DRAFT

# Coastal Scoping Report

***Great Lakes Coastal Flood Study***

***Lake Superior***

***Alger County, Baraga, County, and Marquette County***

***Individual Coastal Scoping Report***

***Report Number 01***

***Draft - April 2014***

U.S. Department of Homeland Security
Federal Emergency Management Agency Region V
536 South Clark Street, 6th Floor
Chicago, Illinois 60605

SUBMITTED BY:

125 S. Wacker Drive, Suite 600
Chicago, IL 60606

Date Submitted: Draft April 2014

DRAFT

# 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.

| Alger County* | Marquette County* | Baraga County* |
|---|---|---|
| Au Train, Township of | Chocolay, Charter Township of | Arvon, Township of |
| Burt, Township of | Marquette, Charter Township of | Baraga , Township of |
| Grand Island, Township of | Marquette, City of | Baraga , Village of |
| Munising, City of | Negaunee, Township of | L'Anse, Township of |
| Munising, Township of | Powell, Township of | L'Anse, Village of |
| Onota, Township of | Sands, Township of | L'Anse Reservation (Keweemau Bay Indian Community) |
| | L'Anse Reservation Off-Reservation Trust Lands | |
| Sault Sainte Marie Off-Reservation Trust Lands | | |

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

DRAFT

# Table of Contents


Acronyms and Abbreviations ..... v

I. Coastal Scoping Overview ..... 1

i. Great Lakes Coastal Flood Study ..... 1

ii. Purpose of Great Lakes Coastal Scoping ..... 2

iii. Coastal Flood Risk Products ..... 3

II. Stakeholder Communication and Coordination ..... 5

i. Lake Superior Coastal Scoping Stakeholder Coordination ..... 5

III. Coastal Scoping Meeting ..... 7

IV. Summary of Data Analysis ..... 9

i. Data that can be used for future Coastal Flood Risk Products ..... 11

I.IV.i.1 Average Annualized Loss (AAL) Data ..... 12

I.IV.i.2 Coastal Recession ..... 13

I.IV.i.3 Federal Land ..... 13

I.IV.i.4 Jurisdictional Boundaries ..... 13

I.IV.i.5 Local Data ..... 14

I.IV.i.6 Publicly Owned Land ..... 14

I.IV.i.7 Shoreline Information ..... 14

I.IV.i.8 Stream Lines/Hydrograph ..... 15

I.IV.i.9 Topography, Bathymetry, and Oblique Imagery ..... 15

I.IV.i.10 Transportation ..... 17

I.IV.i.11 Watershed Boundaries ..... 17

ii. Other Data and Information ..... 17

I.IV.ii.1 Coastal Barrier Resources Systems ..... 18

I.IV.ii.2 Coastal Flood Protection Measures ..... 18

I.IV.ii.3 Community Assisted Visits ..... 19

I.IV.ii.4 Community Rating System ..... 20

I.IV.ii.5 Coordinated Needs Management Strategy (CNMS) and NFIP Mapping Needs ..... 20

I.IV.ii.6 Critically Eroded Beaches and Beach Nourishment/Dune Replacement Projects ..... 22

I.IV.ii.7 Dams ..... 22


DRAFT

I.IV.ii.8 Declared Disasters ..... 22
I.IV.ii.9 Flood Insurance Policies ..... 23
I.IV.ii.10 Gage Data ..... 24
I.IV.ii.11 Historical Flooding and High Water Marks ..... 26
I.IV.ii.12 Letters of Map Change ..... 27
I.IV.ii.13 Ordinance Level ..... 27
I.IV.ii.14 Proposed Draft Transects ..... 28
I.IV.ii.15 Regulatory Mapping ..... 29
I.IV.ii.16 Repetitive Loss ..... 30
I.IV.ii.17 State-level Data Sets, Programs, and Information ..... 31
V. Risk MAP Projects and Needs ..... 31
i. Future Coastal Study ..... 31
ii. Potential for Mitigation Assistance ..... 32
iii. Compliance ..... 32
iv. Communication ..... 33
v. Unmet Needs ..... 33
VI. Close ..... 34
VII. References ..... 34
VIII. Attachments ..... 35

DRAFT

# Table of Contents - continued

# List of Tables

Table 1. Data Collected for Alger, Baraga, and Marquette Counties .....10
Table 2. Hazus AAL Data for Alger, Baraga , and Marquette Counties .....13
Table 3. Summary of Shoreline Types.....144
Table 4. Summary of Shoreline by Land Use .....155
Table 5. Summary of Shoreline Coverage .....15
Table 6. Summary of Shoreline Vegetation Types .....15
Table 7. USACE Coastal Structure Inventory .....19
Table 8. Summary of Community Assisted Visits in Alger, Baraga, and Marquette Counties .....200
Table 9. CNMS Status for Alger, Baraga , and Marquette Counties.....211
Table 10. Declared Disasters in Alger, Baraga , and Marquette Counties.....222
Table 11. Summary of Flood Insurance Policies and Claims for Alger, Baraga, and Marquette Counties .....233
Table 12. NOAA Meteorological Stations on Lake Superior near Alger, Baraga, and Marquette Counties .....24
Table 13. Stream Gage Stations in Alger, Baraga, and Marquette Counties .....25
Table 14. Summary of LOMC cases in Alger, Baraga, and Marquette Counties.....27
Table 15. Program Status and Ordinance Level .....28
Table 16. Effective Mapping Status.....2929
Table 17. Repetitive Loss.....300

# List of Figures

Figure 1: Sample Proposed Draft Transect Figure.....9
Figure 2: USACE Historic Lake Superior Water Level Data (1918-2012).....26

# Attachments

Attachment A. Coastal Data Request Form (sample)
Attachment B. Alger, Baraga, and Marquette Counties Pre-Meeting Correspondence *[To be provided in the Final Coastal Scoping Report]*
Attachment C. Draft Coastal Scoping Maps
Attachment D. Proposed Draft Transect Figures
Attachment E. Stakeholder Comments from Coastal Scoping Meeting *[To be provided in the Final Coastal Scoping Report]*
Attachment F. Alger, Baraga, and Marquette Counties Coastal Scoping Meeting Documents *[To be developed following the Coastal Scoping meeting]*
Attachment G. Coastal Data Request Form Compilation *[To be developed following the Coastal Scoping meeting]*

DRAFT

# Acronyms and Abbreviations

| | |
|---|---|
| AAL | Average Annualized Loss |
| ASFPM | Association of State Floodplain Managers |
| BFE | Base Flood Elevations |
| CAC | Community Assisted Contact |
| CAV | Community Assistance Visit |
| CBRS | Coastal Barrier Resources System |
| CHARTS | Compact Hydrographic Airborne Rapid Total Survey |
| CHL | Coastal Hydraulics Laboratory |
| 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 |
| CSLF | Changes Since Last FIRM |
| DEM | Digital Elevation Model |
| DFO | Department of Fisheries and Oceans |
| DTM | Digital Terrain Model |
| ECID | Enterprise Coastal Inventory Database |
| ERDC | Engineer Research and Development Center |
| ESRI | Environmental Systems Research Institute |
| FEMA | Federal Emergency Management Agency |
| FIPS | Federal Information Processing Standards |
| FIRM | Flood Insurance Rate Map |
| FIS | Flood Insurance Study |
| GIS | Geographic Information Systems |
| GLCFS | Great Lakes Coastal Flood Study |
| GLCRG | Great Lakes Coastal Restoration Grant |
| Hazus-MH | Multi-Hazard Risk Assessment and Loss Estimation Software Program |
| HMA | Hazard Mitigation Assistance |
| HUC8 | Hydrologic Unit Code 8 |
| HWM | High Water Mark |
| LiDAR | Light Detection And Ranging |
| LiMWA | Limit of Moderate Wave Action |
| LOMA | Letter of Map Amendment |

DRAFT

| | |
|---|---|
| LOMC | Letter of Map Change |
| LOMR | Letter of Map Revision |
| LOMR-F | Letter of Map Revision based on Fill |
| MIP | Mapping Information Platform |
| MLI | Midterm Levee Inventory |
| MNUSS | Mapping Needs Update Support System |
| MPTA | Mitigation Planning Technical Assistance |
| MSC | Map Service Center |
| NCMP | National Coastal Mapping Program |
| 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 |
| RL | Repetitive Loss |
| RLTG | Repetitive Loss Target Group |
| SFHA | Special Flood Hazard Area |
| SHMO | State Hazard Mitigation Officer |
| USACE | U.S. Army Corps of Engineers |
| USGS | U.S. Geological Survey |

DRAFT

# I. Coastal Scoping 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 Coastal Scoping 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 Coastal Scoping Map and Report that summarize and display the Coastal Scoping findings

The Coastal Scoping process involves coordination with Great Lakes stakeholders, data collection and analysis, community interviews, a Coastal Scoping 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).

DRAFT

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.

DRAFT

## ii. Purpose of Great Lakes Coastal Scoping

The Great Lakes Coastal Scoping 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, discuss local priorities and data, discuss coastal issues, and move towards a project that will successfully identify the risks associated with Great Lakes flooding.

This Coastal Scoping Report discusses the communities potentially affected by coastal flooding in Alger, Baraga, and Marquette Counties, Michigan. This Coastal Scoping process 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 the Great Lakes flood study include updated FIRMs and Flood Insurance Studies (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 dependent not only on the coastal flood study analysis results and future congressional funding, but also on the type of datasets, local and national, that are available.

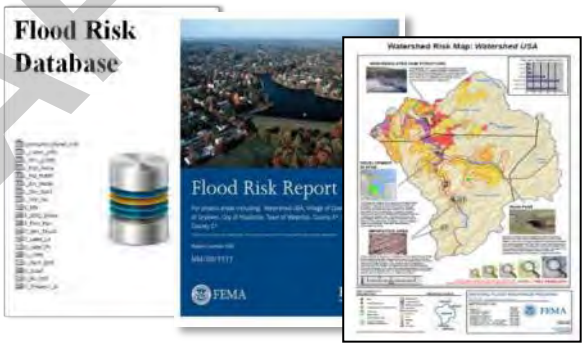
The following section describes the coastal flood risk products that a community may receive, as well as some products that are under development for the Great Lakes study areas.

## 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




DRAFT

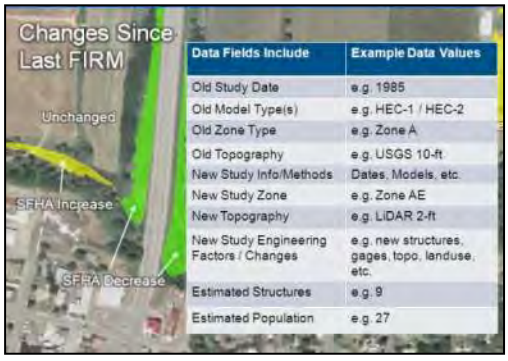
These products will summarize information captured in flood risk datasets that may be generated during a Risk MAP, or flood risk, study. The flood risk datasets could include regular and enhanced products. Standard flood risk datasets, also termed products, are listed below.

- **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
  - Flood zone changes are categorized and quantified.

  Provide Study/Reach Level Rationale for Changes Including:



- Methodology and assumptions
- 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 Geographic Information Systems (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.

HAZUS MH
EARTHQUAKE • WIND • FLOOD

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

DRAFT

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 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 1-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 Coastal Scoping 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 Superior Coastal Scoping Stakeholder Coordination

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

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

Coastal Scoping meeting letter invitations were sent to local community and county stakeholders within the Alger, Baraga, and Marquette Counties portions of the Lake Superior 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.

DRAFT

The Coastal Scoping 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 includes data requests for:

- Base map data
- Coastal data
- Historic flood data
- Risk assessment
- Other comments/concerns based on local knowledge

No information was received prior to the Coastal Scoping meeting.

The core stakeholder documents, stakeholder contact list, and Coastal Scoping meeting invitations will be provided in Attachment B, Alger, Baraga, and Marquette Counties Pre-Meeting Correspondence, in the final Coastal Scoping Report.

DRAFT

# III. Coastal Scoping Meeting

The Coastal Scoping meeting for Alger, Baraga, and Marquette Counties will be held on Friday, May 9, 2014 at the Marquette County Courthouse. Communities and stakeholders affected by coastal flooding in Alger, Baraga, and Marquette Counties were invited to the Coastal Scoping meeting. The purpose of this meeting was to facilitate discussion about study needs, desired compliance support, and local flood risk awareness efforts.

The objectives of the Coastal Scoping meeting include:

- 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
- NFIP regulatory updates
- Coastal Scoping schedule and deliverables

The Coastal Scoping meeting presentations include the following information:

- An overview of the GLCFS and schedule
- Review of the Coastal Scoping 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
- Encouragement and facilitated discussion regarding coastal study needs, desired compliance support, and local flood risk awareness efforts

Draft Coastal Scoping maps for Alger, Baraga, and Marquette Counties (Attachment C) will be displayed and utilized during the meeting to encourage the discussion regarding areas of coastal flood risk concern and areas of hazard mitigation interest. The draft Coastal Scoping maps shown at the meeting will include geospatial data that was collected prior to the meeting.

DRAFT

**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 - *None for this study area*
- Shoreline
- Streams
- U.S. Geological Survey (USGS) gages

Participants at the Coastal Scoping meeting will be asked to cooperatively identify areas of flooding concern using the draft Coastal Scoping maps and through general discussion during the meeting.

In addition to the draft Coastal Scoping maps, figures showing the location of initially proposed draft transects around Alger, Baraga, and Marquette Counties will be available for review and comment immediately following the meetings. Stakeholders will be encouraged to review the proposed draft transects and provide comments related to the location of the transects. The proposed draft transect maps that will be available at the Coastal Scoping meeting for Alger, Baraga, and Marquette Counties can be found in Attachment D. A sample map is shown as Figure 1:

DRAFT

[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.

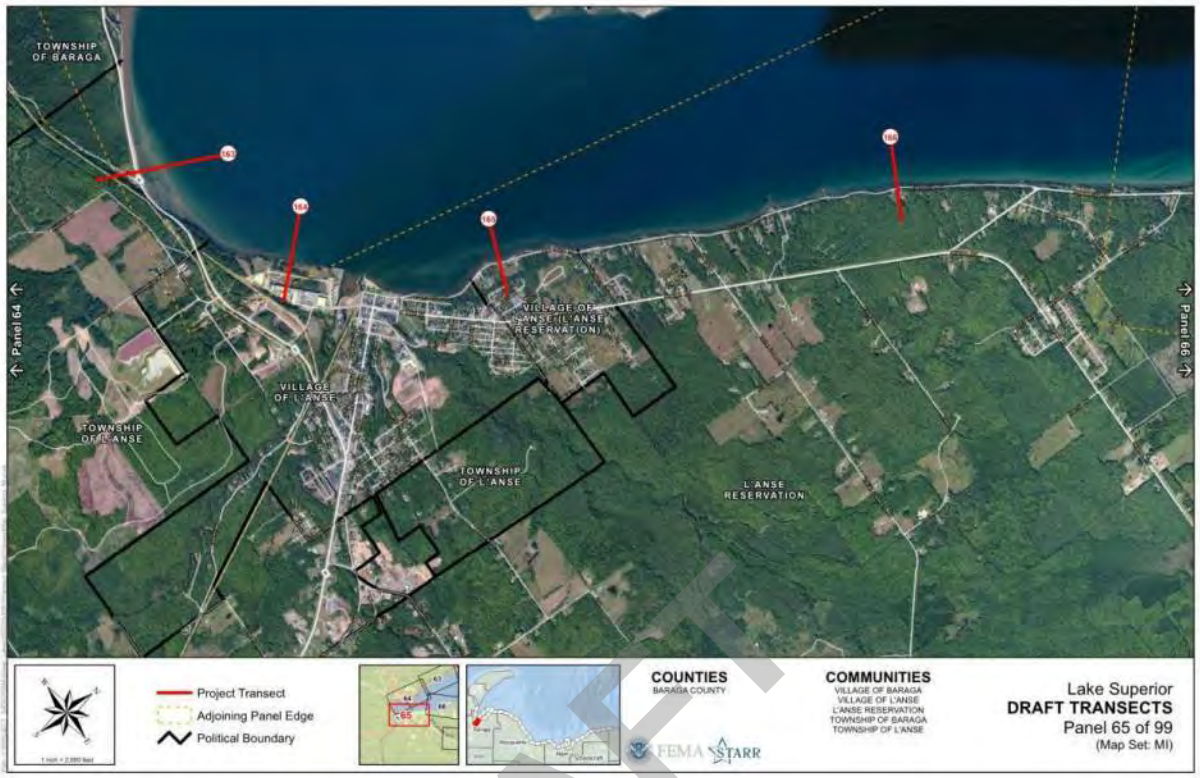



**Figure 1: Sample Proposed Draft Transect Figure**

- Additional information will be added following the Coastal Scoping meeting

DRAFT

# IV. Summary of Data Analysis

During this Coastal Scoping portion of the Lake Superior 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 telephone conversation, the Coastal Scoping meeting, and the Coastal Scoping Coastal Data Request Forms sent to each coastal community. This section lists the types of data and their sources that were collected for the Alger, Baraga, and Marquette Counties study area, including information that will be collected during and after the Coastal Scoping 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 Alger, Baraga, and Marquette Counties Lake Superior Project Area prior to moving forward with the coastal flood study.

