APPENDIX D

St. Clair County Discovery Report

Discovery Report

Great Lakes Coastal Flood Study

Lake St. Clair

St. Clair County, Michigan Individual Report

Report Version 01

February 2013

FEMA

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Federal Emergency Management Agency Region V
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Date Submitted: February 2013

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.

St. Clair
Algonac, City of
Clay, Township of
Cottrellville, Township of
East China, Township of
Ira, Township of
Marine City, City of
Marysville, City of
Port Huron, City of
St. Clair, City of
St. Clair, Township of

Table of Contents

Table of Contents - continued

Table of Contents - continued

List of Tables

List of Figures

Attachments

Acronyms and Abbreviations

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

I. Discovery Overview

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

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

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

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

i. Great Lakes Coastal Flood Study

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

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

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

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

ii. Purpose of Great Lakes Discovery

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

This Discovery Report discusses the communities potentially affected by coastal flooding in St. Clair County, Michigan. This Discovery 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 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, but also on the type of datasets, local and national, that are available.

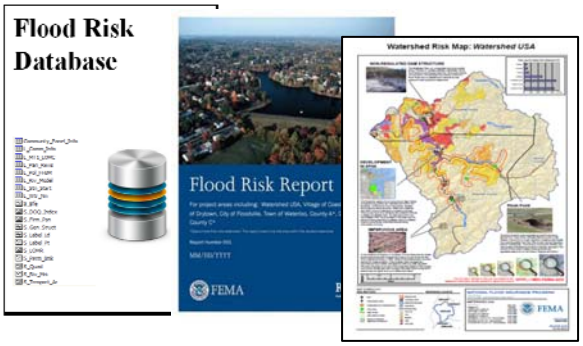
The following section describes the coastal flood risk products that a community may receive as part of a Risk MAP flood study, as well as some products that are under development for the Great Lakes study areas.

iii. Coastal Flood Risk Products

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

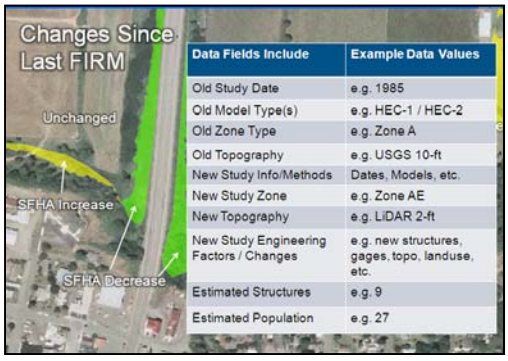
The three products are:

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

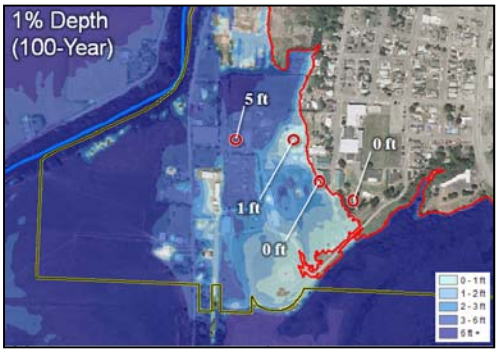


These products will summarize information captured in flood risk datasets that may be generated during a Risk MAP, or flood risk, study. The flood risk datasets could include regular and enhanced products. Standard flood risk datasets, also termed products, are listed below.

- **Changes Since Last FIRM (CSLF)**
  - The CSLFs serve the following purposes: Identifies areas and types of flood zone change:
    - Compares current effective (previous) with proposed (new) flood hazard mapping
    - Categorizes and quantifies flood zone changes
  - 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)**
  - Flood Depth and Analysis Grids (DAGs) will be created for the 1-percent-annual-chance event of the coastal engineering studies performed and as appropriate for the data. Wave runup areas may not be applicable.
  - Created using the regulatory mapping and associated zone breaks as input



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

HAZUS MH
EARTHQUAKE • WIND • FLOOD

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

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

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

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

II. Stakeholder Communication and Coordination

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

i. Lake St. Clair Discovery Stakeholder Coordination

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

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

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

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

- Base Map Data
- Coastal Data
- Historic Flood Data
- Risk Assessment

- Flood Mitigation Information
- Community Plans and Projects
- Other comments/concerns based on local knowledge

In addition to the hard copy letter invitations, and in order to improve the communication and data sharing leading up to the Discovery Meeting, FEMA offered local communities an opportunity to attend pre-Discovery Meeting conference call, referred to as an "Information Exchange Session". The conference call information was included in the Discovery Invitation letters mailed to local community officials, and an email reminder was sent out as well. The session's intent was to begin the process of learning about local data availability and what the critical issues are for the Great Lakes communities.

The core stakeholder documents, "Information Exchange Session" documents, stakeholder contact list, and Discovery Meeting invitations can be found in Attachment B, St. Clair County Pre-Meeting Correspondence.

III. St. Clair County Discovery Meeting

The Discovery Meeting for St. Clair County coastal communities was held on August 20, 2012 in Goodells, Michigan. Communities affected by coastal flooding in St. Clair County were invited to the Discovery Meeting. The purpose of this meeting was to facilitate discussion about study needs, mitigation project needs, desired compliance support, and local flood risk awareness efforts.

The objectives of the Discovery Meeting included:

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

The Discovery Meeting presentations included the following information:

- An overview of the Great Lakes Coastal Flood Study and schedule
- Review of the Discovery process and outcomes
- Discussion of coastal mapping and flood risk topics to be aware of
- Discussion of how the study may affect the communities, including compliance requirements
- Review of hazard mitigation opportunities and grant funding

- Encouragement and facilitation discussion regarding coastal study needs, mitigation project needs, desired compliance support, and local flood risk awareness efforts

A draft Discovery Map for St. Clair County (Attachment C) was 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 Discovery Map shown at the meeting included geospatial and tabular data that had been collected prior to the meeting:

Geospatial Data:

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

Tabular Data:

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

Participants at the Discovery Meeting were asked to cooperatively identify Areas of Concern and Areas of Mitigation Interest (AoMIs) within the St. Clair County Lake St. Clair study area using the Discovery Map and through general discussion during the meeting.

In addition to the draft Discovery Map, figures showing the location of initially proposed transects around St. Clair County were available for review and comment. Stakeholders were encouraged to review the proposed transects and provide comments related to the location of the transects. The proposed transect maps that were available at the Discovery

[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.

Meeting for St. Clair County can be found in Attachment D. A sample map is shown below as Figure 1.

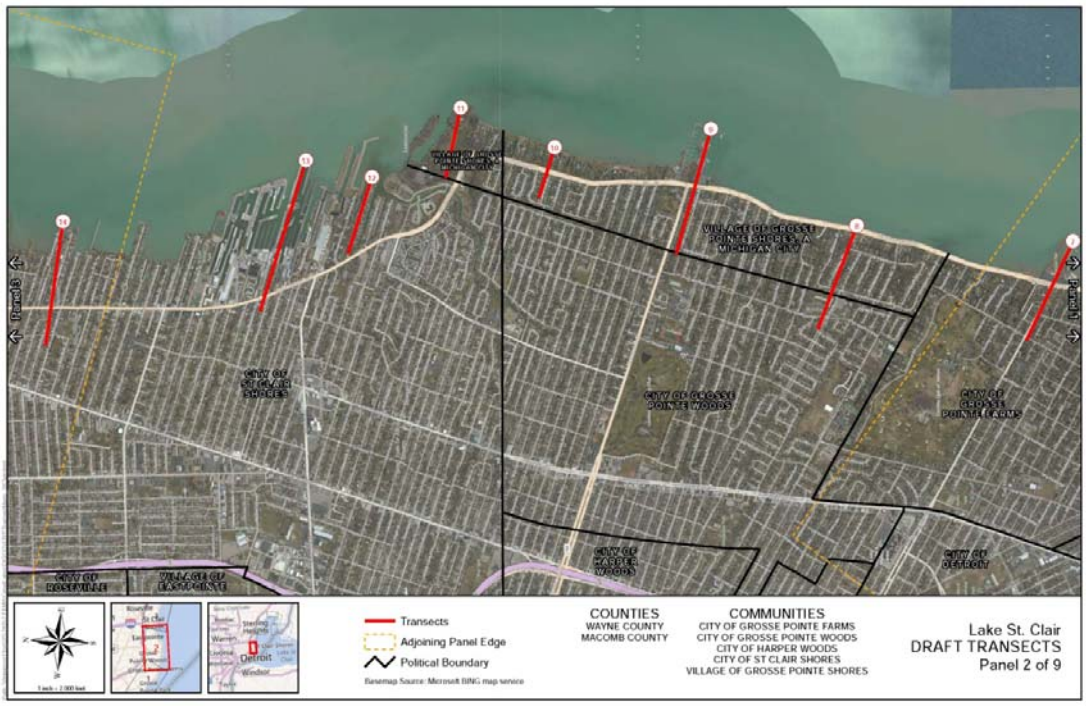


Figure 1: Sample Proposed Transect Figure

All comments that were provided during the St. Clair County Discovery Meeting have been compiled into the table below. While the draft Discovery Map and Transect Maps were not marked up with comments during the St. Clair County Discovery meeting, comments were captured in discussion throughout the Discovery Meeting. Each comment collected for St. Clair County is captured below.

Table 1. Stakeholder General Comments and Transect Comments

State	County	Location of comment	FIPS	CID	Comment
Michigan	St. Clair	St. Clair County shoreline	26147	N/A	Noted concern regarding overland flooding and how that risk will be mapped
Michigan	St. Clair	St. Clair County shoreline	26147	N/A	Concerns were expressed relative to density of near-shore vegetation, particularly phragmites, which may compromise accuracy of new LiDAR bathymetry being collected in 2012 and 2013

Table 1. Stakeholder General Comments and Transect Comments

State	County	Location of comment	FIPS	CID	Comment
Michigan	St. Clair	St. Clair County	26147	N/A	Requested the effective transects be used for Lake St Clair, where available

FIPS = Federal Information Processing Standards

CID = Community Identification Number

Discovery meeting minutes, sign in sheets, PowerPoint presentation, marked up draft Discovery Maps, and correspondence documentation have been included in Attachment E, St. Clair County Discovery Meeting Documents.

IV. Summary of Data Analysis

During this Discovery portion of the Lake St. Clair Coastal Flood Study project, a collection of tabular and spatial data was conducted for all the coastal communities from Federal and State sources, as well as information collected through phone conversation, the information exchange session conference call, the Discovery Meeting, and the Discovery Coastal Data Request Forms sent to each coastal community. This section lists the types of data and their sources that were collected for the St. Clair County study area, including information collected during and after the Discovery Meeting. The data analysis that follows Table 2 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. Clair County Lake St. Clair Project Area prior to moving forward with the coastal flood study.

Table 2. Data Collected for St. Clair County

Data Types	Deliverable/Product	Source	Date of Data Collection	Level
Average Annualized Loss Data (AAL)	Discovery Map	Federal Emergency Management Agency (FEMA)	June 2012	Nationwide
Bathymetry and Topography	Discovery Report	USACE	2012	Lakewide
Census Blocks	Discovery Map	U.S. Census Bureau	June 2012	Countywide
Coastal Data Request Form	Discovery Report	Community and County Stakeholders	July 2012	Countywide
Contacts	Discovery Report	Local Community Websites, State/FEMA updates	June 2012	Countywide
Community Assistance Visits (CAVs)	Discovery Report	FEMA Community Information System (CIS)	July 2012	Countywide

Table 2. Data Collected for St. Clair County

Data Types	Deliverable/Product	Source	Date of Data Collection	Level
Community Rating System (CRS)	Discovery Report	FEMA's "Community Rating System Communities and Their Classes"	July 2012	Nationwide
Comprehensive Plans	Discovery Report	Local Community Websites	July 2012	Countywide
Coastal Barrier Resources System (CBRS)	Discovery Map	U.S. Fish and Wildlife Service	July 2012	Nationwide
Coastal Structures	Discovery Map/Tabular Data	U.S. Army Corps of Engineers (USACE)	August 2012	Nationwide
Coordinated Needs Management Strategy (CNMS)	Discovery Map	FEMA	July 2012	Countywide
Critically Erosion Beach Areas	None Identified	None Identified	N/A	Countywide
Critical Facilities	Discovery Report	Local Mitigation Plan	July 2012	Countywide
Dams	Discovery Report	USACE, National Inventory of Dams, Flood Insurance Rate Map (FIRM) Database	July 2012	Countywide
Declared Disasters	Discovery Report	FEMA's "Disaster Declarations Summary"	June 2012	Nationwide
Demographics, Industry	Discovery Report	U.S. Census Bureau, Local Mitigation Plans	June 2012	Countywide
Effective Floodplains	Discovery Map	FEMA Map Service Center and Mapping Information Platform	June 2012	Countywide
Flood Insurance Policies	Discovery Report	FEMA CIS	July 2012	Nationwide
Hazard Mitigation Plans and Status	Discovery Report	Local Mitigation Plans	July 2012	Countywide
Hazard Mitigation Assistance Program Grants Received	Discovery Report	FEMA's "Hazard Mitigation Program Summary" Community Input	June 2012	Nationwide
Hazard Mitigation Projects	Discovery Report	Local Mitigation Plans	July 2012	Countywide
High Water Marks	Discovery Report, Tabular Data	Effective Flood Insurance Study (FIS)	August 2012	Countywide
Historical Flooding	Discovery Report	Effective Flood Insurance Study (FIS), Local Mitigation Plans	July 2012	Countywide
Historical Storm Events	Discovery Report	Effective FIS, Local Mitigation Plans	July 2012	Countywide

Table 2. Data Collected for St. Clair County

Data Types	Deliverable/Product	Source	Date of Data Collection	Level
Individual/Public Assistance	Discovery Report	FEMA's "Public Assistance Subgrantee Summary"	June 2012	Nationwide
Local Data	Discovery Report	Coastal Data Request Form completed by communities	August 2012	Countywide
Letters of Map Change (LOMCs)	Discovery Map	FEMA's Mapping Information Platform	July 2012	Countywide
Meteorological Gages	Discovery Map	National Oceanic and Atmospheric Administration (NOAA) Great Lakes Environmental Research Laboratory	July 2012	Regionwide
Oblique Imagery	Discovery Report	USACE	2012	Lakewide
Ordinance Status	Discovery Report	Local Community Websites	July 2012	Countywide
Repetitive Loss	Discovery Report	FEMA CIS	July 2012	Countywide
Shoreline Classification	Discovery Map	USACE	July 2012	Regionwide
Stream Gages	Discovery Map	USGS	July 2012	Countywide
Water Level Gages	Discovery Map	NOAA Department of Fisheries and Oceans	July 2012	Regionwide
Wave Gages	Discovery Map	NOAA	July 2012	Regionwide

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

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

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

The Average Annualized Loss (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/proposed mitigation projects or future development patterns and practices, and it can run specialized risk assessments, such as what happens when a dam or levee fails.

Hazus-MH includes national datasets that can be supplemented with local data. If local detailed data are available, users may consider using this data to perform more refined Hazus analyses. Hazus-MH is flexible and allows users to update Hazus-MH with local data or use a combination of both local and national. Augmenting the Hazus-MH provided data with local data can improve the accuracy and resolution of analysis results. Additional information about the Hazus-MH process and tool can be found at http://www.fema.gov/protecting-our-communities/hazus.

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

The results are shown in the table below. 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 Discovery Map (Attachment C).

Table 3. Hazus AAL Data for St. Clair County

County	FIPS Code	Total (in thousands of $)	Building (in thousands of $)	Content (in thousands of $)
St. Clair	26147	597,575	265,237	312,931

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 St. Clair. 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.

In Michigan, areas prone to erosion along the shoreline, including Lake St. Clair, are subject to special setback requirements established by the Michigan Department of

Environmental Quality (MDEQ). From the MDEQ's website, high risk erosion areas are those shorelands of the Great Lakes and connecting waters where recession of the zone of active erosion has been occurring at a long-term average rate of one foot or more per year. The erosion can be caused from one or several factors, including high water levels, storms, wind, ground water seepage, surface water runoff, and frost. The high risk erosion area regulations require setback distances to protect new structures from erosion for a period of 30 to 60 years, depending on the size, number of living units, and type of construction. Approximately 300 miles of shoreline are classified as high risk erosion area in Michigan. Updates of the recession rate studies, which form the basis of the setbacks, are periodically conducted to reflect changing water levels and shore protection efforts.

For the Lake St. Clair study area, high risk erosion area maps were provided by MDEQ as part of this Discovery process for the Township of Fort Gratiot (part of Lake Huron study) and the City of Port Huron (St. Clair County). The maps depict the high risk erosion areas and show the number, in feet, of the 30-year projected recession distance and 50-year projected recession distance.

Additional information can be found at the MDEQs High Risk Erosion Areas website at http://www.michigan.gov/deq/0,1607,7-135-3313_3677_3700-10860--,00.html .

If users of this Discovery Report have any additional erosion or recession data or photographs that you would like to submit, please contact FEMA Region V Mitigation Division.

I.IV.i.3 Federal Land

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

No federal lands were found in the St. Clair County project area.

I.IV.i.4 Jurisdictional Boundaries

St. Clair County jurisdictional boundaries were obtained from the May 3, 2010 effective FIRM database. The source of that data is the "Michigan Geographic Framework" dataset available through Michigan CGI (Center for Geographic Information) at http://www.mcgi.state.mi.us/mgdl/.

I.IV.i.5 Local Data

As part of this Discovery process, communities were asked to fill out a Coastal Data Request Form and provide information on data that they had available at the local level

that may useful during the coastal flood study analysis. The Coastal Data Request Form (Attachment A) included data requests for base map data, coastal data, historic flood data, risk assessment information, mitigation information, and community plans and projects.

Communities from the St. Clair County project area did not submit information or data via the Coastal Data Request Form at the time this report was created. However, the Southeast Michigan Council of Governments (SEMCOG) noted they maintain a large set of digital data for the area, including LiDAR, contours, and 2010 building footprints.

On a state-level, Michigan CGI Geographic Data Library Catalog at http://www.mcgi.state.mi.us/mgdl/ serves as the state's repository of digital geographic information. Michigan State University Map Library at http://www2.lib.msu.edu/branches/map/index.jsp provides coverage of state boundary data, historical county boundary data, elevation data, and environmental data.

I.IV.i.6 Publicly Owned Land

The Michigan CGI Geographic Data Library Catalog at http://www.mcgi.state.mi.us/mgdl/ currently contains over 60 unique statewide datasets including the state's base map, aerial imagery, geology, hydrography, land ownership, topography, and much more. Publicly owned lands (national, state, and local parks, forests, etc.) were found in "DNR Land and Mineral Ownership" dataset available through Michigan CGI.

While this dataset indicated there are various parcels scattered throughout the county with DNR mineral and/or land ownership, no publicly-owned lands of a large land mass were found along the shoreline of St. Clair County within the study area.

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 St. Clair. The dataset includes identification of "artificial" shoreline, which may be indicative of local coastal flood protection structures. This dataset does not identify the level of protection of any coastal structures, and it does not validate whether or not a coastal structure exists. The current dataset contains data at one-mile spacing. The dataset does not include field-based reconnaissance or sediment/subsurface soil collection. The dataset can be downloaded from http://www.greatlakescoast.org/ under the "Technical Resources" section.

From this dataset, the approximate shoreline along St. Clair County, including St. Clair River, that is covered by this Great Lakes Coastal Flood Study totals 154.3 miles. The shoreline classification information for St. Clair County is summarized in Tables 4 through 7, including shoreline types, land uses, coverage, and vegetation types, respectively.

Table 4. 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. Clair County (Lake St. Clair)	125.3	55.1	--	48.9	20.7	0.6
St. Clair County (St. Clair River)	29.0	27.1	0.6	--	1.3	--

Source: USACE 2012, Lake St. Clair Shoreline Classification

Table 5. 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. Clair County (Lake St. Clair)	128.5	0.6	--	--	9.3	17.0	31.3	70.3
St. Clair County (St. Clair River)	29.0	8.2	--	--	1.3	0.6	18.3	0.6

Source: USACE 2012, Lake St. Clair Shoreline Classification

Table 6. 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)
St. Clair County (Lake St. Clair)	128.5	--	72.8	--	55.7	--	--
St. Clair County (St. Clair River)	29.0	3.2	--	--	25.8	--	--

Source: USACE 2012, Lake St. Clair Shoreline Classification

Table 7. 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. Clair County (Lake St. Clair)	128.5	--	--	57.6	--	--	70.9
St. Clair County (St. Clair River)	29.0	--	--	26.5	--	2.5	--

Source: USACE 2012, Lake St. Clair Shoreline Classification

I.IV.i.8 Stream Lines/Hydrograph

Stream lines and water areas for St. Clair County were acquired from the May 3, 2010 effective FIRM database. The source of that data is the National Hydrography Dataset (NHD) available through USGS at http://nhd.usgs.gov. The NHD is a digital vector

dataset used by GIS. It contains features such as lakes, ponds, streams, rivers, canals, dams and stream gages. The datasets are designed to be used in general mapping and in the analysis of surface-water systems.

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 St. Clair shoreline. Topography is the configuration of natural and man-made features of a surface area and their relative position and elevations. Bathymetry is the underwater equivalent to topography.

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

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

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

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

ground and the ground truth data will be unbiased and within +/-15 cm (RMSE[3]) in flat terrain and within +/-30 cm (RMSE) in hilly terrain. Horizontal positions will be accurate to +/- 1.5m (RMSE). Data will be processed to 2ft contours.

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

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

As part of the GLCFS, USACE collected oblique imagery for the entire Great Lakes coastline in 2012. Oblique imagery is captured at an angle, as compared to an overhead view provided by orthophotos, and allows users a 3-dimensional view of landscape, buildings, and other features. This dataset may be useful to communities during emergency response, planning, and identification of shoreline types and obstructions; and management of assets, critical facilities, and public properties along the Lake St. Clair 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 .

A compilation of State and local-level topographic and bathymetric data available in St. Clair County is listed below:

- SEMCOG Aerial Imagery Collection:

  http://www.semcog.org/Aerials.aspx

  SEMCOG was awarded an ARRA (American Recovery and Reinvestment Act) grant to acquire LiDAR data at 1.5-meter average post spacing for the Livingston, Macomb, Monroe, and St. Clair Counties in Spring 2010. The base resolution for the seven county region is one-foot pixel resolution. In addition, 2009 LiDAR was captured for Washtenaw and Wayne Counties.

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

LiDAR Acquisition information is listed by county at http://www.semcog.org/uploadedFiles/Data_and_Maps/Aerials/2010productcontacts.pdf

- Michigan Department of Technology, Management & Budget (DTMB):

  http://www.mcgi.state.mi.us/mgdl/?action=thm
  DTMB lists various data including Digital Elevation Models (DEMs), Digital Raster Graphics (DRGs), Great Lakes Bathymetric Contours, Great Lakes Bathymetry, and Topo Quad Boundaries.

I.IV.i.10 Transportation

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

In addition, transportation data was obtained from the St. Clair County May 3, 2010 effective FIRM database. The source of that data is the "Michigan Geographic Framework" dataset available through Michigan CGI (Center for Geographic Information) at http://www.mcgi.state.mi.us/mgdl/.

I.IV.i.11 Watershed Boundaries

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

St. Clair County project area contains portions of three HUC-8 watersheds: Lake St. Clair (04090002), Birch-Willow (04080104) and St. Clair (04090001).

ii. Other Data and Information

St. Clair County is located in the southeastern portion of the lower peninsula of Michigan. It is bordered on the south by Lake St. Clair and Macomb County; on the west by Lapeer County; on the north by Sanilac County; on the northeast by Lake Huron and on the east by the St. Clair River. The major transportation arteries of St. Clair County are I-94, I-69, Gratiot Avenue, 26-Mile Road, Michigan State Highway 29, Fred W. Moore Highway, and Belle River Road. The 2010 census population of St. Clair County was reported to be 163,040 (U.S. Census Bureau, 2010).

As is the case for most of Michigan, the climate of St. Clair County is affected by the moderating influence of the Great Lakes. The heat storage capacity of the lakes tends to dampen climatic extremes and to delay seasonal changes. Lake breezes can lower daily maximum temperatures by as much as 15° F relative to the areas not under their influence. Climatology data was gathered from Michigan State Climatologist's Office, a service of

the Michigan State University Department of Geography. St. Clair County's climate is continental. On average, the warmest month is July, with an average maximum temperature of 81.9° F, as recorded at the station located in Port Huron. The lowest average daily minimum temperature occurs in January and averages 16.1° F. The average total annual precipitation is 31.5 inches, well distributed seasonally. Average annual snowfall is about 38.5 inches, with most falling in December through March. The highest monthly snow fall was 39.4 inches in December 2000 (Michigan State Climatologist's Office, Port Huron Station 6680, 2009).

St. Clair County is largely drained in the north by the Black River and its tributaries; by the Pine River in the central portion; and in the southern portion of the county by the Belle River and its tributaries. The rivers empty into the St. Clair River which borders the county to the east and flows from Lake Huron to Lake St. Clair. The soils that have developed belong to the Podzolic Group and are mostly silt loams and sand loams that are somewhat poorly drained. The northern and southern portion of the county is mostly flat to gently rolling sandy loams with most development being residential and occurring along Lake Huron and Lake St. Clair's shoreline, respectively. Ponding does occur as the soils are difficult to drain (Federal Emergency Management Agency, 2010).

I.IV.ii.1 Coastal Barrier Resources Systems

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

St. Clair County project area has no designated units of the coastal barriers along the Lake St. Clair shoreline.

I.IV.ii.2 Coastal Flood Protection Measures

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

Much of the shoreline along Lake St. Clair has steel, concrete, and wood seawalls and breakwaters to protect from flooding and erosion. However, most of these protective works have been inadequate and easily topped by flood waters. It's important to note that these shore protection measures are multi-purpose in nature and do not necessarily offer protection from the 1-percent annual chance of occurrence flood elevations; however, they may protect from most ice damage and from floods of lesser magnitude.

During 1972 and 1973, the USACE took emergency measures with Operation Foresight. This program was a cooperative effort between Federal, State, and local governments. With the help of the USACE, most of the shore and canal properties were protected by dikes of sandbags and cribbing under cooperation of residents and volunteers. In St. Clair County, under Operation Foresight, elevations of 580.8 (NAVD88) feet were established for lakefront dikes and 578.5 (NAVD88) feet for canal dikes (U.S. Army Corps of Engineers, 1974)

The design for Operation Foresight was for a temporary measure and the dikes and other structures have since been partially removed by home owners. The protection measures were constructed to meet immediate flood threats and were never considered to be permanent. Earth-filled dikes may provide protection from wave action and spray, however, when they are breached or overtopped, they tend to entrap water behind the wall and do not permit drainage back into the Lake (U.S. Army Corps of Engineers, 1974).

Many local property owners use seawalls, revetments, riprap, and/or groins to prevent storm damage and beach erosion along Lake St. Clair. Concrete and steel sheet piling at the bank level protect against erosion. (Federal Emergency Managment Agency, 2010).

USACE maintains a large infrastructure of over 900 coastal structures in the United States. These coastal structures protect harbors and shore-based infrastructure, provide beach and shoreline stability control, provide flood protection to varying degrees, and protect coastal communities, roadways and bridges, etc. These maintained coastal structures include seawalls, bulkheads, revetments, dikes and levees, breakwaters, groins, sills/perched beaches, and jetties and piers. The Enterprise Coastal Inventory Database from the Engineer Research and Development Center (ERDC) was obtained through USACE to determine where these structures exist along Lake St. Clair. No USACE maintained coastal structures were found to exist along the St. Clair County shoreline.

FEMA's Midterm Levee Inventory (MLI) project compiled a database of structures that were designed to provide at least the minimum level of protection from the base flood level (1- percent-annual-chance flood). For this Discovery process, the November 2011 MLI Status Report published by FEMA was reviewed. The MLI Levee database showed no levee segments along the St. Clair County shoreline that provide protection from the base flood.

I.IV.ii.3 Community Assisted Visits

Statewide Community Assistance Visits (CAVs) are part of the evaluation and review process used by FEMA and local officials to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. Generally, a CAV consists of a tour of the floodplain, an inspection of community permit files, and meetings with local appointed and elected officials. During a CAV, observations and investigations focus on identifying issues in various areas, such as the community's floodplain management regulations (ordinance), community

administration and enforcement procedures, engineering or other issues within the FIRMs, other problems in the community's floodplain management, and problems with the biennial report data. Any administrative problems or potential violations identified during a CAV are documented in the CAV findings report. The community is notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines.

The summary of CAV visits were extracted from the FEMA Community Information System (CIS) (https://portal.fema.gov/famsVuWeb/home) July 2012.

The summary of CAV visits were extracted from FEMA's Community Information System (CIS) at https://portal.fema.gov in July 2012. Table 8 shows the most recent CAV date by community in this project area.

Table 8. Summary of Community Assisted Visits

Community	CID	CAV Date
Algonac, City of	260191	5/13/1992
Clay, Township of	260194	7/21/2009
Cottrellville, Township of	260196	N/A
East China, Township of	260197	2/6/2009
Ira, Township of	260199	2/16/2012
Marine City, City of	260200	5/13/1992
Marysville, City of	260201	N/A
Port Huron, City of	260204	N/A
St. Clair, City of	260279	8/30/2000
St. Clair, Township of	260205	10/26/2009

CID = Community Identification
CAV = Community Assisted Visit

I.IV.ii.4 Community Rating System

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

No communities along the Lake St. Clair shoreline in St. Clair County currently participate in the CRS program.

I.IV.ii.5 Comprehensive Plans

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

The St. Clair County Comprehensive Plan can be downloaded here: http://cis.stclaircounty.org/

Comprehensive plans were not collected or provided during this Discovery process for the individual communities along the Lake St. Clair shoreline in St. Clair County.

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

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

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

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

information to determine whether they are "Valid" or "Unverified" (Federal Emergency Managment Agency, 2010).

Table 9 summarizes the draft results of the validation analysis obtained from CNMS in June 2012. CNMS only captures riverine studies at this time.

Table 9. CNMS Status for St. Clair County

County	FIPS	Stream Miles			
		Unknown	Unverified	Valid	Total
St. Clair	26147	0	46	218	265

I.IV.ii.7 Critical Facilities

Critical facilities are the facilities that can impact the delivery of vital services, cause greater damages to other sectors of a community, or put special populations at risk. Hospitals, roads, schools, and shelters are all examples of critical facilities that play a central role in disaster response and recovery. Understanding which facilities are exposed, and the degree of that exposure, can help reduce or eliminate service interruptions and costly redevelopment. Incorporating this information into development planning helps communities get back on their feet faster. In St. Clair County, 8-percent of critical facilities and 6-percent of road miles (or 132 miles) are within a floodplain (National Oceanic & Atmospheric Administration, 2009).

Location of critical facilities within a county or community can be viewed from the NOAA Coastal Services Center, Critical Facilities Flood Exposure Tool at http://www.csc.noaa.gov/criticalfacilities/

The assessment of the flood risk posed to critical facilities is an important aspect of the Hazard Mitigation Plans (HMPs). Information on critical features can also be found in the St. Clair County Hazard Mitigation Plan, but were not compiled as part of this report.

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

According to the Critical Dune Area Maps maintained by MDEQ at http://www.michigan.gov/deq/0,4561,7-135-3311_4114_4236-70207--,00.html (accessed July 2012), there are no critical dune areas along Lake St. Clair.

Critically eroded beaches and beach nourishment/dune replacement projects were not identified in St. Clair County through this Discovery process.

I.IV.ii.9 Dams

The National Inventory of Dams (NID) is a congressionally authorized database that documents dams in the United States and its territories. The current NID, published in 2010, includes information on 84,000 dams that are more than 25 feet high, hold more than 50 acre-feet of water, or are considered a significant hazard if they fail. The NID is

maintained and published by the USACE, in cooperation with the Association of State Dam Safety Officials, the States and territories, and Federal dam-regulating agencies. The database contains information about the dams' locations, sizes, purposes, types, last inspections, regulatory facts, and other technical data. The information contained in the NID is updated approximately every 2 years.

The NID is available at the USACE website https://nid.usace.army.mil/. At the time this report was compiled, no dams were identified within the St. Clair County project area.

I.IV.ii.10 Declared Disasters

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

The list of FEMA's disaster declarations is available at http://www.fema.gov/data-feeds and also by county through https://explore.data.gov/Other/FEMA-Disaster-Declarations-Summary/uihf-be6u. Table 10 lists the major disaster declarations that have been declared in all of St. Clair County.

Table 10. Declared Disasters in St. Clair County

Declared County/Area	Disaster Number	Declaration Date	Incident Type	Description
St. Clair (County)	363	12/1/1972	Flood	Severe storms & flooding
St. Clair (County)	371	4/12/1973	Flood	Severe storms & flooding
St. Clair (County)	465	4/26/1975	Flood	Severe storms, high winds & flooding
St. Clair (County)	495	3/19/1976	Severe Storm(s)	Severe storms, tornadoes, icing & flooding
St. Clair (County)	1128	7/23/1996	Severe Storm(s)	Severe storms and flooding
St. Clair (County)	1527	6/30/2004	Severe Storm(s)	Severe storms, tornadoes, and flooding
St. Clair (County)	3057	1/27/1978	Snow	Blizzards & snowstorms
St. Clair (County)	3160	1/10/2001	Snow	Snow
St. Clair (County)	3189	9/23/2003	Other	Power outage
St. Clair (County)	3225	9/7/2005	Hurricane	Hurricane katrina evacuation*

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

I.IV.ii.11 Flood Insurance Policies

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

Table 11 below summarizes the numbers and premiums of insurance policies, the total coverage, and the numbers and dollar amounts of paid losses in communities of St. Clair County. The data were based on Community Summary Reports that were extracted from FEMA's CIS website (https://portal.fema.gov/) in July 2012.

Table 11. Summary of Flood Insurance Policies and Claims

Community	CID	Number of Policies	Total Premium	Total Coverage	Number of claims since 1978	Dollar ($) paid for claims since 1978
Algonac, City of	260191	260	$ 182,700	$ 45,180,200	86	$274,798
Clay, Township of	260194	940	$ 627,207	$ 167,665,000	421	$1,086,171
Cottrellville, Township of	260196	36	$ 25,420	$ 7,955,200	13	$29,135
East China, Township of	260197	145	$ 105,344	$ 26,327,900	96	$500,538
Ira, Township of	260199	192	$ 125,020	$ 35,169,900	95	$144,958
Marine City, City of	260200	33	$ 20,033	$ 5,794,000	45	$202,334
Marysville, City of	260201	10	$ 4,460	$ 2,479,000	4	$1,834
Port Huron, City of	260204	50	$ 37,499	$ 11,608,300	26	$136,091
St. Clair, City of	260279	14	$ 8,650	$ 3,157,000	11	$6,746
St. Clair, Township of	260205	4	$ 2,688	$ 856,200	3	$3,268

CID = Community Identification

Source: FEMA's CIS "Community Disaster Detail – Flood Insurance" report

I.IV.ii.12 Gage Data

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

Meteorological Stations

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

Table 12 shows the meteorological station identification number and location for the gages in the St. Clair County study area.

Table 12: Meteorological Stations in St. Clair County

County	Station ID	Location	Owner	Data	Years of Historical Data
St. Clair	AGCM4	Algonac, MI	National Ocean Service	Meteorological Observation	2012
St. Clair	FTGM4	Fort Gratiot, MI	National Ocean Service	Meteorological Observation	2004-Present
St. Clair	MBRM4	Mouth of Black River, MI	National Ocean Service	Meteorological Observation	2009-Present

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

Stream Gages

The USGS National Water Information System Web Interface http://waterdata.usgs.gov/nwis, provides real-time data for any given stream gage location. Table 13 shows the gage identification numbers and locations for the gages in the study areas of St. Clair County. USGS stream gage locations are shown on the Discovery Map.

Table 13. Stream Gage Stations in St. Clair County

Gage ID	Begin Date	End Date	Gage Location
04159488	1978/01/01	1982/10/04	Silver Creek near Jeddo, MI
04159492	1944/03/01	2000/09/30	Black River near Jeddo, MI
04159500	1944/03/01	1991/09/30	Black River near Fargo, MI
04159900	1963/04/01	2000/09/30	Mill Creek near Avoca, MI
04160000	1947/06/01	1964/09/30	Mill Creek near Abbottsford, MI
04160050	1932/10/01	1943/12/31	Black River near Port Huron, MI
04160600	1962/10/01	2000/09/30	Belle River at Memphis, MI

Water Level Station

NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) maintains several water level stations along Lake St. Clair. 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.

Table 14 lists the water level stations along Lake St. Clair

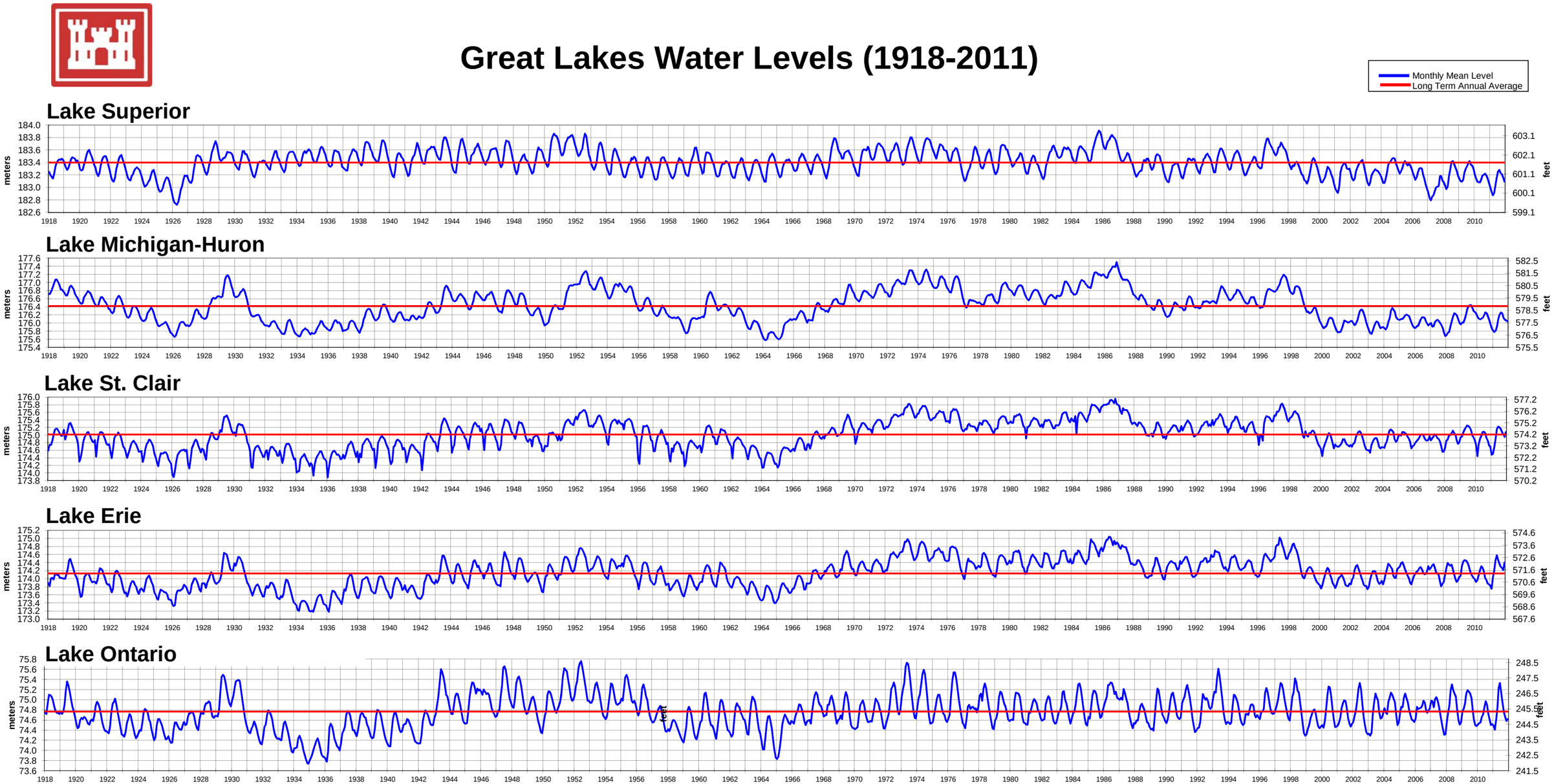
Table 14. Water Level Stations

Station Number	Station	Latitude	Longitude	Hourly Records	6-minute Records
9014070	Algonac, MI	42° 37.2' N	82° 31.6' W	1/1975 – 1/2010	1/1996 – 2010
9034052	St. Clair Shores, MI	42° 28.3' N	82° 52.3' W	1/1975 – 1/2010	1/1996 – 2010
9044036	Fort Wayne, MI	42° 17.9' N	83° 50.5' W	1/1975 – 1/2010	1/1996 – 2010
9044049	Windmill Point, MI	42° 21.4' N	82° 55.8' W	1/1975 – 1/2010	1/1999 – 2010

The station information and water level data are available at NOAA CO-OPS Website: http://tidesandcurrents.noaa.gov/station_retrieve.shtml?type=Great Lakes Water Level Data&state=St.+Clair+River&id1=841.

