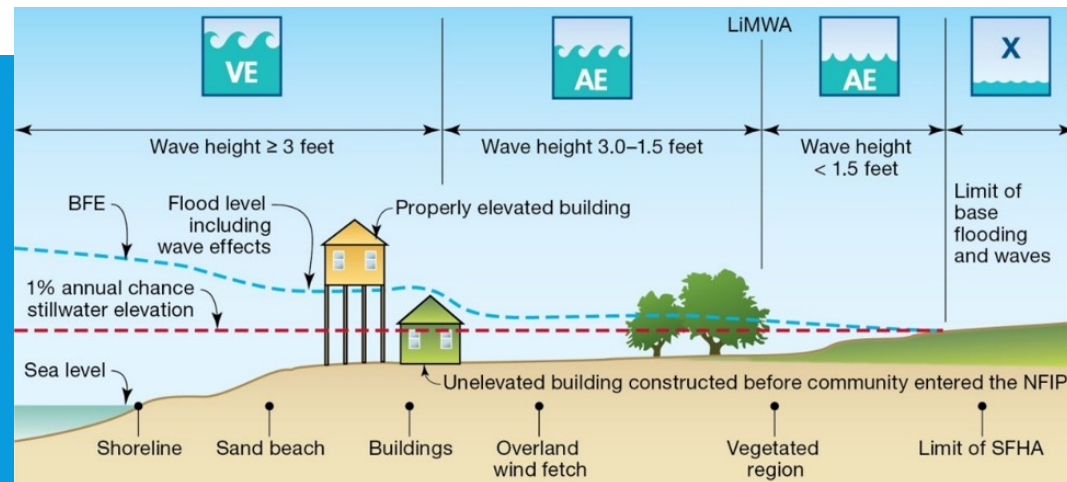




# Cooperating Technical Partners Information Exchange

*Coastal Letter of  
Map Revisions:  
MT-2s*

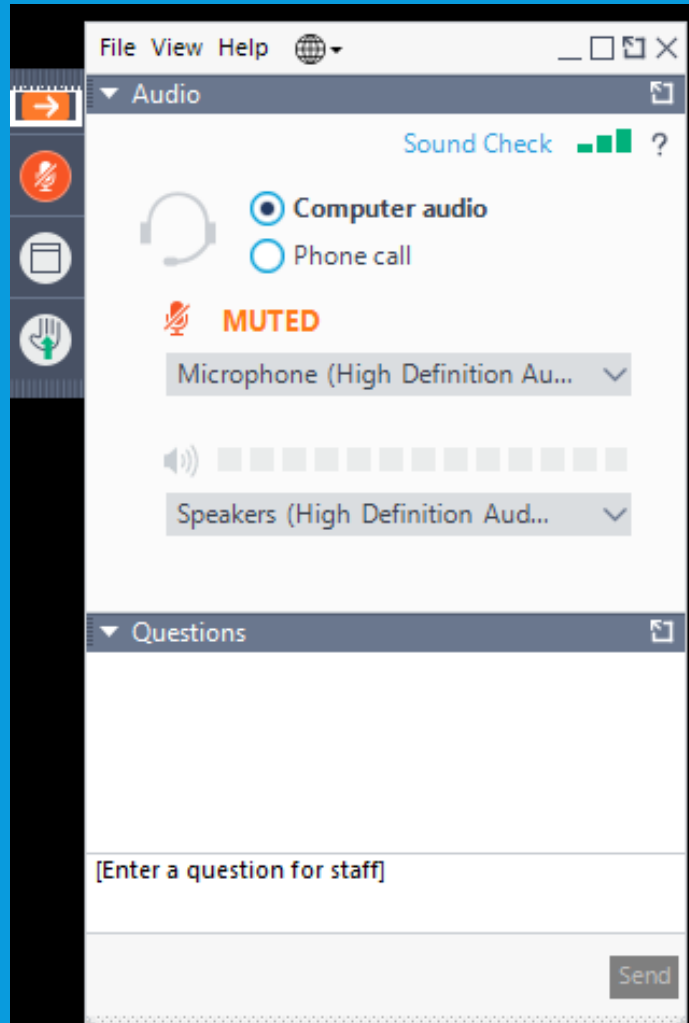


ASFPM Flood Science Center

May 12, 2020



# Audio and Web Settings



- Open and hide your webinar control panel using the orange arrow button at top left corner
- Choose “Computer audio” to use speakers or headphones
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**Submit questions and comments using the “Questions” panel**



# Webinar Participation

- All lines will be automatically be muted.



*Use the “Questions” window in the webinar control panel to submit any questions or comments to the moderator.*

- Selected questions will be read to the presenters and answered on the live webinar.
- Submitted questions not asked during the webinar will be answered by the presenters and posted as a document on the webinar event page at [floodsciencecenter.org](http://floodsciencecenter.org)



# Continuing Education Credits

- Certified Floodplain Managers and Certified Planners are eligible for 1 CEC for participating in this webinar.
- You must have registered individually and indicated you are a CFM and/or AICP at time of registration.
- Eligibility for CEC is dependent on your time spent viewing the webinar, as determined by the webinar software.



*Attending this webinar in a group setting or only viewing the recording is NOT eligible for CEC.*



# Additional Logistics

- To suggest future CTP webinar topics, please contact Alan Lulloff at [alan@floods.org](mailto:alan@floods.org) or type a suggested topic into the Questions panel today.



**ASFPM CFM CECs will be automatically applied.**



**Certificates of Attendance will be emailed.**

**Processing will take a few weeks.** Please contact [cfm@floods.org](mailto:cfm@floods.org) with any certificate issues only after a few weeks have elapsed.

- A follow-up email with link to slides and recording will be sent **in about a week or so.**

**Thank You for Joining Us!**



# ASFPM Mapping and Engineering Standards Committee Cooperating Technical Partners Subcommittee

## Co-chairs:

- Brooke Seymour, P.E., CFM - [bseymour@udfcd.org](mailto:bseymour@udfcd.org)  
Mile High Flood District
- Maria Lamm, CFM - [coxsm@dnr.sc.gov](mailto:coxsm@dnr.sc.gov)  
South Carolina Department of Natural Resources

## Goals:

- *Identify common concerns*
- *Provide opportunities for information exchange*
- *Identify training needs*
- *Promote and document the value of CTPs*



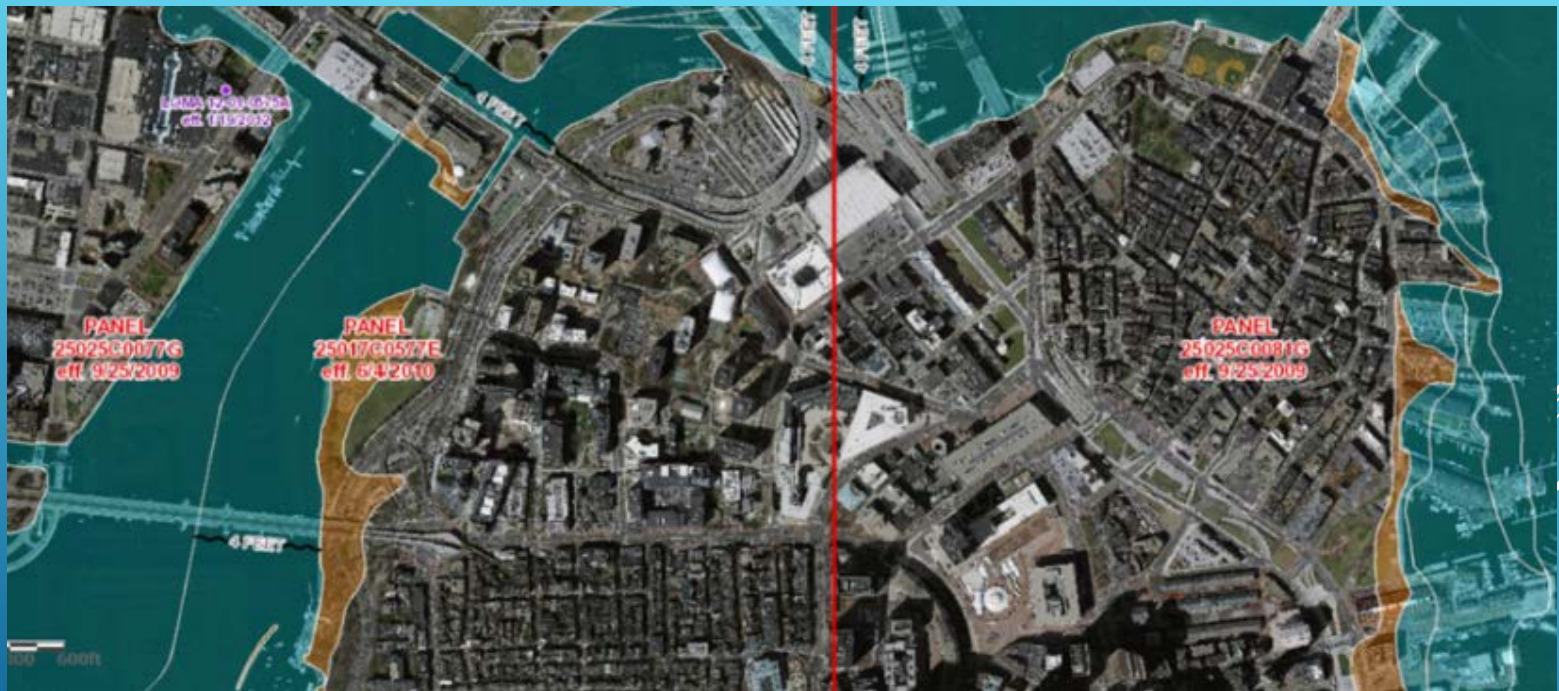
# Agenda

- **Introduction** - Alan Lulloff, P.E., CFM - ASFPM Flood Science Center
- **Types of Revisions: LOMR, CLOMR, PMR**
  - Erin Benford, Coastal Scientist - AECOM
- **Applicable Regulations and Policies**
- **Submittal Requirements**
- **Common Issues and Mistakes**
- **Great Lakes Submittal Requirements**
  - Jeff Gangai, CFM - Dewberry
- **Questions/Discussion**

