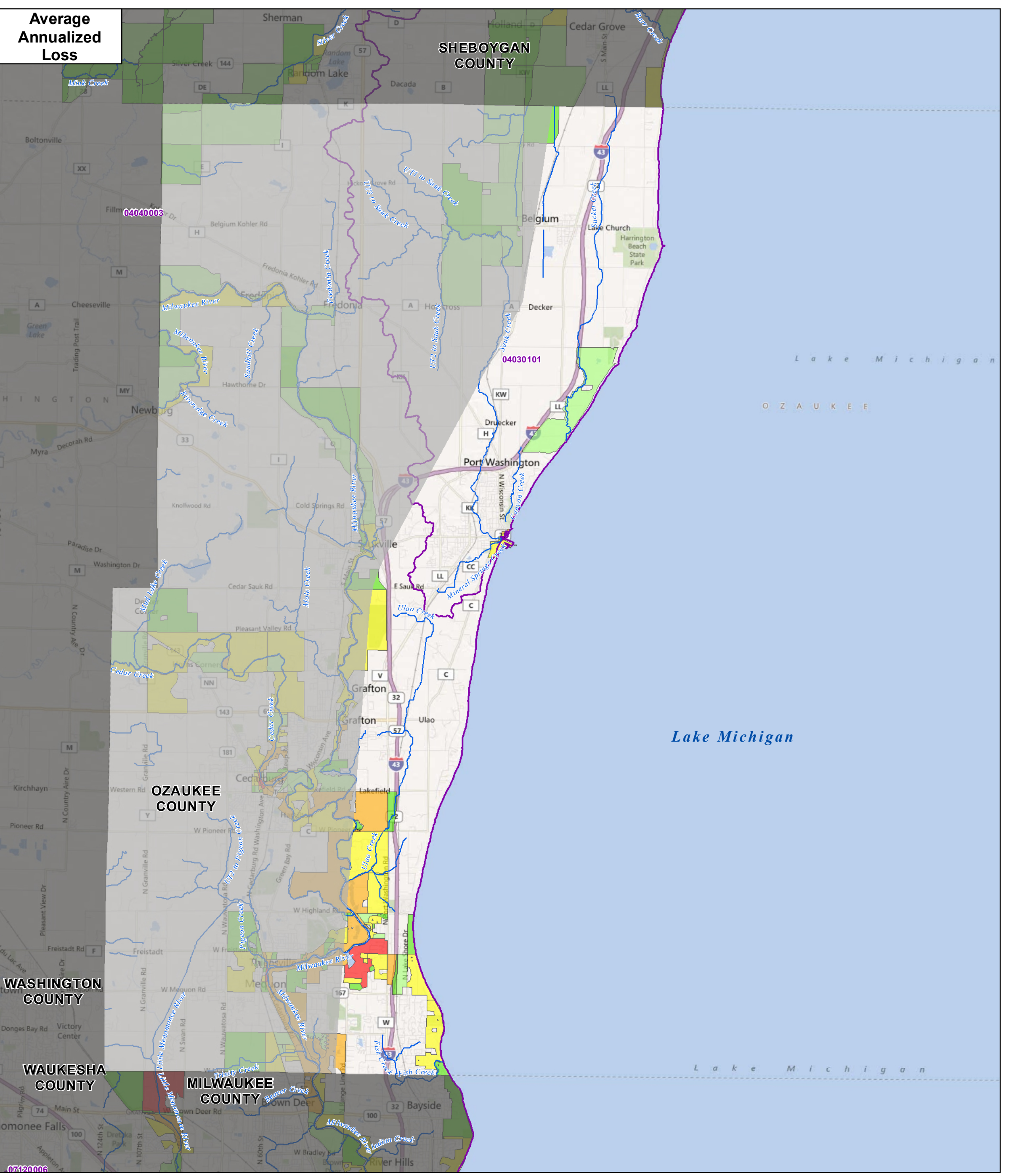
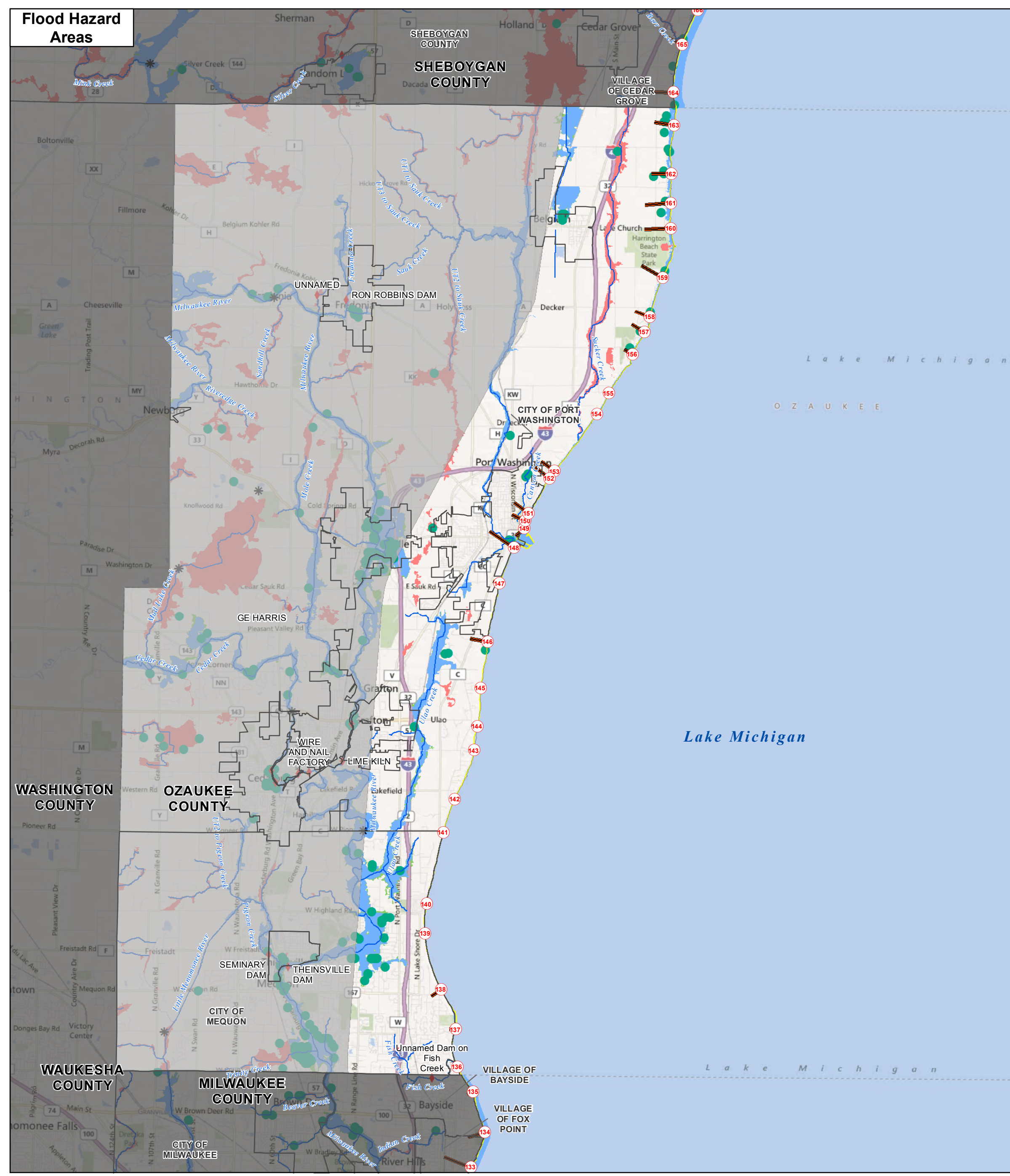
COASTAL STUDY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM
Discovery Map

LAKE MICHIGAN COASTAL STUDY
MANITOWOC COUNTY, WISCONSIN COASTAL STUDY COMMUNITIES

Manitowoc County
Cleveland, Village of
Manitowoc County
Manitowoc, City of
Two Rivers, City of



Declared Disasters						
Lake	State	Declared County/Area	Declaration Date	Disaster Type	Incident Type	Description
Lake Michigan	WI	Ozaukee (County)	4/21/1965	DR	Tornado	TORNADOES, SEVERE STORMS & FLOODING
Lake Michigan	WI	Ozaukee (County)	4/27/1973	DR	Flood	SEVERE STORMS & FLOODING
Lake Michigan	WI	Ozaukee (County)	3/23/1976	DR	Flood	SEVERE STORMS, ICING, WIND & FLOODING
Lake Michigan	WI	Ozaukee (County)	10/7/1986	DR	Flood	SEVERE STORMS & FLOODING
Lake Michigan	WI	Ozaukee (County)	8/6/1991	DR	Severe Storm(s)	SEVERE STORMS & HAIL
Lake Michigan	WI	Ozaukee (County)	7/7/1997	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
Lake Michigan	WI	Ozaukee (County)	6/18/2004	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
Lake Michigan	WI	Ozaukee (County)	6/14/2008	DR	Severe Storm(s)	SEVERE STORMS, TORNADOES, AND FLOODING
Lake Michigan	WI	Ozaukee (County)	1/24/2001	EM	Snow	SNOW
Lake Michigan	WI	Ozaukee (County)	9/13/2005	EM	Hurricane	HURRICANE KATRINA EVACUATION

Summary of Flood Insurance Policies and Claims									
Lake	State	County	Community	OID	No. Policies	Total Premium Coverage	Total Coverage	Number of claims since 1978	Dollar (\$) paid for claims since 1978
Lake Michigan	WI	Ozaukee	Ozaukee County	550310	101	\$90,431	\$19,366,400	33	\$215,225
Lake Michigan	WI	Ozaukee	Bayside, Village of	550270	30	\$14,517	\$8,638,200	22	\$77,911
Lake Michigan	WI	Ozaukee	Mequon, City of	555564	0	\$186,340	\$0	0	\$0
Lake Michigan	WI	Ozaukee	Port Washington, City of	550316	40	\$14,097	\$9,990,500	4	\$12,174

Mitigation Action		
Name of Plan	Plan Expiration Date	Identified Hazard Mitigation Action
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Ensure that municipalities, builders and homeowners understand and follow safe building zoning regulations.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Review the county ordinance provision for set-backs and ensure that it is adequate.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Incorporate into local comprehensive planning process (including SMART growth, as applicable)
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Conduct a feasibility study (with a cost benefit analysis) for conducting LiDAR mapping flights for good digital terrain maps (DTM) to model the surface contours for flooding and other scenario modeling/projections
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Continue public outreach efforts for flood mitigation efforts
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Discuss potential regulatory and ordinance changes that would allow municipalities to condemn properties in flood areas.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Complete amendments/revisions to the Flood Rate Insurance Maps (FIRMs) as necessary
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Explore with the approximately 16 home owners in the Edgewater Drive area (Town of Grafton) the feasibility of a buyout or other flood mitigation program. Also, ensure that the road is of adequate height to escape flood damage.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Update, as necessary, the stormwater plan
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Update, as necessary, the water management plans. Continue marking stormwater drains.
Ozaukee County, Wisconsin Hazard Mitigation Plan, 2008	3/18/14	Support the Pigeon Creek restoration mitigation project.

MAP SYMBOLOGY

<p>LEGEND</p> <ul style="list-style-type: none"> ◆ Dams ● LOMCs * USGS Gages — Transects — Shoreline — Streams — Watersheds (HUC 8) ▨ Coastal Barrier Resource System 	<ul style="list-style-type: none"> □ Coastal Discovery Area ▭ Surrounding Counties □ Municipal Boundaries <p>EFFECTIVE SFHA</p> <ul style="list-style-type: none"> ■ A ■ AE ■ 0.2% PCT ANNUAL CHANCE FLOOD 	<p>AAL DATA Total Average Annualized Losses per Census Block</p> <ul style="list-style-type: none"> ■ Less than \$10,000 ■ \$10,001 - \$100,000 ■ \$100,001 - \$1,000,000 ■ \$1,000,001 - \$5,000,000 ■ Greater than \$5,000,000 	<p>Coordinated Needs Management Strategy (CNMS) Validation Status</p> <ul style="list-style-type: none"> — Unverified — Unknown — Valid
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COASTAL STUDY LOCATOR

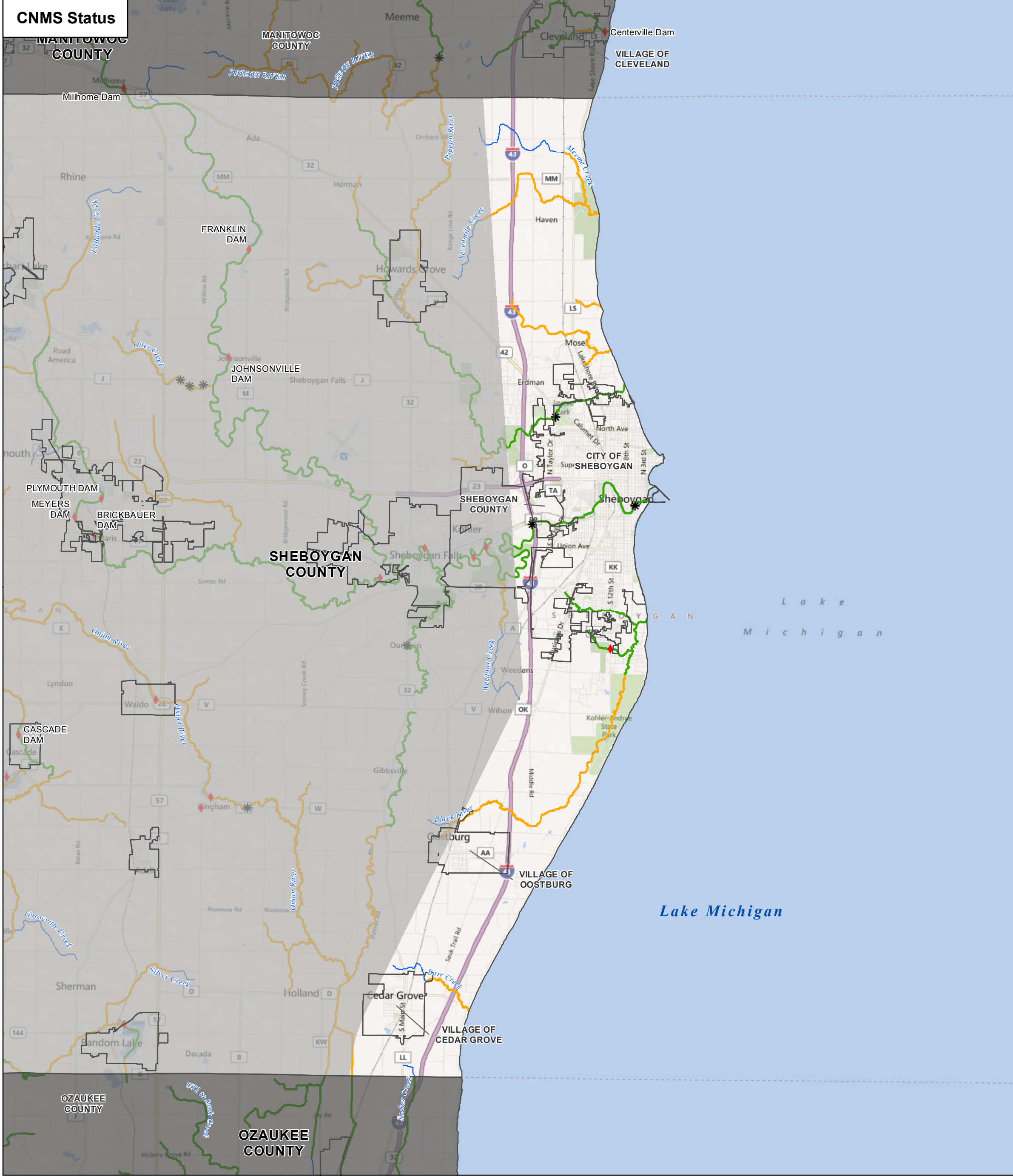
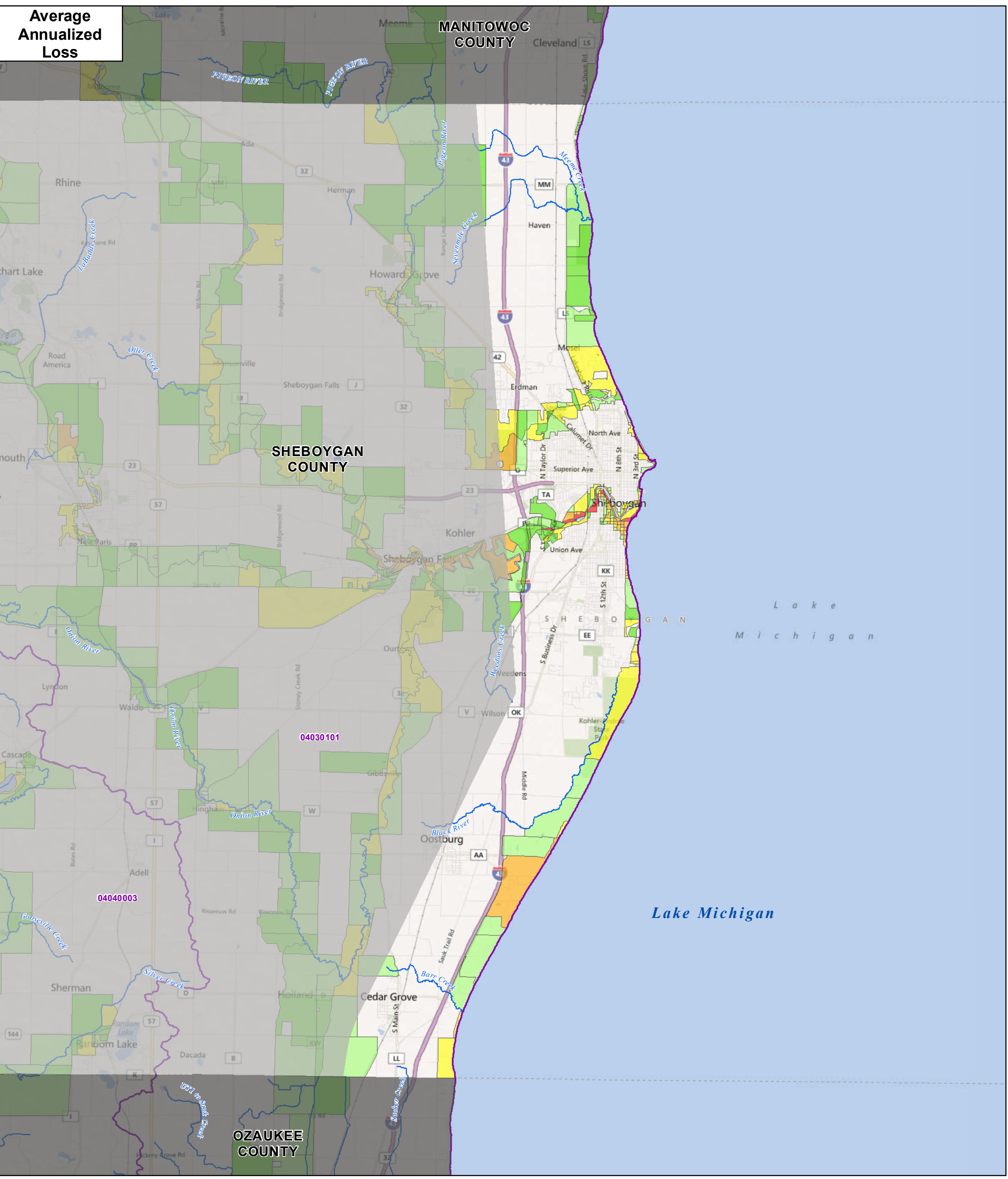
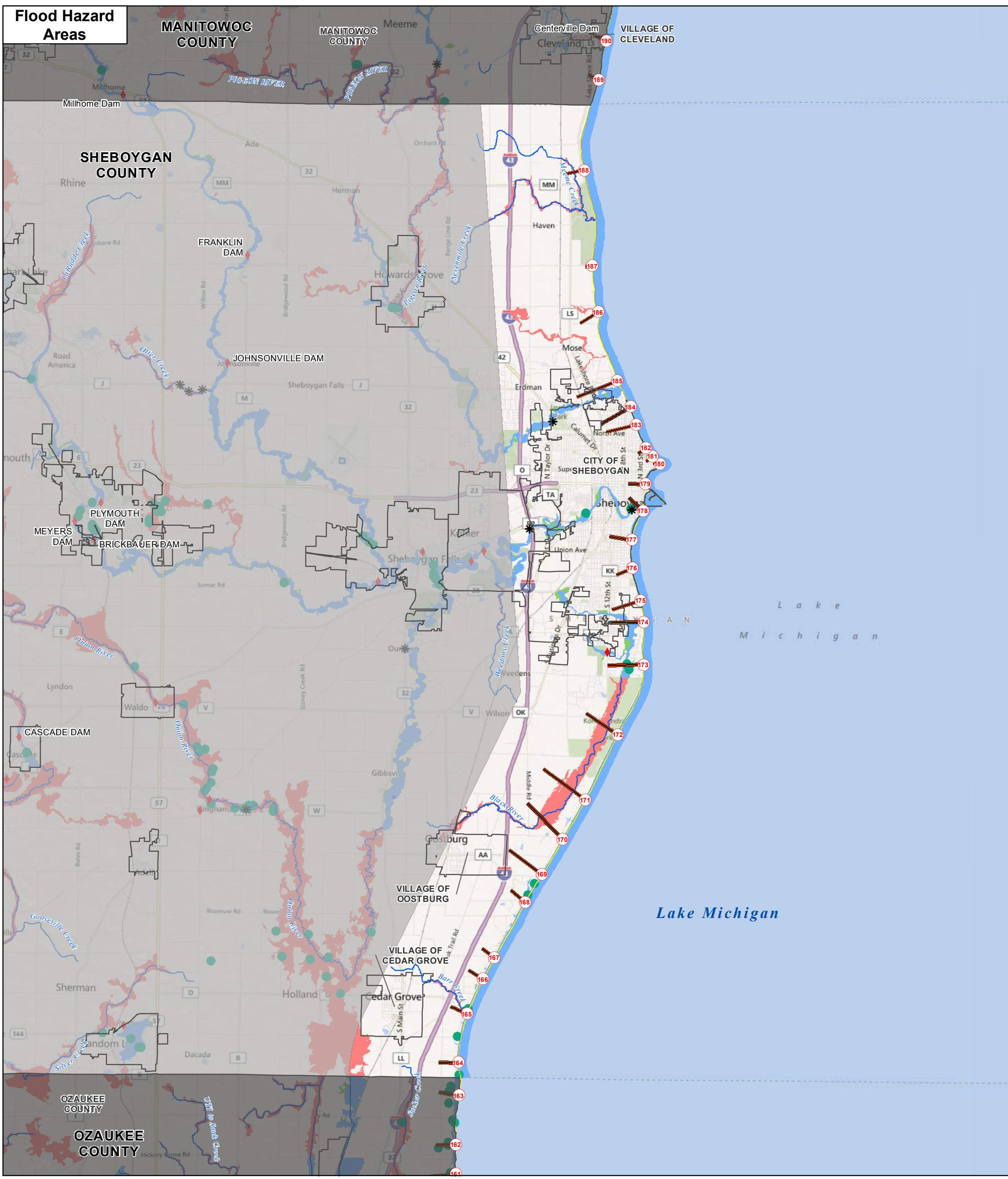