The monthly high and low water level data from the year 1918 to 2011 at Lake St. Clair are available at the USACE website: http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/. Figure 2 is USACE's graphic that shows Historic Great Lakes Water Levels from 1918 to 2011 (U.S. Army Corps of Engineers, 2012).

Great Lakes Water Levels (1918-2011)



The monthly average levels are based on a network of water level gages located around the lakes.

Elevations are referenced to the International Great Lakes Datum (1985).

The Great Lakes Water Levels Report provides daily mean water levels of Lake St. Clair for the past three months. The data are available at the USACE website at http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/currentconditions/great lakes waterlevels/.

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://climate.geo.msu.edu

I.IV.ii.13 Hazard Mitigation Plans

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

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

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

Local mitigation plans are required to be updated every 5 years to maintain eligibility for FEMA Hazard Mitigation Assistance (HMA) grant programs. The status of current hazard mitigation plans is shown in the Table 15. The data was obtained from FEMA's Plan Approval Status Report based on Regional reports for the end of June 2012 (Federal Emergency Management Agency, May 2012).

Table 15. Hazard Mitigation Plan Status

Jurisdiction	Approval Date	Expiration Date
St. Clair County	5/9/2006	5/9/2011
City of Port Huron	6/12/2006	6/12/2012

During the Discovery process, stakeholders noted that St. Clair County had received a planning grant and the process to update the St. Clair County Hazard Mitigation plan is underway.

I.IV.ii.14 Hazard Mitigation Grant Program

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

A variety of hazard mitigation projects have been submitted to FEMA's HMGP. A list of projects that have been closed, approved, withdrawn, or denied in St. Clair County is included in Attachment F. A summary of HMGP projects can also be downloaded from https://explore.data.gov/catalog/raw .

I.IV.ii.15 Historical Flooding & High Water Marks

The information below has been compiled from FEMA's *Flood Insurance Study, St. Clair County, Michigan*, effective in 2010.

Flooding in St. Clair County is generally experienced from rainstorms in the spring or early summer. The more severe flooding occurs in late winter or early spring from rainfall and/or snowmelt in conjunction with ice jams. Water-surface elevations on the Great Lakes vary from season to season and from year to year. Seasonal variations generally reach peak values during the period from May to July, then recede to a low value in the month of February (Federal Emergency Managment Agency, 2010).

Continuous winds, blowing strongly from a southerly direction across Lake St. Clair, can create a wind setup or rise in lake level above the normal undisturbed water level along the north shore. Additionally, waves generated by these winds may induce wave run-up or a further increase in water-surface elevations above the setup level. These phenomena are of comparatively short duration and quickly subsides when the wind velocity lessens or the wind direction changes. An increase in the water-surface elevation of Lake St. Clair will be manifested by an attendant rise in the St. Clair River's stage (Federal Emergency Managment Agency, 2010).

Flooding of record in the Township of Clay occurred during the period from March 15 to 19, 1973. Undisturbed water levels in Lake St. Clair were approximately 4.0 feet above low water datum at the time. Southwest winds created an additional wind setup along the northern shore of Lake St. Clair and raised both river and lake stages above overflow levels. Ponding of water was reported in houses, garages and yards in several of the residential areas. This flood had an estimated frequency of 200 years (Federal Emergency Managment Agency, 2010).

Low lying areas along in the Township of Clay and the Township of Ira have been subject to periodic flooding caused by overflows of the St. Clair River or rises in the water levels of Lake St. Clair and the dredged waterways that are directly connected to Lake St. Clair (Federal Emergency Managment Agency, 2010).

No high water mark data was found within St. Clair County for Lake St. Clair. If local stakeholders have available high water mark data or historic photographs, they are encouraged to submit them to FEMA Region V Mitigation Division.

I.IV.ii.16 Letters of Map Change

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

Table 16 lists the number of LOMCs in the county. No Conditional LOMAs or Conditional LOMR-Fs were included. The LOMCs are shown on the Discovery Map. Clusters of LOMCs indicate a need for updated maps.

Table 16. Summary of LOMC cases in St. Clair County project area

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. Clair	1151	18	16	0

I.IV.ii.17 Locally Identified Mitigation Actions

Table 17 lists the mitigation actions that were extracted from the St. Clair County Hazard Mitigation Plan, which expired on May 9, 2011.

Table 17. Hazard Mitigation Actions

Name of Plan	County	Plan Expiration Date	Hazard Mitigation Action
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Maintain updated floodplain mapping
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Implement land use planning regulations in floodplain and coastal zone areas.
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Alleviate repetitive loss properties by: wet floodproofing of structures; dry floodproofing structures; acquisition of repetitive loss properties; purchase or transfer of development rights; conservation easements.
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Implement effective stormwater management.
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Continue to enhance the capabilities of the county GIS system to function as a planning tool to aid in regulatory efforts to mitigate hazard events.

Table 17. Hazard Mitigation Actions

Name of Plan	County	Plan Expiration Date	Hazard Mitigation Action
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Use land development techniques, such as cluster housing, to preserve natural resources and features
St. Clair County Hazard Mitigation Plan, 2005	St. Clair County	5/9/2011	Require that development and redevelopment site plans protect wood lots, wetlands, and other natural vegetation.

I.IV.ii.18 Ordinances

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

Title 44 of the Code of Federal Regulations Sections 60.3(a)–(e) describes the NFIP floodplain ordinance levels and provides the minimum requirements for community participation in the NFIP. The proper ordinance level for each community is determined by the type of flooding that is present within the community. Ordinance levels are shown in the table below:

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

Ordinance information for St. Clair County communities within the project area is shown in Table 18.

Table 18. Program Status and Ordinance Level

Community	CID	FIRM Date	Program Status	Ordinance Level
Algonac, City of	260191	5/3/2010	Participating	C
Clay, Township of	260194	5/3/2010	Participating	D
Cottrellville, Township of	260196	5/3/2010	Participating	D
East China, Township of	260197	5/3/2010	Participating	D

Table 18. Program Status and Ordinance Level

Community	CID	FIRM Date	Program Status	Ordinance Level
Ira, Township of	260199	5/3/2010	Participating	D
Marine City, City of	260200	5/3/2010	Participating	D
Marysville, City of	260201	5/3/2010	Participating	C
Port Huron, City of	260204	5/3/2010	Participating	D
St. Clair, City of	260279	5/3/2010	Participating	D
St. Clair, Township of	260205	5/3/2010	Participating	D

CID = community identification

I.IV.ii.19 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 St. Clair shoreline.

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

Stakeholders were provided with the proposed transect shapefiles (GIS digital data) upon request, and the proposed draft transects (Attachment D) were also reviewed during the Discovery Meeting. Input from local officials was requested regarding the placement and the number of transects. Table 19 is a compilation of the comments received regarding the proposed transects along Lake St. Clair in St. Clair County. Please refer to the draft Discovery Map (Attachment C) or to the proposed transect figures (Attachment D) to identify the transect location based on transect number.

Table 19. Transect Comments

Stakeholder	Transect Number (on draft Discovery Map)	Comment
Michigan Department of Environmental Quality	N/A – related to all transects	Requested the effective transects be used for St. Clair County

Based on the comments captured throughout the Discovery process and during the Discovery Meeting, proposed draft transects for Lake St. Clair have been revised to incorporate the request to utilize effective transect locations where possible. The revised

proposed draft transects can be seen on the Final Discovery Maps, located in Appendix F of the - Lake St. Clair Discovery Report (Federal Emergency Managment Agency, 2012). These transects are subject to change based on the future coastal analysis and should not be considered final at this time.

I.IV.ii.20 Pre-Disaster Mitigation (PDM) Program

The Pre-Disaster Mitigation (PDM) program is a nation-wide competitive grant program that was created to assist State and local governments, including Indian Tribe governments, with the funding to implement cost-effective hazard mitigation activities prior to disasters. The intent of this program is to reduce overall risk to people and property, while also minimizing the cost of disaster recovery.

Grants awarded during past fiscal years can be downloaded from the Pre-Disaster Mitigation Archives at http://www.fema.gov/pre-disaster-mitigation-grant-program/pre-disaster-mitigation-archives.

I.IV.ii.21 Public Assistance (PA) Grant Program

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

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

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

I.IV.ii.22 Regulatory Mapping

The effective mapping for coastal communities within St. Clair County is listed in Table 20 by community.

Table 20. Effective Mapping Status

Community	CID	Firm Date	Program Status
Algonac, City of	260191	5/3/2010	Participating
Clay, Township of	260194	5/3/2010	Participating
Cottrellville, Township of	260196	5/3/2010	Participating
East China, Township of	260197	5/3/2010	Participating
Ira, Township of	260199	5/3/2010	Participating
Marine City, City of	260200	5/3/2010	Participating
Marysville, City of	260201	5/3/2010	Participating

Table 20. Effective Mapping Status

Community	CID	Firm Date	Program Status
Port Huron, City of	260204	5/3/2010	Participating
St. Clair, City of	260279	5/3/2010	Participating
St. Clair, Township of	260205	5/3/2010	Participating

CID = community identification

For the May 3, 2010 effective Lake St. Clair countywide study, the results from the 1988 *Revised Report on Great Lakes Open-Coast Flood Levels* and the 2007 *Flood Level Restudy of Lake St. Clair and Anchor Bay* reports, both prepared by the USACE, were incorporated into the study. Additional information on the countywide scope of study can be found in the FIS for St. Clair County (Federal Emergency Managment Agency, 2010).

Updated FEMA Guidelines and Specification (G&S) for coastal studies along the Great Lakes was not available at the time that study was performed. Moving forward, Great Lakes studies are expected to follow guidance within FEMA's *Draft Guidelines and Specifications for Coastal Studies Along the Great Lakes, issued on May 8, 2012* (Federal Emergency Management Agency, 2012).

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

I.IV.ii.23 Repetitive Loss Properties

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

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

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

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

Repetitive losses were filed in several communities in St. Clair County project area, as shown in Table 21.

Table 21. Repetitive Loss

Community	CID	Number of Repetitive Loss Structures	Total Repetitive Loss Payment
Algonac, City of	260191	3	$ 49,403
Clay, Township of	260194	13	$ 133,969
Cottrellville, Township of	260196	2	$ 24,610
East China, Township of	260197	10	$ 328,837
Ira, Township of	260199	6	$ 84,774
Marine City, City of	260200	7	$ 161,102
Marysville, City of	260201	0	$ 0
Port Huron, City of	260204	2	$ 43,580
St. Clair, City of	260279	0	$ 0
St. Clair, Township of	260205	0	$ 0

I.IV.ii.24 Socio-Economic Analysis

The more homes and people located in a floodplain, the greater the potential for harm from flooding. Impacts are likely to be even greater when additional risk factors (age, income, capabilities) are involved, since people at greatest flood risk may have difficulty evacuating or taking action to reduce potential damage. In St. Clair County, approximately 11 percent of the population is inside a FEMA floodplain (National Oceanic & Atmospheric Administration, 2009).

In 2009, lake-related businesses provided 8.2 percent of the total jobs in St. Clair County. This accounted for approximately 3,500 jobs, $41 million in wages, and $80 million in goods & services. This represents an 8 percent decrease in lake-related jobs since 2005 (National Oceanic & Atmospheric Administration, 2009).

I.IV.ii.25 State-level Datasets, Programs, and Information

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

Michigan Coastal Zone Enhancement Program Assessment and Strategy (2011-2016):

Every five years, the Coastal Zone Management Act encourages states and territories to conduct self-evaluations of their coastal management programs to assess significant changes in the state's coastal resources and management practices, identify critical needs, and prioritize areas for enhancement under the Coastal Zone Enhancement Program. More information on this program can be found at http://coastalmanagement.noaa.gov/enhanc.html. The Coastal Zone Enhancement Program Assessment and Strategy can be downloaded at http://coastalmanagement.noaa.gov/mystate/docs/mi3092011.pdf .

The Michigan Coastal Management Program website, located at www.mi.gov/coastalmanagement provides information on the Program including information on its permitting, coastal planning and technical assistance programs. Michigan's Coastal Management Program was developed under the federal Coastal Zone Management Act and approved in 1978. Since then, the Program has assisted organizations in protecting and enhancing their coastal areas, funded studies related to coastal management, and helped to increase recreational opportunities in Michigan's Great Lakes coastal area.

Coastal Zone Boundary maps can be downloaded at http://www.michigan.gov/deq/0,4561,7-135-3313_3677_3696-90802--,00.html

A list of previously awarded coastal management grants can be found here: http://www.michigan.gov/deq/0,4561,7-135-3313_3677_3696-171451--,00.html

Integrated Coastal Management Tool

http://www.glc.org/habitat/lsc/icm/

The Integrated Coastal Management Tool is a software program designed to assess or estimate coastal habitat change and thereby promote more informed coastal resource management decision-making. Existing data sets for coastal Lake St. Clair are available with the tool, which can be used to:

- Inventory habitats
- Assess land and water habitat conditions
- Identify and rank potential restoration and conservation sites
- Analyze "what if" scenarios for proposed changes in land use or land cover
- Create maps, reports, and data tables

The tool uses existing GIS data layers such as land cover, streams, invasive species, threatened or endangered species, shoreline hardening and others to calculate habitat statistics.

The Integrated Coastal Management Tool was designed with the local planner, the coastal conservation group, and the coastal manager in mind. Altering the scenarios is easy, which allows the user to quickly compare how different management decisions or actions will affect coastal habitat.

SEMCOG - Restoring and Protecting Lake St. Clair
http://www.semcog.org/lakestclair.aspx

SEMCOG facilitates the Lake St. Clair/St. Clair River Protection and Restoration Partnership. The Partnership contains representatives of 36 organizations including local, state, regional and federal government agencies, non-governmental organizations, business, universities and associations. The goal of the partnership is to implement the management plan resulting in protection and restoration of the river and lake.

Great Lakes Coastal Restoration Grants
The Great Lakes received $475 million for restoration efforts in 2010, as part of the Great Lakes Restoration Initiative, or GLRI. Michigan Sea Grant was awarded more than $1.5 million to help restore particular areas in the region and is leading two projects while assisting on five others. The projects focus on endangered fish, invasive species, beach contamination, water pollution and sound boating and marina operations.

Additional information can be found at Michigan Sea Grant website at http://www.miseagrant.umich.edu/explore/restoration/.

V. Risk MAP Projects and Needs

This section provides information about the planned next steps for the Lake St. Clair coastal flood study, including information about the upcoming coastal study, potential for mitigation technical assistance within the project area, possible 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 the Lake St. Clair Discovery effort and provided in this report will be utilized in the upcoming GLCFS for Lake St. Clair.

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

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

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

Engineering & Mapping:

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

Draft coastal flood maps (or workmaps) will be produced for the study area. The workmaps will include the 1-percent- and 0.2-percent-annual chance flood hazard areas, Coastal High Hazard (VE Zone) and Coastal A Zone (AE Zone), Base Flood Elevations (BFEs), and Limit of Moderate Wave Action (LiMWA) boundary. The LiMWA boundary identifies the 1.5-foot wave height line and alerts property owners that although their property is in a Zone AE area, it may also be affected by waves 1.5 feet or higher. Communities will be provided with an opportunity to review the workmaps after the coastal analysis is complete and prior to FIRM production.

National Flood Insurance Program Integration:

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

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

Risk Assessment Products:

Depending on available data, results of coastal analysis, local needs identified, local partnerships, and fiscal year funding, the coastal flood risk products such as Flood Risk Map, Flood Risk Report, Changes Since Last FIRM (CSLF), Flood Depth and Analysis Grids, and Hazus-MH analyses may be generated for identified coastal communities in St. Clair County. Optional Flood Risk Assessment products such as coastal wave height grids,

erosion risk determination, and wave hazard severity area datasets have not yet been funded. Table 22 summarizes the products projected for the coastal communities.

Table 22. Potential Flood Risk Products

County	State	Flood Risk Map and Flood Risk Report?	Changes Since Last FIRM?	Flood Depth and Analysis Grids?	Hazus-MH?	Optional Flood Risk Assessment Products
St. Clair	MI	✓	✓	✓	✓	Not yet funded

ii. Potential for Mitigation Assistance

As part of a Risk MAP project, Mitigation Planning Technical Assistance (MPTA) may 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 datasets and products into potential and effective community legislation, guidance, regulations, procedures, etc.
- Assistance with the creation, acquisition and incorporation of GIS data into potential and effective maps, planning mechanisms, emergency management procedures, etc.
- Facilitating the identification of data gaps and interpret technical data to identify risk reduction definiencies that should be corrected.

During this discovery process, it was identified that St. Clair County had received planning grant funding and is in the process of updating their Hazard Mitigation Plans. It is recommended additional discussion occur between FEMA and the St. Clair County stakeholders as this coastal flood study moves forward to see if MPTA would be an appropriate and beneficial option.

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

iii. Compliance

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

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

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

These compliance topics, including coastal Special Flood Hazard Areas (SFHAs), building requirements in VE Zones, and Limit of Moderate Wave Action (LiMWA), are discussed in detail at http://www.greatlakescoast.org and in the basin-wide Lake St. Clair Discovery Report (Federal Emergency Managment Agency, 2012).

iv. Communication

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

Ongoing communication and coordination will be an essential part of this Lake St. Clair Coastal Flood Study for St. Clair County. Throughout this study process, Federal, State, and local stakeholders for St. Clair County will be kept informed via email, phone calls, letters, newsletters, and meetings.

The Great Lakes Coastal Flood Study website http://www.greatlakescoast.org is an excellent resource where stakeholders can obtain the most update-to-date information about the status of the Great Lakes Coastal Flood Study, data collection, upcoming meetings, new technical reports, the latest methodologies, factsheets, and much more.

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

v. Unmet Needs

The St. Clair County Discovery process did not identify specific needs that would not be met during the coastal flood study. All stakeholder comments were addressed and will continue to be addressed throughout the coastal flood study.

During the Discovery Meeting and throughout the Discovery process, Lake St. Clair stakeholders did note general concerns with proceeding with a new coastal flood risk study. Many stakeholders were concerned about what to expect in terms of extent of new SFHA boundaries. In addition, St. Clair County representatives noted concern regarding overland flooding and how that risk will be mapped. FEMA acknowledged this concern throughout this Discovery process. During the upcoming engineering and mapping tasks, workmaps designed to give local stakeholders an opportunity to review and comment on flood risk data and revised SFHAs will be distributed before the data is carried into NFIP FIRM maps.

Concerns were also expressed relative to density of near-shore vegetation, particularly phragmites, which may compromise accuracy of new LiDAR bathymetry being collected in 2012 and early 2013. St. Clair County suggested it would be helpful to photograph potential problem areas and build site-specific datasets to enhance ground-truthing techniques. There was an offer to consider local resources in obtaining survey points and photographs of the shoreline, for ground verification and independent validations.

In addition, comments related to the proposed transects were raised during the Discovery Meeting by State and county representatives. It was suggested the effective transects along Lake St. Clair be used. As a result, the St. Clair County effective transects were incorporated into the proposed transect layout. It should be noted that the transects proposed in this report remain subject to change pending further coastal analysis.

VI. Close

Federal, State, and local stakeholders were interested in the Discovery processes and in providing local data that may assist in the upcoming Lake St. Clair coastal flood study. Many stakeholders were interested in learning more about the new methodologies being used as part of the Great Lakes Coastal Flood Studies, and how their community would be specifically affected by the Lake St. Clair flood study. The information gathered in this Discovery process will provide invaluable information as the Lake St. Clair Coastal Flood Study proceeds.

VII. References

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

VIII. Attachments

Discovery data and information, as well as this report and appendices, have been stored digitally on FEMA's Mapping Information Platform (MIP) Discovery Data Repository at J:\FEMA\DISCOVERY_DATA_REPOSITORY\R05_DATA\MICHIGAN_MI_26 and can be accessed by FEMA authorized users. The MIP can be accessed from https://hazards.fema.gov/. A username and password is required to access certain data within the MIP.

The final Discovery Report and appendices are also available for download from http://www.greatlakescoast.org/.

Attachment A. Coastal Data Request Form Compilation
Attachment B. St. Clair County Pre-Meeting Correspondence
Attachment C. Draft Discovery Map
Attachment D. Proposed Transects
Attachment E. St. Clair County Discovery Meeting Documents
Attachment F. Hazard Mitigation Grant Program Projects

ATTACHMENT A

COASTAL DATA REQUEST FORM

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605
FEMA

Community Discovery Coastal Data Request Form

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

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

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

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

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

Contact Information	
Community/Organization	
Name:	
Title:	
Address:	
E-mail:	
Phone:	
Contact Preference	☐ Email ☐ Phone ☐ Mail

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605
FEMA

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*
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*
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 known hazards with geographical boundaries, i.e., landslide hazard areas, storm surge inundation zones, wildfire hazard areas, etc.	☐ *Hard copy*	☐ *Digital*
	Other relevant data	☐ *Hard copy*	☐ *Digital*

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536 S. Clark St. 6th Floor
Chicago, IL 60605
FEMA

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:

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536 S. Clark St. 6th Floor
Chicago, IL 60605
FEMA

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

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Chicago, IL 60605
FEMA

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

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Chicago, IL 60605
FEMA

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

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FEMA

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

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605
FEMA

Does your community have areas of recent or planned development/re-development and areas of high growth or other natural land changes (e.g., wildfires or landslides):	☐ 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 B

ST. CLAIR COUNTY PRE-MEETING CORRESPONDENCE

Core Stakeholder Pre-Meeting Documents

Information Exchange Session Documents

CEO/FPA Mailing List

Hard Copy Discovery Meeting Invitations

Lake St. Clair Email Distribution List

Email Discovery Meeting Invitation

Keating, Laura

Subject:	FEMA Invitation to Lake Michigan/Lake St. Clair Discovery Kickoff Meeting WebEx for Michigan Core Stakeholders
Location:	NEW Phone: (877) 537-6647 Conference ID: 31578 and NEW WebEx
Start:	Thu 6/21/2012 11:00 AM
End:	Thu 6/21/2012 12:30 PM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer:	Keating, Laura
Required Attendees:	'Alan Lulloff'; 'Byron Lane (MDEQ)'; 'Catrina Covino'; 'Eric Kuklewski'; 'Erin Maloney'; 'Ernie Sarkipato (MDEQ)'; 'Greg Mausolf (USACE)'; 'Heather Stirratt (NOAA)'; Hillier, Timothy; 'Holly Davis'; 'Jennifer Day (NOAA)'; 'Jerry Fulcher (MI CZM)'; 'Joel Pepper'; 'Julie Tochor'; Keating, Laura; 'Ken Hinterlong'; 'Les Thomas (MDEQ)'; 'Linda Burke (MDEQ)'; 'Maria Zingas (MDEQ)'; 'Mary Weidel (USACE)'; 'Matt Occhipinti (MDEQ)'; 'Matt Schnepp'; 'Michelle Hohn'; 'Mike Hanke'; 'Patrick Durack (MDEQ)'; Randhawa, Jaspreet; 'Richard Foody'; 'Sheila Meier (MDEQ)'; 'Stephen Aichele (USGS)'; 'Susan Conradson (MDEQ)'; 'Tom Smith'; 'Wayne Lasch'; breederl@msu.edu; 'Roberts, Stacey'; Denick, Roger (Roger.Denick@stantec.com); jread@glos.us
Optional Attendees:	Luce, Janet K; Breederland, Mark; Tabar, Jeffrey R
Categories:	Red Category

Good Afternoon,

In preparation for this call tomorrow at 1pm CT/2pm ET, please find attached the agenda, as well as a couple handouts that we will discuss during the call.


Michigan_Core_Stakeholder_preD...


LCFS_ LiMWA Fact Sheet.pdf


MAF-Form.pdf

Also, please note the updated WebEx and call-in number:

WebEx information:

Participant Join URL: https://atkinsglobalna.webex.com/atkinsglobalna/j.php?J=652104155

Meeting Number: 652 104 155
Meeting Password: This meeting does not require a password.

Audio Conference information:
Phone: (877) 537-6647
Conference ID: 31578

Thanks,
Laura Keating

Good Afternoon,

Please note the date change that was made to better accommodate schedules.

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

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

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

You may have recently received a similar Discovery Kickoff Meeting invitation for another State. Although some of the information presented at the other WebEx meetings will be the same, we will be discussing items specific to those counties in Michigan and request that you attend this WebEx as well.

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

Lake Michigan:

Counties	Venue	Address	Date, Time
Vanburen Berrien	Berrien County Administrative Building	701 Main Street St. Joseph, MI 49085	Monday 09/10/2012 3:00 - 5:00 pm
Ottawa Allegan	Ottawa County Fillmore Street Complex Board Room	12220 Fillmore Street, Rm 310 West Olive, MI 49460	Tuesday 09/11/2012 3:30 - 5:30 pm

Oceana Muskegon	Louis A. McMurray Conference and Transportation Center	2624 Sixth Street Muskegon Heights, MI 49444	Wednesday 09/12/2012 9:00 - 11:00 am
Manistee Mason	Community Room	400 S. Harrison Street Ludington, MI 49431	Wednesday 09/12/2012 3:00 - 5:00 pm
Grand Traverse Benzie Leelanau	Training Room	400 Boardman Avenue Traverse City, MI 49684	Thursday 09/13/2012 1:00 - 3:00 pm
Antrim Charlevoix Emmet	Bellaire Community Hall	202 North Bridge Street Bellaire, MI	Friday 09/14/2012 9:00 - 11:00 am
Mackinac	TBD	TBD	Tentatively planned - Monday 08/13/2012; 3:00 - 5:00 pm
Delta Schoolcraft Menominee	Bay de Noc Community College, Rooms 958 & 962, Escanaba, MI	2001 N. Lincoln Road, Escanaba, MI 49829	Tuesday 08/14/20012; 3:00 - 5:00 PM

Lake St. Clair

Counties	Venue	Address	Date, Time
St. Clair	TBD	TBD	Tentatively planned - 8/20/2012; 9:00 - 11:00 AM
Macomb	Macomb County Verkuilen Building - Tentative as of 3/27/2012	21885 Dunham Rd., Clinton Twp, MI 48036	8/20/2012; 3:00 - 5:00 PM
Wayne	TBD	TBD	Tentatively planned - 8/21/2012; 9:00 - 11:00 AM

Please let me know if the proposed time on this meeting invitation **(1pm CDT/2pm EDT)** is acceptable. We are trying to determine the best time for everyone to participate in the Lake Michigan and Lake St. Clair Discovery Kickoff Meeting WebEx for the State of Michigan.

We look forward to discussing this project with you during the call. Please do not hesitate to contact me if you have any questions.

Sincerely,

Laura Keating, CFM
STARR

Laura.Keating@starr-team.com
Phone/fax: 925-296-8048

NEW WebEx information:

Participant Join URL: https://atkinsglobalna.webex.com/atkinsglobalna/j.php?J=652104155

Meeting Number: 652 104 155
Meeting Password: This meeting does not require a password.

Project Name:	Lake Michigan/Lake St. Clair Discovery Project
Meeting:	Lake Michigan/Lake St. Clair Pre-Discovery Kickoff Meeting for Michigan Core Stakeholders
Date and Time:	Thursday, June 21, 2012 at 1pm CDT/2pm EDT
Place:	**Audio Conference information:** Phone: (877) 537-6647 Conference ID: 31578 Participant Join URL: https://atkinsglobalna.webex.com/atkinsglobalna/j.php?J=652104155 Meeting Number: 652 104 155 Meeting Password: This meeting does not require a password.
Facilitator:	FEMA, STARR

Core Stakeholder Pre-Discovery Kickoff Meeting Agenda

Great Lakes Coastal Flood Study Overview

- Objectives
- Status
- Schedule

Hazard Mitigation Resources, Strategies, and Actions

- Improving Mitigation Strategies
- Introduction to Mitigation Action Form

Discovery Process Overview

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

Coastal Focus – Information to be Aware Of

- Coastal Flood Risk Datasets
- Transects
- Erosion and Erosion Control Revetments
- LiMWA
- Coastal Zone Mapping

Next Steps

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

Questions/Comments?

FEMA

Core Stakeholders
Lake Michigan/Lake St. Clair
Pre-Discovery Kickoff Meeting

State of Michigan

June 21, 2012

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
greatlakescoast.org

Great Lakes Coastal Flood Study
Discovery "Kick-off"

Core Stakeholders – Who's here?

- State partners & stakeholders
  - MDEQ – State CTP
  - MDEQ – State NFIP Coordinator
  - MDHS – SHMO
  - MDEQ – Coastal Zone Management
- Other Core Stakeholders
  - Sea Grant – Michigan
  - Others?

- Risk MAP Project Team
  - FEMA / STARR
  - USACE
  - ASFPM
  - NOAA

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
Discovery "Kick-off"

Today's Agenda

- Review Great Lakes study objectives and status
- Hazard Mitigation Resources, Strategies and Actions
  - Introduce Mitigation Action Form
- Discovery Process Overview
  - Scope and Schedule, Discovery Meeting Outcomes, Information Exchange Calls, and Pre-Discovery Meeting Data Collection.
- Coastal Focus
  - Coastal Flood Risk Datasets, Transects, Erosion, LiMWA, Coastal Zone Mapping
- Next steps
  - Identify issues for discovery meeting preparations
  - Identify issues/actions for Core Stakeholder follow-up

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Great Lakes Coastal Flood Study
Program Overview

- **Latest models, data, and technology**
  - Includes basin-wide water surface grids and storm sampling, built from continuous record of 50 years of meteorological, water level, and ice field data (1960 - 2009).
  - Includes changes to run-up computational approach
  - Updated version of Appendix D.3 (FEMA Guidelines and Standards) will be introduced for comment in May 2012
- **Deliver updated flood maps**
- **Equip Federal Agencies, eight States and hundreds of coastal communities with data and planning tools to facilitate actions to enhance resiliency of the Great Lakes ecosystem**

RiskMAP
Increasing Resilience Together

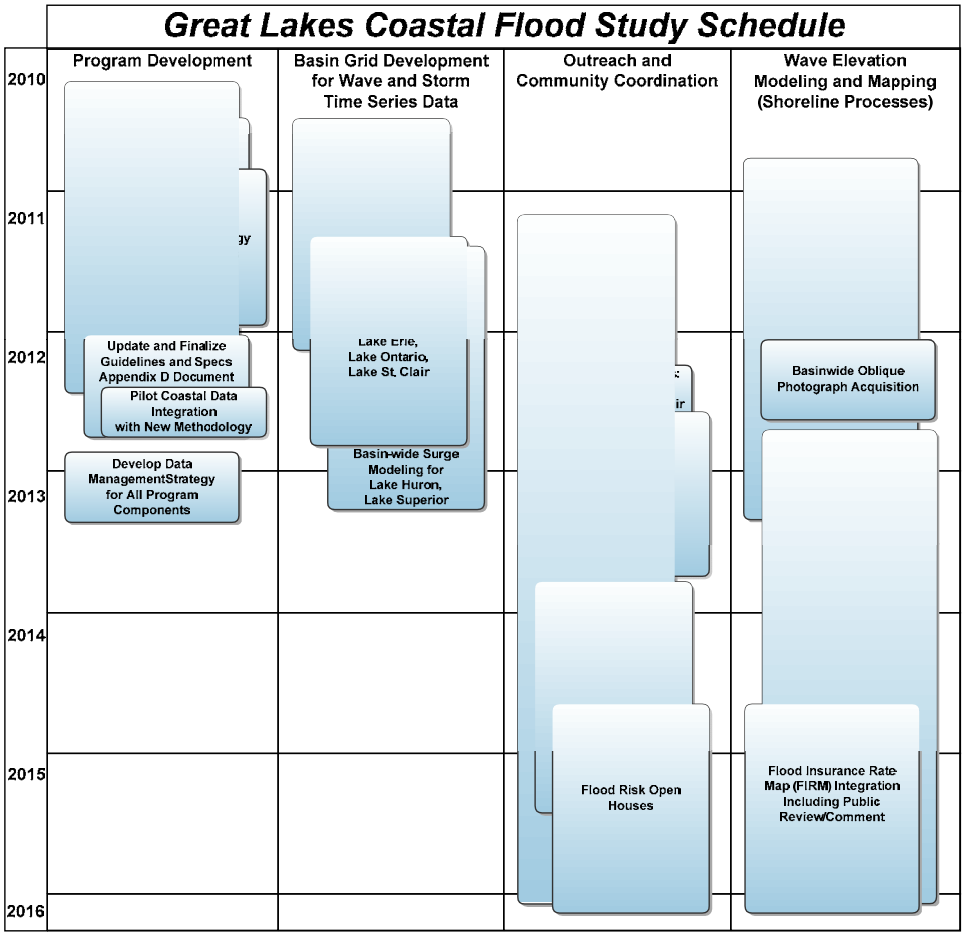
Program Overview

Methodology Focus points from 2009 Stakeholder Meeting:

- Employ a response (or extremal) approach to run-up computation, not the old process of event-based computations, where wind set-up was treated as a separate computational component at shoreline.
- Consider new wave run-up processes through continuation of response-based modeling at shoreline, and transitions to better utilization of WHAFIS and ST-Wave methodologies.

Great Lakes Coastal Flood Study
Program Status and Schedule

- FY11 task orders funded 2012 outreach actions along Lake Michigan, Lake St. Clair and Lake Erie
- FY12 contracting processes will fund major production along these same lakes - including wave height computations, draft inundation mapping and significant PMRs
- FY13 contracting will play catch-up on PMRs, and run new production Lakes Superior, Huron



RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
greatlakescoast.org

Great Lakes Coastal Flood Study

HM Resources, Strategies & Actions

Obtaining Mitigation Action Gains through the Great Lakes Study Program:

- Leverage conversations with local communities while working Discovery meetings and "Risk Data and Mitigation Workshops"
- Build a Mitigation Actions strategy through participation with Core Stakeholders
    - Involvement by State partners is critical --- funding can be considered under fy12 CTP Program Management
    - STARR will likely lead under fy12 Task Order
    - Conversations will start sometime in October, with strategy and small tool development to be complete by April 2013

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
HM Resources, Strategies & Actions

- The right action (or mix of actions) will be based on recent community experiences and level of complexity in existing infrastructure
  - *Public Works*
  - *Building Standards*
  - *Community Planning and HM Plan Update / Integration processes*
  - *Communication Processes, GIS, etc.*
- Get the right people to the table: Integrated vs. Discipline-specific
- Document ideas and actions through the FEMA Action Tracking form

Land Use Ordinances	Local Building Codes	Mitigation Projects	Community Identified Mitigation Programs	Management Best Practices
Zoning, Setbacks, Floodplain Management, etc.	IBC, IRC, Local Regulations, etc.	Acquisition, Elevation, Floodproofing, etc.		Integration of natural hazards into other planning mechanisms

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Great Lakes Coastal Flood Study
HM Resources, Strategies & Actions

MSP/EMHSD Pub. 106
March 2011
EMERGENCY MANAGEMENT AND
HOMELAND SECURITY DIVISION
Michigan Department of State Police

Michigan Hazard Mitigation Plan
(Updated March 2011 edition)

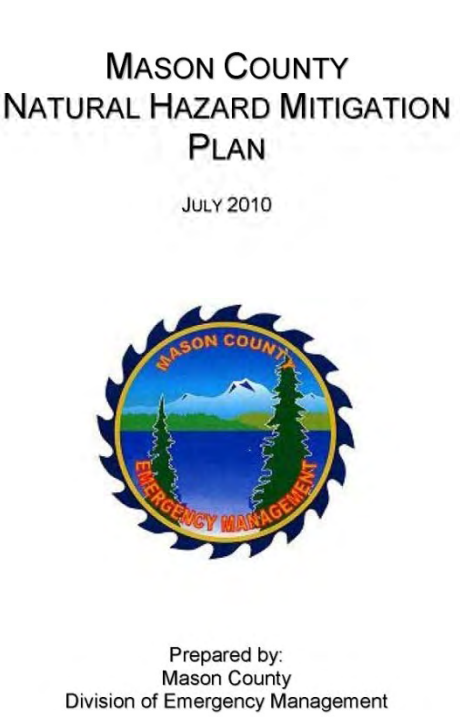
Reducing hazard risks and vulnerabilities through education, planning, physical improvements, early warning, and coordination of programs and resources.

