Coastal Scoping Report

Great Lakes Coastal Flood Study

Lake Superior

St. Louis County, Minnesota and Douglas County, Wisconsin

Individual Coastal Scoping Report

Report Number 01

Draft - April 2014

FEMA

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Federal Emergency Management Agency Region V
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Project Area Community List

This list includes all communities within the Project Area covered by this report for the Great Lakes Coastal Study under consideration for new Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) products and data sets, 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 data sets or FISs and FIRMs.

St. Louis County*	Douglas County*
Duluth, City of	Oliver, Village of
St. Louis County* (Unincorporated Areas)	Douglas County* (Unincorporated Areas)
Hermantown, City of	Superior, City of
Lakewood, Township of	Superior, Village of
Rice Lake, Township of	

*In Wisconsin and Minnesota, 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.

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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 and 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 system
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

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

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).

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

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 The current, effective FIRMs are outdated primarily due to the age of data and the coastal methodologies used in producing them.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

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

ii. Purpose of Great Lakes 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 St. Louis County, Minnesota and Douglas County, Wisconsin. This Coastal Scoping process helped FEMA to better identify the types of data sets 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 data sets, local and national, that are available.

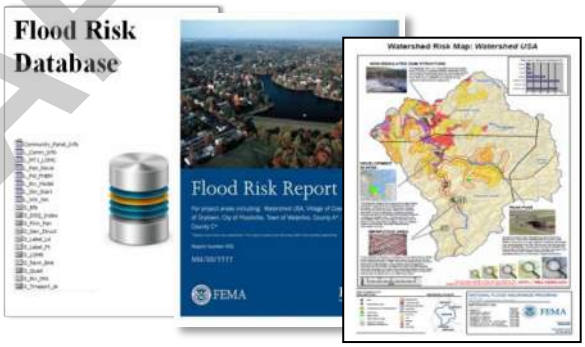
The following section describes the coastal flood risk products that a community may receive, as well as some products that are under development for the Great Lakes study areas.

iii. Coastal Flood Risk Products

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

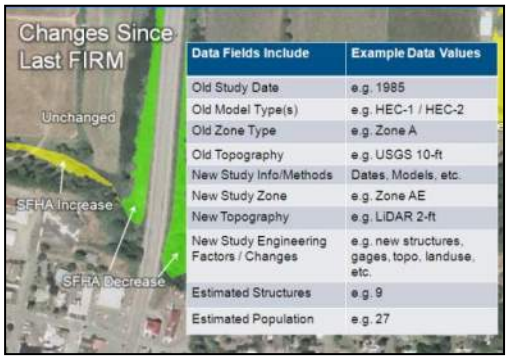
The three products are:

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



These products will summarize information captured in flood risk data sets that may be generated during a Risk MAP, or flood risk, study. The flood risk data sets could include regular and enhanced products. Standard flood risk data sets, 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 system (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.

In addition, FEMA is looking into the possibility of developing some unique Great Lakes coastal flood risk products that utilize data sets 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 data set contains data at 1-mile spacing. The data set 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 data sets 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, and the State Hazard Mitigation Officers (SHMOs). 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 St. Louis and Douglas 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.

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 included data requests for:

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

No information has been received prior to the Coastal Scoping meeting.

The core stakeholder documents, stakeholder contact list, and Coastal Scoping meeting invitations can be found in Attachment B, St. Louis and Douglas Counties Pre-Meeting Correspondence.

III. Coastal Scoping Meeting

The Coastal Scoping meeting for St. Louis and Douglas Counties will be held on Thursday, May 1, 2014 at the Douglas County Building in Superior, WI. Communities and stakeholders affected by coastal flooding in St. Louis and Douglas 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 included:

- Continuation and expansion upon stakeholder engagement
- Discussion of data inputs from federal, state, and local stakeholders
- Identification of local coastal flood hazard needs and areas of concern
- Identification of flood risk products and data sets
- NFIP regulatory updates
- Coastal Scoping schedule and deliverables

The Coastal Scoping meeting presentations included 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 St. Louis and Douglas Counties (Attachment C) were 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 included geospatial and tabular data that had been collected prior to the meeting.

Geospatial Data:

- Average Annualized Loss (AAL) data
- Coastal Barrier Resources System (CBRS)[1] – *none for St. Louis County*
- Coordinated Needs Management Strategy (CNMS)[2] Data- riverine only
- Proposed transects
- Effective Special Flood Hazard Areas (SFHAs) – *none for St. Louis County*
- Jurisdictional boundaries
- Letters of Map Change (LOMCs)
- Levees – *None for this study area*
- Shoreline
- Streams
- U.S. Geologic 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 St. Louis and Douglas 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 St. Louis and Douglas Counties can be found in Attachment D. A sample map is shown as Figure 1:

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

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

Figure 1: Sample Proposed Draft Transect Figure

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

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 St. Louis and Douglas Counties study area, including information 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 St. Louis and Douglas Counties Lake Superior Project Area prior to moving forward with the coastal flood study.

Table 1. Data Collected for St. Louis and Douglas 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
Community Rating System (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	N/A	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
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
High Water Marks	Coastal Scoping Report	Effective FIS	To be collected	Countywide
Historical Flooding	Coastal Scoping Report	Effective FIS, Local Mitigation Plans	2/20/2014	Countywide

Table 1. Data Collected for St. Louis and Douglas Counties

Data Types	Deliverable/ Product	Source	Date of Data Collection	Level
Historical Storm Events	Coastal Scoping Report	Effective FIS, Local Mitigation Plans	2/20/2014	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	2012	Lakewide
Ordinance Level	Coastal Scoping Report	FEMA CIS	2/6/2014	Countywide
Proposed Draft Transects	Coastal Scoping Map	FEMA	4/2/2014	Lakewide
Repetitive Loss	Coastal Scoping Report	FEMA CIS	1/24/2014	Countywide
Shoreline Classification	Coastal Scoping Map	USACE	1/29/2014	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

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 provides 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 data sets 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 data sets. 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).

Table 2. Hazus AAL Data for St. Louis and Douglas Counties

FIPS Code	County	Total Losses for Building and Content (in thousands of $)
27137	St. Louis	$1,595
55031	Douglas	$10,761

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.

No federal lands were found in the St. Louis and Douglas Counties project area.

I.IV.i.4 Jurisdictional Boundaries

Douglas County's jurisdictional boundary was obtained from their National Flood Hazard Layer (NFHL) database, dated February 2, 2012.

Jurisdictional boundaries can also 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.

