



# CNMS for Coastal Risk Management, What communities need to know

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**compass**  
*Identify, Interpret, Integrate*

# Acknowledgements

- ▶ **FEMA HQ:**
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# What is CNMS?

- ▶ FEMA's CNMS is a collection of procedures for the identification and management of flood hazard mapping requirements.
- ▶ It is used to organize, store and analyze flood hazard mapping needs as well as document study reaches that meet FEMA's validity standards.
- ▶ A Geospatial Database that tracks:
  - New, Validated or Updated Engineering (NVUE)
  - Unverified study reaches (need of restudy)
  - Flood mapping requests
- ▶ CNMS also provides the framework for performing validation assessment.



# Coastal CNMS – What you need to know.

- ▶ Among the challenges associated with managing flood risk is that updates to Flood Insurance Rate Maps (FIRMs) will always be necessary due to:
  - Changes in the physical environment,
  - Climate patterns, and
  - Engineering methods.
- ▶ A significant evolution of CNMS starting in 2015 was the additional of a Coastal framework and a set of coastal study assessment checks.



# Coastal CNMS – What you need to know.

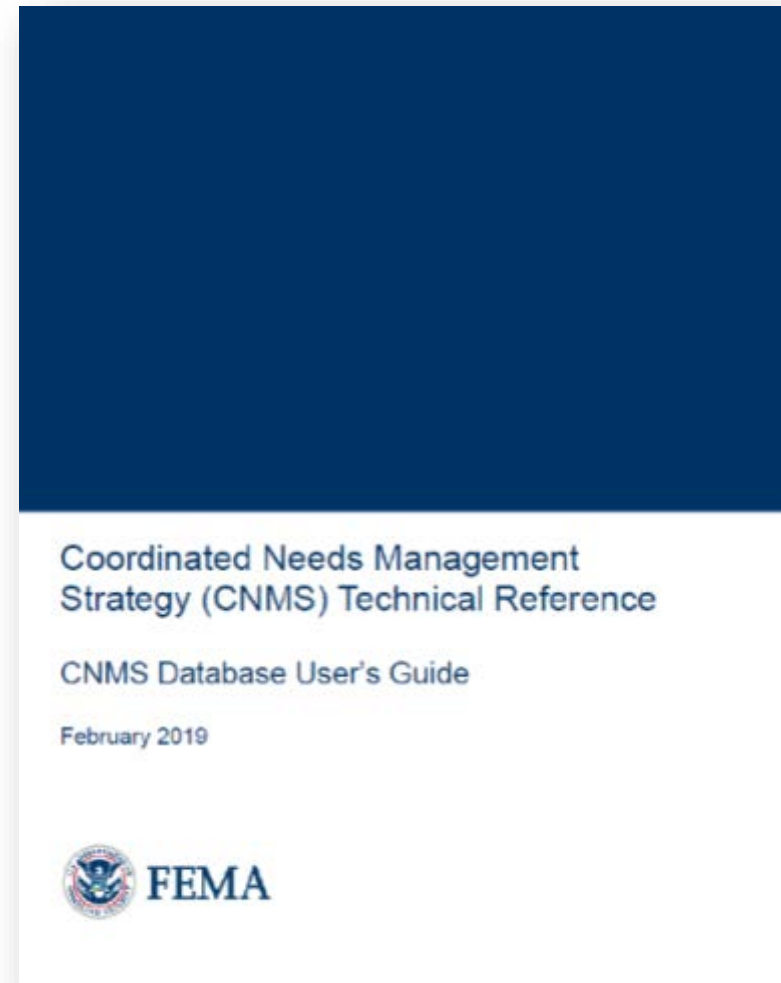
- ▶ It is hoped that Communities will learn how to identify the factors that can impact the identification of coastal risks and when new study data or significant coastal storm impacts might invalidate as effective study.
- ▶ FEMA has invested into new coastal studies for the nation during Risk MAP, hence it is critical to maintain that investment and assess each coastal study on a 5-year basis, and communicate restudy needs with stakeholders and constituents.