Prepared by:

Emergency Management and Homeland Security Division
Michigan Department of State Police

And

The Michigan Citizen-Community Emergency Response Coordinating Council



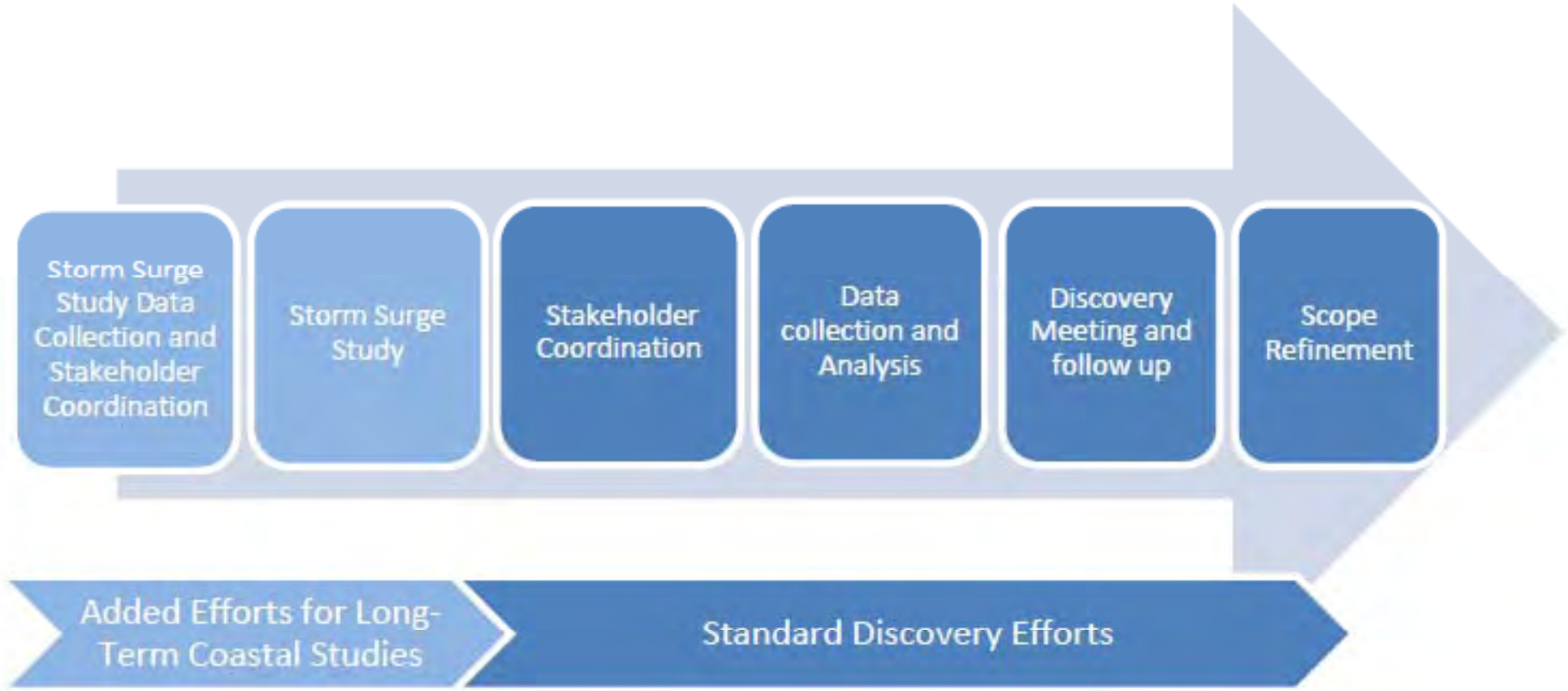
MASON COUNTY
NATURAL HAZARD MITIGATION
PLAN

JULY 2010

Prepared by:
Mason County
Division of Emergency Management

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
Discovery Process Overview



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Great Lakes Coastal Flood Study
greatlakescoast.org

Great Lakes Coastal Flood Study
Lake Michigan Discovery

- 18 Michigan counties
  - Menominee
  - Delta
  - Schoolcraft
  - Mackinac
  - Emmet
  - Charlevoix
  - Grant Traverse
  - Antrim
  - Leelanau
  - Benzie
  - Manistee
  - Mason
  - Oceana
  - Muskegon
  - Ottawa
  - Allegan
  - Van Buren
  - Berrien
- 197 coastal communities

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
greatlakescoast.org

Great Lakes Coastal Flood Study
Lake St. Clair Discovery

- 3 Michigan counties
  - St. Clair
  - Macomb
  - Wayne
- 31 coastal communities

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
greatlakescoast.org

Great Lakes Coastal Flood Study
Lake Michigan/Lake St. Clair Discovery

Schedule of Activities

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

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
Lake Michigan Discovery

FEMA

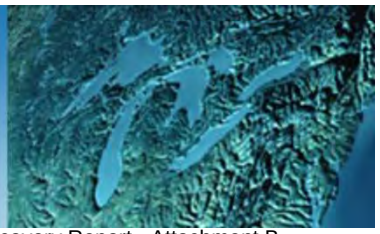
Flood Risk Discovery and Initial Coordination - 8 Meetings Planned for Lake Michigan

Michigan

Counties	Tentative Venue	Address	Date, Time
Vanburen Berrien	Berrien County Administrative Building	701 Main Street St. Joseph, MI 49085	Monday 09/10/2012 2:00 - 5:00 pm
Ottawa Allegan	Ottawa County Fillmore Street Complex Board Room	12220 Fillmore Street, Rm 310 West Olive, MI 49460	Tuesday 09/11/2012 9:00 - 12:00 pm
Oceana Muskegon	Louis A. McMurray Conference and Transportation Center	2624 Sixth Street Muskegon Heights, MI 49444	Wednesday 09/12/2012 9:00 - 12:00 pm
Manistee Mason	Community Room	400 S. Harrison Street Ludington, MI 49431	Wednesday 09/12/2012 3:00 - 6:00 pm

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
greatlakescoast.org



Great Lakes Coastal Flood Study
Lake Michigan Discovery cont'd…

Flood Risk Discovery and Initial Coordination - 8 Meetings Planned for Lake Michigan

Michigan

Counties	Tentative Venue	Address	Date, Time
Grand Traverse Benzie Leelanau	Training Room	400 Boardman Avenue Traverse City, MI 49684	Thursday 09/13/2012 1:00 - 4:00 pm
Antrim Charlevoix Emmet	Bellaire Community Hall	202 North Bridge Street Bellaire, MI	Friday 09/14/2012 9:00 - 12:00 pm
Mackinac	TBD	TBD	Tentatively planned - Monday 08/13/2012; 3:00 - 5:00 pm
Delta Schoolcraft Menominee	Bay de Noc Community College Rooms 958 & 962	2001 N Lincoln Road Escanaba, MI 49829	Tuesday 08/14/20012; 3:00 - 5:00 PM

RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
Lake St. Clair Discovery

Flood Risk Discovery and Initial Coordination - 3 Meetings Planned for Lake St. Clair

Michigan

Counties	Tentative Venue	Address	Date, Time
St. Clair	TBD	TBD	Tentatively planned 8/20/2012; 9:00 - 11:00 AM
Macomb	Macomb County Verkuilen Building - Tentative as of 3/27/2012	21885 Dunham Rd., Clinton Twp, MI 48036	8/20/2012; 3:00 - 5:00 PM
Wayne	TBD	TBD	Tentatively planned 8/21/2012; 9:00 - 11:00 AM

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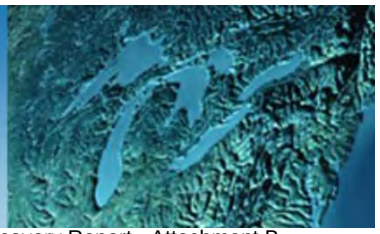


Discovery Outcomes

Outcome #1 - Encourage community participation

- Vet transect locations
- Identify reaches requiring special attention
- Document local data sources that will help improve study
- Identify local coastal management issues

Discovery Outcomes

Outcome #2 - Explain study process and timelines

- High-level – Steps involved in study, and timeline
- Regulatory and non-regulatory products
- NFIP changes – Map revision objectives
- New concepts like LiMWA
- Where to find data and reports

Discovery Outcomes

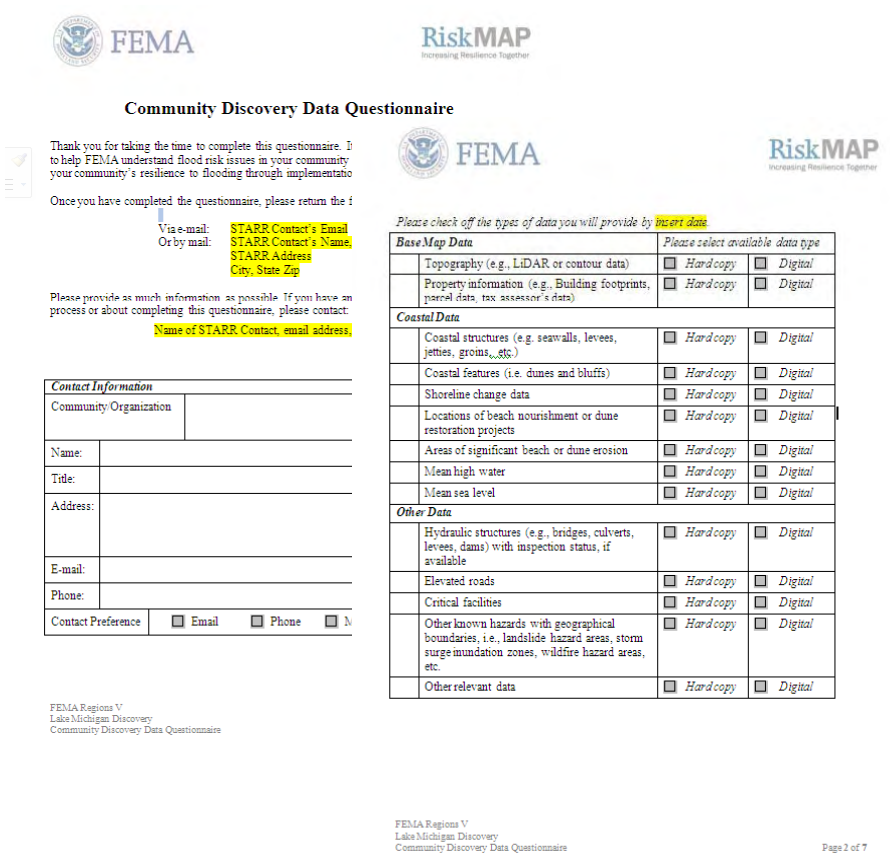
Outcome #3 - Introduce Mitigation Action Goals

- Distribute and discuss mitigation action form
- Develop Mitigation strategies and options
    - Land Use Ordinances
    - Local Building Codes
    - Management Best Practices
    - Traditional HM Projects
    - Community Planning and Programs
- Evaluate opportunities to build storm response erosion data to enhance local planning objectives and processes

Great Lakes Coastal Flood Study
Lake Michigan/Lake St. Clair Discovery

Info Exchange Calls

- Discovery meeting Invitations sent out week of July 2 (5-6 weeks prior to meeting date)
- Calls start week of July 9 or 16
- Data Questionnaire to request:
  - *Basemap Data*
  - *Coastal Data*
  - *Other Data*
  - *Historical Flood Data*
  - *Risk Assessment*
  - *Flood Mitigation Information*
  - *Community Plans and Projects*



FEMA RiskMAP

Community Discovery Data Questionnaire

Thank you for taking the time to complete this questionnaire. I
to help FEMA understand flood risk issues in your community
your community's resilience to flooding through implementatio

Once you have completed the questionnaire, please return the f

Via e-mail: STARR Contact's Email
Or by mail: STARR Contact's Name,
STARR Address
City, State Zip

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

Name of STARR Contact, email address,

Contact Information	
Community/Organization	
Name:	
Title:	
Address:	
E-mail:	
Phone:	
Contact Preference	☐ Email ☐ Phone ☐ M

FEMA Regions V
Lake Michigan Discovery
Community Discovery Data Questionnaire

FEMA RiskMAP

Please check off the types of data you will provide by insert date.

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*
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 sea level	☐ *Hard copy*	☐ *Digital*
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 known hazards with geographical boundaries, i.e., landslide hazard areas, storm surge inundation zones, wildfire hazard areas, etc.	☐ *Hard copy*	☐ *Digital*
	Other relevant data	☐ *Hard copy*	☐ *Digital*

FEMA Regions V
Lake Michigan Discovery
Community Discovery Data Questionnaire
Page 2 of 7

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Standard data inventory

- High-resolution digital topography
- Bathymetry Data – NOAA National Geophysical Data Center
- FIS reports
- Letters of Map Amendment and/or Letters of Map Revision
- Flood insurance policies and claim information
- CRS data
- Federal and State disaster information
- CAV information
- Repetitive loss data
- Census data
- Basemap data (roads, railroads, etc)

Additional data to be collected

- FEMA-approved Hazard Mitigation Plans
- CBRS areas
- Building footprints/parcels
- Coastal data (structures, limit of PFD, shoreline change data, mean high water, mean sea level, tide gauge info, wind station data, wave buoy, areas of sig. beach/dune erosion)
- Data from other Federal/State agencies
  - Erosion rates

Great Lakes Coastal Flood Study
Lake Michigan/Lake St. Clair Discovery

Flood Risk Discovery and Initial Coordination Draft Agenda

- Why are we here? (20 minutes)
  - Overview of study and explain role of discovery
- How is coastal flood risk being assessed for the Great Lakes? (30 minutes)
  - Review draft transects; coastal guidance updates; VE Zone Mapping and LiMWA; and coastal flood risk products
- How does this apply to my community? (20 min)
  - NFIP compliance and building codes; coastal planning and hazard mitigation opportunities; local coastal mitigation best practices; and hazard mitigation grant opportunities
- Interactive Session (40 minutes)
  - Utilization of coastal flood risk products for planning and mitigation; identification of existing local coastal data; view and discuss local coastal areas of concern using the discovery map; and discuss mitigation action opportunities and introduce the mitigation action form
- Wrap-up and Next Steps (10 minutes)
- Optional Interactive Stations (60 minutes following meeting)
  - Draft Transect Location Reviews and Discussion; Mitigation Resources, Strategies, and Actions

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Discovery Meeting Invitees

- Compiled list of community and county officials, including:
  - Chief Executive Officers (CEOs)
  - Floodplain Administrators (FPAs)
- For communities: only CEOs will receive official mailed invitation to Discovery Meetings (with a cc to FPA, State SHMO, State NFIP Coordinator)
- Compiled list of Other Federal Agencies (OFAs), State partners, and associations
- Need your help to reach out to others who should be invited to Discovery Meetings
  - Local Planners, Engineers, GIS Staff, and Building Officials
  - Emergency Management staff
  - Other State and Local resources

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Lake Michigan/Lake St. Clair Discovery

- **Final Discovery Reports**
  - Single, comprehensive report for all of Lake Michigan, with appendices for each county
  - Single, comprehensive report for all of Lake St. Clair, with appendices for each county
  - Includes pre-discovery data, meeting agenda, sign-in sheets, discussion topics, decisions made, etc.
- **Final Discovery Maps**
  - Including feedback from participants
  - Visual representation of meeting outcomes

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Flood Risk Datasets

- Coastal Depth Grids and HAZUS
- Changes Since Last FIRM
- Erosion, Shoreline Features, and Lake Levels

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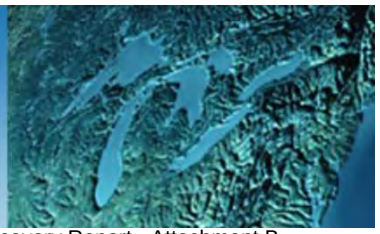
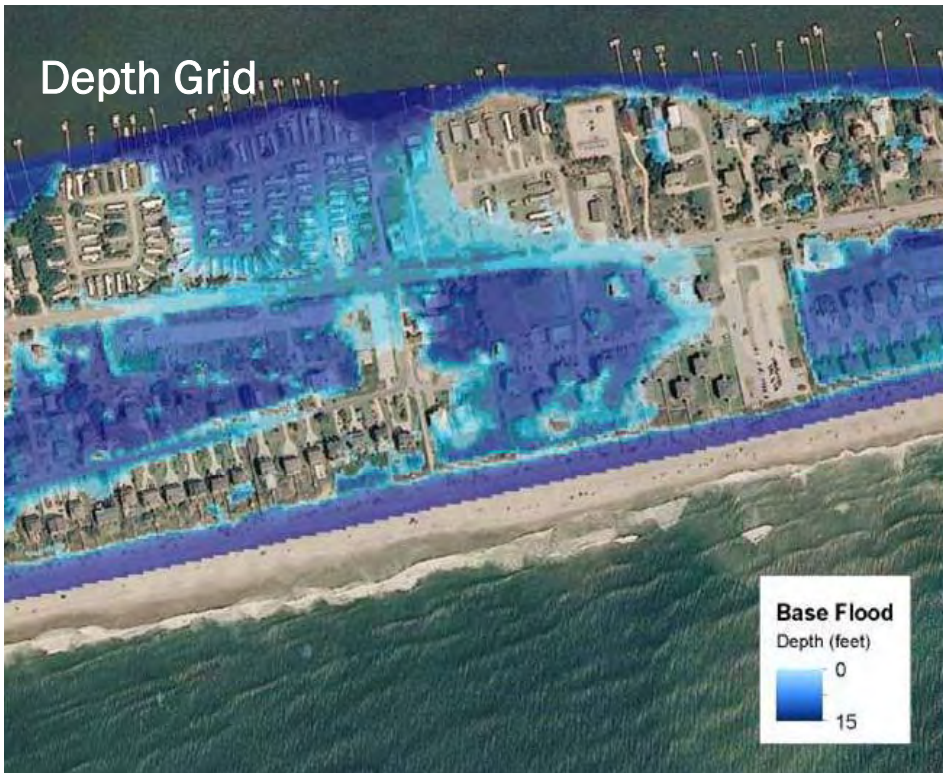


Standard Flood Risk Products

- Coastal Depth Grids
- Flood Risk Assessment (HAZUS)

HAZUS MH
EARTHQUAKE • WIND • FLOOD



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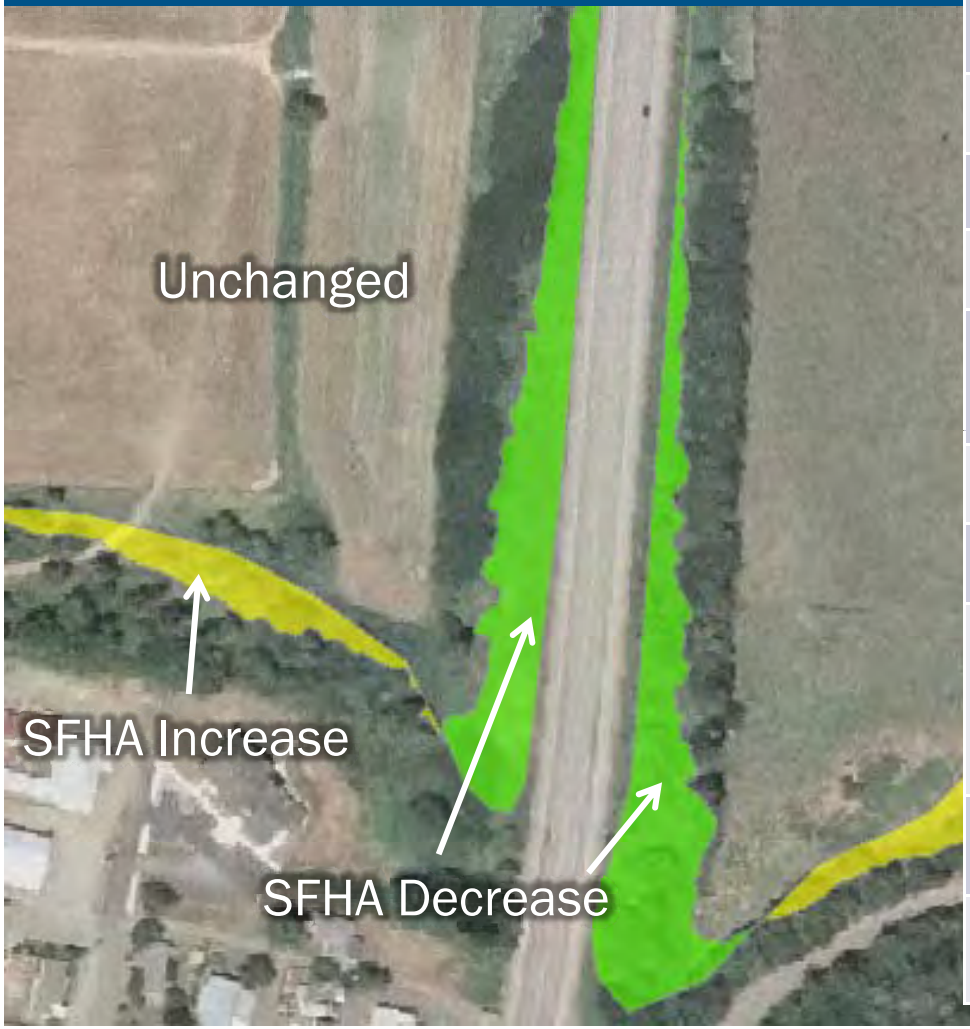
Changes Since Last FIRM



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

Great Lakes Flood Risk Products

Erosion

Red Lantern Restaurant, Lake Michigan, IN

Lake Levels

Lake Michigan Shoreline
Reference

Shoreline Feature Dataset

Upper Peninsula Shoreline
Reference

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Shoreline Features Database

Shoreline Material
Sand
Cohesive
Cobble
Diamicton*
Shingle
Bedrock
Artificial

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

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

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

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

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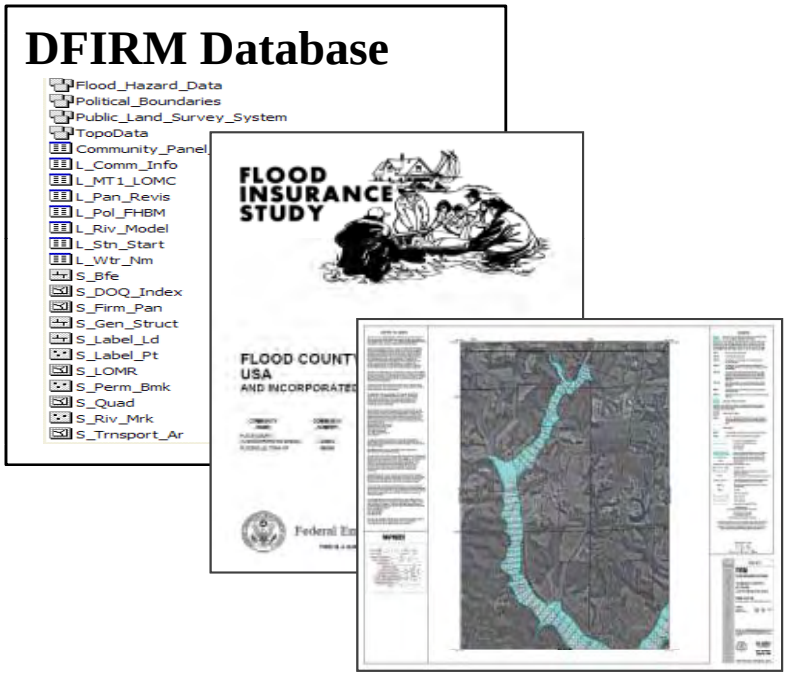
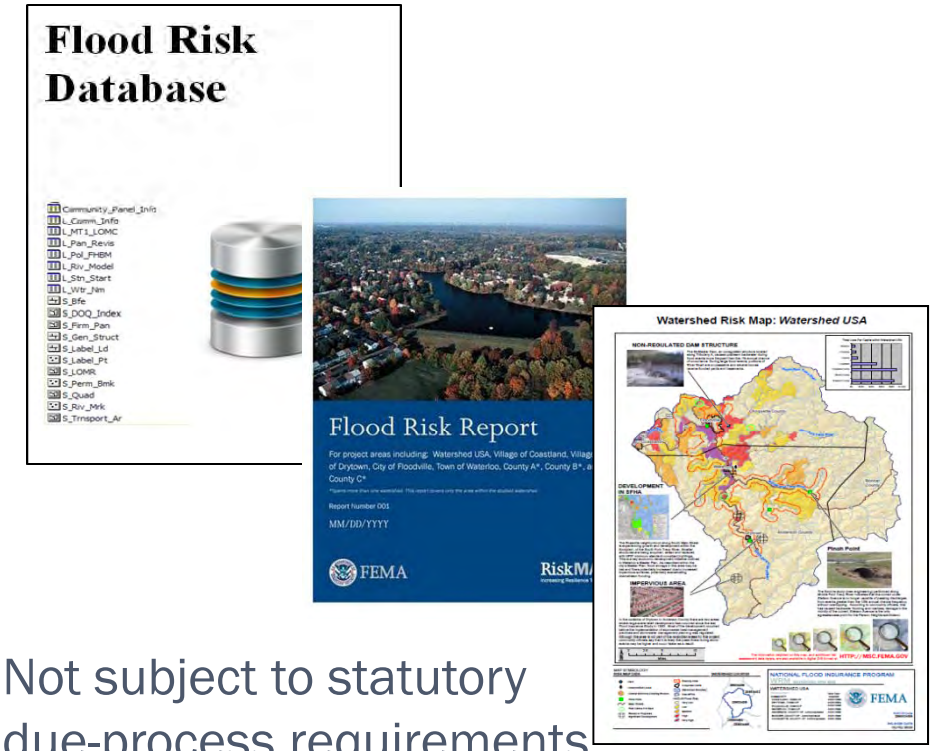
Program Product Comparisons

Traditional Regulatory Products



Subject to statutory due-process requirements

Non-Regulatory Products



Not subject to statutory due-process requirements

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Coastal Flood Hazard Zones

- Hazard Zones
  - VE Zone – Areas expected to be affected by wave impact in 100-year event
    - Base Flood Elevation established
  - AE Zone – Areas expected to be flooded by inundation in 100-year event
    - Base Flood Elevation established
  - X Zone – Areas not expected to be flooded in 100-year event
    - Shaded X – Areas expected to be flooded in 500-year event
    - Base Flood Elevations not established
  - LiMWA – Areas subject to wave heights of at least 1.5 feet
    - Non-Regulatory
- Gutters
  - Internal zone breaks where Base Flood Elevation changes
  - VE/AE Gutter - Location where risk of damage due to wave action diminishes

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How is LiMWA Defined?

- Coastal Zone Wave Heights
  - Zone VE includes wave heights equal to or greater than three feet
  - Zone AE includes wave heights less than three feet
- LiMWA is the line mapped to delineate the inland extent of wave heights of at least 1.5 feet
  - Wave heights as small as 1.5 feet can cause significant damage to structures
- LiMWA alerts people that are not in the high wave hazard zone (VE Zone) that they may still be affected by wave action in the AE Zone

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Wave Action - Structural Risk

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

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

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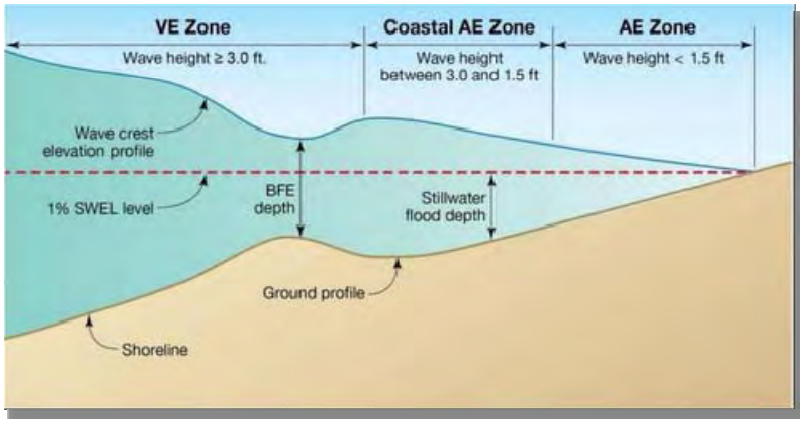
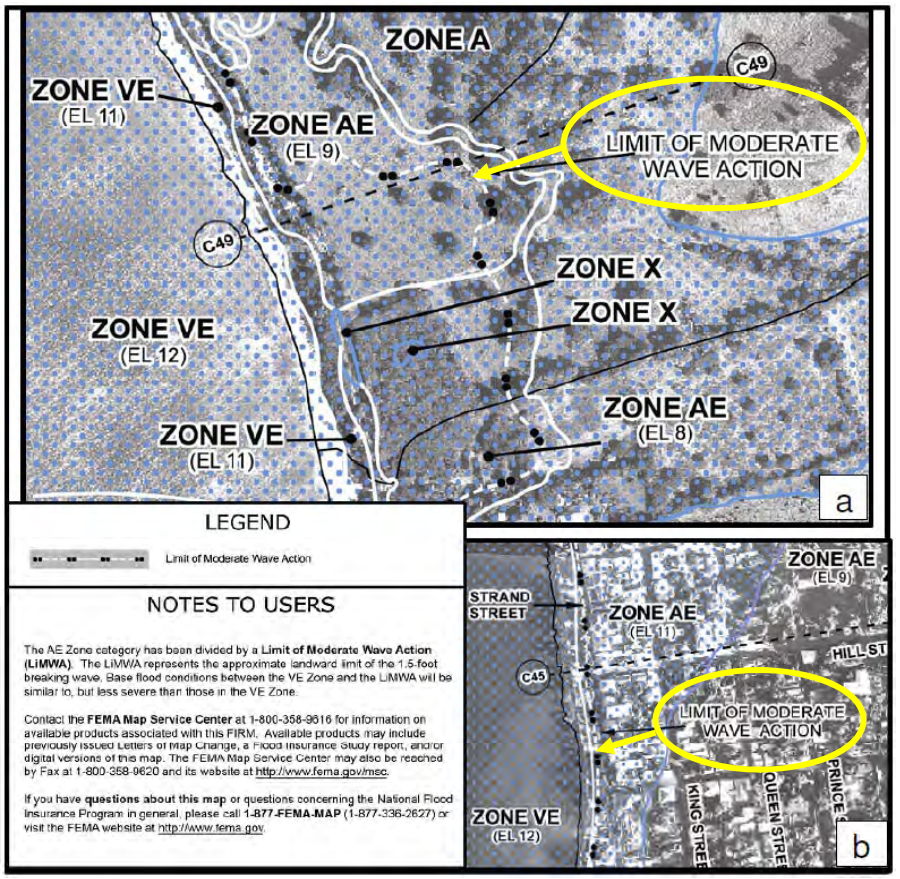
Limit of Moderate Wave Action (LiMWA)

FEMA Procedure Memorandum No. 50, 2008

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





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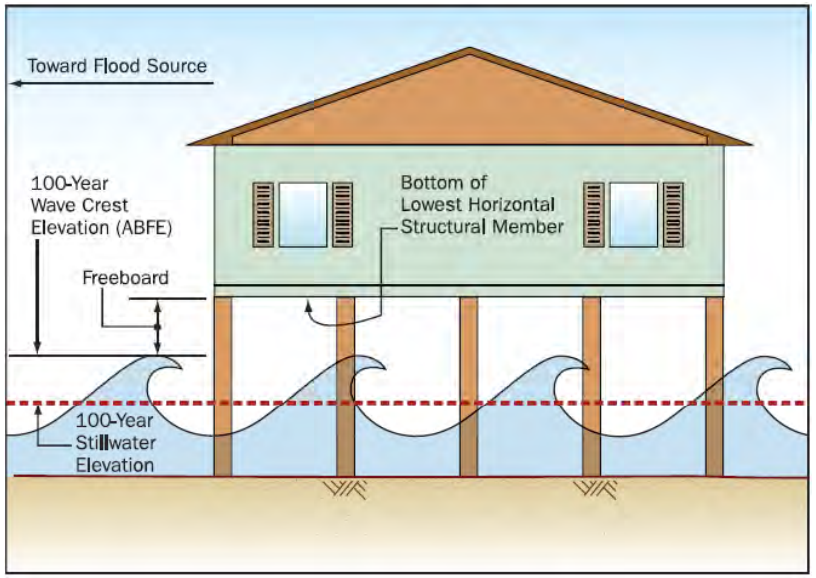
Coastal Zones and NFIP Compliance

- Must meet minimum NFIP and community coastal requirements
- NFIP design and construction requirements are more stringent in V zones due to wave, debris, and erosion hazards in V zones
- Recommendations for exceeding the minimum NFIP requirements (Coastal A Zones)
  - Can obtain CRS credits for Coastal A Zone Requirements
- Resources Available



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Transect

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Transect Placement

- Transects are placed to define representative profiles for a shoreline reach.
- Transect spacing depends on upland development
  - Developed areas – As dense as 1000 ft
  - Rural areas – Spacing can be 1-2 miles
- Transects are:
  - Profiles along which flooding analysis is performed
  - Used to transform offshore conditions to the shoreline
  - Use to define flood impacts upland to a particular shoreline type

Draft Transect Layout – Lake Michigan, Michigan

- **Transect Estimates** - Michigan – 1,963 Miles

State	County	Proposed Draft Transects
Michigan	Emmet	41
	Charlevoix	30
	Antrim	20
	Grand Traverse	48
	Leelanau	68
	Benzie	10
	Manistee	15
	Mason	11
	Oceana	11
	Muskegon	15
	Ottawa	20
	Allegan	18
	Van Buren	11
	Berrien	38
	Mackinac	60
	Schoolcraft	40
	Delta	120
	Menominee	25
Total		**601**

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Draft Transect Layout – Lake St. Clair, Michigan

- Transect Estimates
  - Michigan – 89 Miles

State	County	Proposed Draft Transects
Michigan	St. Clair	15
	Macomb	25
	Wayne	10
	Total	**50**

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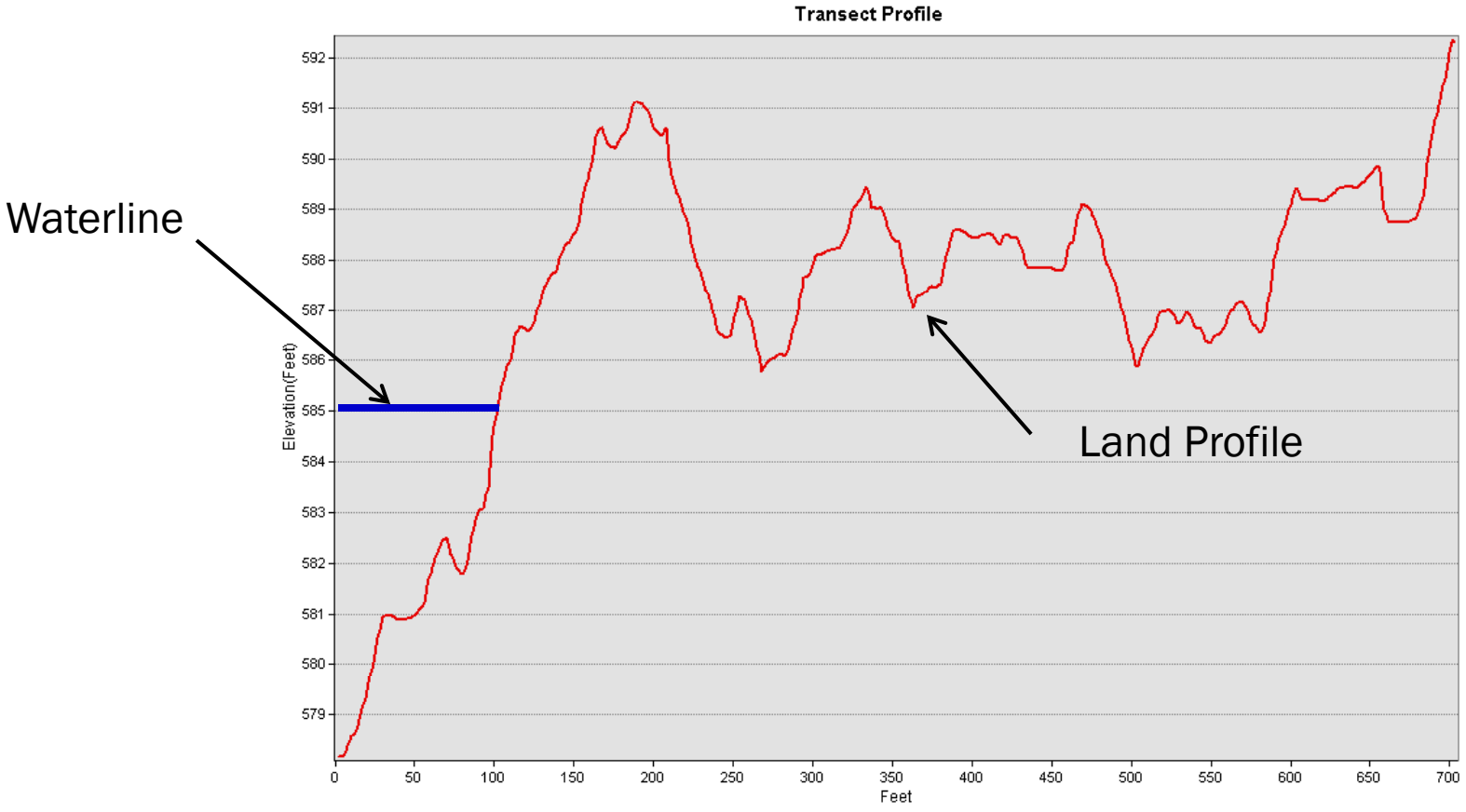
Profile from newest LiDAR



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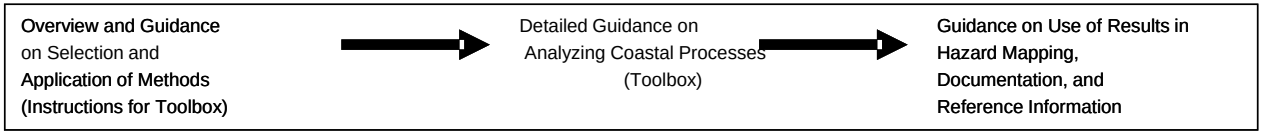
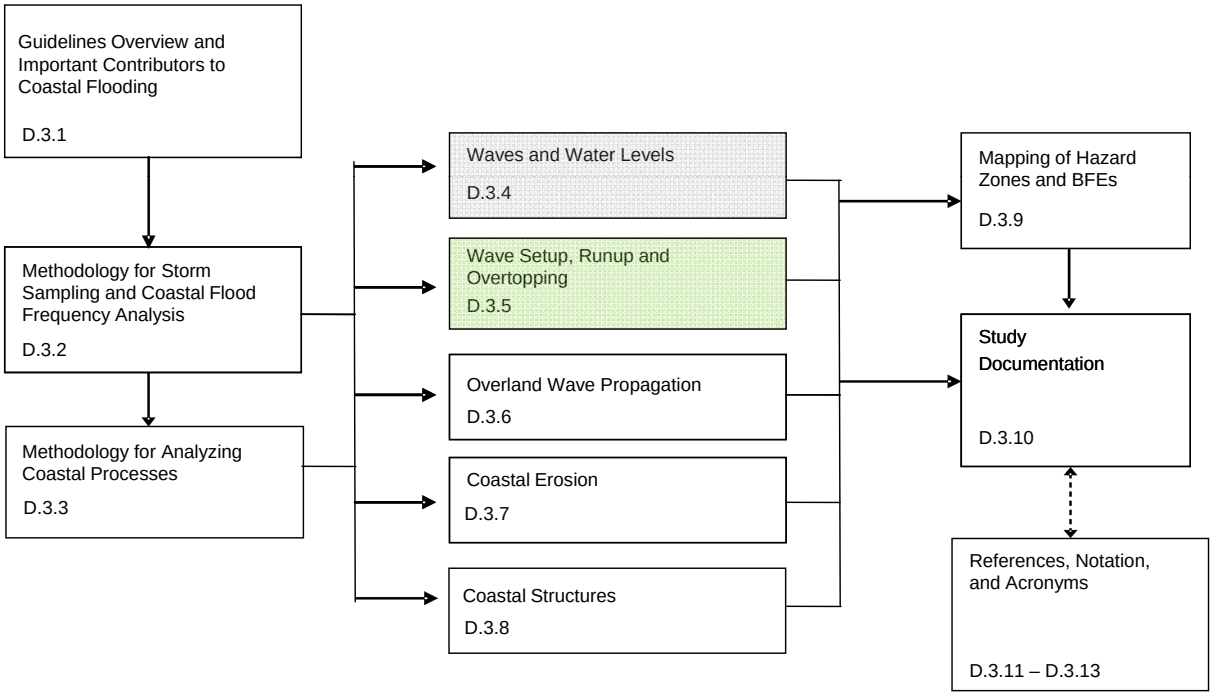
Coastal Analysis and Updates to Guidance





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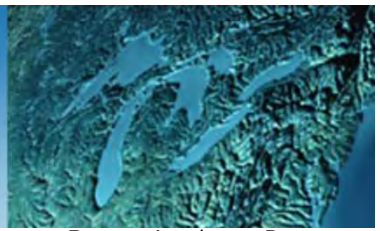
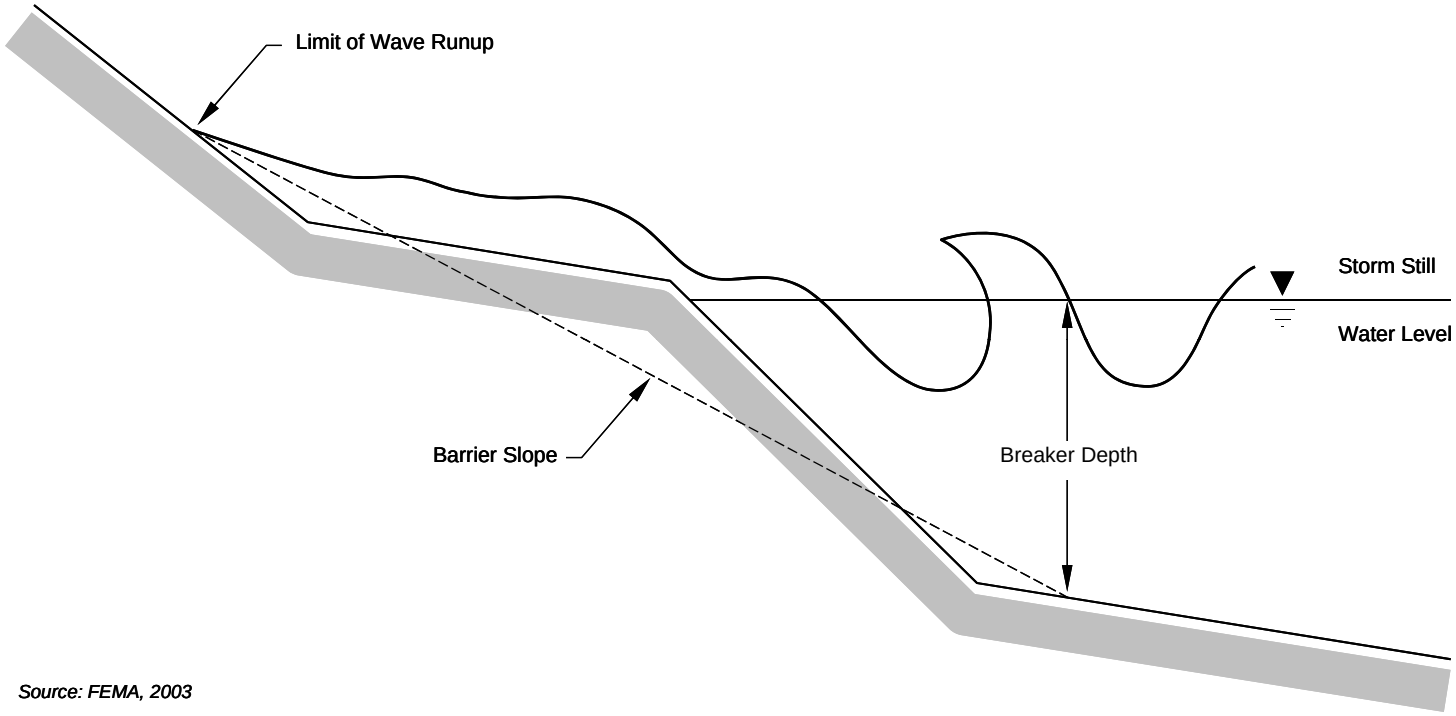


