



FEMA

VILLAGE OF PLEASANT PRAIRIE MEETING

Kenosha County Upper Fox River Watershed and Coastal Study Map Update

KENOSHA COUNTY, WISCONSIN
November 29, 2022

RiskMAP
Increasing Resilience Together



Welcome & Introduction

- Risk MAP Project Team, Wisconsin Department of Natural Resources (WDNR)
 - G. Fritz Statz- Project Lead
 - Brian Cunningham - NFIP Coordinator
 - Chris Olds – State Floodplain Engineer
 - Andrea Stern - Regional Engineer
 - Tanya Lourigan - Dam Safety/Floodplain Section Supervisor

Welcome & Introduction

- Federal Emergency Management Agency (FEMA)
 - Munib Ahmad – Region V Engineer
 - Ken Hinterlong – Region V Engineer
 - Frank Shockey – Region V Senior NFIP Specialist
 - Cadence Peterson – Region V Planner

RiskMAP Overview

- Risk MAP

- **Mapping** – Flood hazard and risk identification
- **Assessment** – HAZUS and other risk assessment tools
- **Planning** – Hazard mitigation planning and HMA grants

- Risk MAP Vision

- Deliver quality data
- Increase public awareness of flood risk
- Encourage local/regional actions that reduce risk



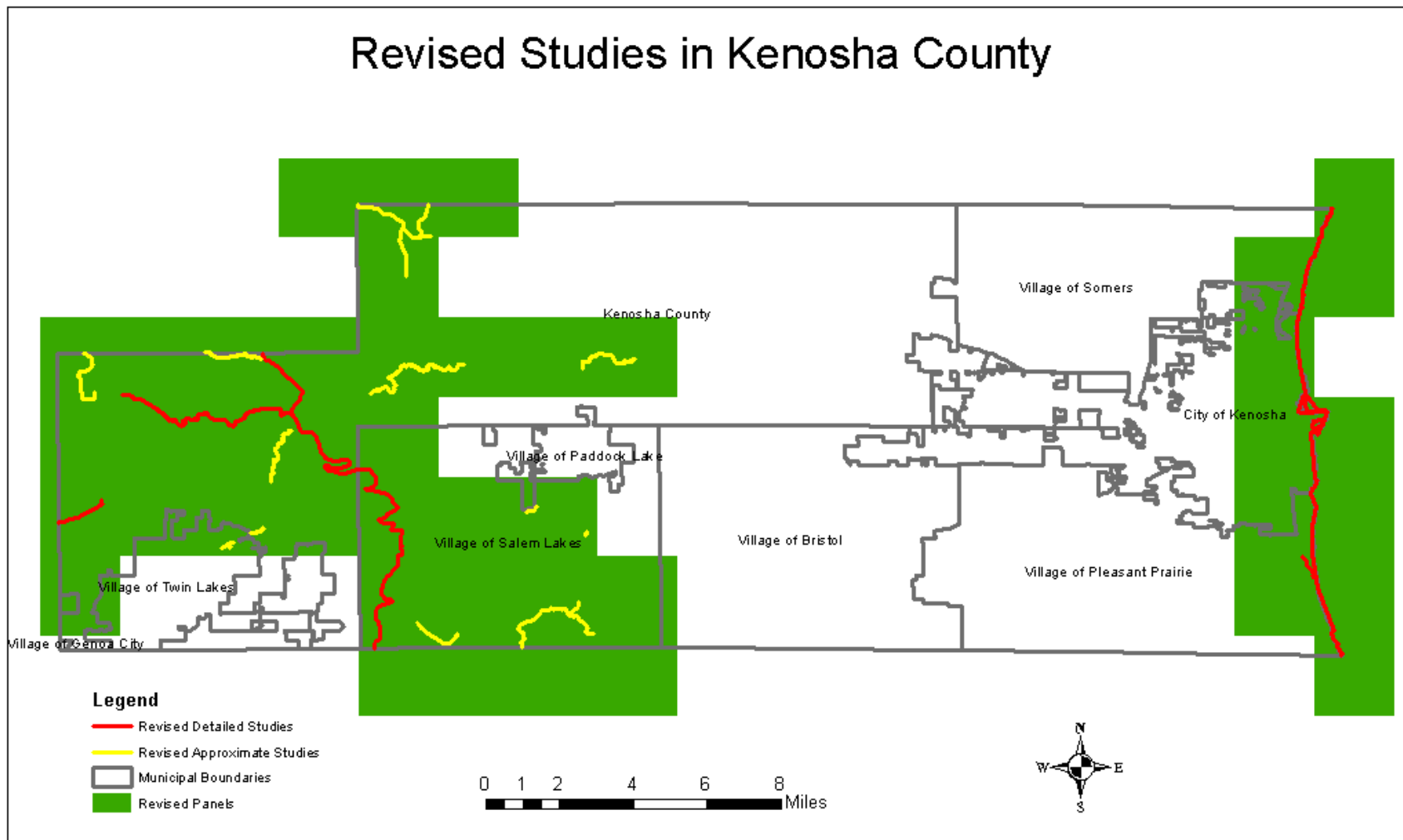
Project History

- Project Starts – 2013
- Data Development & Map production
2014 – through 2017
- Flood Risk Review Meeting
July 26, 2017
- Preliminary maps finalized and distributed
March 28, 2022
- Located online at <https://www.fema.gov/preliminaryfloodhazarddata>
- *FEMA Viewer:* Search “fema map changes viewer”
- Local Officials Meeting
May 31, 2022, and July 5, 2022