**Table 1. Data Collected for Alger, Baraga, and Marquette Counties**

| Data Types | Deliverable/ Product | Source | Date of Data Collection | Level |
|---|---|---|---|---|
| AAL | Coastal Scoping Map | FEMA | 1/20/2014 | Nationwide |
| Bathymetry and Topography | Coastal Scoping Report | USACE | 2012 | Lakewide |
| Census Blocks | Coastal Scoping Map | U.S. Census Bureau | 1/14/2014 | Countywide |
| Contacts | Coastal Scoping Report | Local Community Websites, State/FEMA updates | 2/19/2014 | Countywide |
| CAVs | Coastal Scoping Report | FEMA Community Information System (CIS) | 2/6/2014 | Countywide |
| CRS | Coastal Scoping Report | FEMA's "Community Rating System Communities and Their Classes" | 2/6/2014 | Nationwide |
| CBRS | Coastal Scoping Map | U.S. Fish and Wildlife Service | 1/16/2014 | Nationwide |
| Coastal Structures | Coastal Scoping Map/Tabular Data | USACE | To be collected | Nationwide |
| CNMS | Coastal Scoping Map | FEMA | 12/31/2013 | Countywide |
| Critically Eroded Beach Areas | Coastal Scoping Report | Local Stakeholders | To be collected | Statewide |
| Dams | Coastal Scoping Report | USACE, National Inventory of Dams, FIRM Database | 2/19/2014 | Countywide |
| Declared Disasters | Coastal Scoping Report | FEMA's "Disaster Declarations Summary" | 1/27/2014 | Nationwide |
| Demographics, Industry | Coastal Scoping Report | U.S. Census Bureau | | Countywide |
| Effective Floodplains | Coastal Scoping Map | FEMA Map Service Center and Mapping Information Platform | 2/19/2014 | Countywide |
| Flood Insurance Policies | Coastal Scoping Report | FEMA CIS | 2/5/2014 | Nationwide |

DRAFT

**Table 1. Data Collected for Alger, Baraga, and Marquette Counties**

| Data Types | Deliverable/ Product | Source | Date of Data Collection | Level |
|---|---|---|---|---|
| Hazard Mitigation Plan Status | Coastal Scoping Report | Local Mitigation Plans | N/A | Countywide |
| High Water Marks | Coastal Scoping Report | Effective FIS | N/A | Countywide |
| Historical Flooding | Coastal Scoping Report | Effective FIS, Local Mitigation Plans | N/A | Countywide |
| Historical Storm Events | Coastal Scoping Report | Effective FIS | N/A | Countywide |
| Local Data | Coastal Scoping Report | Coastal Data Request Form completed by communities | To be collected | Countywide |
| LOMCs | Coastal Scoping Map | FEMA's Mapping Information Platform | 2/4/2014 | Countywide |
| Meteorological Gages | Coastal Scoping Map | NOAA Great Lakes Environmental Research Laboratory | 1/16/2014 | Regionwide |
| Oblique Imagery | Coastal Scoping Report | USACE | N/A | Lakewide |
| Ordinance Level | Coastal Scoping Report | FEMA CIS | 2/6/2014 | Countywide |
| Proposed Draft Transects | Coastal Scoping Map | FEMA | N/A | Lakewide |
| Repetitive Loss | Coastal Scoping Report | FEMA CIS | 1/24/2014 | Countywide |
| Shoreline Classification | Coastal Scoping Map | USACE | 1/28/2014 | Regionwide |
| Stream Gages | Coastal Scoping Map | USGS | 1/21/2014 | Countywide |
| Water Level Gages | Coastal Scoping Map | NOAA Department of Fisheries and Oceans | 2/5/2014 | Regionwide |
| Wave Gages | Coastal Scoping Map | NOAA | 2/5/2014 | Regionwide |

DRAFT

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

During the Coastal Scoping 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 GIS websites can provide some of the pertinent data, but local knowledge of flooding 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

AAL data provide a general understanding of the dollar losses associated with a certain frequency of flood events within a county and are 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 these 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 Managment Agency, 2011). AAL data summarized at the census block level are shown on the draft Coastal Scoping Maps (Attachment C).

DRAFT

**Table 2. Hazus AAL Data for Alger, Baraga, and Marquette Counties**

| FIPS Code | County | Total Losses for Building and Content (in thousands of $ ) |
|---|---|---|
| 26003 | Alger | $584 |
| 26013 | Baraga | $207 |
| 26103 | Marquette | $4,195 |

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 Superior. 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.

- Additional information will be added to this section following the Coastal Scoping meeting

### I.IV.i.3 Federal Land

Federal lands data were obtained from the National Atlas at http://nationalatlas.gov/mld/fedlanp.html . These data are also available from the National Coastal Scoping 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.

Pictured Rocks National Lakeshore, in Alger County, contains 42 miles of shoreline along Lake Superior between Munising, MI and Grand Marais, MI.

No federal lands were found in the Baraga and Marquette Counties project area.

### I.IV.i.4 Jurisdictional Boundaries

Alger, Baraga, and Marquette Counties' jurisdictional boundaries can be obtained from a derived set of TIGER line files available through the U.S. Census Bureau geography division. To find out more about TIGER line files and other Census TIGER database derived data sets visit http://www.census.gov/geo/www/tiger.

DRAFT

### I.IV.i.5 Local Data

As part of this Coastal Scoping process, communities were asked to fill out a Coastal Data Request Form and provide information on data that they have 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) includes data requests for base map data, coastal data, historic flood data, and risk assessment information.

- This section will be completed following Coastal Scoping meetings. A compilation of the completed Coastal Data Request Forms will be provided in Attachment G I the Final Coastal Scoping Report.

### I.IV.i.6 Publicly Owned Land

No statewide geospatial coverage dataset for publicly owned lands was identified during this Coastal Scoping 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 Superior. 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 1-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.

DRAFT

From the USACE shoreline feature dataset, the approximate shoreline along Alger, Baraga, and Marquette Counties that is covered by this study totals 286.82 miles. The shoreline classification information for Alger, Baraga, and Marquette Counties 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) |
|---|---|---|---|---|---|---|
| Alger | 123.02 | - | 59.02 | - | 49.72 | 14.29 |
| Baraga | 78.35 | 9.33 | 18.66 | - | 24.87 | 25.50 |
| Marquette | 85.43 | 7.46 | 32.00 | 0.62 | 31.69 | 13.67 |

Source: USACE 2012, Lake Superior 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) |
|---|---|---|---|---|---|---|---|---|
| Alger | 123.02 | 1.24 | - | 62.15 | - | 23.02 | 8.08 | 28.51 |
| Baraga | 78.35 | 4.35 | - | 21.14 | - | 34.20 | 17.41 | 1.24 |
| Marquette | 85.43 | 8.70 | - | 39.15 | 3.11 | 16.16 | 14.91 | 3.41 |

Source: USACE 2012, Lake Superior 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) |
|---|---|---|---|---|---|---|---|
| Alger | 123.02 | 17.30 | 0.62 | 4.97 | 48.52 | 35.45 | 14.29 |
| Baraga | 78.35 | 11.82 | 2.49 | - | 60.94 | 3.11 | - |
| Marquette | 85.43 | 21.45 | 0.62 | 3.73 | 49.69 | 9.94 | - |

Source: USACE 2012, Lake Superior 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) |
|---|---|---|---|---|---|---|---|
| Alger | 123.02 | 103.76 | - | 4.35 | 0.62 | 1.24 | 13.05 |
| Baraga | 78.35 | 48.50 | 8.09 | 13.06 | 3.73 | - | 4.98 |
| Marquette | 85.43 | 72.39 | - | 3.73 | 4.97 | 3.73 | 0.62 |

Source: USACE 2012, Lake Superior Shoreline Classification

DRAFT

### I.IV.i.8 Stream Lines/Hydrograph

Stream lines and water areas for Alger, Baraga, and Marquette Counties were obtained from a derived set of TIGER line files available through the U.S. Census Bureau geography division. To find out more about TIGER line files and other Census TIGER database derived data sets visit http://www.census.gov/geo/maps-data/data/tiger-line.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 Superior 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.

For the entire Marquette County coastal shoreline, and for a portion of Alger and Baraga Counties' shoreline, 2011 USACE/JALBTCX Great Lakes Topographic/Bathymetric LiDAR was obtained from the NOAA Coastal Services Center website. The data were collected between June and September of 2011 as part of the National Coastal Mapping Program (NCMP), which is designed to provide high-resolution elevation and imagery data along U.S. shorelines on a recurring basis. Data were collected using the Compact Hydrographic Airborne Rapid Total Survey (CHARTS) system, which includes both topographic and bathymetric LiDAR sensors among other instruments. The horizontal accuracy of the data was better than +/- .75m (2.46ft), and vertical accuracy was better than +/- 0.2m (0.66ft), both at 95 percent confidence. Collection generally extended from approximately 500 meters inland from the shoreline to either 1,000 meters offshore or the point of laser extinction.

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 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 Superior 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.

DRAFT

### I.IV.i.10 Transportation

The World Topo Map service has been used as a basemap layer on the Coastal Scoping Map, and includes a transportation layer. For more information on Environmental Systems Research Institute (ESRI) Map services and how they can be used in GIS, please visit http://goto.arcgisonline.com/maps/World_Topo_Map

In addition, transportation data were obtained from the Alger, Baraga, and Marquette Counties from a derived set of TIGER line files available through the U.S. Census Bureau geography division. To find out more about TIGER line files and other Census TIGER database derived data sets visit http://www.census.gov/geo/maps-data/data/tiger-line.html.

### I.IV.i.11 Watershed Boundaries

USGS Hydrologic Unit Code 8 (HUC8) watershed boundaries were obtained from the National Atlas 2011 "Raw Data Download" (http://nationalatlas.gov/atlasftp.html).

Alger County contains portions of four HUC-8 watersheds: Manistique (04060106), Betsy-Chocolay (04020201), Lake Superior (04020300), and Fishdam-Sturgeon (04030112).

Baraga County contains portions of five HUC-8 watersheds: Dead-Kelsey (04020105), Betsy-Chocolay (04020201), Sturgeon (04020104), Michigamme (04030107), and Brule (04030106).

Marquette County contains portions of four HUC-8 watersheds: Dead-Kelsey (04020105), Michigamme (04030107), Cedar-Ford (04030109) and Escanaba (04030110).

DRAFT

## ii. Other Data and Information

Alger County is located in the Upper Peninsula of Michigan. It is bordered by Lake Superior to the North, Luce County to the East, Schoolcraft and Delta Counties to the South and Marquette County to the West. Alger county has a land area of 915.07 square miles and a population of 9,601; the largest municipality - Munising City - has a population of 2,355 (U.S. Census Bureau 2010).

Baraga County is located in the Upper Peninsula of Michigan. It is bordered by Lake Superior to the North, Marquette County to the East, Iron County to the South and Houghton County to the West. Baraga County has a land area of 898.26 square miles and a population of 8,860; the largest municipality - L'Anse - has a population of 2,011. Baraga County contains the L'Anse Indian Reservation which is the land base for the Keweemau Bay Indian Community (U.S. Census Bureau 2010).

Marquette County is located in the Upper Peninsula of Michigan. It is the largest county in Michigan with the greatest population in the Upper Peninsula. Marquette County has a land area of 1,808.40 square miles and a population of 67,077. It is bordered by Lake

Superior to the North, Alger County to the East, Menominee and Dickson Counties to the South and Baraga and Iron Counties to the West. The largest municipality – Marquette - has a population of 21,355 (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. 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.

Alger County contains one designated unit of coastal barrier along the Lake Superior shoreline and/or within this study area.

Baraga County contains one designated unit of coastal barrier along the Lake Superior shoreline and/or within this study area.

Marquette County contains four designated units of coastal barrier along the Lake Superior shoreline and/or within this study area.

DRAFT

### I.IV.ii.2 Coastal Flood Protection Measures

Coastal structures along Lake Superior will be reviewed in more detail during the engineering analysis portion of the Lake Superior study and will not be analyzed as part of this Coastal Scoping 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 Coastal Scoping process, the November 2011 MLI Status Report published by FEMA was reviewed. The MLI Levee database shows no levee segments in Alger, Baraga, and Marquette Counties study areas that provide protection from the 1-percent-annual-chance flood; however, as discussed below, other flood protection measures do exist.

No Lake Superior flood protection measures were found in Alger, Baraga, and Marquette Counties.

The USACE Coastal and Hydraulics Laboratory (CHL), a member of the Engineer Research and 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.erdc.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, bridges, and other structures or infrastructure. These structures include seawalls, bulkheads, revetments, dikes and levees, breakwaters, groins, sills/perched beaches, and jetties and piers.

The USACE coastal structures along Lake Superior found within Alger, Baraga, and Marquette Counties 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 Great Lakes 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

DRAFT

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) |
|---|---|---|---|---|
| Michigan | Marquette County | Big Bay Harbor East Breakwater | NA | 134 |
| Michigan | Marquette County | Big Bay Harbor Revetment | NA | 274 |
| Michigan | Marquette County | Big Bay Harbor West Breakwater | NA | 240 |
| Michigan | Marquette County | Marquette Harbor Breakwater | NA | 1375 |
| Michigan | Marquette County | Presque Isle Harbor Breakwater | NA | 858 |

NA = Not Available

### I.IV.ii.3 Community Assisted Visits

Statewide 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 CIS at https://portal.fema.gov in January 2014. Table 8 shows the most recent CAV date by community or jurisdiction. Not all communities within the project area were identified as having a CAV; therefore, those communities are not included in the table.

**Table 8. Summary of Community Assisted Visits in Alger, Baraga, and Marquette Counties**

| County | Community | CID | CAV Date | FIRM Date |
|---|---|---|---|---|
| Alger | Au Train, Township of | 260342 | 10/04/06 | 6/18/1987 |
| Marquette | Chocolay, Charter Township | 260448 | 09/20/95 | 5/4/1987 |

CAV = Community Assisted Visit
Source: FEMA's CIS Summary Report

DRAFT

### I.IV.ii.4 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 January 2014.

No coastal communities in Alger, Baraga, and Marquette Counties participate in the CRS program.

### I.IV.ii.5 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 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 Managment Agency, 2013).

DRAFT

Table 9 summarizes the draft results of the county-wide validation analysis obtained from CNMS in December 2013. CNMS only captures riverine studies at this time.

**Table 9. CNMS Status for Alger, Baraga, and Marquette Counties**

| County | FIPS | Unknown (stream miles) | Unverified (stream miles) | Valid (stream miles) | Total (stream miles) |
|---|---|---|---|---|---|
| Alger | 26003 | 15.91 | - | - | 15.91 |
| Baraga | 26013 | 10.90 | - | 4.40 | 15.30 |
| Marquette | 26103 | - | - | 152.31 | 152.31 |

FIPS = Federal Information Processing Standard

### I.IV.ii.6 Critically Eroded Beaches and Beach Nourishment/Dune Replacement Projects

Critically eroded beaches and beach nourishment/dune replacement projects were not identified in Alger, Baraga, or Marquette Counties at the time this report was issued, although it should be noted that all counties experience shore erosion.

- ❖ This section will be completed following Coastal Scoping meetings.

### I.IV.ii.7 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 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/.

At the time this report was compiled, the NID identified 1 dam in Alger County, 2 dams in Baraga County, and 10 dams in Marquette County within the project areas.

DRAFT

### I.IV.ii.8 Declared Disasters

The FEMA Disaster Declarations Summary is a summarized data set 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 data set 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 Alger, Baraga, and Marquette Counties.

**Table 10. Declared Disasters in Alger, Baraga, and Marquette Counties**

| Declared County/Area | Disaster Number | Declaration Date | Incident Type | Description |
|---|---|---|---|---|
| Alger (County) | 3035 | 3/2/1977 | Drought | DROUGHT |
| Alger (County) | 3057 | 1/27/1978 | Snow | BLIZZARDS AND SNOWSTORMS |
| Alger (County) | 3225 | 9/7/2005 | Hurricane | HURRICANE KATRINA EVACUATION* |
| Baraga (County) | 1413 | 5/6/2002 | Flood | FLOODING |
| Baraga (County) | 3035 | 3/2/1977 | Drought | DROUGHT |

**Table 10. Declared Disasters in Alger, Baraga, and Marquette Counties**

| Declared County/Area | Disaster Number | Declaration Date | Incident Type | Description |
|---|---|---|---|---|
| Baraga (County) | 3057 | 1/27/1978 | Snow | BLIZZARDS AND SNOWSTORMS |
| Baraga (County) | 3225 | 9/7/2005 | Hurricane | HURRICANE KATRINA EVACUATION |
| Marquette (County) | 2261 | 5/6/1999 | Fire | MI - TOWER LAKE MOUNTAIN FIRE - 05/06/1999 |
| Marquette (County) | 3137 | 1/27/1999 | Snow | MI - SEVERE WEATHER 1/2 /99 |
| Marquette (County) | 3225 | 9/7/2005 | Hurricane | HURRICANE KATRINA EVACUATION* |
| Marquette (County) | 4121 | 6/18/2013 | Flood | FLOODING |

*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 Michigan Hazard Mitigation Plan, at the Michigan State Police website under their Emergency Management and Homeland Security Publications page (http://www.michigan.gov/msp/0,4643,7-123-1593_3507-14743--,00.html).

### I.IV.ii.9 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 Coastal Scoping 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 Alger, Baraga, and Marquette Counties. The data are based on Community Summary Reports that were extracted from FEMA's CIS website (https://portal.fema.gov/famsVuWeb/home) in January 2014. For communities not listed, data was not available at this source.

**Table 11. Summary of Flood Insurance Policies and Claims for Alger, Baraga, and Marquette Counties**

| County | Community | CID | No. Policies | Total Premium | Total Coverage | Number of claims since 1978 | Dollar ($) paid for claims since 1978 |
|---|---|---|---|---|---|---|---|
| Alger | Au Train, Township of | 260342 | 9 | $8,621 | $1,547,300 | 0 | $ 0 |
| Alger | Burt, Township of | 260719 | 1 | $ 414 | $350,000 | 4 | $33,300 |
| Alger | Munising, City of | 260002 | 1 | $ 414 | $350,000 | 1 | $5,712 |
| Baraga | Baraga , Village of | 260551 | 9 | $21,200 | $1,861,800 | 0 | $ 0 |
| Baraga | L'Anse, Township of | 260353 | 1 | $ 439 | $45,000 | 0 | $ 0 |
| Baraga | L'Anse, Village of | 260552 | 2 | $3,602 | $290,000 | 6 | $14,324 |
| Marquette | Chocolay, Charter Township of | 260448 | 25 | $16,951 | $4,690,900 | 7 | $15,361 |

DRAFT

**Table 11. Summary of Flood Insurance Policies and Claims for Alger, Baraga, and Marquette Counties**

| County | Community | CID | No. Policies | Total Premium | Total Coverage | Number of claims since 1978 | Dollar ($) paid for claims since 1978 |
|---|---|---|---|---|---|---|---|
| Marquette | Marquette, City of | 260716 | 2 | $ 839 | $630,000 | 1 | $4,265 |
| Marquette | Powell, Township of | 260452 | 9 | $17,880 | $1,625,500 | 0 | $ 0 |

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

### I.IV.ii.10 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 Superior's Alger, Baraga, and Marquette Counties project areas.