Wisconsin county and municipal boundaries are also available through Wisconsin Department of Natural Resources at http://dnr.wi.gov/maps/gis/appwebview.html.

Minnesota county and municipal boundaries are also available through Minnesota Geospatial Office at http://www.mngeo.state.mn.us/.

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 in the Final Coastal Scoping Report.

I.IV.i.6 Publicly Owned Land

No statewide geospatial coverage data set for publicly owned lands was identified during this coastal scoping process.

I.IV.i.7 Shoreline Information

A shoreline feature data set 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 data set captures shoreline types, land uses, coverage, and vegetation types along the entire Great Lakes shoreline, including Lake Superior. The data set includes identification of "artificial" shoreline, which may be indicative of local coastal flood protection structures. This data set 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 data set contains data at 1-mile spacing. The data set does not include field-based reconnaissance or sediment/subsurface soil collection. The data set can be downloaded from http://www.greatlakescoast.org/ under the "Technical Resources" section.

From the USACE shoreline feature data set, the approximate shoreline along St. Louis and Douglas Counties that is covered by this study totals 54.11 miles. The shoreline classification information for St. Louis and Douglas 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)
St. Louis County	29.23	6.22	16.79	--	6.22	--
Douglas County	24.88	1.24	--	--	23.63	--

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)
St. Louis County	29.23	4.98	--	--	1.24	1.24	18.04	3.73
Douglas County	24.88	--	--	14.93	--	4.98	--	4.98

Source: USACE 2012, Lake Superior Shoreline Classification

Table 5. Summary of Shoreline Coverage

County	Total Shoreline (mile)	Bluff 2'-10' (mile)	Coastal Wetland (mile)	Dune 2'-10' (mile)	Flat Coast (mile)	High Bluff 10'+ (mile)	High Dune 10'+ (mile)
St. Louis County	29.23	16.17	--	1.87	11.20	--	--
Douglas County	24.88	2.49	--	--	6.22	15.55	0.62

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)
St. Louis County	29.23	9.95	1.87	8.71	6.84	1.87	--
Douglas County	24.88	20.52	0.62	0.62	2.49	0.62	--

Source: USACE 2012, Lake Superior Shoreline Classification

I.IV.i.8 Stream Lines/Hydrograph

Stream lines and water areas for St. Louis and Douglas 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

Topographic and bathymetric elevation data are critical inputs to the modeling software being used for the GLCFS. 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. These surface models are typically developed from Light Detection and Ranging (LiDAR).

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 St. Louis County, 2010 Great Lakes Restoration Initiative (GLRI) Bathymetric LiDAR was obtained from the NOAA Coastal Services Center. The data were collected in July

and August of 2010 as part of the Great Lakes Restoration Initiative, which is an inter-agency initiative led by the Environmental Protection Agency (EPA) targeting areas with the most significant problems in the Great Lakes region. Data was collected using the LADS Mk II shallow water survey system developed by Fugro LADS. The horizontal accuracy of the data was better than +/- 3m (9.84ft), and vertical accuracy was recorded at better than +/- 0.293m (0.96ft). Collection extents of bathymetric data were from the shoreline to extinction depth or 1 km, whichever was closer. Some areas experienced gaps in bathymetry due to turbid water, glassy lake surfaces, boats, and extinction depths. However, attempts were made to re-fly areas where the lake bottom was not completely captured.

2012 Duluth Area LiDAR was obtained from the Minnesota Department of Natural Resources (MDNR). The data were collected in October and November of 2012 for the purpose of assessing landscape changes resulting from significant flooding in the Duluth area during spring 2012. This data set updated areas previously collected in the 2011 Arrowhead Region LiDAR. 154 flight lines of data were collected at a nominal pulse spacing (NPS) of 1.5 meters. The data was compiled to meet +/- 3.8ft horizontal accuracy and 0.23 feet RMSE vertical accuracy at 95 percent confidence. Bathymetric LiDAR was not included in this data set.

For Douglas County, the GLCFS will use the best topographic and bathymetric data available along the Lake Superior coastline and identification of available datasets is currently in progress as part of the coastal scoping efforts.

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 data set 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.

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

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 was obtained from the St. Louis and Douglas Counties Maps & Data section of the US Census website, 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).

St. Louis County contains portions of five HUC-8 watersheds: Cloquet (04010202), Beaver-Lester (04010102), St. Louis (04010201), Baptism-Brule (04010101) and Rainy Headwaters (09030001).

Douglas County contains portions of three HUC-8 watersheds: St. Louis (04010201), Beartrap-Nemadji (04010301), and Namekagon (07030002).

ii. Other Data and Information

St. Louis County is located in the northeastern portion of Minnesota. It is bordered by Lake Superior and Lake County on the east, Canada on the north, Itasca, Koochiching, and Aitkin Counties on the west, and Douglas and Carlton Counties on the south. The St. Louis River flows through the southern part of St. Louis County. The county contains the "Hill of Three Waters," a point of convergence of three large watersheds. Rainfall at this location drains into the Hudson Bay, Lake Superior, and the Mississippi River. St. Louis County had a 2012 population of 200,319 (U.S. Census Bureau, 2012).

Douglas County is located in northwestern Wisconsin and is bordered on the east by Bayfield County, on the south by Washburn and Burnett Counties, on the west by Pine and Carlton County, and on the north by St. Louis County and Lake Superior. The county is bound to the north by the St. Louis River and the waterway systems that connect it to Superior Bay Douglas County has a land area of 1,304 square miles and a population of 43,785 in 2012 (U.S. Census Bureau, 2012).

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.

Douglas County has one designated unit of coastal barriers along the Lake Superior shoreline while there are none in the study area for St. Louis County.

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 St. Louis and Douglas Counties study areas that provide protection from the 1-percent-annual-chance flood, however, as discussed below, other flood protection measures do exist.