# COASTAL LETTER OF MAP REVISIONS (MT-2S): WHAT THEY ARE AND HOW THEY WORK

Erin Benford, Coastal Scientist - AECOM

Jeff Gangai, CFM - Dewberry



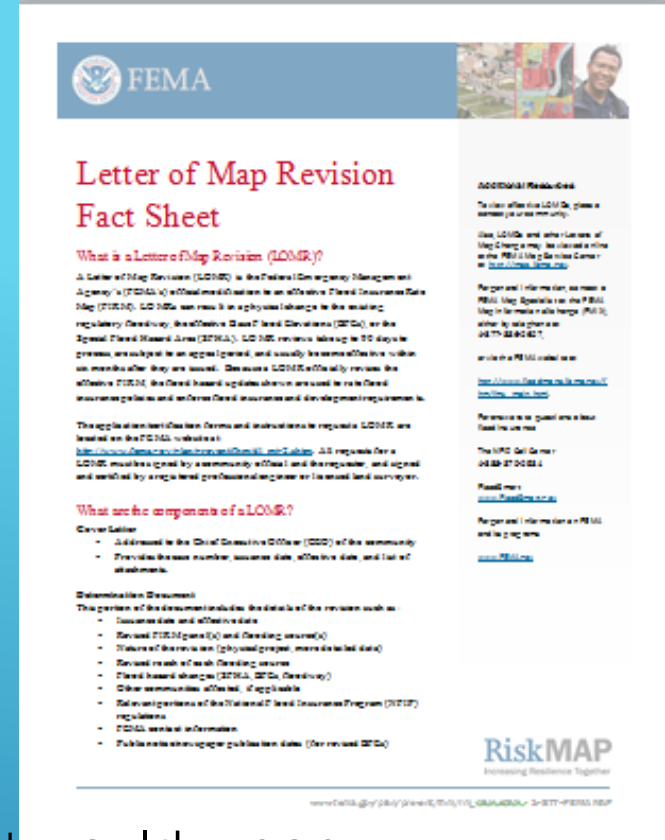


# WHAT IS A LOMR?

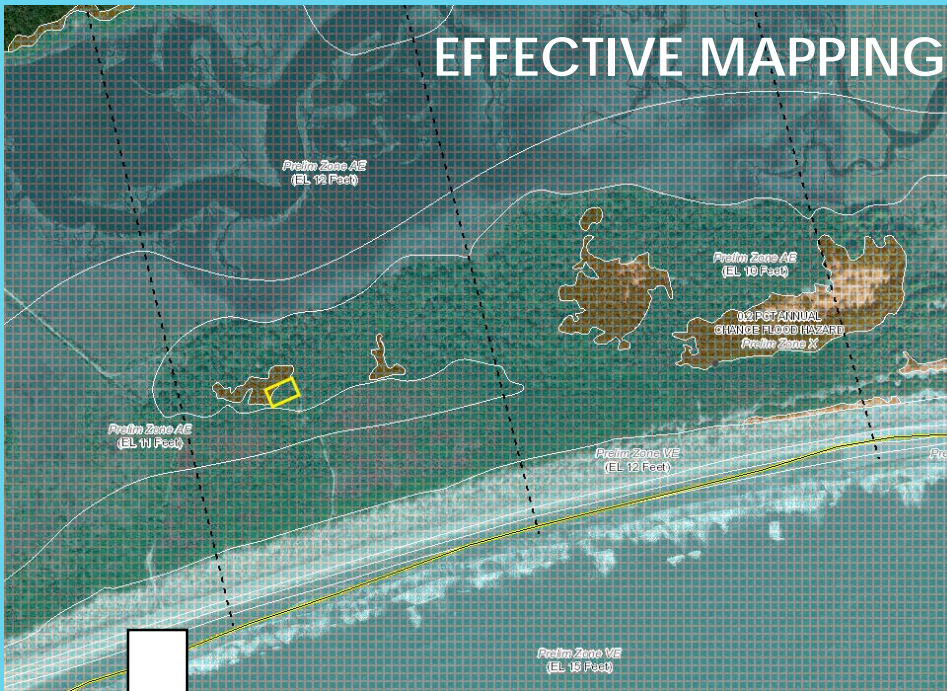
- ▶ Official modification to an effective Flood Insurance Rate Map (FIRM).
- ▶ Physical change to the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA).

# WHAT IS A CLOMR?

- ▶ FEMA's comment on a proposed project that would, upon construction, result in the modification of the existing regulatory floodway, the effective BFEs, or the SFHA.
- ▶ Does not revise an effective FIRM; rather, it indicates whether the project, if completed as proposed, would be eligible for a LOMR.
- ▶ <https://www.fema.gov/media-library/assets/documents/19871>

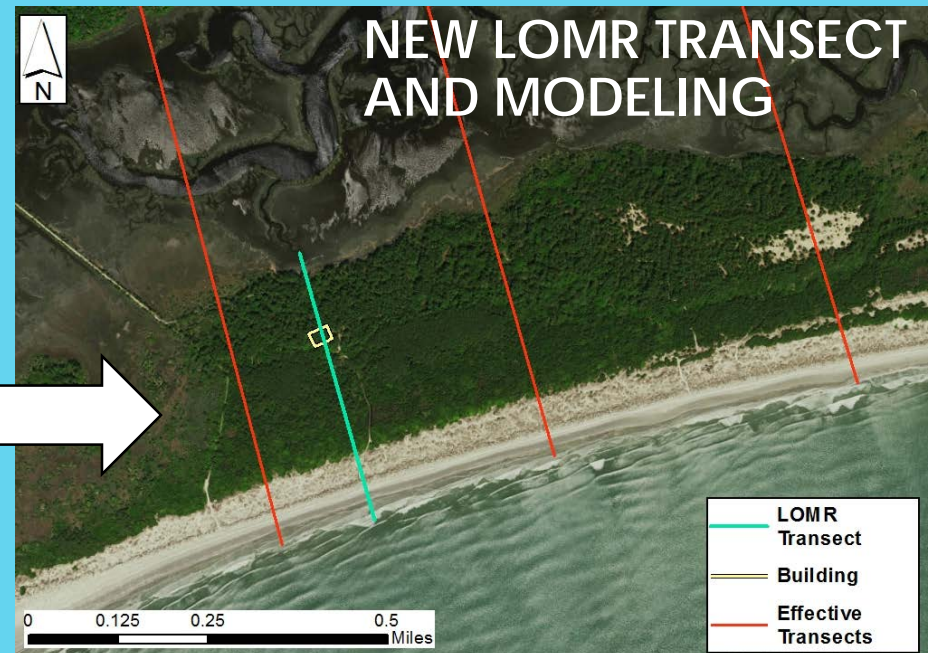
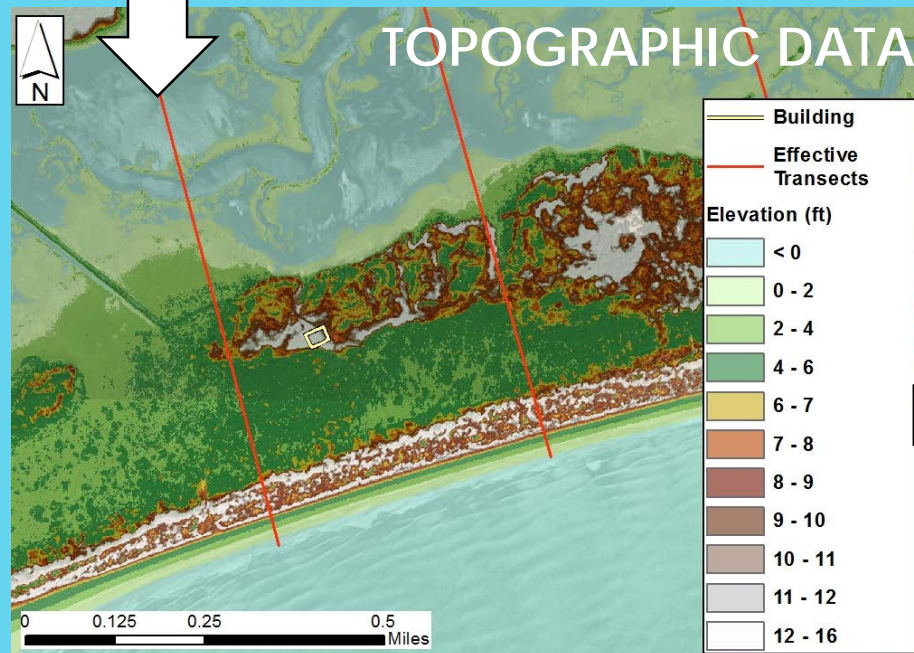


## EFFECTIVE MAPPING



## WHEN C/LOMR?

- ▶ New topographic data
- ▶ Updated modeling
- ▶ Property Changes (i.e. New construction)
- ▶ More detailed analyses
- ▶ 44 CFR 65.12 – When a CLOMR is specifically required
- ▶ A community can request a CLOMR under 44 CFR 65.8





# BASIC DATA REQUIREMENTS:

- ▶ Application/certification forms (MT-2 Form 1, 4 and 5 (structures))
- ▶ Community acknowledgment (from each impacted community)
- ▶ Hydrologic computations/files\*
- ▶ Hydraulic analysis/files\*
- ▶ Certified topographic workmap with SFHA and floodway delineations\*
- ▶ Annotated FIRM & FIS report\*
- ▶ Project narrative and site photographs (optional)

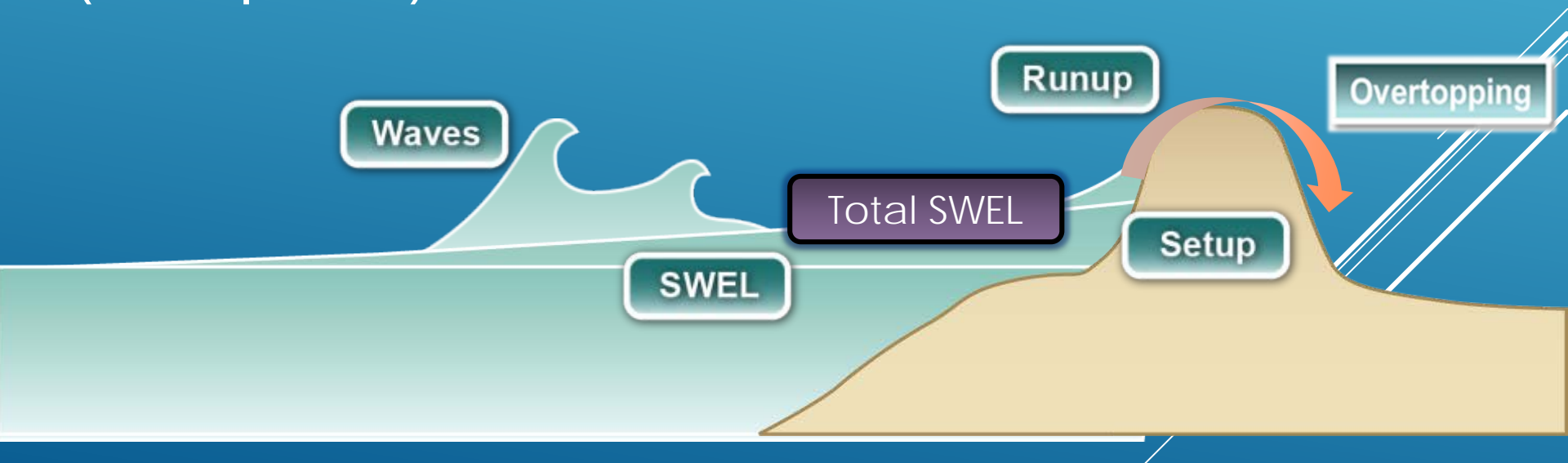
*\* If applicable*

# REGULATORY REQUIREMENTS:

- ▶ Notification to any property owners impacted by increased flood hazards (SFHA, BFE, and/or floodway; Section 65.6).
- ▶ Public notice of any floodway change (NFIP, Section 65.7)