Wave Runup

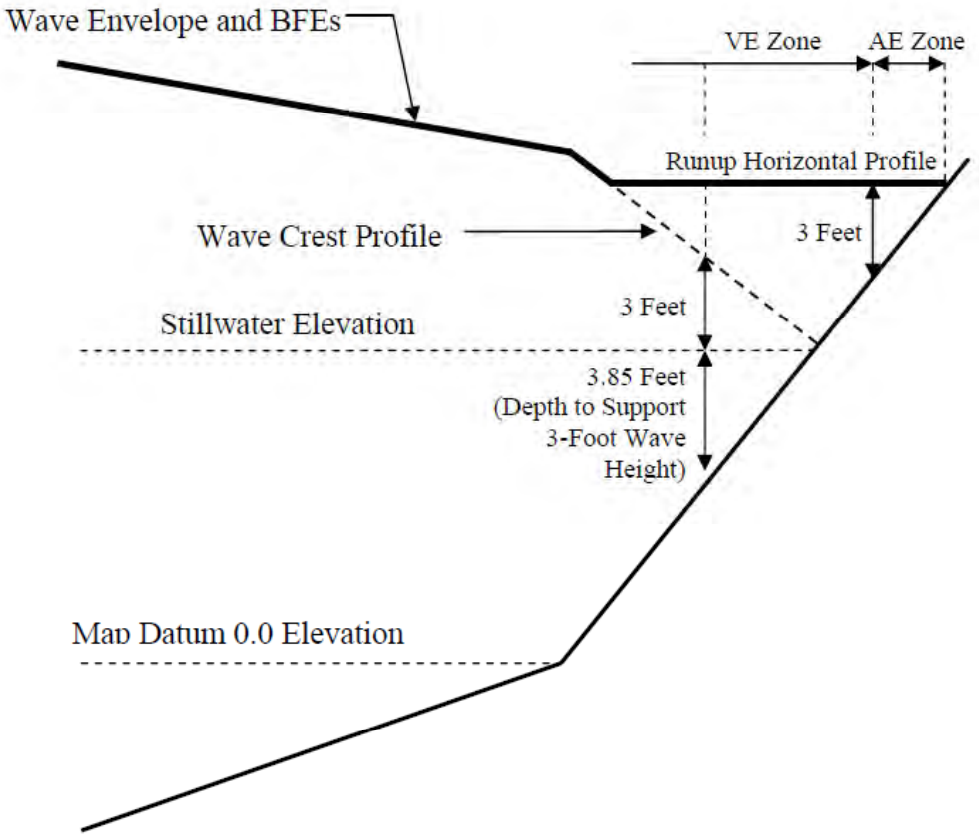


Source: FEMA, 2003

Figure D.3.5-5. Wave Runup Sketch

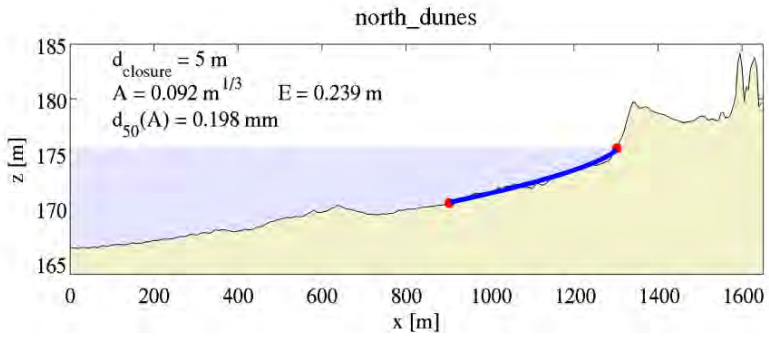
Wave Envelope

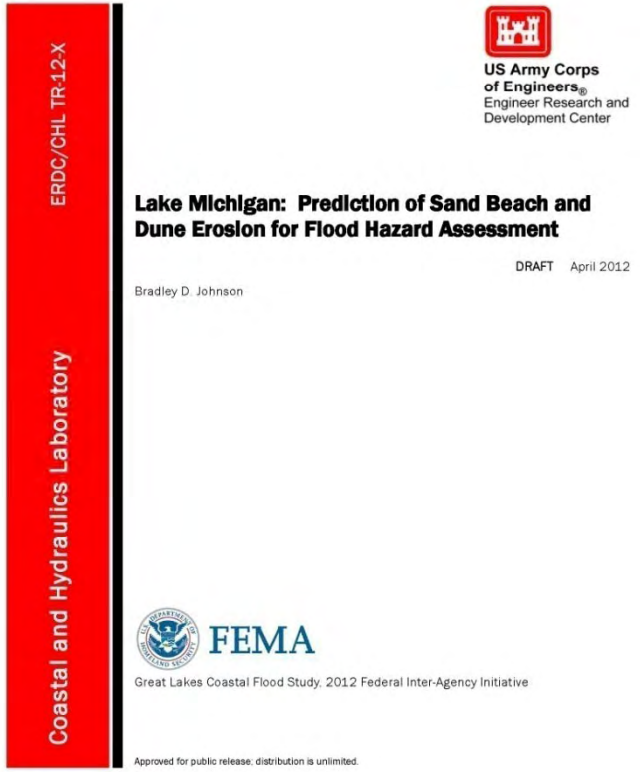
- Overland Wave Propagation
  - Wave crest is 3 feet above still water elevation
- Runup
  - Horizontal profile 3 feet above ground elevation



Erosion Assessment Methods

- 1-D surf zone dynamics model
  - CSHORE
  - SBEACH
  - COSMOS
- Requirements
  - Cross-shore profile
  - Sediment grain size





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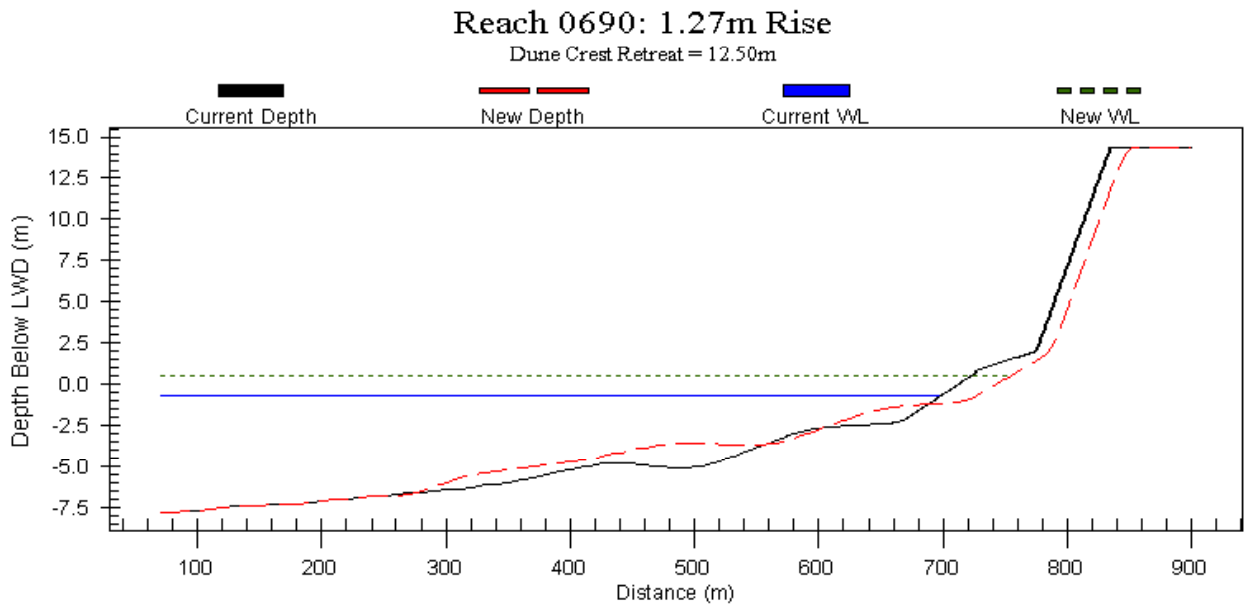
Profile Adjustment

- In lieu of historical cross-shore profiles
- Necessary for response-based approach
- Utilize Bruun Rule for rising or falling lake levels



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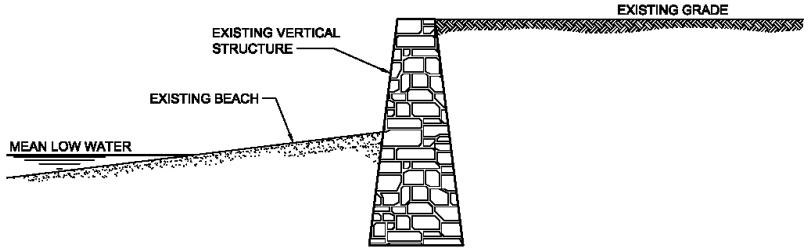
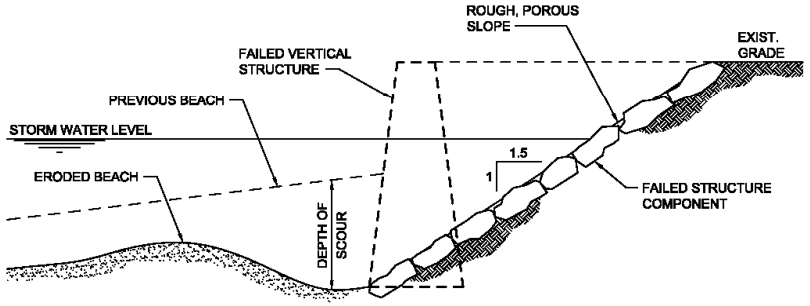
Vertical Structures



VERTICAL STRUCTURE GEOMETRY PRIOR TO FAILURE



VERTICAL STRUCTURE FAILURE GEOMETRY

PARTIAL FAILURE OF VERTICAL COASTAL STRUCTURE

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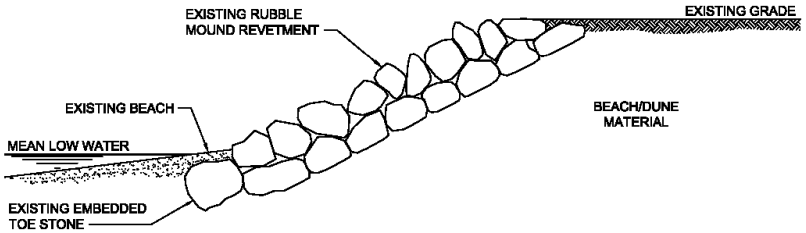
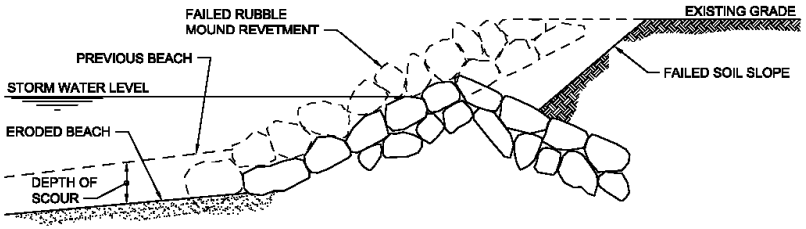
Sloped Structures



REVETMENT GEOMETRY PRIOR TO FAILURE



REVETMENT FAILURE GEOMETRY

PARTIAL FAILURE OF A SLOPING REVETMENT

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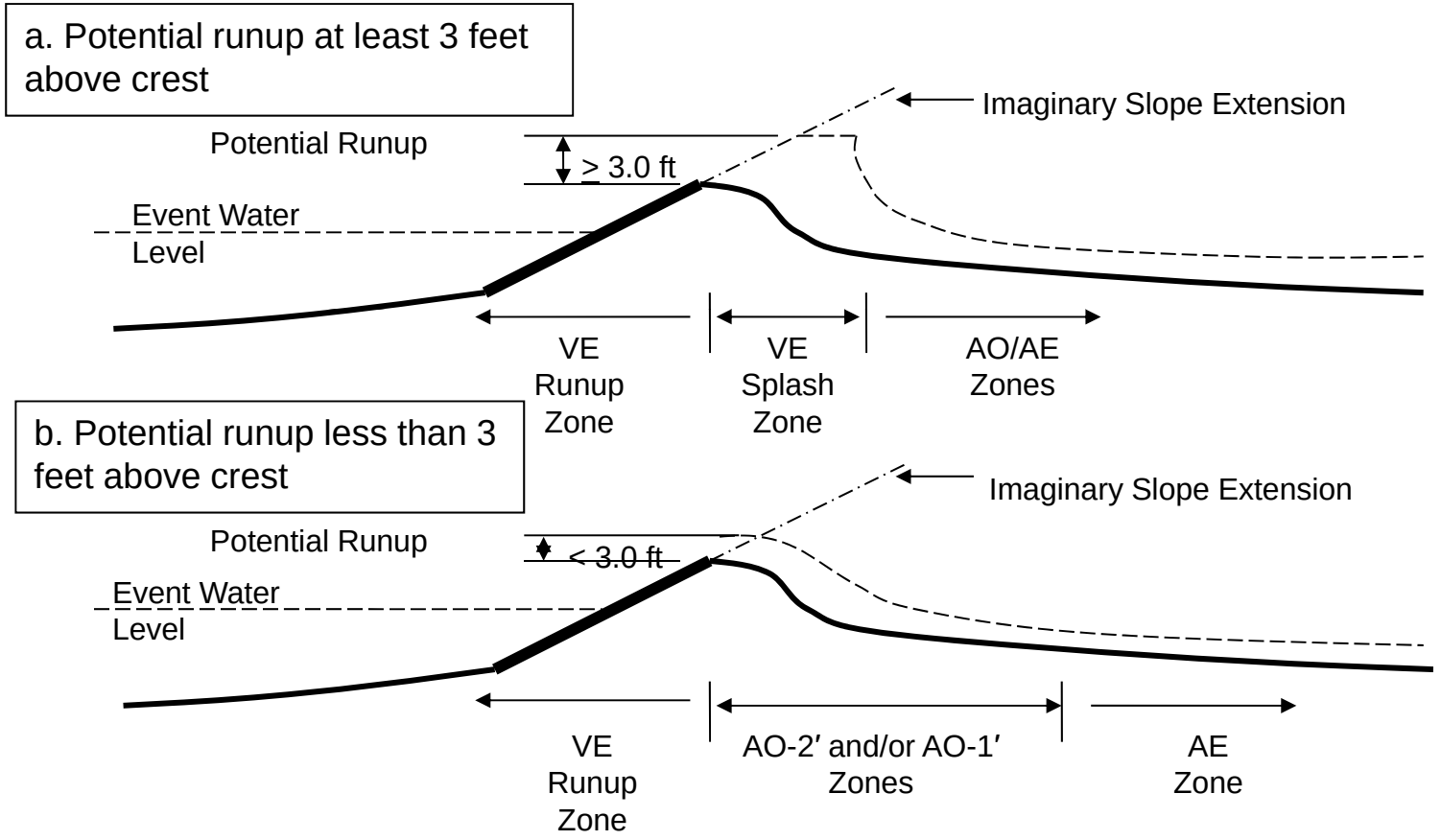
Interpretation of Wave Runup Results



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Transect Analysis to Mapping

- Flood zone extents are analyzed along representative shoreline transects
- Zones are drawn between transects by interpolation based on:
  - Topography
  - Upland Cover
    - Type
    - Density
  - Upland Development
    - Residential
    - Commercial
    - Open
  - Coastal Structures
    - Presence
    - Condition

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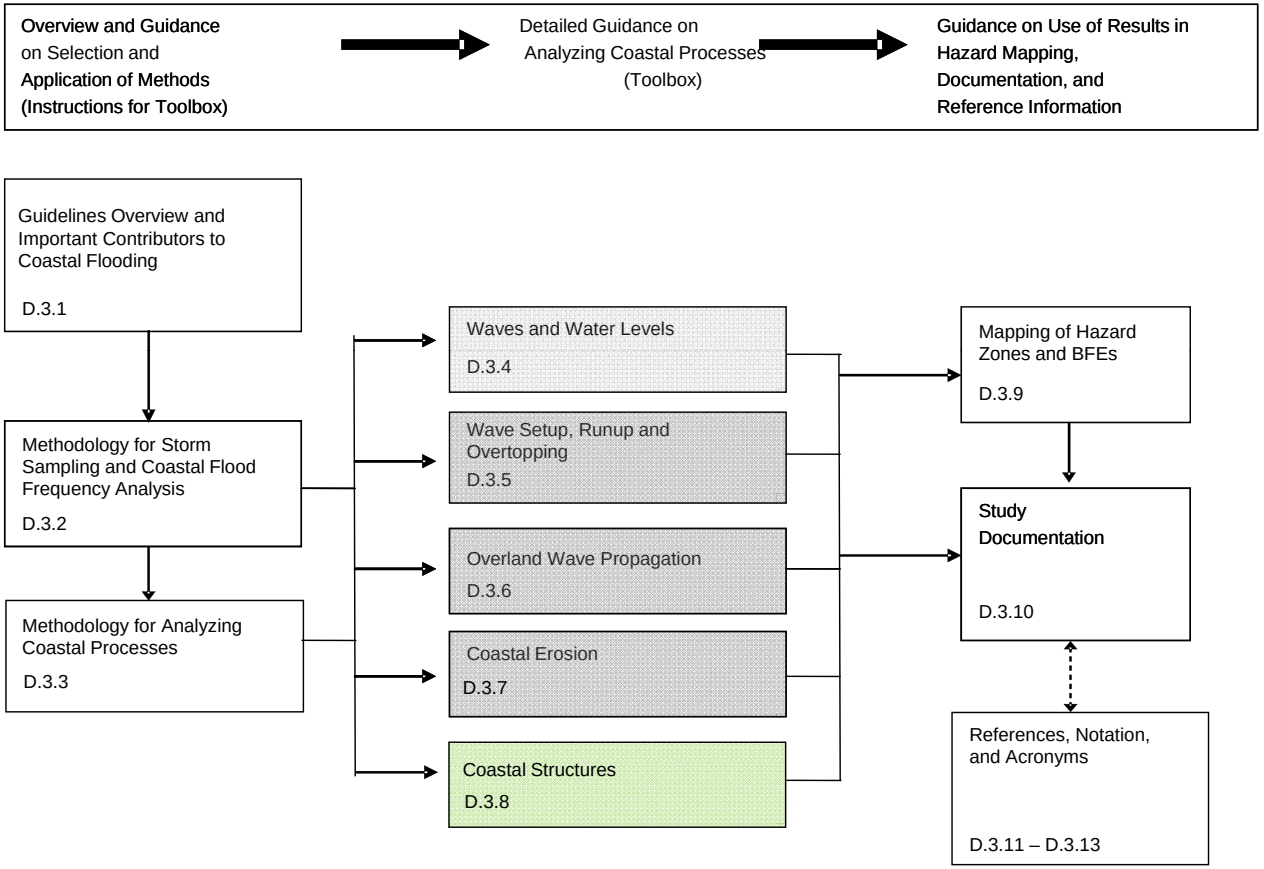
Updates to Guidance



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VE Zones in the Great Lakes

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

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Lake Michigan Demonstration Projects

- Sites have been selected based on availability of historic data and assume a broad reflection of conditions throughout the lakes
- Lake Michigan demonstration data and associated reports will address two areas of ongoing evaluation:
  - Sensitivity of Erosion Prediction to Initial Beach Profile Conditions; and
  - Evaluation of Runup Computational Options (response- and event-based approaches) and an evaluation of CSHORE for predicting runup using mobile and fixed-bed assumptions.

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Next Steps

- **We will provide:**
  - Draft Transect Layouts
  - Community Contact List
  - Summary of Today's Meeting
    - Document discussions and outcomes
    - Action items
- **Work with you to:**
  - Gather additional data, such as:
    - Locations of coastal structures, areas of recent or proposed development, and beach nourishment or dune restoration projects
  - Verify community contacts to attend Information Exchange/Discovery Meetings
  - Select agency representatives to attend Discovery Meetings

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Contacts

FEMA

FEMA:

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Stacey.Roberts@starr-team.com

Jaspreet Randhawa
Jaspreet.Randhawa@starr-team.com

RiskMAP
Increasing Resilience Together

Keating, Laura

From: Keating, Laura
Sent: Monday, July 30, 2012 3:03 PM
To: 'reppp@porthuron.org'; 'harmerk@porthuron.org'; 'supervisor@iratownship.org'; 'buildingdept@iratownship.org'; 'supervisor@claytownship.org'; 'cbrowne@marinecity-mi.org'; 'brianb@twp.stclair.mi.us'; 'gw_orr@comcast.net'; 'jhami@cityofmarysvillmi.com'; 'mbooth@cityofstclair.com'; 'dcunningham@cityofstclair.com'; 'brian@twp.stclair.mi.us'; 'rpbird@yahoo.com'; 'dmalear@algonac-mi.gov'; 'bkauffman@stclaircounty.org'; 'dstruck@stclaircounty.org'; 'Hinterlong, Ken'; Randhawa, Jaspreet; Davis, Holly A (Holly.Davis@atkinsglobal.com); Caufield, Brian A.; Roberts, Stacey; 'cmiller79@comcast.net'; 'c.miller@hiscfa.org'; Schultz, Michael D. (Chicago); 'tfloyd@stclaircounty.org'; 'bgratopp@stclaircounty.org'
Subject: Follow-up RE: FEMA's Great Lakes Coastal Flood Study: Discovery Information Exchange Session for St. Clair County

Good Afternoon,

Thank you for attending the call today. If you were unable to make it, please feel free to reach out to me with any questions you may have prior to the upcoming Discovery Meeting on August 20th.

I'm attaching a copy of the presentation, as well as the draft transects and the data request form as discussed during the meeting. Please note the transects are in GIS (shapefile format). Let me know if you would like this in pdf format instead.


LakeStClair_DraftTransects_Jun...


StClairCounty_MI_Info Exchange...


LAKE ST CLAIR Discovery Coasta...

Thanks!
Laura

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

-----Original Appointment-----
From: Keating, Laura
Sent: Wednesday, July 25, 2012 2:43 PM
To: Keating, Laura; 'reppp@porthuron.org'; 'harmerk@porthuron.org'; 'supervisor@iratownship.org'; 'buildingdept@iratownship.org'; 'supervisor@claytownship.org'; 'cbrowne@marinecity-mi.org'; 'brianb@twp.stclair.mi.us'; 'gw_orr@comcast.net'; 'jhami@cityofmarysvillmi.com'; 'mbooth@cityofstclair.com'; 'dcunningham@cityofstclair.com'; 'brian@twp.stclair.mi.us'; 'rpbird@yahoo.com'; 'dmalear@algonac-mi.gov'; 'bkauffman@stclaircounty.org'; 'dstruck@stclaircounty.org'; 'Hinterlong, Ken'; Randhawa, Jaspreet; Davis, Holly A (Holly.Davis@atkinsglobal.com); Caufield, Brian A.; Roberts, Stacey; 'cmiller79@comcast.net'; 'c.miller@hiscfa.org'; Schultz, Michael D. (Chicago); 'tfloyd@stclaircounty.org'; 'bgratopp@stclaircounty.org'
Subject: FEMA's Great Lakes Coastal Flood Study: Discovery Information Exchange Session for St. Clair County
When: Monday, July 30, 2012 7:00 AM-8:00 AM (GMT-08:00) Pacific Time (US & Canada).
Where: Call in number: 1-866-398-2885 Participant Code: 197462 and WebEx

Good Afternoon,

You are receiving this meeting invitation because you have been identified as a ***Lake St. Clair*** local community stakeholder. You should have recently received an invitation in the mail from the Federal Emergency Management Agency (FEMA), regarding the ***Great Lakes Coastal Flood Study*** effort, inviting you to attend a Discovery Meeting in August, as well as this information exchange session, scheduled for ***Monday, July* 30th at 10am ET**. More information about the ***Great Lakes Coastal Flood Study*** may be found at http://www.greatlakescoast.org.

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

Date/Time:	Monday, July 30, 2012; 10:00 - 11:00 am ET
Link to WebEx:	http://e-meetings.verizonbusiness.com/nc/join.php
Meeting Number:	445288484
Call in number:	1-866-398-2885
Participant Code:	197462

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

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

<< File: LAKE ST CLAIR Discovery Coastal Data Request Form - 07-18-2012.docx >>

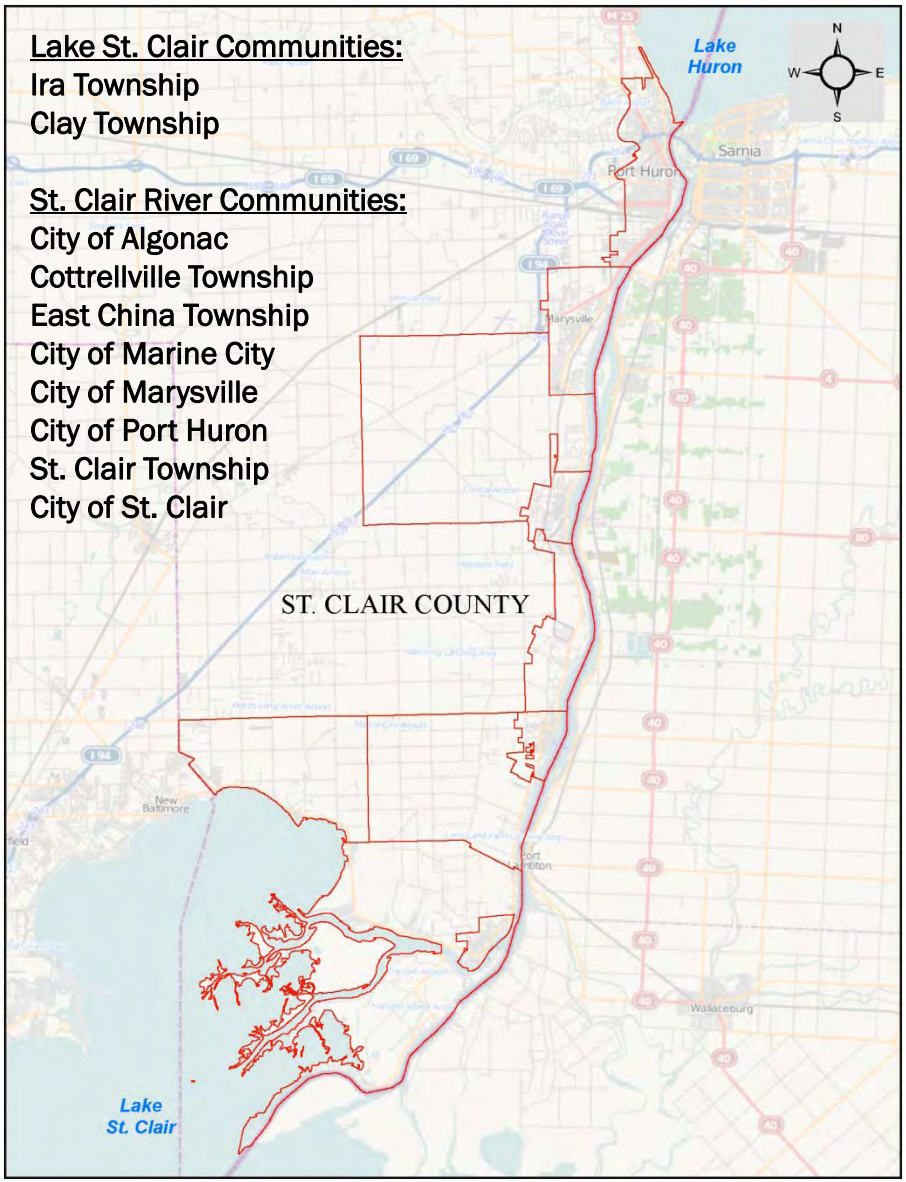
Thanks,
Laura

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

FEMA

Information Exchange Session for Lake St. Clair Discovery

St. Clair County
July 30, 2012
10am – 11am



RiskMAP
Increasing Resilience Together

Great Lakes Coastal Flood Study
greatlakescoast.org

Purpose of Information Exchange

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

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Great Lakes Coastal Flood Study
greatlakescoast.org

Risk MAP (Mapping, Assessment, and Planning) Vision

Goals

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

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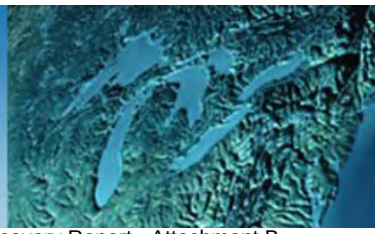
greatlakescoast.org



Overview of Great Lakes Coastal Flood Study

FEMA

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

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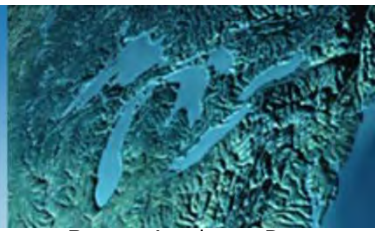
Great Lakes Coastal Flood Study
greatlakescoast.org



Hazard Mitigation Resources, Strategies & Actions

FEMA

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

Land Use Ordinances	Local Building Codes	Mitigation Projects	Community Identified Mitigation Programs	Management Best Practices
Zoning, Setbacks, Floodplain Management, etc.	IBC, IRC, Local Regulations, etc.	Acquisition, Elevation, Floodproofing, etc.		Integration of natural hazards into other planning mechanisms

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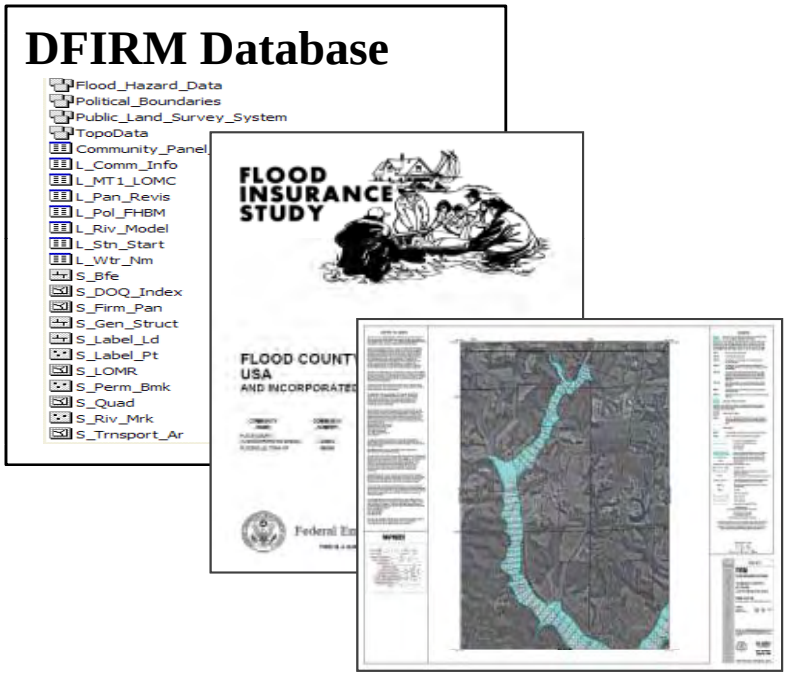
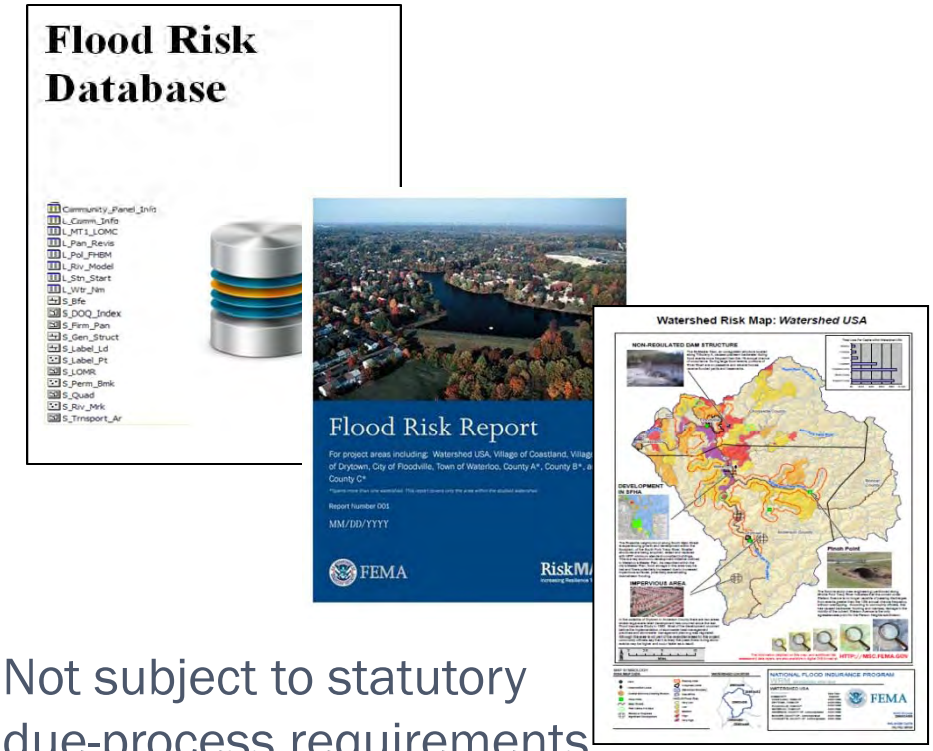
Products and Datasets: Regulatory and Non-regulatory

Traditional Regulatory Products



Subject to statutory due-process requirements

Non-Regulatory Products



Not subject to statutory due-process requirements

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Great Lakes Coastal Flood Study
greatlakescoast.org

Products and Datasets: Coastal Products in Development

Erosion

Red Lantern Restaurant, Lake Michigan, IN

Lake Levels

Lake Michigan Shoreline
Reference

Shoreline Feature Dataset

Upper Peninsula Shoreline
Reference

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Risk MAP Overview: Shoreline Features Database

Shoreline Material
Sand
Cohesive
Cobble
Diamicton*
Shingle
Bedrock
Artificial

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

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

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

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

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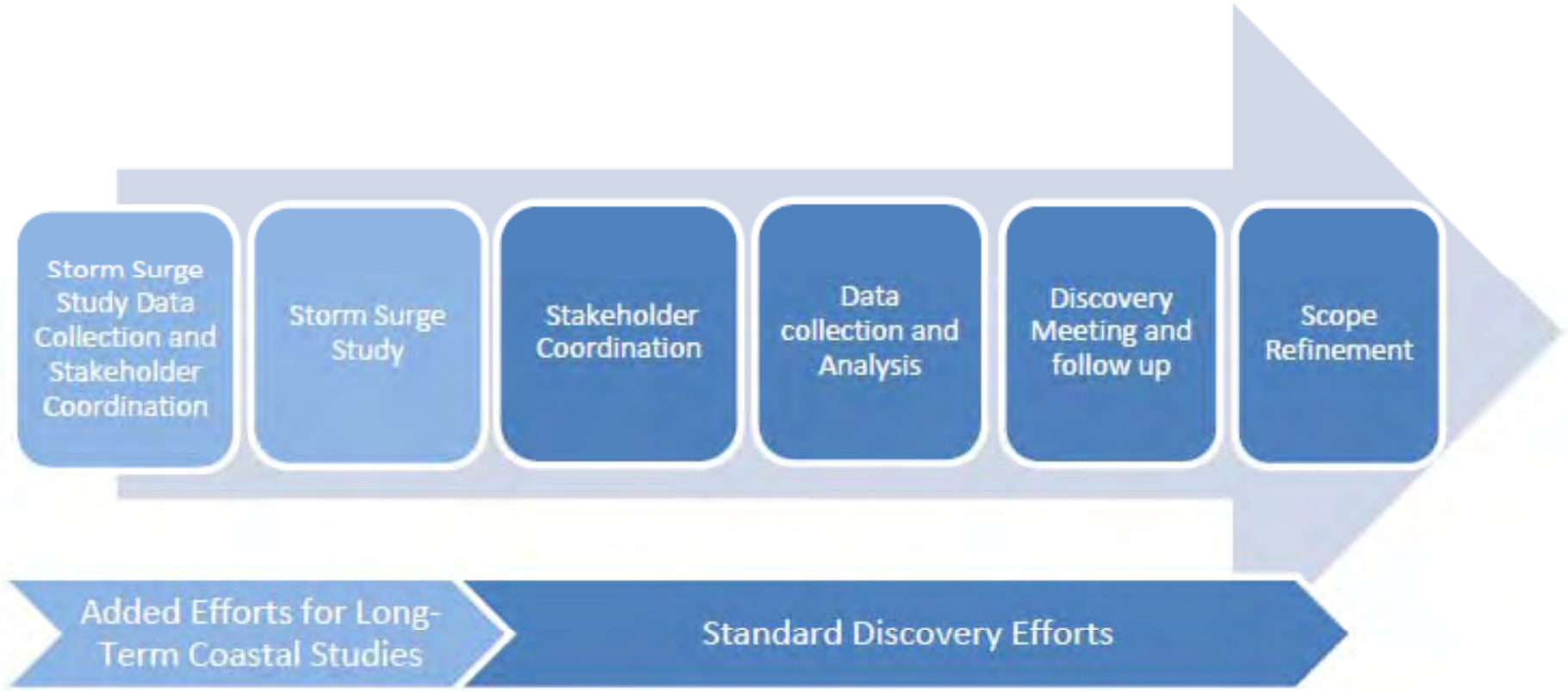
Great Lakes Coastal Flood Study
Discovery Process Overview



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Great Lakes Coastal Flood Study
greatlakescoast.org

Great Lakes Coastal Flood Study
Discovery Meeting

FEMA

Discovery Meeting Venue	Discovery Meeting Address	Discovery Meeting Date, Time
Goodells County Park Community Center Meeting Room	8345 County Park Drive Goodells, MI 48027	Monday 8/20/2012; 8:30 am - 10:30 am

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Draft Discovery Meeting Agenda

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

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

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

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Great Lakes Coastal Flood Study
Discovery Products

- **Final Discovery Report**
  - Single, comprehensive report for all of Lake Michigan, with appendices for each coastal community by county
  - Includes pre-discovery data, meeting agenda, sign-in sheets, discussion topics, decisions made, etc.
- **Final Discovery Maps**
  - Including feedback from participants
  - Visual representation of meeting outcomes

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Great Lakes Coastal Flood Study
greatlakescoast.org

Who Should Attend the Discovery Meeting?