The USACE Coastal & Hydraulics Laboratory (CHL), a member of the Engineer Research & Development Center (ERDC), has compiled an inventory of coastal structures called the Enterprise Coastal Inventory Database (ECID). The ECID application and database houses information on more than 900 coastal structures in the U.S. and uses a Google Earth interface for users to access information on the structures including project reports, aerial photographs, wave and water level and bathymetric data. The database and application are available at http://chl.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 and infrastructures. 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 St. Louis and Douglas 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

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)
Wisconsin	Douglas County	Duluth Superior Harbor (Superior Entry) North Breakwater	NA	1423
Minnesota	St. Louis County	Duluth Superior Harbor (Duluth Ship Canal) North Pier	NA	524
Minnesota	St. Louis County	Duluth Superior Harbor (Superior Entry) South Breakwater	NA	569
Minnesota	St. Louis County	Duluth Superior Harbor (Duluth Ship Canal) South Pier	NA	524

NA = Not Available

I.IV.ii.3 Community Assisted Visits

CAVs are part of the evaluation and review process used by FEMA and local officials to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. Generally, a CAV consists of a tour of the floodplain, an inspection of community permit files, and meetings with local appointed and elected officials. During a CAV, observations and investigations focus on identifying issues in various areas, such as the community's floodplain management regulations (ordinance), community administration and enforcement procedures, engineering or other issues within the FIRMs, other problems in the community's floodplain management, and problems with the biennial report data. Any administrative problems or potential violations identified during a CAV are documented in the CAV findings report. The community is notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. The summary of CAV visits were extracted from FEMA's 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 St. Louis and Douglas Counties

County	Community	CID	CAV Date	FIRM Date
St. Louis	Duluth, City of	270421	10/10/13	2/19/1992
St. Louis	St. Louis County*	270416	4/29/04	2/19/1992
Douglas	Douglas County*	550538	4/29/92	2/12/2012

*Unincorporated Areas
CID = Community Identification

I.IV.ii.4 Community Rating System

The 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 February 2014.

No coastal communities in St. Louis or Douglas 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).

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 St. Louis and Douglas Counties

County	FIPS	Unknown (stream miles)	Unverified (stream miles)	Valid (stream miles)	Total (stream miles)
St. Louis	27137	1906.41	2.65	37.95	1947.01
Douglas	55031	886.77	16.15	11.77	914.69

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 Douglas or St. Louis Counties at the time this report was issued, although it should be noted that all counties experience shore erosion.

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 4 dams in St. Louis County and no dams in Douglas County within the project areas.

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

I.IV.ii.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 data set).

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 St. Louis and Douglas Counties.

Table 10. Declared Disasters in St. Louis and Douglas Counties

Declared County/Area	Disaster Number	Declaration Date	Incident Type	Description
St. Louis (County)	291	7/22/1970	Flood	Heavy Rains & Flooding
St. Louis (County)	350	8/25/1972	Flood	Severe Storms & Flooding
St. Louis (County)	1064	8/18/1995	Severe Storm(s)	Severe Thunderstorms, Winds, Flooding, Tornadoes, and Heat
St. Louis (County)	1175	4/8/1997	Flood	Severe Flooding, High Winds, Severe Storms
St. Louis (County)	1283	7/28/1999	Severe Storm(s)	Severe Storms, Winds, and Flooding
St. Louis (County)	1370	5/16/2001	Flood	Severe Winter Storms, Flooding, and Tornadoes
St. Louis (County)	3242	9/13/2005	Hurricane	Hurricane Katrina Evacuation*
St. Louis (County)	4069	7/6/2012	Severe Storm(s)	Severe Storms and Flooding
Douglas (County)	352	9/10/1972	Flood	Heavy Rains & Flooding
Douglas (County)	1284	8/16/1999	Flood	WI-Flood-07/20/99
Douglas (County)	3014	6/17/1976	Drought	Drought
Douglas (County)	3249	9/13/2005	Hurricane	Hurricane Katrina Evacuation*
Douglas (County)	4076	8/2/2012	Severe Storm(s)	Severe Storms and 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 Wisconsin disaster history can be found in the State of Wisconsin Hazard Mitigation Plan Appendix A. This plan can be found at http://emergencymanagement.wi.gov/mitigation/planning.asp.

Additional information on Minnesota disaster history can be found in the State of Minnesota Hazard Mitigation Plan. This plan can be found on the Minnesota Department of Public Safety website at https://dps.mn.gov/divisions/hsem/hazard-mitigation/Pages/state-hazard-mitigation-plan.aspx.

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 St. Louis and Douglas Counties. The data are based on Community Summary Reports that were extracted from FEMA's CIS website (https://portal.fema.gov/famsVuWeb/home) in February 2014.

Table 11. Summary of Flood Insurance Policies and Claims for St. Louis and Douglas Counties

County	Community	CID	No. Policies	Total Premium	Total Coverage	Number of claims since 1978	Dollar ($) paid for claims since 1978
St. Louis	Duluth, City of	270421	156	$138,280	$29,756,400	89	$757,089
St. Louis	Hermantown, City of	270708	10	$13,250	$3,997,900	3	$16,031
St. Louis	Rice lake, Township of	270742	3	$1,203	$385,000	2	$3,361
St. Louis	St. Louis County *	270416	143	$97,684	$20,730,500	34	$346,175
Douglas	Douglas County *	550538	45	$31,373	$6,824,800	4	$84,972
Douglas	Oliver, Village of	550113	1	$ 265	$19,000	1	$ 0
Douglas	Superior, City of	550116	28	$12,222	$5,965,300	3	$ 0

*Unincorporated areas
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 St. Louis and Douglas Counties project areas.

Table 12. NOAA Meteorological Stations on Lake Superior near St. Louis and Douglas Counties

County	Station ID	Location	Owner	Data	Years of Historical Data
St. Louis	DULM5	Duluth, MN	NOS	Meteorological Observation	2004-Present
St. Louis	45027	North of Duluth, MN	UM Duluth	Meteorological Observation	2011-Present
St. Louis	45028	Western Lake Superior	UM Duluth	Meteorological Observation	NA
St. Louis	SLVM5	Silver Bay, MN	NWS	Meteorological Observation	2006-Present

In addition, the Great Lakes Environmental Research Laboratory is a part of NOAA focused on the Great Lakes. It maintains multiple data sets, including a collection of meteorological data for both the United States and Canada. The data sets can be found online at http://www.glerl.noaa.gov . No stations were identified in Douglas County.

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 St. Louis and Douglas Counties. All USGS stream gage locations are shown on the draft Coastal Scoping Map.

Table 13. Stream Gage Stations in St. Louis and Douglas Counties

County	Gage ID	Begin Date	End Date	Gage Location
St. Louis	464646092052900	10/1/1994	9/30/2002	Superior Bay Duluth Ship Canal at Duluth, MN
St. Louis	04015410	9/25/1992	9/30/1993	Miller Creek Near Mouth at Duluth, MN
Douglas	044226092005600	10/1/1996	6/22/1998	Superior Bay Entry Channel at Superior, WI
Douglas	04024081	10/23/1980	11/10/1985	Lake Superior Tributary at Superior, WI
Douglas	04024080	10/1/1994	9/20/1995	Tower Avenue Storm Sewer at Superior, Wi
Douglas	040244533	7/1/1995	9/22/1996	Undeveloped Urban Site at Superior, WI
Douglas	040244534	7/1/1995	9/22/1996	Golf Course Site at Superior, WI

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 year 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).