Revised Studies

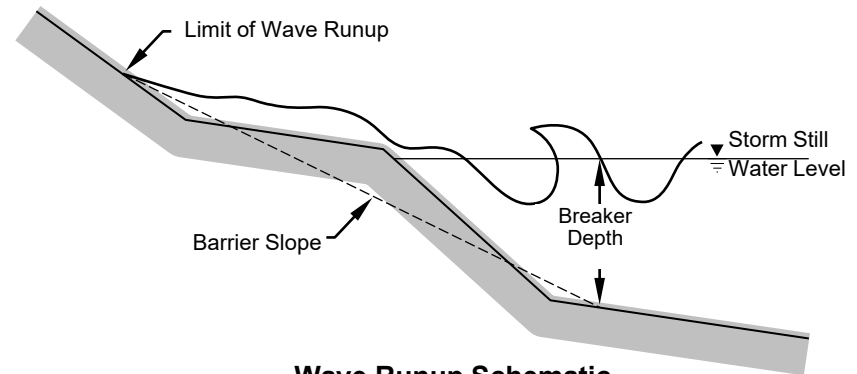
Revised Studies in Kenosha County



The Great Lakes Coastal Flood Study Approach

Regional Study Approach

- Lakewide water level and wave analysis
 - 150 storms from 1960 to 2009
 - Modeling conducted by STARR in 2016
- Greater consistency in assumptions
- Reduces number of boundary conditions



Wave Runup Schematic
from FEMA Great Lakes Coastal Guidelines "D.3" Update

Local/County-Level Activities

- Mapping tasks performed at the county level
- Nearshore wave transformations
- Episodic erosion
- Wave setup
- Runup and overtopping
- Overland wave propagation