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# CNMS Technical Reference

- ▶ **CNMS Data Development**
  - Workflow and process, data input/output
- ▶ **CNMS Data Entry Process**
  - Feature class/attribute descriptions, study phase updates
- ▶ **Appendices**
  - Validation assessments, data dictionary, QC tool



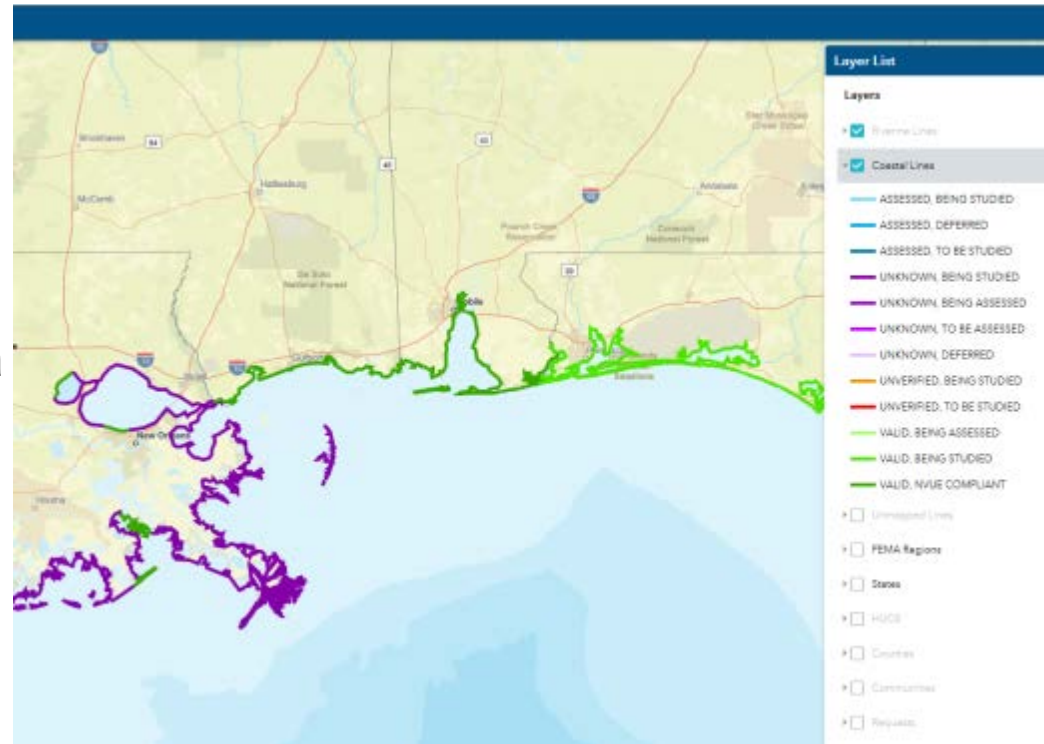
# Where is CNMS?

- ▶ 10 Regional CNMS Databases
  - ArcGIS File Geodatabases
- ▶ Maintained by each FEMA RSC
  - CNMS lead (PTS provider) within each RSC
  - Contact RTC for copy/info
- ▶ Quarterly Rollup to FEMA HQ
  - Due last day of every Fiscal Quarter
  - National rollup used for NVUE metric reporting and program planning
  - Refresh of [CNMS Online Viewer](#)
    - Community engagement tool;
    - CNMS requests capture