**Table 12. NOAA Meteorological Stations on Lake Superior near Alger, Baraga, and Marquette Counties**

| County | Station ID | Location | Owner | Data | Years of Historical Data |
|---|---|---|---|---|---|
| Alger | GRMM4 | Grand Marais, MI | NWS | Meteorological Observation | 2006-Present |
| Marquette | MCGM4 | Marquette C.G., MI | NOS | Meteorological Observation | 2004-Present |
| Marquette | BIGM4 | Big Day, MI | NWS | Meteorological Observation | 2007-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 . No stations were identified in Baraga.

DRAFT

## Stream Gages

The USGS National Water Information System Web Interface http://waterdata.usgs.gov/nwis (accessed February 2014) provides real-time data for any given stream gage location. Table 13 below shows the gage identification numbers and locations for the gages in the study areas of Alger, Baraga, and Marquette Counties. All USGS stream gage locations are shown on the draft Coastal Scoping Map.

**Table 13. Stream Gage Stations in Alger, Baraga, and Marquette Counties**

| County | Gage ID | Begin Date | End Date | Gage Location |
|---|---|---|---|---|
| Alger | 04044724 | 10/1/1993 | 9/30/2005 | AU TRAIN RIVER AT FOREST LAKE, MI |
| Baraga | 04043150 | 10/1/2001 | 9/30/2005 | SILVER RIVER NEAR L'ANSE, MI |
| Baraga | 04041500 | 2/1/1932 | 9/30/2005 | STURGEON RIVER NEAR ALSTON, MI |
| Baraga | 04042000 | 7/1/1927 | 9/30/1947 | STURGEON RIVER NEAR BARAGA , MI |
| Baraga | 04042500 | 10/1/1942 | 9/30/1972 | OTTER RIVER NEAR ELO, MI |
| Marquette | 04044563 | 6/1/1979 | 9/30/1981 | BIG CREEK NEAR HARVEY, MI |
| Marquette | 04044573 | 6/1/1979 | 9/30/1981 | CEDAR CREEK NEAR HARVEY, MI |
| Marquette | 04044583 | 10/1/1965 | 9/30/1981 | CHERRY CREEK NEAR HARVEY, MI |
| Marquette | 04044595 | 6/1/1979 | 9/30/1981 | SILVER CREEK AT SILVER CREEK RD AT HARVEY, MI |
| Marquette | 04043800 | 3/28/1990 | 9/30/2005 | MCCLURE STORAGE BASIN RELEASE NEARMARQUETTE, MI |
| Marquette | 04043238 | 12/1/2004 | 9/30/2005 | SALMON TROUT RIVER NEAR BIG BAY, MI |

DRAFT

## Water Level Station:

NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) maintains several water level stations along Lake Superior. 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/stations.html#LakeSuperior. The monthly high and low water level data from the years 1918 to 2012 at Lake Superior are available at the USACE Website: http://www.lre.usace.army.mil/Missions/GreatLakesInformation/GreatLakesWaterLevels/HistoricalData.aspx.

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

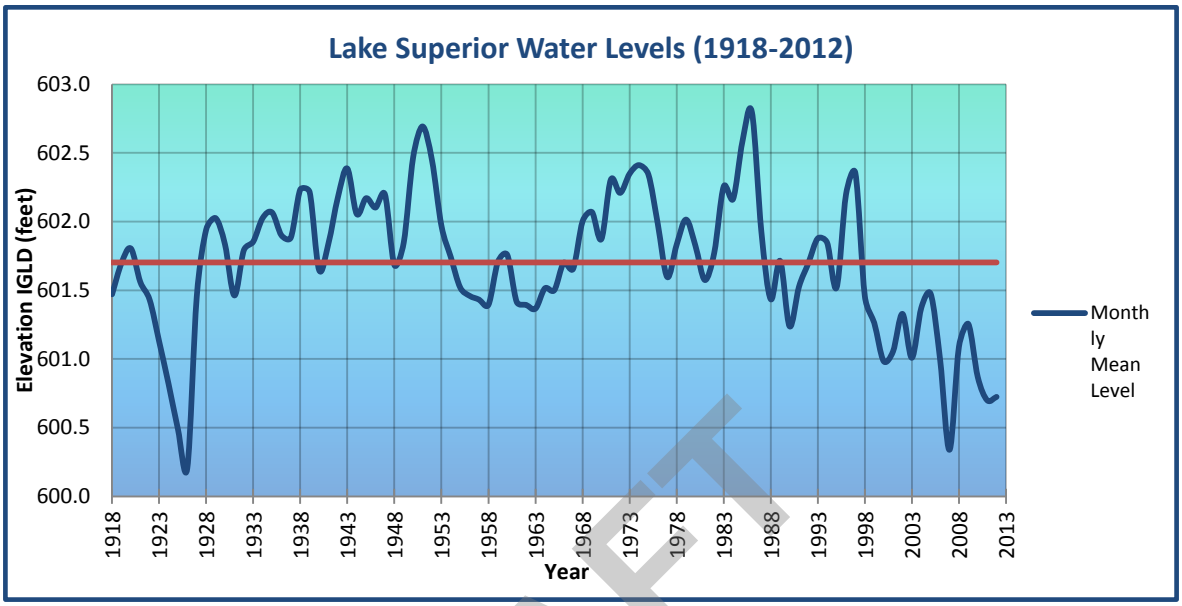



**Figure 2: USACE Historic Lake Superior Water Level Data (1918-2012)**

The Great Lakes Water Levels Report provides daily mean water levels of Lake Superior for the past three months. The data are available at the USACE website: http://www.lre.usace.army.mil/Missions/GreatLakesInformation/GreatLakesWaterLevels/CurrentConditions.aspx.

DRAFT

### 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.11 Historical Flooding and High Water Marks

As part of this Coastal Scoping process, effective FISs were reviewed for information on historical flooding and high water mark data. No information specific to Lake Superior flooding or high water marks (HWMs) was identified for these counties.

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.12 Letters of Map Change

An 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 February 2014.

Table 14 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 Coastal Scoping Maps. Clusters of LOMCs indicate a need for updated maps.

**Table 14. Summary of LOMC cases in Alger, Baraga, and Marquette Counties**

| 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 |
|---|---|---|---|---|
| Alger | 85 | 1 | 0 | 0 |
| Baraga | 10 | 0 | 0 | 1 |
| Marquette | 76 | 0 | 2 | 2 |

DRAFT

### I.IV.ii.13 Ordinance Level

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 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:

| Ordinance Level | Description |
|---|---|
| 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 |

**Table 15. Program Status and Ordinance Level**

| County | Community | CID | Program Status | Ordinance Level |
|---|---|---|---|---|
| Alger | Au Train, Township of | 260342 | Participating | NA* |
| Alger | Burt, Township of | 260719 | Participating | NA* |
| Alger | Grand Island, Township of | 261915 | NA* | NA* |
| Alger | Munising, City of | 260002 | Participating | NA* |
| Alger | Munising, Township of | 261784 | NA* | NA* |
| Alger | Onota, Township of | 260345 | Suspended | NA* |
| Baraga | Arvon, Township of | 261917 | NA* | NA* |
| Baraga | Baraga , Township of | 260352 | Not Participating | Not Applicable |
| Baraga | Baraga , Village of | 260551 | Participating | NA* |
| Baraga | L'Anse, Township of | 260353 | Participating | NA* |
| Baraga | L'Anse Reservation | 261526 | NA* | NA* |
| Baraga | L'Anse, Village of | 260552 | Participating | NA* |
| Marquette | Chocolay, Charter Township of | 260448 | Participating | NA* |
| Marquette | Marquette, Charter Township of | 260758 | Participating | NA* |
| Marquette | Marquette, City of | 260716 | Participating | NA* |
| Marquette | Negaunee, Township of | 261225 | NA* | NA* |
| Marquette | Powell, Township of | 260452 | Participating | NA* |
| Marquette | Sands, Township of | 261284 | NA* | NA* |

*Not provided within FEMA's Community Information System

DRAFT

### I.IV.ii.14 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 Superior shoreline.

The originally proposed draft transect layout is shown on the draft Coastal Scoping Map for Alger, Baraga, and Marquette Counties (Attachment C). During the Coastal Scoping meeting, input will be solicited regarding transect locations. The current transect layout includes an identification number per transect. Note that these identification numbers will change as the draft transects are revised in the future.

- This section and the transect map shown in attachment C will be updated following the Coastal Scoping meeting.

### I.IV.ii.15 Regulatory Mapping

The effective mapping status for communities in the Alger, Baraga, and Marquette Counties project area is listed in Table 16.

DRAFT

**Table 16. Effective Mapping Status**

| County | Community | CID | FIRM Date | Program Status |
|---|---|---|---|---|
| Alger | Au Train, Township of | 260342 | 6/18/1987 | Participating |
| Alger | Burt, Township of | 260719 | NSFHA | Participating |
| Alger | Grand Island, Township of | 261915 | NA | NA |
| Alger | Munising, City of | 260002 | NSFHA | Participating |
| Alger | Munising, Township of | 261784 | NA | NA |
| Alger | Onota, Township of | 260345 | 11/20/2000 | Suspended |
| Baraga | Arvon, Township of | 261917 | NA | NA |
| Baraga | Baraga , Township of | 260352 | Not Applicable | Not participating |
| Baraga | Baraga , Village of | 260551 | 1/3/1997 | Participating |
| Baraga | L'Anse, Township of | 260353 | 2/24/1978 | Participating |
| Baraga | L'Anse, Village of | 260552 | 4/1/1988 | Participating |
| Baraga | L'Anse Reservation | 260526 | NA | NA |
| Marquette | Chocolay, Charter Township of | 260448 | 5/4/1987 | Participating |
| Marquette | Negaunee, Township of | 261225 | NA | NA |
| Marquette | Marquette, Charter Township of | 260758 | NSFHA | Participating |
| Marquette | Marquette, City of | 260716 | 12/2/1994 | Participating |
| Marquette | Powell, Township of | 260452 | 11/20/2000 | Participating |
| Marquette | Sands, Township of | 261284 | NA | NA |

NSFHA = No Special Flood Hazard Area

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

### I.IV.ii.16 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 10-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.

Repetitive losses were reviewed in FEMA's CIS "Community Disaster Detail – Flood Insurance" report. Table 17 details the total number of repetitive loss structures and total amount of repetitive loss payments in Alger, Baraga, and Marquette Counties project area communities.

**Table 17. Repetitive Loss**

| County | Community | CID | Total Repetitive Loss Structures | Total Repetitive Loss Payment |
|---|---|---|---|---|
| Alger | Au Train, Township of | 260342 | 0 | - |
| Alger | Burt, Township of | 260719 | 0 | - |
| Alger | Grand Island Township | 261915 | 0 | - |
| Alger | Munising, City of | 260002 | 0 | - |
| Alger | Munising, Township of | 261784 | 0 | - |
| Alger | Onota, Township of | 260345 | 0 | - |
| Baraga | Arvon, Township of | 261917 | NA | NA |

DRAFT

| County | Community | CID | Total Repetitive Loss Structures | Total Repetitive Loss Payment |
|---|---|---|---|---|
| Baraga | Baraga , Township of | 260352 | 0 | - |
| Baraga | Baraga , Village of | 260551 | 0 | - |
| Baraga | L'Anse, Township of | 260353 | 0 | - |
| Baraga | L'Anse, Village of | 260552 | 0 | - |
| Baraga | L'Anse Reservation | 261526 | NA | NA |
| Marquette | Chocolay, Charter Township of | 260448 | 0 | - |
| Marquette | Marquette, Charter Township of | 260758 | 0 | - |
| Marquette | Marquette, City of | 260716 | 0 | - |
| Marquette | Neguanee, Township of | 261225 | 0 | - |
| Marquette | Powell, Township of | 260452 | 0 | - |
| Marquette | Sands, Township of | 261284 | 0 | - |

#### I.IV.ii.17 State-level Data Sets, Programs, and Information

The information in this section will be compiled by the project team throughout this Coastal Scoping process based on research of the project area and discussions with local and regional stakeholders.

- This section will be completed following the Coastal Scoping meeting.

DRAFT

# V. Risk MAP Projects and Needs

This section provides information about the planned next steps for the Lake Superior 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 Coastal Scoping effort and provided in this report will be utilized in the upcoming coastal flood study for Lake Superior.

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.

- This section will be completed following the Coastal Scoping meeting.

## 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 MTPA 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 are 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, and procedures
- Assistance with the creation, acquisition and incorporation of GIS data into potential and effective maps, planning mechanisms, and emergency management procedures
- Facilitating the identification of data gaps and interpreting technical data to identify risk reduction deficiencies that should be corrected

Additional discussions will occur between FEMA and local stakeholders as this coastal flood study moves forward to see if MPTA would be an appropriate and beneficial option.

## 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), CAVs, 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.

DRAFT

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 Coastal Scoping 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 SFHAs, building requirements in VE Zones, and Limit of Moderate Wave Action (LiMWA), are discussed in detail at http://www.greatlakescoast.org.

## iv. Communication

Throughout this Coastal Scoping process, community representatives and local stakeholders indicated the need to be kept informed about the results of Coastal Scoping, 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, telephone 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 up-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

- This section will be completed following the Coastal Scoping meeting

DRAFT

# VI. Close

- This section will be completed following the Coastal Scoping meeting

# VII. References


Federal Emergency Management Agency. (2012a). *Coordinated Needs Management System*. Retrieved June 2012, from http://cnms.riskmapcds.com/HelpCNMS.html

Federal Emergency Management Agency. (2012, May). *FEMA Great Lakes Coastal Guidelines, Appendix D.3 Update DRAFT.* Retrieved September 2012, from FEMA: http://www.fema.gov/library/viewRecord.do?id=5912

Federal Emergency Management Agency. (May 2012). *Mitigation Planning Report with Transmittal Memo.*

Federal Emergency Management Agency. (2011). *Public Owned Land*. Retrieved July 2012, from Mapping Information Platform: https://hazards.fema.gov/femaportal/wps/portal

Federal Emergency Managment Agency. (2010). *Coordinated Needs Managment Strategy*. Retrieved July 2012, from Coordinated Needs Managment Strategy: http://cnms.riskmapcds.com/HelpCNMS.html

Federal Emergency Managment Agency. (2013). *Discovery Report, Great Lakes Coastal Flood Study, Lake Superior*.

Federal Emergency Managment Agency. (2003). *Guildelines and Specifications for Flood Hazard Mapping Partners.*

Federal Emergency Managment Agency. (2011). *HAZUS Flood Average Annualized Loss Usability Analysis.*

*Great Lakes Information Network*. (2012, October). Retrieved October 4, 2012, from Great Lakes Information Network: http://www.great-lakes.net/lakes/ref/michfact.html

National Oceanic & Atmospheric Administration. (2009). *Ocean and Great Lakes Jobs Snapshot*. Retrieved August 2012, from Coastal County Snapshots: www.csc.noaa.gov/snapshots/

U.S. Army Corps of Engineers. (2012). Shoreline Feature Dataset. Detroit District, MI.


DRAFT

U.S. Census Bureau. (2010). *State and County Quick Facts*. Retrieved July 30, 2012, from http://quickfacts.census.gov

U.S. Environmental Protection Agency. (2012, June 25). *Great Lakes*. Retrieved September 2012, from U.S. Environmental Protection Agency: http://www.epa.gov/glnpo/atlas/gl-fact1.html

U.S. Environmental Protection Agency. (2012). *Great Lakes Factsheet No. 1 Physical Features and Population*. Retrieved October 12, 2012, from The Great Lakes: An Environmental Atlas and Resource Book: http://www.epa.gov/glnpo/atlas/gl-fact1.html

# VIII. Attachments

Coastal Scoping data and information, as well as this report and appendices, have been stored digitally on FEMA's Mapping Information Platform (MIP) Coastal Scoping 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 Coastal Scoping Report and appendices will also be available for download from http://www.greatlakescoast.org/.