Coastal Flood Hazard Modeling Overview

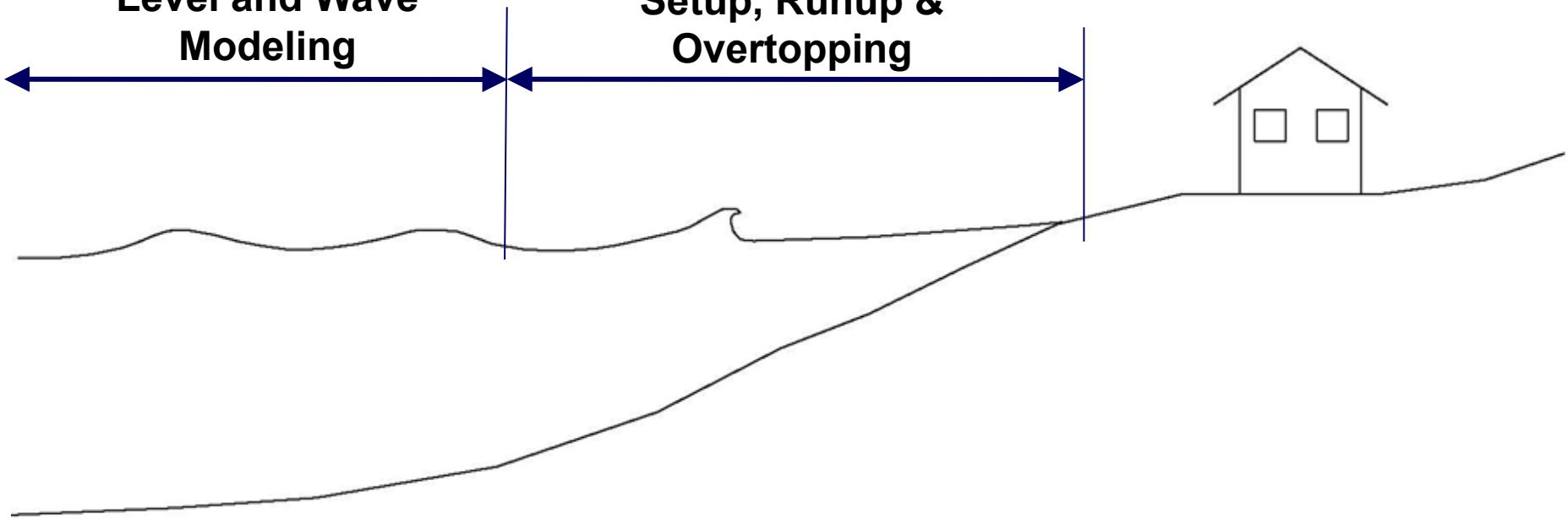
Lake-Wide Variation

Step 1: Offshore Water Level and Wave Modeling

Local Variation

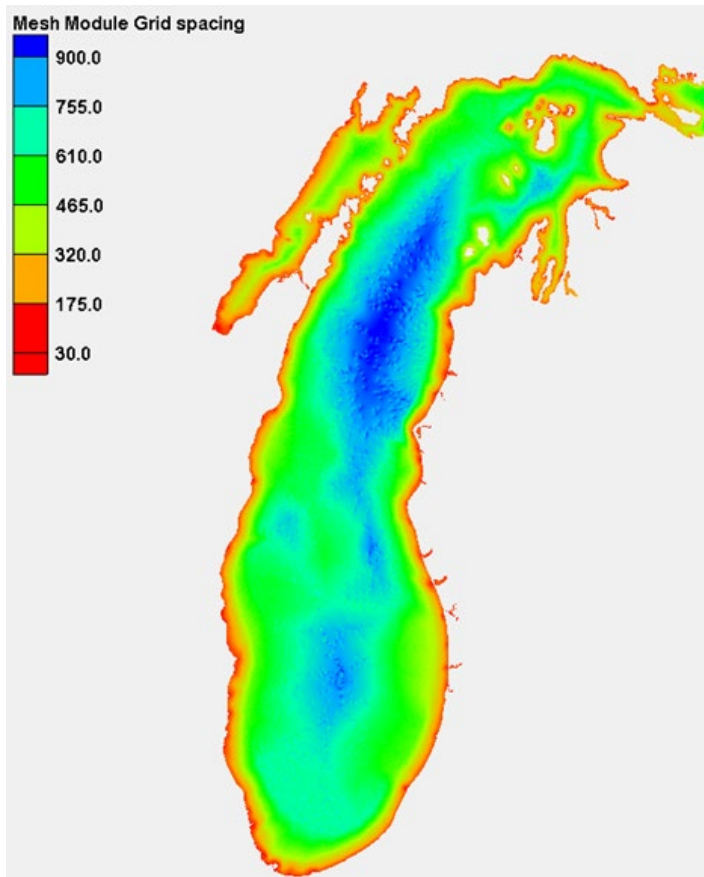
Step 2: Nearshore Wave Setup, Runup & Overtopping

Step 3: Floodplain Mapping

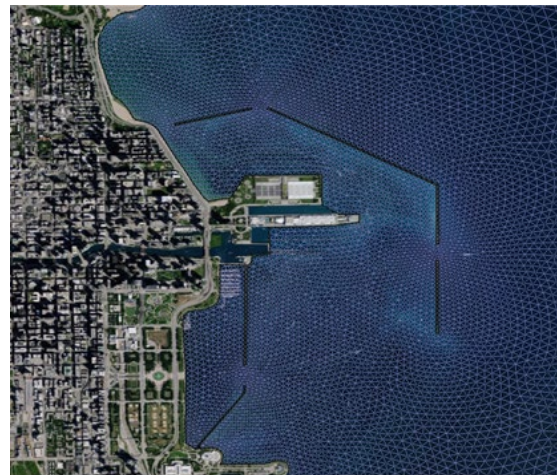


Offshore Water Level and Wave Modeling

ADCIRC+SWAN Mesh



- ▶ Resolution as Fine as 10 m Along Complex Shoreline Features including Jetties, Breakwaters, Inlets, and Natural Shoals