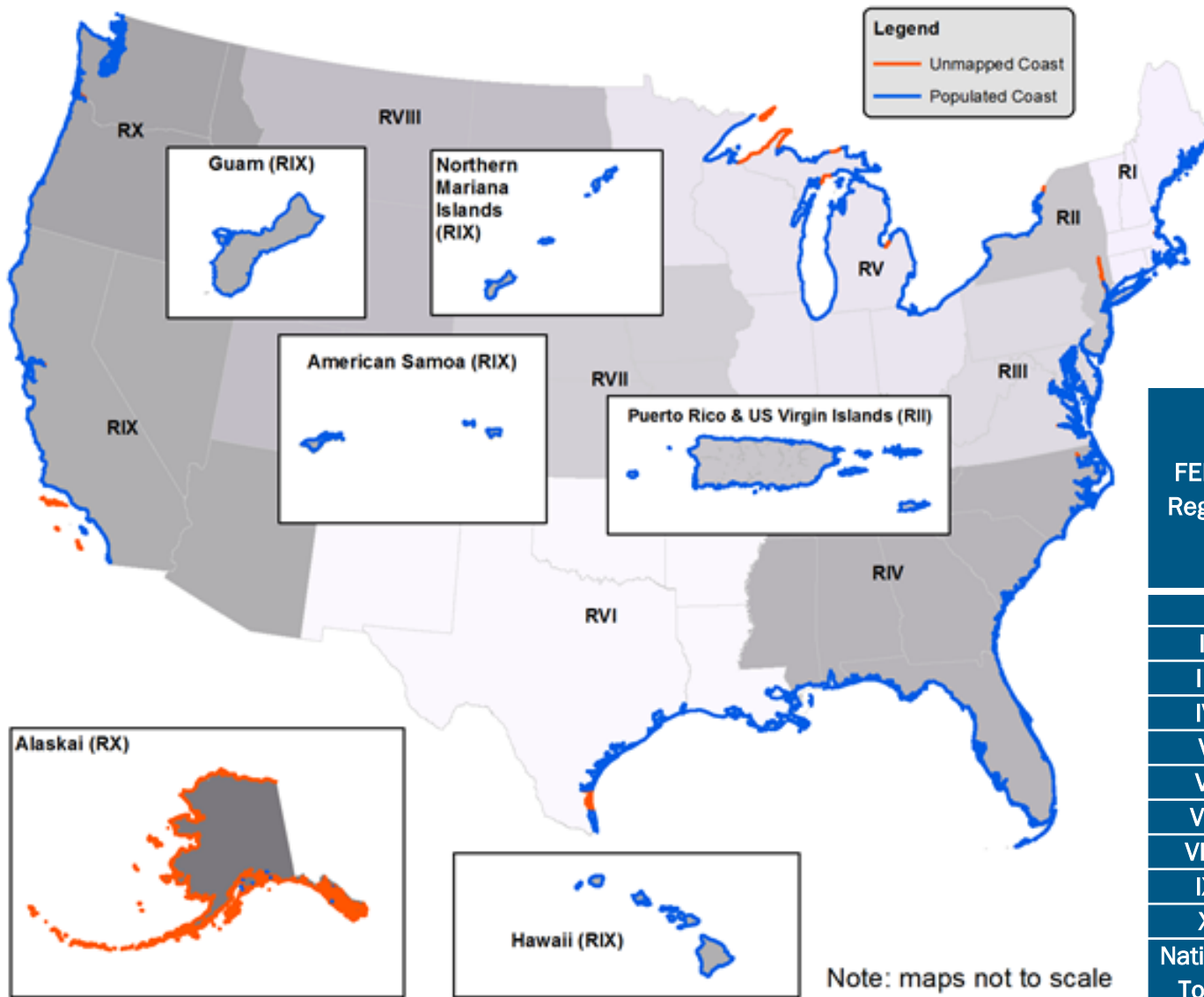
# Where is CNMS? – CNMS Viewer: New Application Tool

- ▶ On April 15, 2019, FEMA launched a new [CNMS Viewer](#) to replace the current CNMS application and functionalities (including the map, interactive tools, NVUE Reports, and creation of requests).
- ▶ The new CNMS Viewer will provide a single location to view Riverine and Coastal inventory of flood hazard studies and mapping needs.
- ▶ For assistance with the CNMS Viewer, please contact MIP Help at [miphelp@riskmapcds.com](mailto:miphelp@riskmapcds.com).