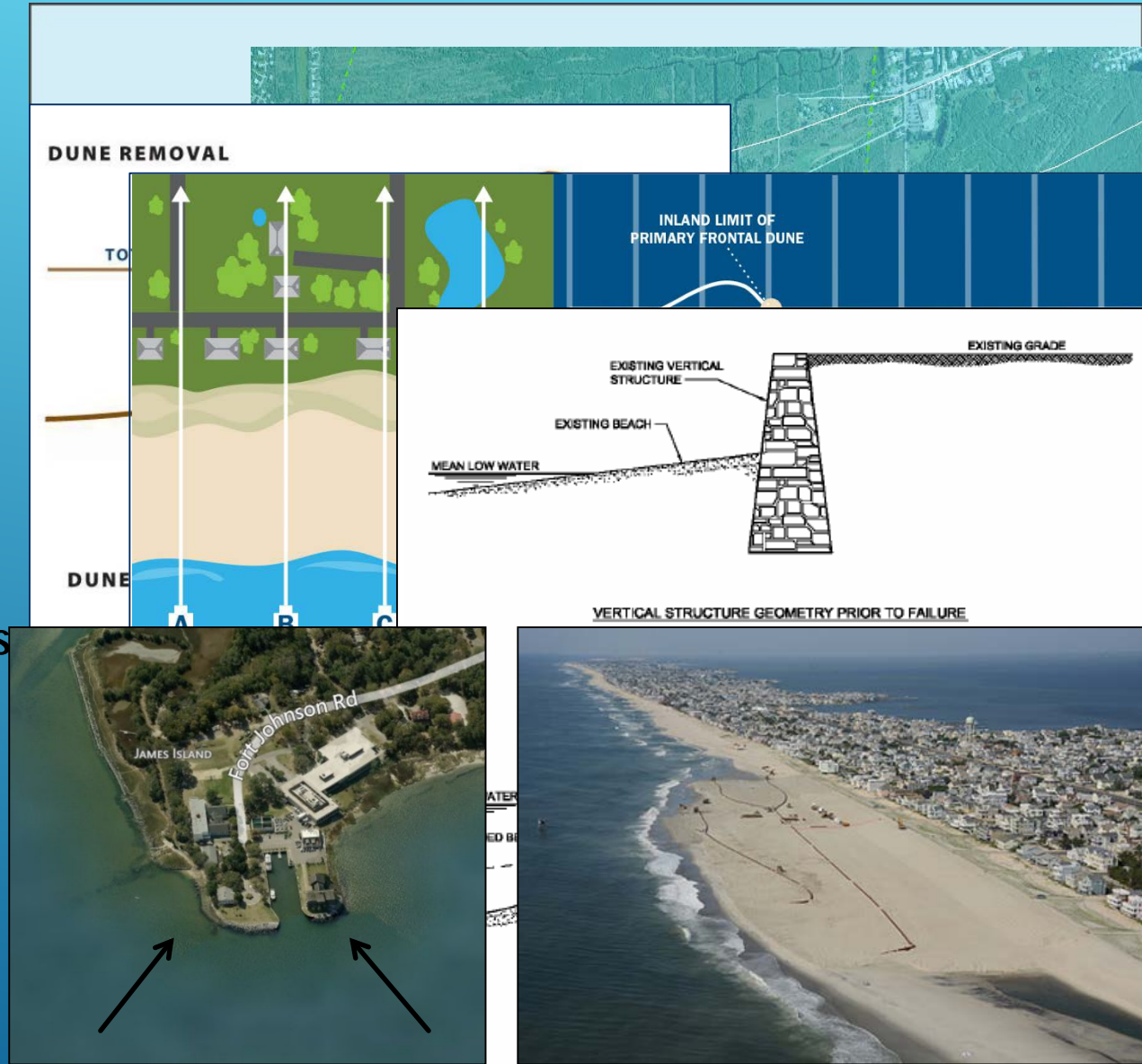
# GENERAL ANALYSIS CONSIDERATIONS: UNDERSTANDING WAVE/SURGE COMPONENTS

1. Storm surge stillwater elevation (SWEL)
2. Amount of wave setup
3. Wave height above storm surge (stillwater + setup) elevation
4. Wave runup and Overtopping above total storm surge elevation (where present)



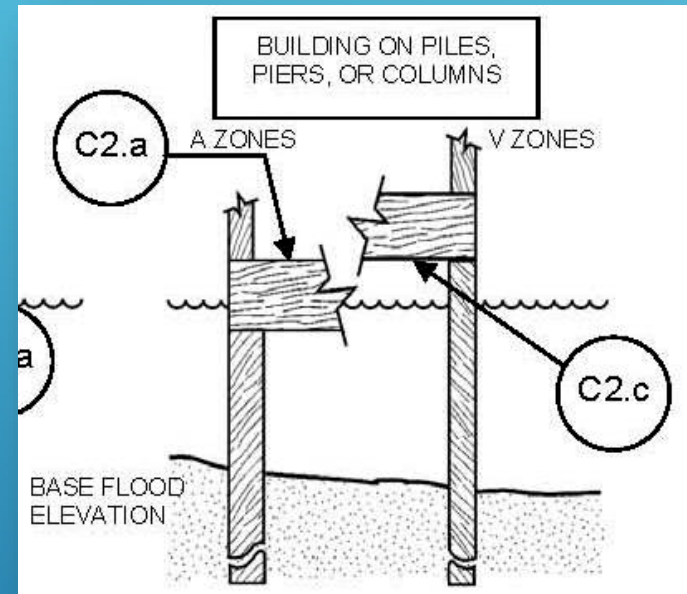
# OTHER ANALYSIS CONSIDERATIONS:

- ▶ Overland Wave Effects
- ▶ Property Location  
(relative to modeling)
- ▶ Erosion
- ▶ Primary Frontal Dune
- ▶ Structures
- ▶ General Site Conditions
  - ▶ Wave Exposure
  - ▶ Beach Nourishment



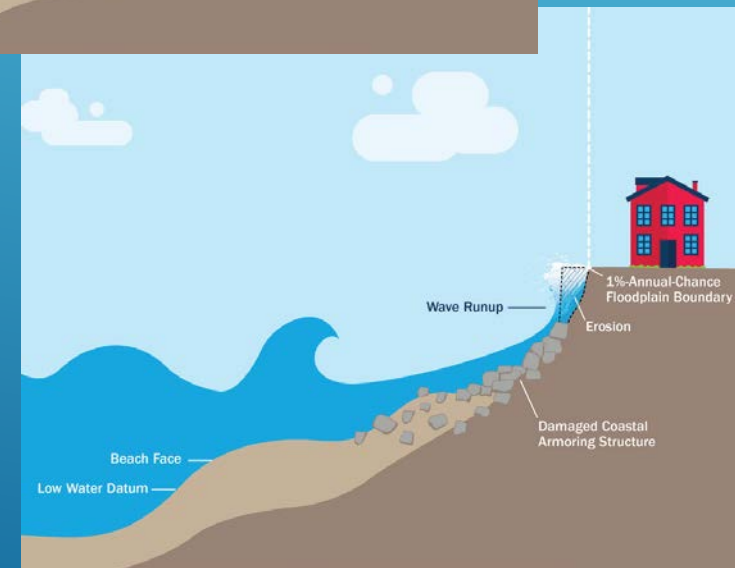
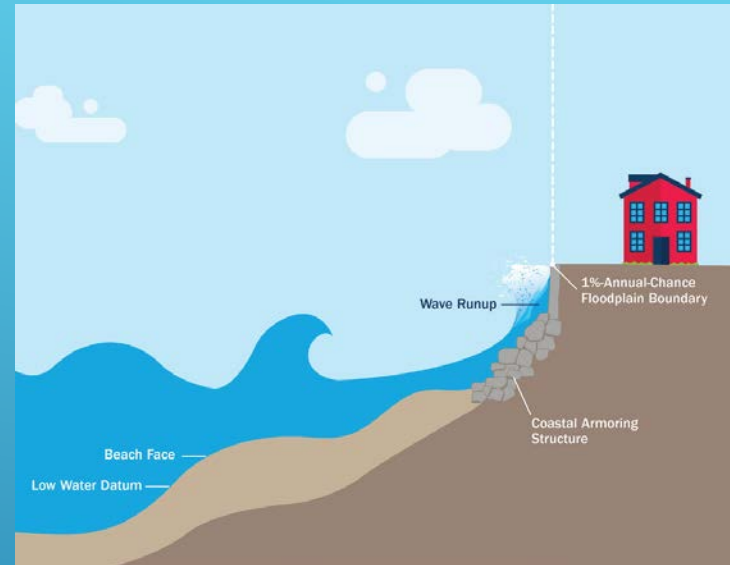
# TOPOGRAPHIC REVISIONS BASED ON FILL

- ▶ Revisions based on Fill in a VE Zone are not allowed
  - ▶ Floodplain Management regulations required structures to be elevated on piles in VE Zones. (60.3(e)(4), (5), and (6))
  - ▶ Assumes fill is being placed for structural support
  - ▶ Exceptions can be made if fill is adequately protected from eroding
- ▶ Revisions based on fill are allowed in AE Zones
  - ▶ Using fill in Coastal A Zones (waves greater than 1.5 feet) for structural support without protection is not recommended




# STRUCTURE CERTIFICATION

- ▶ Coastal Armoring Structures (seawalls, bulkheads, revetments)
- ▶ Regulation Requirements (65.10)
  - ▶ Designed to protect against 1% flood event
  - ▶ USACE TR CERC 89-15
  - ▶ Freeboard
    - ▶ Storm Surge (2 feet)
    - ▶ Wave height (1 feet)
    - ▶ Maximum Wave Runup (1 feet)
    - ▶ Exceptions for BFE or Zone Changes
- ▶ Operation Plans
- ▶ Maintenance Plans