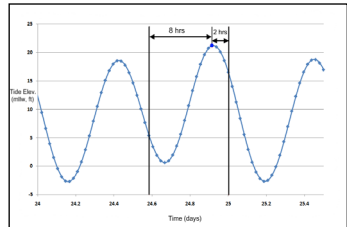


Offshore Water Level and Wave Modeling

Data inputs for lake-wide surface grid

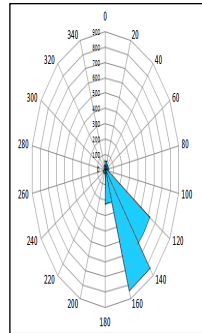
Baseline

Water Level

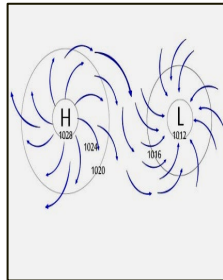


Meteorological Forcing

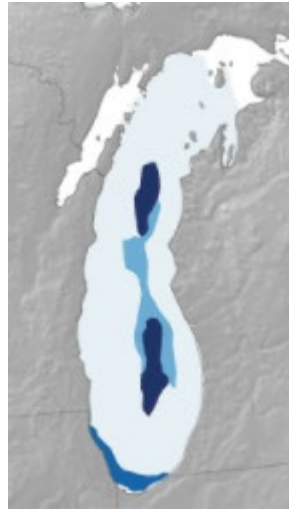
Wind



Pressure

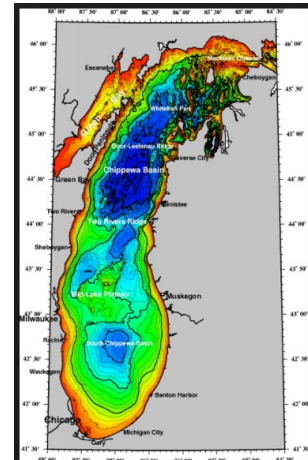


Ice

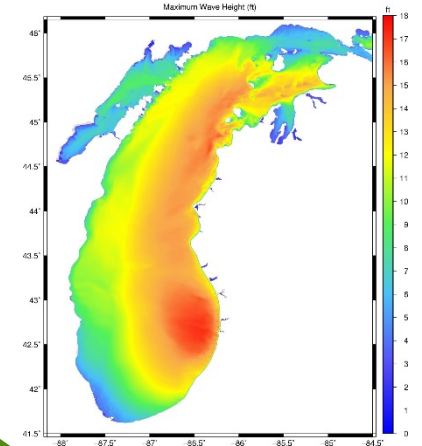


Physical

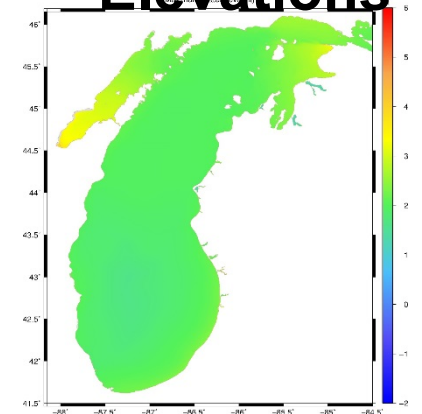
Bathymetry



Waves

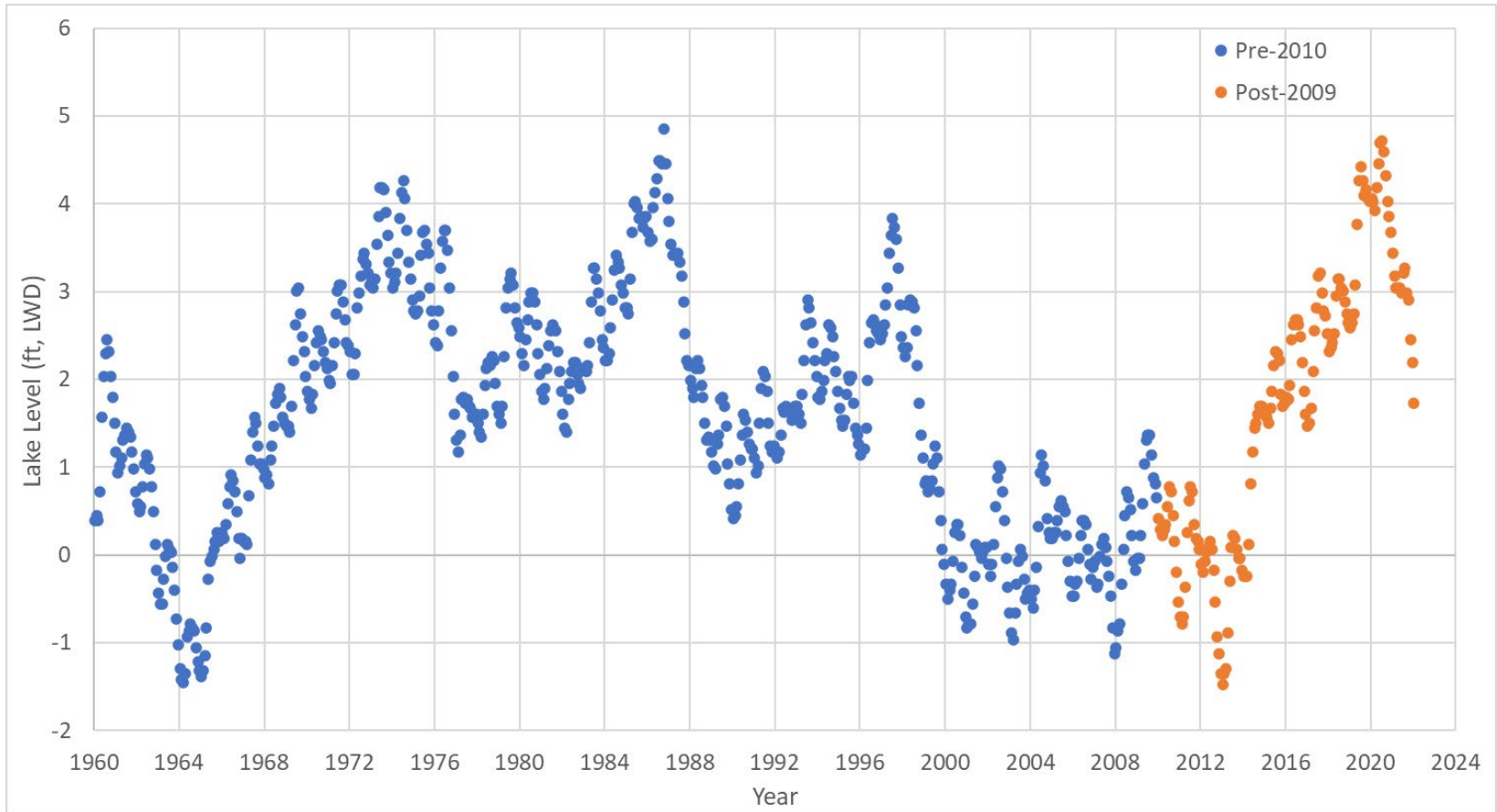


Still Water Elevations

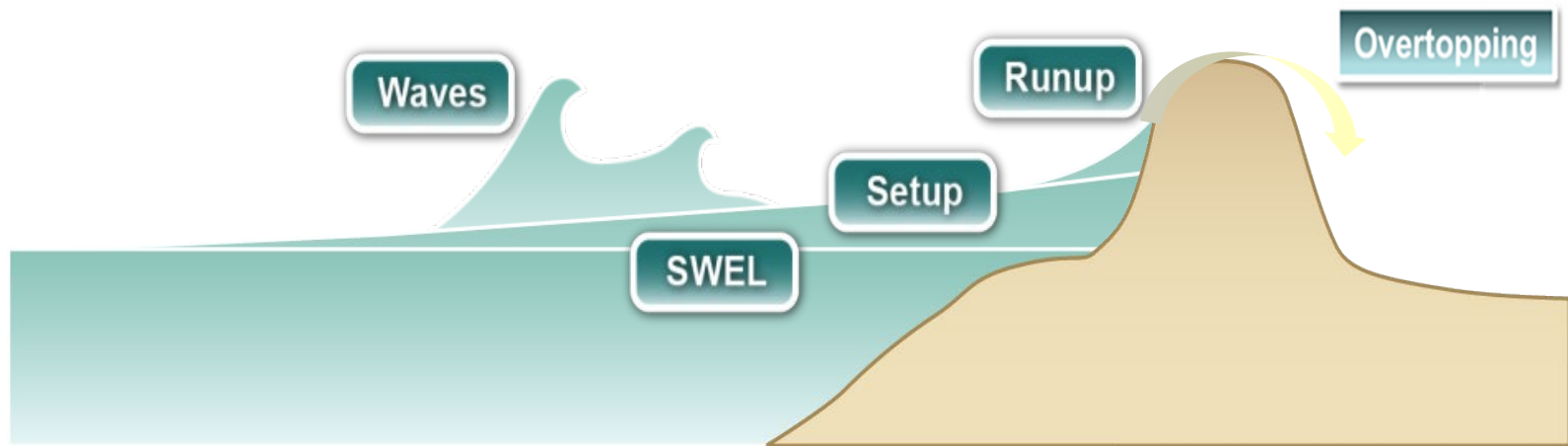


Total of 150 events between 1960-2009

Lake Michigan Water Levels



Measuring Coastal Base Flood Elevation



SWEL = Stillwater Elevation (storm surge level)
TWEL = Total Water Elevation (SWEL + wave effects)

Special Flood Hazard Areas (SFHAs) - Coastal

Zone VE

- Coastal high-hazard zone, where wave action and/or high-velocity water can cause structural damage during the 1-percent-annual-chance flood