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

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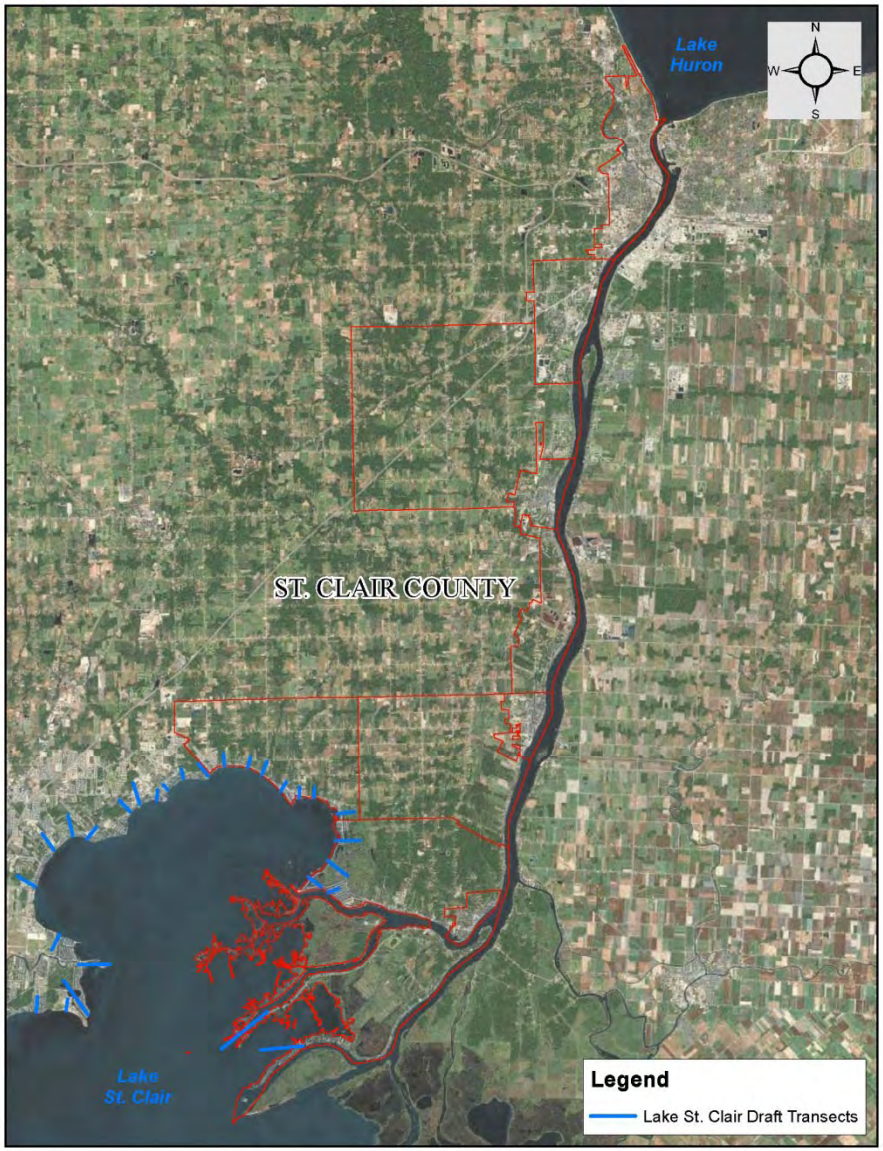
Great Lakes Coastal Flood Study
Discovery Study Area

FEMA

Communities affected by Lake St. Clair and St. Clair River:

Lake St. Clair Communities:
Ira Township
Clay Township

St. Clair River Communities:
City of Algonac
Cottrellville Township
East China Township
City of Marine City
City of Marysville
City of Port Huron
St. Clair Township
City of St. Clair



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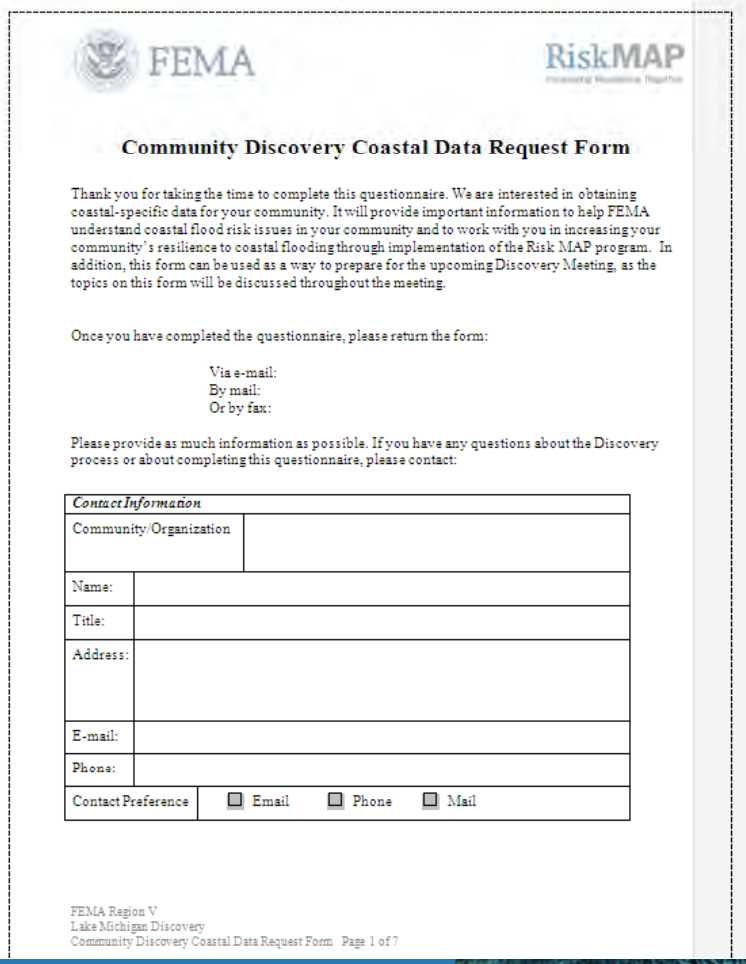
Great Lakes Coastal

Data Request Form Overview

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



FEMA RiskMAP

Community Discovery Coastal Data Request Form

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

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

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

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

Contact Information	
Community/Organization	
Name:	
Title:	
Address:	
E-mail:	
Phone:	
Contact Preference	☐ Email ☐ Phone ☐ Mail

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

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Great Lakes Coastal Flood Study
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Review of Data Collected To Date

FEMA

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

Disaster Type	Incident Begin Date	Incident End Date
SEVERE STORMS & FLOODING	12/1/1972	12/1/1972
SEVERE STORMS & FLOODING	4/12/1973	4/12/1973
SEVERE STORMS, HIGH WINDS & FLOODING	4/26/1975	4/26/1975
SEVERE STORMS, TORNADOES, ICING & FLOODING	3/19/1976	3/19/1976
SEVERE STORMS AND FLOODING	6/21/1996	7/1/1996
SEVERE STORMS, TORNADOES, AND FLOODING	5/20/2004	6/8/2004
BLIZZARDS & SNOWSTORMS	1/27/1978	1/27/1978
SNOW	12/11/2000	12/31/2000
POWER OUTAGE	8/14/2003	8/17/2003

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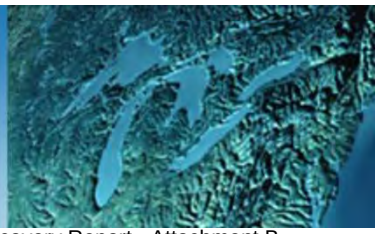

Next Steps and Opportunity to Get Involved

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

THANK YOU FOR YOUR PARTICIPATION!

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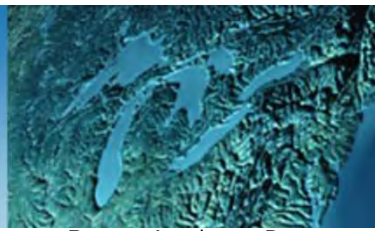

Who to Contact

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

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Questions?

RiskMAP
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Great Lakes Coastal Flood Study
greatlakescoast.org

Community CEO/FPA List - St. Clair County, MI - July 2012

County/City/Township	First/ Last Name	Title	Address	Address	ZIP
Port Huron, City	Pauline Repp	Mayor	Municipal Office Center	100 McMorran Boulevard, Port Huron, MI	48060
	Kimberly Harmer	Planning and Community Development Director (FPA)	Municipal Office Center	100 McMorran Boulevard, Port Huron, MI	48060
Ira, Township	Robert McCoy	Township Supervisor	Township Hall	7085 Meldrum Road, Fair Haven, MI	48023
	Brian Bayly	Building Inspector (FPA)	Township Hall	7085 Meldrum Road, Fair Haven, MI	48023
Clay, Township	Thomas Krueger	Supervisor		4710 Pte. Tremble Road - P.O. Box 429 , Clay Twp., Michigan	48001-0429
	Sid Browne	Building Inspector (FPA)		4710 Pte. Tremble Road - P.O. Box 429 , Clay Twp., Michigan	48001-0429
	Barbara Schutt	Assesssor		4710 Pte. Tremble Road - P.O. Box 429 , Clay Twp., Michigan	48001-0429
	Jeff Kern	Building Inspector (FPA)	Township Hall	51111 River Road, East China, MI	48054
Marine City, City	Charles Browne	Mayor	City Hall	303 South Water Street, Marine City, MI	48039
	Brian Bayly	Zoning Administrator (FPA)	City Hall	303 South Water Street, Marine City, MI	48039
Marysville, City	Gary Orr	Mayor	City Hall	1111 Delaware Avenue, Marysville, MI	48040
	Jason Hami	City Engineer (FPA)	City Hall	1111 Delaware Avenue, Marysville, MI	48040
St. Clair, City	Bill Cedar	Mayor	City Hall	547 North Carney Drive, St. Clair, MI	48079
	Mike Booth	City Manager (FPA)	City Hall	547 North Carney Drive, St. Clair, MI	48079
	Diane Cunningham	Building Clerk	City Hall	547 North Carney Drive, St. Clair, MI	48079
Cottrellville, Township	Tom Raymond	Township Supervisor	Township Hall	7008 Marsh Road, Cottrellville, MI	48039
	George Kunnath	Zoning Administrator (FPA)	Township Hall	7008 Marsh Road, Cottrellville, MI	48039
St. Clair, Township	Brian Mahaffy	Township Supervisor	Township Hall	1539 South Bartlett Road, St. Clair Township, MI	48079
	Brian Bayly	Zoning Administrator (FPA)	Township Hall	1539 South Bartlett Road, St. Clair Township, MI	48079
Algonac, City	Irene Bird	Mayor	City Hall	Post Office Box 454/805 St. Clair River Drive, Algonac, MI	48001
	William Klaassen	Building Inspector (FPA)	City Hall	Post Office Box 454/805 St. Clair River Drive, Algonac, MI	48001
St. Clair, County	William Kauffman	County Administrator		200 Grand River Avenue, Suite 203, Port Huron, MI	48060
	Dave Struck	Director of the Planning Department		200 Grand River Avenue, Suite 203, Port Huron, MI	

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

The Honorable Pauline Repp
Mayor, City of Port Huron
Municipal Office Center
100 McMorran Boulevard
Port Huron, Michigan 48060

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mayor Repp:

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

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

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

Your Discovery Meeting is scheduled to occur:

Date/Time:	Monday, August 20, 2012; 8:30 am - 10:30 am ET
Location:	Goodells County Park Community Center Meeting Room
Address:	8345 County Park Drive Goodells, Michigan 48027

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

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 6, 2012.** Please reference the Discovery Meeting date and time in your RSVP.

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

The Information Exchange conference call is scheduled to occur:

Date/Time:	Monday, July 30, 2012; 10:00 - 11:00 am ET
Link to WebEx:	http://e-meetings.verizonbusiness.com/nc/join.php
Meeting Number:	445288484
Call in number:	1-866-398-2885
Participant Code:	197462

If you or another community representative is unable to attend the Information Exchange conference call, we ask that you fill out and return the enclosed data request form by **August 6, 2012.** This is the same data request form that will be discussed during the conference call. The completed form can be sent to:

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

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

Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Kimberly Harmer, Planning and Community Development Director, City of Port Huron
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

Mr. Robert McCoy
Township Supervisor, Ira Township
Township Hall
7085 Meldrum Road
Fair Haven, Michigan 48023

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. McCoy:

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

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Your Discovery Meeting is scheduled to occur:

Date/Time:	Monday, August 20, 2012; 8:30 am - 10:30 am ET
Location:	Goodells County Park Community Center Meeting Room
Address:	8345 County Park Drive Goodells, Michigan 48027

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

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 6, 2012.** Please reference the Discovery Meeting date and time in your RSVP.

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

The Information Exchange conference call is scheduled to occur:

Date/Time:	Monday, July 30, 2012; 10:00 - 11:00 am ET
Link to WebEx:	http://e-meetings.verizonbusiness.com/nc/join.php
Meeting Number:	445288484
Call in number:	1-866-398-2885
Participant Code:	197462

If you or another community representative is unable to attend the Information Exchange conference call, we ask that you fill out and return the enclosed data request form by **August 6, 2012.** This is the same data request form that will be discussed during the conference call. The completed form can be sent to:

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

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

Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Brian Bayly, Building Inspector, Ira Township
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

Mr. Thomas Krueger
Supervisor, Clay Township
4710 Pte. Tremble Road
Post Office Box 429
Clay Township, Michigan 48001

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. Krueger:

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

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

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

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Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Sid Browne, Building Inspector, Clay Township
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

Mr. John Randolph
Township Supervisor, East China Township
Township Hall
51111 River Road
East China, Michigan 48054

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. Randolph:

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

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

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Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Jeff Kern, Building Inspector, East China Township
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

The Honorable Charles Browne
Mayor, Marine City
City Hall
303 South Water Street
Marine City, Michigan 48039

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mayor Browne:

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

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Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Brian Bayly, Zoning Administrator, Marine City
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605
FEMA

July 19, 2012

Mr. Gary Orr
Mayor, City of Marysville
City Hall
1111 Delaware Avenue
Marysville, Michigan 48040

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. Orr:

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

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

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Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Jason Hami, City Engineer, City of Marysville
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

The Honorable Bill Cedar
Mayor, City of St. Clair
City Hall
547 North Carney Drive
St. Clair, Michigan 48079

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mayor Cedar:

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

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Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Diane Cunningham, Building Clerk, City of St. Clair
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

Mr. Tom Raymond
Township Supervisor, Cottrellville Township
Township Hall
7008 Marsh Road
Cottrellville, Michigan 48039

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. Raymond:

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

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

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

Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: George Kunnath, Zoning Administrator, Cottrellville Township
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

Mr. Brian Mahaffy
Township Supervisor, St. Clair Township
Township Hall
1539 South Bartlett Road
St. Clair Township, Michigan 48079

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. Mahaffy:

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

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

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

Your Discovery Meeting is scheduled to occur:

Date/Time:	Monday, August 20, 2012; 8:30 am - 10:30 am ET
Location:	Goodells County Park Community Center Meeting Room
Address:	8345 County Park Drive Goodells, Michigan 48027

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

Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 6, 2012.** Please reference the Discovery Meeting date and time in your RSVP.

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

The Information Exchange conference call is scheduled to occur:

Date/Time:	Monday, July 30, 2012; 10:00 - 11:00 am ET
Link to WebEx:	http://e-meetings.verizonbusiness.com/nc/join.php
Meeting Number:	445288484
Call in number:	1-866-398-2885
Participant Code:	197462

If you or another community representative is unable to attend the Information Exchange conference call, we ask that you fill out and return the enclosed data request form by **August 6, 2012.** This is the same data request form that will be discussed during the conference call. The completed form can be sent to:

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

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

Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: Brian Bayly, Zoning Administrator, St. Clair Township
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

The Honorable Irene Bird
Mayor, City of Algonac
City Hall
805 St. Clair River Drive
Post Office Box 454
Algonac, Michigan 48001

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mayor Bird:

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

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Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 6, 2012.** Please reference the Discovery Meeting date and time in your RSVP.

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

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

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

Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: William Klaassen, Building Inspector, City of Algonac
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

U.S. Department of Homeland Security
536 S. Clark St. 6th Floor
Chicago, IL 60605

FEMA

July 19, 2012

Mr. William Kauffman
County Administrator, St. Clair County
200 Grand River Avenue
Suite 203
Port Huron, Michigan 48060

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear Mr. Kauffman:

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

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Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com no later than **August 6, 2012.** Please reference the Discovery Meeting date and time in your RSVP.

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

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

Sincerely,

Christine Stack

Christine Stack
Division Director
Mitigation Division, FEMA Region V

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

cc: David Struck, Director of the Planning Department, St. Clair County
Linda Burke, Michigan Department of Environmental Quality
Les Thomas, Michigan Department of Environmental Quality
Byron Lane, Michigan Department of Environmental Quality

Lake St. Clair Email Distribution List
July 2012

Organization	Category	First Name	Last Name	Title	Email
Alliance for the Great Lakes	Ecological	Jamie	Cross		jcross@greatlakes.org
Alliance for the Great Lakes - MI Office	Ecological	Sam	Lovall	Southeast Michigan Outreach Coordinator	slovall@greatlakes.org
Anderson, Eckstein, Westrick, Inc.	Engineer	Jeffrey	Bednar	Senior Project Engineer	jbednar@aewinc.com
Anderson, Eckstein, Westrick, Inc.	Engineer	John	Chown	Senior Project Engineer	jchown@aewinc.com
Burtchville Township	Local Official	Mike	Appel	Township Supervisor	btwpsupervisor@comcast.net
Burtchville Township	Local Official	Bill	Boesch	Zoning Adminstrator (FPA)	N/A
Centers for Ocean Sciences Education Excellence (COSEE Great Lakes)	Ecological	Rosanne W.	Fortner	Director, COSEE Great Lakes	fortner.2@osu.edu
Centers for Ocean Sciences Education Excellence (COSEE Great Lakes)	University	Jim	Diana	Michigan Sea Grant	jimd@umich.edu
Centers for Ocean Sciences Education Excellence (COSEE Great Lakes)	University	Steve	Stewart	Michigan Sea Grant	stew@msu.edu
Central Michigan University	University	Elizabeth	Alm		alm1ew@cmich.edu
Central Michigan University	University	Dave	Cuthrell		cuthrelld@michigan.gov
Central Michigan University	University	Tracy	Galarowicz		galar1tl@cmich.edu
Central Michigan University	University	Tom	Gehring		tom.gehring@cmich.edu
Central Michigan University	University	Mary	Montoye		monto1mj@cmich.edu
Central Michigan University	University	Don	Uzarski		uzars1dg@cmich.edu
Central Michigan University	University	David	Zanatta		zanat1d@cmich.edu
CH2M Hill	Engineer	Frank	Dillon		fdillon@ch2m.com
Chesterfield Township	Regional	Michael	Lovelock	Township Supervisor	mlovelock@chesterfieldtwp.org
Chesterfield Township	Regional	Shawn	Shortt	Building Administrator	sshortt@chesterfieldtwp.org
City of Algonac	Regional	Irene	Bird	Mayor	rpbird@yahoo.com
City of Algonac	Regional	William	Klaassen	Building Inspector	dmalear@algonac-mi.gov
City of Detroit	Mayor	Dave	Bing	Mayor	scheduling@detroitmi.gov
City of Detroit	Regional	Dave	Bing	Mayor	scheduling@detroitmi.gov
City of Detroit	Regional	Raymond	Scott	General Manager	scottr@detroitmi.gov
City of Escorse	Local Official	Jim	Hill	Building Inspector (FPA)	N/A
City of Escorse	Mayor	Darcel	Brown	Mayor	mayor@city-ecorse.org
City of Gibraltar	Mayor	Jim	Gorris	Mayor	gorrisj@cityofgibraltar.net
City of Grosse Point Park, MI	Mayor	Palmer T.	Heenan	Mayor	mayor@grossepointepark.org
City of Grosse Pointe Farms	Regional	Terry	Brennan	Public Service Director	tbrennan@grossepointefarms.org
City of Grosse Pointe Park	Regional	Dale	Krajniak	City Manager	gppkd@aol.com
City of Grosse Pointe Woods	Regional	Robert	Novitke	Mayor	mayornovitke@comcast.net
City of Grosse Pointe Woods	Regional	Gene	Tutag	Building Official	gtutag@gpwmi.us
City of Harper Woods	Regional	Leslie	Frank	Administrative Assistant, City Manager	admin@harperwoodsmi.net
City of Harper Woods	Regional	Kenneth	Poynter	Mayor	hwmayor@harperwoodsmi.net
City of Marysville	Local Official	Jason	Hami	City Engineer (FPA)	jhami@cityofmarysvillmi.com
City of Marysville	Local Official	Tom	Konik	Fire Chief/Emergency Manager	tkosnik@cityofmarysvillemi.com
City of Marysville	Mayor	Gary	Orr	Mayor	gw_orr@comcast.net
City of Mount Clemens	Mayor	Barb	Dempsey	Mayor	bdempsey@cityofmountclemens.com
City of Mount Clemens	Regional	Brian	Tingley	Community Development Director	btingley@cityofmountclemens.com
City of New Baltimore	Mayor	Larry	Smith	Mayor	mayor@cityofnewbaltimore.org
City of New Baltimore	Regional	Greg	Nikkel	Building Inspector	gnikkel@cityofnewbaltimore.org
City of Port Huron	Local Official	Sara	Montoya	Civil Engineer II	montoyas@porthuron.org
City of Port Huron	Regional	Kimberly	Harmer	Planning and Community Development Director	harmerk@porthuron.org
City of Port Huron	Regional	Pauline	Repp	Mayor	reppp@porthuron.org
City of River Rouge	Local Official	Troy	Newman	Building Inspector (FPA)	N/A
City of River Rouge	Mayor	Michael	Aowdler	Mayor	N/A
City of Riverview	Local Official	Dave	Scurto	Community Development Director (FPA)	dscurto@cityofriverview.com
City of Riverview	Mayor	Tim	Durand	Mayor	N/A
City of Rockwood	Local Official	Charles	Earl	Building Inspector (FPA)	beldgdept@rockwoodmi.org
City of Rockwood	Mayor	Daniel	Guzzi	Mayor	mayorguzzi@rockwoodmi.org
City of St. Clair	Local Official	Mike	Booth	City Manager (FPA)	mbooth@cityofstclair.com
City of St. Clair	Local Official	Diane	Cunningham	Building Clerk (FPA)	dcunningham@cityofstclair.com

Lake St. Clair Email Distribution List
July 2012

Organization	Category	First Name	Last Name	Title	Email
City of St. Clair	Mayor	Bill	Cedar	Mayor	N/A
City of St. Clair Shores	Local Official	Bryan	Babcock	Director of Public Works/Water	babcockb@scsmi.net
City of St. Clair Shores	Local Official	Christopher	Rayes	Community Services Director	Chris@scsmi.net
City of St. Clair Shores	Regional	Christopher	Rayes	Director of Community Development	chris@scsmi.net
City of St. Clair Shores	Regional	Kip	Walby	Mayor	walby@scsmi.net
City of Trenton	Local Official	Virgil	Maiani	Building Inspector (FPA)	vmaiani@trenton-mi.com
City of Trenton	Mayor	Kyle	Stack	Mayor	kstack@trenton-mi.com
City of Wyandotte	Local Official	Mark	Kowalewski	City Engineer (FPA)	mkowalewski@wyan.org
City of Wyandotte	Mayor	Joseph	Peterson	Mayor	mayor@wyan.org
Clay Township	Regional	Thomas	Krueger	Supervisor	supervisor@claytownship.org
Clinton Charter Township	Regional	Robert	Cannon	Township Supervisor	r.cannon@clintontownship-mi.gov
Clinton River Watershed Council	Ecological	Tom	Quail	Clinton River Watershed Council	tom@crwc.org
Clinton River Watershed Council	Ecological	Anne	Vaara	Executive Director	contact@crwc.org
Cottrellville Township	Local Official	George	Kunnath	Zoning Administrator (FPA)	N/A
Cottrellville Township	Local Official	Tom	Raymond	Township Supervisor	N/A
Council of Great Lake Industries	Ecological	George	Kuper		straderco@aol.com
D.J. Case & Associates	Engineer	Phil	Seng		phil@djcase.com
Davenport University	University	Chuck	McKeown		mckeownc@msu.edu
Department of Environmental Quality: Office of the Great Lakes	Ecological	Patty	Birkholz	Director	birkholzp@michigan.gov
Department of Environmental Quality: Office of the Great Lakes	Ecological	Amy	Hicks	Executive Assistant (Patty)	hicksa@michigan.gov
DEQ - Office of Great Lakes	State/Reg Agency	Frank	Ruswick	Deputy Director	ruswickf@michigan.gov
DEQ: Office of Great Lakes	State/Reg Agency	Roger	Eberhardt	Senior Environmental Specialist	eberhardtr@michigan.gov
DEQ: Office of the Great Lakes- Areas of Concern Program	State/Reg Agency	Rick	Hobrla	Chief	hobrlar@michigan.gov
DEQ: Office of the Great Lakes- Coastal Management	State/Reg Agency	Alisa	Gonzales-Pennington	Coastal Management Coordinator - NW MI	gonzalesa@michigan.gov
DEQ: Office of the Great Lakes- Coastal Management	State/Reg Agency	Lynda	Krupansky	Coastal Management Coordinator - W and SE MI	krupanskyl@michigan.gov
Detroit Riverfront Conservancy	Ecological	Faye Alexander	Nelson	President & CEO	info@detroitriverfront.org
DLZ	Engineer	Natalie	Dingledine		ndingledine@dlz.com
DLZ	Engineer	Steve	Metzer		smetzer@dlz.com
DTE Energy	Engineer	M.	Gruelle		gruellem@dteenergy.com
DTE Energy	Engineer	Dennis	Leonard		leonardd@dteenergy.com
East China Township	Local Official	Jeff	Kern	Building Inspector (FPA)	N/A
East China Township	Local Official	John	Randolph	Township Supervisor	N/A
East Michigan Council of Governments	Regional	Sue	Fortune		sfortune@emcog.org
East Michigan Council of Governments	Regional	Anamika	Laad		alaad@emcog.org
Ecology and Environment	Ecological	Nick	Owens		nowens@ene.com
ECT	Engineer	Annette	DeMaria	Engineer	ademaria@ect.com
Eldean Development Group	Engineer	Eldean	Shipyard		wade@eldean.com
ENTRIX, Inc.	Engineer	John	Newsted		jnewsted@entrix.com
Environmental Consulting & Technology, Inc.	Engineer	Roy	Schrameck	Senior Engineer	rschrameck@ectinc.com
Environmental Consulting & Technology, Inc.	Engineer	Sanjiv	Sinha		ssinha@ectinc.com
EPA-GLNPO	Ecological	Pranas	Pranckevicius		pranckevicius.pranas@epa.gov
Essex Region Conservation Authority	Engineer	Jeremy	Wychreschuk	Director of Watershed Engineering	Jwyscreschuk@erca.org
Ferris State University	University	Gary	Noble		garynoble@ferris.edu
Fishbeck, Thompson, Carr & Huber, Inc.	Engineer	Fred	Cowles		fecowles@ftch.com
Fort Gratiot Township	Local Official	Jorja	Baldwin	Zoning Administrator (FPA)	jbaldwin@fortgratiottwp.org
Fort Gratiot Township	Local Official	Doug	Hannan	Township Supervisor	dhannan@fortgratiottwp.org
Georgia Pacific	Engineer	Garry	Griffith		gtgriffi@gapac.com
GLERL/NOAA	Fed Agency	Henry	Vanderploeg		henry.vanderploeg@noaa.gov
Grand Valley State University	University	Bopi	Biddanda		biddandb@gvsu.edu
Grand Valley State University	University	John	Koches		kochesj@gvsu.edu
Grand Valley State University	University	Richard	Rediske		redisker@gvsu.edu
Great Lakes Commission	Ecological	Cassie	Bradley		cbradley@glc.org

Lake St. Clair Email Distribution List
July 2012

Organization	Category	First Name	Last Name	Title	Email
Great Lakes Commission	Ecological	Heather	Braun		hbraun@glc.org
Great Lakes Commission	Ecological	Thomas	Crane		tcrane@glc.org
Great Lakes Commission	Ecological	Stuart	Eddy		seddy@glc.org
Great Lakes Commission	Ecological	Tim	Eder	Executive Director	teder@glc.org
Great Lakes Commission	Ecological	Julie	Hinderer		midaj@umich.edu
Great Lakes Commission	Ecological	John	Hummer		jhummer@glc.org
Great Lakes Commission	Ecological	Erika	Jensen		ejensen@glc.org
Great Lakes Commission	Ecological	David	Knight		dknight@glc.org
Great Lakes Commission	Ecological	Rebecca	Pearson		bpearson@glc.org
Great Lakes Commission	Ecological	Victoria	Pebbles	Program Director	vpebbles@glc.org
Great Lakes Environmental Research Laboratory - NOAA	Fed Agency	Craig	Stow		craig.stow@noaa.gov
Great Lakes Fishery Commission	Ecological	Mike	Hansen	Commissioner	info@glfc.org
Great Lakes Fishery Commission	Ecological	Dr. Charles	Krueger	Science Director	info@glfc.org
Great Lakes Information Network	Ecological	Christine	Manninen	Webmaster, Project Manager	manninen@glc.org
Great Lakes Observing System	Ecological	Kelli	Paige	Program Coordinator	kpaige@glos.us
Great Lakes Observing System	State/Reg Agency	Kelli	Paige	Program Coordinator	kpaige@glos.us
Great Lakes Observing System/Michigan Sea Grant	University	Jennifer	Read	Executive Director (GLOS)/ Acting Director (MI Sea Grant)	jread@glos.us
Great Lakes Outdoors Foundation / Michigan United Conservation Clubs (MUCC)	Ecological	Dennis	Muchmore	Executive Director	N/A
Great Lakes Regional Center of National Wildlife Federation	Ecological	Melinda	Koslow		koslowm@nwf.org
Grosse Ile Township	Local Official	Brian	Loftus	Township Supervisor	brianl@grosseile.com
Grosse Ile Township	Local Official	Lorrie	Zalewski	Community Development Manager (FPA)	lorriet@grosseile.com
Grosse Point Farms, MI	Mayor	James C.	Farquhar	Mayor	N/A
GVSU Annis Water Resources Institute	University	Janet	Vail		vailj@gvsu.edu
Hands & Associates, Inc.	Engineer	Charles	Barker		cfbarker@hands-assoc.com
Harrison Township	Regional	Vijay	Parakh	Building Official	vparakh@harrison-township.org
Harrison Township	Regional	Kenneth	Verkest	Township Supervisor	kverkest@harrison-township.org
Harsens Island St. Clair Flats Association	Ecological	Charles	Miller	Environmental Affiars Committee	c.miller@hiscfa.org
Healing Our Waters - Great Lakes Coalition	Ecological	Chad	Lord	Policy Director	clord@npca.org
Healing Our Waters - Great Lakes Coalition	Ecological	Jordan	Lubetkin	Regional Communications Manager	lubetkin@nwf.org
Healing Our Waters - Great Lakes Coalition	Ecological	Jeff	Skelding	Campaign Director	skeldingj@nwf.org
International Association for Great Lakes Research (IAGLR)	Ecological	Robert	Letcher	President	president@iaglr.org
Ira Township	Regional	Brian	Bayly	Building Inspector	buildingdept@iratownship.org
Ira Township	Regional	Robert	McCoy	Township Supervisor	supervisor@iratownship.org
Lake Superior State University	University	Ken	Hemming		khemming@lssu.edu
Lansing Emergency Management Office	State/Reg Agency	Ronda	Oberlin		roberlin@lansingmi.gov
Limno-Tech, Inc.	Engineer	Greg	Peterson		gpeterson@limno.com
Mackinac Island State Park Commission	State/Reg Agency	Diane	Dombroski		dombroskid1@michigan.gov
Macomb County	Local Official	Mark	Hackel	County Executive	executive@macombgov.org
Macomb County	Local Official	Jeff	Schroeder	Director of GIS and Mapping (FPA)	jeff.schroeder@macombgov.org
Macomb County	Regional	Mark	Hackel	County Executive	executive@macombgov.org
Macomb County	Regional	Jeff	Schroeder	Director of GIS and Mapping	jeff.schroeder@macombgov.org
Macomb County Health Department	Local Official	Stacey	McFarlane		stacey.mcfarlane@macombgov.org
Macomb County Office of Emergency Management	Local Official	Peter	Locke	Emergency Management Aide	peter.locke@macombgov.org
Macomb County Water Resources Advisory Council	Ecological	Gerard	Santoro	Program Manager	gerard.santoro@macombcountymi.gov
Marine City	Mayor	Charles	Browne	Mayor	cbrowne@marinecity-mi.org
Marine City	Regional	Brian	Bayly	Zoning Administrator	brianb@twp.stclair.mi.us
MDA - Environmental Stewardship Division	State/Reg Agency	Abby	Eaton	Environmental Resources Specialist	eatona@michigan.gov
MDA - Environmental Stewardship Division	State/Reg Agency	James	Johnson		johnsonj2@michigan.gov
MDEQ	State/Reg Agency	Judy	Andersen		andersenj1@michigan.gov
MDEQ	State/Reg Agency	Chris	Antieau		antieauc@michigan.gov
MDEQ	State/Reg Agency	Jennifer	Bolt		boltj@michigan.gov
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Lake St. Clair Email Distribution List
July 2012

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MDEQ	State/Reg Agency	Andrew	Hartz		hartza@michigan.gov
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MDEQ	State/Reg Agency	Rhonda	Klann		klannr@michigan.gov
MDEQ	State/Reg Agency	Cindy	Masterson		mastersonc@michigan.gov
MDEQ	State/Reg Agency	Mike	Masterson		mastersonm@michigan.gov
MDEQ	State/Reg Agency	JoAnne	Merrick		merrickj@michigan.gov
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MDEQ	State/Reg Agency	James	Milne		milnej@michigan.gov
MDEQ	State/Reg Agency	Douglas	Morse		morsed@michigan.gov
MDEQ	State/Reg Agency	Colleen	O'Keefe		okeefec@michigan.gov
MDEQ	State/Reg Agency	Ann	Person		persona@michigan.gov
MDEQ	State/Reg Agency	Amy	Petersen	Surface Water Assessment Section	petersona1@michigan.gov
MDEQ	State/Reg Agency	Joseph	Rathbun		rathbunj@michigan.gov
MDEQ	State/Reg Agency	Brian	Rudolph		rudolphb1@michigan.gov
MDEQ	State/Reg Agency	Luis	Saldivia		saldivial@michigan.gov
MDEQ	State/Reg Agency	Katherine	Tetzlaff		tetzlaffk@michigan.gov
MDEQ	State/Reg Agency	Mary	Vanderlaan		vanderlaanm@michigan.gov
MDEQ	State/Reg Agency	Robert	Zbiciak		zbiciakr@michigan.gov
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MDEQ		Sheila	Meiers		MEIERS@michigan.gov
MDEQ		Joelle	Pepper		PepperJ@michigan.gov
MDEQ - Office of Geological Survey	State/Reg Agency	John	Esch		eschj@michigan.gov
MDEQ - Remediation Division	State/Reg Agency	Susan	Erickson		ericksons@michigan.gov
MDEQ - The Office of the Great Lakes	State/Reg Agency	Jim	Bredin		bredinj@michigan.gov
MDEQ - The Office of the Great Lakes - Lake Program	State/Reg Agency	Matt	Preisser		preisserm@michigan.gov
MDEQ - The Office of the Great Lakes - Lake Program	State/Reg Agency	John	Riley		rileyj2@michigan.gov
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MDEQ - Water Resources Division	State/Reg Agency	Linda	Burke	Environmental Engineer	burkel4@michigan.gov
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MDEQ - Water Resources Division	State/Reg Agency	Bill	Larsen		larsenb@michigan.gov
MDEQ - Water Resources Division	State/Reg Agency	Todd	Losee		loseet@michigan.gov
MDEQ - Water Resources Division	State/Reg Agency	Amy	Lounds		loundsa@michigan.gov
MDEQ-Marketing, Education & Technology Division	State/Reg Agency	Kevin	Frailey		fraileyk@michigan.gov
MDEQ-Marketing, Education & Technology Division	State/Reg Agency	Tom	Occhipinti		occhipintit@michigan.gov
MDEQ-Michigan natural Features Inventory	State/Reg Agency	Phyllis	Higman		higmanp@michigan.gov
MDEQ-MICHIGAN NATURAL FEATURES INVENTORY	State/Reg Agency	Mike	Penskar		penskarm@michigan.gov
MDEQ-Water Resource Division	State/Reg Agency	Charles	Bauer		bauerc@michigan.gov
MDEQ-Water Resources Division	State/Reg Agency	Dina	Klemans		klemansd@michigan.gov
MDNR - Recreation Division	State/Reg Agency	Cheri	Lee		leec1@michigan.gov
MDNR - Recreation Division	State/Reg Agency	Ron	Olson		olsonr@michigan.gov
MDNR - Wildlife Division	State/Reg Agency	Barbara	Avers		aversb@michigan.gov
MDNR - Wildlife Division	State/Reg Agency	Karen	Cleveland		clevelandk1@michigan.gov
MDNR - Wildlife Division	State/Reg Agency	Lori	Sargent		sargentl@michigan.gov
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Lake St. Clair Email Distribution List
July 2012

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Mich. Dept. of Technology, Management, and Budget	State/Reg Agency	Richard	Vance		rlgvance@yahoo.com
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Michigan Department of Agriculture	State/Reg Agency	Stephen	Shine		shines@michigan.gov
Michigan Department of Agriculture and Rural Development	State/Reg Agency	Tom	Young		youngt1@michigan.gov
Michigan Department of Energy, Labor & Economic Growth	State/Reg Agency	Alice	Wood		wooda@michigan.gov
Michigan Department of Environmental Quality	State/Reg Agency	Linda	Burke		burkel4@michigan.gov
Michigan Department of Environmental Quality	State/Reg Agency	Les	Thomas	NFIP State Coordinator	thomasl@michigan.gov
Michigan Department of Environmental Quality	State/Reg Agency	Michael	Young		youngm1@michigan.gov
Michigan Department of Environmental Quality	State/Reg Agency; Ecological; Local FPM	Jerry	Fulcher	Floodplain Manager	fulcherg@michigan.gov
Michigan Department of Environmental Quality - Executive Division	State/Reg Agency	Jim	Sygo		sygoj@michigan.gov
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Michigan Department of Environmental Quality - Southeast District	State/Reg Agency; Ecological; Local FPM	Maria	Zingas	Floodplain Manager/NFIP Coordinator	zingasm@michigan.gov
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Michigan Department of Natural Resources	State/Reg Agency	Richard	Hausler		N/A
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Lake St. Clair Email Distribution List
July 2012

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Michigan Department of Natural Resources	State/Reg Agency	Ann	Sylvester		sylvesta@michigan.gov
Michigan Department of Natural Resources	State/Reg Agency	Susan	Tangora		tangoras@michigan.gov
Michigan Department of Natural Resources	State/Reg Agency	Michael	Terrell		terrellm1@michigan.gov
Michigan Department of Natural Resources	State/Reg Agency	Leland	VerBerkmoes		N/A
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Michigan Department of Natural Resources	State/Reg Agency	Wendy	Winkler		winklerw@michigan.gov
Michigan Department of Natural Resources	State/Reg Agency	Paul	Yauk		yaukp@michigan.gov
Michigan Department of Natural Resources-Trust Fund	State/Reg Agency	Shamika	Akew		askews2@michigan.gov
Michigan Department of Natural Resources-Trust Fund	State/Reg Agency	Christie	Bayus		bayusc@michigan.gov
Michigan Department of Natural Resources-Trust Fund	State/Reg Agency	John	Cherry		cherryj3@michigan.gov
Michigan Department of Natural Resources-Trust Fund	State/Reg Agency	Steve	DeBrabander		debrabanders@michigan.gov
Michigan Department of Natural Resources-Trust Fund	State/Reg Agency	Earl	Flegler		fleglere@michigan.gov
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Michigan Department of Transportation	State/Reg Agency	Pete	Hanses		N/A
Michigan Department of Transportation	State/Reg Agency	Larry	Karnes		karnesl@michigan.gov
Michigan Department of Transportation	State/Reg Agency	Cynthia L.	Krupp		kruppc@michigan.gov
Michigan Department of Transportation	State/Reg Agency	Molly	Lamrouex		lamrouexm@michigan.gov
Michigan Department of Transportation	State/Reg Agency	Michael	Pennington		penningtonm@michigan.gov
Michigan Department of Transportation	State/Reg Agency	Ulrika	Zay		N/A
Michigan Economic Development Corporation	State/Reg Agency	George	Zimmermann		zimmermanng@michigan.org
Michigan Natural Features Inventory	State/Reg Agency	Pete	Badra		badrap@michigan.gov
Michigan Port Collaborative	State/Reg Agency	Carol	Linteau		linteauc@aol.com
Michigan Sea Grant Extension	State/Reg Agency	Josh	Gunn	Educator	gunnjosh@msu.edu
Michigan Sea Grant Extension	State/Reg Agency	Justin	Selden	Program Instructor	seldenju@anr.msu.edu
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Michigan State Housing Development Authority	State/Reg Agency	Laura	Ashlee		ashleel@michigan.gov
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Michigan State Housing Development Authority	State/Reg Agency	Duane	Thelen		thelend4@michigan.gov
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Lake St. Clair Email Distribution List
July 2012