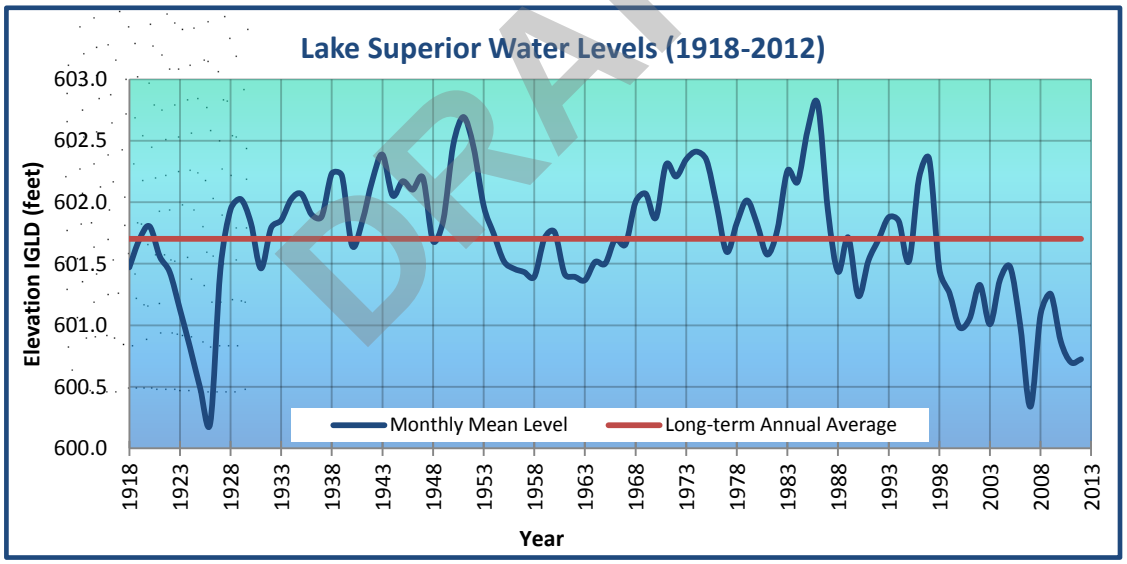


Figure 2: USACE Historic Great Lakes Water Level Data (1918 to 2012)

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.

Wave Gage/Buoy Stations

The 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 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

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

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

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

Table 14. Summary of LOMC cases in St. Louis and Douglas 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
St. Louis	226	12	5	3
Douglas	88	6	0	0

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
St. Louis	St. Louis County *	270416	PARTICIPATING	NA**
St. Louis	Duluth, City of	270421	PARTICIPATING	NA**
St. Louis	Hermantown, City of	270708	PARTICIPATING	NA**
St. Louis	Duluth, Township of	270731	NOT PARTICIPATING	NA
St. Louis	Lakewood, Township of	270738	PARTICIPATING	NA**
St. Louis	Rice lake, Township of	270742	PARTICIPATING	NA**
Douglas	Oliver, Village of	550113	PARTICIPATING	D
Douglas	Superior, City of	550116	PARTICIPATING	D
Douglas	Superior, Village of	550117	SUSPENDED	NA**
Douglas	Douglas County *	550538	PARTICIPATING	D

*Unincorporated Areas
**Not Provided in FEMA's Community Information System

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 St. Louis and Douglas Counties (Attachment C) and includes an identification number per transect. Note that these identification numbers will change as the draft transects are revised in the future.

- 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 St. Louis and Douglas Counties project area is listed in Table 16.

Table 16. Effective Mapping Status

County	Community	CID	FIRM Date	Program Status
St. Louis	Duluth, City of	270421	8/1/1979	Participating
St. Louis	Hermantown, City of	270708	NA	NA
St. Louis	Lakewood, Township of	270738	2/19/1992	NA
St. Louis	Rice Lake, Township of	270742	2/19/1992	NA
St. Louis	St. Louis County*	270416	2/19/1992	Participating
Douglas	Oliver, Village of	550113	2/22/2012	Participating
Douglas	Douglas County*	550538	2/22/2012	Participating
Douglas	Superior, City of	550116	2/22/2012	Participating
Douglas	Superior, Village of	550117	2/22/2012	Suspended

*Unincorporated Areas

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 St. Louis and Douglas Counties project area communities.

Table 17. Repetitive Loss

County	Community	CID	Total Repetitive Loss Structures	Total Repetitive Loss Payment ($)
Douglas	Douglas County*	550538	0	-
Douglas	Oliver, Village of	550113	0	-
Douglas	Superior, City of	550116	0	-
Douglas	Superior, Village of	550117	0	-
St. Louis	Duluth, City of	270421	2	$53,549
St. Louis	Duluth, Township of	270731	0	-
St. Louis	Hermantown, City of	270708	0	-
St. Louis	Lakewood, Township of	270738	0	-
St. Louis	Rice Lake, Township of	270742	0	-
St. Louis	St. Louis County*	270416	2	$67,310

*Unincorporated Areas

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

The information in this section was 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

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 is collected and assessed by FEMA in coordination with the local communities to determine where MPTA resources would be beneficial. Communities should alert FEMA of any resources that are available at the local level, and of actions they are interested in implementing in partnership with FEMA. Technical assistance activities should be based on the needs of the community and assist with already established capabilities.

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

- Advising in the creation of initial Hazard Mitigation Plans
- Advising in the update of existing Hazard Mitigation Plans
- Training to improve a community's capabilities for reducing risk
- Assistance in incorporating flood risk data sets 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 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.

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.

VI. Close

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

VII. References

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Wisconsin Hazard Mitigation Plan at the WI Emergency Management Agency reviewed February 2014 at http://emergencymanagement.wi.gov/mitigation/planning.asp.