- Wave heights or wave runup ≥ 3 feet
- Subdivided into elevation zones, and BFEs are assigned

Zone AE

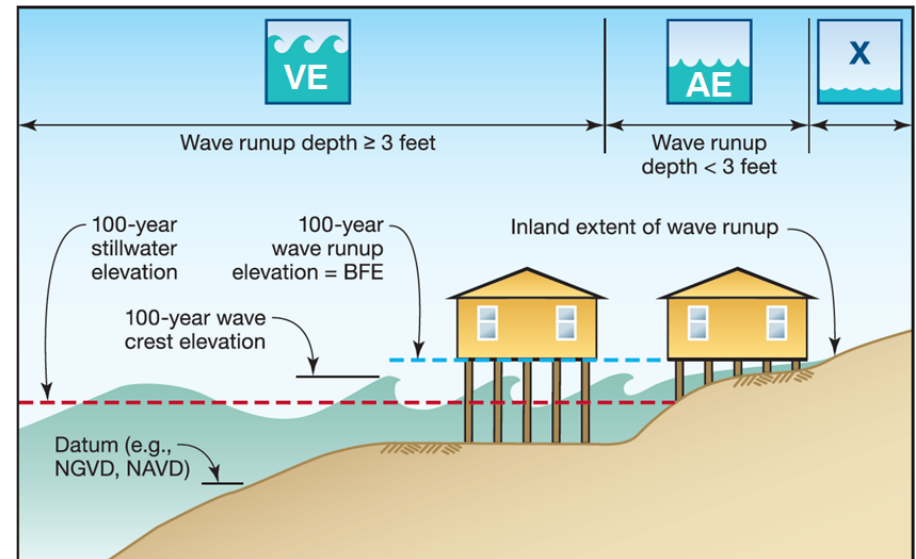
- Applied in areas subject to lower wave energy or inundation by the 1-percent-annual-chance flood
- Wave heights or wave runup < 3 feet
- Subdivided into elevation zones, and BFEs are assigned

Zone AO

- Applied in areas of sheet-flow and shallow flooding
- Given an associated depth instead of a BFE

Zone AH

- Applied in areas of ponding
- Assigned a BFE



Wave Runup Mapping

- Wave runup is very sensitive to shoreline characteristics, especially slope
- Single Base Flood Elevation (BFE)
- Gutters perpendicular to the shore divide the BFEs
- Runup is mapped to elevation associated with BFE, unless overtopping occurs
- VE transitions to AE where runup elevation (BFE) is less than 3 feet above ground elevations