NATIONAL FLOOD INSURANCE PROGRAM
Discovery Map
LAKE MICHIGAN COASTAL STUDY
OZAUKEE COUNTY, WISCONSIN COASTAL STUDY COMMUNITIES

Ozaukee County
 Bayside, Village of
 Mequon, City of
 Port Washington, City of

STARR

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee



Declared Disasters						
Lake	State	Declared County/Area	Declaration Date	Disaster Type	Incident Type	Description
Lake Michigan	WI	Sheboygan (County)	4/27/1973	DR	Flood	SEVERE STORMS & FLOODING
Lake Michigan	WI	Sheboygan (County)	4/26/1974	DR	Tornado	TORNADOES
Lake Michigan	WI	Sheboygan (County)	3/23/1976	DR	Flood	SEVERE STORMS, ICING, WIND & FLOODING
Lake Michigan	WI	Sheboygan (County)	10/7/1986	DR	Flood	SEVERE STORMS & FLOODING
Lake Michigan	WI	Sheboygan (County)	8/12/1998	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
Lake Michigan	WI	Sheboygan (County)	6/18/2004	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
Lake Michigan	WI	Sheboygan (County)	6/14/2008	DR	Severe Storm(s)	SEVERE STORMS, TORNADOES, AND FLOODING
Lake Michigan	WI	Sheboygan (County)	1/24/2001	EM	Snow	SNOW

Summary of Flood Insurance Policies and Claims									
Lake	State	County	Community	CID	No. Policies	Total Premium	Total Coverage	Number of claims since 1978	Dollar (\$) paid for claims since 1978
Lake Michigan	WI	Sheboygan	Sheboygan County	S50424	79	\$52,150	\$17,739,700	12	\$67,196
Lake Michigan	WI	Sheboygan	Cedar Grove, Village of	Not Participating	0	\$0	\$0	0	\$0
Lake Michigan	WI	Sheboygan	Oostburg, Village of	S50427	1	\$405	\$350,000	0	\$0
Lake Michigan	WI	Sheboygan	Sheboygan, City of	S50430	63	\$44,081	\$15,753,600	22	\$153,963

Mitigation Action		
Name of Plan	Plan Expiration Date	Identified Hazard Mitigation Action
Sheboygan County All Hazards Mitigation Plan, February 2008	11/7/2013	Maintain information regarding, and coordination or, congregate care facilities.
Sheboygan County All Hazards Mitigation Plan, February 2008	11/7/2013	Protection of existing buildings and other structures
Sheboygan County All Hazards Mitigation Plan, February 2008	11/7/2013	Review and update floodplain zoning ordinances (as necessary)
Sheboygan County All Hazards Mitigation Plan, February 2008	11/7/2013	Land use planning

Summary of Shoreline Type						
Total Shoreline (mile)	Artificial Shoreline (mile)	Boulders, Bedrock (mile)	Cohesive Clays and Silts (mile)	Sand (mile)	Shingles, Pebbles, Cobbles (Mile)	Other (mile)
28.8	12.4	0.6	0.0	14.0	1.8	0.0

Summary of Shoreline Coverage							
Total Shoreline (mile)	Bluff 2'-10' (mile)	Coastal Wetland (mile)	Dune 2'-10' (mile)	Flat Coast (mile)	High Bluff 10'+ (mile)	High Dune 10'+ (mile)	Other (mile)
28.8	6.8	0.0	15.2	1.9	4.9	0.0	0.0

MAP SYMBOLOGY

- LEGEND**
- ◆ Dams
 - LOMCs
 - * USGS Gages
 - Transsects
 - Shoreline
 - Streams
 - Watersheds (HUC 8)
 - ▨ Coastal Barrier Resource System
 - ▭ Coastal Discovery Area
 - ▭ Surrounding Counties
 - ▭ Municipal Boundaries
- EFFECTIVE SFHA**
- A
 - AE
 - 0.2% PCT ANNUAL CHANCE FLOOD
- AAL DATA**
Total Average Annualized Losses per Census Block
- Less than \$10,000
 - \$10,001 - \$100,000
 - \$100,001 - \$1,000,000
 - \$1,000,001 - \$5,000,000
 - Greater than \$5,000,000
- Coordinated Needs Management Strategy (CNMS) Validation Status**
- Unverified
 - Unknown
 - Valid

COASTAL STUDY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM
Discovery Map

LAKE MICHIGAN COASTAL STUDY
SHEBOYGAN COUNTY, WISCONSIN COASTAL STUDY COMMUNITIES

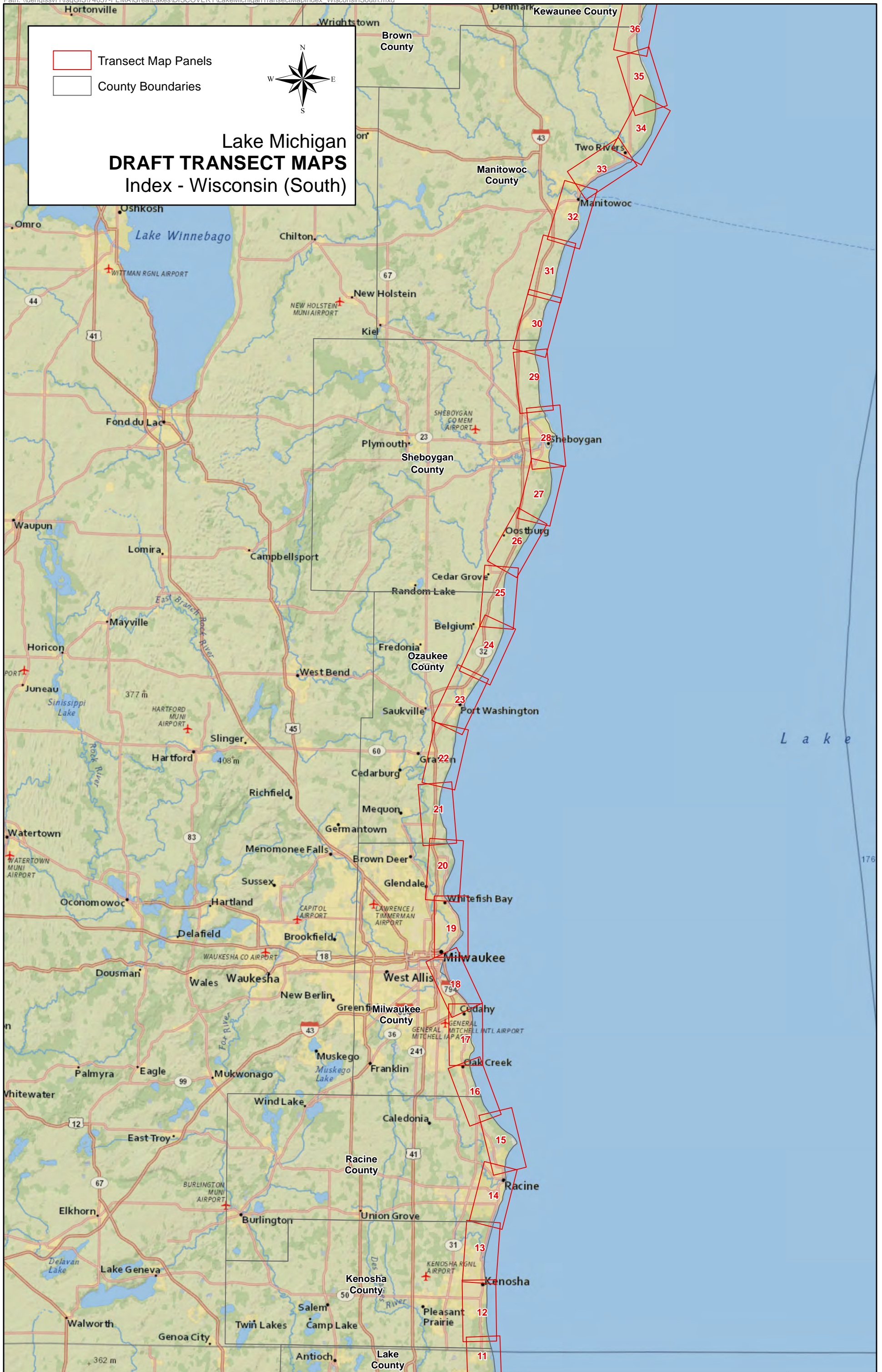
Sheboygan County
Cedar Grove, Village of
Oostburg, Village of
Sheboygan, City of

STARR

FEMA

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

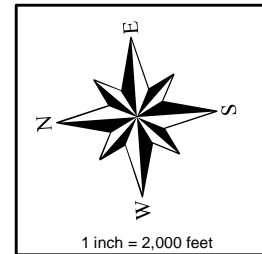
ATTACHMENT D
PROPOSED DRAFT TRANSECTS FIGURES



Lake Michigan
DRAFT TRANSECT MAPS
Index - Wisconsin (South)



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1 inch = 2,000 feet



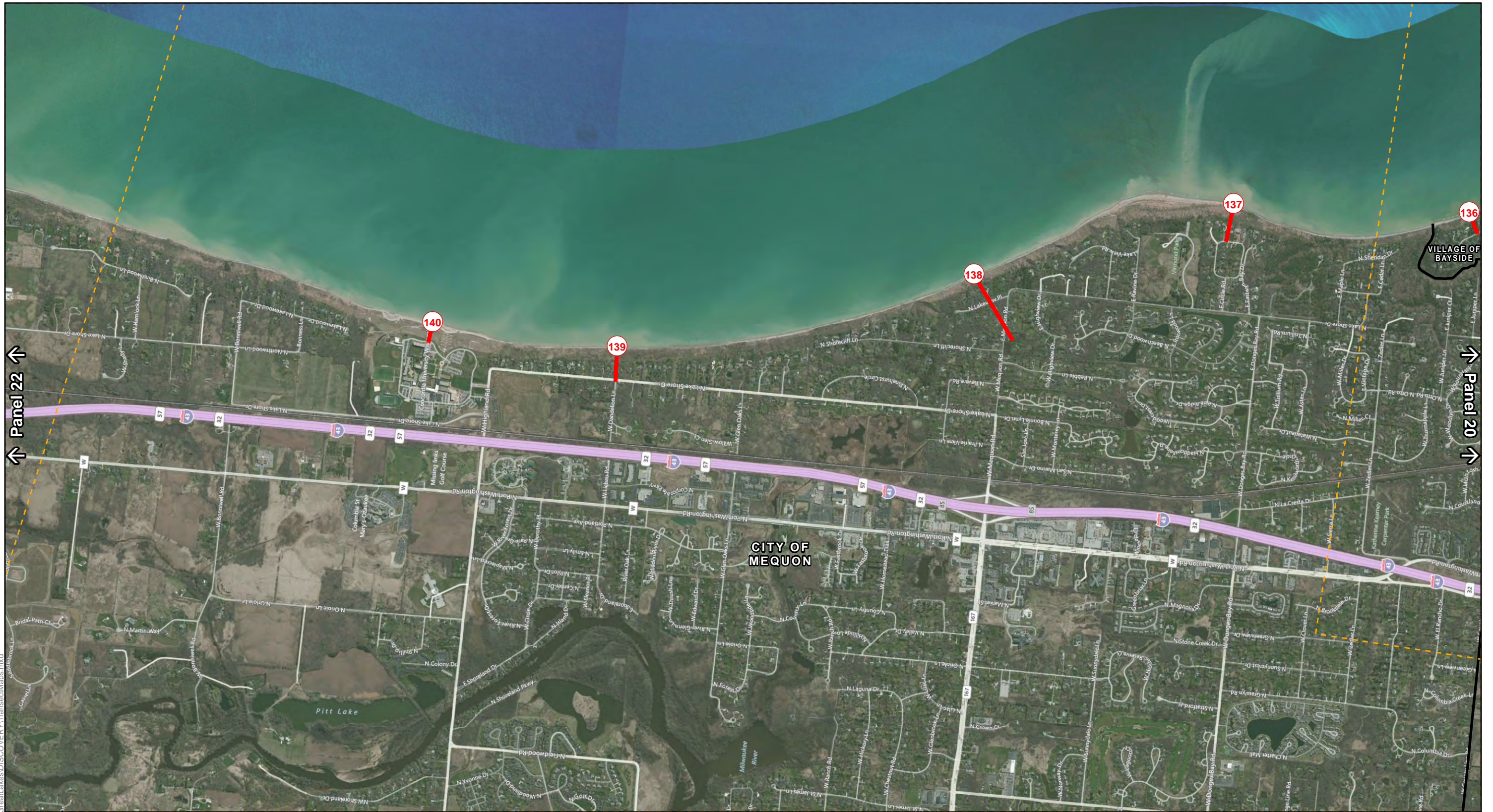
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- Adjoining Panel Edge
- Political Boundary

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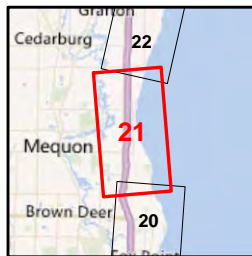
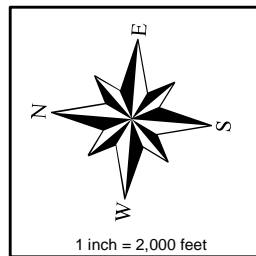
COUNTIES
MILWAUKEE COUNTY
OZAUKEE COUNTY

COMMUNITIES
CITY OF GLENDALE
CITY OF MEQUON
CITY OF MILWAUKEE
VILLAGE OF BAYSIDE
VILLAGE OF FOX POINT
VILLAGE OF RIVER HILLS
VILLAGE OF WHITEFISH BAY

**Lake Michigan
DRAFT TRANSECTS**
Panel 20 of 127



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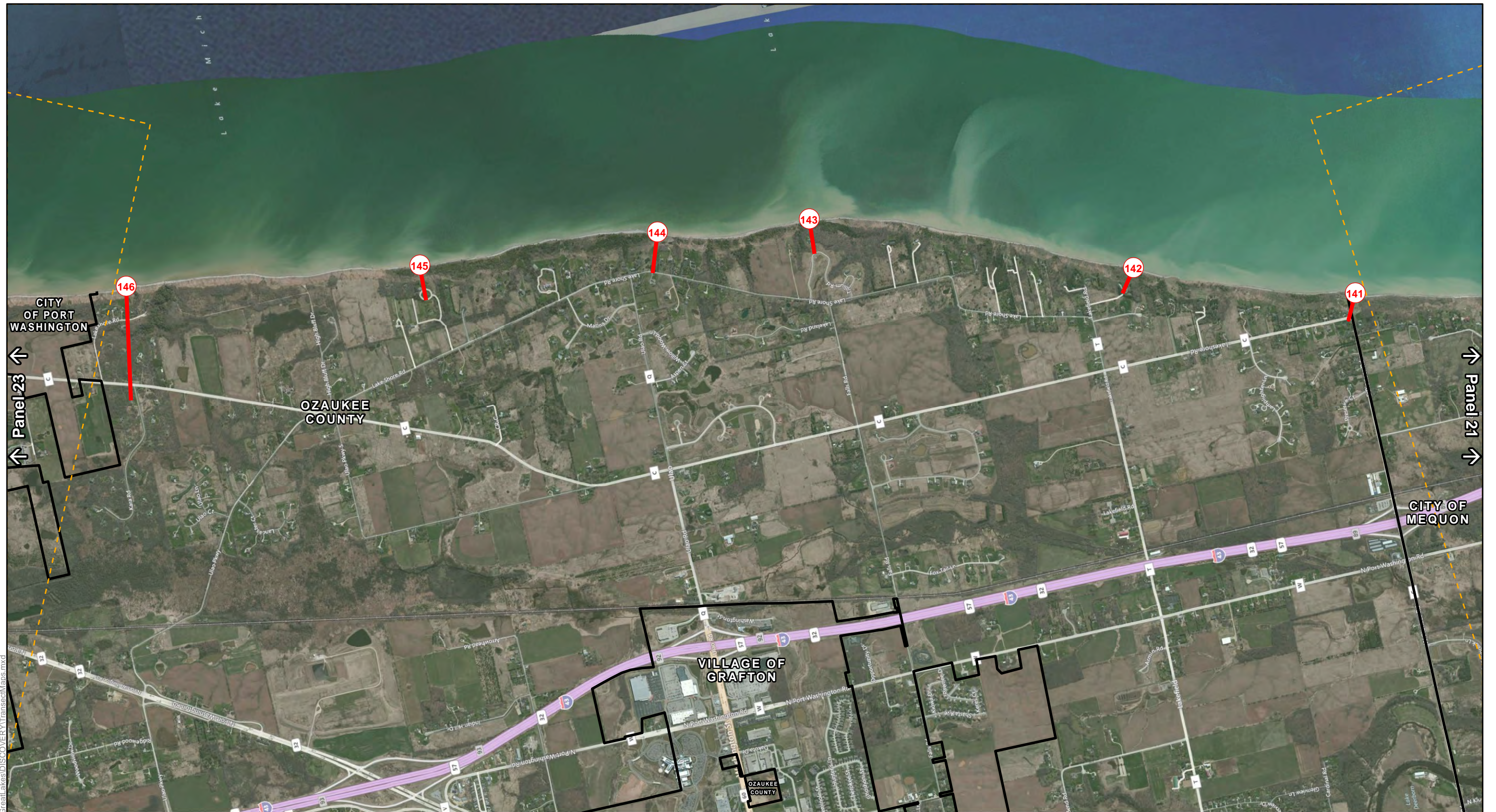
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- Political Boundary

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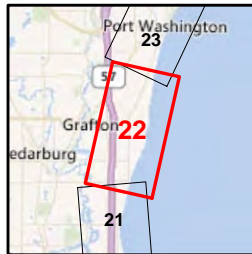
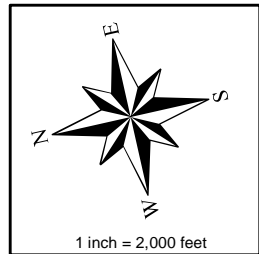
COUNTIES
MILWAUKEE COUNTY
OZAUKEE COUNTY




COMMUNITIES
CITY OF MEQUON
VILLAGE OF BAYSIDE
VILLAGE OF RIVER HILLS

**Lake Michigan
DRAFT TRANSECTS**
Panel 21 of 127



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-  Transects
-  Adjoining Panel Edge
-  Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES

OZAUKEE COUNTY

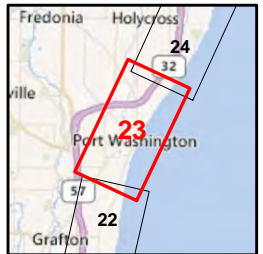
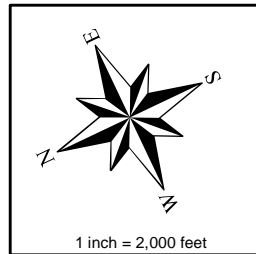
COMMUNITIES