# Coastal CNMS Geometry



FEMA Region	Coastal CNMS Shoreline Miles	Coastal CNMS Shoreline Miles – Populated Coast
I	4,782	4,771
II	4,545	4,357
III	6,637	6,611
IV	11,127	11,127
V	4,689	4,150
VI	5,701	5,235
VII	-	-
VIII	34	34
IX	3,864	3,310
X	43,867	3,481
<b>National Total</b>	<b>85,229</b>	<b>43,076</b>

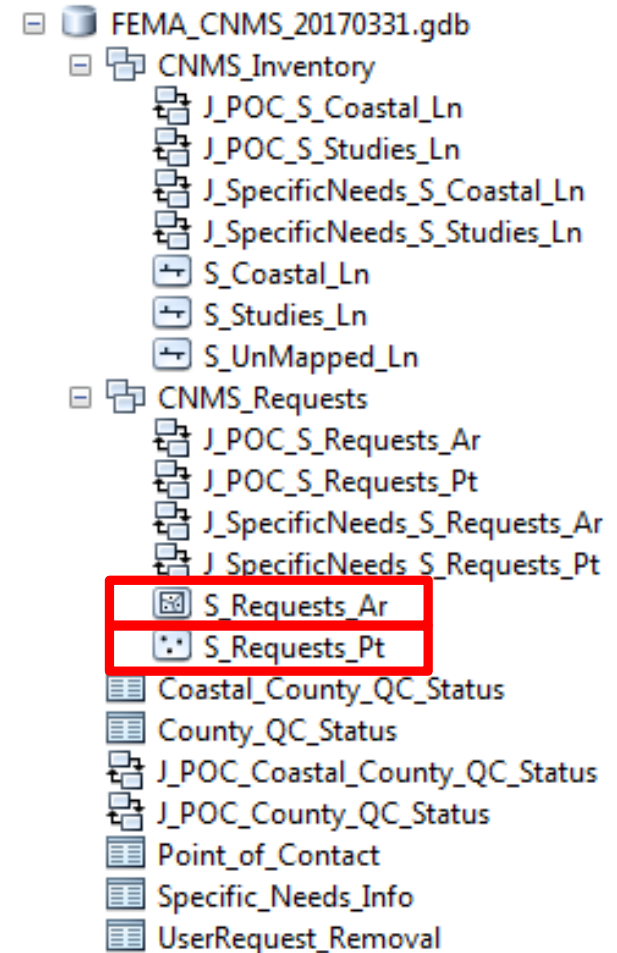
# Coastal CNMS Attributes

## Fields of S\_Coastal\_Ln

Background Data	FEMA Tracking	Effective Study	Assessment Checks	Being Studied	Assessment Check Info
<ul style="list-style-type: none"> <li>• Creach ID</li> <li>• MIP Case #</li> <li>• FIPS/CID/HUC</li> <li>• Study Name</li> <li>• Study Type</li> <li>• Miles</li> </ul>	<ul style="list-style-type: none"> <li>• Source of Line</li> <li>• Status Type</li> <li>• Tiers</li> <li>• Risk Products</li> <li>• FBS</li> <li>• Populated Coast</li> </ul>	<ul style="list-style-type: none"> <li>• Date of Modeling</li> <li>• Surge Model</li> <li>• Setup Meth.</li> <li>• Runup Model</li> <li>• Erosion Meth.</li> <li>• Overland Model</li> <li>• Wave Model</li> </ul>	<ul style="list-style-type: none"> <li>• Critical Checks</li> <li>• Secondary Checks</li> <li>• Check Totals</li> </ul>	<ul style="list-style-type: none"> <li>• MIP Case #</li> <li>• Study Type</li> <li>• Surge Model</li> <li>• Setup Meth.</li> <li>• Runup Model</li> <li>• Erosion Meth.</li> <li>• Overland Model</li> <li>• Wave Model</li> </ul>	<ul style="list-style-type: none"> <li>• Comments</li> <li>• Source</li> <li>• URL</li> </ul>