Wave Overtopping

- Wave overtopping occurs when the wave runup elevation exceeds the barrier's crest elevation
- When overtopping occurs, the zone behind the barrier is designated as:
 - AE if the landward slope is positive
 - BFE established based on runup elevation
 - AO if the landward slope is negative
 - Sheet flow depth established
 - AH if the landward slope is negative and flow is trapped behind a barrier
 - BFE established
- The overtopping rate determines VE splash zones and sheet flow depths

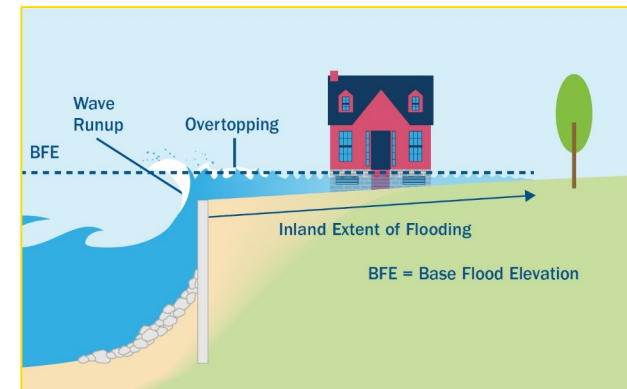
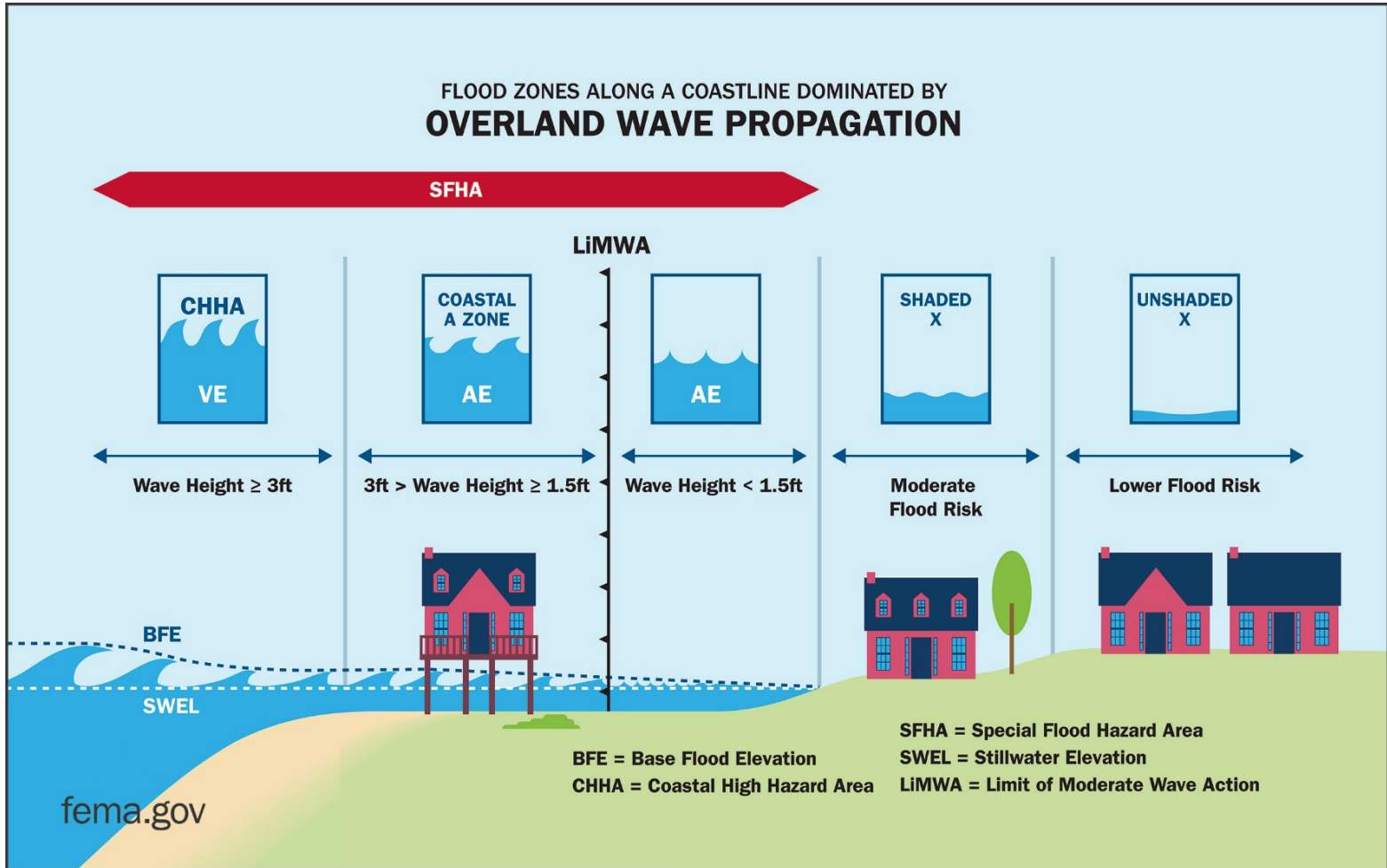


Photo: Green, M. Spencer. AP Photo. 2012.