CITY OF MEQUON
CITY OF PORT WASHINGTON
VILLAGE OF GRAFTON

Lake Michigan DRAFT TRANSECTS Panel 22 of 127



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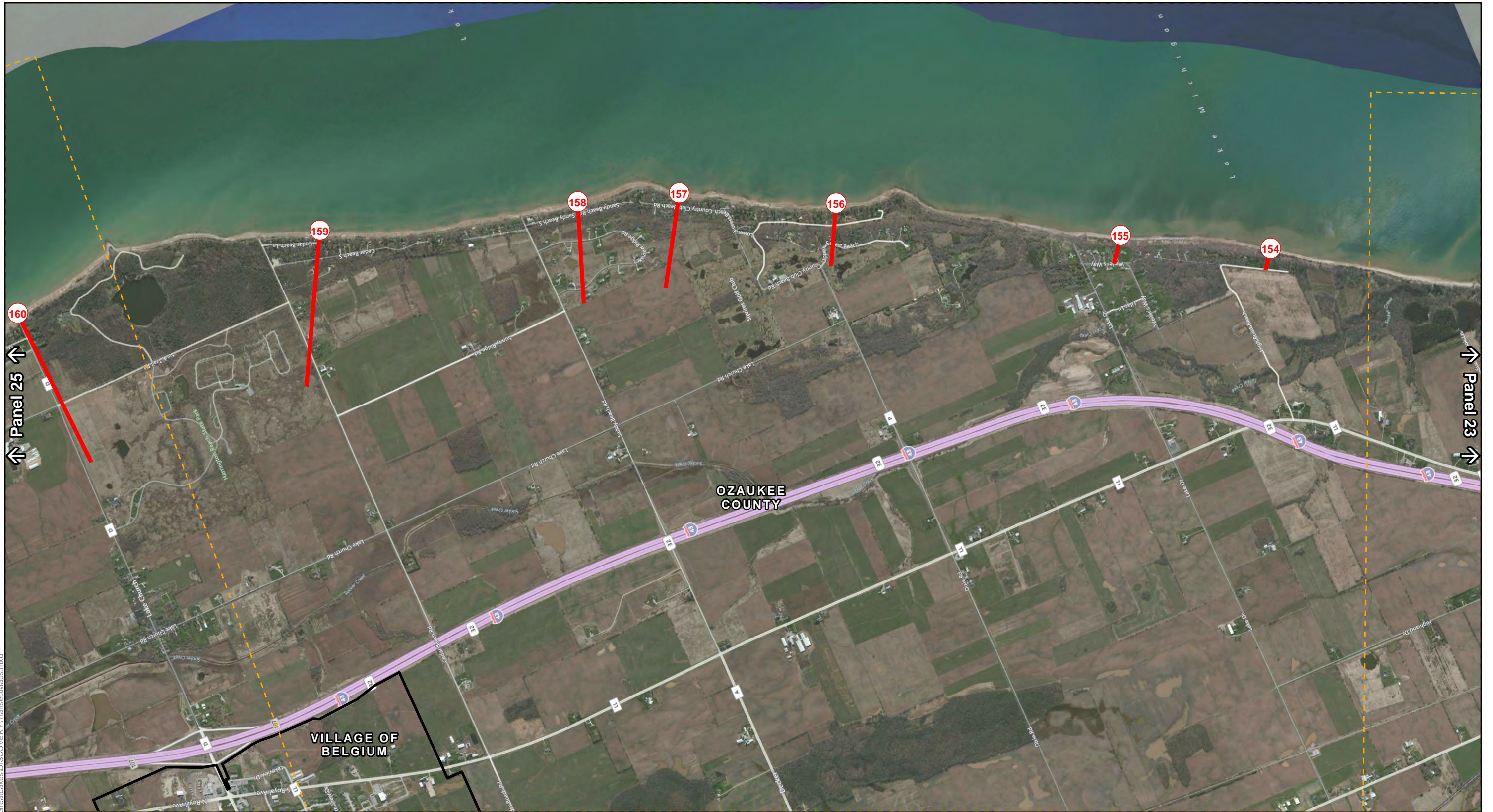
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- Adjoining Panel Edge
- Political Boundary

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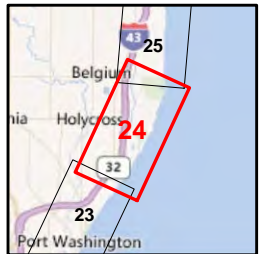
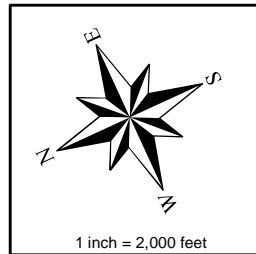
COUNTIES
OZAUKEE COUNTY

COMMUNITIES
CITY OF PORT WASHINGTON
VILLAGE OF SAUKVILLE

**Lake Michigan
DRAFT TRANSECTS**
Panel 23 of 127



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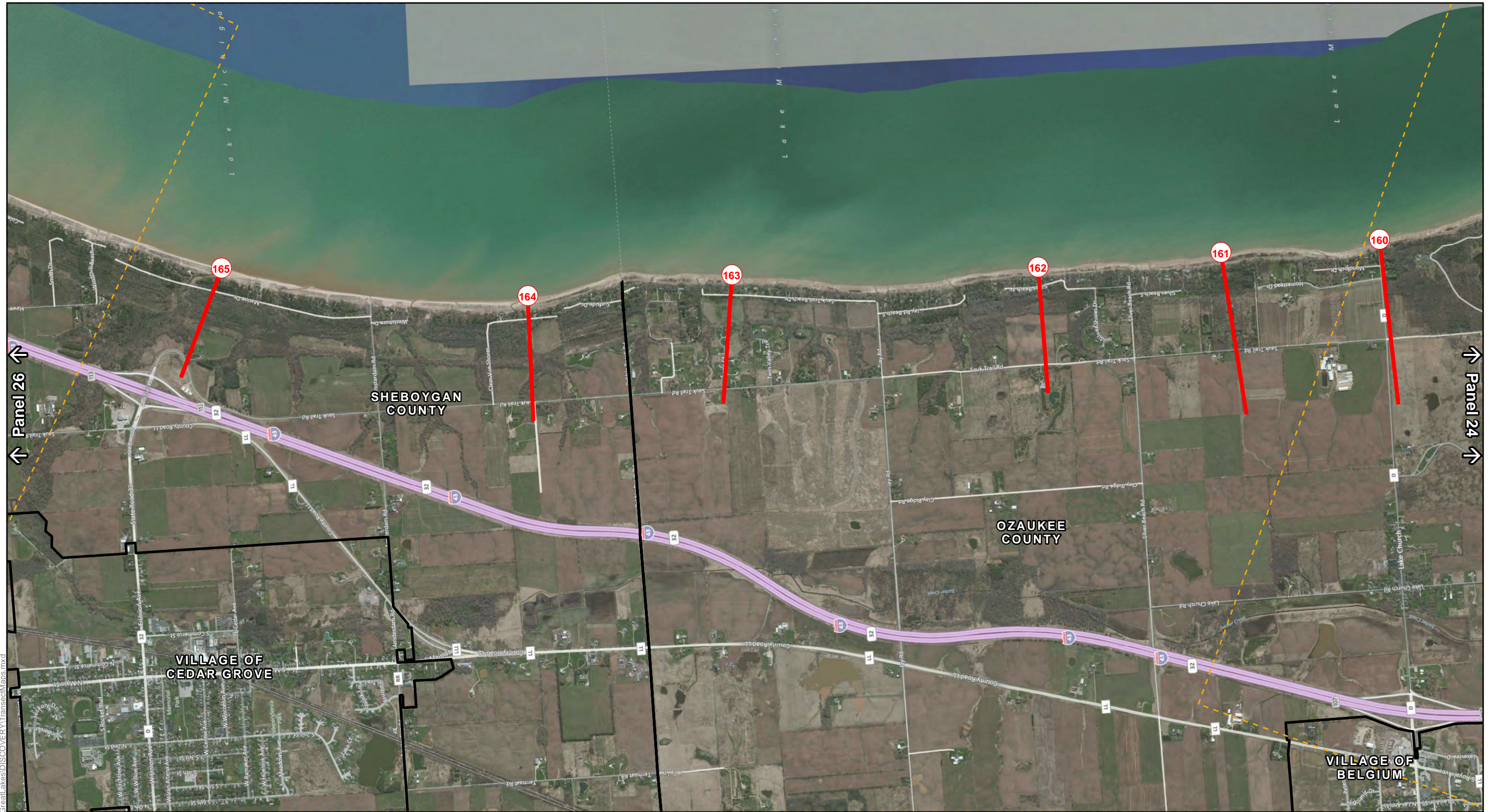
- Transects
- Adjoining Panel Edge
- Political Boundary

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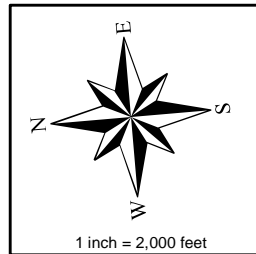
COUNTIES
OZAUKEE COUNTY

COMMUNITIES
VILLAGE OF BELGIUM

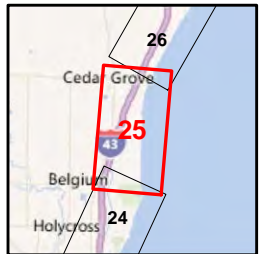
**Lake Michigan
DRAFT TRANSECTS
Panel 24 of 127**



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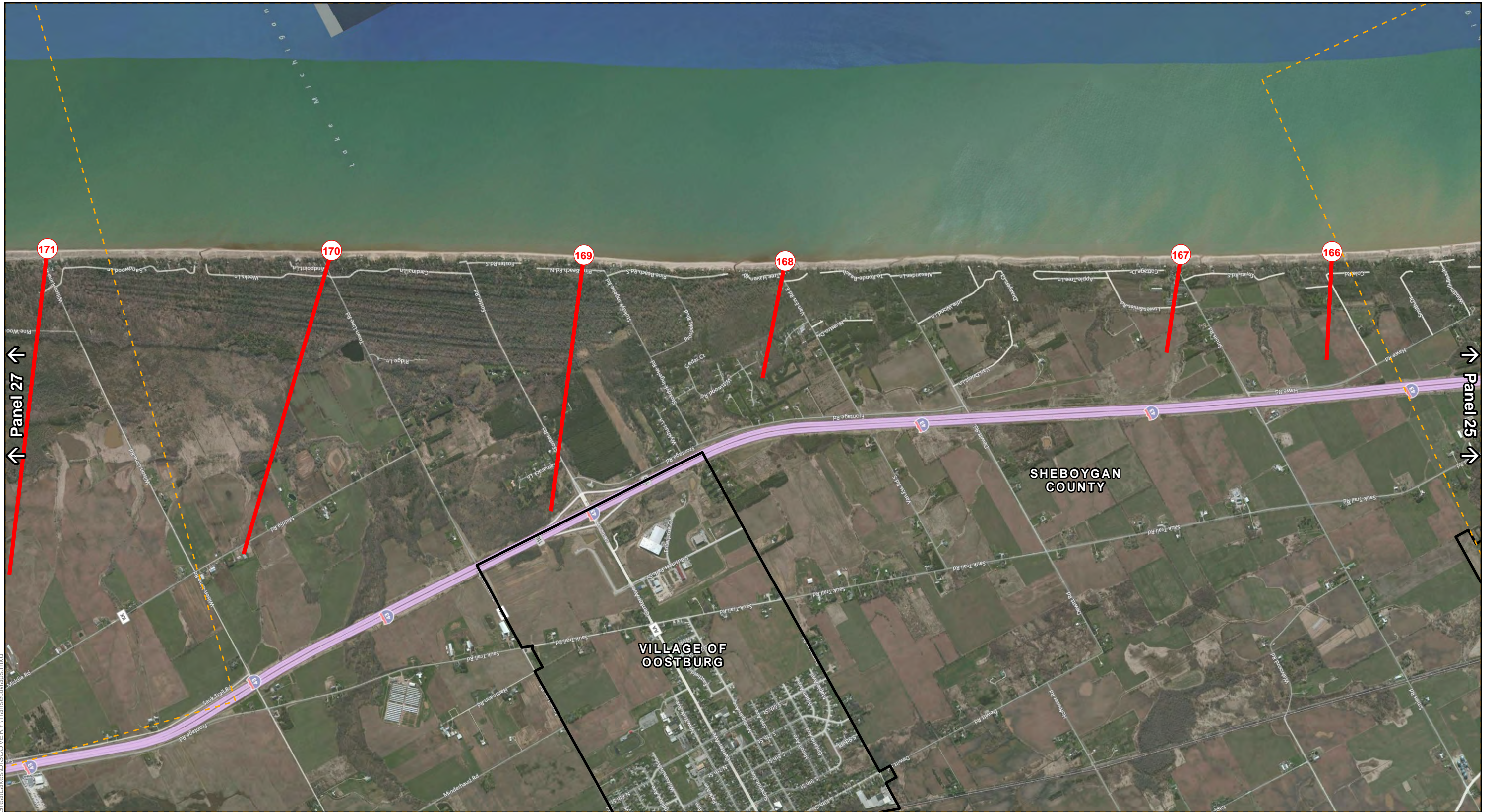
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- Adjoining Panel Edge
- Political Boundary

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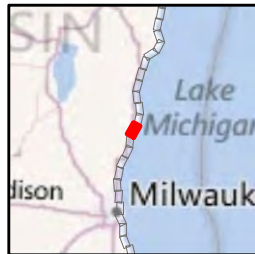
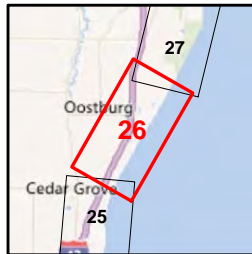
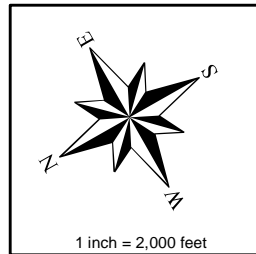
COUNTIES
OZAUKEE COUNTY
SHEBOYGAN COUNTY

COMMUNITIES
VILLAGE OF BELGIUM
VILLAGE OF CEDAR GROVE

**Lake Michigan
DRAFT TRANSECTS**
Panel 25 of 127



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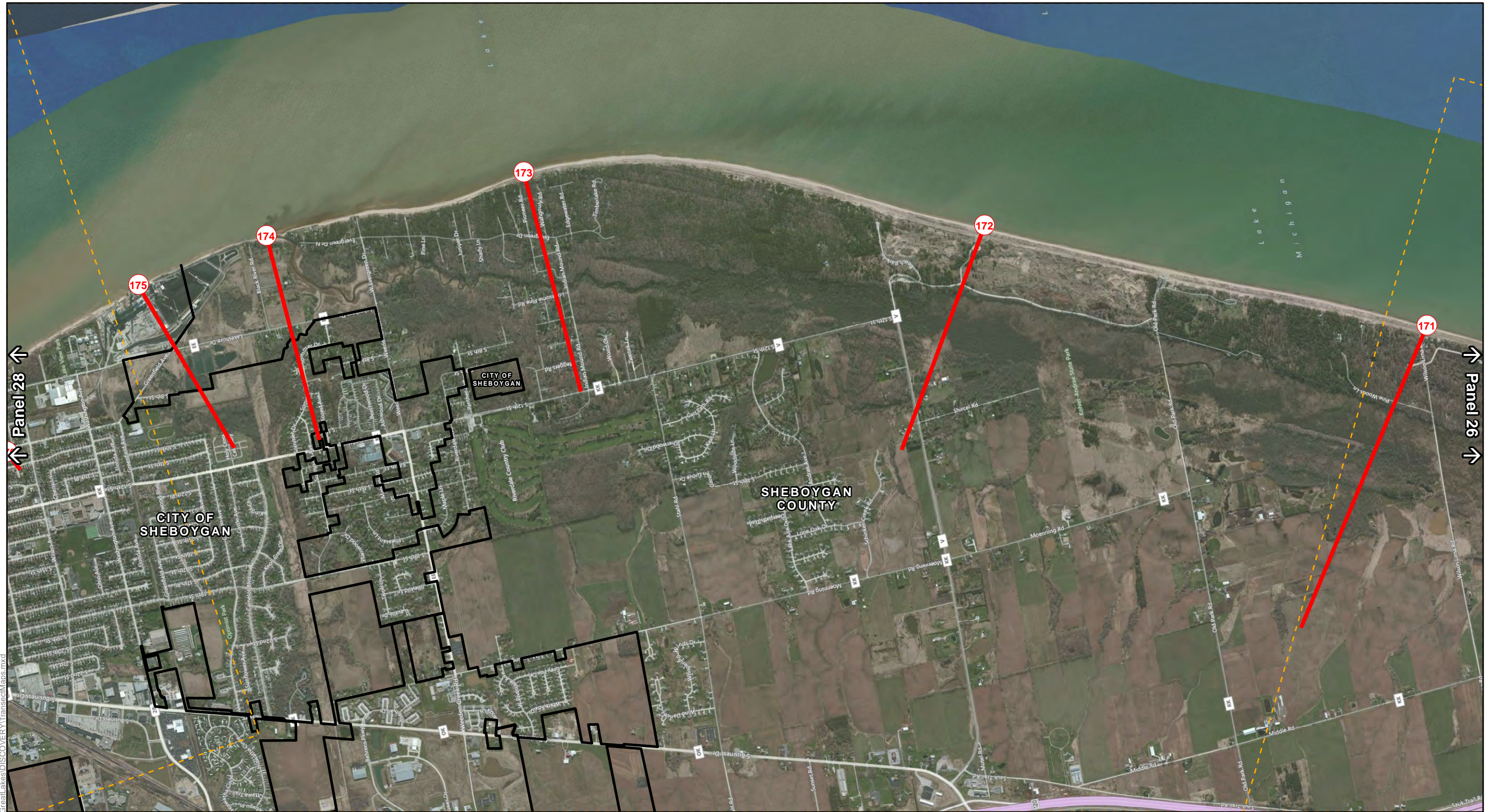
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- Political Boundary

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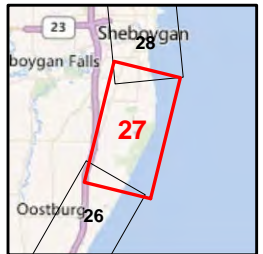
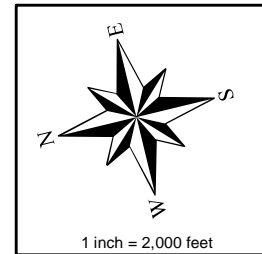
COUNTIES
SHEBOYGAN COUNTY

COMMUNITIES
VILLAGE OF CEDAR GROVE
VILLAGE OF OOSTBURG

**Lake Michigan
DRAFT TRANSECTS
Panel 26 of 127**



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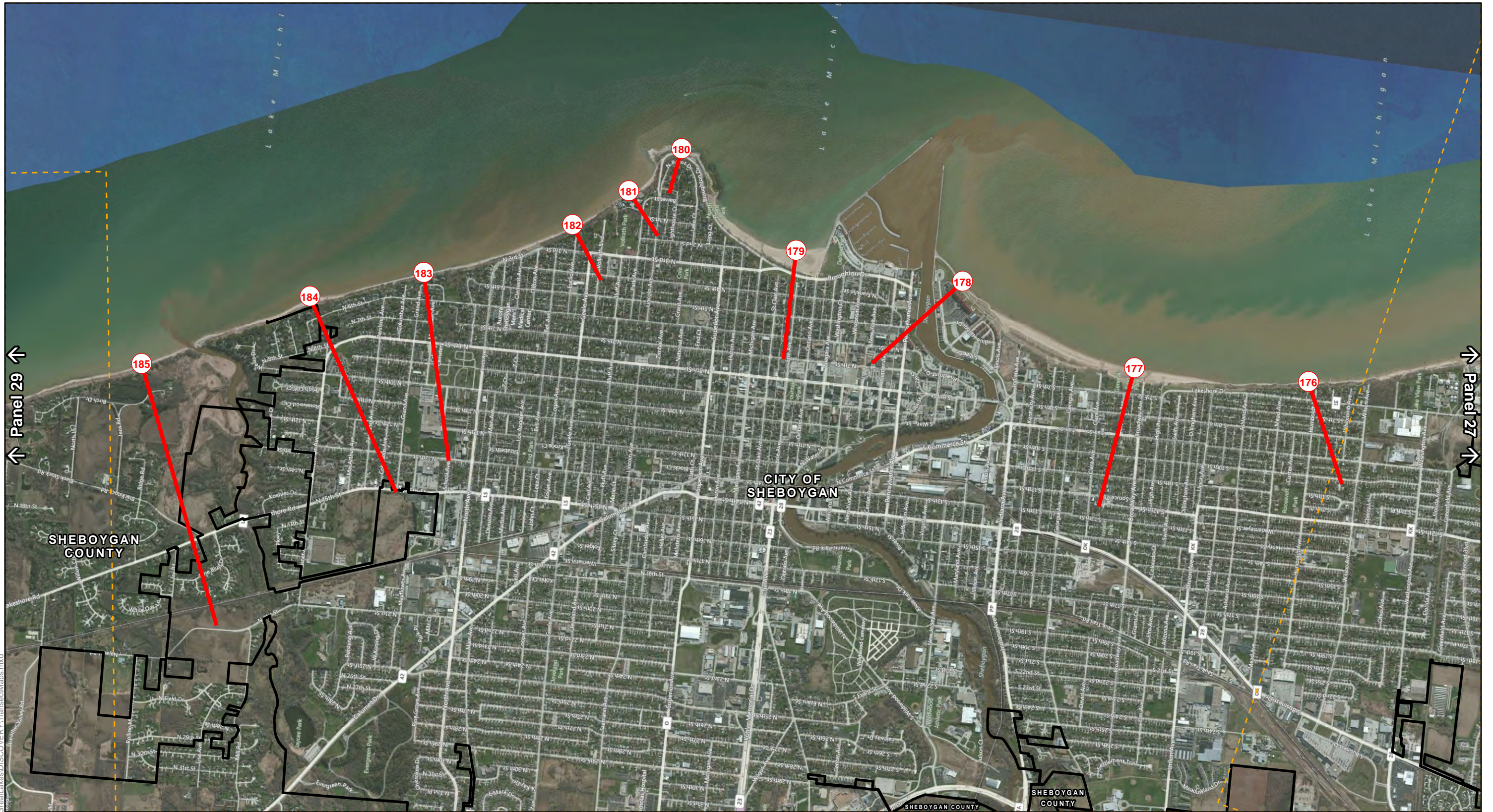
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Basemap Source: Microsoft BING map service