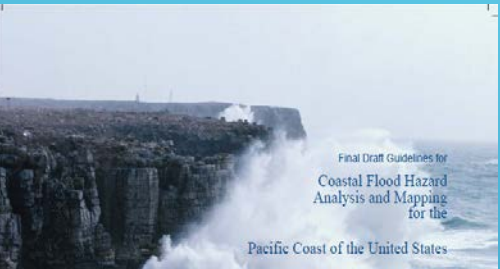


# BASIC LOMR REVIEW CHECKS

- ▶ Model Inputs and their sources
  - ▶ Fetch considerations
  - ▶ Structures are treated properly
  - ▶ The PFD has been considered (if applicable)
  - ▶ Methods and models are acceptable according to FEMA guidance and accepted best practices
  - ▶ All datums match
  - ▶ All relevant hazards are being considered
  - ▶ Requestors are following current FEMA guidance and standards
- 
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# OLD GUIDANCE ..... VS ..... NEW GUIDANCE



## Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update

Final Draft  
February 2007



## Great Lakes Coastal Guidelines Update

March 2009



- Previous guidelines contained almost all relevant information for a study by geographic region
- Can still be referenced for background information, but methodologies may be superseded

### Guidance for Flood Risk Analysis and Mapping

#### Coastal General Study Considerations

### Guidance for Flood Risk Analysis and Mapping

#### Coastal Water Levels

### Guidance for Flood Risk Analysis and Mapping

#### Determination of Wave Characteristics

- New guidelines documents are broken down by subject
- Methods must be taken from new guidance documents
- FEMA updates these documents on a scheduled cycle – please check for new versions!
- <https://www.fema.gov/media-library/assets/documents/34953>

# GUIDANCE UPDATES



## FEMA Policy Standards for Flood Risk Analysis and Mapping FEMA Policy #FP 204-078-1 (Rev 9)

### BACKGROUND

This policy is applicable to Federal Emergency Management Agency (FEMA) staff delivering Risk Analysis and Mapping (Risk MAP), all mapping partners (contractors, cooperating technical partners, and other federal agencies) who perform flood risk projects on behalf of FEMA, and the National Flood Insurance Program (NFIP). Additionally, this policy may be pertinent to states, tribes, communities, homeowners and their consultants who are interested in the Flood Insurance Rate Map (FIRM) process.

This policy updates and supersedes the **Standards for Flood Risk Analysis and Mapping – FP 204-078-1 (Rev 8)** approved on February 11, 2019.

The changes with this revision are:

| Standard IDs (SIDs)  | Standards Change Description   |
|--|--|
| SID 621  | Revised to clarify that the draft database can be transmitted or made available online.  |
| SID 619  | Clarified for consistency in how Primary Frontal Dune features are revised.  |
| SID 614  | Updated to clarify the application and intent of the standard, as it relates to coastal BFEs and LOMA or CLOMA determinations. |
| SID 191  | Rescinded to reflect retiring the Document Control Procedures Manual and updated approach to managing letter templates.        |
| SIDs 36, 62, 168, 386, 391, 395, 402, 405, 406, 407, 508, 516, 522, 524, 525, 600, 601 | Minor updates for clarity and to align with current processes and practice.  |
| SIDs 74, 107, 137, 138, 384, 385   | Minor edits to standardize language as part of routine maintenance.  |
| SIDs 105, 347, 374   | Updated several cross-section and BFE standards to better define and clarify their application and usage on FIRM panels        |
| SIDs 50, 67, 81, 314, 526  | Rescinded because this requirement is covered elsewhere.   |

For coastal Flood Risk Projects, VE Zones are identified using one or more of the following criteria for the 1-percent flood conditions:

1. The breaking wave height zone occurs where 3-foot or greater wave heights could occur (this is the area where the wave crest profile is 2.1 feet or more above the static water elevation) (REQUIRED)
2. The primary frontal dune zone, as defined in 44 C.F.R. § 59.1 of the NFIP regulations (REQUIRED)
3. The wave runup zone occurs where the (eroded) ground profile is 3.0 feet or more below the Total Water Level, and 3.0 feet of wave runup height occurs in the analysis along the profile (REQUIRED)
4. The wave overtopping splash zone is the area landward of the crest of an overtopped barrier, in cases where the potential wave runup exceeds the barrier crest elevation by 3.0 feet or more and exceeds 1.0 cfs/ft (REQUIRED)
5. The high-velocity flow zone is landward of the overtopping splash zone (or area on a sloping beach or other shore type), where the product of depth of flow times the flood velocity squared is greater than or equal to 200 ft<sup>3</sup>/sec<sup>2</sup> (OPTIONAL)



# Poll Question

**Which of the choices is not a component of a coastal flood hazard?**


- Storm surge
- Wave heights
- Floodway
- Overtopping
- Wave setup

# ATLANTIC AND GULF COASTS

## Region 1

- ▶ Studies are based primarily on tide gage analysis
- ▶ Runup is a major hazard
- ▶ PFD does exist in some areas, but is delineated in a slightly different way than other regions
- ▶ 2D studies are starting to be introduced in some areas (Maine)

## Regions 2 & 3

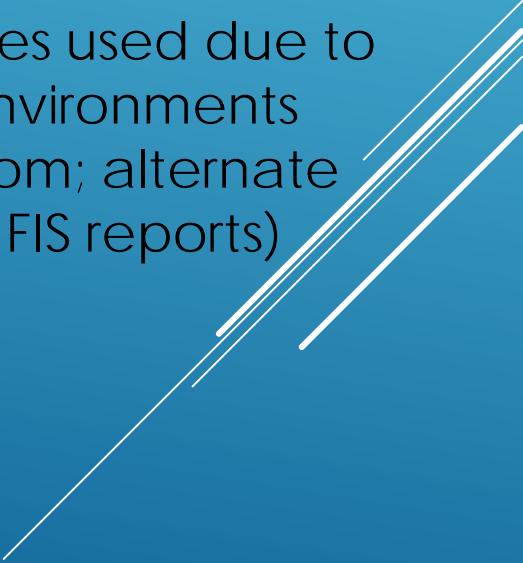
- ▶ 2D storm surge studies
  - ▶ PFD located in open coast settings
  - ▶ Combination of open and sheltered fetch conditions
  - ▶ Generally lower coastal topography means overland wave hazards more prevalent
- 

# ATLANTIC AND GULF COASTS

## Region 4

- ▶ Combination of older generation FEMA surge studies and newer 2D storm surge models (older studies being phased out)
- ▶ PFD delineations very common throughout region
- ▶ Overland wave and runup hazards exist

## Region 6

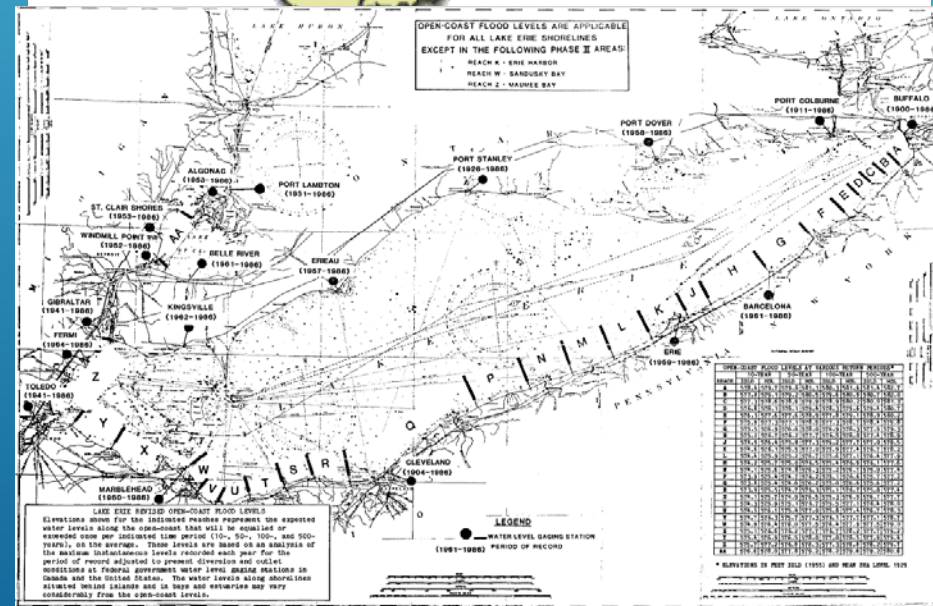
- ▶ Older surge studies being phased out for newer 2D storm surge studies
  - ▶ PFD very common
  - ▶ Some alternative methodologies used due to vast marsh environments (muddy bottom; alternate erosion – see FIS reports)
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# GREAT LAKES

## Regions 2, 3, & 5

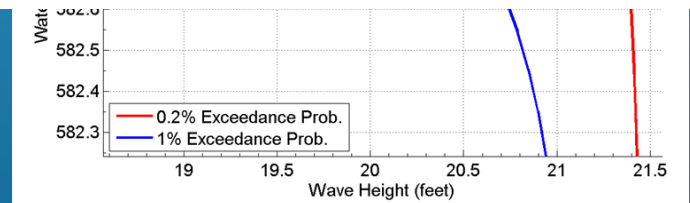
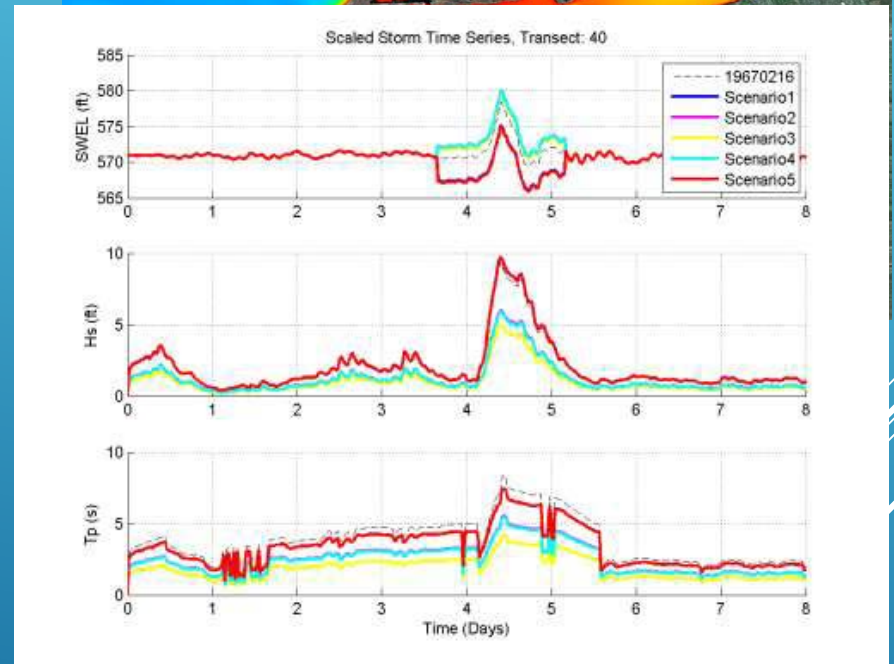
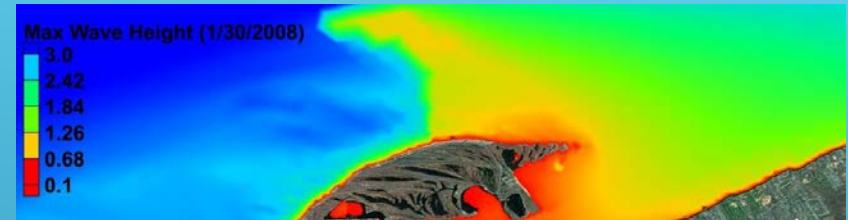
- ▶ Old Studies:
  - ▶ Used 1988 USACE Report on Lake Water levels
    - ▶ Based on Statistical Analysis at limited Water Level Stations
  - ▶ Majority of studies had no Wave analysis
    - ▶ Some used a 3 year wave height associated with 1% water levels
    - ▶ Few cases of wave runup mapped