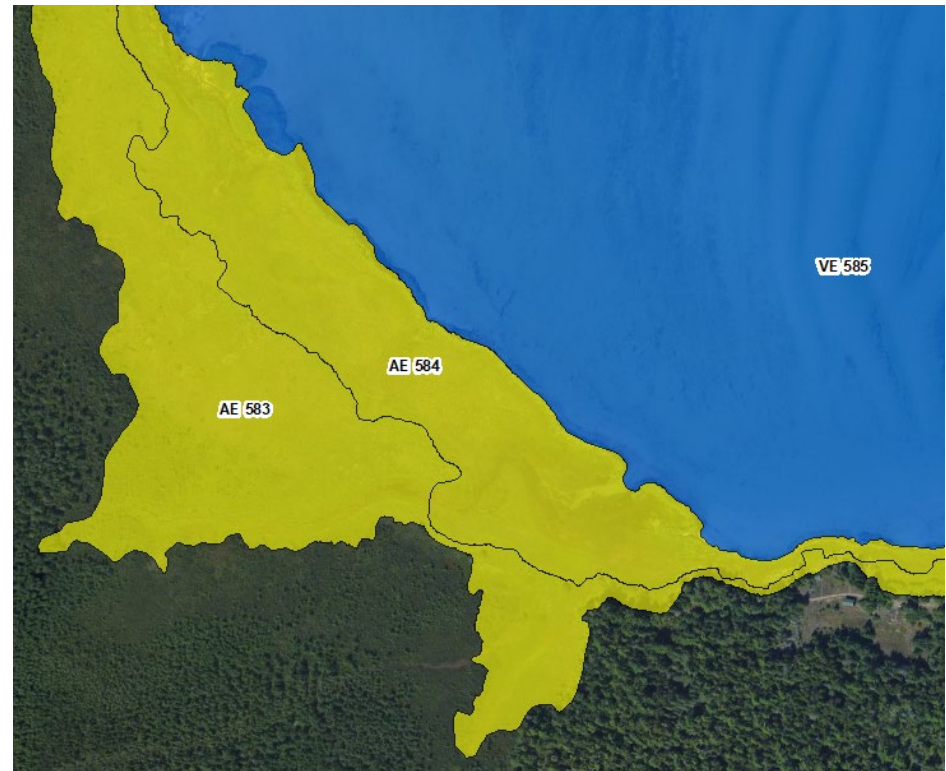
http://journalstar.com/ap/business/two-story-waves-on-great-lakes-halt-shipping/article_bcf2bb34-b528-52f5-8cd4-0c57e7ea8922.html

Overland Wave Propagation Mapping



Overland Wave Propagation Mapping

- Tiered BFEs reflect overland wave decay or regeneration over inundated inland areas as waves propagate onshore over different terrain
- BFEs are defined by wave crest elevation
- Internal gutters are placed where BFEs change moving onshore and follow land use features or terrain elevations
- Transitional zones capture changes in shoreline characteristics between transects
- Landward extent of mapping defined by the 1-percent SWEL



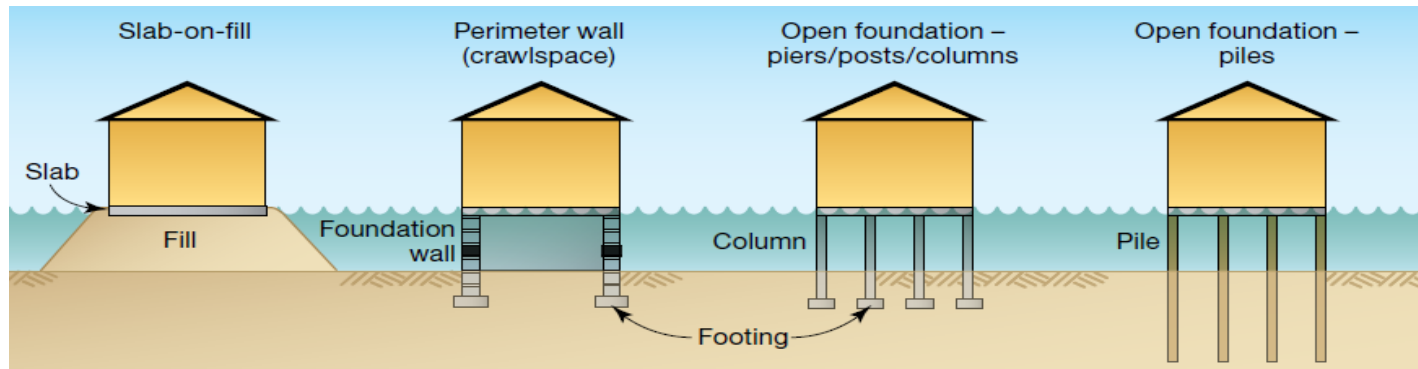
Differences in Development Requirements

A Zones

- Fill is allowed outside the floodway, or if it can be shown not to cause a rise in the BFE.
- Fully enclosed foundation walls (flood openings required) are allowed.
- The lowest floor must be elevated to or above the BFE.
- An as-built lowest floor elevation is required to be on file with the permit records.