**Attachments in this report include:**
**Attachment A.** Coastal Data Request Form (sample)
**Attachment C.** Draft Coastal Scoping Maps
**Attachment D.** Proposed Draft Transect Figures

**The following attachments will be developed after the Coastal Scoping meeting and provided in the Final Coastal Scoping Report:**
**Attachment B.** Alger, Baraga, and Marquette Counties Pre-Meeting Correspondence
**Attachment E.** Stakeholder Comments from Coastal Scoping Meeting
**Attachment F.** Alger, Baraga, and Marquette Counties Coastal Scoping Meeting Documents
**Attachment G.** Coastal Data Request Form Compilation

DRAFT

# Attachment A

# Coastal Data Request Form (sample)

# Community 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 Community 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: Amol Daxikar, CDM, 50 Hampshire Street, Cambridge, MA 02139
E-mail: Amol.Daxikar@starr-team.com
Phone: (617) 452-6386

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

Amol Daxikar

| ***Contact Information*** | |
|---|---|
| Community/Organization | |
| Name: | |
| Title: | |
| Address: | |
| E-mail: | |
| Phone: | |

| Contact Preference | ☐ Email ☐ Phone ☐ Mail |
|---|---|

*Please check off the types of data you will provide by June 15, 2014*

| | ***Base Map Data*** | *Please select available data type* | |
|---|---|---|---|
| | Topography (e.g., LiDAR or contour data) | ☐ *Hard copy* | ☐ *Digital* |
| | Property information (e.g., Building footprints, parcel data, tax assessor's data) | ☐ *Hard copy* | ☐ *Digital* |
| | Land Use | ☐ *Hard copy* | ☐ *Digital* |
| | Vegetation Type | ☐ *Hard copy* | ☐ *Digital* |
| ***Coastal Data*** | | | |
| | Coastal structures (e.g., seawalls, levees, jetties, groins, etc.) | ☐ *Hard copy* | ☐ *Digital* |
| | Coastal features (i.e., dunes and bluffs) | ☐ *Hard copy* | ☐ *Digital* |
| | Shoreline change data | ☐ *Hard copy* | ☐ *Digital* |
| | Locations of beach nourishment or dune restoration projects | ☐ *Hard copy* | ☐ *Digital* |
| | Areas of significant beach or dune erosion | ☐ *Hard copy* | ☐ *Digital* |
| | Mean high water | ☐ *Hard copy* | ☐ *Digital* |
| | Mean lake level | ☐ *Hard copy* | ☐ *Digital* |
| | Anecdotal or historical wave height information | | |
| ***Other Data*** | | | |
| | Hydraulic structures (e.g., bridges, culverts, levees, dams) with inspection status, if available | ☐ *Hard copy* | ☐ *Digital* |
| | Elevated roads | ☐ *Hard copy* | ☐ *Digital* |
| | Critical facilities | ☐ *Hard copy* | ☐ *Digital* |
| | Other relevant data | ☐ *Hard copy* | ☐ *Digital* |

*Please provide the following information about the community:*

| | | |
|---|---|---|
| ***Historical Flood Data*** | | |
| Are you aware of any coastal flooding issues not represented on effective FIRMs: | ☐ yes<br>☐ 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? | ☐ yes<br>☐ no | If yes, please describe: |
| Does your community have other risk assessment data? | ☐ yes<br>☐ no | If yes, please describe: |

| | | |
|---|---|---|
| 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): | ☐ yes<br>☐ 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.) | ☐ yes<br>☐ no | If yes, please describe: |
| Any other comments/concerns based on local knowledge: | | |

# Attachment A

# Coastal Data Request Form (sample)

# Community 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 Community 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: Amol Daxikar, CDM, 50 Hampshire Street, Cambridge, MA 02139
E-mail: Amol.Daxikar@starr-team.com
Phone: (617) 452-6386

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

Amol Daxikar

| ***Contact Information*** | |
|---|---|
| Community/Organization | |
| Name: | |
| Title: | |
| Address: | |
| E-mail: | |
| Phone: | |

| Contact Preference | ☐ Email ☐ Phone ☐ Mail |
|---|---|

*Please check off the types of data you will provide by June 15, 2014*

| ***Base Map Data*** | | *Please select available data type* | |
|---|---|---|---|
| | Topography (e.g., LiDAR or contour data) | ☐ *Hard copy* | ☐ *Digital* |
| | Property information (e.g., Building footprints, parcel data, tax assessor's data) | ☐ *Hard copy* | ☐ *Digital* |
| | Land Use | ☐ *Hard copy* | ☐ *Digital* |
| | Vegetation Type | ☐ *Hard copy* | ☐ *Digital* |
| ***Coastal Data*** | | | |
| | Coastal structures (e.g., seawalls, levees, jetties, groins, etc.) | ☐ *Hard copy* | ☐ *Digital* |
| | Coastal features (i.e., dunes and bluffs) | ☐ *Hard copy* | ☐ *Digital* |
| | Shoreline change data | ☐ *Hard copy* | ☐ *Digital* |
| | Locations of beach nourishment or dune restoration projects | ☐ *Hard copy* | ☐ *Digital* |
| | Areas of significant beach or dune erosion | ☐ *Hard copy* | ☐ *Digital* |
| | Mean high water | ☐ *Hard copy* | ☐ *Digital* |
| | Mean lake level | ☐ *Hard copy* | ☐ *Digital* |
| | Anecdotal or historical wave height information | | |
| ***Other Data*** | | | |
| | Hydraulic structures (e.g., bridges, culverts, levees, dams) with inspection status, if available | ☐ *Hard copy* | ☐ *Digital* |
| | Elevated roads | ☐ *Hard copy* | ☐ *Digital* |
| | Critical facilities | ☐ *Hard copy* | ☐ *Digital* |
| | Other relevant data | ☐ *Hard copy* | ☐ *Digital* |

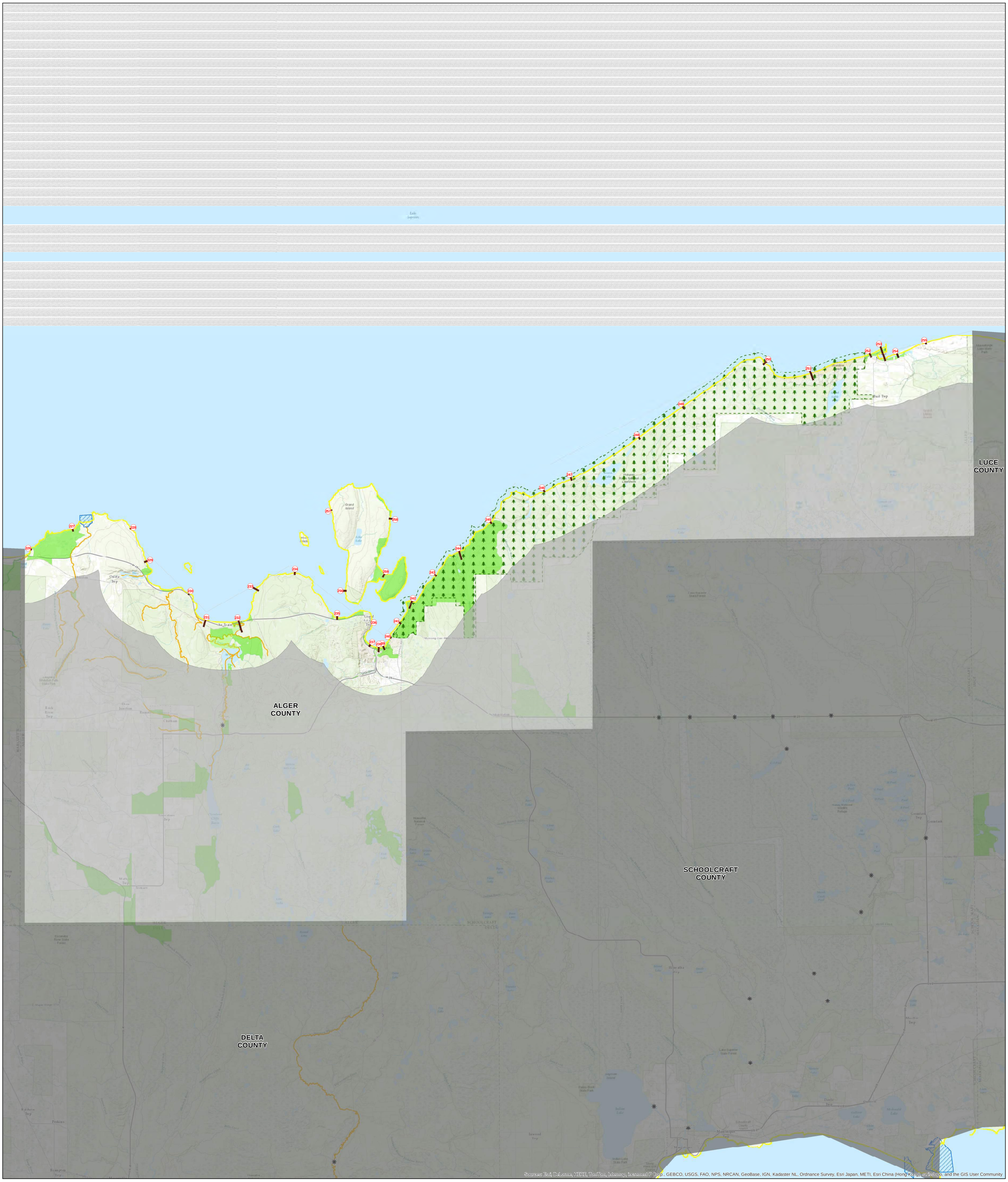
*Please provide the following information about the community:*

| | | |
|---|---|---|
| ***Historical Flood Data*** | | |
| Are you aware of any coastal flooding issues not represented on effective FIRMs: | ☐ yes<br>☐ 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? | ☐ yes<br>☐ no | If yes, please describe: |
| Does your community have other risk assessment data? | ☐ yes<br>☐ no | If yes, please describe: |

| | | |
|---|---|---|
| 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): | ☐ yes<br>☐ 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.) | ☐ yes<br>☐ no | If yes, please describe: |
| Any other comments/concerns based on local knowledge: | | |

# Attachment C

# Draft Coastal Scoping Maps




## MAP SYMBOLOGY

### LEGEND

- Transects
- Shoreline
- Dams
- USGS Gages
- Letters of Map Change
- Coastal Barrier Resource System
- National Park Boundary

**AAL Data**

- 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**

- Unverified
- Unknown
- Valid

N W E S

0 75 150 Miles

## COASTAL STUDY LOCATOR

# NATIONAL FLOOD INSURANCE PROGRAM

# Draft Coastal Scoping Map

## LAKE SUPERIOR COASTAL STUDY

### ALGER COUNTY, MICHIGAN COASTAL STUDY COMMUNITIES

**Au Train, Township of**
**Burt, Township of**
**Grand Island, Township of**
**Munising, City of**
**Munising, Township of**
**Onota, Township of**

STARR

FEMA

HOUGHTON COUNTY

BARAGA COUNTY

MARQUETTE COUNTY

Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

## MAP SYMBOLOGY

### LEGEND

- Transects
- Shoreline
- Dams
- USGS Gages
- Letters of Map Change
- Coastal Barrier Resource System

**AAL Data**

- 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**

- Unverified
- Unknown
- Valid

W E S

0 1.25 2.5 5 Miles

## COASTAL STUDY LOCATOR

# NATIONAL FLOOD INSURANCE PROGRAM

# Draft Coastal Scoping Map

## LAKE SUPERIOR COASTAL STUDY

### BARAGA COUNTY, MICHIGAN COASTAL STUDY COMMUNITIES

**Baraga, Township of**
**Baraga, Village of**
**L'Anse, Township of**
**L'Anse, Village of**
**L'Anse Reservation (Keweemau Bay Indian Community)**

STARR

FEMA

BARAGA COUNTY

MARQUETTE COUNTY

IRON COUNTY

DICKINSON COUNTY

ALGER COUNTY

DELTA COUNTY

MENOMINEE COUNTY

Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

## MAP SYMBOLOGY

### LEGEND

- Transects
- Shoreline
- Dams
- USGS Gages
- Letters of Map Change
- Coastal Barrier Resource System

**Effective Flood Hazard Areas**

- ZONE A
- ZONE AE
- 0.2% ANNUAL CHANCE FLOOD

**AAL Data**

- 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**

- Unverified
- Unknown
- Valid

N W E S

0 5 10 Miles

## COASTAL STUDY LOCATOR

# NATIONAL FLOOD INSURANCE PROGRAM

# Draft Coastal Scoping Map

## LAKE SUPERIOR COASTAL STUDY

### MARQUETTE COUNTY, MICHIGAN COASTAL STUDY COMMUNITIES

**Chocolay, Charter Township of**
**Marquette, Charter Township of**
**Marquette, City of**
**Neguanee, Township of**
**Powell, Township of**
**Sands, Township of**

STARR

FEMA

# Attachment D

# Proposed Draft Transect Figures

223

224

225

226

Panel 82

Panel 84

CHARTER TOWNSHIP OF CHOCOLAY

TOWNSHIP OF ONOTA

M-28

Path: C:\PROJECT DATA\FEMA\Great Lakes\DISCOVERY\Transect Maps\TransectMap_Superior_MI.mxd

N

W

E

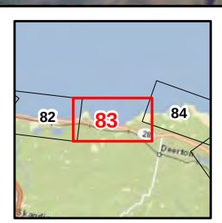
S

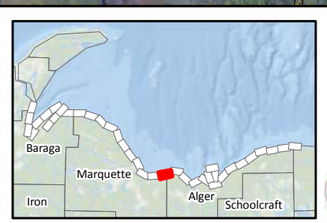
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**

MARQUETTE COUNTY
ALGER COUNTY

**COMMUNITIES**

TOWNSHIP OF ONOTA
CHARTER TOWNSHIP OF CHOCOLAY

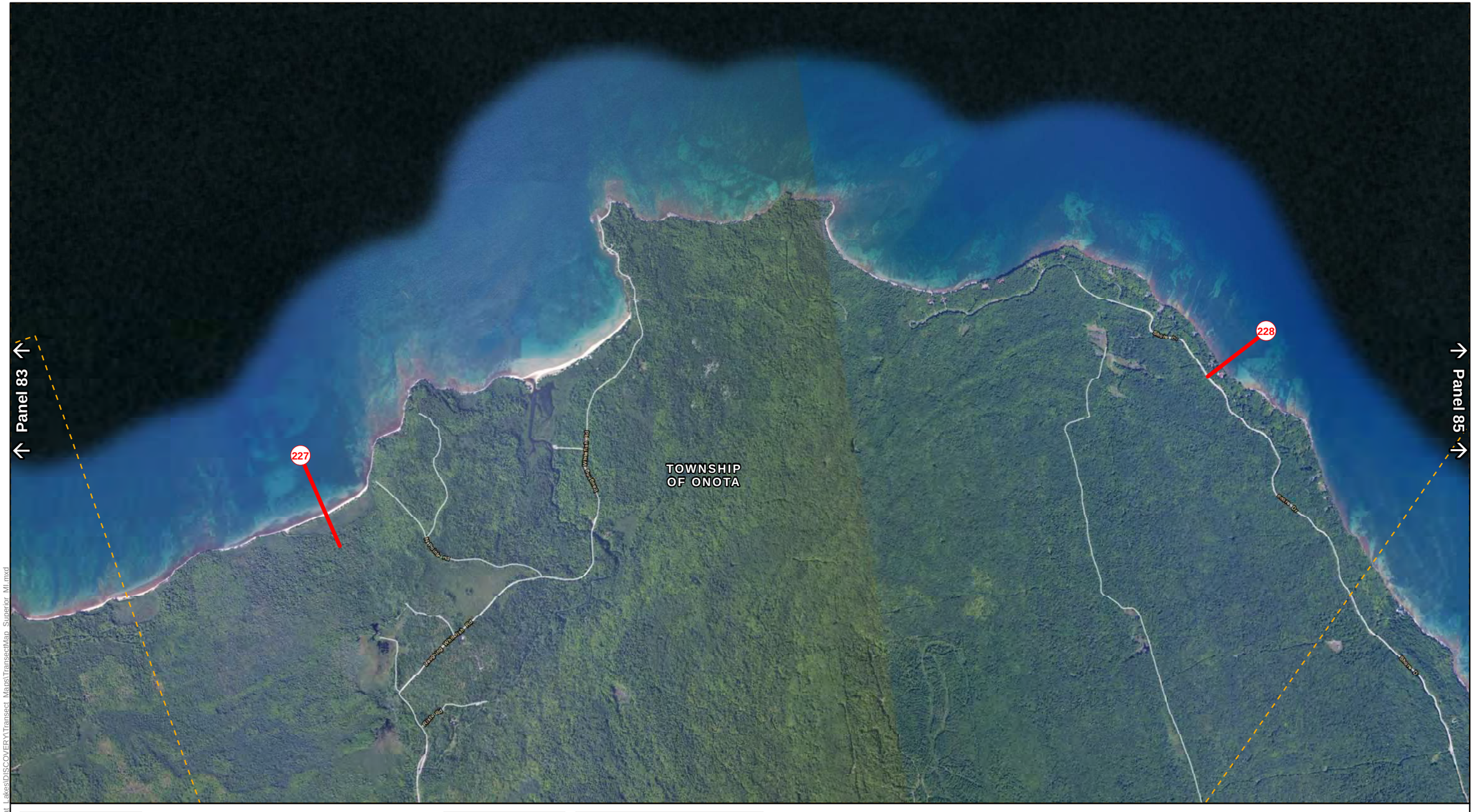
FEMA STARR

Lake Superior

**DRAFT TRANSECTS**

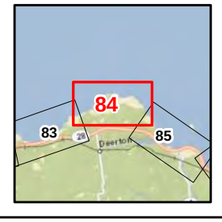
Panel 83 of 99

(Map Set: MI)




N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary



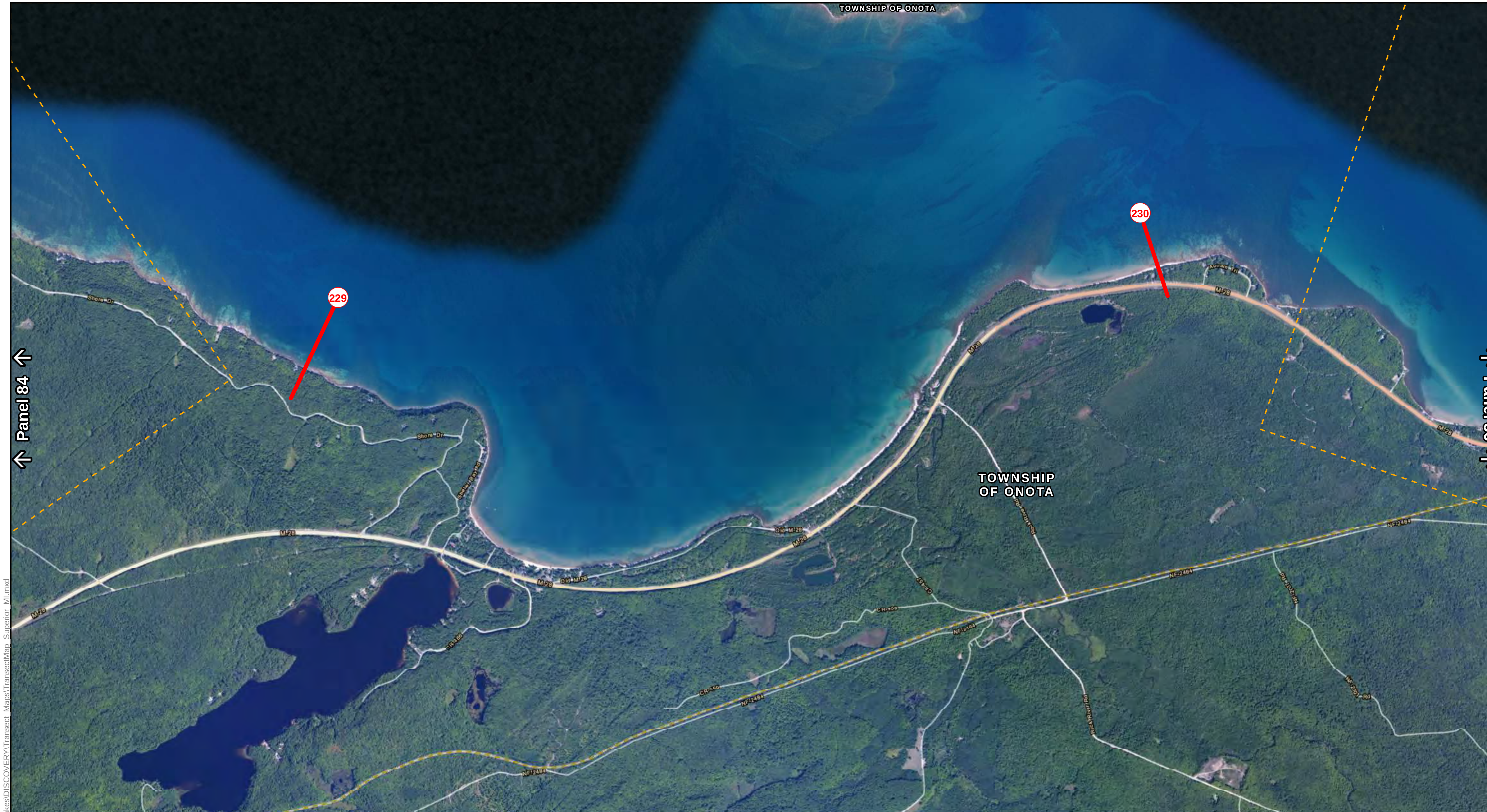
**COUNTIES**
ALGER COUNTY

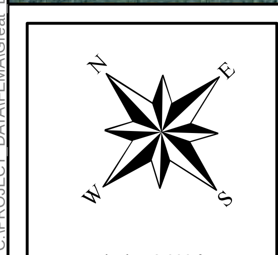
**COMMUNITIES**
TOWNSHIP OF ONOTA

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 84 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\GreatLakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