COUNTIES
SHEBOYGAN COUNTY

COMMUNITIES
CITY OF SHEBOYGAN

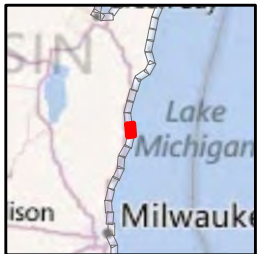
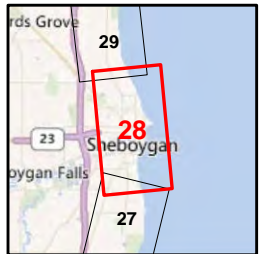
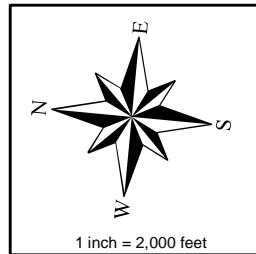
**Lake Michigan
DRAFT TRANSECTS
Panel 27 of 127**



↑ Panel 29 ↑

↓ Panel 27 ↓

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- Transects
- Adjoining Panel Edge
- Political Boundary

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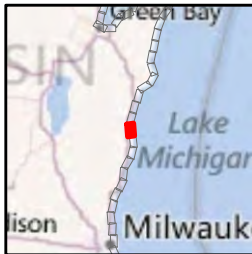
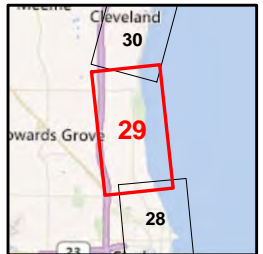
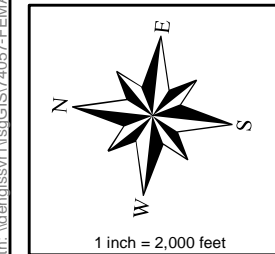
COUNTIES
SHEBOYGAN COUNTY

COMMUNITIES
CITY OF SHEBOYGAN

**Lake Michigan
DRAFT TRANSECTS
Panel 28 of 127**



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- Political Boundary

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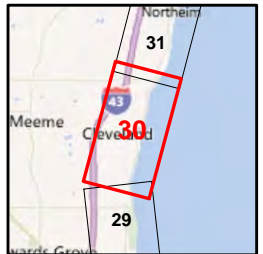
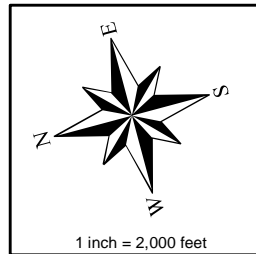
COUNTIES
SHEBOYGAN COUNTY

COMMUNITIES
CITY OF SHEBOYGAN

**Lake Michigan
DRAFT TRANSECTS
Panel 29 of 127**



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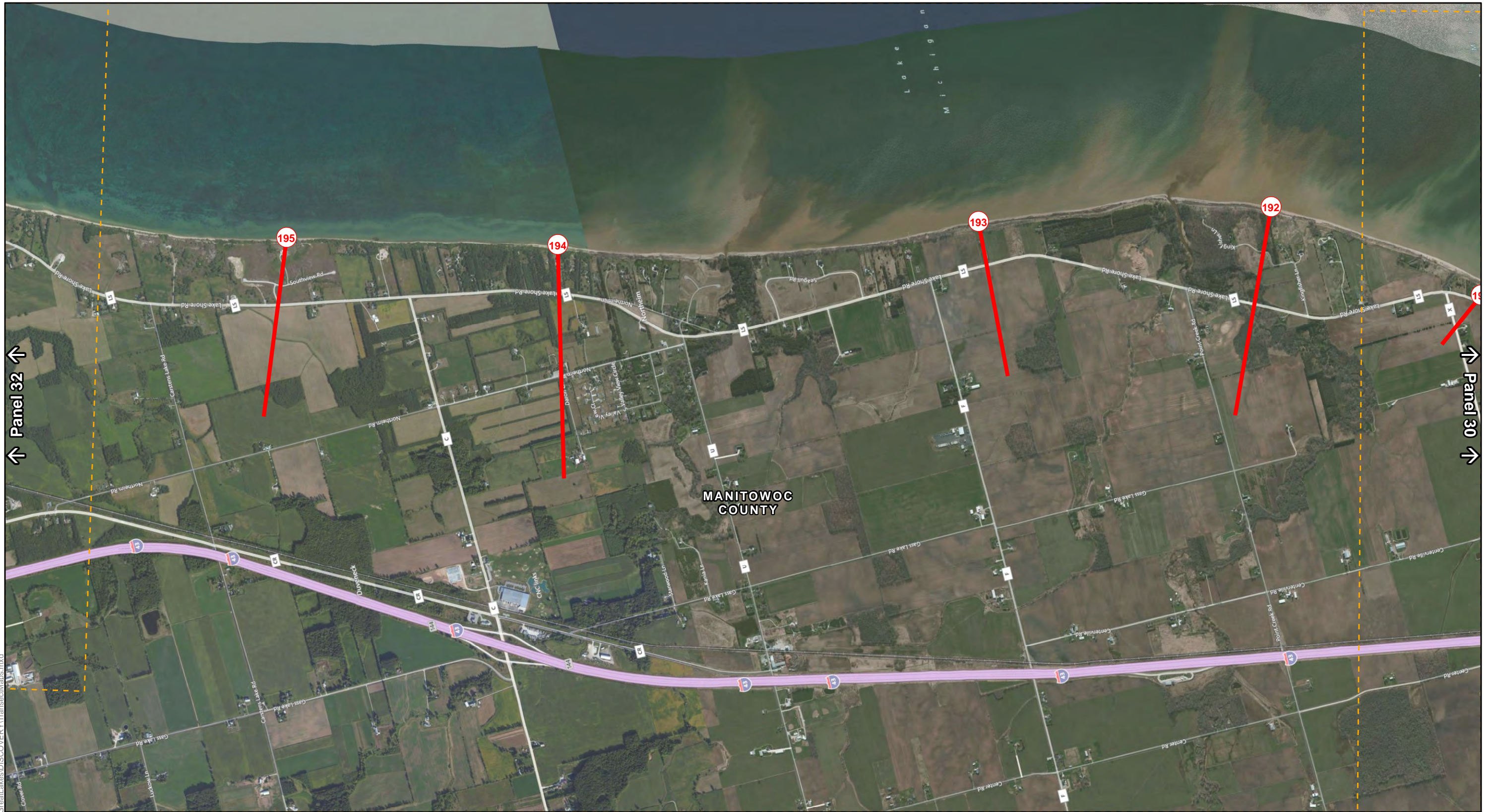
- Transects
- Adjoining Panel Edge
- Political Boundary

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COUNTIES
 MANITOWOC COUNTY
 SHEBOYGAN COUNTY

COMMUNITIES
 VILLAGE OF CLEVELAND

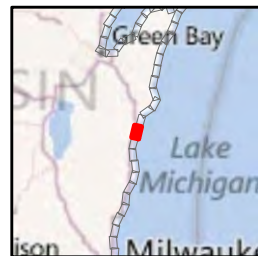
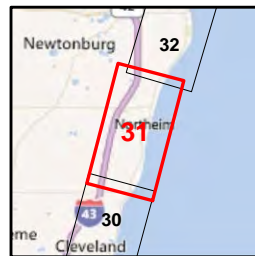
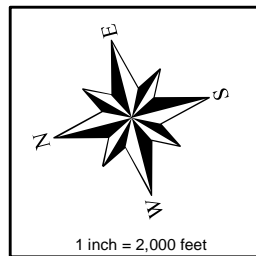
**Lake Michigan
 DRAFT TRANSECTS
 Panel 30 of 127**



↑ Panel 32 ↑

↑ Panel 30 ↓

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- Transects
- Adjoining Panel Edge
- Political Boundary

Basemap Source: Microsoft BING map service

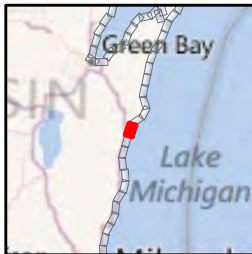
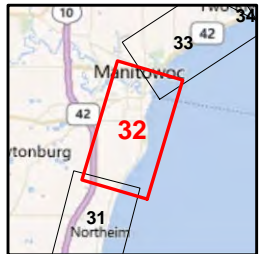
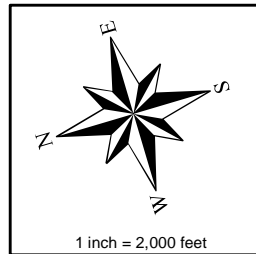
COUNTIES
MANITOWOC COUNTY

COMMUNITIES

Lake Michigan
DRAFT TRANSECTS
Panel 31 of 127



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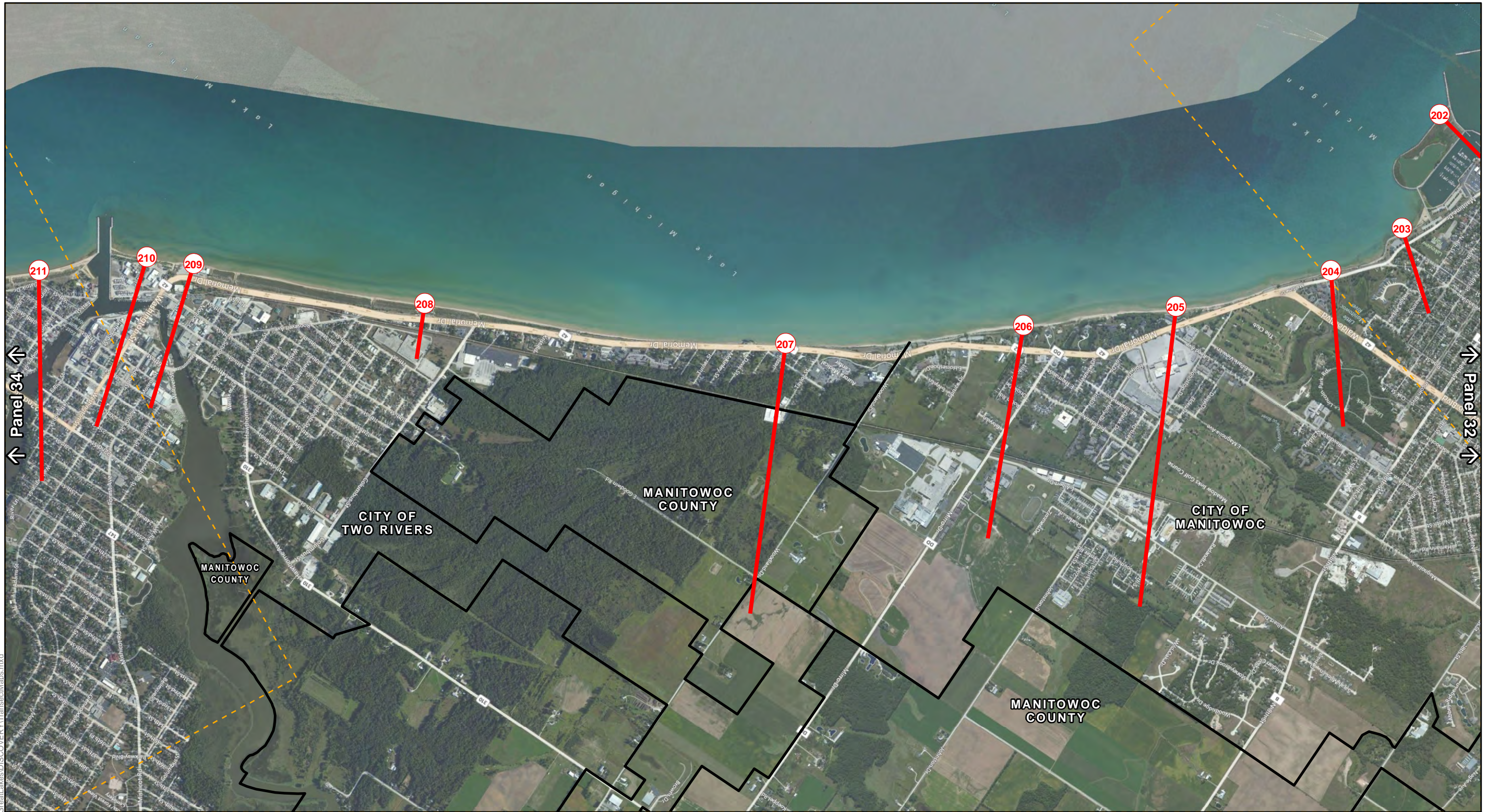
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- Adjoining Panel Edge
- Political Boundary

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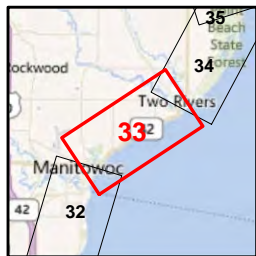
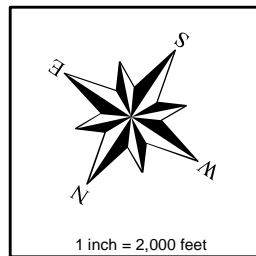
COUNTIES
MANITOWOC COUNTY

COMMUNITIES
CITY OF MANITOWOC

**Lake Michigan
DRAFT TRANSECTS
Panel 32 of 127**



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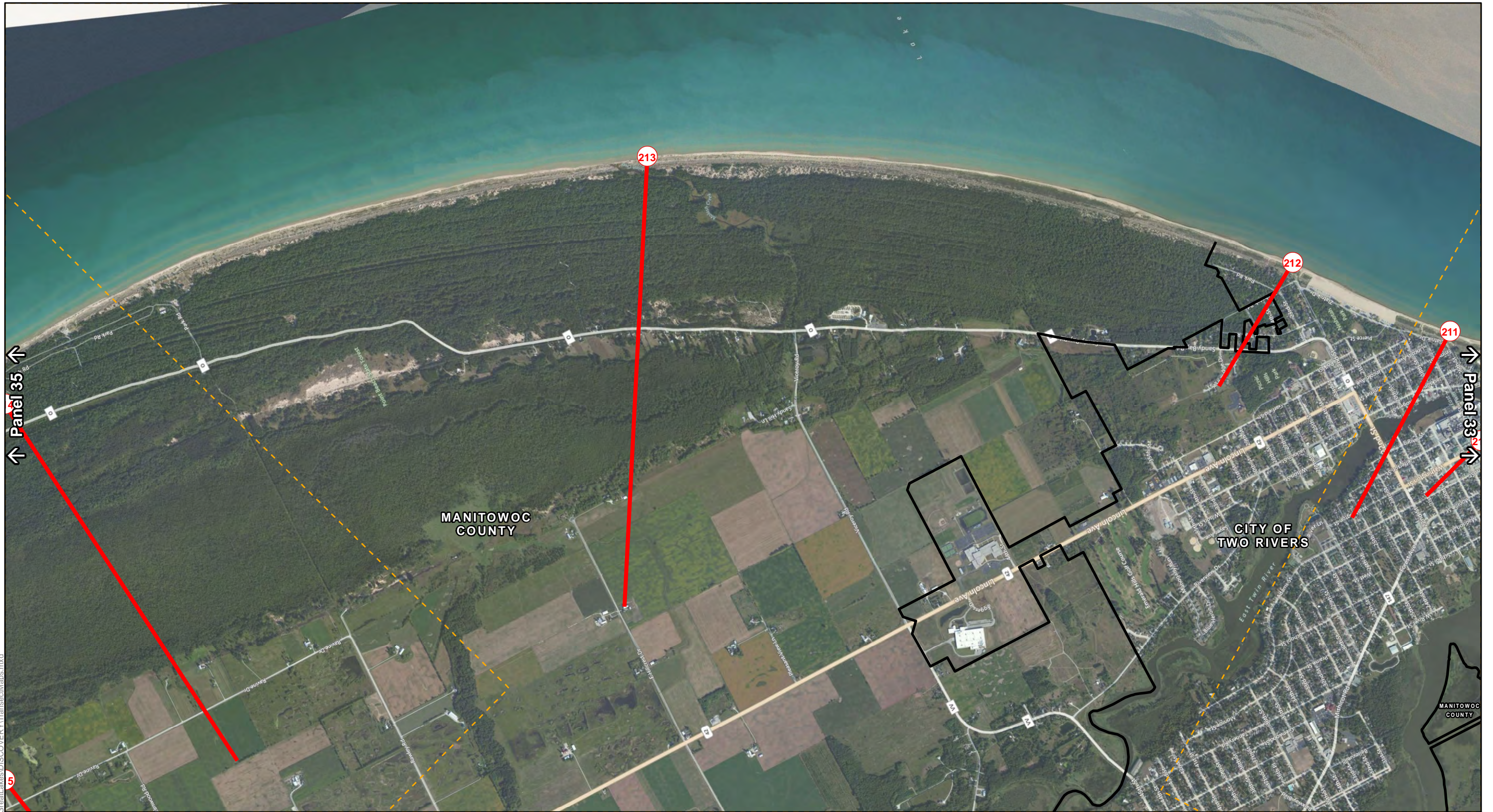
- Transects
- Adjoining Panel Edge
- Political Boundary

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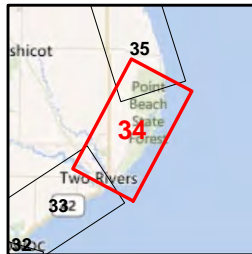
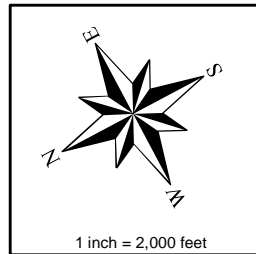
COUNTIES
MANITOWOC COUNTY

COMMUNITIES
CITY OF MANITOWOC
CITY OF TWO RIVERS

Lake Michigan
DRAFT TRANSECTS
Panel 33 of 127



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- Transects
- Adjoining Panel Edge
- Political Boundary

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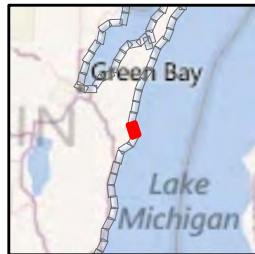
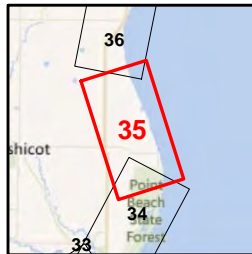
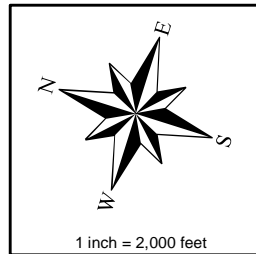
COUNTIES
MANITOWOC COUNTY

COMMUNITIES
CITY OF TWO RIVERS

**Lake Michigan
DRAFT TRANSECTS
Panel 34 of 127**



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- Adjoining Panel Edge
- Political Boundary

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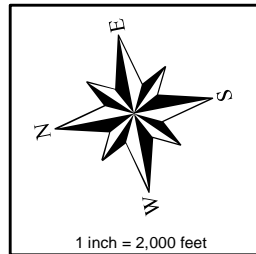
COUNTIES
MANITOWOC COUNTY

COMMUNITIES

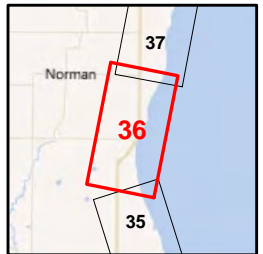
Lake Michigan
DRAFT TRANSECTS
Panel 35 of 127



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1 inch = 2,000 feet



- Transects
- Adjoining Panel Edge
- Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES
KEWAUNEE COUNTY
MANITOWOC COUNTY

COMMUNITIES

Lake Michigan
DRAFT TRANSECTS
Panel 36 of 127

ATTACHMENT E
STAKEHOLDER COMMENTS FROM DISCOVERY MEETING

Stakeholder Comments from Discovery Meeting

ID (Corresponds to Final Discovery Map)	State	County	Location of Comment	FIPS	CID	Comment (from Discovery Meetings or on draft Discovery Map/transect figures) ⁱ	Type
MAN-127	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Erosion Bluff	General Comment
MAN-TR-1	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Move transect to the south where area is developed	Transect Comment
MAN-TR-2	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Add a new transect due to slight change in shoreline and highly developed area	Transect Comment
MAN-TR-3	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Add a new transect due to change in shoreline (different shoreline make-up than areas to south)	Transect Comment
MAN-TR-4	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Move transect 191 further north to area of shoreline rip rap	Transect Comment
MAN-TR-5	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Move transect to area where bluff changes btw two future development areas	Transect Comment
MAN-TR-6	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Delete transect	Transect Comment
MAN-TR-7	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Move transect to north where city power station is located	Transect Comment
MAN-TR-8	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Add transect in area of high development where rip rap has been added	Transect Comment
MAN-TR-9	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Keep transect where there has been a lot of floodplain issues	Transect Comment
MAN-TR-10	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Keep transect where there are a lot homes near shore	Transect Comment
MAN-TR-11	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Keep transect for nuclear power plant	Transect Comment
MAN-TR-12	Wisconsin	Manitowoc	Manitowoc County along shoreline	55071	N/A	Remove transect	Transect Comment
OZA-128	Wisconsin	Ozaukee	Ozaukee County Unincorporated	55089	550310	Are we mapping floodplain on bluff?	General Comment
OZA-129	Wisconsin	Ozaukee	Ozaukee County Unincorporated	55089	550310	Effective transects exist from Dec. 4, 2007 study	General Comment
OZA-130	Wisconsin	Ozaukee	Port Washington	55089	550316	WWTP and water treatment plant in here	General Comment
OZA-131	Wisconsin	Ozaukee	Ozaukee County Unincorporated	55089	550310	Beach Area	General Comment
SHE-132	Wisconsin	Sheboygan	Sheboygan County Unincorporated	55117	550424	Flat	General Comment
SHE-133	Wisconsin	Sheboygan	Sheboygan County Unincorporated	55117	550424	Higher Dune	General Comment

Stakeholder Comments from Discovery Meeting

ID (Corresponds to Final Discovery Map)	State	County	Location of Comment	FIPS	CID	Comment (from Discovery Meetings or on draft Discovery Map/transect figures) ⁱ	Type
SHE-134	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	City limits	General Comment
SHE-135	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	South Pier	General Comment
SHE-136	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	Relatively flat with beach	General Comment
SHE-137	Wisconsin	Sheboygan	Sheboygan County Unincorporated	55117	550424	City limits	General Comment
SHE-138	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	Raised grades bluff; High bluff starts here	General Comment
SHE-139	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	Too many transects?	General Comment
SHE-140	Wisconsin	Sheboygan	Sheboygan County Unincorporated	55117	550424	Erosion bluff	General Comment
SHE-141	Wisconsin	Sheboygan	Sheboygan County Unincorporated	55117	550424	500ft of rip rap; Lift Station is being relocated; existing action, local community funded;2.5M for coastal improvement plan	General Comment
SHE-TR-14	Wisconsin	Sheboygan	Sheboygan County Unincorporated	55117	550424	Stakeholder indicated suggested transect location; no comment	Transect Comment
SHE-TR-15	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	Stakeholder indicated suggested transect location; no comment	Transect Comment
SHE-TR-16	Wisconsin	Sheboygan	Sheboygan, City of	55117	550430	Stakeholder indicated suggested transect location; no comment	Transect Comment

ⁱDue to the various methods used to collect flood risk information and transect comments, including discussions during Discovery Meetings, maps marked up with comments, and emails or letters sent containing comments, the meaning of some comments may not be clear in this table and are subject to interpretation.