# GREAT LAKES

## Regions 2, 3, & 5

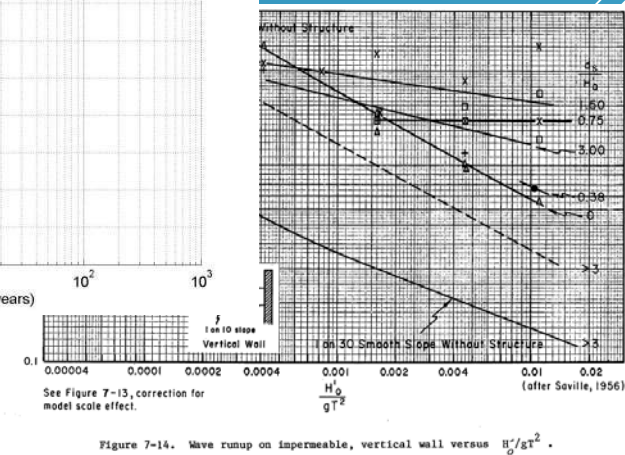
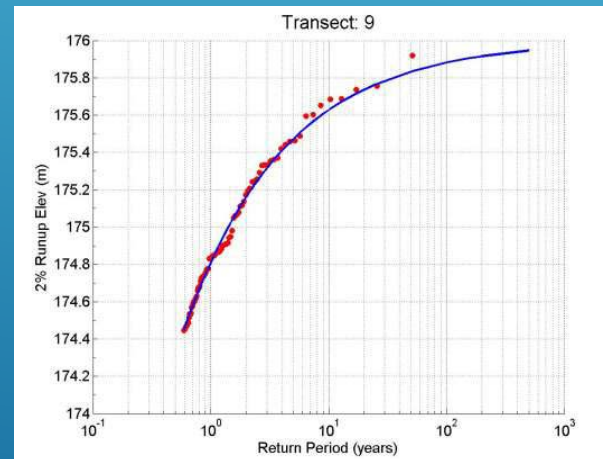
- ▶ 2D storm surge studies
  - ▶ Based on Historic storms
  - ▶ Lake level consideration
  - ▶ 2D Wave Modeling
  - ▶ Ice consideration
- ▶ Five WHAFIS runs with combination of wave heights and wave period representing 1% conditions
- ▶ Create time-series of each of the five scenarios
- ▶ Erosion - 1D CSHORE model
- ▶ PFD does exist in some areas



# GREAT LAKES

## Regions 2, 3, & 5

- ▶ Wave Runup is a major Hazard
  - ▶ Response based methodology
  - ▶ 1D CSHORE Model or Empirical Formulas
  - ▶ Each Historic Storm modeled
  - ▶ Includes Erosion
- ▶ Vertical Wall Runup
  - ▶ USACE Shore Protection Manual
  - ▶ 5 Wave height and water level scenarios
- ▶ Wave Overtopping VE and AO Depth Zones

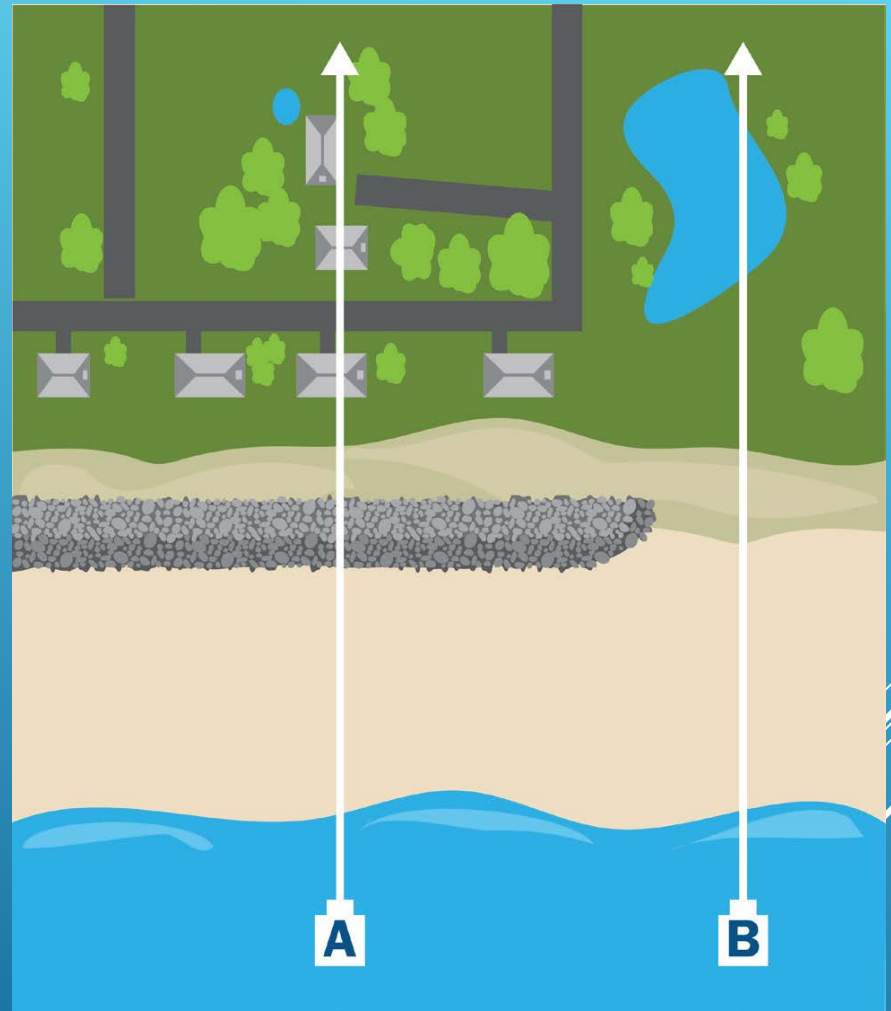
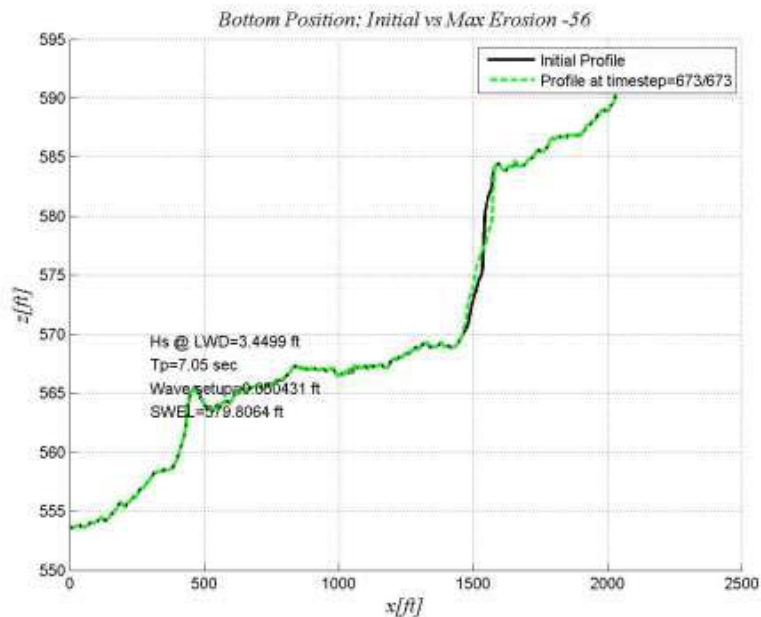