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Michigan State University - County	University	Hal	Hudson		msue.tuscola@county.msu.edu
Michigan State University - Planning & Zoning Center	University	Mark	Wyckoff		wyckoff@pzcenter.msu.edu
Michigan State University-Institute of Agricultural Technology	University	Thomas	Coon		coontg@anr.msu.edu
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Michigan Technological University	University	Mark	Maroste		mmaroste@mtu.edu
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Michigan Technological University	University	Robert	Shuchman		shuchman@mtu.edu
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MSU - Institute of Water Research	University	Jon	Bartholic		bartholi@msu.edu
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NOAA	Fed Agency	Jennifer	Day		jennifer.day@noaa.gov
NOAA / GLERL	Fed Agency; Ecological	Drew	Gronewald	Hydrologist/Physical Scientist	drew.gronewold@noaa.gov
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NOAA Great Lakes Environmental Research Lab	Fed Agency	Brent	Lofgren		brent.lofgren@noaa.gov
NOAA Weather Service	Fed Agency	Danny	Costello	Hydrologist	Danny.costello@noaa.gov
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Northeast Michigan Council of Governments	Regional	Diane	Rekowski		drekowski@nemcog.org
Northeast Michigan Council of Governments	Regional	Nico	Tucker		ntucker@nemcog.org
Northwest Michigan Council of Governments	Regional	Matt	McCauley		mccauley@nwm.cog.mi.us
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Public Sector Consultants, Inc.	Engineer	Mark	Coscarelli		mcoscarelli@pscinc.com
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SEMCOG	Regional	Chuck	Hersey		hersey@semcog.org
Sierra Club (Michigan Chapter)	Ecological	Anne	Woiwode	State Director	anne.woiwode@sierraclub.org
Southeast Michigan Council of Governments	Regional	Amy	Mangus		mangus@semcog.org
Southeast Michigan Council of Governments	Regional	William	Parkus		parkus@semcog.org
Southeast Michigan Council of Governments	Regional	Paul	Tait		tait@semcog.org
Southeast Michigan Council of Governments	State Official	Ann	Burns		burns@semcog.org
Southwest Michigan Planning Commission	Regional	Marcy	Colclough		colcloughm@swmpc.org
Southwest Michigan Planning Commission	Regional	John	Egelhaaf		egelhaafj@swmpc.org
St Clair Shores Waterfront Enviornmental Committee	Ecological	Mark	Balon	Member	babsmrb@yahoo.com
St Clair Shores Waterfront Enviornmental Committee	Ecological	Joe	St. John	Chairperson	scswateradvisory@lycos.com
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St. Clair County	Local Official	David	Struck	Director of the Planning Department (FPA)	dstruck@stclaircounty.org
St. Clair County Health Department	Local Official	Kristen	O'Reilly	Storm Water Coordinator	koreilly@hd.stclaircounty.org
St. Clair County Metropolitan Planning Commission	Local Official	Geoffrey	Donaldson	Senior Planner	gdonaldson@stclaircounty.org
St. Clair County BOC	Local Official	Bill	Gratopp	Commissioner	bgratopp@stclaircounty.org
St. Clair Township	Local Official	Brian	Bayly	Zoning Administrator (FPA)	brianb@twp.stclair.mi.us
St. Clair Township	Local Official	Brian	Mahaffy	Township Supervisor	brian@twp.stclair.mi.us
State of Michigan	State/Reg Agency	Charles	Allen		allenc9@michigan.gov
State of Michigan	State/Reg Agency	Jordan	Kameron		jordank@michigan.gov
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Lake St. Clair Email Distribution List
July 2012

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The City of St. Clair Shores	Mayor	Robert A.	Hison	Mayor	hison@scsmi.net
The Nature Conservancy	Ecological	Nicole	Van Helden	Director of Conservation-Green Bay	nvanhelden@tnc.org
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University of Michigan: CILER - School of Natural Resources and the Environment (UM SNRE)	University; Ecological	Dmitry	Beletsky	Associate Research Scientist	beletsky@umich.edu
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West Michigan Shoreline Regional Development Commission	Regional	Erin	Kuhn		ekuhn@wmsrdc.org
West Michigan Shoreline Regional Development Commission	Regional		Nan		nemmer@wmsrdc.org
West Michigan Shoreline Regional Development Commission	Regional	Susan	Stine-Johnson		sstinejohnson@wmsrdc.org
Western Michigan University	University	David	Lemberg		david.lemberg@wmich.edu
Western U.P. Planning and Development Region	Regional	Kim	Stoker		kstoker@wuppdr.org
Western U.P. Planning and Development Region 2	Regional	Lori	Hauswirth		lhauswirth@wuppdr.org
	Engineer	William	Boesch		wboeschjr@hotmail.com
	Engineer	Bradford	Spencer		bs-spencer@comcast.net

Great Lakes Coastal Flood Study
Lake St. Clair – State of Michigan - Email Discovery Invitation Language
FINAL – JULY 26, 2012

Re: Invitation to Attend Community Meetings Regarding Lake St. Clair Coastal Flood Risk

Dear State of Michigan Lake St. Clair Coastal Flood Study Stakeholders:

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

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

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

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

County	Discovery Meeting Venue	Discovery Meeting Address	Discovery Meeting Date, Time
St. Clair	Goodells County Park Community Center Meeting Room	8345 County Park Drive, Goodells, MI 48027	Monday 8/20/2012; 8:30 am - 10:30 am
Macomb	Robert A. VerKuilen Building	21885 Dunham Road, Clinton Twp, MI 48036	Monday 8/20/2012; 2:00 pm - 4:00 pm
Wayne	Grosse Pointe Public Library, Ewald Branch	15175 E. Jefferson Avenue, Grosse Pointe Park, MI 48230	Tuesday 8/21/2012; 2:00 pm – 4:00 pm

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

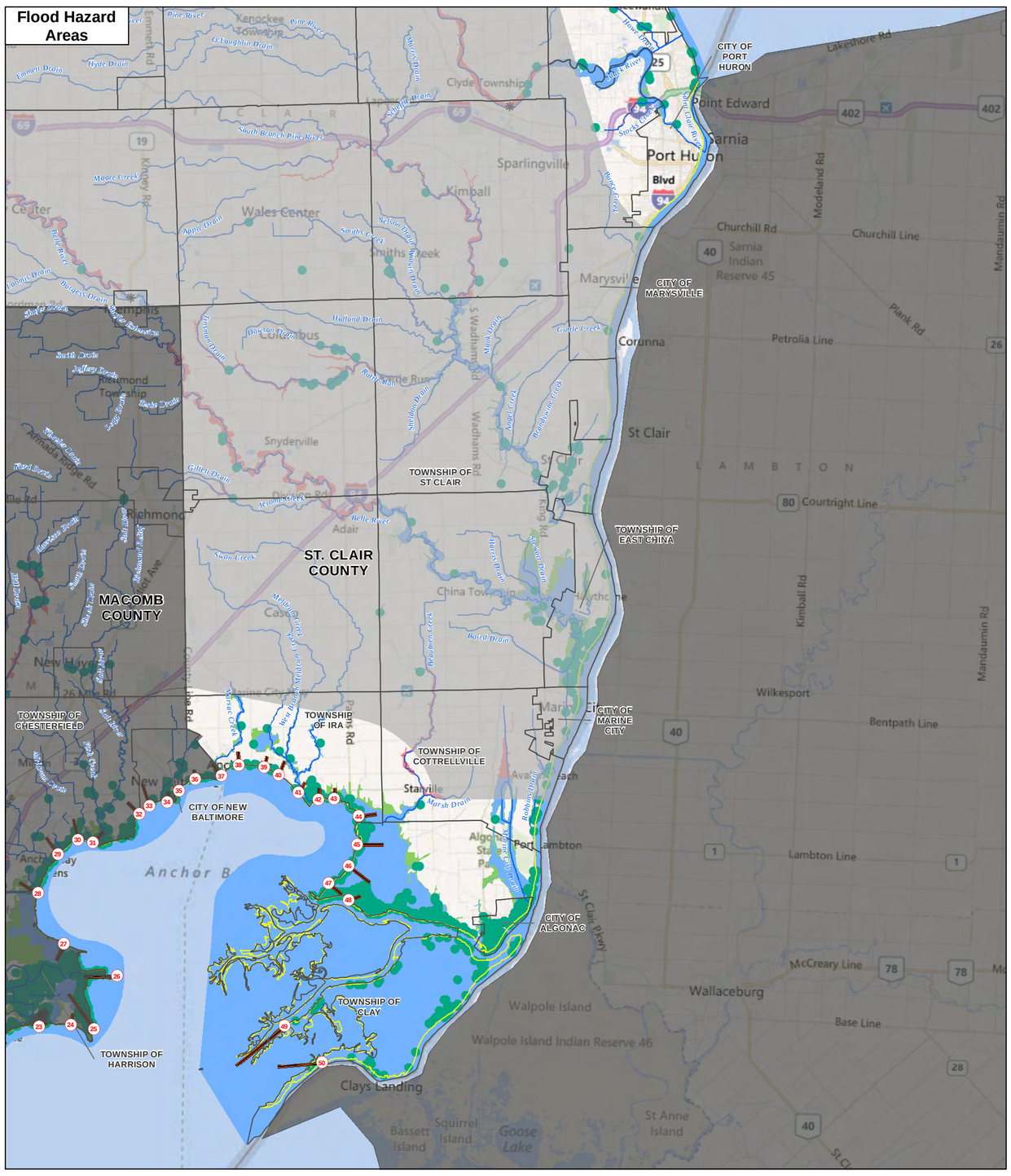
available to eligible communities. Please RSVP to FEMA's study contractor (STARR) Scott Banjavcic at (312) 780-7755 or email to GreatLakesFloodStudy@starr-team.com by **August 10, 2012.** Please reference the Discovery Meeting date and time in your RSVP.

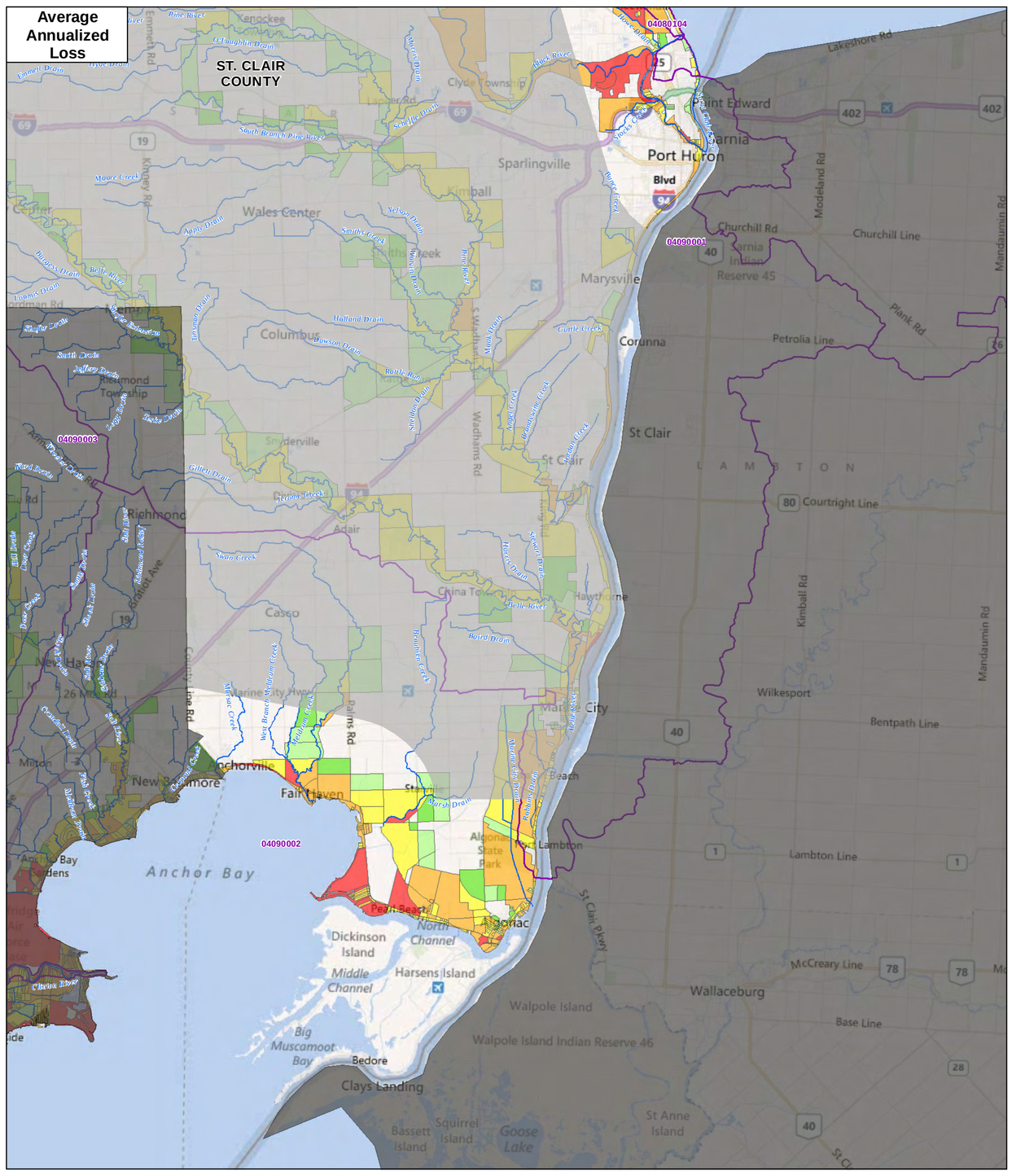
A attached Community Coastal Data Request Form was recently mailed to local community officials, along with the Discovery Meeting invitation. This form is also available online at http://www.greatlakescoast.org/pubs/forms/GLCFS_Discovery_Coastal_Data_Request_Form.pdf. If you have data or information that you would like to provide to FEMA or discuss with us in advance of the Discovery Meetings, please contact Laura Keating of STARR at (925) 296-8048 or by email at GreatLakesFloodStudy@starr-team.com.

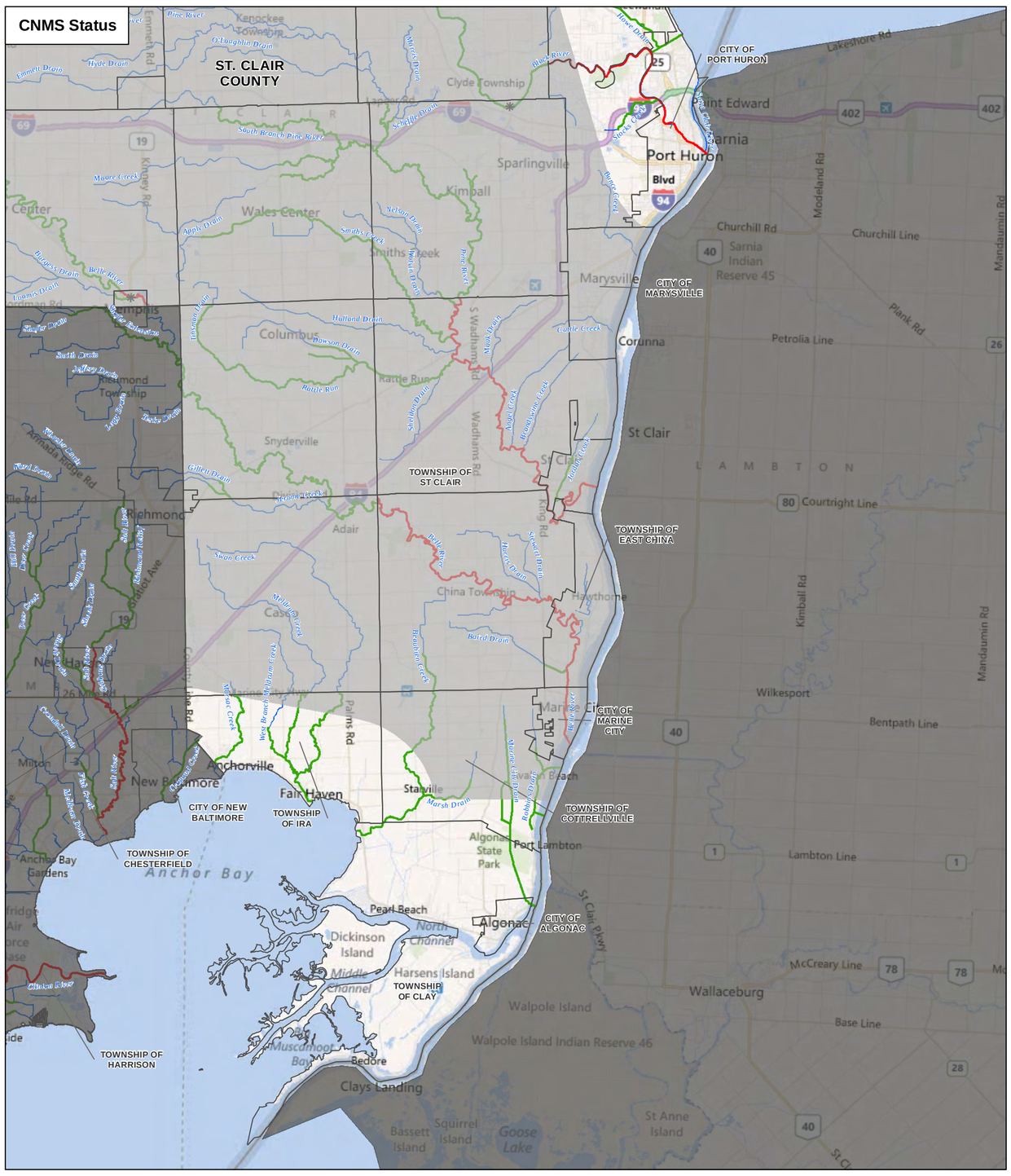
We look forward to working with you to reduce the risks associated with coastal flooding and increase resiliency for the long term. To learn more about Discovery, please visit http://www.fema.gov/library and search keywords "Discovery brochure" or contact Ken Hinterlong, FEMA Region V Senior Engineer,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

ATTACHMENT C

DRAFT DISCOVERY MAP







Declared Disasters

Lake	State	Declared County/Area	Declaration Date	Disaster Type	Incident Type	Description
Lake St. Clair	MI	St. Clair (County)	12/1/1972	DR	Flood	SEVERE STORMS & FLOODING
Lake St. Clair	MI	St. Clair (County)	4/12/1973	DR	Flood	SEVERE STORMS & FLOODING
Lake St. Clair	MI	St. Clair (County)	4/26/1975	DR	Flood	SEVERE STORMS, HIGH WINDS & FLOODING
Lake St. Clair	MI	St. Clair (County)	3/19/1976	DR	Severe Storm(s)	SEVERE STORMS, TORNADOES, ICING & FLOODING
Lake St. Clair	MI	St. Clair (County)	7/23/1996	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
Lake St. Clair	MI	St. Clair (County)	6/30/2004	DR	Severe Storm(s)	SEVERE STORMS, TORNADOES, AND FLOODING
Lake St. Clair	MI	St. Clair (County)	1/27/1978	EM	Snow	BLIZZARDS & SNOWSTORMS
Lake St. Clair	MI	St. Clair (County)	1/10/2001	EM	Snow	SNOW
Lake St. Clair	MI	St. Clair (County)	9/23/2003	EM	Other	POWER OUTAGE
Lake St. Clair	MI	St. Clair (County)	9/7/2005	EM	Hurricane	HURRICANE KATRINA EVACUATION

Summary of Shoreline Type

Total Shoreline (mile)	Artificial Shoreline (mile)	Boulders, Bedrock (mile)	Cohesive Clays and Silts (mile)	Sand (mile)	Shingles, Pebbles, Cobbles (Mile)	Other (mile)
29.0	27.1	0.6	0.0	1.3	0.0	0.0

Summary of Shoreline Type

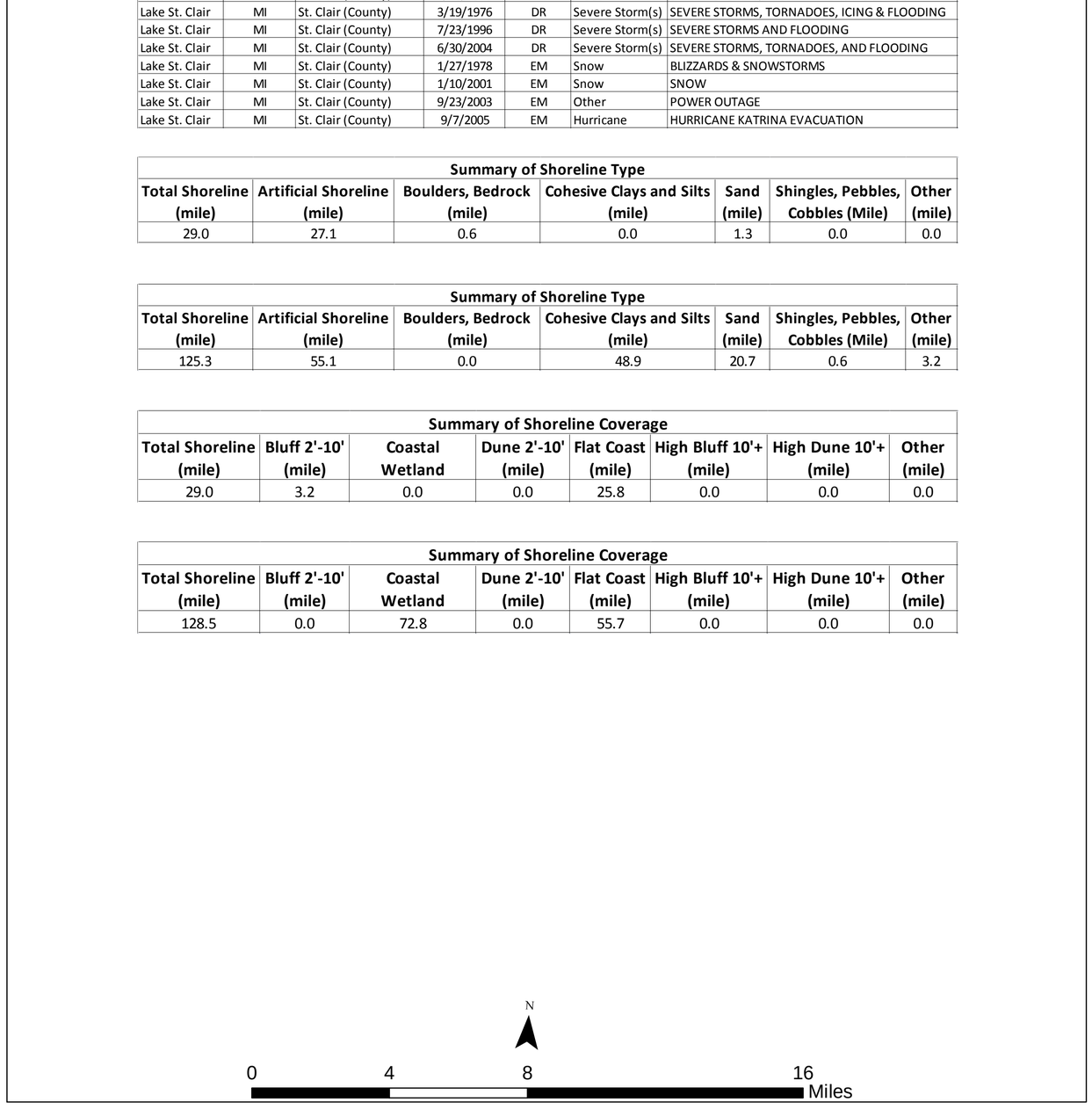
Total Shoreline (mile)	Artificial Shoreline (mile)	Boulders, Bedrock (mile)	Cohesive Clays and Silts (mile)	Sand (mile)	Shingles, Pebbles, Cobbles (Mile)	Other (mile)
125.3	55.1	0.0	48.9	20.7	0.6	3.2

Summary of Shoreline Coverage

Total Shoreline (mile)	Bluff 2'-10' (mile)	Coastal Wetland	Dune 2'-10' (mile)	Flat Coast (mile)	High Bluff 10'+ (mile)	High Dune 10'+ (mile)	Other (mile)
29.0	3.2	0.0	0.0	25.8	0.0	0.0	0.0

Summary of Shoreline Coverage

Total Shoreline (mile)	Bluff 2'-10' (mile)	Coastal Wetland	Dune 2'-10' (mile)	Flat Coast (mile)	High Bluff 10'+ (mile)	High Dune 10'+ (mile)	Other (mile)
128.5	0.0	72.8	0.0	55.7	0.0	0.0	0.0



MAP SYMBOLOGY

LEGEND

- Dams
- LOMCs
- USGS Gages
- Transects
- Shoreline
- Streams
- Watersheds (HUC 8)
- Coastal Barrier Resource System
- Coastal Discovery Area
- Surrounding Counties
- Municipal Boundaries

EFFECTIVE SFHA

- A
- AE
- 0.2% PCT ANNUAL CHANCE FLOOD

AAL DATA
Total Average Annualized Losses per Census Block

- Less than $10,000
- $10,001 - $100,000
- $100,001 - $1,000,000
- $1,000,001 - $5,000,000
- Greater than $5,000,000

Coordinated Needs Management Strategy (CNMS)
Validation Status

- Unverified
- Unknown
- Valid

COASTAL STUDY LOCATOR

NATIONAL FLOOD INSURANCE PROGRAM

Discovery Map

LAKE ST. CLAIR COASTAL STUDY

ST. CLAIR COUNTY, MICHIGAN COASTAL STUDY COMMUNITIES

St. Clair County
Algonac, City of
Clay, Township of
Cottrellville, Township of
East China, Township of
Ira, Township of
Marine City, City of
Marrysville, City of
Port Huron, City of
St. Clair, City of
St. Clair, Township of

STARR

FEMA

ATTACHMENT D

PROPOSED TRANSECTS

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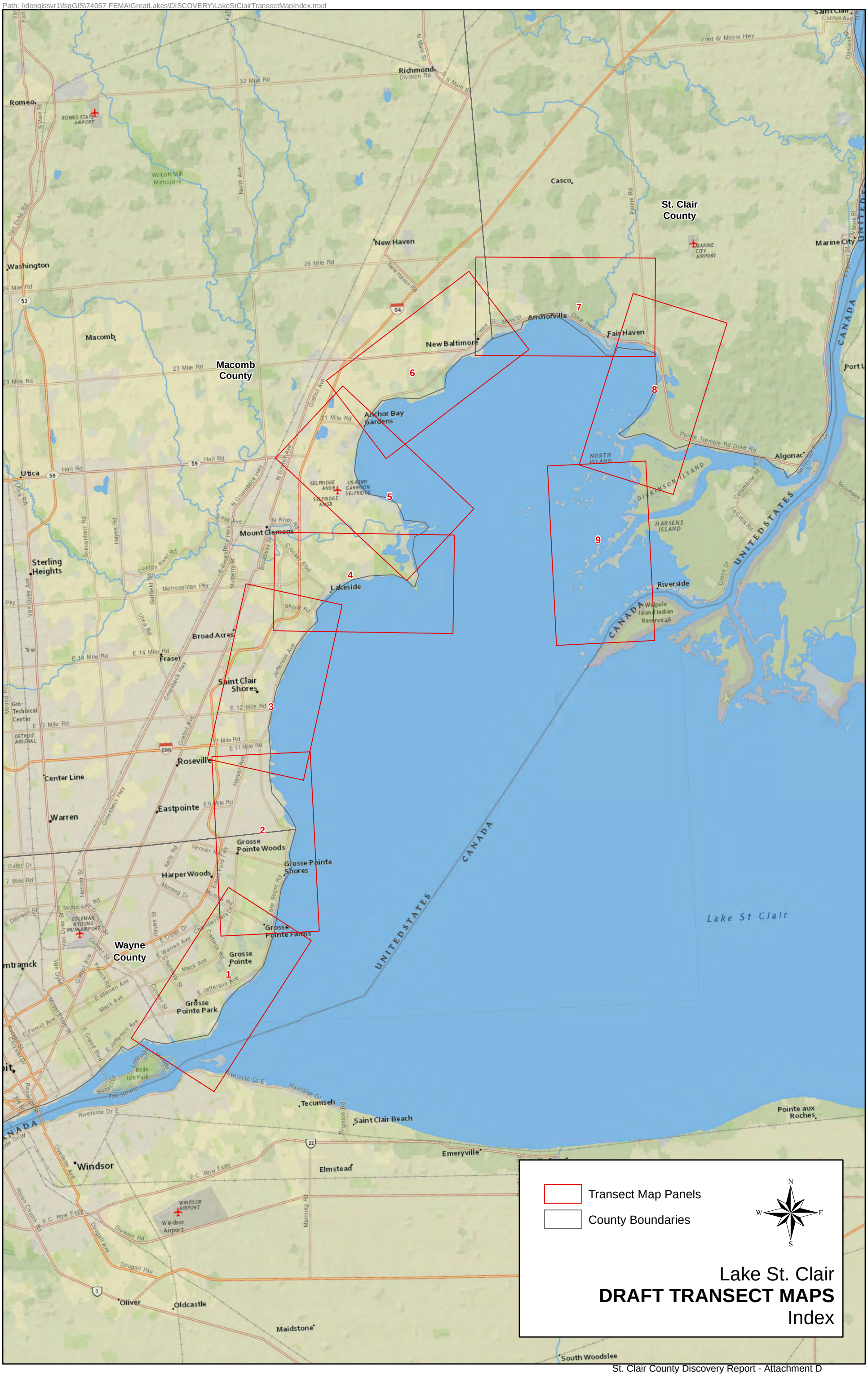

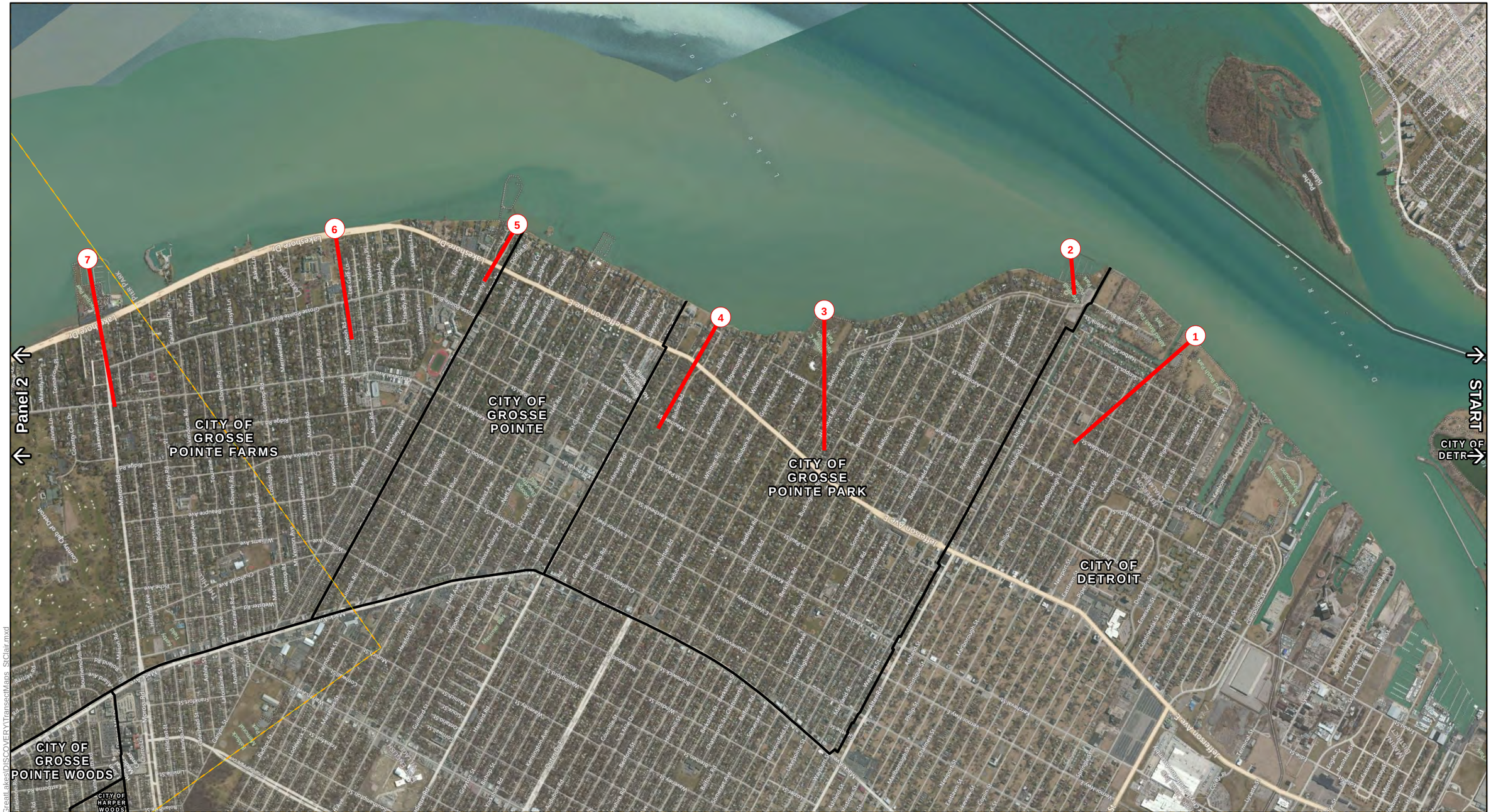

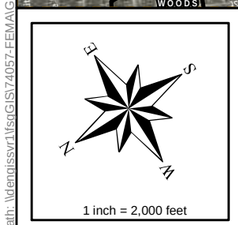

Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES

WAYNE COUNTY

COMMUNITIES

CITY OF DETROIT
CITY OF GROSSE POINTE
CITY OF GROSSE POINTE FARMS
CITY OF GROSSE POINTE PARK
CITY OF GROSSE POINTE WOODS
CITY OF HARPER WOODS

Lake St. Clair

DRAFT TRANSECTS

Panel 1 of 9

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1 inch = 2,000 feet

Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES

WAYNE COUNTY
MACOMB COUNTY

COMMUNITIES

CITY OF GROSSE POINTE FARMS
CITY OF GROSSE POINTE WOODS
CITY OF HARPER WOODS
CITY OF ST CLAIR SHORES
VILLAGE OF GROSSE POINTE SHORES

Lake St. Clair
DRAFT TRANSECTS
Panel 2 of 9

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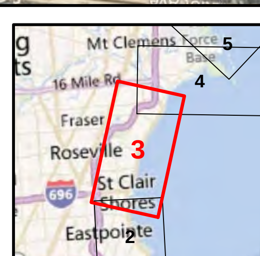
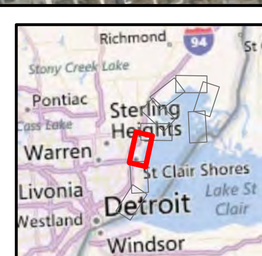




Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES

MACOMB COUNTY

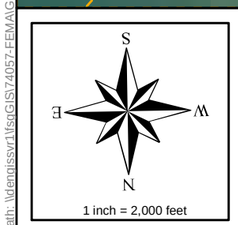
COMMUNITIES

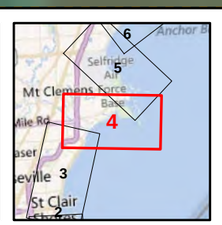
CHARTER TOWNSHIP OF CLINTON
CITY OF ROSEVILLE
CITY OF ST CLAIR SHORES
TOWNSHIP OF HARRISON

Lake St. Clair

DRAFT TRANSECTS

Panel 3 of 9





Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES
MACOMB COUNTY

COMMUNITIES
CHARTER TOWNSHIP OF CLINTON
CITY OF MOUNT CLEMENS
TOWNSHIP OF HARRISON

Lake St. Clair
DRAFT TRANSECTS
Panel 4 of 9

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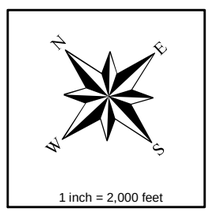

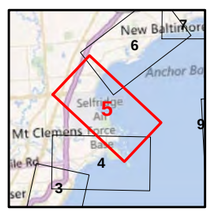

Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES

MACOMB COUNTY

COMMUNITIES

CHARTER TOWNSHIP OF CLINTON
TOWNSHIP OF CHESTERFIELD
TOWNSHIP OF HARRISON
TOWNSHIP OF MACOMB

Lake St. Clair

DRAFT TRANSECTS

Panel 5 of 9

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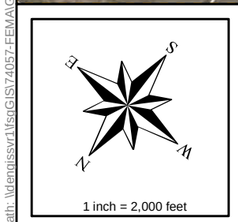
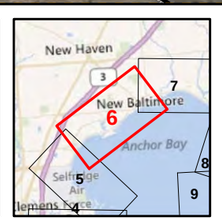
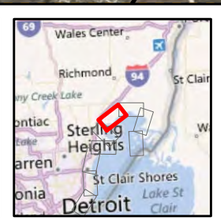






Transects

Adjoining Panel Edge

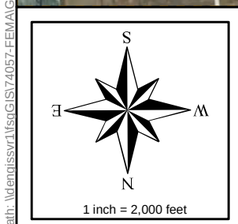
Political Boundary

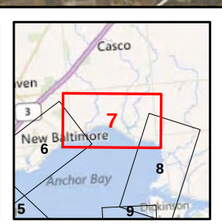
Basemap Source: Microsoft BING map service

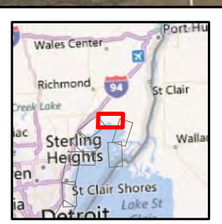
COUNTIES
MACOMB COUNTY
ST. CLAIR COUNTY

COMMUNITIES
CITY OF NEW BALTIMORE
TOWNSHIP OF CHESTERFIELD

Lake St. Clair
DRAFT TRANSECTS
Panel 6 of 9







Transects

Adjoining Panel Edge

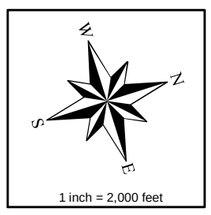
Political Boundary

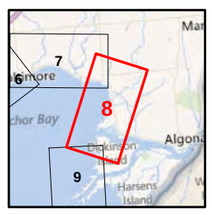
Basemap Source: Microsoft BING map service

COUNTIES
MACOMB COUNTY
ST. CLAIR COUNTY

COMMUNITIES
CITY OF NEW BALTIMORE
TOWNSHIP OF CHESTERFIELD
TOWNSHIP OF IRA

Lake St. Clair
DRAFT TRANSECTS
Panel 7 of 9





Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES
ST. CLAIR COUNTY

COMMUNITIES
TOWNSHIP OF CLAY
TOWNSHIP OF COTTRELLVILLE
TOWNSHIP OF IRA

Lake St. Clair
DRAFT TRANSECTS
Panel 8 of 9

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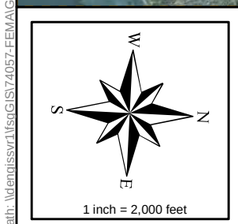

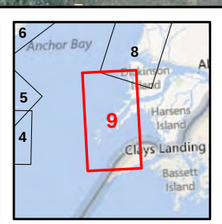

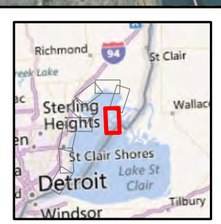

Transects

Adjoining Panel Edge

Political Boundary

Basemap Source: Microsoft BING map service

COUNTIES
ST. CLAIR COUNTY

COMMUNITIES
TOWNSHIP OF CLAY

Lake St. Clair
DRAFT TRANSECTS
Panel 9 of 9

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ATTACHMENT E

ST. CLAIR COUNTY DISCOVERY MEETING DOCUMENTS

Discovery Meeting Agenda

Discovery Meeting Sign-In Sheets

Discovery Meeting Minutes

Discovery Meeting Presentation

Project Name:	FEMA Region V Discovery
Meeting:	ST. CLAIR COUNTY Great Lakes Coastal Discovery Meeting
Date and Time:	MONDAY, AUGUST 20, 2012; 8:30 – 10:30 AM ET
Place:	GOODELLS COUNTY PARK COUMMUNITY CENTER
Facilitator:	ERIN MALONEY, FEMA BRIAN CAUFIELD, MATT REMBOLD, BRETT ADDAMS, STARR

Discovery Meeting Agenda

1. **Why are we here? (8:30 – 8:45 AM ET)**
   - Great Lakes Coastal Flood Study Overview and Schedule
   - Discovery Process and Outcomes

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

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

4. **Interactive Session A (9:20 – 9:45 AM CT)**
   - View and Discuss Local Coastal Areas of Concern Using the Discovery Map and Community Risk MAP Questionnaire

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

6. **Interactive Session B (9:55 -10:20 AM ET)**
   - Discuss Mitigation Action Opportunities
   - Introduce the Mitigation Action Form and Mitigation Action Tracker

7. **Wrap Up (10:20 – 10:30 AM ET)**
   - Review of action items and next steps

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

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

August 20, 2012 ST. CLAIR COUNTY DISCOVERY MEETING SIGN-IN SHEET

Please verify contact information and intial meeting attendance.