# Mapping Requests/Needs

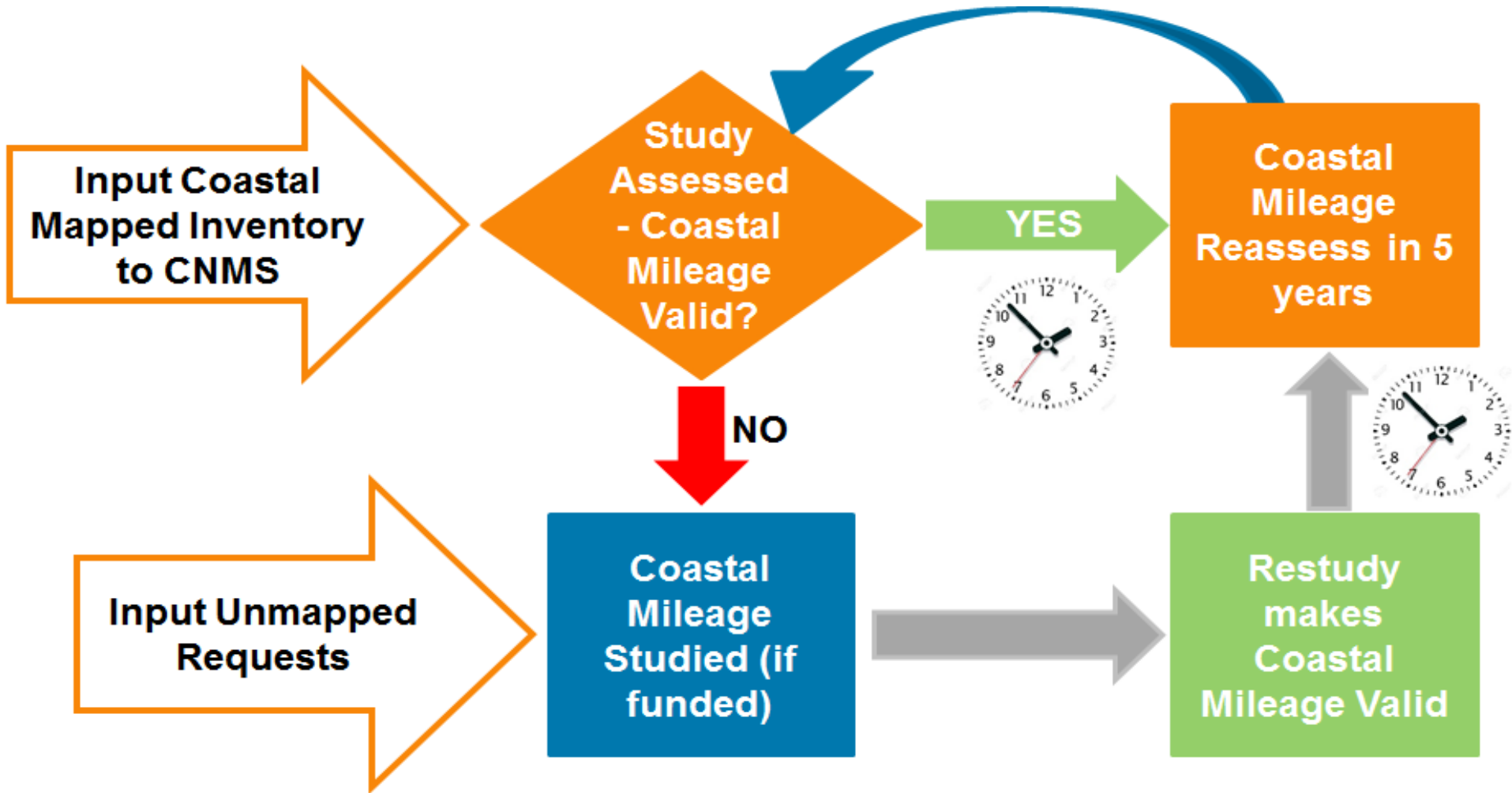
- ▶ CNMS is a repository for mapping requests/needs
- ▶ Coastal studies that fail a critical and/or three plus secondary checks will become a need for restudy
- ▶ Stakeholders can submit flood or cartographic requests
- ▶ Requests are analyzed for future mapping projects