# GREAT LAKES

## Regions 2, 3, & 5

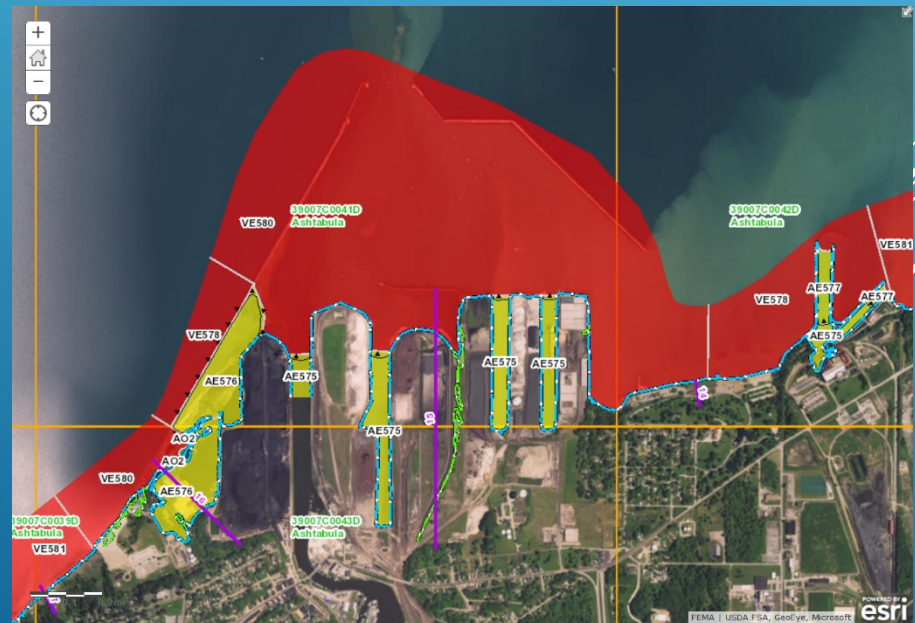
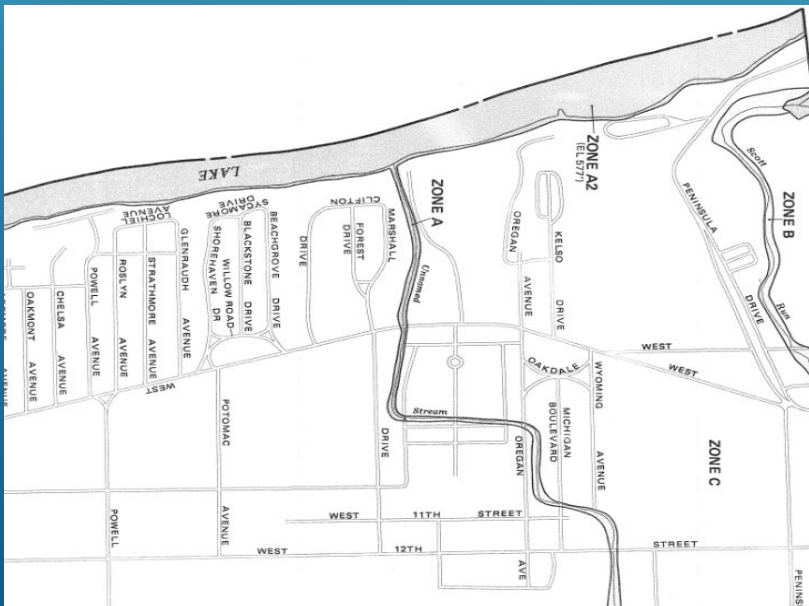
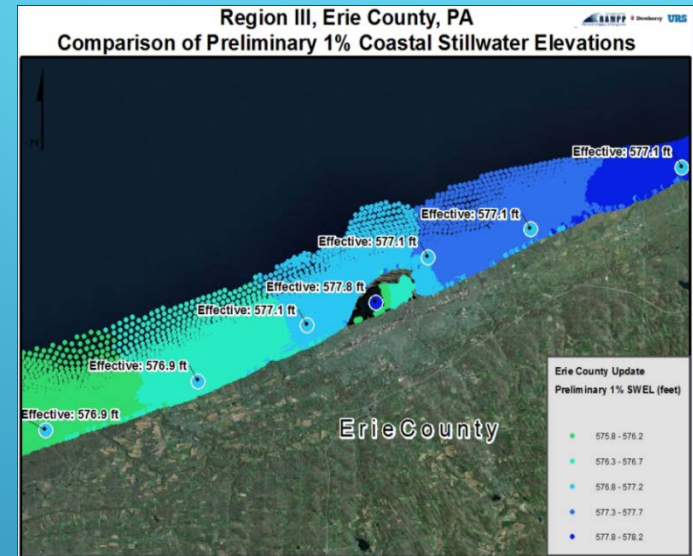
- ▶ Bathymetric elevation data increased importance with Response based methods



# GREAT LAKES

## Regions 2, 3, & 5

- ▶ Major Changes to Mapping
  - ▶ One Stillwater BFE to many with waves and wave runup
  - ▶ AE to VE and AO



# PACIFIC COAST

## Regions 9 & 10

- ▶ Regional surge and wave hindcasts using 2D models and measurements
- ▶ Response based Methods
- ▶ Runup & Overtopping is a major hazard
- ▶ Dynamic Water Level (Tides+Surge+Setup)
- ▶ Total Water Level (Tides +Surge+Setup+Runup)
- ▶ Erosion generally not applied
- ▶ PFD does exist in some areas





# ANALYSES & CONSIDERATIONS ARE EVOLVING!

| SID # | Effective Date | Implementation Description   | Category                      | Standard Type    | Standard   |
|-------|----------------|--|-------------------------------|------------------|--|
| 207   | 4/1/2003       | Existing standard. Already implemented.  | Letter of Map Revision (LOMR) | Working Standard | At a minimum, the analyses and other supporting data provided in support of a revision request must be equivalent to or better than the scientific and technical data employed by FEMA for the preparation of the effective analyses.                                |
| 88    | 5/1/2012       | Existing standard. Already implemented.  | Coastal - Analysis            | Working Standard | All coastal processes and flooding sources that contribute to the 1-percent-annual-chance flood condition both at a regional and local scale must be considered.   |
| 412   | 12/3/2008      | Existing standard. Already implemented.  | Coastal - Mapping             | Working Standard | For coastal Flood Risk Projects, the LiMWA must be calculated, where appropriate.  |
| 536   | 7/31/2013      | Applicable for all coastal Flood Risk Projects in the data development stage where the erosion analyses have not been completed yet. | Coastal - Analysis            | Working Standard | For Atlantic Ocean and Gulf of Mexico coastal Flood Risk Projects, the 1-percent-annual-chance water level datum, above which the dune reservoir volume will be calculated for erosion analyses, will include storm surge, tidal effects, and wave setup components. |
| 537   | 2/28/2018      | Effective immediately  | Coastal - Waves               | Working Standard | LOMRs revising coastal flooding shall use the effective still water elevations and shall include wave setup.   |

- ▶ The data/analyses you submit must be as *good* or better than the effective.
- ▶ As FEMA guidance evolves, you may need to submit items not addressed in the effective study.

\* FEMA Policy Standards for Flood Risk Analysis and Mapping (#FP 204-078-1)

# WHAT DO THE STUDY UPDATES MEAN FOR MY C/LOMR?

## Older Studies

- ▶ Static surge values used along entire transect
- ▶ Wave setup computed as separate component (where computed)
- ▶ Erosion volume determined by SWEL
- ▶ Runup methods sometimes include/exclude wave setup
- ▶ Starting wave conditions determined by WIS or ACES (fetch dependent)

## Newer Studies

- ▶ 2D surge models produce rasters that allow surge to vary along transect
- ▶ Wave setup is implicit in SWEL surfaces in 2D models
- ▶ Erosion volume is determined by SWEL + setup (TWL)
- ▶ Since wave setup is included in SWEL values, setup no longer removed in runup calcs
- ▶ Starting waves determined from raster surface from 2D model

# WHAT DO THE STUDY UPDATES MEAN FOR MY C/LOMR?

- ▶ All necessary study data can be obtained from FEMA Engineering Library (FRiSEL website)
- ▶ SWEL values will need to be extracted to transects in same way topo data is
- ▶ PFD lines are included in Map Service Center (MSC) dataset for each county
- ▶ LiMWA lines are also included in county datasets
- ▶ If specific methodology data for study is needed, the TSDN and IDS reports can be obtained from FRiSEL; contain detailed engineering descriptions
- ▶ If you still have questions about methods or data, you can contact FMIX (FEMA Mapping and Insurance eXchange) or your case engineer; [https://www.floodmaps.fema.gov/fhm/fmx\\_main.html](https://www.floodmaps.fema.gov/fhm/fmx_main.html)



# Poll Question

**Across the Regions, what is the largest common change in methods from older generation studies?**

- Erosion methods
- Storm surge methods
- Overland wave height modeling
- Primary Frontal dune mapping
- Wave runup methods

# FRISEL DATA SEARCH

## Mapping

INFORMATION PLATFORM



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## Flood Risk Study Engineering Library

Keyword(s) Search



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## Advanced Search

State

51 - Virginia

County

51115 - Mathews County

Community Name

510096 - MATHEWS COUNTY\*

Type of Data Product

Coastal Analysis (Studies)

1 result matches the search criteria

Showing 1 to 1

[DL](#) [FEMA Case Number: 11-03-0556S - Coastal Analysis \(Studies\)](#)

Project ID/Name: REG Mathews County, VA, Coastal PMR | Type of Data Product: Coastal Analysis (Studies) | Effective Date: 02/28/2013 |  
Date Uploaded: 03/21/2013 | Project CID(s): 51115C-Mathews County-wide | Product CID(s): 51073C-Gloucester County-wide

Page 1 of 1

1

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# NEW CONSIDERATIONS

## Post-Storm Data



# NEW CONSIDERATIONS


## Post-Storm Data



### Emergency Response Imagery

National Geodetic Survey

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The imagery posted on this site was acquired by the **NOAA Remote Sensing Division** to support NOAA homeland security and emergency response requirements. In addition, it will be used for ongoing research efforts for testing and developing standards for airborne digital imagery.

**Tips** for navigating the Emergency Response Imagery Viewer.

#### Navigation

National Geodetic Survey  
Pre-Event Imagery

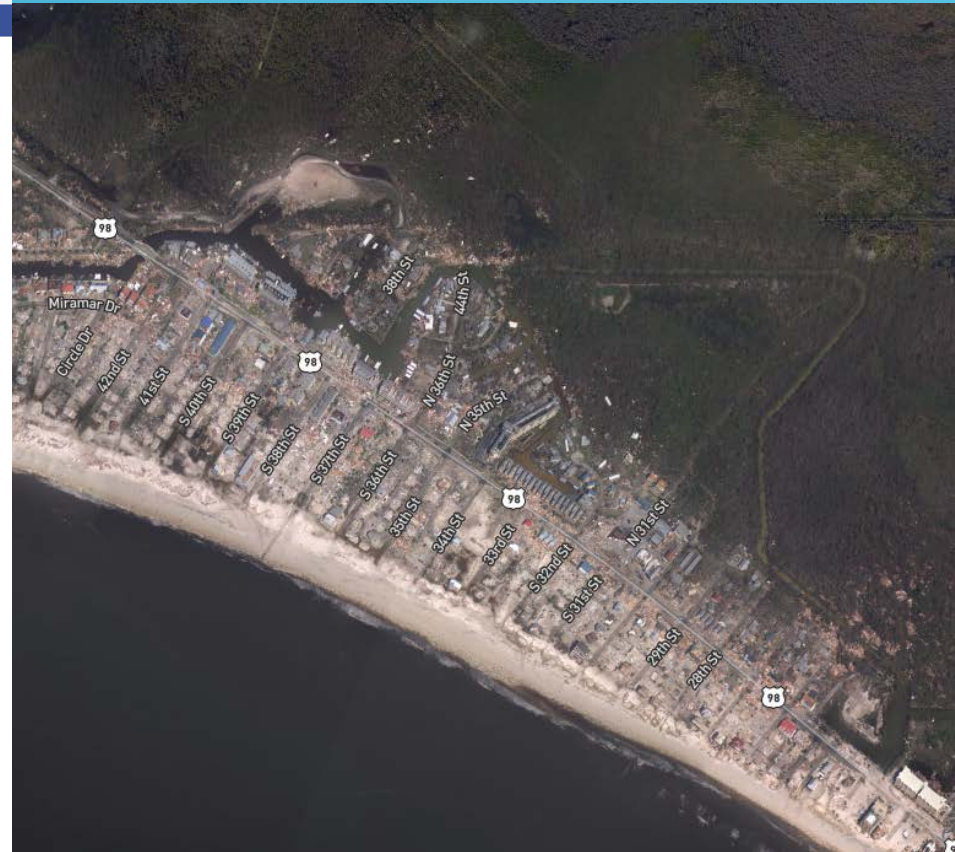
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#### Emergency Response Imagery:

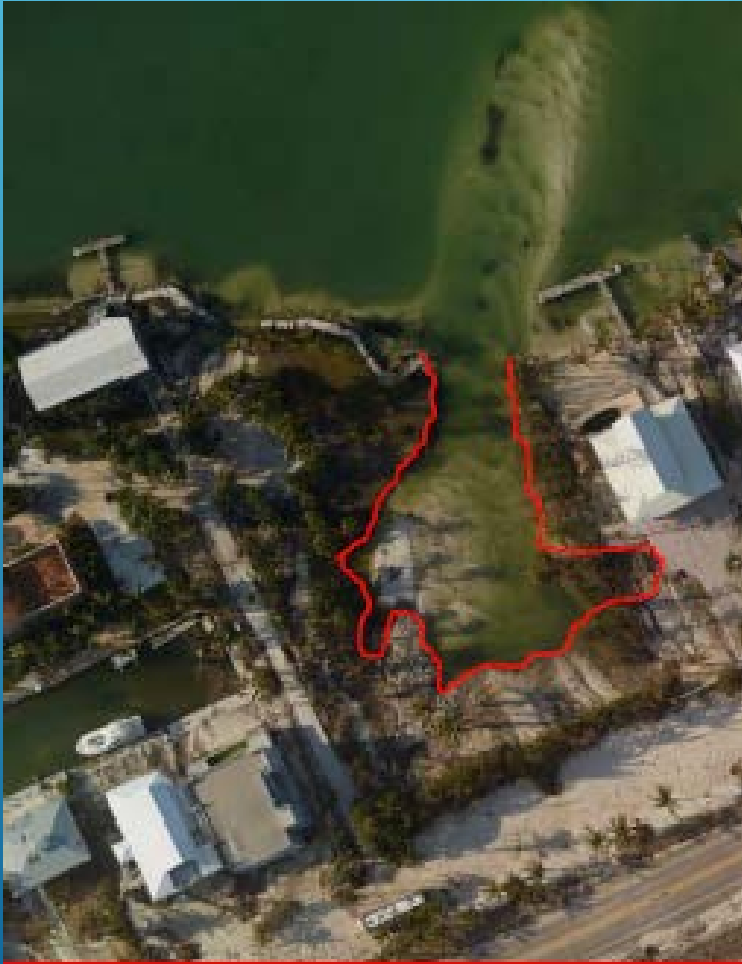
- Hurricane Dorian (2019)
- Hurricane Barry (2019)
- Hurricane Michael (2018)
- Hurricane Florence (2018)
- Tropical Storm Gordon (2018)
- Hurricane Nate (2017)
- Hurricane Maria (2017)
- Hurricane Irma (2017)
- Hurricane Harvey (2017)
- Hurricane Matthew (2016)
- Louisiana Flooding (2016)
- Midwest U.S. Flooding (2015)
- Illinois Tornadoes (2015)
- Hurricane Arthur (2014)
- Hurricane Sandy (2012)
- Hurricane Isaac (2012)
- Hurricane Irene (2011)
- Joplin, MO Tornado (2011)
- Tuscaloosa, AL Tornado (2011)
- North Dakota Flooding (2011)
- Hurricane Earl (2010)
- Nor'Easter Nov09 (2009)
- Hurricane Ike (2008)
- Hurricane Gustav (2008)
- Hurricane Humberto (2007)
- Tropical Storm Ernesto (2006)
- Hurricane Wilma (2005)
- Hurricane Rita (2005)
- Hurricane Ophelia (2005)
- Hurricane Katrina (2005)
- Hurricane Dennis (2005)
- Hurricane Ivan (2004)
- Hurricane Jeanne (2004)
- Hurricane Isabel (2003)