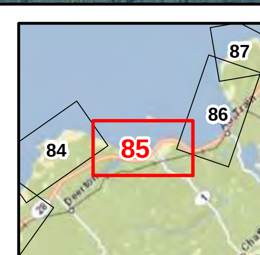


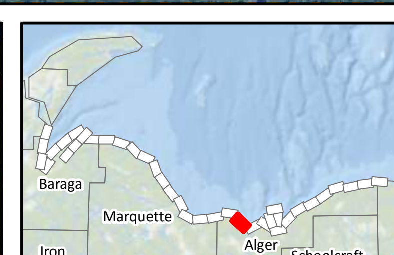




Project Transect

Adjoining Panel Edge

Political Boundary



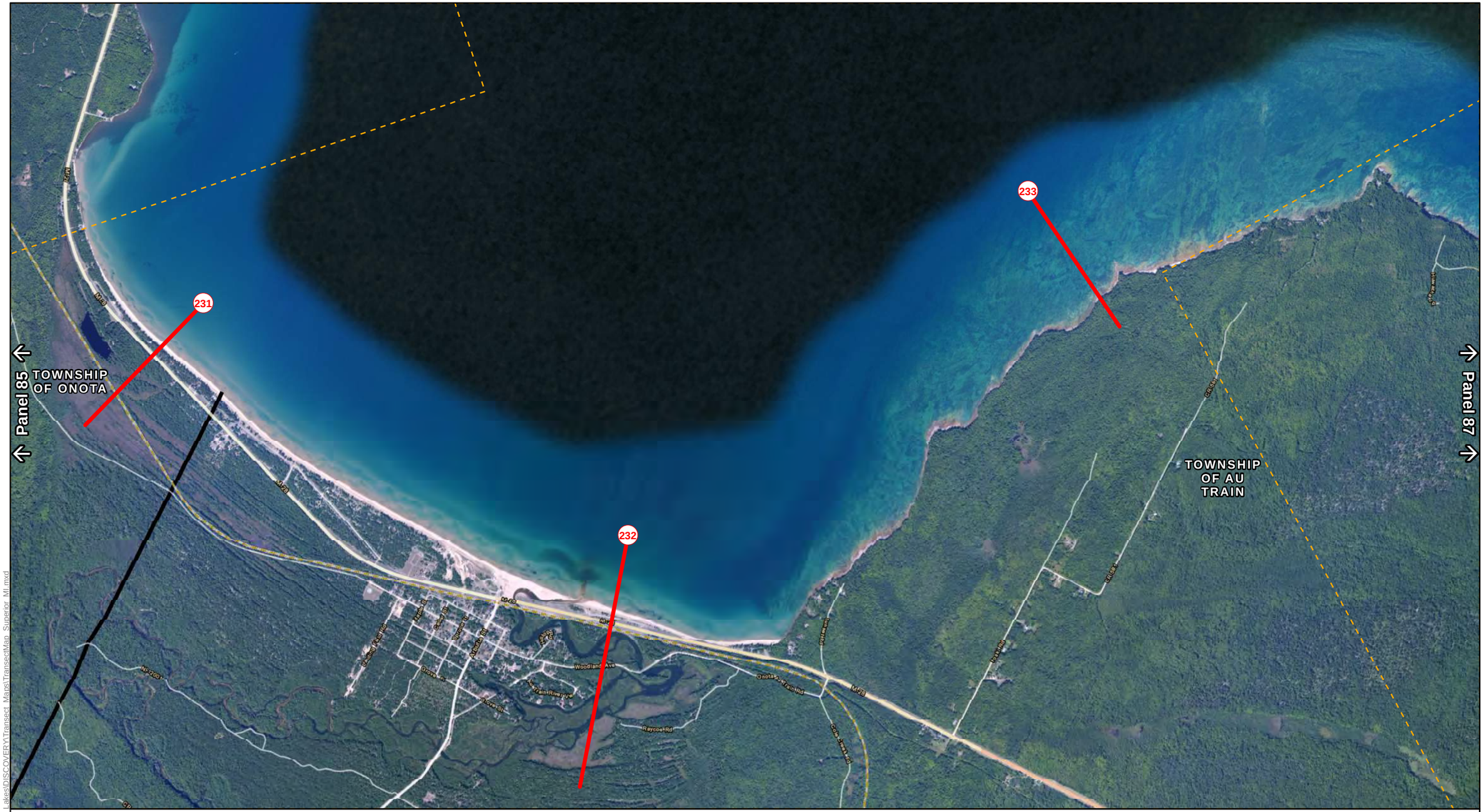



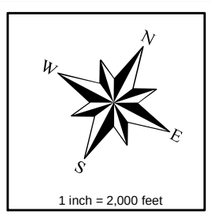

**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF ONOTA

Lake Superior
**DRAFT TRANSECTS**
Panel 85 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

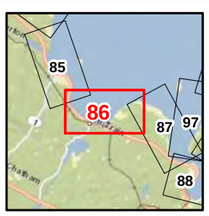


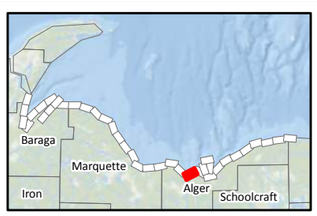




Project Transect

Adjoining Panel Edge

Political Boundary



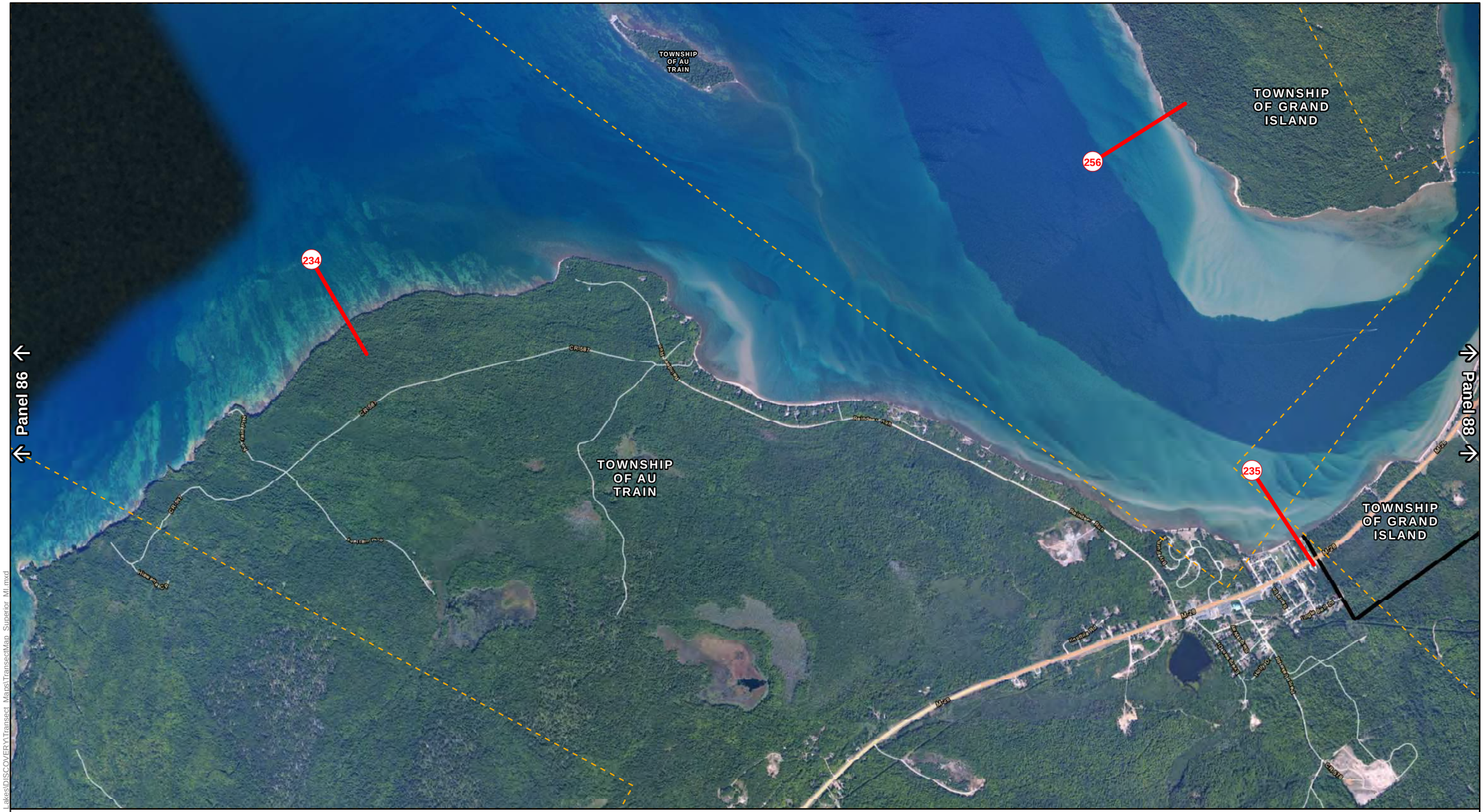

**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF ONOTA
TOWNSHIP OF AU TRAIN

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 86 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd




Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

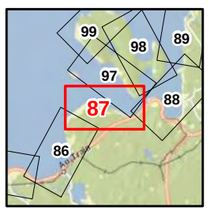
N
E
S
W

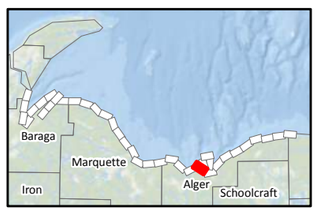
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF GRAND ISLAND
TOWNSHIP OF AU TRAIN

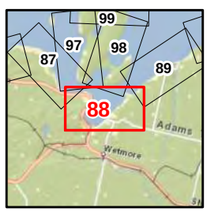
FEMA STARR

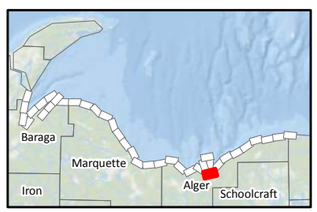
Lake Superior
**DRAFT TRANSECTS**
Panel 87 of 99
(Map Set: MI)

Project Transect

Adjoining Panel Edge

Political Boundary




## COUNTIES

ALGER COUNTY

## COMMUNITIES

CITY OF MUNISING
TOWNSHIP OF AU TRAIN
TOWNSHIP OF GRAND ISLAND
TOWNSHIP OF MUNISING

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 88 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

TOWNSHIP OF GRAND ISLAND

TOWNSHIP OF MUNISING

243

244

Panel 88

Panel 90

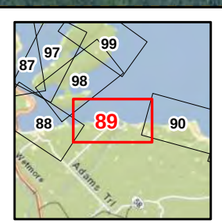
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

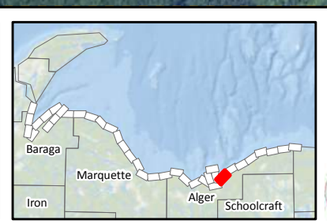
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF MUNISING
TOWNSHIP OF GRAND ISLAND

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 89 of 99
(Map Set: MI)

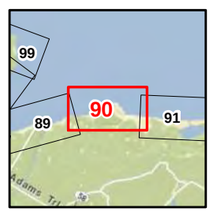
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

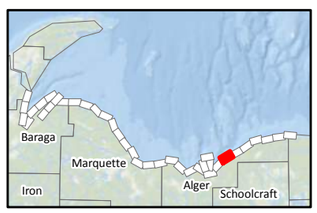
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



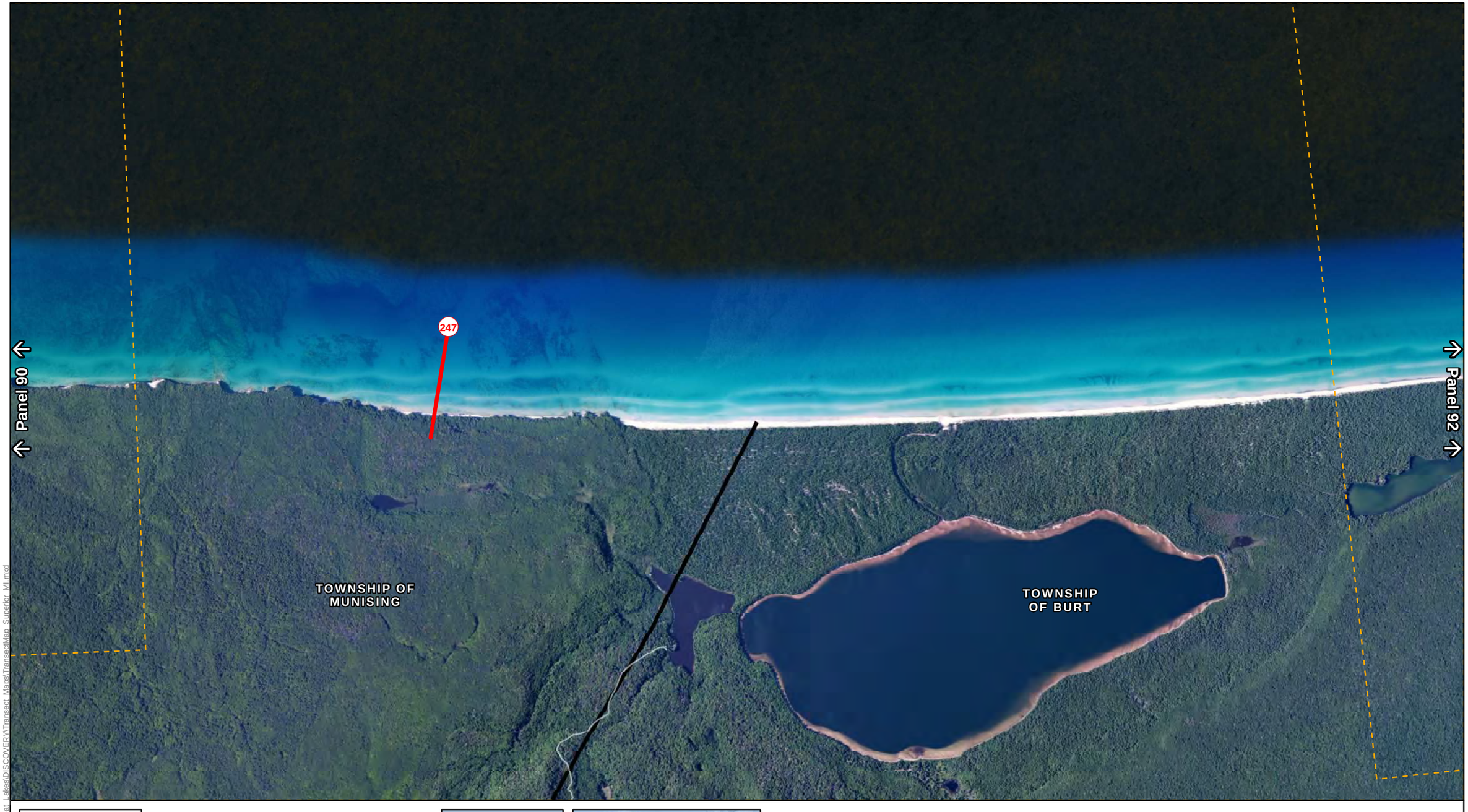




**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF MUNISING

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 90 of 99
(Map Set: MI)