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\COASTAL SCOPING_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 are also 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

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 ☐ 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 ☐ no	If yes, please describe:
Does your community have other risk assessment data?	☐ yes ☐ 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 ☐ 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 ☐ no	If yes, please describe:
Any other comments/concerns based on local knowledge:		

Attachment C

Draft Coastal Scoping Maps

ST. LOUIS COUNTY

LAKE COUNTY

DOUGLAS 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

N 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

ST. LOUIS COUNTY, MINNESOTA COASTAL STUDY COMMUNITIES

Duluth, City of
Duluth, Township of
Hermantown, City of
Lakewood, Township of
Rice Lake, Township of
St Louis County* UNINCORPORATED AREA

STARR

FEMA

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 1.25 2.5 5 Miles

COASTAL STUDY LOCATOR

NATIONAL FLOOD INSURANCE PROGRAM

Draft Coastal Scoping Map

LAKE SUPERIOR COASTAL STUDY

DOUGLAS COUNTY, WISCONSIN COASTAL STUDY COMMUNITIES

Douglas County* UNINCORPORATED AREA
Oliver, Village of
Superior, City of
Superior, Village of

STARR

FEMA

Attachment D

Proposed Draft Transect Figures

TOWNSHIP OF DULUTH

LAKE COUNTY UNINCORPORATED AREA

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061

060

059

058

Panel 26

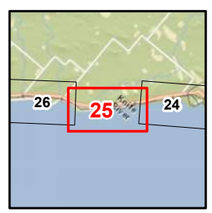
Panel 24

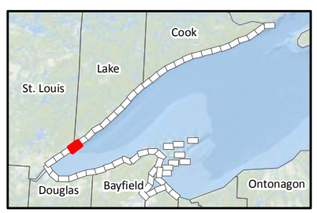
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary





COUNTIES
LAKE COUNTY
ST. LOUIS COUNTY

COMMUNITIES
TOWNSHIP OF DULUTH
LAKE COUNTY UNINCORPORATED AREA

FEMA STARR

Lake Superior
DRAFT TRANSECTS
Panel 25 of 99
(Map Set: MN / WI)

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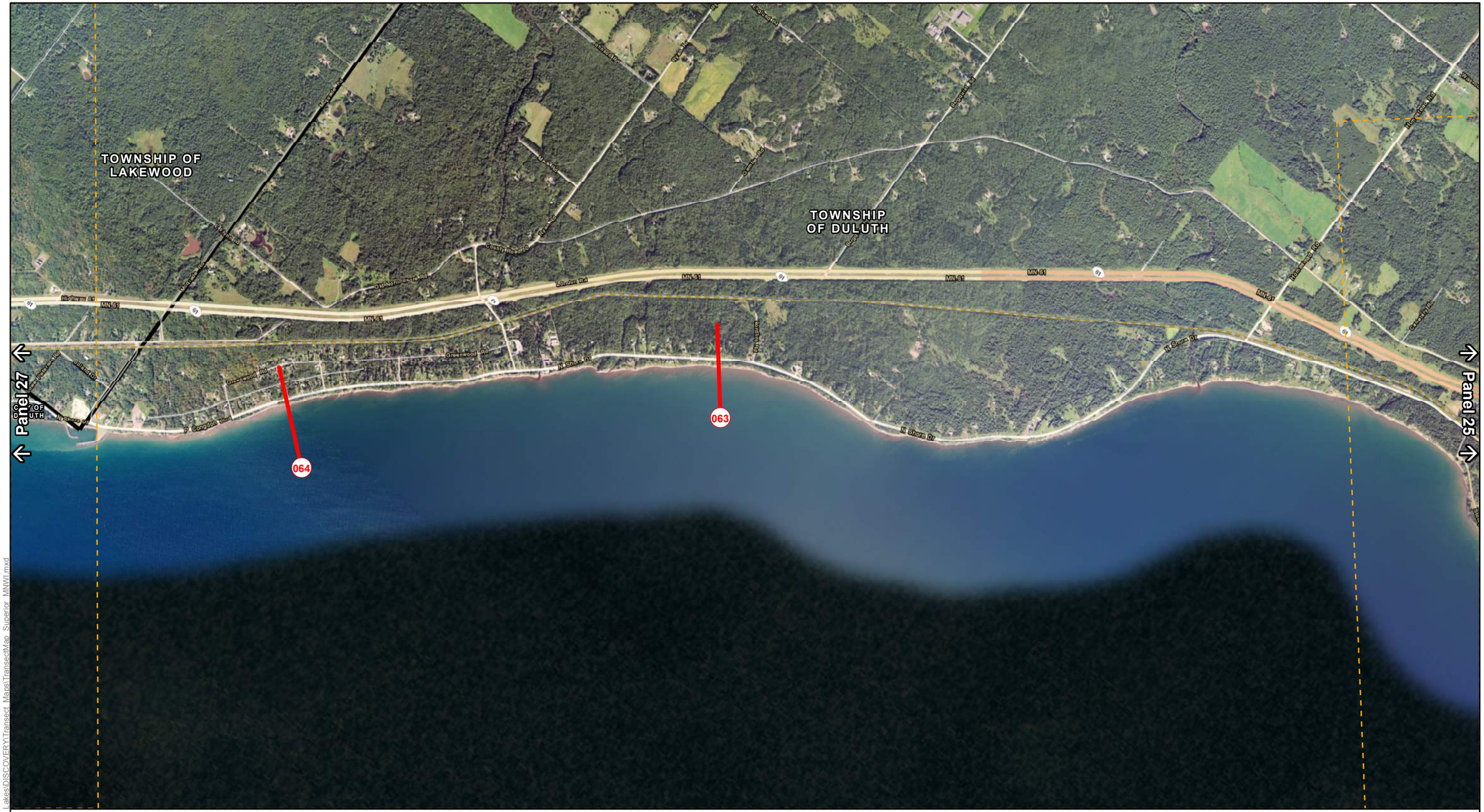

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Project Transect

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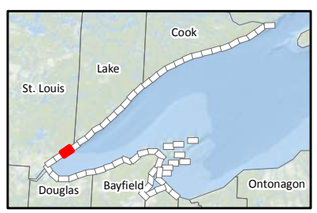
Political Boundary



COUNTIES
ST. LOUIS COUNTY

COMMUNITIES
CITY OF DULUTH
TOWNSHIP OF DULUTH
TOWNSHIP OF LAKEWOOD

FEMA STARR

Lake Superior
DRAFT TRANSECTS
Panel 26 of 99
(Map Set: MN / WI)

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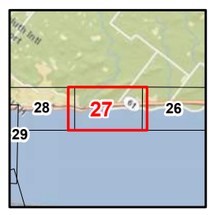
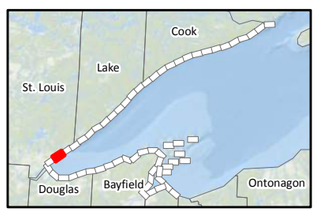
- Project Transect
- Adjoining Panel Edge
- Political Boundary