No.	Sign Intials	Affiliation	Title	Name First	Name Last	Street Address	Phone	Email Address
1		City of Algonac	Building Inspector	William	Klaassen			
2	Sem	City of Port Huron	Civil Engineer II	Sara	Montoya	100 McMorran Boulevard Port Huron, MI 48060	810.984.9730	montoyas@porthuron.org
3		St. Clair County Metro Planning Commission	Senior Planner	Geoff	Donaldson	200 Grand River Avenue, Suite 202 Port Huron, MI 48060	(810) 989-6950	gdonaldson@stclaircounty.org
4	EM	FEMA Region V	~~Senior~~ Engineer	~~Lee~~ Erin	~~Traeger~~ Maloney	536 South Clark St., 6th Floor Chicago, IL 60605	(312) 408-~~5500~~ 5435	~~lee.traeger@fema.dhs.gov~~
5		STARR	Engineer	Brian	Caufield	50 Hampshire Street Cambridge, MA 02139	(617) 452-6000	caufieldba@cdmsmith.com
6		STARR	Engineer	Matt	Rembold	125 South Wacker Drive Chicago, IL 60606	(312) 346-5000	remboldmd@cdmsmith.com
7		STARR	GIS Specialist	Brett	Addams	125 South Wacker Drive Chicago, IL 60606	(312) 346-5000	addamsbh@cdmsmith.com
8		CLAY TOWNSHIP	SUPERVISOR	TOM	KRENDEL	4710 PTE TREMBLE ALGONAC 48001	810 794 9303	SUPERVISOR@CLAYTOWNSHIP.ORG
9		St Clair County	Co. Commissioner	Bill	Gratopp	200 Grand River Port Huron 48060	810-989-6900	bgratopp@stclaircounty.org
10		HISCFA	Bd Member	Whitey	Simon	4722 GREEN BOX 95 H.I	810 748-3975	whiteysim@yahoo.com

August 20, 2012 ST. CLAIR COUNTY DISCOVERY MEETING SIGN-IN SHEET
Please verify contact information and intial meeting attendance.

No.	Sign Intials	Affiliation	Title	Name First	Name Last	Street Address	Phone	Email Address
11		HRC	Project Engineer	Karyn	Stickel	555 Hulet Dr. Bloomfield Hills MI 48303	248-454-6516	kstickel@hrc-engr.com
12	FEMA	FEMA Region V	National Hazards Program Specialist	Frank	Shockey	536 S Clark St 6th floor Chicago IL 60605	312-408-5521	frank.shockey@dhs.gov
13	Don Brown Rep. Miller		Deputy District Director	Don	Brown	48701 Van Dyke Shelby Twp MI	586-977-5010	Don.Brown@mail.house.gov
14		Tetra Tech	Project Eng.	Bob	Nelson	2008 Military #17 Port Huron MI 48060	810 984 8240	Bob.Nelson@tetratech.com
15		St. Clair County Metropolitan planning commission	Senior Planner	Geoffrey	Donaldson	200 Grand River, Ste 202 Port Huron, MI 48060	810-989-6950	gdonaldson@stclaircounty.org
16								
17								
18								
19								

August 20, 2012 ST. CLAIR COUNTY DISCOVERY MEETING SIGN-IN SHEET

Please verify contact information and intial meeting attendance.

No.	Sign Intials	Affiliation	Title	Name First	Name Last	Street Address	Phone	Email Address
20	PP	MICH SENATE	SENATOR	PHIL	PAVLOV	1577 S. ALPINE	517-373-7708	PAVLOVSENATE@GMAIL.COM
21	WCK	ALGONAC	BUILDING OFFICIAL	BILL	KLAASSEN	620 N. MAIN	794 9351	
22								
23								
24								
25								
26								
27								
28								
29								

Meeting schedule: Monday, August 20, 2012 8:30 – 10:30 am (ET)
Meeting Location: Goodells County Park Community Center, Goodells, MI
Discovery Area: Coastal communities in St. Clair County
Attendees: 15 people attended the Lake St. Clair Discovery Meeting. Please see attached sign-in sheet for a complete list of attendees.

FACILITATORS

FEMA
Erin Maloney, FEMA-Region V
Frank Shockey, FEMA-Region V

STARR Contractor
Brian Caufield, STARR
Matt Rembold, STARR
Brett Addams, STARR

ASFPM
Alan Lulloff, ASFPM

MEETING AGENDA:

1. **Why are we here? (15 minutes)**
   - Great Lakes Coastal Flood Study Overview and Schedule
   - Discovery Process and Outcomes

2. **Coastal mapping and flood risk topics to be aware of (25 minutes)**

3. **How does this apply to my community? (10 minutes)**

4. **Interactive Session A (25 minutes)**
   - View and Discuss Local Coastal Areas of Concern Using the Discovery Map and Community Risk MAP Questionnaire

5. **Hazard mitigation opportunities and grant funding (10 minutes)**

6. **Interactive Session B (25 minutes)**
   - Discuss Mitigation Action Opportunities
     Introduce the Mitigation Action Form and Mitigation Action Tracker

7. **Wrap Up (10 minutes)**
   - Review of action items and next steps

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

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

INTERACTIVE DISCUSSION:

- *Question:* Don Brown, Deputy District Director for U.S. Representative Candice S. Miller, asked how coarse the new LiDAR data would be. His concern was that residents are being mapped within the floodplain due to inaccurate data. *Answer:* Brian reviewed the new LiDAR specifications.
- *Discussion:* General concern about the new study. The general consensus of the community officials present was they felt that there had been no previous claims under the NFIP in St. Clair County due to flooding. They have a general concern regarding the NFIP and felt that it hurts their communities. The discussion was led by Michigan State Senator Phil Pavlov.

FEATURES NOTED ON MAPS:

- No specific comments were noted on the workmaps.

ACTIONS:

- Email sign-in sheet to Don Brown, Deputy District Director for U.S. Representative Candice S. Miller.
- Use effective transects in new study as per request by Maria Zingas, Engineer for the Michigan Department of Environmental Quality (not present at St. Clair County meeting; discussed with FEMA and STARR during the Macomb County Discovery Meeting).
- Maria Zingas may provide other comments regarding the location of the draft transects at a later date.

FEMA

Lake St. Clair Discovery

St. Clair County, MI

August 20, 2012
0830 to 1130

Goodells County Park
Community Center

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Introductions

Who's here?

- State Representatives
  - MDEQ
  - SHMO
- Risk MAP Project Team
  - FEMA
  - STARR
- Local Stakeholders
  - CEOs
  - Floodplain Administrators
  - Planners
  - Engineers
  - Emergency Managers
  - Community Leaders
  - Regional Planning Agencies
  - Coastal Organizations

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Status of St. Clair County studies

- Effective 05/03/2010

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Discovery Meeting Agenda

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

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Risk Mapping, Assessment and Planning
Risk MAP

FEMA

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



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Great Lakes Coastal Flood Study

U.S. Army Corps of Engineers, Detroit District

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Great Lakes Coastal Flood Study
Overview

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

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Lake St. Clair Discovery

- 3 counties in Michigan
- 16 coastal communities
- 7 connecting channels communities

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Great Lakes Coastal Flood Study
Discovery Study Area

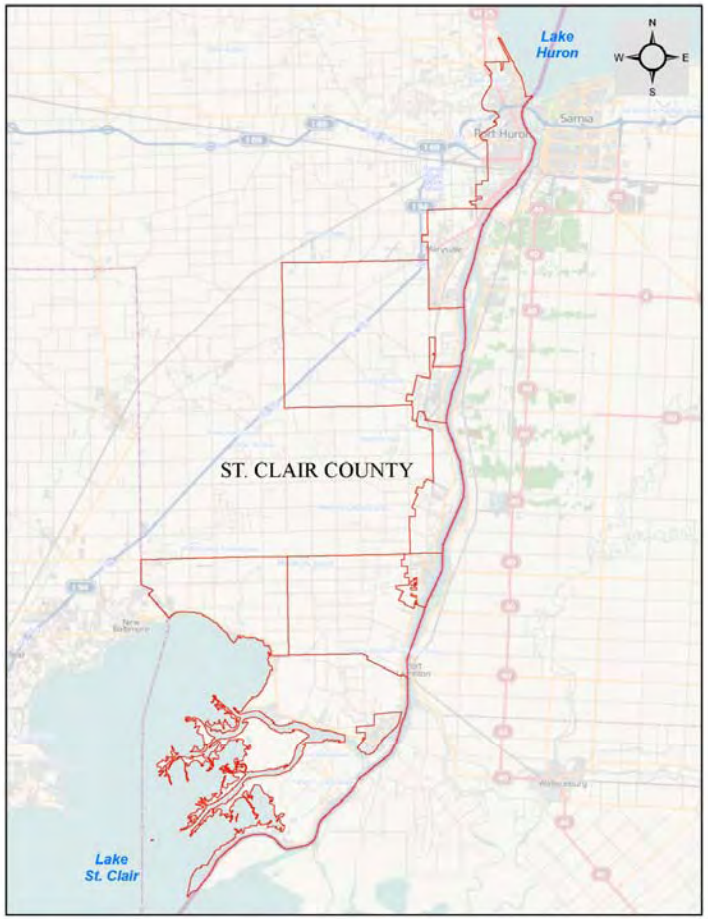
FEMA

<u>Lake St. Clair Communities:</u>

Ira Township
Clay Township
City of Algonac

<u>St. Clair River Communities:</u>

Cottrellville Township
East China Township
City of Marine City
City of Marysville
City of Port Huron
St. Clair Township
City of St. Clair



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Discovery Meeting Objectives

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

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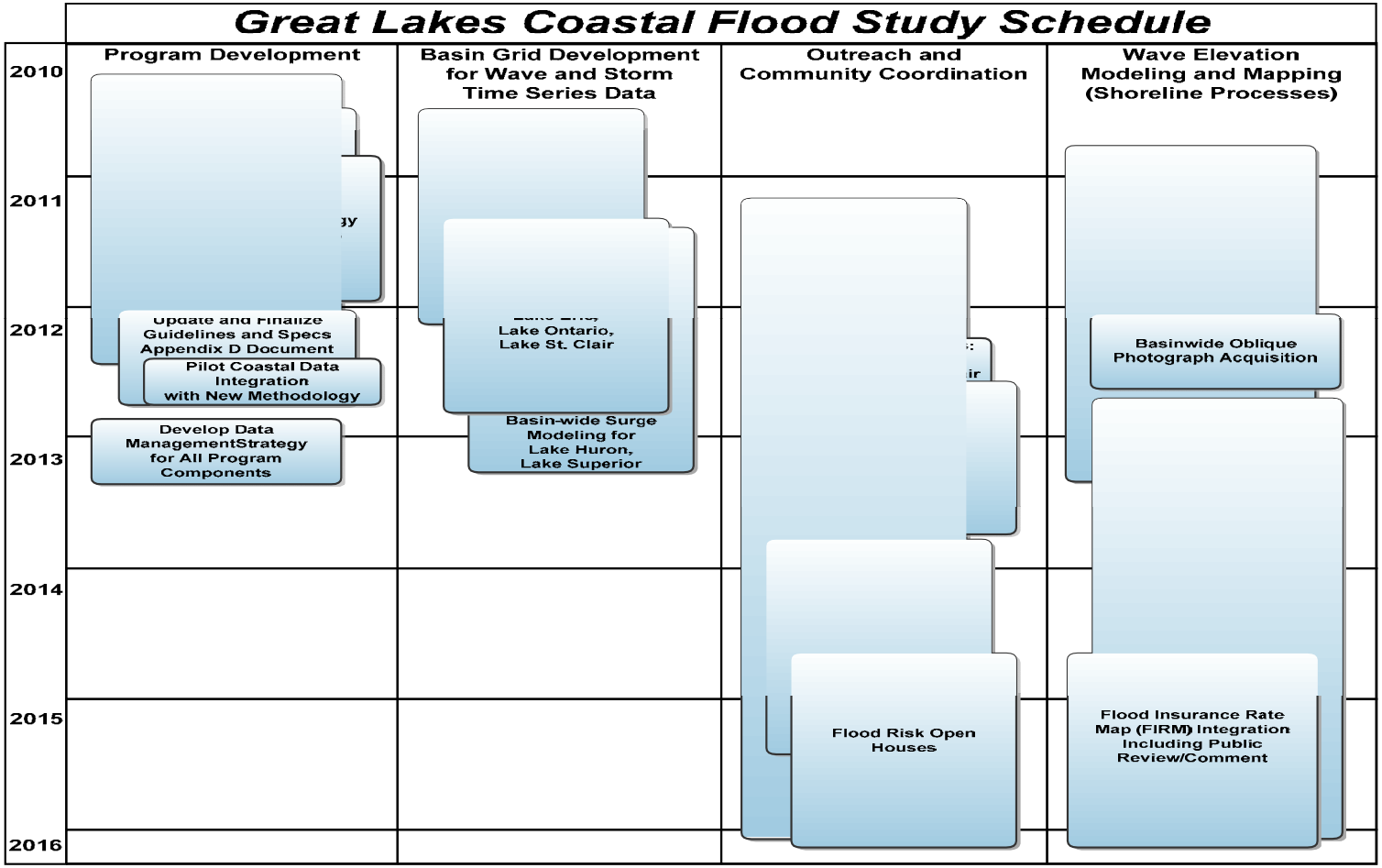
Stakeholder Engagement



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Data Inputs

- Updates to analysis and methodology guidance
- Proposed transect locations
- Topographic and Bathymetry data collected
- Bare Earth Imagery collected
- Identify reaches requiring special attention and data
- Document local data sources that will help improve study

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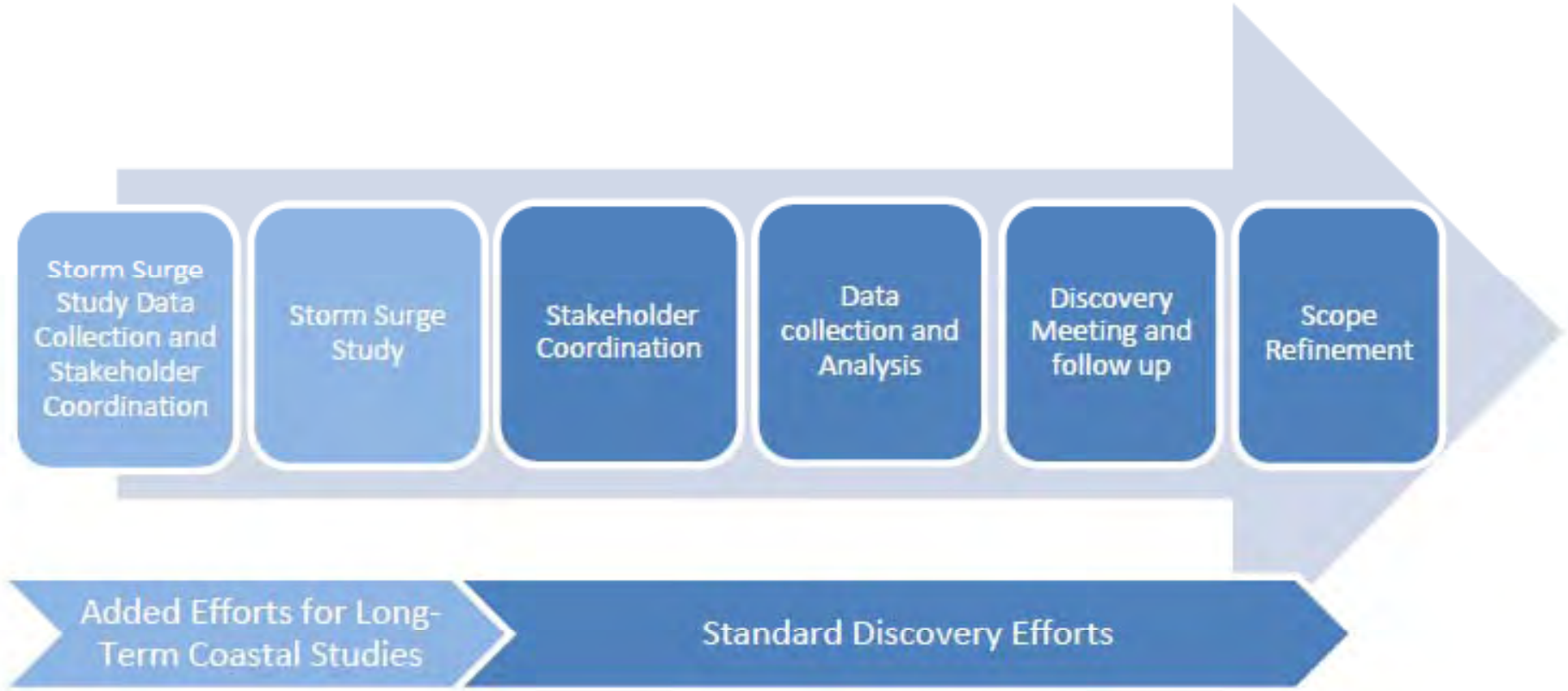
Discovery Schedule Overview



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Lake St. Clair Discovery

Schedule of Activities

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

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Discovery Products

- **Final Discovery Report**
  - Single, comprehensive report for all of Lake St. Clair, with appendices for each Discovery meeting
  - Includes pre-discovery data, meeting agenda, sign-in sheets, discussion topics, decisions made, etc.
- **Final Discovery Maps**
  - Including feedback from participants
  - Visual representation of meeting outcomes
  - Delivered in digital format

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Discovery Outcomes

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

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Data Collection in progress

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

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Data Gaps

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

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Coastal Mapping and Flood Risk Topics

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

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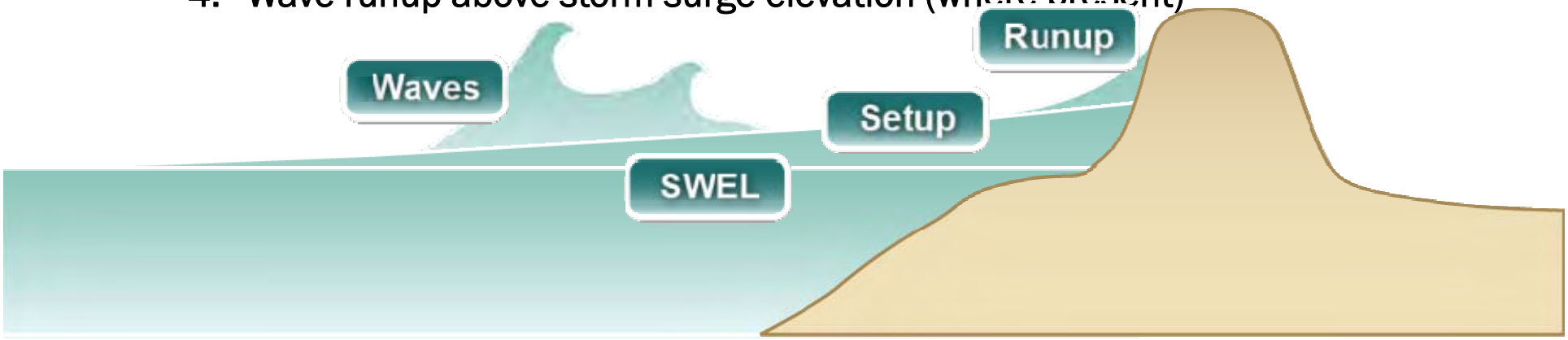
Basic Elements of a Coastal Hazard Analysis

Base Flood Elevation on FIRM includes 4 components:

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



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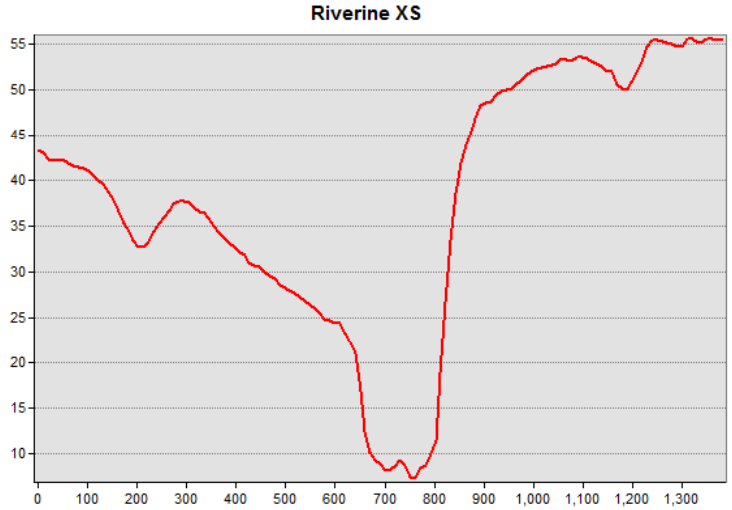
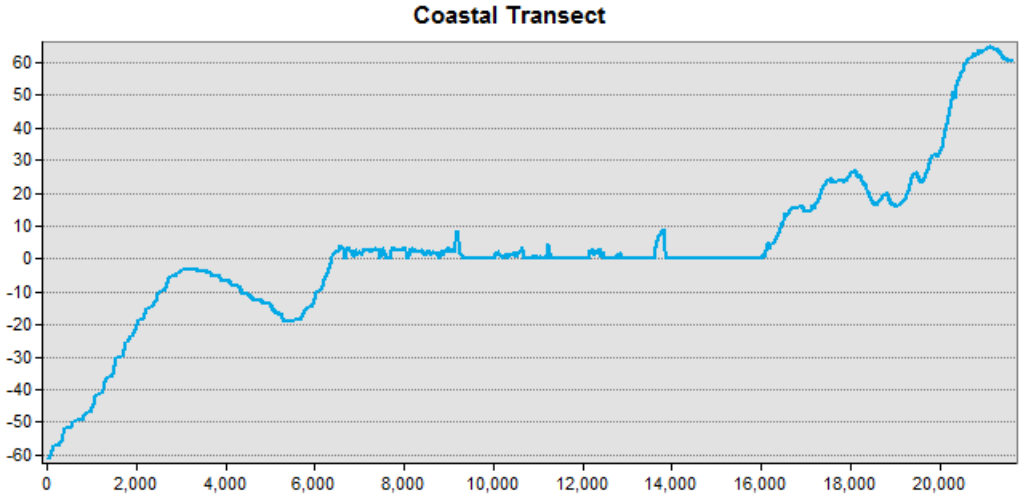
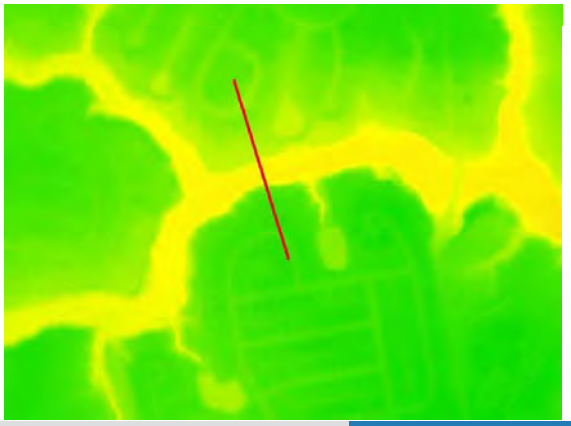
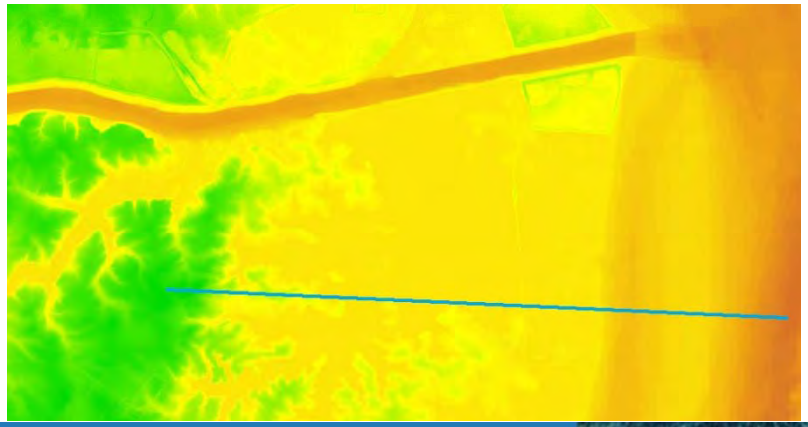
Riverine XS vs Coastal Transect









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Transect Placement

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

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Draft Transect Layout
St. Clair County

- 15 transects
- 58 miles of shoreline

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Draft Transect Layout
St. Clair County

- 15 transects
- 58 miles of shoreline

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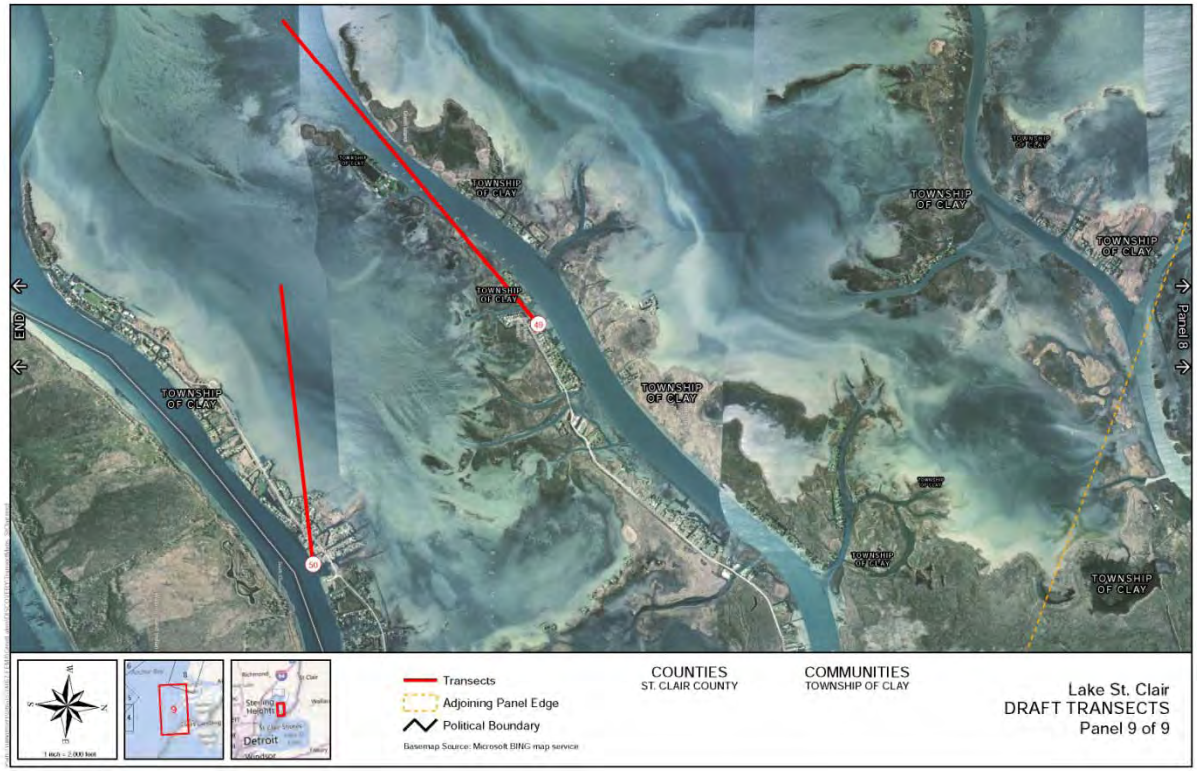

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Coastal Flood Hazard Zones

- Hazard Zones
  - Zone VE – Areas expected to be affected by high velocity wave impact in 100-year event (wave heights or runup depth at or greater than 3 feet)
    - Base Flood Elevation established
  - Zone AE – Areas expected to be flooded by inundation in 100-year event
    - Base Flood Elevation established (wave heights and runup depth less than 3 feet)
  - Zone X – Areas not expected to be flooded in 100-year event
    - Shaded X – Areas expected to be flooded in 500-year event
    - Base Flood Elevations not established
- Non-Regulatory
  - LiMWA – Areas subject to wave heights of at least 1.5 feet
- Gutters
  - Internal zone breaks where Base Flood Elevation changes
  - VE/AE Gutter - Location where risk of damage due to wave action diminishes

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VE Zones in the Great Lakes

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

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How is LiMWA Defined?

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

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Wave Action - Structural Risk

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

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

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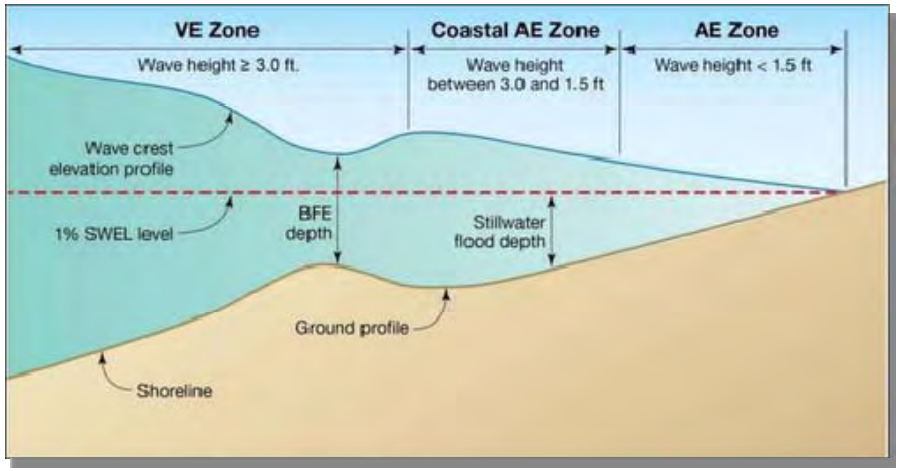
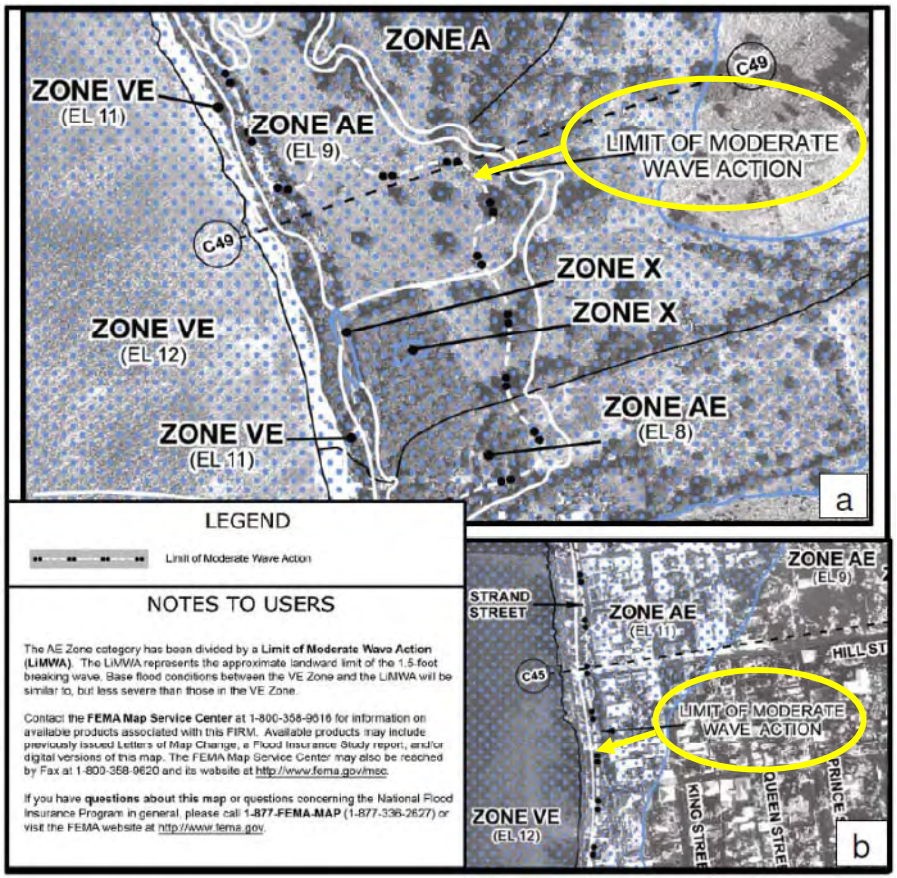
Limit of Moderate Wave Action (LiMWA)

FEMA Procedure Memorandum No. 50, 2008

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





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Coastal Flood Risk Products

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

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Standard Flood Risk Products

- Coastal Depth Grids
- Flood Risk Assessment (HAZUS)

HAZUS MH
EARTHQUAKE • WIND • FLOOD

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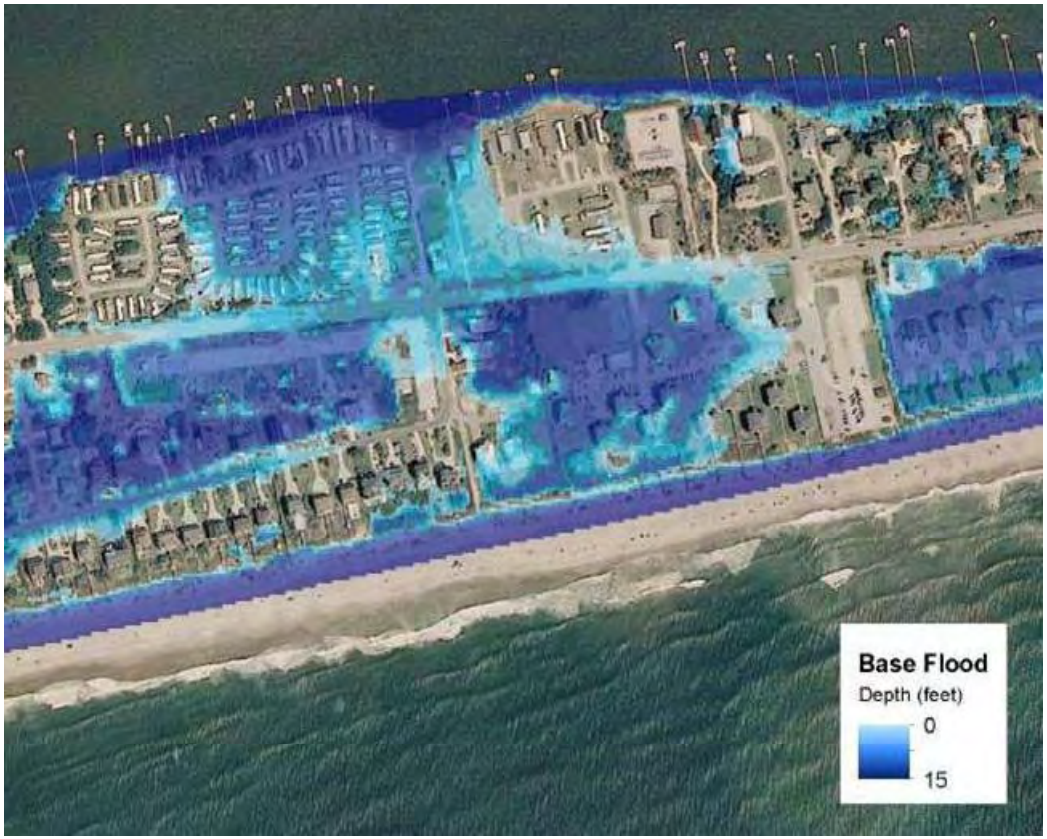
Coastal Depth Grid

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



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Coastal Flood Risk Assessments

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

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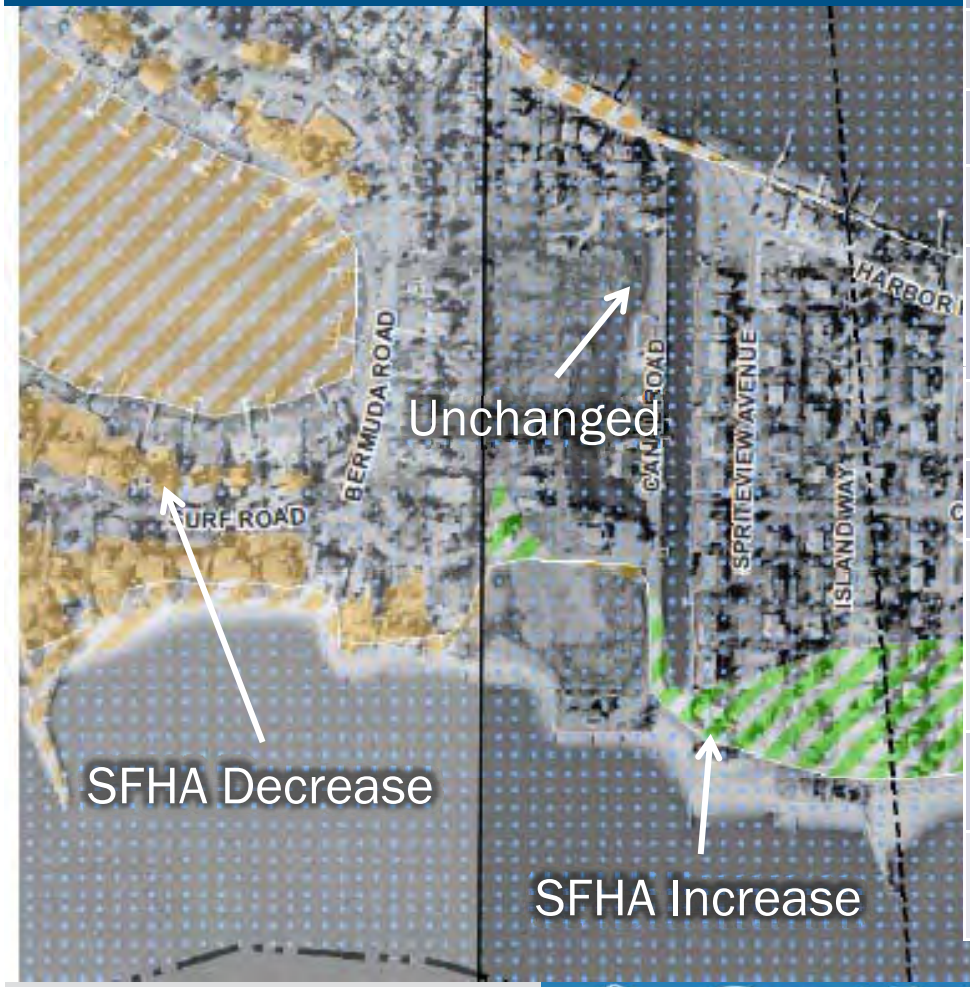
Changes Since Last FIRM