## Coastal CNMS Development History



# Coastal Assessment Checks



# Coastal Study Assessment Checks

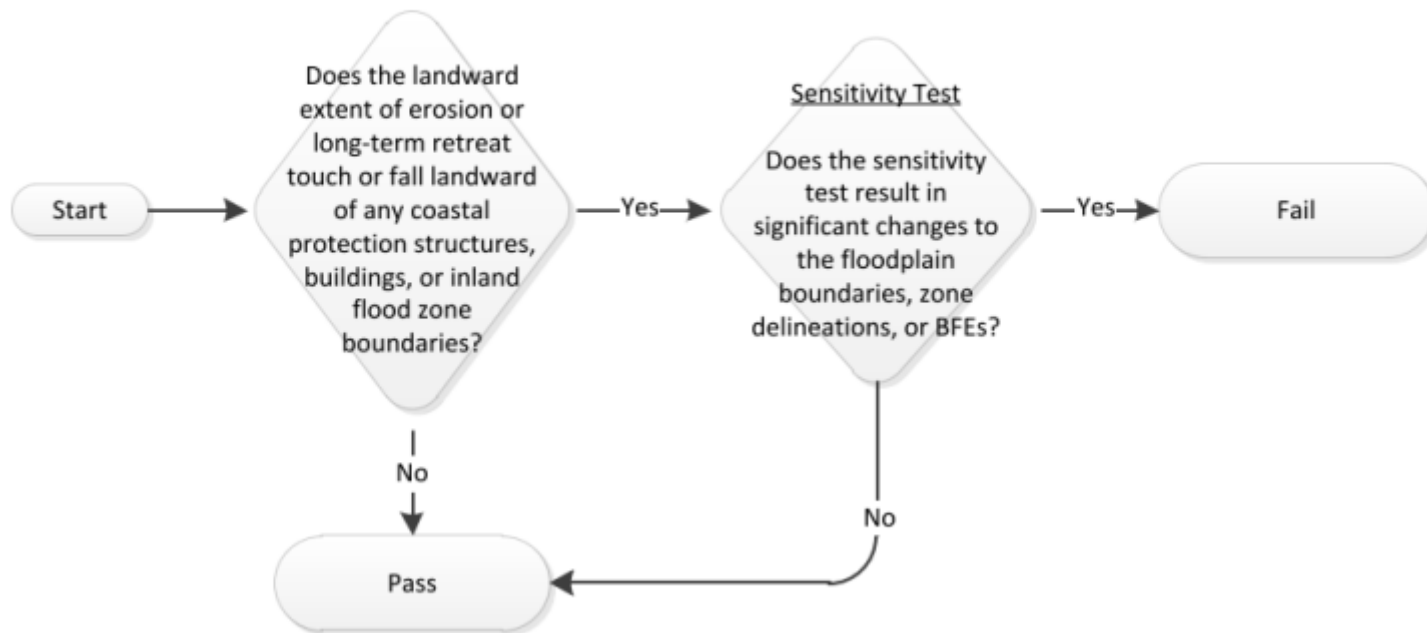
Critical Checks	Secondary Checks
C1 - Storm events SWL exceeds the 1% SWEL	S1 - Starting wave conditions no longer appropriate
C2 - Statistically significant storm intensity data	S2 - Bathy/topo meet FEMA Standards
C3 -Changes in ice coverage (Great Lakes Only)	S3 - Significant changes to land use or vegetation
C4 - Effective models inaccurate	S4 - Repetitive loss properties outside of coastal SFHA
C5 - Coastal/mapping modeling changes or improvements from effective study	S5 - Patterns of LOMRs indicated from coastal SFHA
C6 - Shoreline erosion	S6 - High water marks collected since effective study
C7 -Existing coastal structures adequate in providing flood protection	