ATTACHMENT F
SHEBOYGAN, MANITOWOC, AND OZAUKEE COUNTY
DISCOVERY MEETING DOCUMENTS

Discovery Meeting Agenda

Discovery Meeting Sign-In Sheets

Discovery Meeting Minutes

Discovery Meeting Presentation



Project Name:	FEMA Region V Discovery
Meeting:	SHEBOYGAN, MANITOWOC, OZAUKEE COUNTIES Great Lakes Coastal Discovery Meeting
Date and Time:	THURSDAY, AUGUST 16, 2012; 8:30 – 10:30 AM CT
Place:	LAKESHORE TECHNICAL COLLEGE
Facilitator:	LEE TRAEGER, FEMA GARY HEINRICHS, WDNR JASPREET RANDHAWA, SCOTT BANJAVCIC, TROY THIELEN, STARR

Discovery Meeting Agenda

1. Why are we here? (8:30 – 8:45 AM CT)

- Great Lakes Coastal Flood Study Overview and Schedule
- Discovery Process and Outcomes

2. Coastal mapping and flood risk topics to be aware of (8:45 – 9:10 AM CT)

3. How does this apply to my community? (9:10 – 9:20 AM CT)

4. Interactive Session A (9:20 – 9:45 AM CT)

- View and Discuss Local Coastal Areas of Concern Using the Discovery Map and Community Risk MAP Questionnaire

5. Hazard mitigation opportunities and grant funding (9:45 – 9:55 AM CT)

6. Interactive Session B (9:55 -10:20 AM CT)

- Discuss Mitigation Action Opportunities
- Introduce the Mitigation Action Form and Mitigation Action Tracker

7. Wrap Up (10:20 – 10:30 AM CT)

- Review of action items and next steps

Optional Interactive Stations (30 minutes - 1hr following meeting)

- *Draft Transect Map Station: Talk to technical staff about draft transects and view draft transects in GIS*
- *Mitigation Resources, Strategies, and Actions Station: Talk with FEMA and State staff about areas of concern and potential mitigation actions to help reduce risk. Fill out Mitigation Action Form.*

August 16, 2012 MANITOWOC, SHEBOYGAN, OZAUKEE, COUNTIES DISCOVERY MEETING SIGN-IN SHEET
Please verify contact information and initial meeting attendance.

No.	Sign Initials	Affiliation	Title	Name First	Name Last	Street Address	Phone	Email Address
1	SWA	City of Two Rivers	Engineer	Scott	Ahl		920 793-5542	scoahl@two-rivers.org
2	VB	City of Two Rivers	Zoning Administrator	Vicky	Berg			vicber@two-rivers.org
3	ALZ	Ozaukee County	Director Land and Water Management Department	Andy	Holschbach	121 W. Main Street, P.O. Box 994 Port Washington, WI 53074	(262) 284-8271	aholschbach@co.ozaukee.wi.us
4	MM	Sheboygan County Planning & Conservation Dept.	Code Administrator	Matthew	Mrochinski	508 New York Ave. Sheboygan, WI 53081	(920) 459-3061	mrochmm@co.sheboygan.wi.us
5	KF	Sheboygan County Planning & Conservation Dept.	Zoning Administrator	Kathryn	Fabian	508 New York Ave. Sheboygan, WI 53081		
6		FEMA Region V	Senior Engineer	Lee	Traeger	536 South Clark St., 6th Floor Chicago, IL 60605	(312) 408-5500	lee.traeger@fema.dhs.gov
7		STARR	Engineer	Scott	Banjavcic	125 South Wacker Drive Chicago, IL 60606	(312) 346-5000	banjavcics@cdmsmith.com
8	2/06	STARR	Engineer	Jaspreet	Randhawa	125 South Wacker Drive Chicago, IL 60606	(312) 346-5000	randhawa@cdmsmith.com
9	TOP	STARR	GIS Specialist	Troy	Thielen	125 South Wacker Drive Chicago, IL 60606	(312) 346-5000	thielen@cdmsmith.com
10		Wisconsin Department of Natural Resources	Floodplain Planning Program Manager	Gary	Heinrichs	101 S Webster St. Madison, WI 53707	(608) 266-3093	gary.heinrichs@wisconsin.gov

August 16, 2012 MANITOWOC, SHEBOYGAN, OZAUKEE, COUNTIES DISCOVERY MEETING SIGN-IN SHEET
 Please verify contact information and initial meeting attendance.

No.	Sign Initials	Affiliation	Title	Name First	Name Last	Street Address	Phone	Email Address
11	LEH	Shep. Co.	ENGINEER	LEONAR	Harvey	1211 No. 23 RD SHEBOYGAN, WI 53081	920-419-3226	harvealh@Co. shelby99@wi.us
12	Ben	Ozaukee County	Sanitation & Zoning Specialist	BARRY	SULLIVAN	121 W. Main ST. Port Washington WI 53074	(262) 284-8318	bsullivan@co-ozaukee.wi.us
13	RAS	CITY of MANITOWOC	BUILDING INSPECTOR	RICHARD	SCHWARZ	900 QUAY ST MANITOWOC 54220	920 686-6946	rschwarz@manitowoc.org
14	PJB	CITY of MANITOWOC	DEPUTY CITY PLANNER	PAUL	BRAW	900 QUAY ST MANITOWOC 54220	920 686-6930	PBR@MANITOWOC.ORG
15	SES	City of Shep	City Planner	STEPH	Sokolowski	828 Center Ave	920 459 3377	
16	MMH	DNR	Regional Engineer	Michelle	Hase	141 NW Barstow Rm 180 Waunakee	262-574-2127	michell.hase@wi.gov
17	RJ	Manitowoc County	Code Adm.	Fred	Goettle	4319 Expo Dr.	683-4185	fredgoettle@Co.Manitowoc.wi.us
18	AR	Manitowoc County	Associate Planner / GIS Specialist	Andrea	Raymakers	4319 Expo Dr.	683-4185	Andrea.Raymakers@Co.Manitowoc.wi.us
19								
20								

= would like PDFs of transcripts that were offered during Info Exchange



Meeting schedule: Thursday, August 16, 2012 8:30 – 10:30 am (CT)

Meeting Location: Lakeshore Technical College, Cleveland, WI

Discovery Area: Coastal communities in Sheboygan, Ozaukee, and Manitowoc Counties, WI

Attendees: 21 people attended the Lake Michigan Discovery Meeting. Please see attached sign-in sheet for a complete list of attendees

FACILITATORS

FEMA

Lee Traeger

Wisconsin DNR

Gary Heinrichs, NFIP Coordinator

Roxanne Grey, SHMO

Katie McMahan, CTP Lead

STARR Contractor

Jaspreet Randhawa

Scott Banjavcic

Troy Thielen

ASFPM

Alan Lulloff

MEETING AGENDA:

1. **Why are we here? (15 minutes)**
 - Great Lakes Coastal Flood Study Overview and Schedule
 - Discovery Process and Outcomes
 2. **Coastal mapping and flood risk topics to be aware of (25 minutes)**
 3. **How does this apply to my community? (10 minutes)**
 4. **Interactive Session A (25 minutes)**
 - View and Discuss Local Coastal Areas of Concern Using the Discovery Map and Community Risk MAP Questionnaire
 5. **Hazard mitigation opportunities and grant funding (10 minutes)**
 6. **Interactive Session B (25 minutes)**
 - Discuss Mitigation Action Opportunities
 - Introduce the Mitigation Action Form and Mitigation Action Tracker
 7. **Wrap Up (10 minutes)**
 - Review of action items and next steps
- Optional Interactive Stations (30 minutes - 1hr following meeting)***
- *Draft Transect Map Station: Talk to technical staff about draft transects and view draft transects in GIS*
 - *Mitigation Resources, Strategies, and Actions Station: Talk with FEMA and State staff about areas of concern and potential mitigation actions to help reduce risk. Fill out Mitigation Action Form.*



INTERACTIVE DISCUSSION:

- Towns, cities, counties currently listed in study are confirmed by communities.
- Modeling/Transect section:
 - Gary Heinrichs asked about the “where present” note on wave run-up. It was confirmed that wave runup might not occur at all locations along the coast, and it’s occurrence is dependent on the features of the coast.
- *Question:* Does WDNR have any resources regarding how to alter building codes in response to the LIMWA? *Answer:* Gary Heinrichs notes that WDNR does not have any particular guidance but FEMA does. He suggested a common sense approach would require homes to build up 1.5 feet plus the 2 feet of freeboard or prevent development within the LIMWA. Lee and Gary directed participants to the FEMA resources.
- *Question:* When will the decision be made regarding whether or not VE zones will be placed on the regulatory maps? *Answer:* Lee answered that hopefully by the end of September the decision will be made. Jaspreet added that the VE zones will be shown on the work map that will be presented to communities if they are present.
- *Question:* What is the status of the Hazard Mitigation Plans for the counties? *Answer:* City and County of Sheboygan are in the process of updating their plan. County of Ozaukee is also updating its plan.
- *Question:* Can hazard mitigation plans or actions identify concerns such as erosion or is it just flooding? *Answer:* All hazards should be considered for mitigation planning and identification of mitigation actions.
- *Question:* Are there grants available for erosion type projects as well as flood projects? *Answer:* Jaspreet clarified there are stipulations regarding grant eligibility, and communities should consult with SHMO regarding particular grants.
- STARR demonstrated use of USACE’s online viewer for oblique photos.
- *Question:* How can we obtain LIDAR from USACE? *Answer:* STARR or FEMA can put participant in touch with USACE (Greg Mausolf) to determine how/when LIDAR will be available.
- *Question:* Is it feasible for property owners to apply for a LOMR? *Answer:* Yes, anyone can hire a coastal engineer to do a coastal analysis and apply for a LOMR.
- Note that all attendees were requesting a copy of the current transect shapefile.
- *Question:* How are transects placed and what do they represent? *Answer:* Transects are a place on-shore where the model will be evaluated. The transect should represent a reach of coastline that has similar coastal features.
- Manitowoc County needs ftp information to send data to STARR.
- *Question:* Edgar Harvey asked about how to obtain LIDAR from USACE. *Answer:* STARR will put him in touch with Greg Mausolf at USACE.
- Alan Lulloff asked if we are mapping floodplain on bluff, and STARR replied that we are mapping continuous floodplain areas.
- The following participants would like pdfs/GIS of transects:
 - City of Manitowoc
 - Manitowoc County
 - City of Two Rivers
 - City of Sheboygan

FEATURES NOTED ON MAPS:

- City of Sheboygan would like a copy of their effective transect shapefile and the new transects to determine what better captures the shoreline features.
- Paul Braun identified an area of erodible bluffs in the city of Manitowoc Transects 197-199.
- Ozaukee County officials identified a flat beach area (Transects 156 – 163) at the north end of the county to the Sheboygan county line. There are private roads and residences that are probably in the floodplain



- in this area and a discrepancy between the BFE on the Ozaukee County side of the beach and the BFE on the Sheboygan County side of the beach area.
- Ozaukee County official marked the WWTP and water treatment plant for Port Washington on the map (Transect 149) as important structures.
 - Ozaukee County officials would like the effective transects from Dec 2007 to be incorporated into the study and considered when placing final transects.
 - City of Sheboygan asked why there were so many transects in the bluff area on the north end of the city (Transects 180-185)
 - City of Sheboygan labeled Transects 175-180 as a flatter beach area of town (southern part of the city).
 - An expensive development called South Beach is located near the mouth of the Sheboygan River near Transect 178.
 - City of Sheboygan labeled a higher dune area south of the city at Transect 173 and flat areas at the very southern end of the county (Transects 184-185)
 - Sheboygan County labeled erosion problems at the north end of the county (North of Transect 188, just south of Transect 187).

MITIGATION ACTIONS:

- Paul Braun, City of Manitowoc, identified a bluff erosion issue along or across Silver Creek Road and South 10th Street/County Highway LS.
- Paul Braun, City of Manitowoc, erosion issue at city water intake “rainy well”. Solution was to employ bank stabilization in area.
- Sheboygan County noted that Highway LS is being relocated away from the coast due to erosion. This is an existing action; \$2.5 million capital improvement plan.

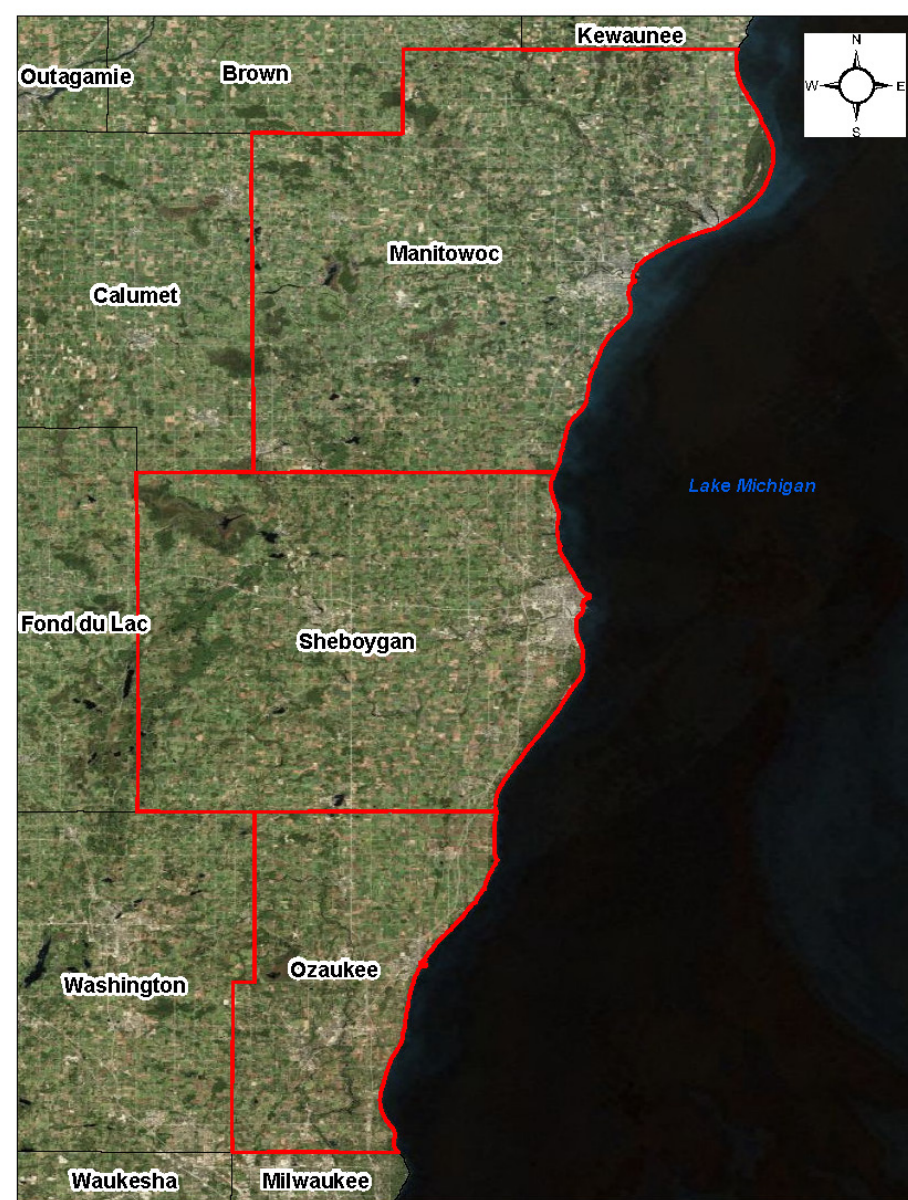


FEMA

Lake Michigan Discovery

Manitowoc County, WI
Sheboygan County, WI
Ozaukee County, WI

August 16, 2012
8.30 am to 10.30 am
Lakeshore Technical College



RiskMAP
Increasing Resilience Together

Great Lakes
Coastal Flood Study

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

greatlakescoast.org



Introductions

Who's here?

■ State Representatives

- WDNR
- SHMO

■ Risk MAP Project Team

- FEMA
- STARR

■ Local Stakeholders

- CEOs
- Floodplain Administrators
- Planners
- Engineers
- Emergency Managers
- Community Leaders
- Regional Planning Agencies
- Coastal Organizations



Discovery Meeting Agenda

- **Why are we here?**
 - Risk MAP Program, Great Lakes Study, and Discovery
- **Coastal mapping and flood risk topics**
- **How does this apply to my community?**
 - NFIP compliance, local impacts of coastal study, hazard mitigation, and grant funding
- **Interactive Sessions**
 - View and Discuss Local Coastal Areas of Concern Using the Discovery Map and Community Risk MAP Questionnaire
 - Discuss Mitigation Action Opportunities and Introduce the Mitigation Action Form
- **Wrap Up**
- **Optional Interactive Stations**



Risk Mapping, Assessment and Planning

Risk MAP



Through collaboration with State, Local, and Tribal entities, Risk MAP aims to deliver quality data that increases public awareness and leads to action that reduces risk to life and property



RiskMAP

Increasing Resilience Together



Great Lakes
Coastal Flood Study

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

greatlakescoast.org



Great Lakes Coastal Flood Study



U.S. Army Corps of Engineers, Detroit District

RiskMAP

Increasing Resilience Together

Great Lakes
Coastal Flood Study

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

greatlakescoast.org



Great Lakes Coastal Flood Study Overview



- Latest models, data, and technology
- Deliver updated flood maps and flood risk datasets
- Equip Federal Agencies, eight States and hundreds of coastal communities with data and planning tools to facilitate flood risk actions to enhance resiliency along the Great Lakes
- Partners Involved:
 - FEMA
 - USACE
 - Engineering Research Development Center (ERDC)
 - ASFPM
 - States
 - FEMA Contractors



Lake Michigan Discovery

- 34 counties in total
 - 4 counties in UP Michigan
 - 11 counties in Wisconsin
 - 2 counties in Illinois
 - 3 counties in Indiana
 - 14 counties in lower Michigan
- 226 coastal communities



Great Lakes Coastal Flood Study Discovery Study Area

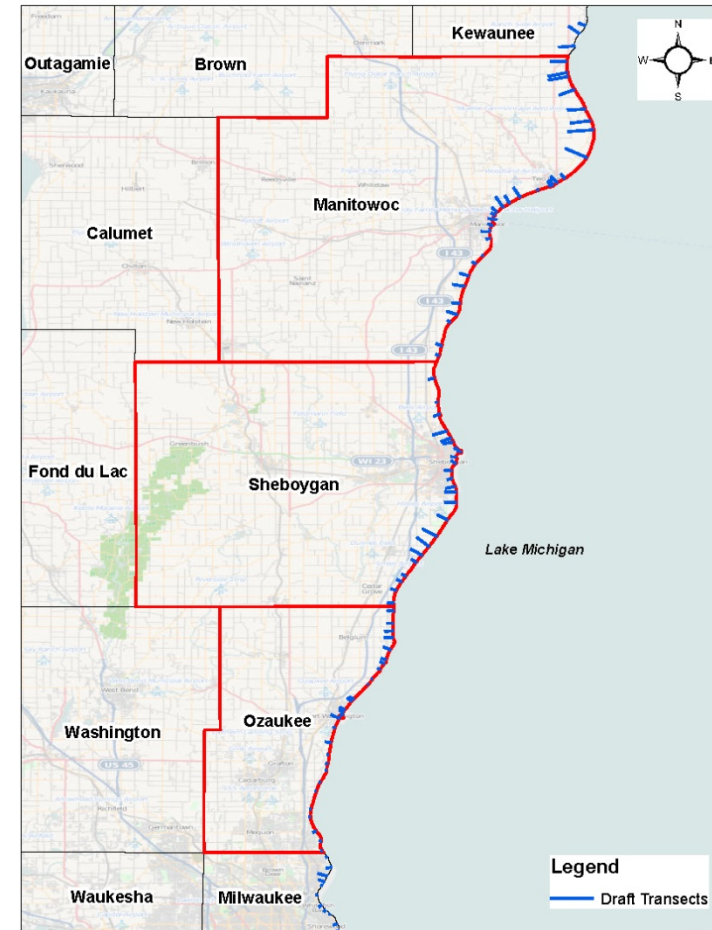


Lake Michigan coastal communities in Manitowoc, Sheboygan, and Ozaukee Counties:

Manitowoc County
Cleveland
Manitowoc (City)
Two Rivers

Sheboygan County
Cedar Grove
Oostburg
Sheboygan

Ozaukee County
Bayside
Mequon
Port Washington



Effective Map Status

- Sheboygan County went effective 4/2/2009
- Manitowoc County went effective on 8/2/2011
- Ozaukee County went effective 12/4/2007

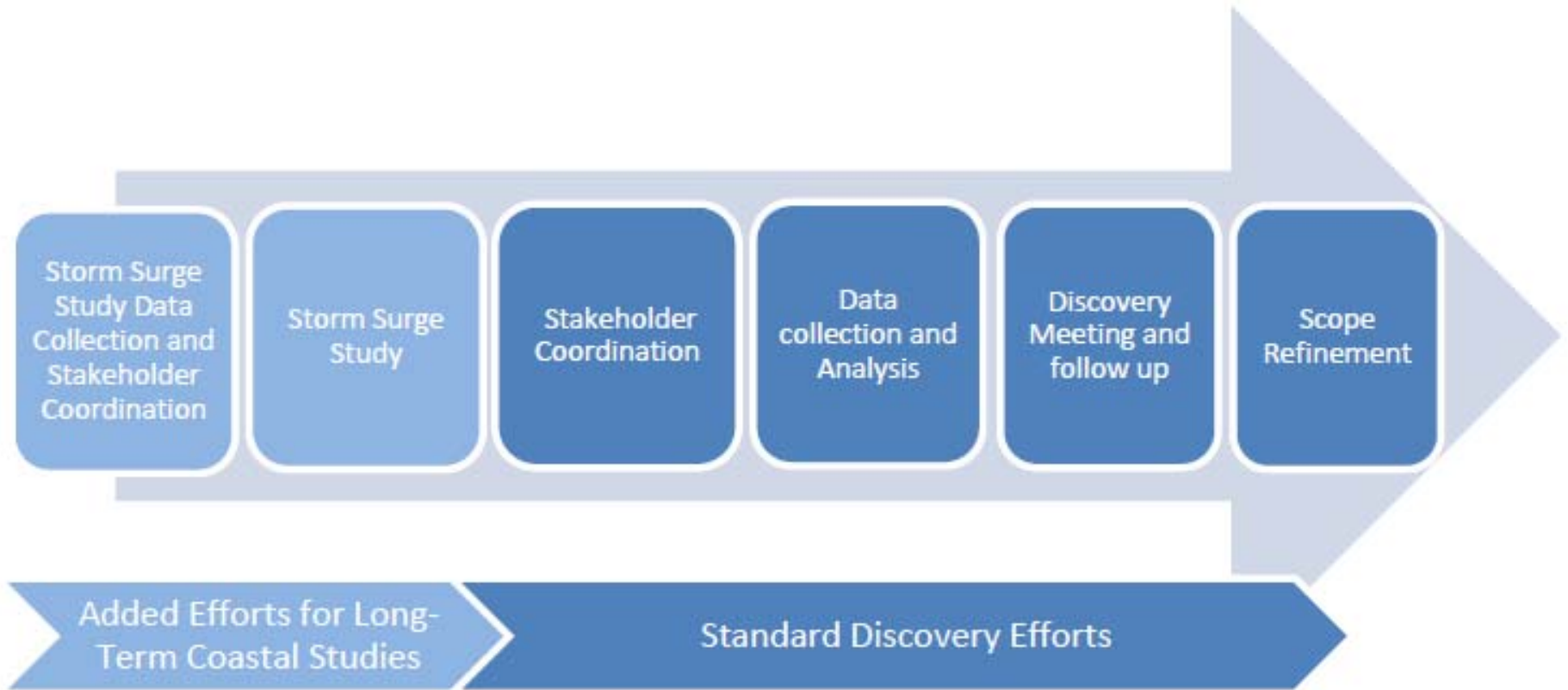


Discovery Meeting Objectives

- Continue and expand upon stakeholder engagement
- Discuss data inputs from Federal, state and local
- Identify local coastal flood hazard needs and areas of concern
- Identify products and datasets that best advance coastal mitigation action
- NFIP regulatory updates
- Discovery schedule and deliverables



Discovery Schedule Overview



Lake Michigan Discovery

Schedule of Activities

- Identify Draft Transect Locations – Completed
- Research available data – Completed
- Information Exchange with Community Stakeholders – July 2012
- Prepare draft Discovery Maps and Reports – August 2012
- Establish inventory of coastal structures based on oblique imagery – October 2012
- Facilitate Discovery Meetings – August/September 2012
- Final Discovery Report and Maps – November 2012
- Create library of digital data – November 2012



Great Lakes Coastal Flood Study Discovery Products



■ Final Discovery Report

- Single, comprehensive report for all of Lake Michigan, with appendices for each Discovery meeting
- Includes pre-discovery data, meeting agenda, sign-in sheets, discussion topics, decisions made, etc.

■ Final Discovery Maps

- Including feedback from participants
- Visual representation of meeting outcomes
- Delivered in digital format



Discovery Outcomes

- **Explain the Project**
 - Regulatory and non-regulatory products/datasets
 - Analysis, concepts, timelines
- **Encourage Community Participation**
 - Transect Locations
 - Areas of concern and need
 - Data to improve upon products and datasets
- **Introduce Mitigation Action**
 - Mitigation Action Form
 - Action Tracker
 - Mitigation strategies for coastal flood and erosion



Data Collection in progress

- New high quality USACE Topographic – Light Detection and Ranging (LiDAR) and Bathymetry Data
- Base data – boundaries, streams, census blocks, etc.
- Average Annualized Loss data
- Shoreline classification Dataset
- Dams
- Federal and State disaster information
- Repetitive loss data
- Hazard Mitigation plans
- Hazard Mitigation Grants Program (HMGP) projects
- Stream, wave, and water level gage locations
- Pre-Disaster Mitigation Program projects
- Draft Transects



Data Gaps

- Building footprints
- Critically eroded beach areas
- Coastal construction control line
- Critical Facilities (in GIS format)
- High water marks
- Areas of recent or planned development
- Areas of high growth
- Recent land changes due to development, erosion, etc.
- Known flooding issues not represented on effective FIRMs or listed in CNMS





FEMA

Coastal Mapping and Flood Risk Topics

- Draft Transects
- Coastal Guidance Updates
- VE Zone Mapping and LiMWA
- Coastal Flood Risk Products

RiskMAP

Increasing Resilience Together



Great Lakes

Coastal Flood Study

Lake Michigan Discovery Report Appendix G - Sheboygan, Manitowoc, and Ozaukee

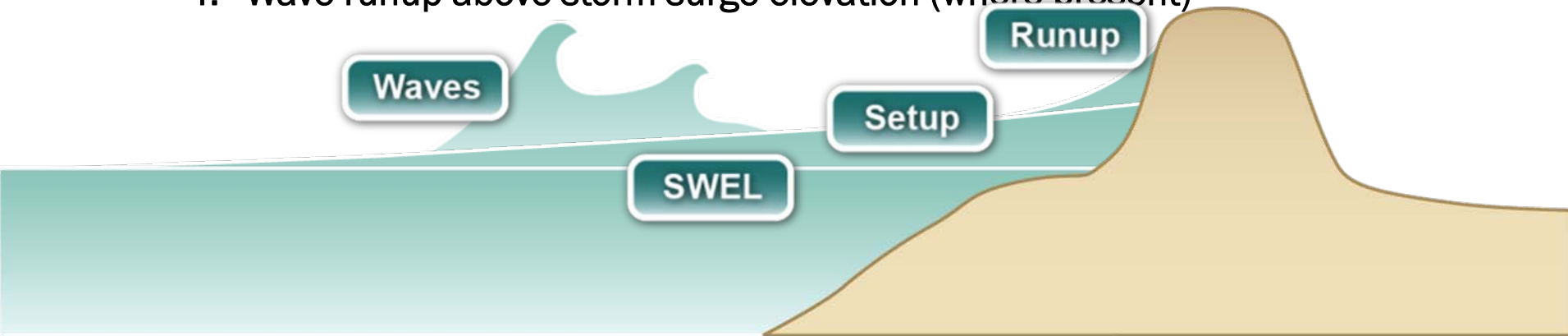
greatlakescoast.org



Basic Elements of a Coastal Hazard Analysis

Base Flood Elevation on FIRM includes 4 components:

1. Storm surge stillwater elevation (SWEL) – determined from storm surge model
2. Amount of wave setup
3. Wave height above storm surge (stillwater) elevation
4. Wave runup above storm surge elevation (where present)



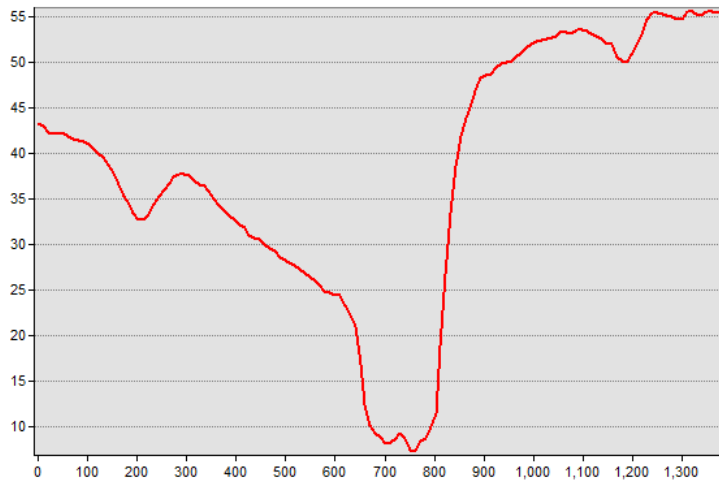
Storm Selection

- One storm event does not produce extreme waves or water levels everywhere within the lake.
- Storm selection considers events that produce extreme events all along the lake shoreline.
- Needed a balance between minimizing the number of storms & selecting enough storms so that extreme flooding hazards are well defined.
- Select top 10 surge events from each gage station (\approx 150-200 events)
- Select top 10 wave events from each gage station (\approx 150-200 events)
- Select a 50/50 split of top surge and wave events

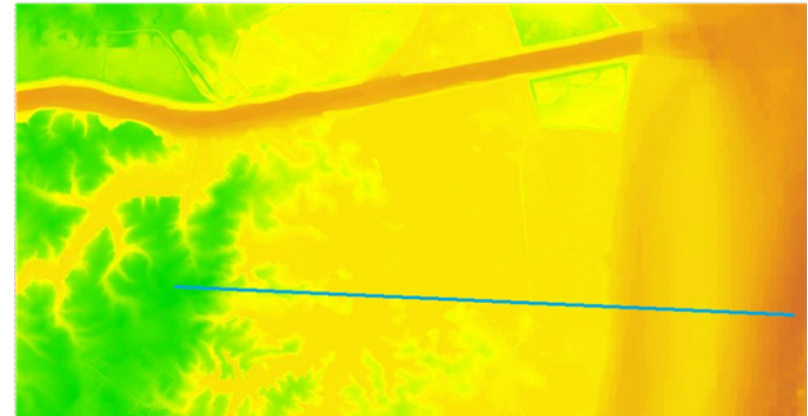
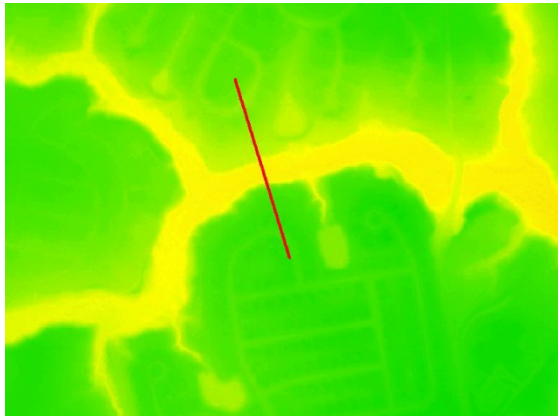
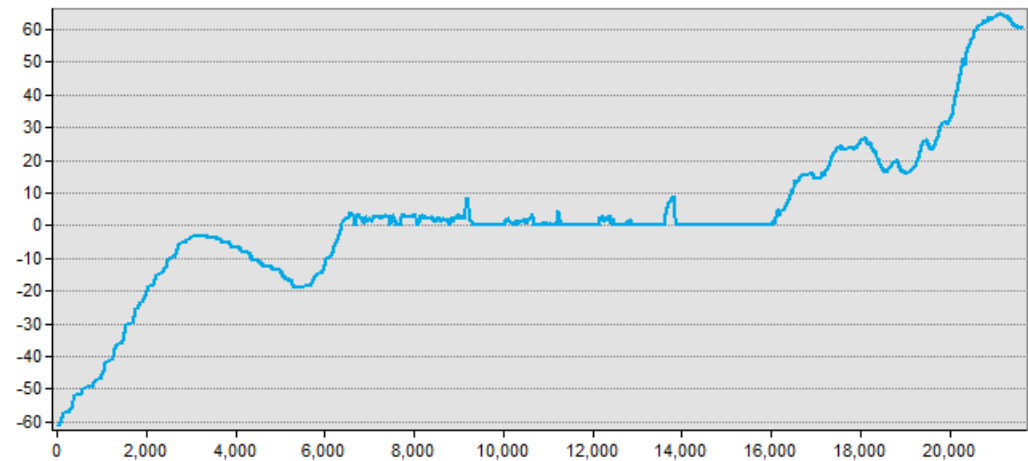


Riverine XS vs Coastal Transect

Riverine XS

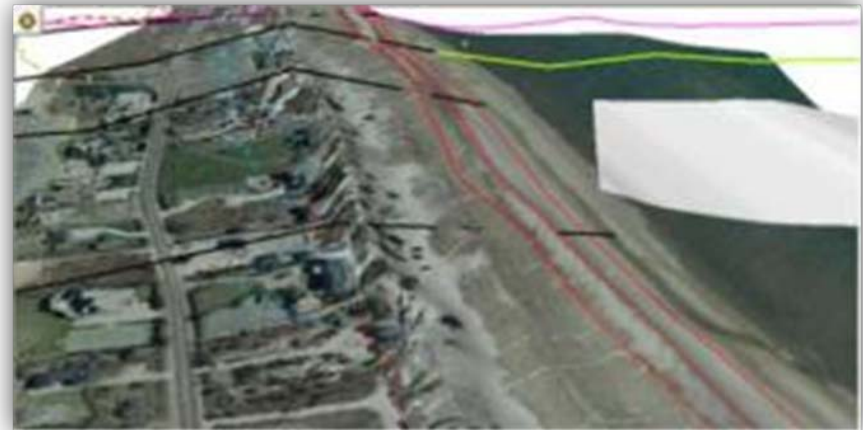


Coastal Transect



Transect Placement

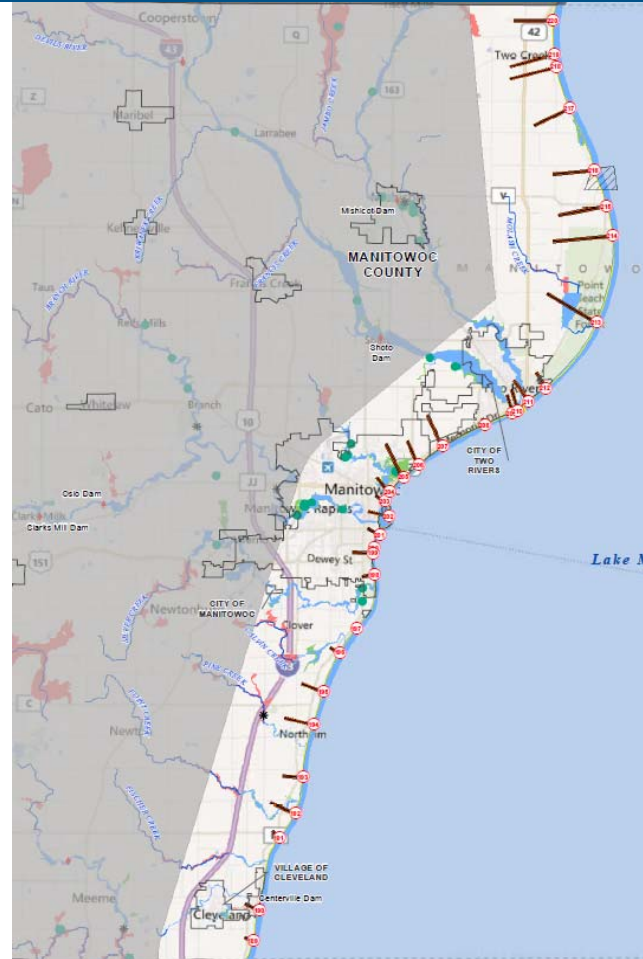
- Transects are placed to define representative profiles for a shoreline reach
- Transect spacing depends on upland development
 - Developed areas – As dense as 1,000 ft
 - Rural areas – Spacing can be 1-2 miles
- Transects are:
 - Profiles along which flooding analysis is performed
 - Used to transform offshore conditions to shoreline
 - Use to define coastal flood risks inland of shoreline



Draft Transect Layout Manitowoc County



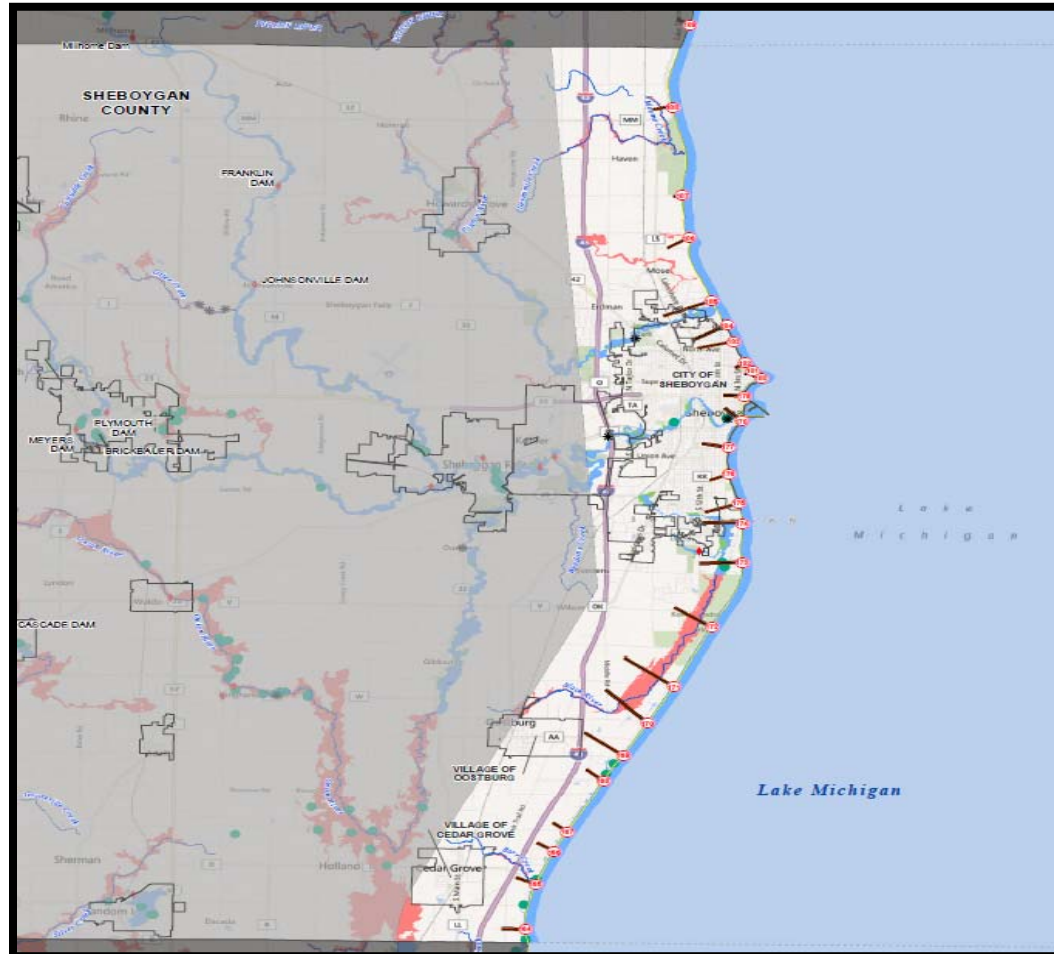
- 32 transects
- 35 miles of shoreline along Lake Michigan



Draft Transect Layout Sheboygan County



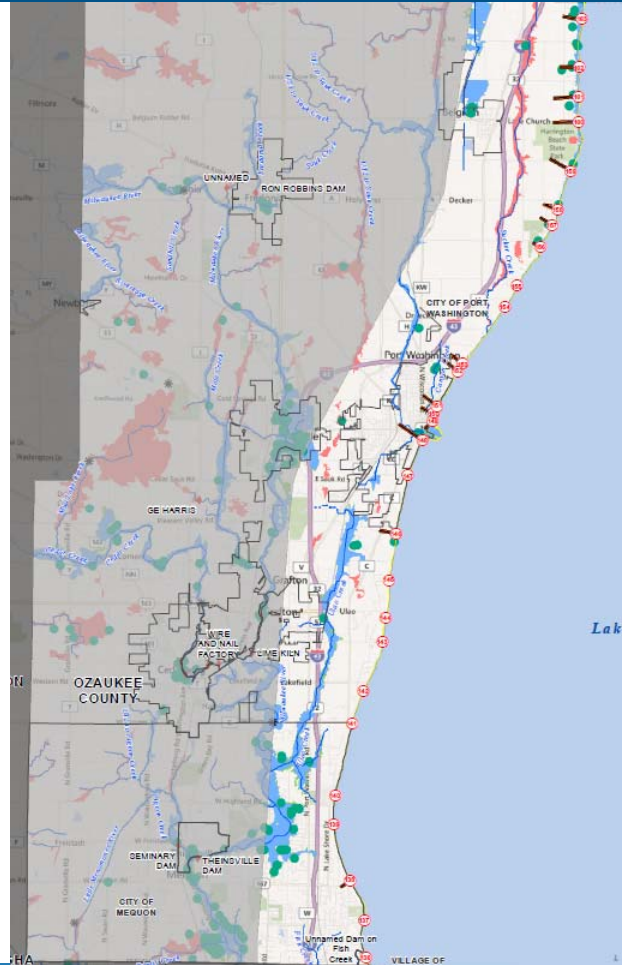
- 25 transects
- 27 miles of shoreline along Lake Michigan



Draft Transect Layout Ozaukee County



- 27 transects
- 27 miles of shoreline along Lake Michigan



Coastal Flood Hazard Zones

■ Hazard Zones

- **Zone VE** – Areas expected to be affected by high velocity wave impact in 100-year event (wave heights or runup depth at or greater than 3 feet)
 - Base Flood Elevation established
- **Zone AE** – Areas expected to be flooded by inundation in 100-year event
 - Base Flood Elevation established (wave heights and runup depth less than 3 feet)
- **Zone X** – Areas not expected to be flooded in 100-year event
 - Shaded X – Areas expected to be flooded in 500-year event
 - Base Flood Elevations not established
- **LiMWA** – Areas subject to wave heights of at least 1.5 feet
 - Non-Regulatory

■ Gutters

- Internal zone breaks where Base Flood Elevation changes
- VE/AE Gutter - Location where risk of damage due to wave action diminishes



VE Zones in the Great Lakes

- From the revised Appendix D.3:
 - “VE zones may also be mapped where the engineering analysis indicates their presence“
 - “The typical study finding is a narrow VE zone, making its usefulness uncertain on maps at usual scales“
 - “Relatively small numbers of existing coastal buildings are likely to be affected by possible VE zone designations along some Great Lakes”
 - “Only with prior approval from the FEMA study representative should the VE zones be mapped”



How is LiMWA Defined?