COUNTIES
ST. LOUIS COUNTY

COMMUNITIES
CITY OF DULUTH
TOWNSHIP OF DULUTH
TOWNSHIP OF LAKEWOOD

Lake Superior
DRAFT TRANSECTS
Panel 27 of 99
(Map Set: MN / WI)

CITY OF DULUTH

Panel 29

Panel 27

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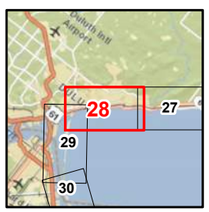
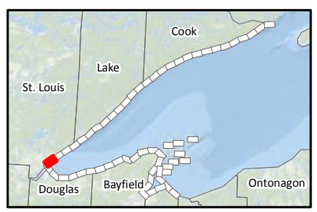
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary





COUNTIES
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COMMUNITIES
CITY OF DULUTH

FEMA STARR

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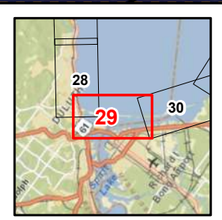

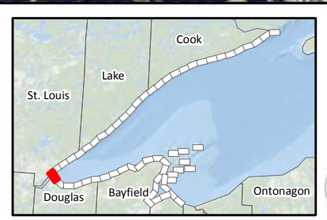

COUNTIES
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DOUGLAS COUNTY

COMMUNITIES
CITY OF DULUTH
CITY OF SUPERIOR

FEMA STARR

Lake Superior
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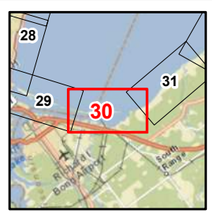
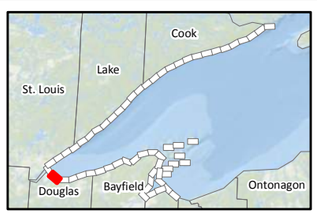




COUNTIES

ST. LOUIS COUNTY
DOUGLAS COUNTY

COMMUNITIES

CITY OF DULUTH
CITY OF SUPERIOR
DOUGLAS COUNTY UNINCORPORATED AREA

FEMA STARR

Lake Superior

DRAFT TRANSECTS

Panel 30 of 99

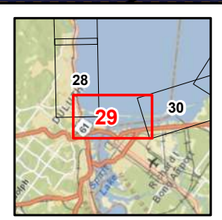
(Map Set: MN / WI)

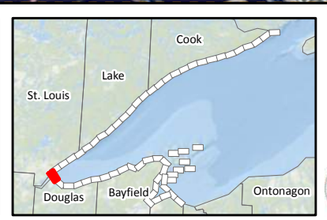
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary





COUNTIES
ST. LOUIS COUNTY
DOUGLAS COUNTY

COMMUNITIES
CITY OF DULUTH
CITY OF SUPERIOR

FEMA STARR

Lake Superior
DRAFT TRANSECTS
Panel 29 of 99
(Map Set: MN / WI)

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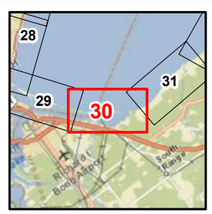
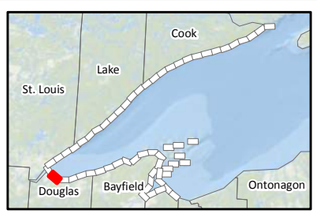
Project Transect