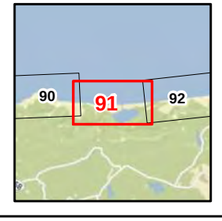

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary

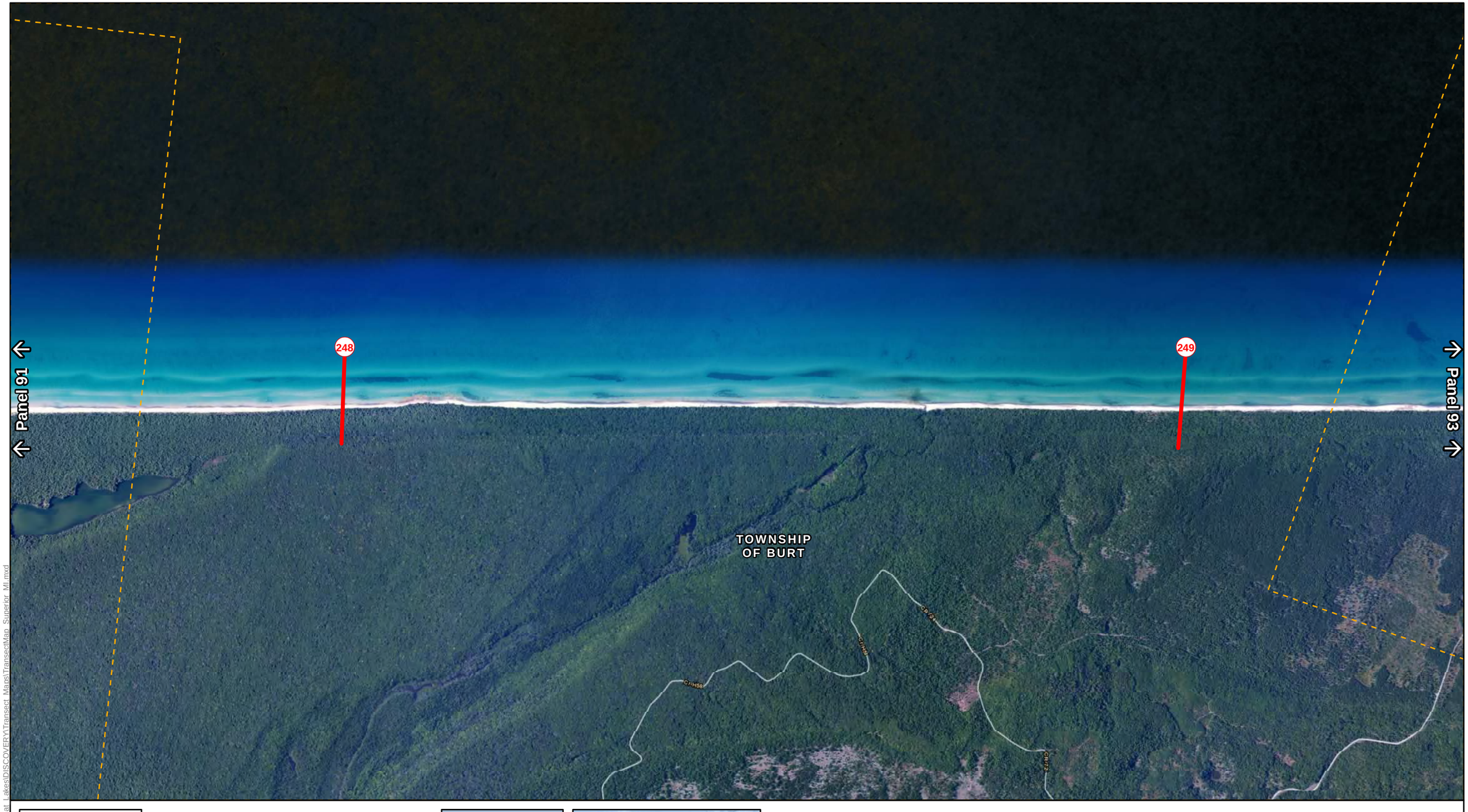


**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF MUNISING
TOWNSHIP OF BURT

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 91 of 99
(Map Set: MI)



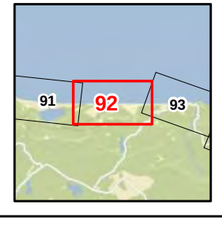

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



**COUNTIES**
ALGER COUNTY

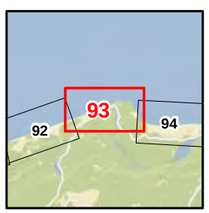
**COMMUNITIES**
TOWNSHIP OF BURT

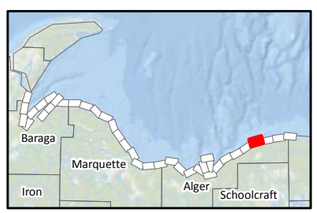
FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 92 of 99
(Map Set: MI)

N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary



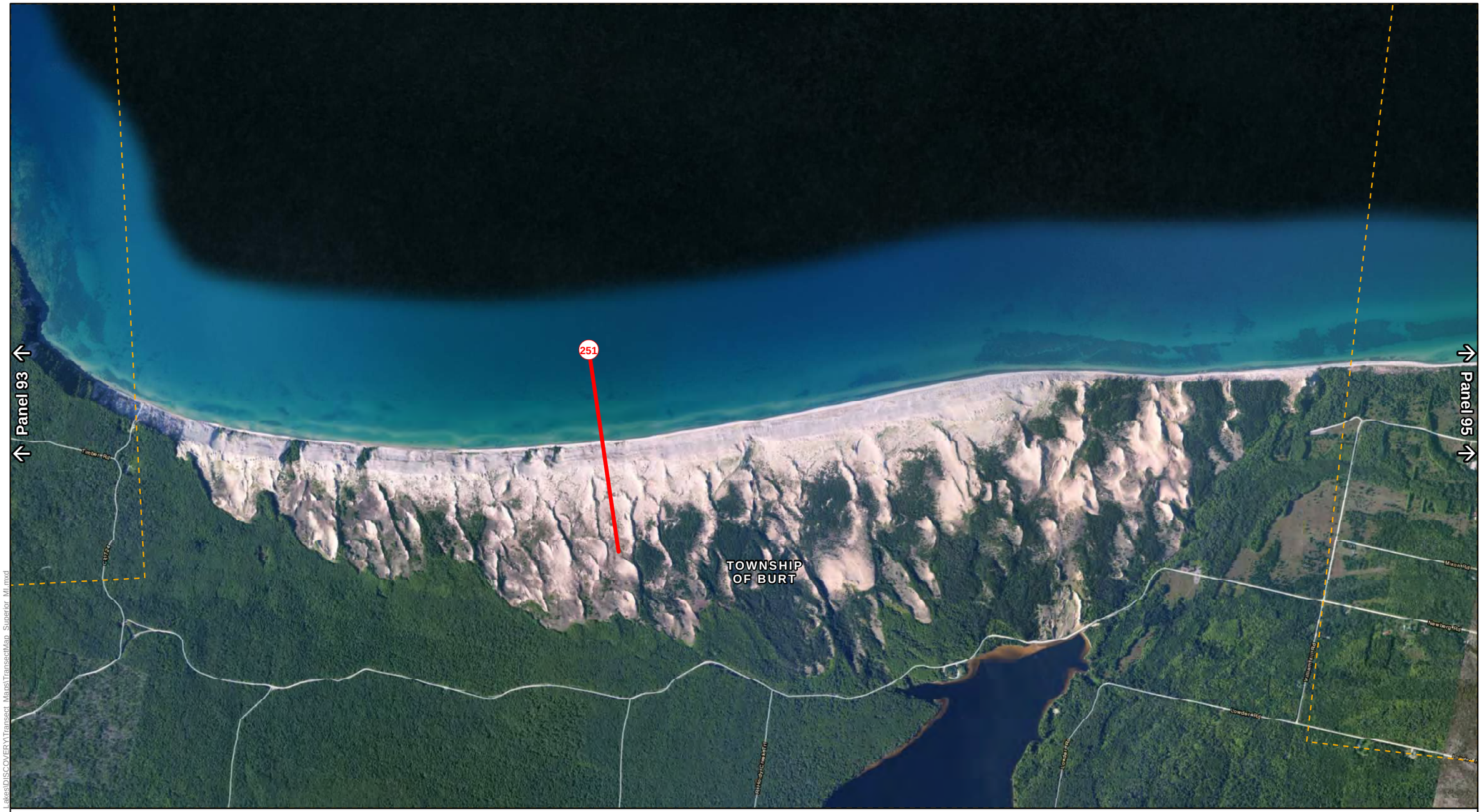

**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF BURT

FEMA STARR

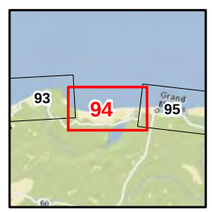
Lake Superior
**DRAFT TRANSECTS**
Panel 93 of 99
(Map Set: MI)

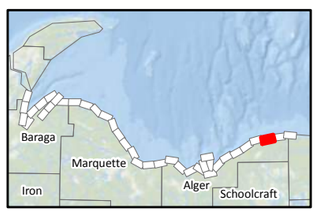
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Mans\TransectMap_Superior_MI.mxd




N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary




**COUNTIES**
ALGER COUNTY

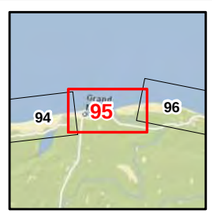
**COMMUNITIES**
TOWNSHIP OF BURT

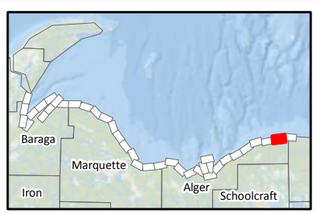
FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 94 of 99
(Map Set: MI)

N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary




**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF BURT

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 95 of 99
(Map Set: MI)

Panel 95

No Panel

TOWNSHIP OF BURT

N

W E

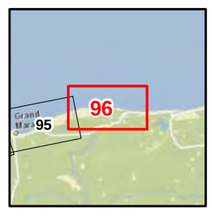
S

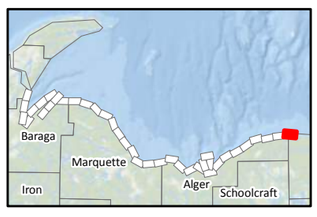
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**

ALGER COUNTY
LUCE COUNTY

**COMMUNITIES**

TOWNSHIP OF BURT

FEMA STARR

Lake Superior

**DRAFT TRANSECTS**

Panel 96 of 99

(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

TOWNSHIP OF GRAND ISLAND

TOWNSHIP OF AU TRAIN

TOWNSHIP OF AU TRAIN

TOWNSHIP OF AU TRAIN

Panel 99

Panel 98

256

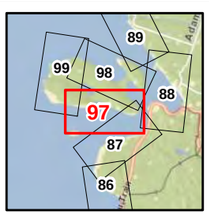
235

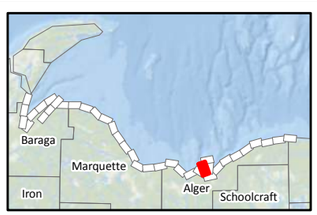
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF GRAND ISLAND
TOWNSHIP OF AU TRAIN

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 97 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

TOWNSHIP OF GRAND ISLAND

CITY OF MUNISING

Panel 97

Panel 99

259

258

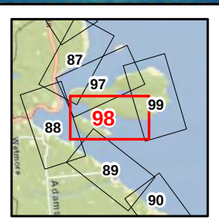
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

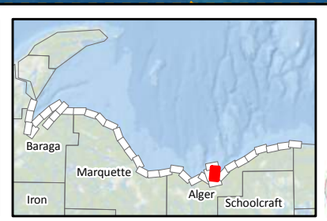
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
CITY OF MUNISING
TOWNSHIP OF GRAND ISLAND

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 98 of 99
(Map Set: MI)

Panel 97

Panel 98

257

258

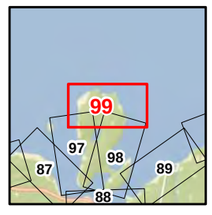
TOWNSHIP
OF GRAND
ISLAND

N
W
E
S
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



**COUNTIES**
ALGER COUNTY

**COMMUNITIES**
TOWNSHIP OF GRAND ISLAND

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 99 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

TOWNSHIP OF BARAGA

Panel 63

No Panel

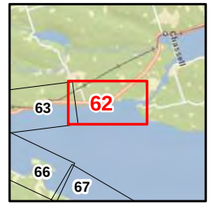
157

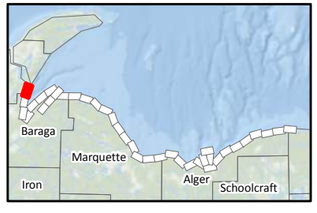
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
BARAGA COUNTY
HOUGHTON COUNTY

**COMMUNITIES**
TOWNSHIP OF BARAGA

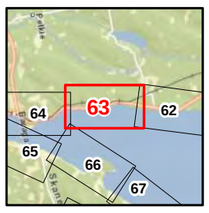
FEMA STARR

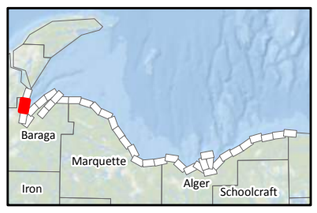
Lake Superior
**DRAFT TRANSECTS**
Panel 62 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Mains\TransectMap_Superior_MI.mxd

1 inch = 2,000 feet

- Project Transect
- Adjoining Panel Edge
- Political Boundary




**COUNTIES**
BARAGA COUNTY

**COMMUNITIES**
TOWNSHIP OF BARAGA
L'ANSE RESERVATION

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 63 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

VILLAGE OF BARAGA

TOWNSHIP OF BARAGA

VILLAGE OF BARAGA (L'ANSE RESERVATION)

L'ANSE RESERVATION

TOWNSHIP OF L'ANSE

VILLAGE OF L'ANSE

Panel 65

Panel 63

162

163

164

161

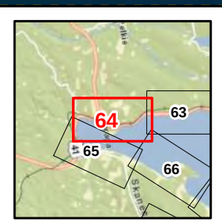
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

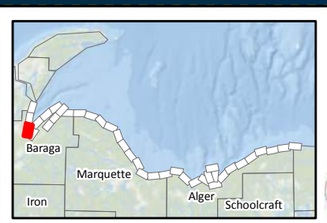
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




## COUNTIES

BARAGA COUNTY

## COMMUNITIES

VILLAGE OF BARAGA
VILLAGE OF L'ANSE
L'ANSE RESERVATION
TOWNSHIP OF BARAGA
TOWNSHIP OF L'ANSE

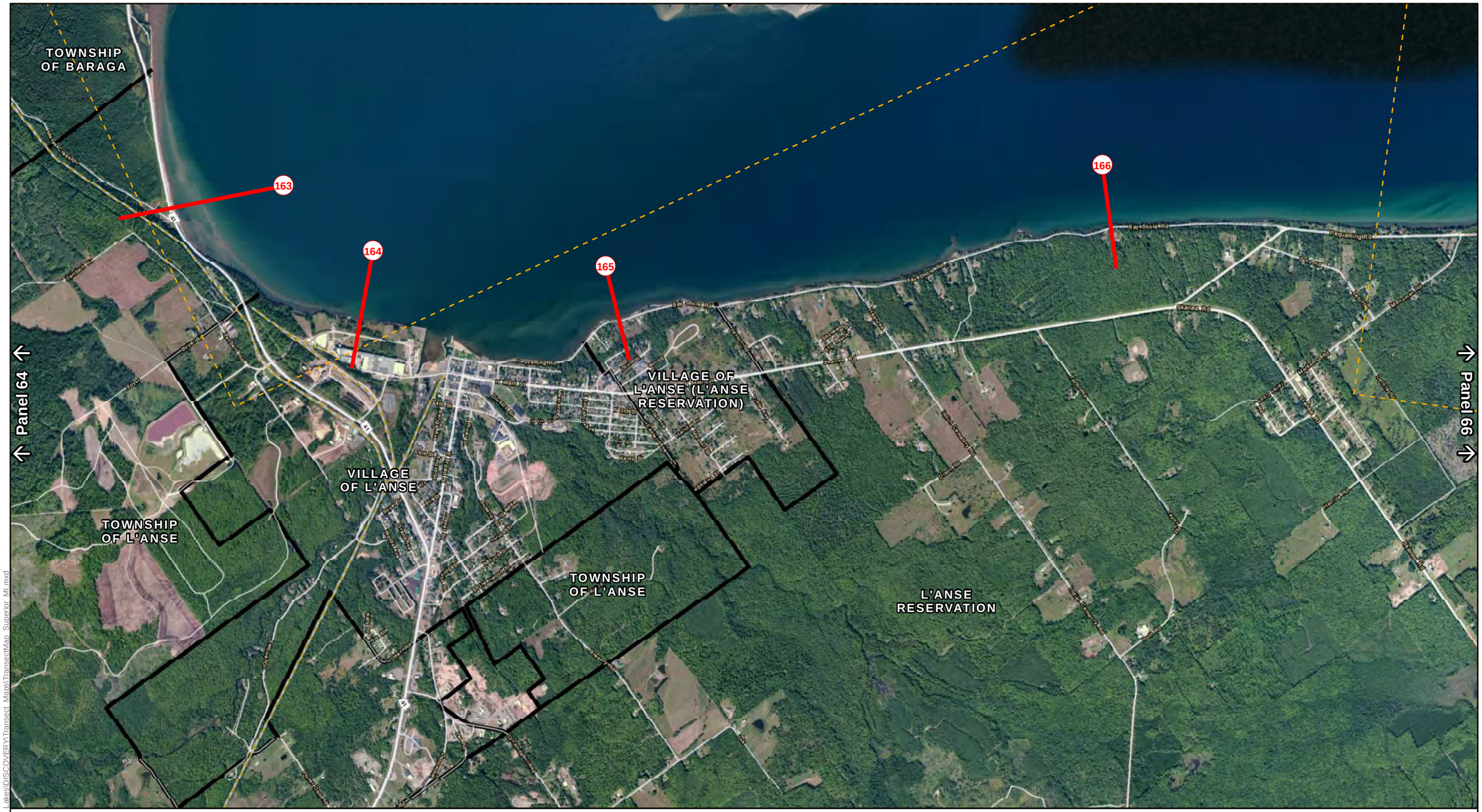
FEMA STARR

Lake Superior

# DRAFT TRANSECTS

Panel 64 of 99

(Map Set: MI)




1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary

## COUNTIES

BARAGA COUNTY

## COMMUNITIES

VILLAGE OF BARAGA
VILLAGE OF L'ANSE
L'ANSE RESERVATION
TOWNSHIP OF BARAGA
TOWNSHIP OF L'ANSE

Lake Superior

# DRAFT TRANSECTS

Panel 65 of 99

(Map Set: MI)

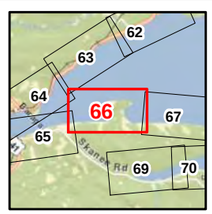
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Mans\TransectMap_Superior_MI.mxd

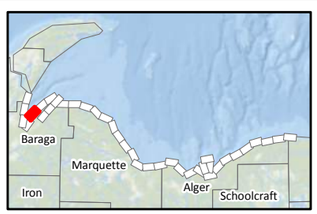
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