**1 Critical or 3 Secondary Fails  
= Unverified Study**



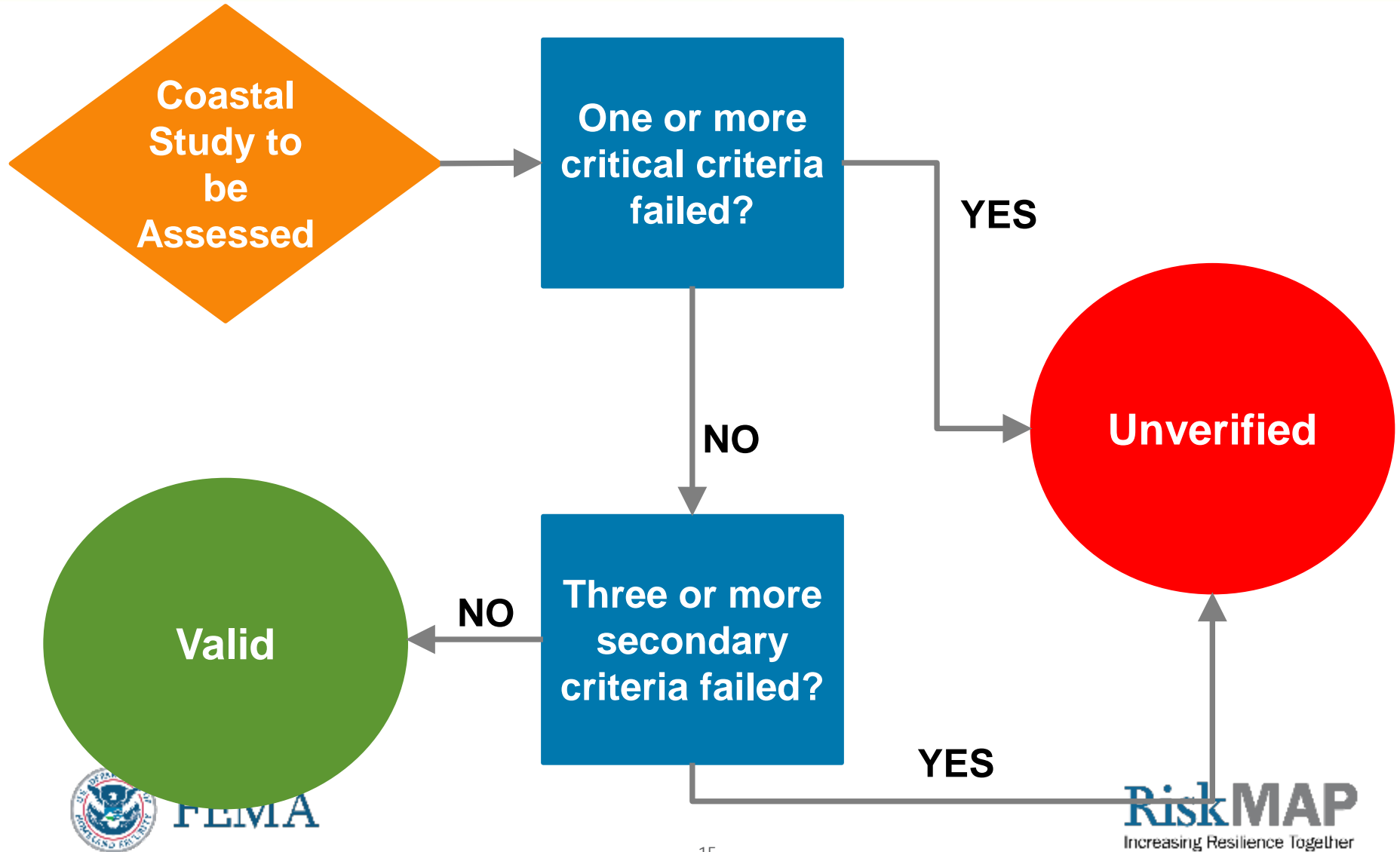
# Example of Coastal Check

## Evaluation Process for Coastal Erosion and Long-Term Retreat



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# Coastal Assessment Checks





# Study Validity Over Time

- ▶ Studies are ideally reviewed for validity starting 5 years after the modeling was conducted.
- ▶ Study validity could change in less than 5 years if major events in the area occur.
- ▶ The older a study is, the more likely it is to be unverified.
- ▶ The older a study is, the higher the possibility of sensitivity tests being necessary to validate some criteria.
- ▶ Study validity is primarily affected by 3 types of factors:
  - *Event sensitive factors*
  - *Time sensitive factors*
  - *Programmatic/Method sensitive factors*

# Study Validity Over Time

- ▶ Some Study aspects are ***event sensitive*** (i.e. are affected directly by new meteorological occurrences)
  - Tide Gage Data
  - Storm Occurrences
  - Ice Coverage
  - Tsunami Occurrences
- ▶ These aspects of a study may remain valid through time if no new events have occurred.
- ▶ Lack of occurrence (i.e. storm strikes) over time may bring down the results of statistical analyses, but the study remains valid.
- ▶ These factors are not necessarily influenced by time, but the likelihood of occurrence is assumed to increase as the study ages.

# Study Validity Over Time

- ▶ Some study aspects are *time sensitive*.
  - Shoreline/Land use change
  - Topo/Bathy data
  - Structural condition
  - Repetitive loss/LOMR data
- ▶ Though there are no direct time constraints on how long a study is valid, changes in ground conditions occur that may affect the study