VE Zones (and AE Zones on the water side of a LIMWA)

- Fill is not allowed for structural support of buildings.
- Only open foundations on columns or piles, free of obstructions, or breakaway walls are allowed below the BFE.
- Bottom of lowest horizontal structural member to or above BFE, with an as-built elevation on file.
- A Professional Engineer or Architect shall certify the design of the structure, including wind loading, and that must be on file with the permit records.



The National Flood Insurance Program (NFIP)

- Created by the National Flood Insurance Act of 1968
- Participation is **voluntary**
 - Adopt and enforce regulations
 - Eligible for flood insurance
- **Benefits** of participation:
 - Flood insurance
 - Grants and loans
 - Disaster assistance
 - Federally-backed mortgages



Flood Insurance 101

- Homeowners insurance does not cover flooding
- Almost everyone in a participating community of the NFIP can buy flood insurance
- Available to homeowners, business owners, renters, condo unit owners, and condo associations
- Sold through private insurance companies and agents, or directly through the NFIP
- Claims are paid regardless of disaster declaration
- No payback requirement



NFIP Limits of Coverage

How much flood insurance coverage is available?

Flood coverage limits for a standard flood policy are:

Coverage Type	Coverage Limit
One to four-family structure	\$250,000
One to four-family home contents	\$100,000
Other residential structures	\$500,000
Other residential contents	\$100,000
Business structure	\$500,000
Business contents	\$500,000
Renter contents	\$100,000

Mandatory Purchase Requirement

Flood Disaster Prevention Act of 1973

- Flood insurance purchase is required to make, increase, extend or renew any loan secured by structure in SFHA
- Flood insurance required for term of loan

Flood Insurance Reform Act of 1994

- Established penalties for lender non-compliance
- Requires lenders to review revised FIRMs
- Requires notification and mandatory purchase if revised FIRM shows structure in SFHA
- If escrow account is established, requires escrow for flood insurance

What Happens Next?

- Upper Fox River and Lake Michigan Coastal Areas
- Proposed Flood Hazard Determination (FHD) published to Federal Register by FEMA – 9/1/2022
- Community CEOs receive certified letter indicating intent to publish FHD in local newspaper – 10/7/2022
- WDNR publishes FHD in local newspaper – 10/20/2022
- 90-Day Appeals period opens - Ends on January 18
- Resolve appeals and comments and produce final maps

90-Day Appeal Period

- Community (or individuals via their community) may appeal areas:
 - Areas showing new or revised BFEs
 - Areas where there is a change in the Special Flood Hazard Areas (SFHA)
 - Areas showing new or revised SFHA (increase or decrease)
 - Areas showing new or revised regulatory Floodway boundaries (increase or decrease)

Requirements for Appeal

- Revised hydrologic and/or hydraulic analysis
- Data believed to be better than those used in original analysis
 - Documentation for source of new data
 - Proof that new topo data meets FEMA accuracy standards
- Explanation of the error or misapplication of methodology
- Revised flood profiles, floodway data tables and Summary of Discharges table
- Revised floodplain and floodway

Comments

- All other challenges to the maps are considered comments.
 - Corporate limit revisions;
 - Road name errors and revisions;
 - Base map errors;
 - Requests that changes effected by a LOMA, LOMR-F, or LOMR be incorporated; and
 - Other possible omissions or potential improvements to the mapping.

Appeal/Comment Flow Chart



Final Steps

- FEMA issues a Letter of Final Determination
- Final FIRMs and spatial data are distributed to the communities
- Community adopts the FIRMs and FIS
- FEMA approves revised ordinance
- FIRMs are effective

Letter of Final Determination

- Sent to CEO of Community
- Establishes effective date of FIS and FIRM
- Formal notification to community of need to update floodplain management regulations by the effective date
- Followed by two additional reminder letters

WHAT IS FLOODPLAIN MANAGEMENT?

Floodplain management is a partnership between:

- Federal Regulations (44 CFR 59-72)
- State Regulations (NR 116)
- Local Ordinance

Management of development in the floodplains results in construction practices that can reduce flood losses and the high costs associated with flood disasters to all levels of government.

Federal Role

- Enroll communities in National Flood Insurance Program
- Provide Federal Flood Insurance to citizens in participating communities
- Risk Identification (Map Production)
- Establish minimum development protection standards
- Provide flood insurance coverage
- Inform and educate the public
- Provide technical assistance

Local Role

- Adopt & enforce floodplain ordinance
- Minimize flood damage
- Issue permits for development in Special Flood Hazard Areas (SFHAs)
- Require elevation data for SFHA structures
- Provide flood zone determinations
- Substantial damage/substantial improvement determinations during disaster & non-disaster events
 - Field Inspections
 - Rectify Violations
 - Inform & educate public
 - Set up filing system for audits

Wisconsin DNR

- Provide technical assistance and training for NFIP compliance
- Conduct Community Assistance contacts and visits
- Facilitate Flood Insurance Rate Map remapping process
- Attend community meetings as requested
- Provide model ordinance for communities
- Inform and educate the public

Legal Nonconforming Structure

What is a legal nonconforming structure?

- A lawful structure that was in place prior to the passage of the ordinance
- Any structure built in the floodplain after the effective passage of the ordinance are not legal and may be in violation of the local floodplain ordinance