Adjoining Panel Edge

Political Boundary





COUNTIES

ST. LOUIS COUNTY
DOUGLAS COUNTY

COMMUNITIES

CITY OF DULUTH
CITY OF SUPERIOR
DOUGLAS COUNTY UNINCORPORATED AREA

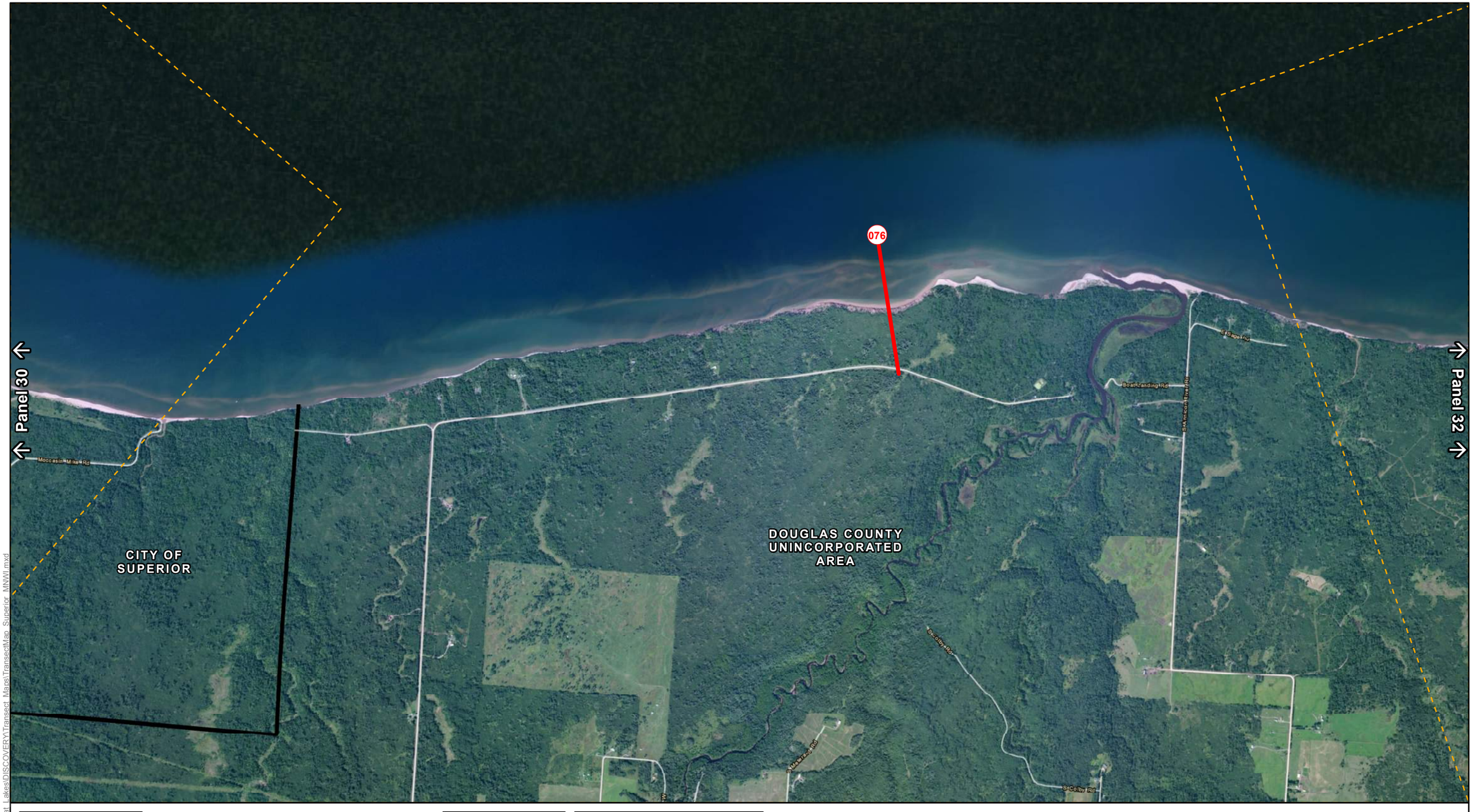
FEMA STARR

Lake Superior

DRAFT TRANSECTS

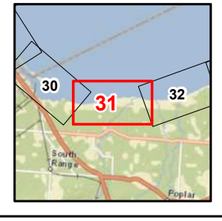
Panel 30 of 99

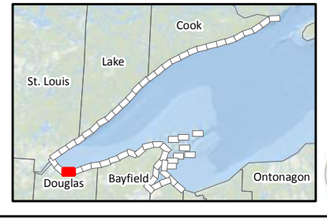
(Map Set: MN / WI)



N
W E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary





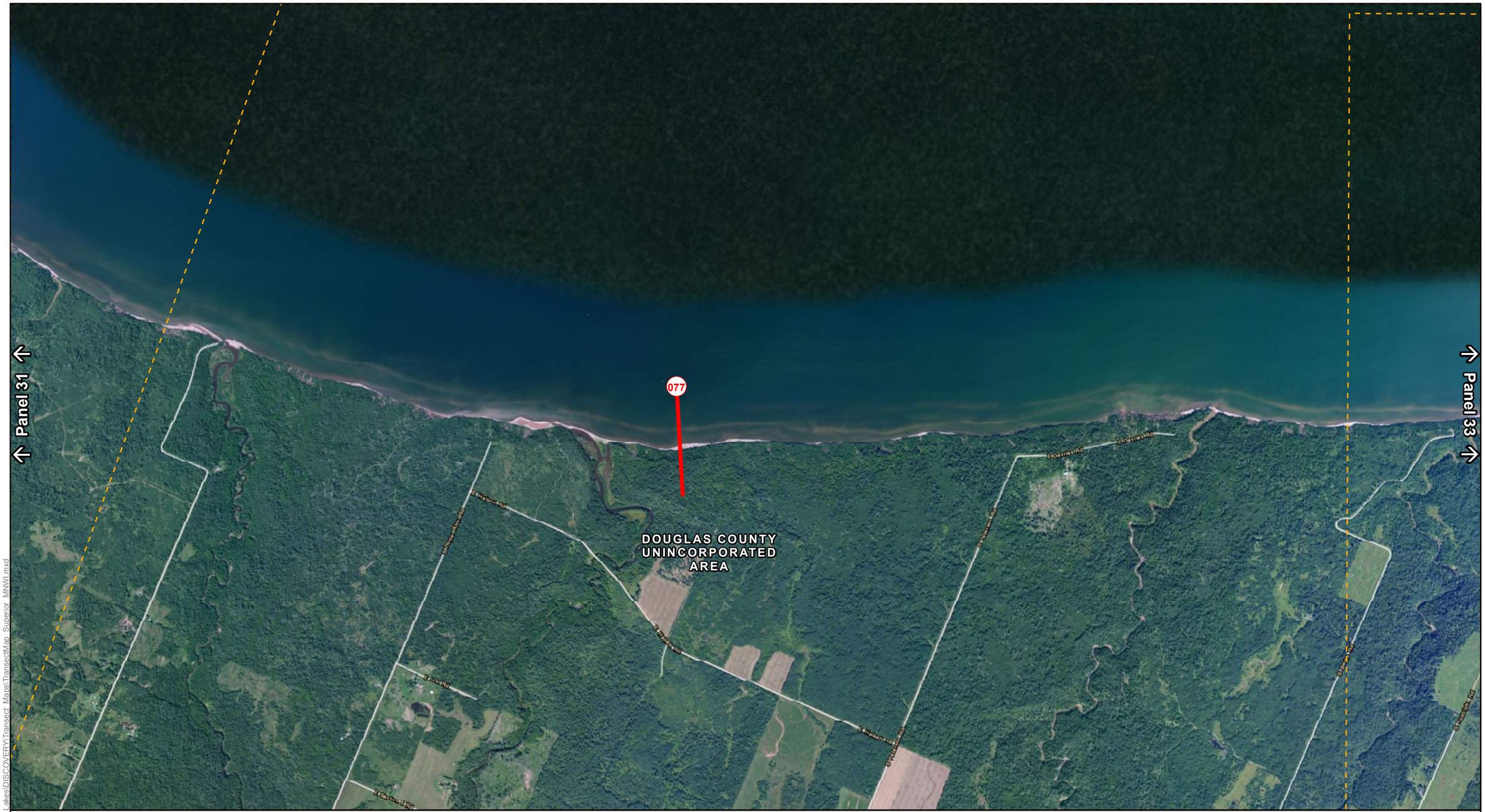
COUNTIES
DOUGLAS COUNTY

COMMUNITIES
CITY OF SUPERIOR
DOUGLAS COUNTY UNINCORPORATED AREA

FEMA STARR

Lake Superior
DRAFT TRANSECTS
Panel 31 of 99
(Map Set: MN / WI)

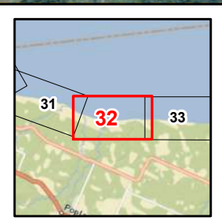
Path: C:\PROJECT DATA\FEMA\Great Lakes\DISCOVERY\Transect Maps\TransectMap_Superior_MNWI.mxd