- LiMWA is the line mapped to delineate the inland extent of wave heights of at least 1.5 feet
 - Wave heights as small as 1.5 feet can cause significant damage to structures
- LiMWA alerts people that are not in the high wave hazard zone (Zone VE) that they may still be affected by wave action in the Zone
- CRS benefit for communities requiring Zone VE construction standards in areas defined by LiMWA or areas subject to waves greater than 1.5 ft



Wave Action - Structural Risk

- US Army Corps of Engineers – 1973
 - Breaking wave height of 3 feet
 - “area subject to high velocity waters, including but not limited to hurricane wave wash”
- FEMA – 2000
 - Coastal Construction Manual
 - Additional post-storm damage assessments identified 1.5 wave also can knock a structure off a foundation



http://www.fema.gov/pdf/rebuild/mat/coastal_a_zones.pdf

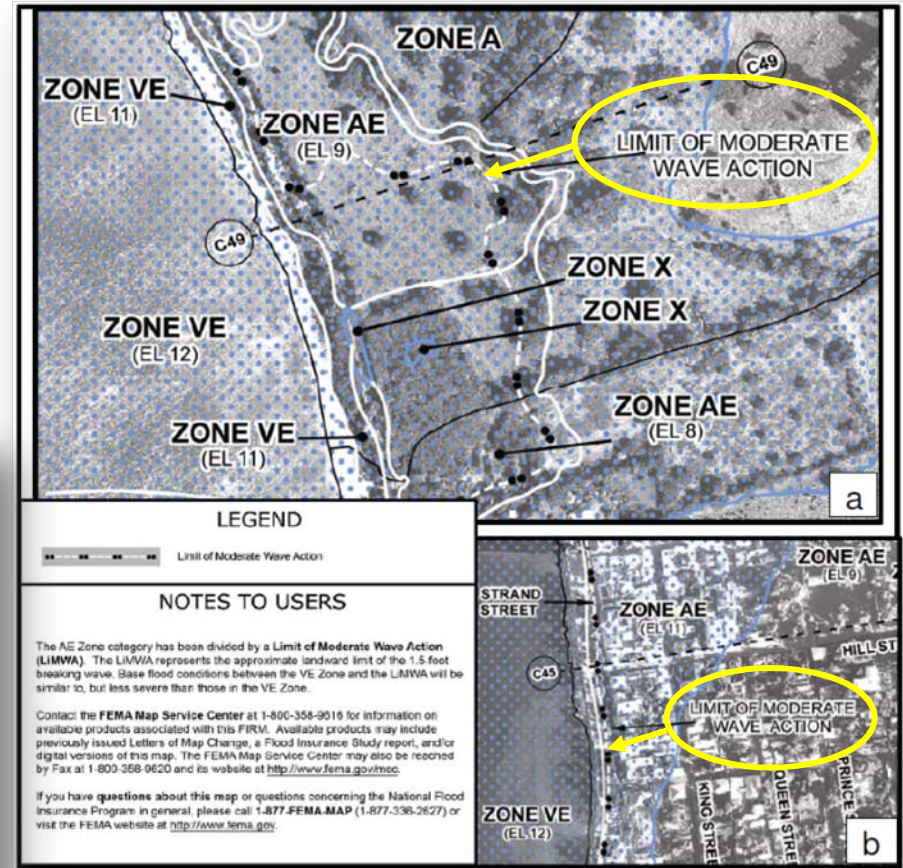
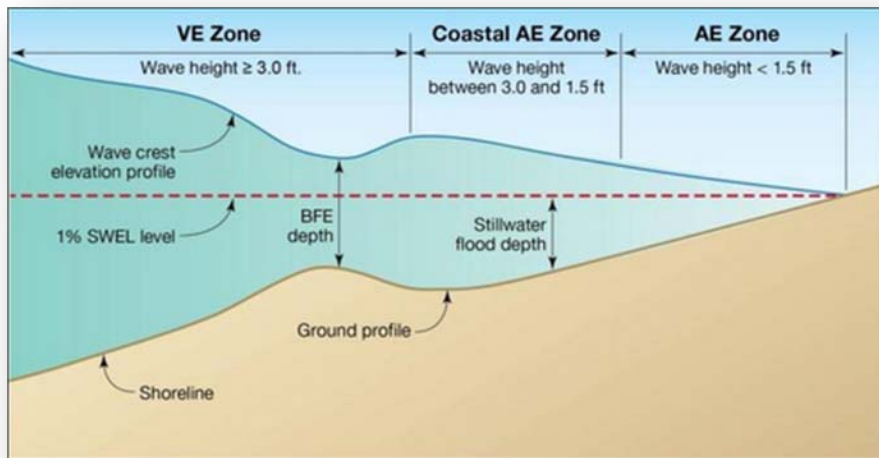


Limit of Moderate Wave Action (LiMWA)



FEMA Procedure Memorandum No. 50, 2008

- Not a regulatory requirement
- No Federal Insurance requirements tied to LiMWA





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Coastal Flood Risk Products

- Coastal Depth Grids and HAZUS
- Changes Since Last FIRM
- Coastal Non-Regulatory Products

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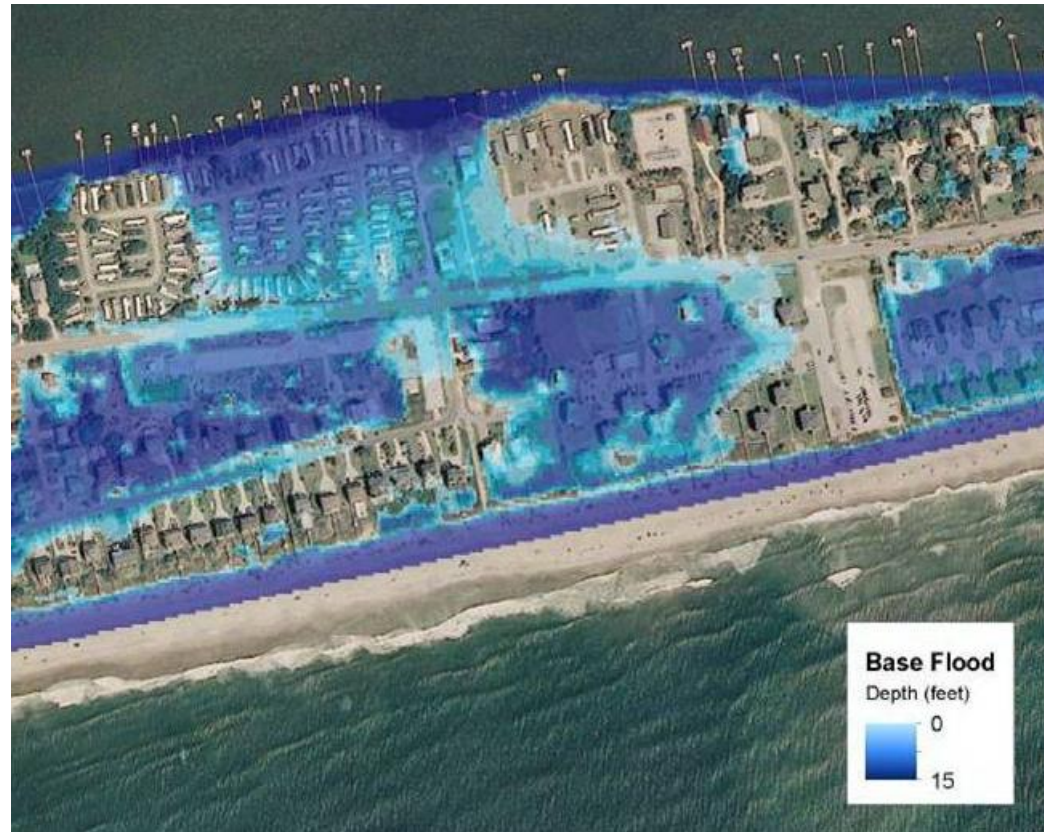
Standard Flood Risk Products

- Coastal Depth Grids
- Flood Risk Assessment (HAZUS)



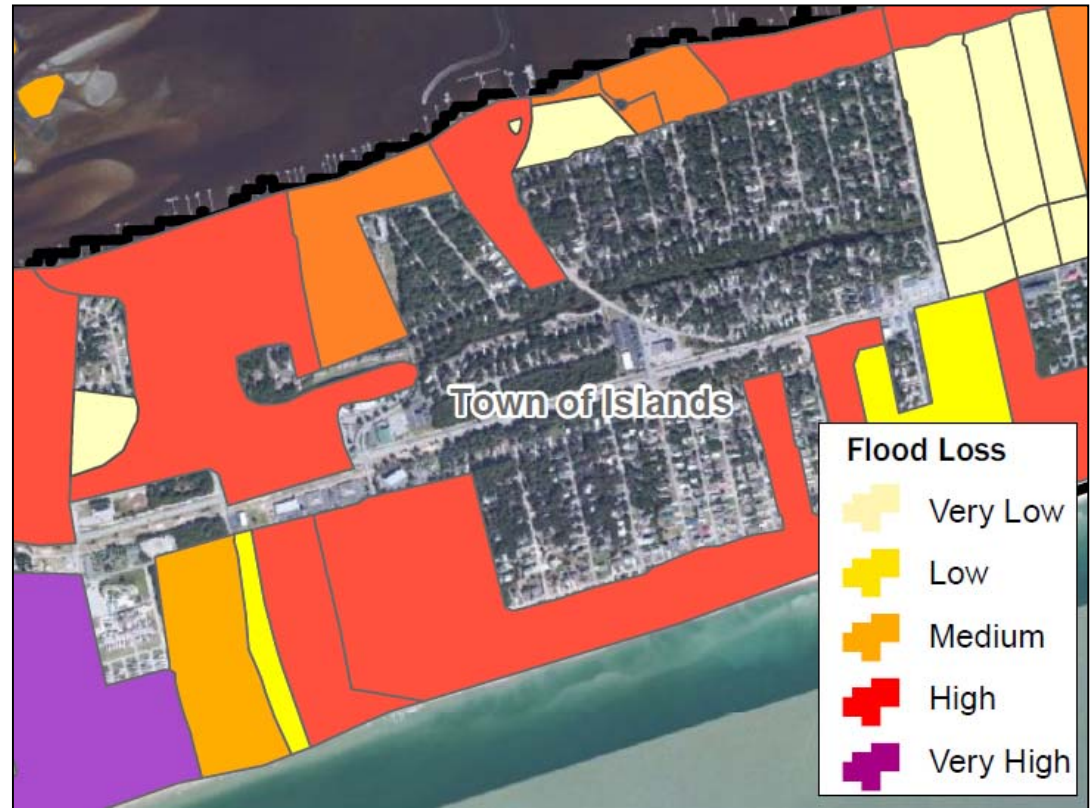
Coastal Depth Grid

- Should reflect total depth (i.e. stillwater and waves) – typically only produced for the 1% annual chance flood
- Created using the regulatory mapping and associated zone breaks as input



Coastal Flood Risk Assessments

- Similar to Flood Risk Assessments for riverine, but using the coastal depth grids as input for the refined analysis
- Hazus analysis and data can support adoption of higher regulatory standards for structures in high loss areas
- Provides justification to fund mitigation actions



Changes Since Last FIRM



Data Fields Include	Example Data Values
Old Study Date	e.g. 1985
Old Model Type(s)	e.g. HEC-1 / HEC-2
Old Zone Type	e.g. Zone A
Old Topography	e.g. USGS 10-ft
New Study Info/Methods	Dates, Models, etc.
New Study Zone	e.g. Zone AE
New Topography	e.g. LiDAR 2-ft
New Study Engineering Factors / Changes	e.g. new structures, gages, topo, landuse, etc.
Estimated Structures	e.g. 9
Estimated Population	e.g. 27

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Coastal Non-Regulatory Products in Development



Erosion



Red Lantern Restaurant, Lake Michigan, IN

Lake Levels



Lake Michigan Shoreline
[Reference](#)

Shoreline Feature Dataset



Upper Peninsula Shoreline
[Reference](#)



Shoreline Features Database

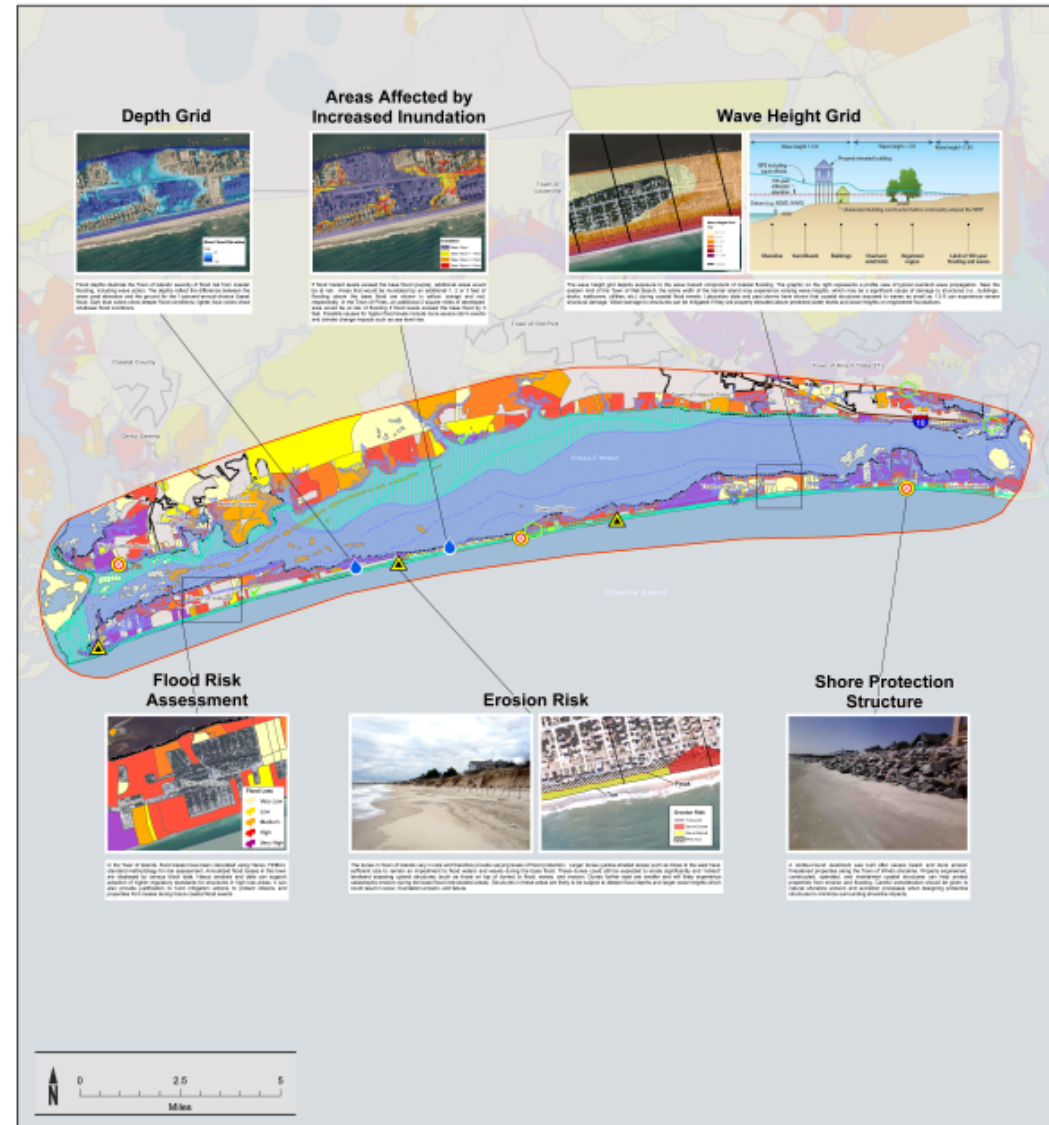
Shoreline Material	Primary Land Use	Primary Coast Type	Primary Vegetation
Sand	High Density Residential	High Dune, 10'+	None
Cohesive	Moderate Density Residential	Dune, 2' - 10'	High Density Shrubs/Trees
Cobble	Low Density Residential	High Bluff, 10'+	Moderate Density Shrubs/Trees
Diamicton*	Commercial/Industrial	Bluff, 2' - 10'	Low Density Shrubs/Trees
Shingle	Park Land	Coastal Wetland	Manicured Lawn
Bedrock	Farm Land	Flat Coast	Native Vegetation
Artificial	Forested		

- Contains primary and secondary Land Use tables – same for coast type and vegetation
- Current project collects data at one-mile spacing, for scoping and cost
- Current project does not include field-based reconnaissance or sediment/subsurface soils collection



Coastal FRM

- Similar to riverine map
- Highlights area where datasets were produced
- Use of callout boxes
- Should drive the conversation towards mitigation



MAP SYMBOLOLOGY			COASTAL STUDY LOCATOR	
Base Data Composite Limits Major Roads Watershed Boundary State Boundary	Flood Data Rivers and Streams Resubly Area New OFNR Coastal Range Influence Area New Zone VE	Flood Risk Very Low Low Medium High Very High	Areas of Mitigation Interest Accredited Lenses Non-Accredited Lenses Dams Coastal Structures Stream Flow Constrictors Non-Use Non-Use Areas of Mitigation Success Other	Risk Mapping, Assessment, and Planning (Risk MAP) FRM FLOOD RISK MAP: COASTAL USA For more information of data used for this map, please consult the Coastal USA Flood Risk Database and Flood Risk Report. HUC-8 Code: N/A RELEASE DATE: 11/30/2011



Coastal Updates to Flood Risk Report



- Explanations of coastal non-regulatory datasets and their use in risk communication and mitigation planning
- References to other publications and resources that provide information on coastal risks
- Captures and reports increases and decreases in Coastal High Hazard Areas (VE & V Zones) within the Changes Since Last FIRM tables in the FRR

Area of Study	Total Area (mi ²)	Increase (mi ²)	Decrease (mi ²)	Net Change (mi ²)
Within SFHA	23.8	1.6	0.4	1.2
Within Floodway	1.4	0.2	0.0	0.2
Within CHHA (VE or V Zone)	7.8	0.9	0.5	0.4



Non-Regulatory Product Usage and Action



- Risk MAP Products and Datasets help communities make good decisions to reduce flood risk:
 - Hazard Mitigation Planning
 - Floodplain Management and Community Rating System
 - Community Comprehensive or General Planning
 - Community Investment - Capital Improvement Planning
 - Public Outreach
 - Hazard Mitigation Assistance Grant Application Prioritization and Support
 - Other Non-FEMA Grants to Reduce Flood Risk
 - Response and Recovery Planning
- Mitigation Action Form





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How does this apply to my community?

- NFIP Compliance
- Local impacts of coastal study

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National Flood Insurance Program

- Allows property owners to purchase flood insurance at reduced rates
- Community responsibilities
 - adopt and enforce compliant regulations
- FOCUS is in building the local floodplain management capability



V Zones for Lake Michigan?

- Lake Michigan communities currently do not have V/VE Zones. Majority of the communities have coastal A/AE zones.
- If coastal AE and VE Zones are added on maps where they did not exist before, all affected communities must update regulations to include coastal requirements.
 - State will provide regulations assistance and technical support if/when coastal flood zones are added.