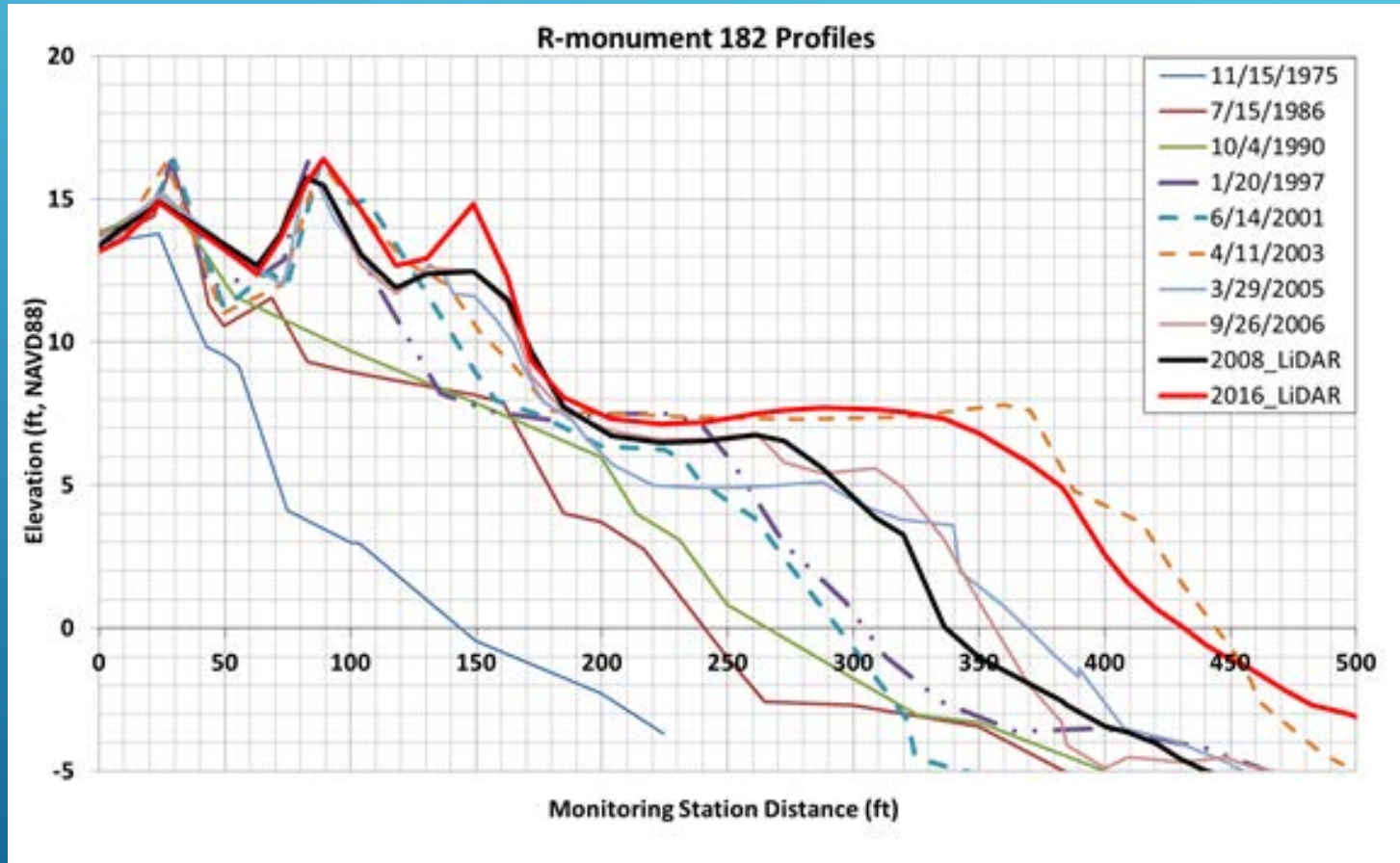
# NEW CONSIDERATIONS

## Post-Storm Data



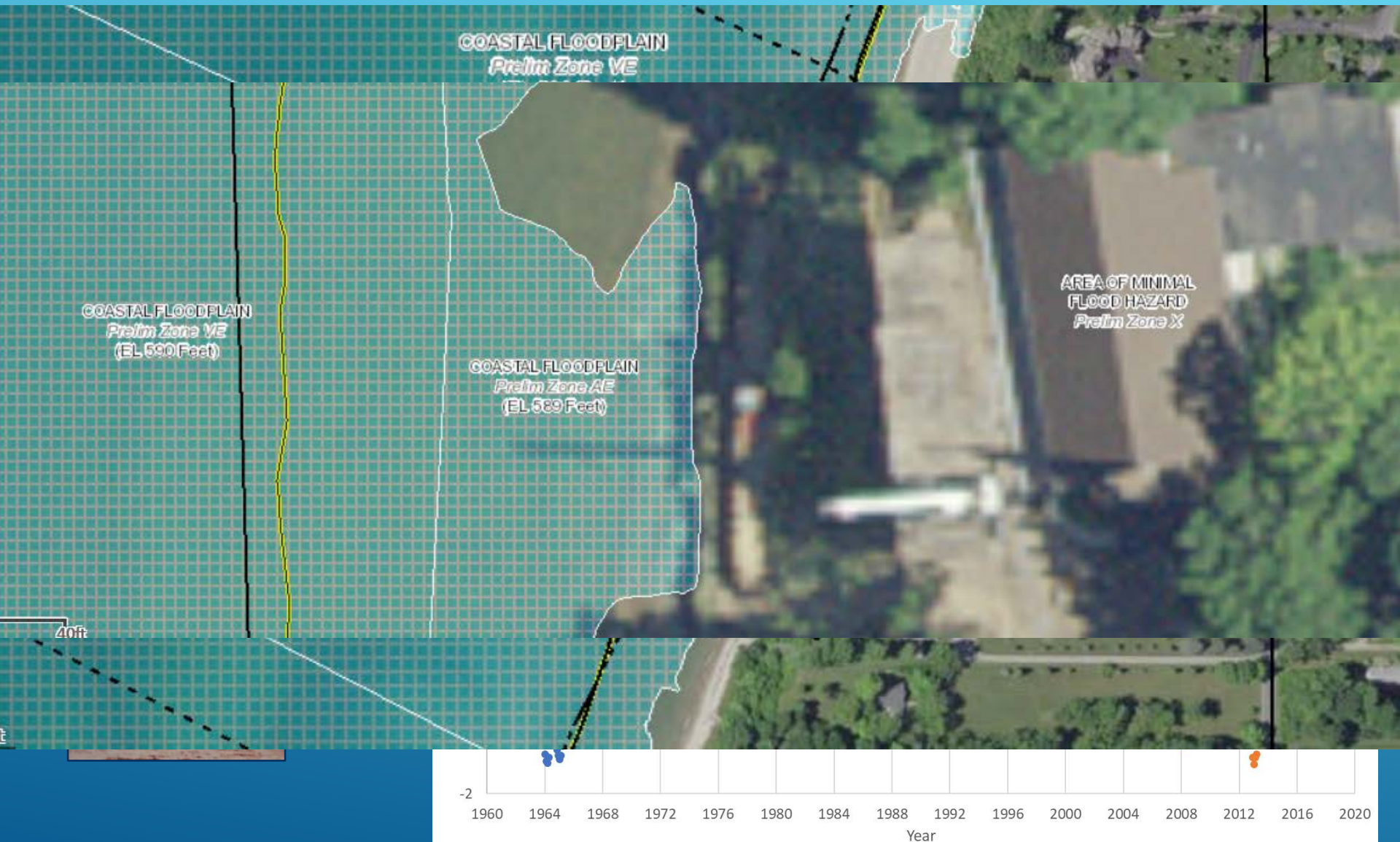
# NEW CONSIDERATIONS

## Beach monitoring programs



# NEW CONSIDERATIONS

## Great Lakes High Water Levels

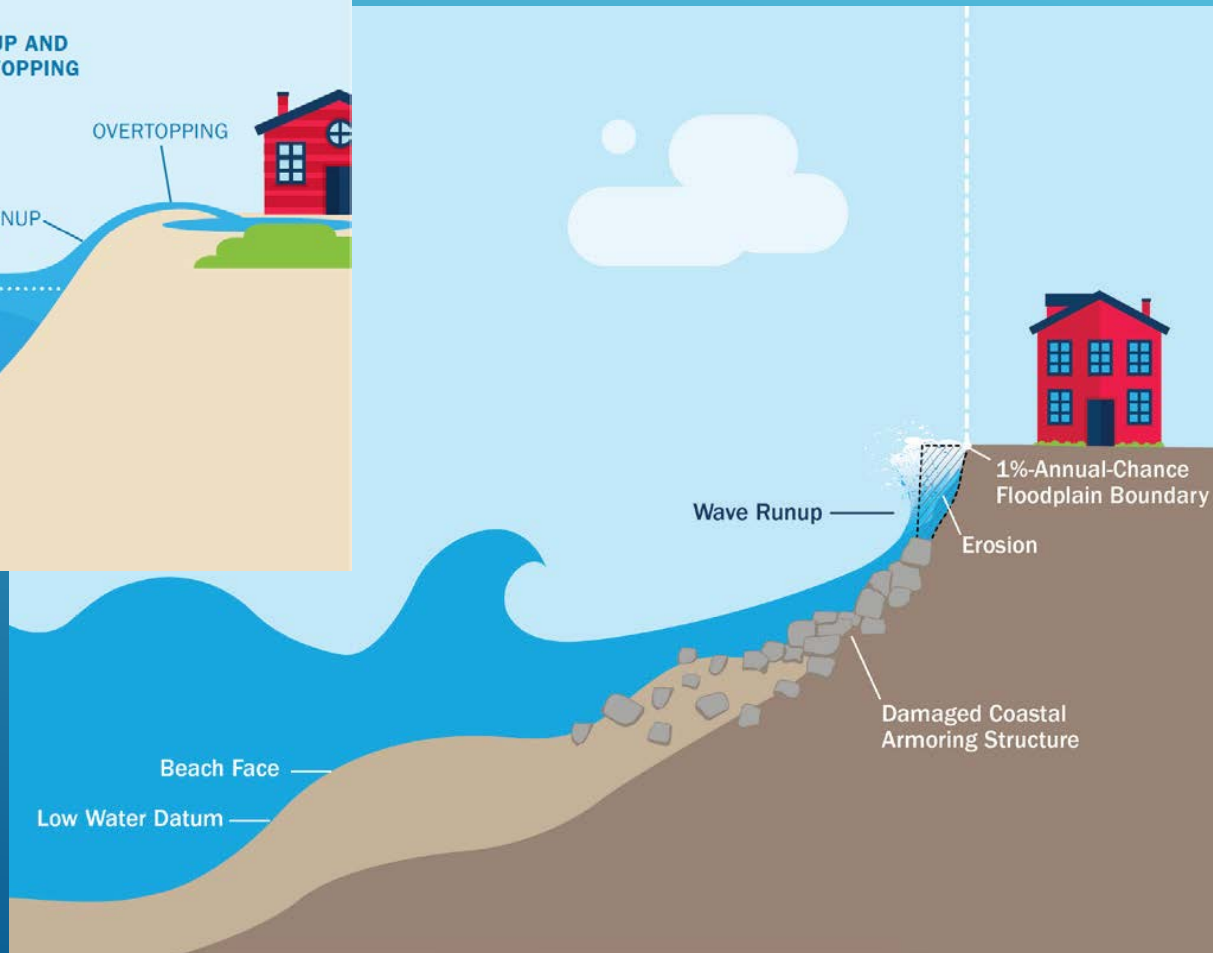
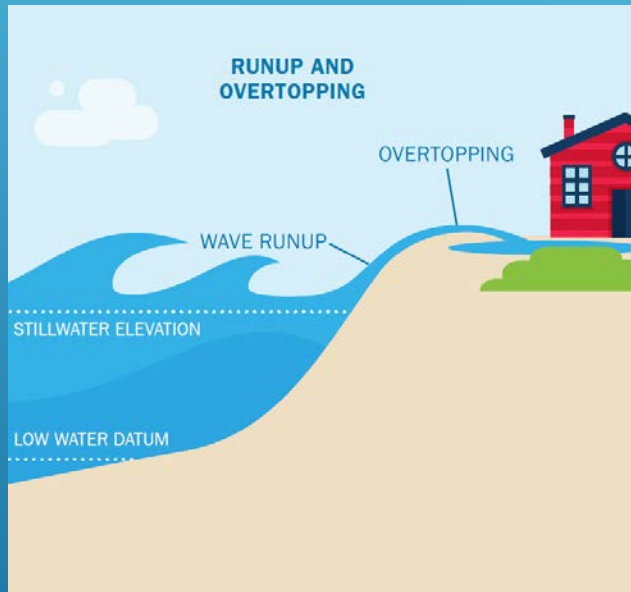




# NEW CONSIDERATIONS

## Great Lakes High Water Levels

- New analysis may be needed to assess changing risks for repaired or new buildings.



# IN CONCLUSION:

- ▶ *New flood maps are based on:*
  - ▶ *More technical data and methodology:*
    - ▶ *LOMRs should be conducted with 'as good, or better' methodologies*
    - ▶ *Impacts several aspects of the modeling and analysis*
  - ▶ *Updated guidance:*
    - ▶ *Old guidance may not necessarily be superseded, but LOMRs are expected to follow new guidance, regardless of the age of the effective study*

## *What does this mean?*

- ▶ *Some aspects of map revisions are getting easier and some are more technically complex*
- ▶ *Data acquisition could be more difficult*
- ▶ *Review times could increase*

# A FEW HELPFUL LINKS

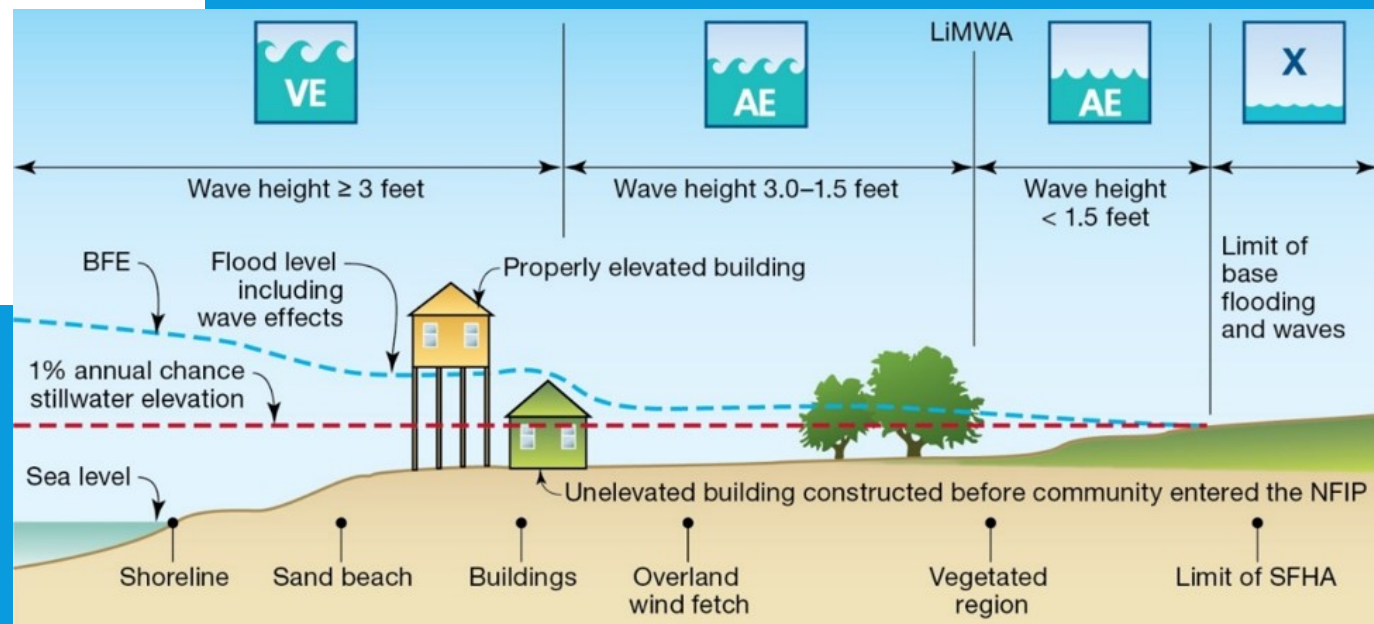
- ▶ FEMA MT-2 Application and Instructions: <https://www.fema.gov/mt-2-application-forms-and-instructions>
- ▶ FEMA Online LOMC Submission (and Training): <https://www.fema.gov/online-lomc-training>
- ▶ FEMA Coastal Floodplain Mapping Introduction: <https://fema.maps.arcgis.com/apps/MapSeries/index.html?appid=89d2e393f2c64d7cae07264f4d00c19d>
- ▶ Current FEMA Guidance Documents: <https://www.fema.gov/media-library/assets/documents/34953>
- ▶ FEMA Data Engineering Library: <https://hazards.fema.gov/wps/portal/frisel>
- ▶ USACE Shore Protection Manual: <https://usace.contentdm.oclc.org/digital/collection/p16021coll11/id/1932>
- ▶ Coastal Engineering Manual Collection: <https://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals/u43544q/636F617374616C20656E67696E656572696E67206D616E75616C/>



# QUESTIONS?



# Questions & Discussion



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# Closing Comments

- To suggest future CTP webinar topics, please contact Alan Lulloff at [alan@floods.org](mailto:alan@floods.org) or type a suggested topic into the Questions panel today.



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- A follow-up email with link to slides and recording will be sent **in about a week or so.**

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