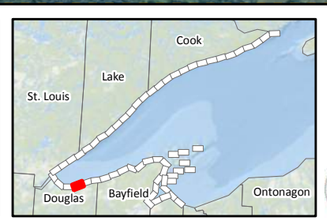


Path: C:\PROJECT_DATA\FEMA\Great_Lakes\DISCOVERY\Transect_Maps\TransectMap_Superior_MNWI.mxd

N
W
E
S
1 inch = 2,000 feet

Project Transect
Adjoining Panel Edge
Political Boundary



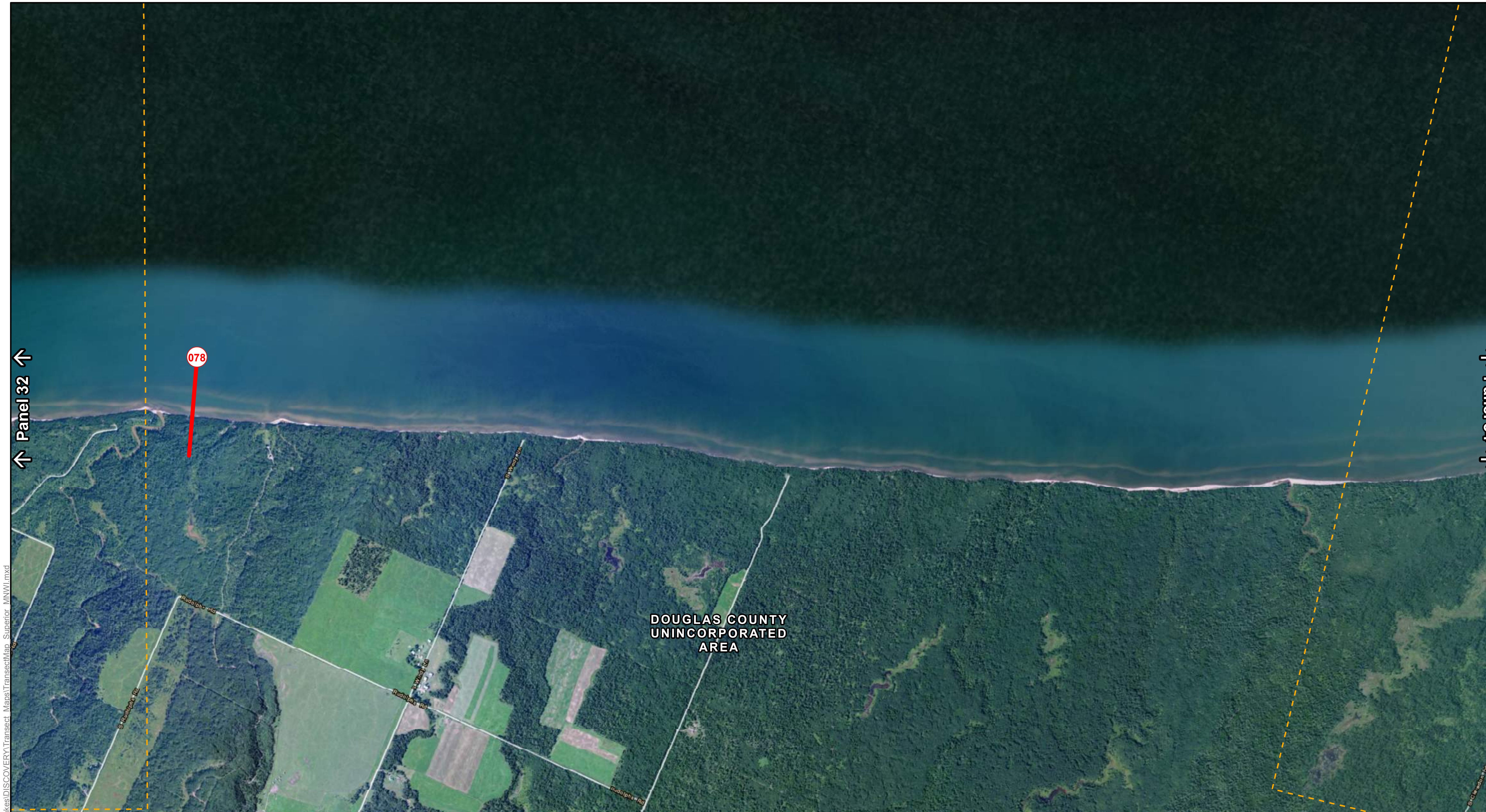


COUNTIES
DOUGLAS COUNTY

COMMUNITIES
DOUGLAS COUNTY UNINCORPORATED AREA

FEMA STARR

Lake Superior
DRAFT TRANSECTS
Panel 32 of 99
(Map Set: MN / WI)

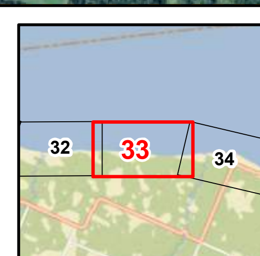


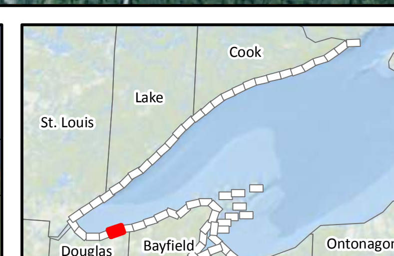
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary





COUNTIES

DOUGLAS COUNTY

COMMUNITIES

DOUGLAS COUNTY UNINCORPORATED AREA

FEMA STARR

Lake Superior

DRAFT TRANSECTS

Panel 33 of 99

(Map Set: MN / WI)

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

079

080

Panel 33

Panel 35

DOUGLAS COUNTY
UNINCORPORATED
AREA

BAYFIELD COUNTY
UNINCORPORATED AREA

N

W E

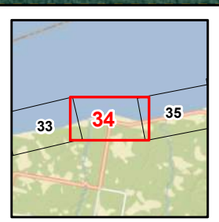
S

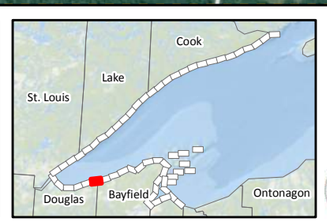
1 inch = 2,000 feet

Project Transect

Adjoining Panel Edge

Political Boundary





COUNTIES

DOUGLAS COUNTY
BAYFIELD COUNTY

COMMUNITIES

DOUGLAS COUNTY UNINCORPORATED AREA
BAYFIELD COUNTY UNINCORPORATED AREA

FEMA STARR

Lake Superior
DRAFT TRANSECTS
Panel 34 of 99
(Map Set: MN / WI)

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