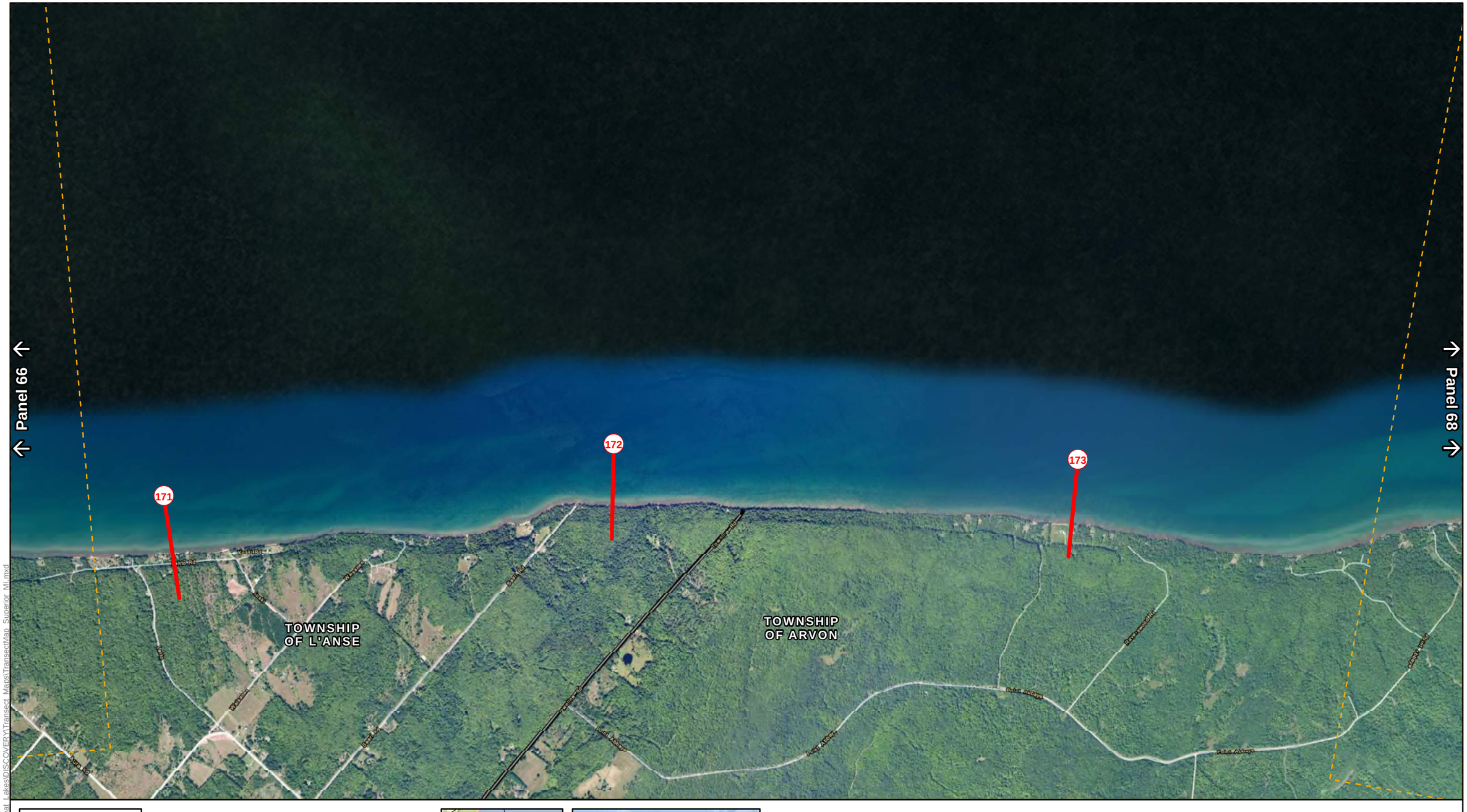




**COUNTIES**
BARAGA COUNTY

**COMMUNITIES**
TOWNSHIP OF L'ANSE
L'ANSE RESERVATION

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 66 of 99
(Map Set: MI)



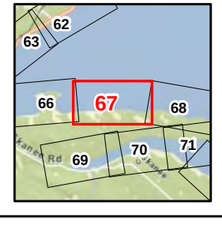

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Mains\TransectMap_Superior_MI.mxd

1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



**COUNTIES**
BARAGA COUNTY

**COMMUNITIES**
TOWNSHIP OF L'ANSE
TOWNSHIP OF ARVON

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 67 of 99
(Map Set: MI)

Panel 67

Panel 71

174

175

176

TOWNSHIP OF ARVON

Point Abbaye

Point Abbaye

Point Abbaye

Point Abbaye

Point Abbaye

Point Abbaye

Point Abbaye

Point Abbaye

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

N

W

E

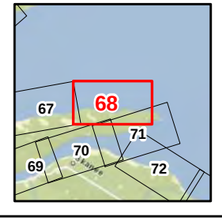
S

1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



**COUNTIES**

BARAGA COUNTY

**COMMUNITIES**

TOWNSHIP OF ARVON

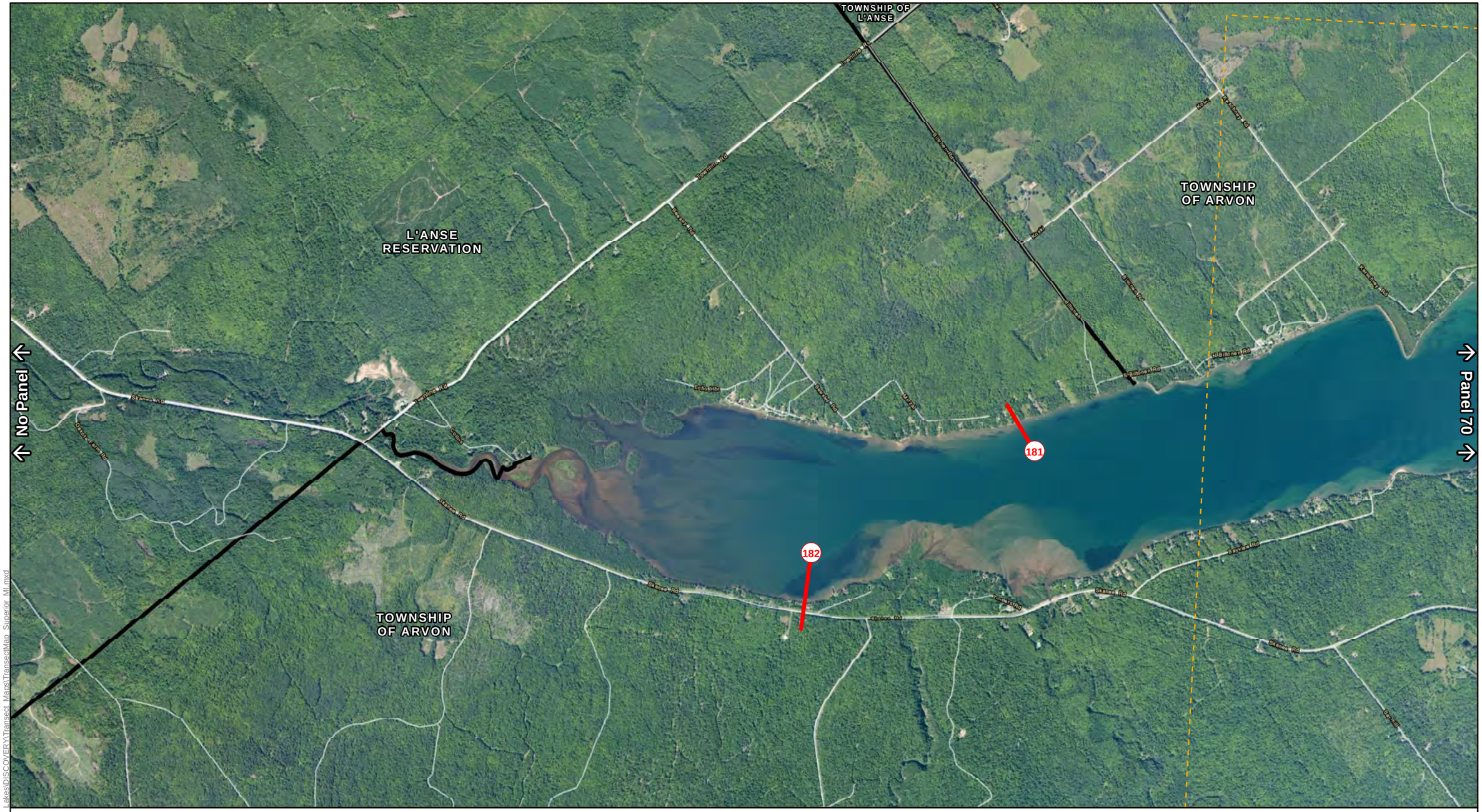
FEMA STARR

Lake Superior

**DRAFT TRANSECTS**

Panel 68 of 99

(Map Set: MI)




1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary

**COUNTIES**

BARAGA COUNTY

**COMMUNITIES**

L'ANSE RESERVATION
TOWNSHIP OF ARVON
TOWNSHIP OF L'ANSE

Lake Superior

**DRAFT TRANSECTS**

Panel 69 of 99

(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

TOWNSHIP OF ARVON

180

179

183

184

Panel 69

Panel 71

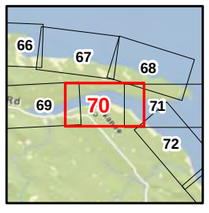
TOWNSHIP OF ARVON

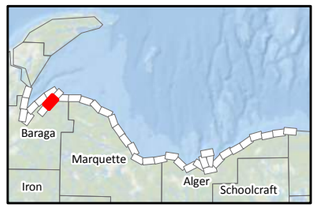
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
BARAGA COUNTY

**COMMUNITIES**
TOWNSHIP OF ARVON

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 70 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\Transect_Map_Superior_MI.mxd

TOWNSHIP OF ARVON

Point Abbaye

Point Abbaye

Point au Sable

Grand Sable Rd

179

184

185

177

178

Panel 70

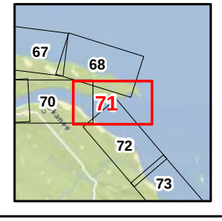
Panel 72

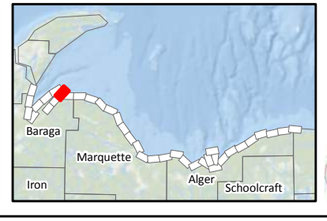
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
BARAGA COUNTY

**COMMUNITIES**
TOWNSHIP OF ARVON

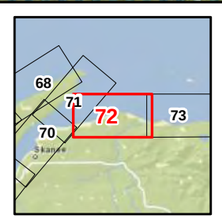
FEMA STARR

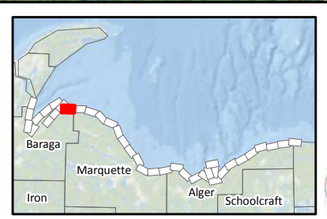
Lake Superior
**DRAFT TRANSECTS**
Panel 71 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\Transect\Map_Superior_MI.mxd

N
W E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary




**COUNTIES**
BARAGA COUNTY
MARQUETTE COUNTY

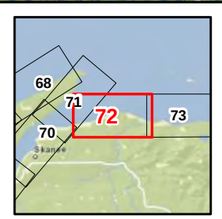
**COMMUNITIES**
TOWNSHIP OF POWELL
TOWNSHIP OF ARVON

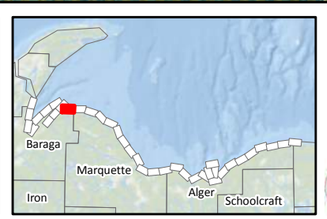
FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 72 of 99
(Map Set: MI)

N
W E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary




**COUNTIES**
BARAGA COUNTY
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL
TOWNSHIP OF ARVON

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 72 of 99
(Map Set: MI)

Panel 72

Panel 74

188

189

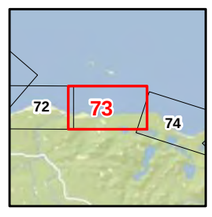
TOWNSHIP
OF POWELL

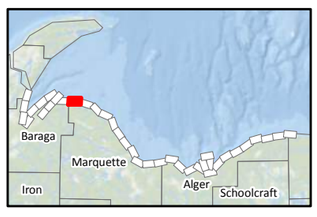
N
W
E
S
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



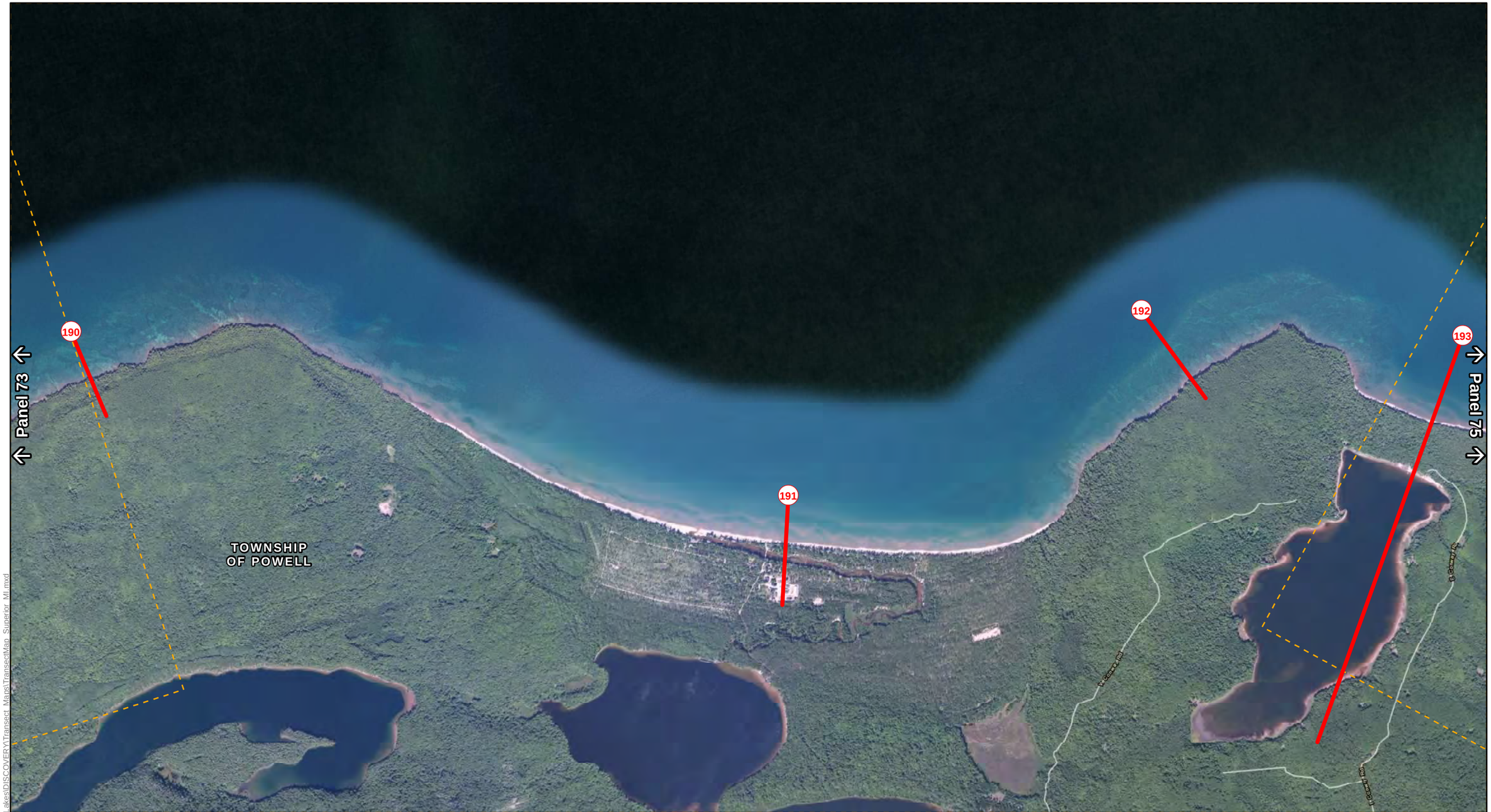

**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 73 of 99
(Map Set: MI)

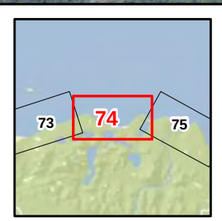
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

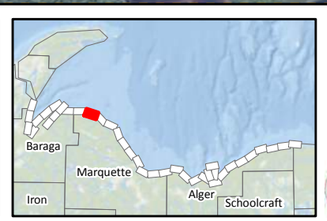



Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary



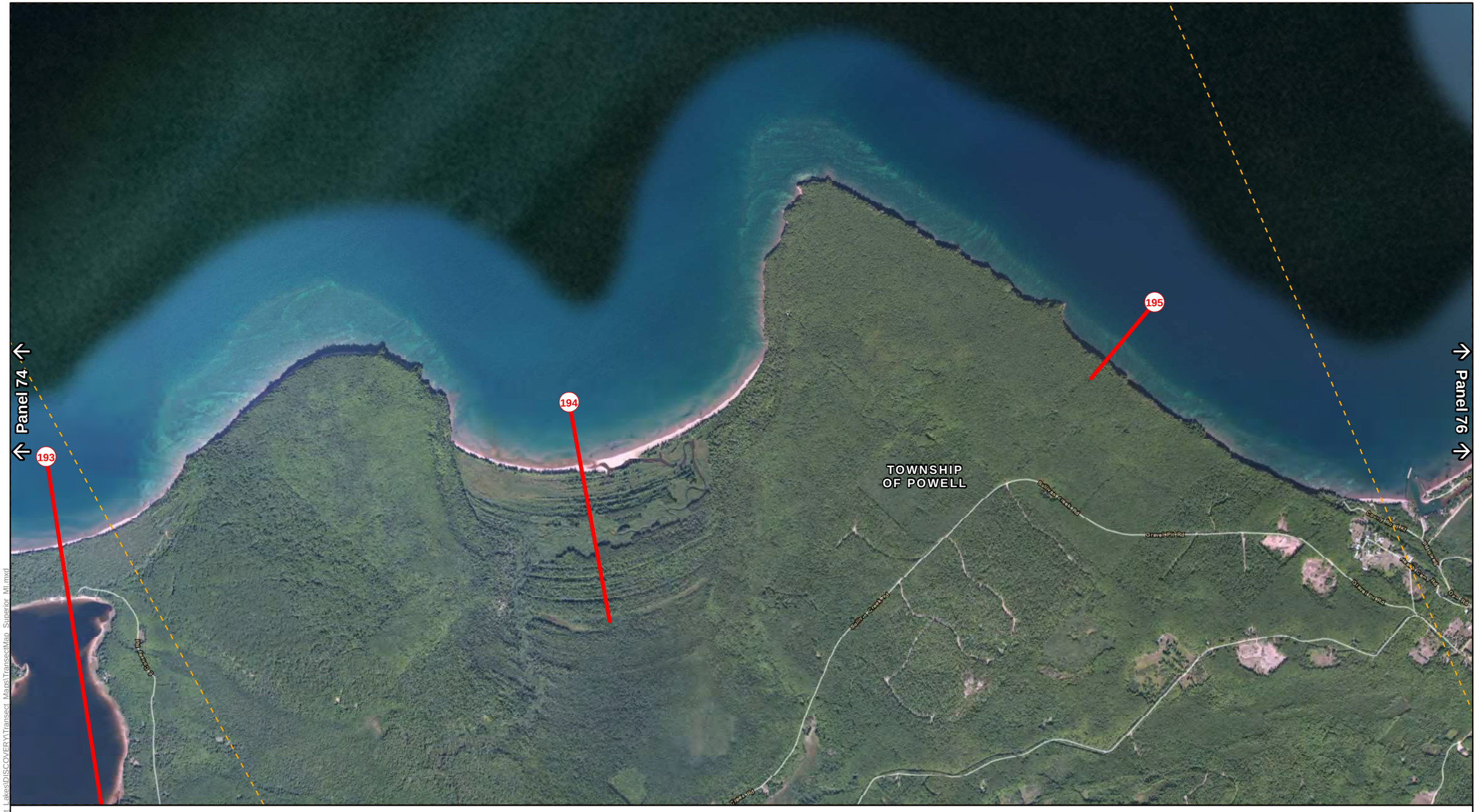




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 74 of 99
(Map Set: MI)