Community Rating System (CRS)

- Flood insurance premium rates discounted to reward community actions that reduce flood losses, facilitate accurate insurance ratings, and promote the awareness of flood insurance
- Class rating system from 1 to 10
- Each Class improvement (500 point increments) results in additional 5% discount, up to 45% in SFHAs for Class 1 communities
- Uniform minimum credits give you points for activities on the state level (state laws) and make achieving a Class 9 relatively easy
- 18 creditable activities organized under four categories:
 - Public Information
 - Mapping and Regulations
 - Flood Damage Reduction
 - Flood Preparation
- <http://training.fema.gov/EMIWeb/CRS/>





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Hazard Mitigation

- Opportunities
- Grant Funding

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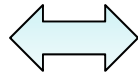
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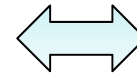
Local Hazard Mitigation Plans

Risk MAP
Risk MAP products
and Datasets



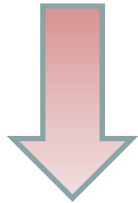
Hazard Mitigation Plan

- Uses Risk Information
- Identifies Projects/Actions
- Integrated with Other Community Plans



Other Community Plans

- Comprehensive plans
- Land Use Plans
- Capital Improvement
- Stormwater
- Management Plans
- Emergency Operations



Mitigation Actions/Projects



Mitigation Actions

- Address specific **existing** assets (e.g., elevate critical facility, enlarge a culvert, acquisition of floodplain properties, floodproof floodprone properties)
- Address **future** risks (e.g., update building codes)
- Based on local capabilities
 - Build on current strengths, ongoing efforts (add-on to stormwater management regulations)
 - Coordinate with Federal programs (e.g., NFIP, CRS)



Mitigation Activity

Sheboygan County All Hazards Mitigation Plan

Plan Expiration Date	Identified Hazard Mitigation Action
11/7/2013	Maintain information regarding, and coordination or, congregate care facilities.
11/7/2013	Protection of existing buildings and other structures
11/7/2013	Review and update floodplain zoning ordinances (as necessary)
11/7/2013	Land use planning



Mitigation Activity

- Manitowoc County All Hazards Mitigation Plan

Plan Expiration Date	Identified Hazard Mitigation Action
9/23/2014	Monitor natural features along Lake Michigan for deterioration that would allow for flooding or mudslides to impact properties along the shore
9/23/2014	Maintain maps indicating past incidences and areas most susceptible to future hazards
9/23/2014	Maintain current land use regulations that permit building of structures within vulnerable coastal locations
9/23/2014	Work with the Coast Guard to monitor conditions where drifting ice can damage shore structures and destroy vegetation, move sand or stones from beaches, or dump sand, rock, or other debris on beaches
9/23/2014	Construction of riprap to manage bluff erosion shifts due to the eroding force of the water where coastal areas lack bluff reinforcement.
9/23/2014	Enforce land use regulations that preserve natural resources adjacent to and in defined floodplains
9/23/2014	Implement floodproofing techniques such as elevation, relocation, barrier construction, and wet floodproofing for residents, businesses, and critical facilities



Mitigation Activity

- **Ozaukee County All Hazards Mitigation Plan**

Plan Expiration Date	Identified Hazard Mitigation Action
3/18/14	Ensure that municipalities, builders and homeowners understand and follow safe building zoning regulations.
3/18/14	Review the county ordinance provision for set-backs and ensure that it is adequate.
3/18/14	Incorporate into local comprehensive planning process (including SMART growth, as applicable)
3/18/14	Conduct a feasibility study(with a cost benefit analysis) for conducting LiDAR mapping flights for good digital terrain maps (DTM) to model the surface contours for flooding and other scenario modeling/projections
3/18/14	Continue public outreach efforts for flood mitigation efforts
3/18/14	Discuss potential regulatory and ordinance changes that would allow municipalities to condemn properties in flood areas.
3/18/14	Complete amendments/revisions to the Flood Rate Insurance Maps (FIRMs) as necessary
3/18/14	Explore with the approximately 16 home owners in the Edgewater Drive area (Town of Grafton) the feasibility of a buyout or other flood mitigation program. Also, ensure that the road is of adequate height to escape flood damage.
3/18/14	Update, as necessary, the stormwater plan
3/18/14	Update, as necessary, the water management plans. Continue marking stormwater drains.
3/18/14	Support the Pigeon Creek restoration mitigation project.



Mitigation Examples



FEMA Funding Opportunities

- Hazard Mitigation Assistance includes both post-disaster and pre-disaster grants



HMGP is a post-disaster grant program.

PDM, FMA, RFC and SRL are available annually, subject to Congressional appropriations.



- Mitigation Plan Requirement
- Local/State Cost Share
- States Manage Programs and Set Funding Priorities
- State Hazard Mitigation Officer (SHMO) is contact



Mitigation Grants/Programs: OFAs



US Army Corps
of Engineers®



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Interactive Session

- View and Discuss Local Coastal Areas of Concern Using the Discovery Map
- Discuss Mitigation Action Opportunities and Introduce the Mitigation Action Form

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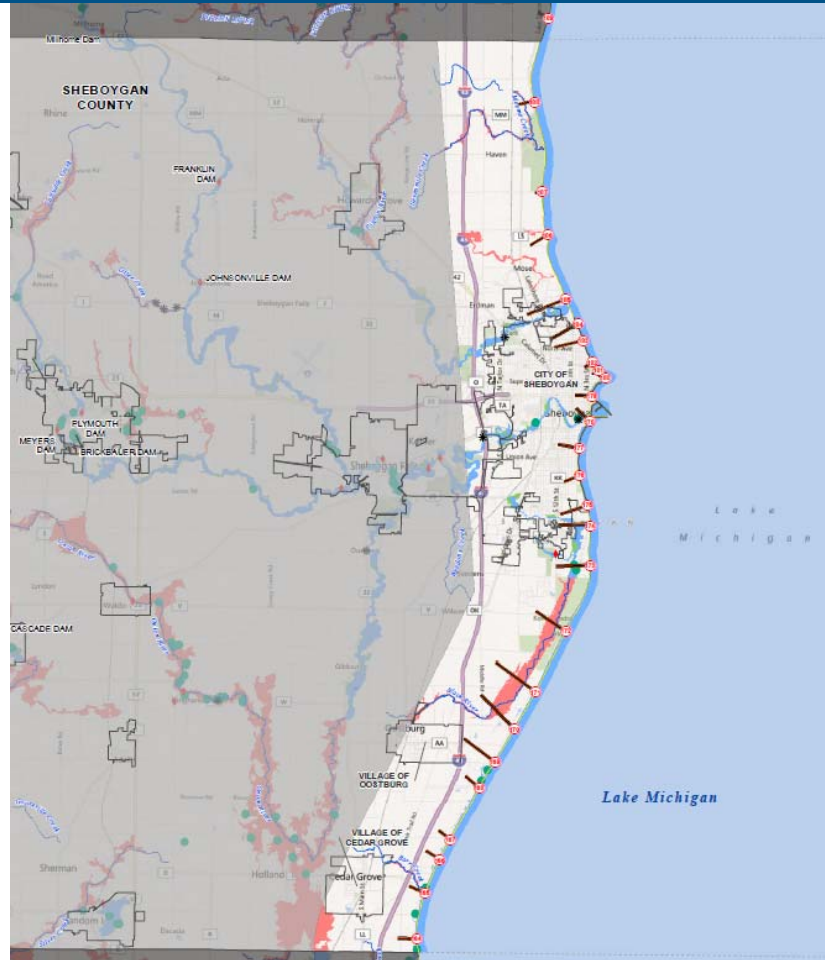
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Sheboygan County, WI Discovery Map – Flood Hazard Areas



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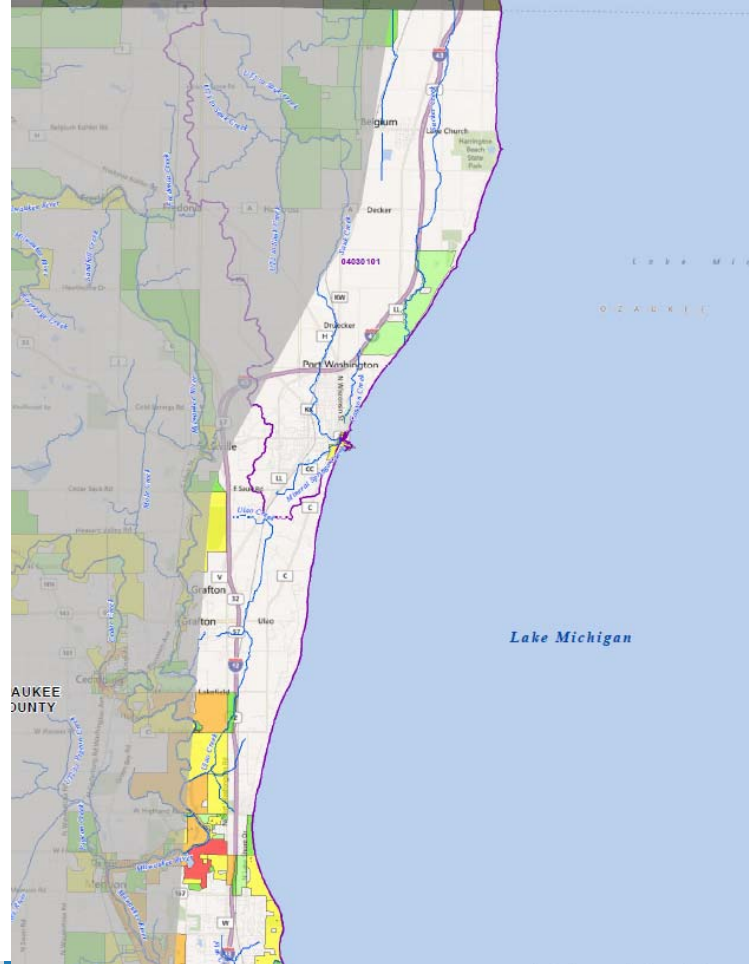
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Ozaukee County, WI Discovery Map – AAL



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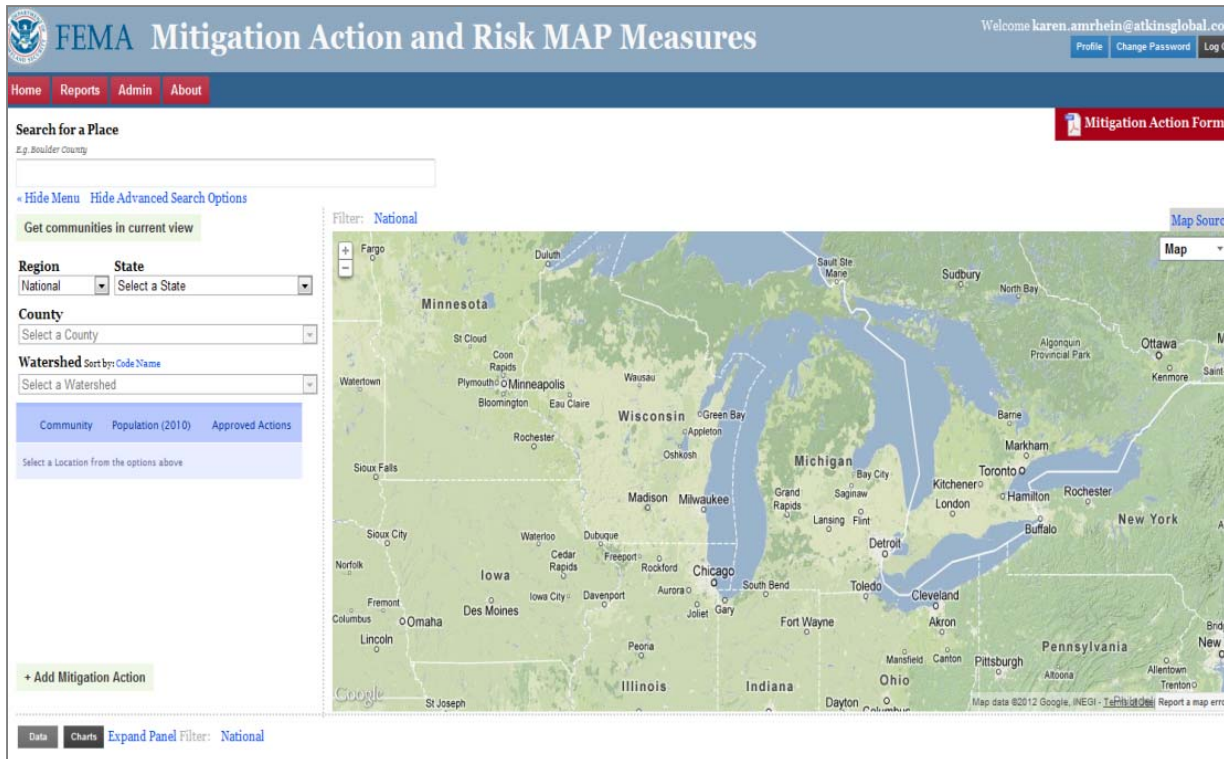
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Action Tracker



- New mitigation tool
- Houses community-identified mitigation actions
- Actions can be edited by community officials
- A tool for communities to support future mitigation planning efforts

We will input your community's action into the Action Tracker and send you a report and a link - <http://fema.starr-team.com>



Next Steps

- **Communities:**
 - Provide data and Mitigation Action Forms to STARR with a target date of September 14, 2012

- **STARR/FEMA will:**
 - Assess data and information provided
 - Email summary of today's Discovery Meeting to you within one month
 - Prepare final Discovery Maps and Discovery Report
 - Follow-up regarding Risk MAP Project





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Questions?

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Optional Interactive Stations

- **Draft Transect Map Station**
 - View draft transect locations and oblique imagery in data viewer
 - Discuss draft transect locations with technical staff
- **Mitigation Resources, Strategies, and Actions Station**
 - Talk with FEMA and State representatives about areas of concern and potential mitigation actions to help reduce risk
 - Fill out Mitigation Action Form



Contact

- FEMA Region V
 - Ken Hinterlong @ ken.hinterlong@fema.dhs.gov
 - Lee Traeger @ Lee.traeger@fema.dhs.gov
- Wisconsin Partners
 - Gary Heinrichs @Gary.Heinrichs@Wisconsin.gov
- STARR
 - Brian Caufield (technical) @ caufieldac@cdmsmith.com
 - Jaspreet Randhawa (outreach) @ randhawajg@cdmsmith.com
- Online
 - info@greatlakescoast.org



ATTACHMENT G
COASTAL DATA REQUEST FORM COMPILATION

Lake Michigan Coastal Data Request Form Compilation
 Risk Assessment and Flood Mitigation Information
 *Please refer to sample Coastal Data Request Form found in Attachment A

CONTACT INFORMATION				RISK ASSESSMENT		FLOOD MITIGATION INFORMATION										
Community, County or State Organization	County	Contact Name	Contact Title	Does your community have HAZUS-based loss estimates from average annualized loss?	Does your community have other risk assessment data?	Does your community have a hazard mitigation plan?	Does the plan reflect any coastal flood hazards?	Does the hazard mitigation plan indicate any data deficiencies for flood hazards that could be addressed through a flood study, especially near coastal zones?	Does your community have on-going mitigation projects, such as acquisition, elevation, flood control, soil stabilization, natural systems restoration, floodproofing, etc.	Any specific coastal mitigation projects?	Does your community have experience with coastal flood disasters and flood disaster recovery?	Does your community coordinate floodplain management programs with and planning of open space? If possible, any coastal specific?	Have you had any prior proactive mitigation actions and planning efforts that resulted in reduced losses? If possible, any coastal specific?	Has your community applied and granted Individual Assistance/Public Assistance grants for declared disasters?	Has your community applied for FEMA Hazard Mitigation Grants program or other mitigation funds (USACE, NRCS, USGS, state Hazard Mitigation officer, etc.) in the past?	How would you rank the community's ability to implement mitigation actions and to communicate flood risk to citizens?
Two Rivers, City of	Manitowoc	Vicky Berg	Zoning Administrator	No	No	No			No	No	No	Zoning ordinance includes minimum setbacks for shore yards and rear yards.	No	No	No	Low
Village of Cleveland	Manitowoc	Steven G. Simons	Director of Public Works	No	No	No	No	No	No	No	No	Yes - Re-establishing a ridge/swale area north of Public Works Garage.	No	No	No	Medium
Sheboygan County	Sheboygan	Matthew Mrochinski	Code Administrator	No	No	Yes - it is currently being updated	Yes - General; based upon current mapping. Money has been budgeted for hazard zone mapping in conjunction with the updating of the hazard mitigation plan.	No	Yes - Soil stabilization - location(s) not noted. County Road LS relocation project in Section 10 and 3 of the Town of Mosel because of continuing bluff slumping that is threatening highway. Construction is scheduled for 2013.	Yes - County Road LS bluff stabilization project in Section 10, T. of Mosel (2004)	Yes - General flood disaster recovery	No	Yes - County Road LS bluff stabilization project completed in attempt to stabilize area of lake bluff that was, due to erosion/slumping, threatening the integrity of the county highway.	Yes	Yes - Applied for but were not awarded any.	

Lake Michigan Coastal Data Request Form Compilation

Other Data and Historical Flood Data

***Please refer to sample Coastal Data Request Form found in Attachment A**

CONTACT INFORMATION					OTHER DATA					HISTORICAL FLOOD DATA
Community, County or State Organization	County	State	Contact Name	Contact Title	Hydraulic Structures (i.e. bridges, culverts, levees, dams) with inspection status, if available	Elevated roads	Critical Facilities	Other known hazards with geographical boundaries, i.e., landslide hazard areas, storm surge inundation zones, wildfire hazard areas, etc.	Other relevant data	Are you aware of any coastal flooding issues not represented on effective FIRMs:
Two Rivers, City of	Manitowoc	WI	Vicky Berg	Zoning Administrator						No
Village of Cleveland	Manitowoc	WI	Steven G. Simons	Director of Public Works						No
Sheboygan County	Sheboygan	WI	Matthew Mrochinski	Code Administrator	Hard copy		Digital			No

Lake Michigan Coastal Data Request Form Compilation

Basemap Data and Coastal Data

***Please refer to sample Coastal Data Request Form found in Attachment A**

CONTACT INFORMATION					BASE MAP DATA		COASTAL DATA						
Community, County or State Organization	County	State	Contact Name	Contact Title	Topography	Property Information (Building Footprints, Parcel Data, Tax Assessor's Data)	Coastal Structure Inventory (Seawalls, Jetties, etc)	Coastal Feature Inventory (dunes, bluffs, etc)	Shoreline Change Data	Locations of beach nourishment or dune restoration projects	Areas of significant beach or dune erosion	Mean high water	Mean lake level
Two Rivers, City of	Manitowoc	WI	Vicky Berg	Zoning Administrator	Digital data available	Digital data available							
Village of Cleveland	Manitowoc	WI	Steven G. Simons	Director of Public Works									
Sheboygan County	Sheboygan	WI	Matthew Mrochinski	Code Administrator	Digital	Digital	Digital	Digital	Hard copy/Digital				

Lake Michigan Coastal Data Request Form Compilation
 Community Plans and Projects and Other GIS Data
 *Please refer to sample Coastal Data Request Form found in Attachment A

CONTACT INFORMATION				COMMUNITY PLANS AND PROJECTS							GIS DATA
Community, County or State Organization	County	Contact Name	Contact Title	Does your community have a comprehensive plan? If so, was your hazard mitigation plan coordinated with the comprehensive plan?	Does your community's comprehensive plan have a special consideration for coastal areas?	Does your community have a coastal zone management plan?	Does your community have planning staff or a planning/zoning commission and other measures, such as ordinances, administrative plans, or other programs contributing to effective administration of floodplain zoning, building codes, open space preservation, and coastal zone management? If so, explain the role in floodplain management and provide examples of programs in place.	Does your community have areas of recent or planned development/re-development and areas of high growth or other natural land changes (e.g., wildfires or landslides):	Are there any locations of other ongoing studies or projects and studied areas that have been modified since the effective map and require an updated study (e.g., highway improvement, seawall improvement, etc.)	Any other comments/concerns based on local knowledge:	Other GIS Data Available - include type of data, date of data, data sources, etc if available
Two Rivers, City of	Manitowoc	Vicky Berg	Zoning Administrator	Yes - Our community has a Comprehensive Plan.	Yes - Majority of coast along Lake Michigan is zoned conservancy & designated as Park Land and Open Space.	No	Yes - Site & Architectural Plan review for structures conducted by City Staff and Planning Commission.	No	Yes - GLRI - Beach Study in conjunction with DNR.		Available Data for Two Rivers: 1. Trcty_e.dgn; trcty_n.dgn; trcty_s.dgn; These files contain information from April, 1996 aerial flight, including topography, 2-ft contours, building footprint, and other information. 2. Mappingtr.dgn; This file
Village of Cleveland	Manitowoc	Steven G. Simons	Director of Public Works	Yes - Our community has a Comprehensive Plan. No - Our community's Hazard Mitigation Plan was not coordinated with the Comprehensive Plan.	Yes - Plan to maintain open spaces and restrict development in the 100-year floodplain.	No	Yes - Comprehensive Plan; Updated floodplain ordinance in Village; and Code of Ordinances	No	No		
Sheboygan County	Sheboygan	Matthew Mrochinski	Code Administrator	Yes - Our community has a Comprehensive Plan. Yes - The Hazard Mitigation Plan was coordinated with the Comprehensive Plan. Hazard mitigation plan in process of being updated.	No	No	Yes - Administration of the county's shoreland and floodplain zoning ordinances. Requirement of increased building setbacks in bluff area of Lake Michigan coastline.	No	No		Contours and shoreline data were provided. NOTE: The Sheboygan River is one of 39 remaining "Areas of Concern" on the Great Lakes. (see Sheboygan_AOC_08-15-12 attachment)