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

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Coastal Non-Regulatory Products in Development

Erosion

Red Lantern Restaurant, Lake Michigan, IN

Lake Levels

Lake Michigan Shoreline
Reference

Shoreline Feature Dataset

Upper Peninsula Shoreline
Reference

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Shoreline Features Database

Shoreline Material
Sand
Cohesive
Cobble
Diamicton*
Shingle
Bedrock
Artificial

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

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

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

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

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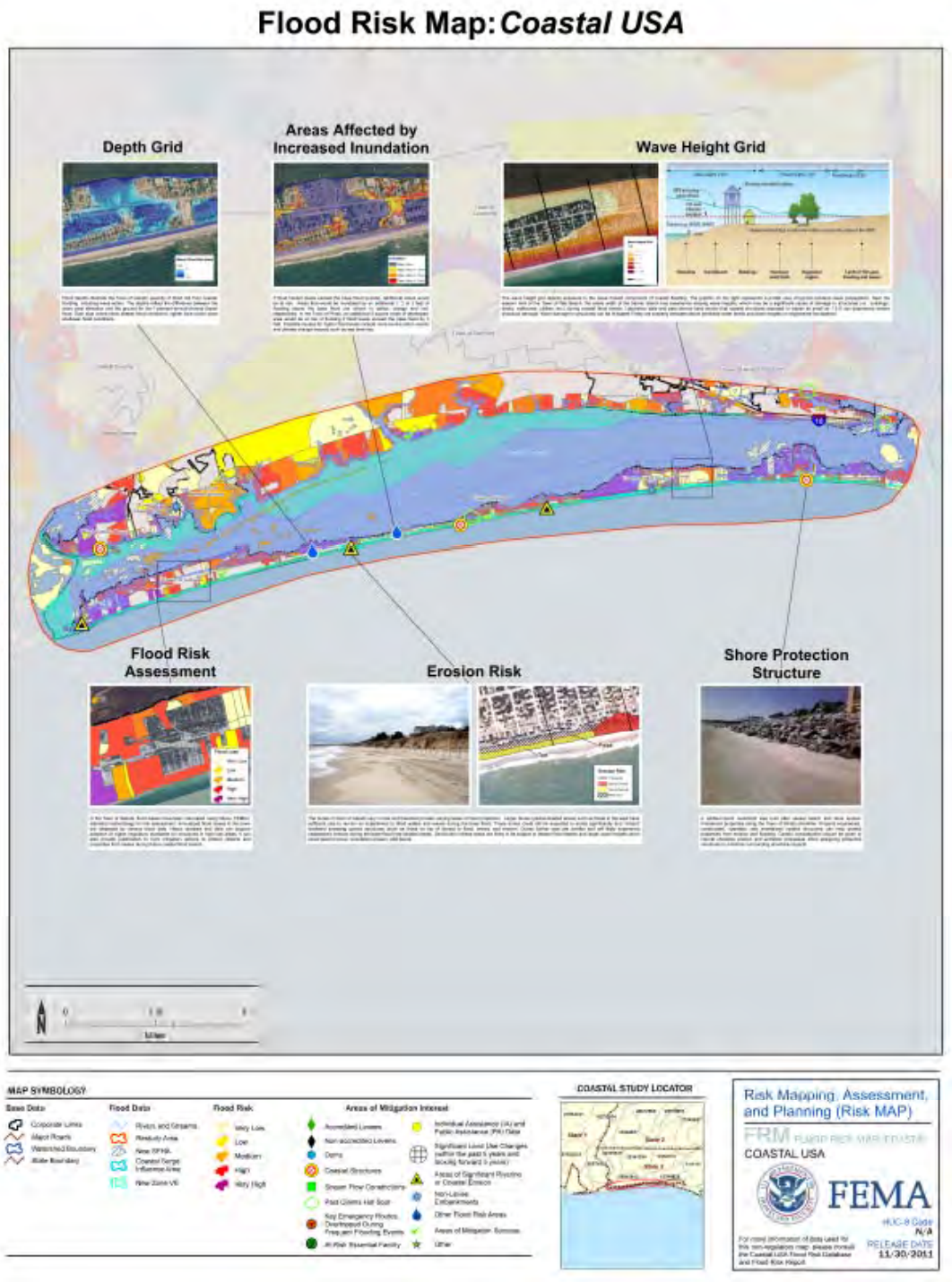
Coastal FRM

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



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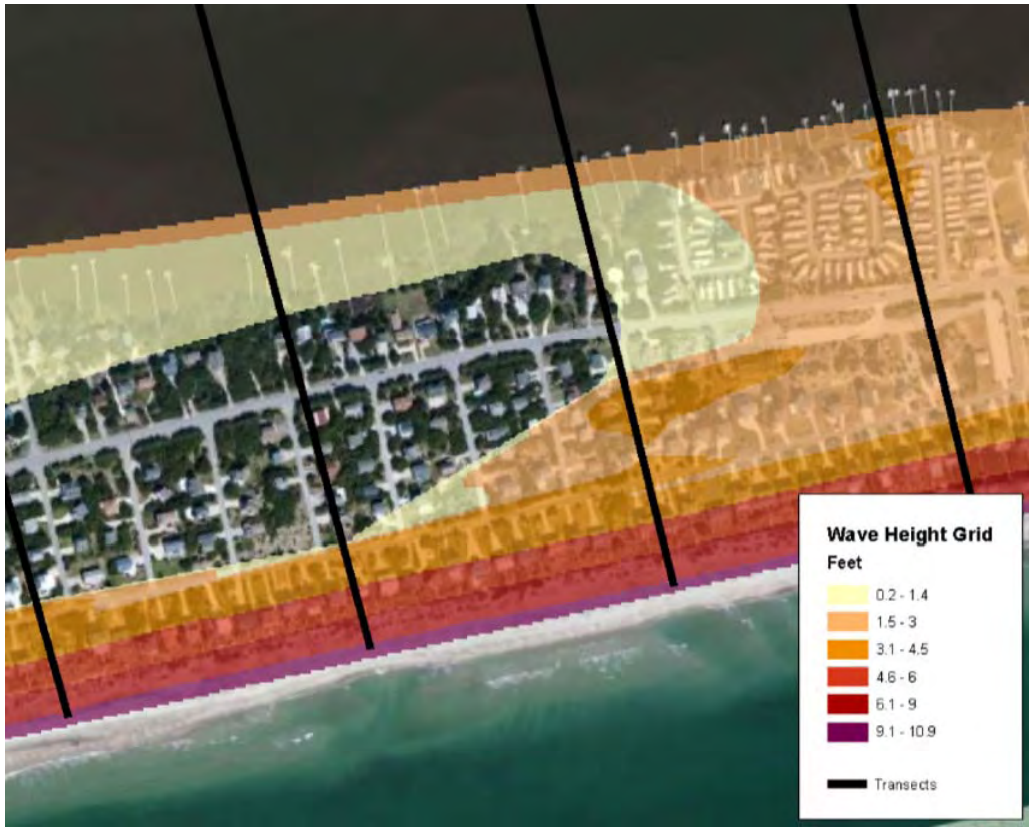
Coastal Wave Height Grid

- Dataset showing wave height information to greater detail than the Wave Hazard Severity Areas dataset by delivering within a raster dataset
- Represents the full wave height, not just the portion of the wave crest that lies above the stillwater elevation
- Wave damage to structures can be mitigated if they are properly elevated above predicted water levels and wave heights on engineered foundations



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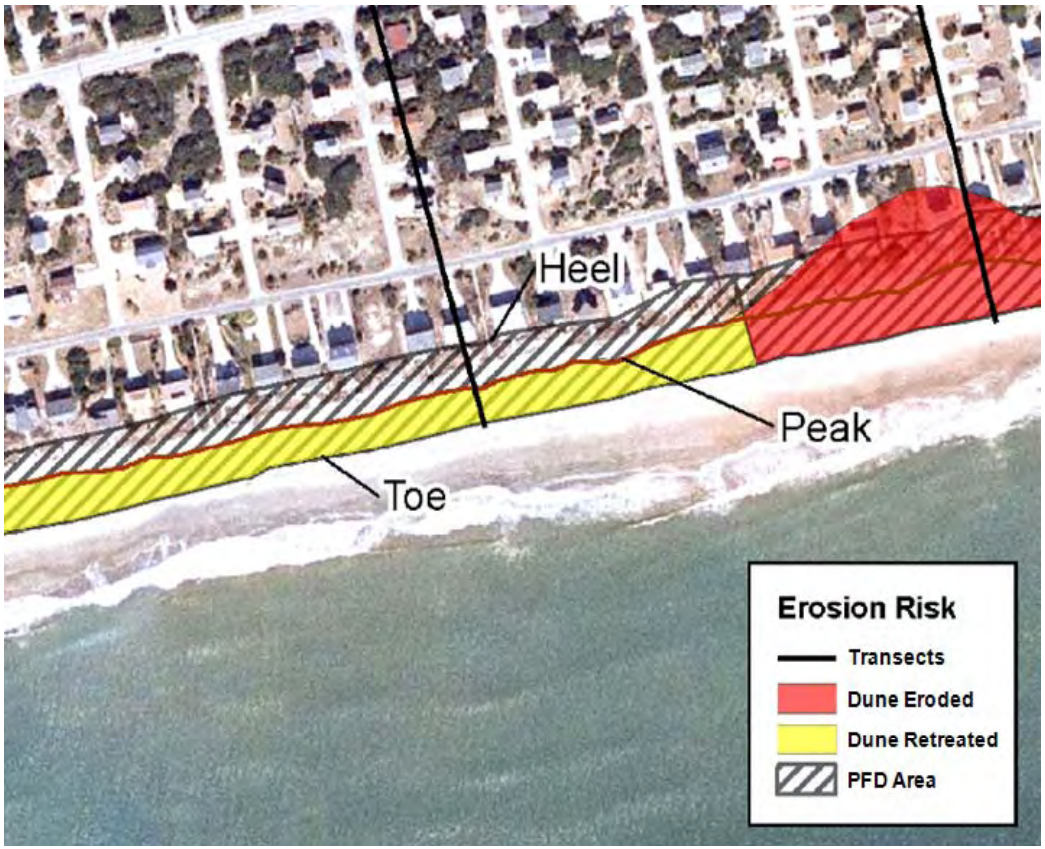
Erosion Risk Determination

- Polygons depicting the spatial extent of the regulatory Primary Frontal Dune (PFD), based on topography and/or shoreline survey data and augmented with aerial photos as needed
- Polygons can be further subdivided to show the spatial extent of the eroded ground as estimated from the erosion analysis conducted for the 1% annual chance flood



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Coastal Updates to Flood Risk Report

FEMA

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

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

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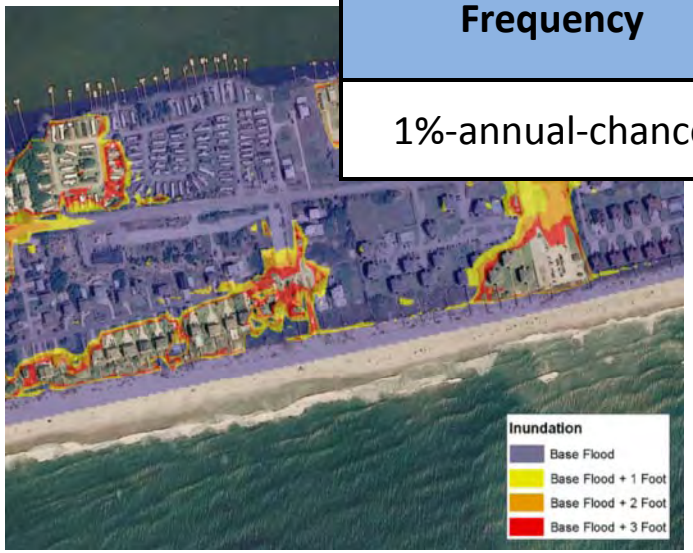
Coastal Updates to Flood Risk Report

- Captures and reports the additional areas that would be inundated, based on 1, 2, or 3 feet of increased inundation

Flood Event Frequency	Area of Additional Inundation (mi^2)				
	1-ft Increase	2-ft Increase		3-ft Increase	
		Newly Inundated	Total	Newly Inundated	Total
1%-annual-chance	0.6	0.8	1.4	1.2	2.6



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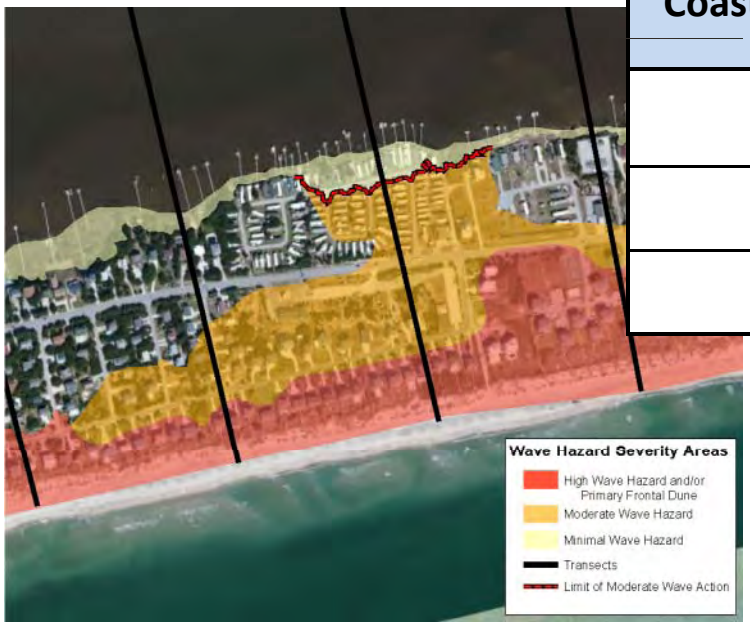
Coastal Updates to Flood Risk Report

- Captures and reports the total area and number of structures (if available) within each of the 3 different levels of wave hazard (High, Moderate, and Minimal)



Coastal Wave Hazard Severity	Total Area (mi^2)	# of Structures
High	0.4	15
Moderate	2.6	187
Minimal	3.3	296

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Non-Regulatory Product Usage and Action

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

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How does this apply to my community?

- NFIP Compliance
- Local impacts of coastal study

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National Flood Insurance Program

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

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V Zones for Lake St. Clair?

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

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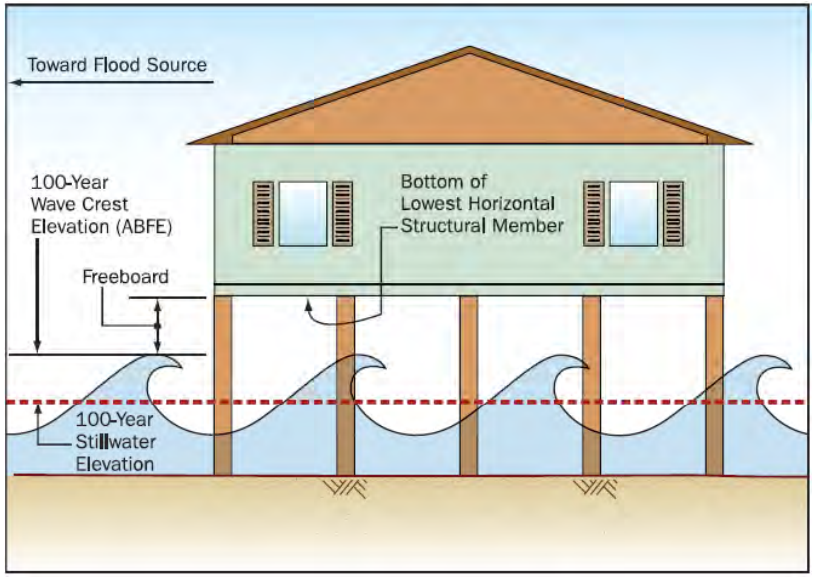
Coastal Zones and NFIP Compliance

- Must meet minimum NFIP and community coastal requirements
- NFIP design and construction requirements are more stringent in V zones due to wave, debris, and erosion hazards in V zones
- Recommendations for exceeding the minimum NFIP requirements (Coastal A Zones)
  - Can obtain CRS credits for Coastal A Zone Requirements
- Resources Available



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Community Rating System (CRS)

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

Public Information	Mapping and Regulations
Flood Damage Reduction	Flood Preparation

- http://training.fema.gov/EMIWeb/CRS/

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Interactive Session A

- View and Discuss Local Coastal Areas of Concern Using the Discovery Map

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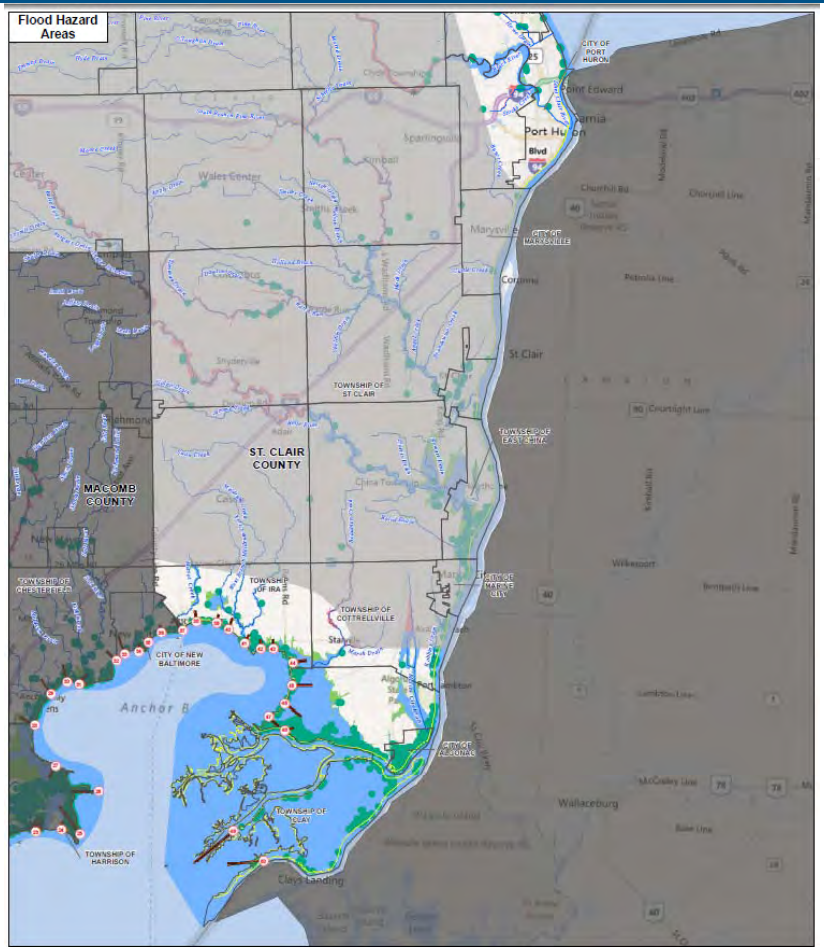
St. Clair County, MI
Discovery Map – Flood Hazard Areas



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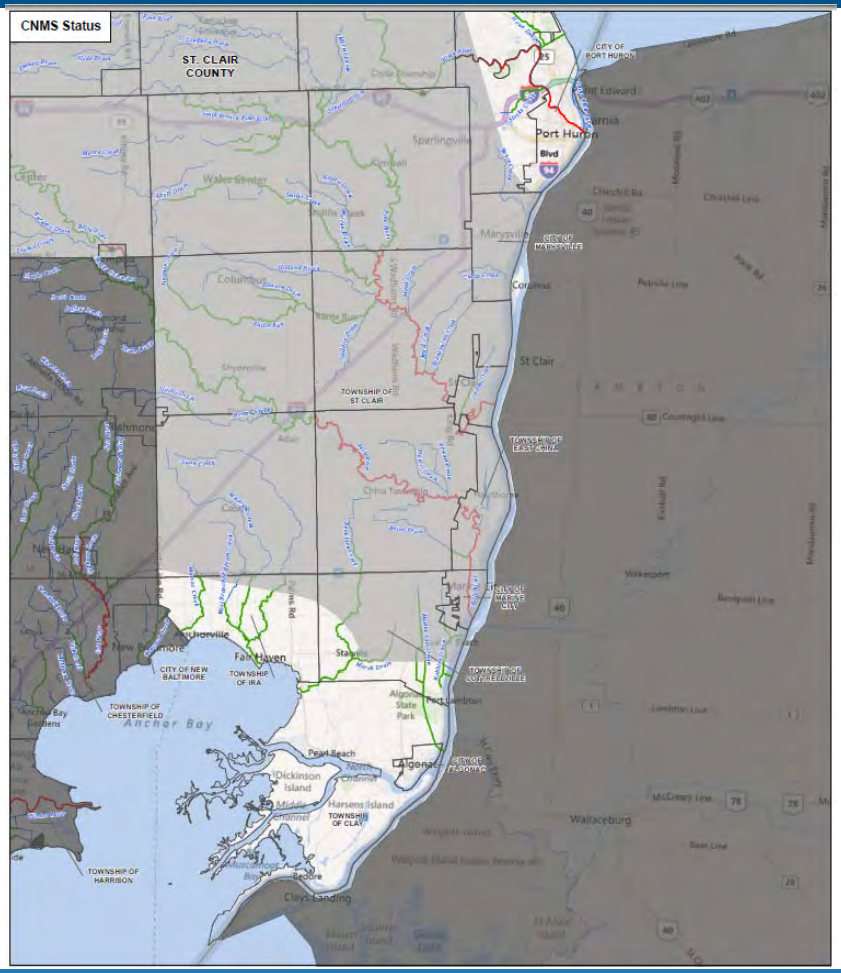
St. Clair County, MI
Discovery Map – CNMS Status



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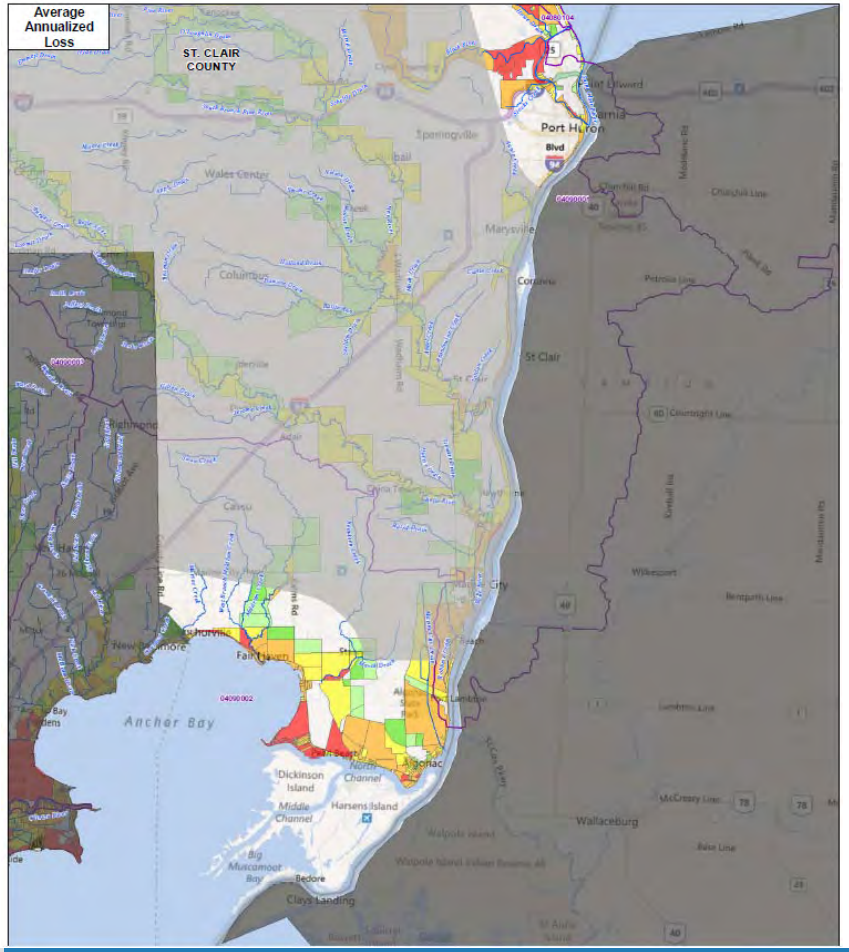
St. Clair County, MI
Discovery Map – AAL and CBRS



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Hazard Mitigation

- Opportunities
- Grant Funding

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Local Hazard Mitigation Plans

Risk MAP
Risk MAP products and Datasets

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

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

Mitigation Actions/Projects

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Mitigation Actions

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

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Example Mitigation Actions

STRUCTURAL /NON-STRUCTURAL PROJECTS

Detention

Drainage

Acquisition

Elevation

Retrofits

PLANNING MECHANISMS

Zoning

Building Codes

Ordinances

Open Space Plan

EDUCATION & OUTREACH

Public Awareness

Outreach

Educational programs

NATURAL RESOURCE PROTECTION

Stream and wetland restoration

Erosion control

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St. Clair County Mitigation Best Practices

- City of Port Huron – Standby Power Source for Water Treatment Plant
  - HMGP funding under Federal Disaster 1346-DR-MI
  - Critical infrastructure failure mitigation project
  - Ensured continued operation of the water treatment plant during an electric power failure

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FEMA Funding Opportunities

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

HMGP is a post-disaster grant program.

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

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

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Mitigation Grants/Programs: OFAs

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US Army Corps of Engineers®

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Hazard Mitigation Resources, Strategies & Actions

- The right action (or mix of actions) will be based on recent community experiences and level of complexity in existing infrastructure
  - *Public Works*
  - *Building Standards*
  - *Community Planning and HM Plan Update / Integration processes*
  - *Communication Processes, GIS, etc.*
- Get the right people to the table: Integrated vs. Discipline-specific
- Document ideas and actions through the FEMA Mitigation Action Form

Land Use Ordinances	Local Building Codes	Mitigation Projects	Community Identified Mitigation Programs	Management Best Practices
Zoning, Setbacks, Floodplain Management, etc.	IBC, IRC, Local Regulations, etc.	Acquisition, Elevation, Floodproofing, etc.		Integration of natural hazards into other planning mechanisms

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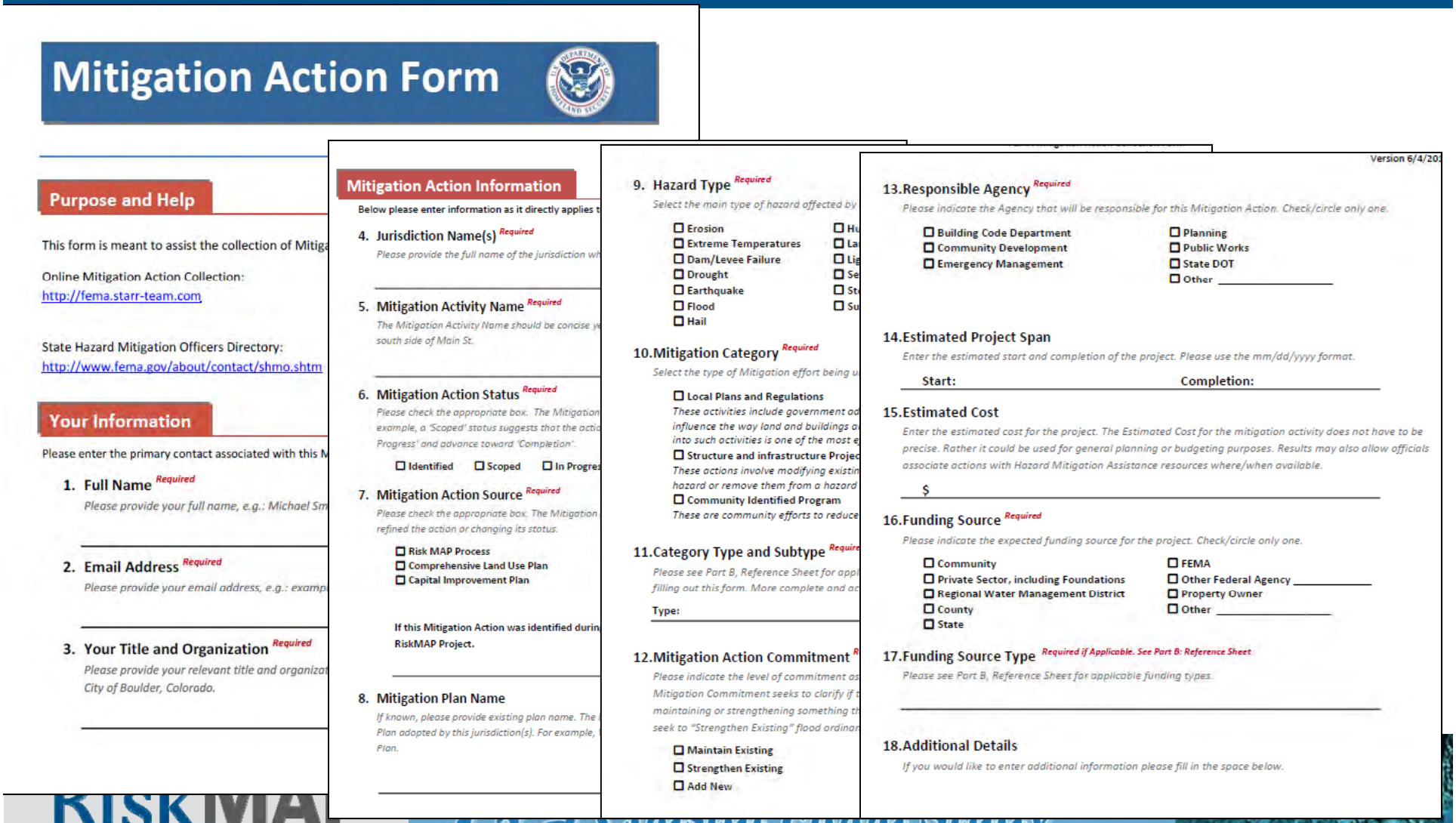
Meet the Action Form



Mitigation Action Form

Purpose and Help

This form is meant to assist the collection of Mitiga

Online Mitigation Action Collection:
http://fema.starr-team.com

State Hazard Mitigation Officers Directory:
http://www.fema.gov/about/contact/shmo.shtm

Your Information

Please enter the primary contact associated with this M

1. **Full Name** Required
   Please provide your full name, e.g.: Michael Sm
2. **Email Address** Required
   Please provide your email address, e.g.: exampl
3. **Your Title and Organization** Required
   Please provide your relevant title and organizat
   City of Boulder, Colorado.

Mitigation Action Information

Below please enter information as it directly applies t

4. **Jurisdiction Name(s)** Required
   Please provide the full name of the jurisdiction wh
5. **Mitigation Activity Name** Required
   The Mitigation Activity Name should be concise ye
   south side of Main St.
6. **Mitigation Action Status** Required
   Please check the appropriate box. The Mitigation
   example, a 'Scoped' status suggests that the actio
   Progress' and advance toward 'Completion'.
   ☐ Identified ☐ Scoped ☐ In Progres
7. **Mitigation Action Source** Required
   Please check the appropriate box. The Mitigation
   refined the action or changing its status.
   ☐ Risk MAP Process
   ☐ Comprehensive Land Use Plan
   ☐ Capital Improvement Plan

   If this Mitigation Action was identified durin
   RiskMAP Project.
8. **Mitigation Plan Name**
   If known, please provide existing plan name. The
   Plan adopted by this jurisdiction(s). For example,
   Plan.

9. **Hazard Type** Required
   Select the main type of hazard affected by
   ☐ Erosion
   ☐ Extreme Temperatures
   ☐ Dam/Levee Failure
   ☐ Drought
   ☐ Earthquake
   ☐ Flood
   ☐ Hail
   ☐ Hu
   ☐ La
   ☐ Lig
   ☐ Se
   ☐ St
   ☐ Su
10. **Mitigation Category** Required
    Select the type of Mitigation effort being u
    ☐ Local Plans and Regulations
    These activities include government ac
    influence the way land and buildings a
    into such activities is one of the most e
    ☐ Structure and infrastructure Projec
    These actions involve modifying existin
    hazard or remove them from a hazard
    ☐ Community Identified Program
    These are community efforts to reduce
11. **Category Type and Subtype** Require
    Please see Part B, Reference Sheet for appl
    filling out this form. More complete and ac
    Type:
12. **Mitigation Action Commitment** R
    Please indicate the level of commitment as
    Mitigation Commitment seeks to clarify if t
    maintaining or strengthening something th
    seek to "Strengthen Existing" flood ordinan
    ☐ Maintain Existing
    ☐ Strengthen Existing
    ☐ Add New

Version 6/4/20

13. **Responsible Agency** Required
    Please indicate the Agency that will be responsible for this Mitigation Action. Check/circle only one.
    ☐ Building Code Department
    ☐ Community Development
    ☐ Emergency Management
    ☐ Planning
    ☐ Public Works
    ☐ State DOT
    ☐ Other _____
14. **Estimated Project Span**
    Enter the estimated start and completion of the project. Please use the mm/dd/yyyy format.
    Start: Completion:
15. **Estimated Cost**
    Enter the estimated cost for the project. The Estimated Cost for the mitigation activity does not have to be precise. Rather it could be used for general planning or budgeting purposes. Results may also allow officials associate actions with Hazard Mitigation Assistance resources where/when available.
    $
16. **Funding Source** Required
    Please indicate the expected funding source for the project. Check/circle only one.
    ☐ Community
    ☐ Private Sector, including Foundations
    ☐ Regional Water Management District
    ☐ County
    ☐ State
    ☐ FEMA
    ☐ Other Federal Agency _____
    ☐ Property Owner
    ☐ Other _____
17. **Funding Source Type** Required if Applicable. See Part B: Reference Sheet
    Please see Part B, Reference Sheet for applicable funding types.
18. **Additional Details**
    If you would like to enter additional information please fill in the space below.

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Interactive Session B

- Discuss Mitigation Action Opportunities and Introduce the Mitigation Action Form

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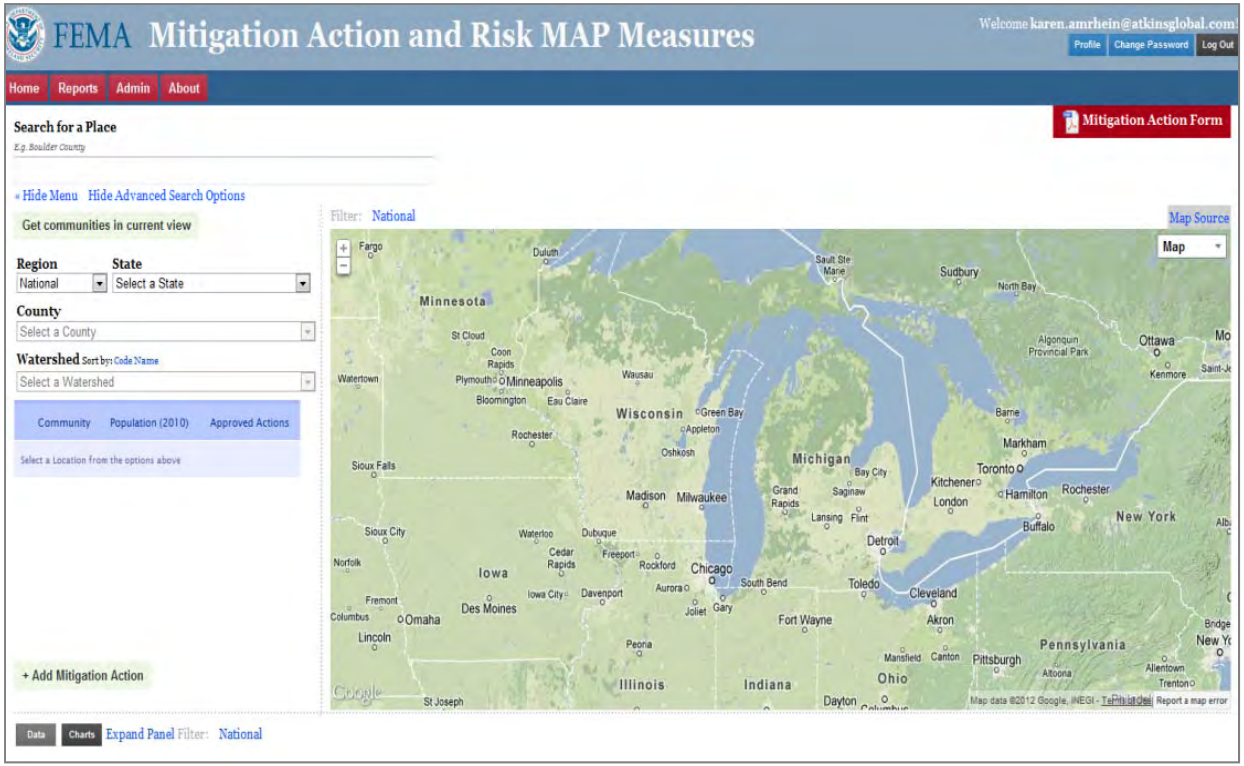
Action Tracker



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

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

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Results from Interactive Sessions

- **Review and Clarify Communication, Planning, and Compliance Needs**
  - Local coastal areas of concern
  - Existing local coastal data
  - Mitigation Action opportunities
  - Mitigation Action form
  - Action Tracker

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Next Steps

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

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

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Questions?

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Optional Interactive Stations

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

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Contact

- FEMA Region V
  - Ken Hinterlong @ ken.hinterlong@fema.dhs.gov
  - Erin Maloney@ erin.maloney@fema.dhs.gov
- Michigan Partners
  - Les Thomas@ Thomasl@michigan.gov
- STARR
  - Brian Caufield (technical) @ caufieldba@cdmsmith.com
  - Jaspreet Randhawa (outreach) @ randhawajg@cdmsmith.com
- Online
  - info@greatlakescoast.org

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ATTACHMENT F

ST. CLAIR COUNTY HAZARD MITIGATION GRANT PROGRAM PROJECTS

HAZARD MITIGATION GRANT PROGRAM (HMGP) PROJECTS
St. Clair County, MI
As of July 2012

Disaster Number	Declaration Date	Incident Type	Disaster Title	Project Type	Project Description	Project Counties	Status
1237	08/05/1998	Severe Storm(s)	SEVERE STORMS AND HIGH WINDS	202.1: Elevation of Private Structures - Riverine	ELEVATE 27 HOMES ABOVE 100-YR BFE ALONG LAKE ST. CLAIR.	ST. CLAIR	Closed
1346	10/17/2000	Severe Storm(s)	SEVERE STORMS AND FLOODING	601.1: Generators		ST. CLAIR	Approved
1346	10/17/2000	Severe Storm(s)	SEVERE STORMS AND FLOODING	602.1: Other Equipment Purchase and Installation		ST. CLAIR	Withdrawn
1346	10/17/2000	Severe Storm(s)	SEVERE STORMS AND FLOODING	402.1: Infrastructure Protective Measures (Roads and Bridges)		ST. CLAIR	Withdrawn
1346	10/17/2000	Severe Storm(s)	SEVERE STORMS AND FLOODING	602.1: Other Equipment Purchase and Installation	The weather station was installed at the Goodells Park, on July 20, 2004, in St. Clair County, Wales Township - approximately 633 feet south of Lapeer Road and 1434 feet east of Goodells Road in accordance with the approved scope of work. The weather station was moved from the approved location to 10730 Mary Street, north of the Eastern Michigan Grain Factory in Emmett, Michigan on December 18, 2006 due to unforeseen circumstances. No additional funds were requested for the change in location.-BBAKER-11/18/2009 15:14 GMT	ST. CLAIR	Approved
1527	06/30/2004	Severe Storm(s)	SEVERE STORMS, TORNADOES, AND FLOODING	403.1: Stormwater Management - Culverts	Project A1527.15 is for the removal of an under-capacity twin arch culvert and replacement with an appropriately sized single aluminum box culvert to mitigate roadway flooding on Mayer Road.-MSCHNEP1-11/10/2005 14:07 GMT	ST. CLAIR	Approved