Path: C:\PROJECT_DATA\FEMA\Great Lakes\DISCOVERY\Transect Maps\Transect\Map_Superior_MI.mxd

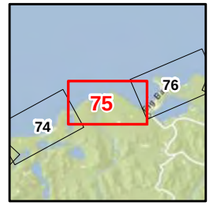
N
E
S
W

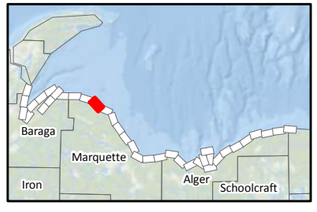
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 75 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

Panel 75

Panel 77

197

198

199

196

TOWNSHIP
OF POWELL

Dam Rd

Sugar Beach Rd

County Road B

N

E

S

W

1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary

75

76

77

Baraga

Marquette

Iron

Alger

Schoolcraft

**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 76 of 99
(Map Set: MI)

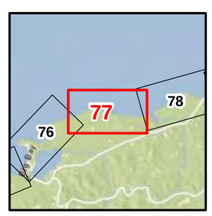
Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

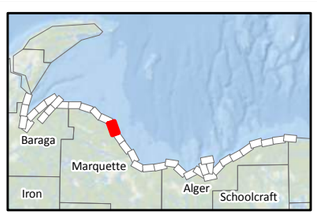
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



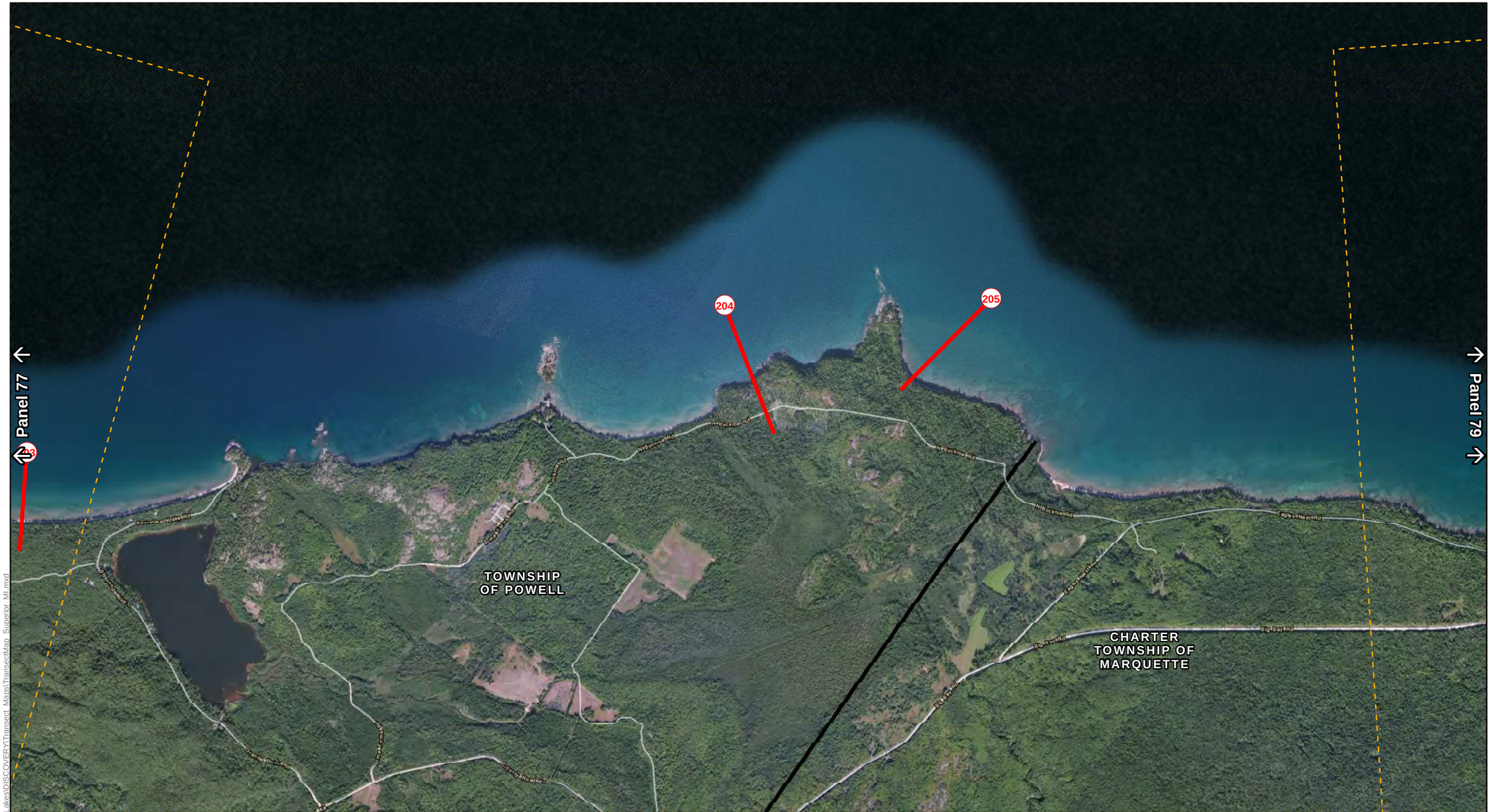




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 77 of 99
(Map Set: MI)



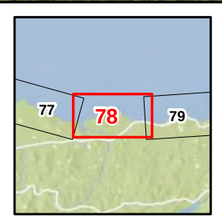

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

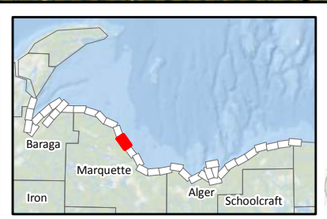
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
TOWNSHIP OF POWELL
CHARTER TOWNSHIP OF MARQUETTE

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 78 of 99
(Map Set: MI)

Panel 78

Panel 80

206

207

208

209

CHARTER TOWNSHIP OF MARQUETTE

Big Bay Rd

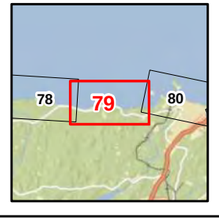
Path: C:\PROJECT_DATA\FEMA\AGreat_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

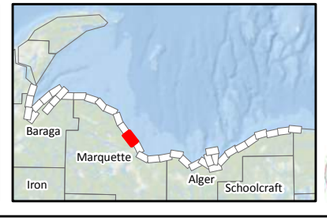
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



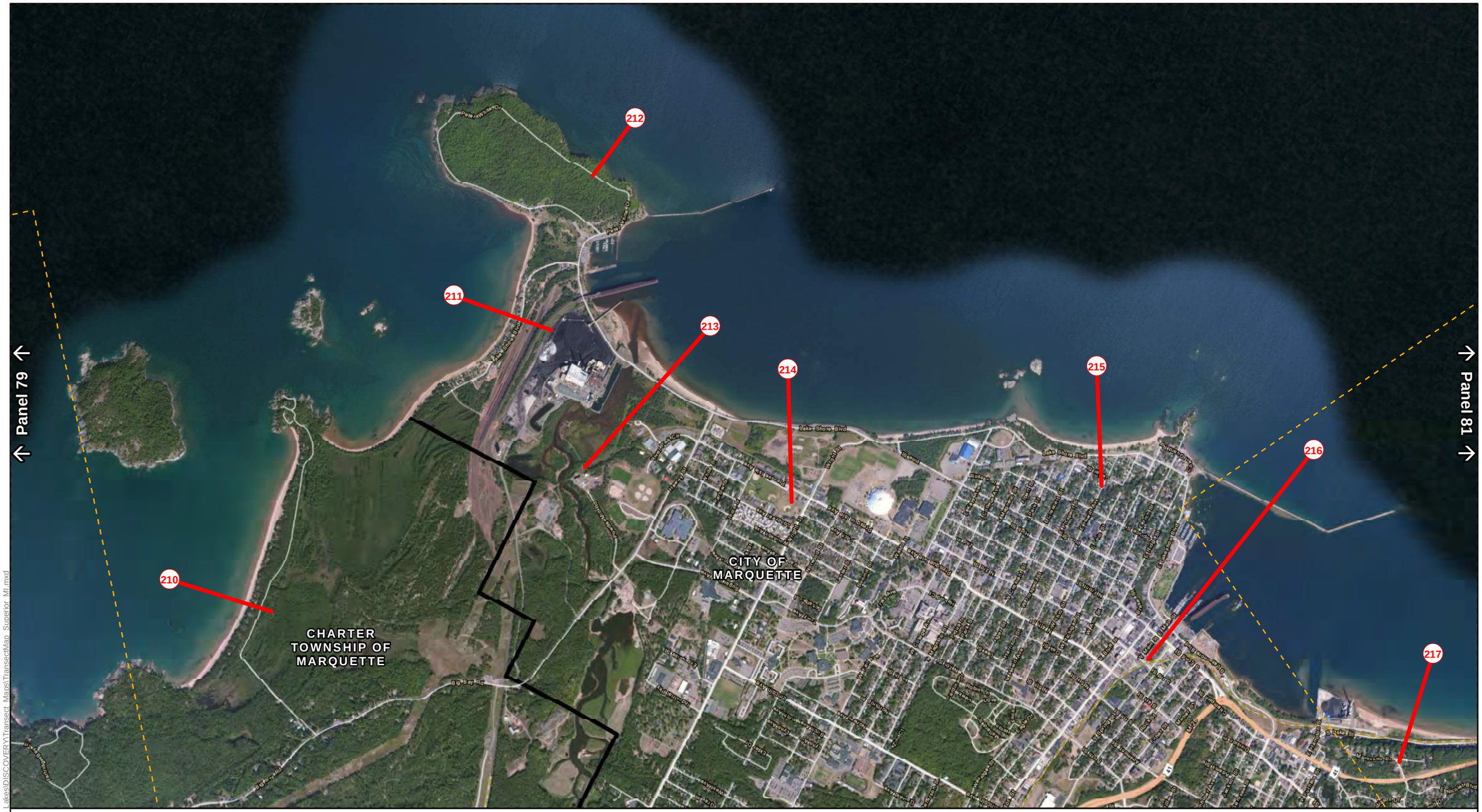




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
CHARTER TOWNSHIP OF MARQUETTE

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 79 of 99
(Map Set: MI)



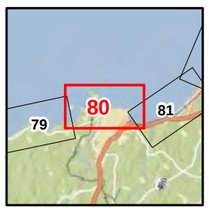

N E S W

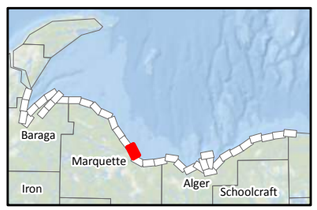
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary



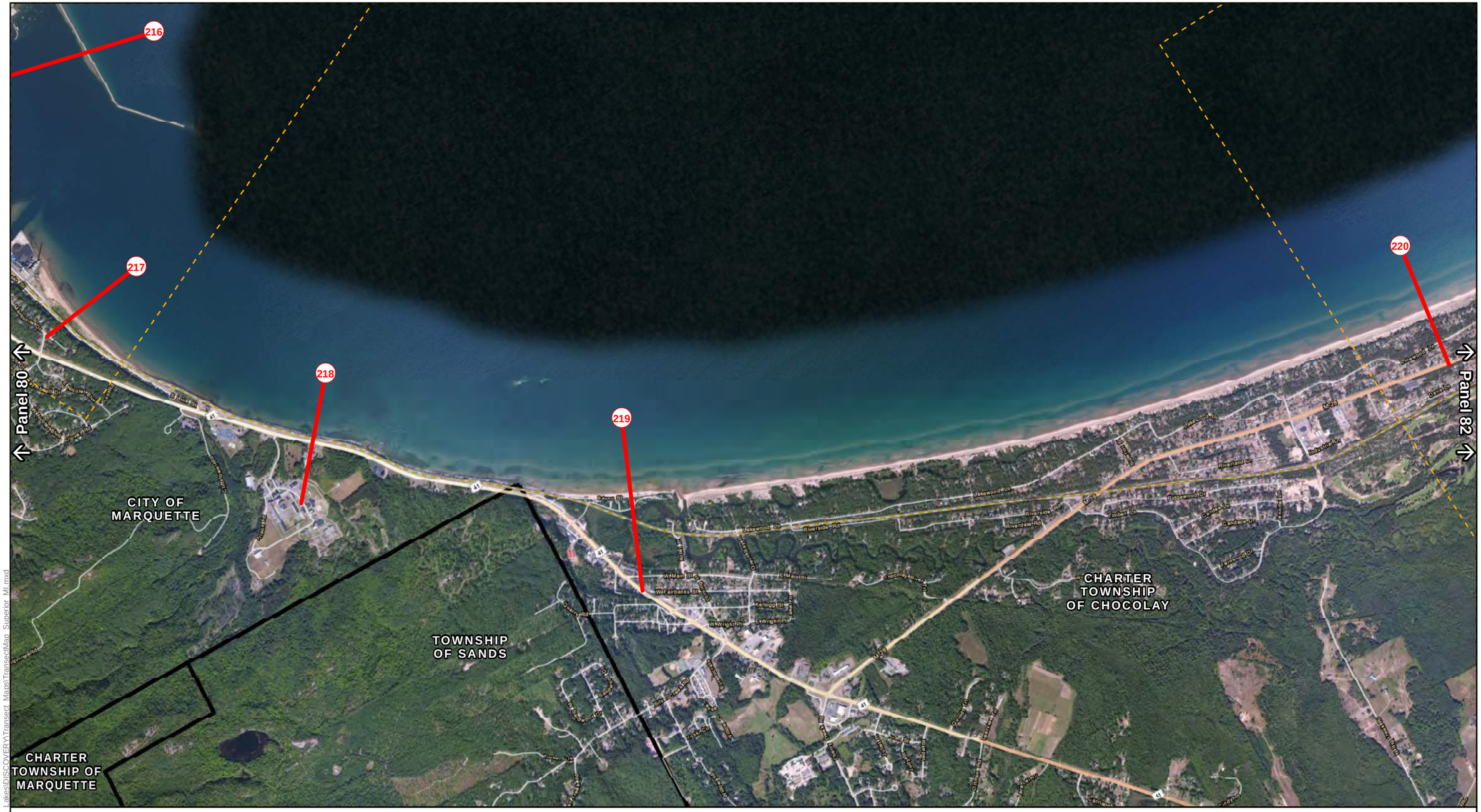

**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
CITY OF MARQUETTE
CHARTER TOWNSHIP OF MARQUETTE

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 80 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Mans\TransectMap_Superior_MI.mxd



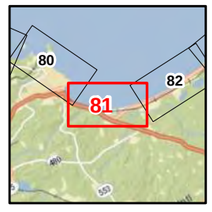

Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

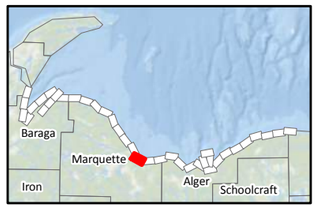
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
CITY OF MARQUETTE
TOWNSHIP OF SANDS
CHARTER TOWNSHIP OF CHOCOLAY
CHARTER TOWNSHIP OF MARQUETTE

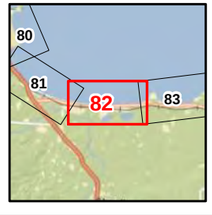
FEMA STARR

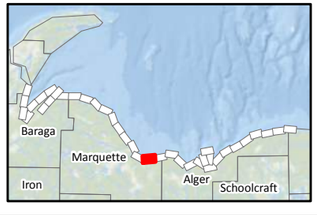
Lake Superior
**DRAFT TRANSECTS**
Panel 81 of 99
(Map Set: MI)

Path: C:\PROJECT_DATA\FEMA\Great Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MI.mxd

N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary




**COUNTIES**
MARQUETTE COUNTY

**COMMUNITIES**
CHARTER TOWNSHIP OF CHOCOLAY

FEMA STARR

Lake Superior
**DRAFT TRANSECTS**
Panel 82 of 99
(Map Set: MI)

223

224

225

226

Panel 82

Panel 84

CHARTER TOWNSHIP OF CHOCOLAY

TOWNSHIP OF ONOTA

M-28

Path: C:\PROJECT DATA\FEMA\Great Lakes\DISCOVERY\Transect Maps\TransectMap_Superior_MI.mxd

N

W

E

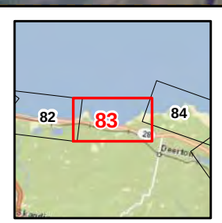
S

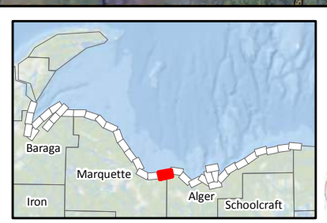
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary




**COUNTIES**

MARQUETTE COUNTY
ALGER COUNTY

**COMMUNITIES**

TOWNSHIP OF ONOTA
CHARTER TOWNSHIP OF CHOCOLAY

FEMA STARR

Lake Superior

**DRAFT TRANSECTS**

Panel 83 of 99

(Map Set: MI)