- ▶ Newer technologies make better data available that may indicate an issue that was previously not considered.
- ▶ Structure deterioration and shoreline conditions will likely cause impacts to the study area.
- ▶ More data for RepLoss/LOMRs would be accumulated over time, which could lead to a potential change in status.

# Study Validity Over Time

- ▶ Some study aspects are ***programmatic/method sensitive***.
  - Model acceptance/validity
  - Model/Mapping Guidance changes
- ▶ Any major changes to the modeling or mapping procedures or guidance could impact the study status.
- ▶ Over time, flaws are discovered in models or they are determined to not produce high enough accuracy results for program needs.
- ▶ These factors do not necessarily increase in risk over time, although as programs age, guidelines and methods may evolve as well.

# 5-Year Plan

Regional Studies and Calendar Year due				
CY 2017	CY 2018	CY 2019	CY 2020	CY 2021
FIMP Surge Study	CT Tidal Gage	Cape Tidal Gage	Boston Surge	Central ME Tidal Gage
MS Surge Study	Nantucket Tidal Gage	Essex Tidal Gage	NH Tidal Gage	Dukes Tidal Gage
USACE AS Surge Study	HI Surge Study	RI Tidal Gage	Region 3 Surge Study	Plymouth Tidal Gage
USACE GU Surge Study	PR Surge Study	Region 3 Surge Study		NYC_NJ_Surge Study
USACE NMI Surge Study		NWFLWMD FWJ Surge Study		Lake Erie Surge Study
USVI Surge Study		LA USACE Surge Study		GA-NEFL Surge Study-FL
				NC Surge Study
				TX USACE Surge Study
R2, R4, R9	R1, R2, R9	R1, R3, R4, R6	R1, R3	R1, R2, R3, R4, R6

## 2022 and Beyond

NE ME Tidal Gage	Lake Ontario Surge Study	ECCFL Surge Study	Washington Studies
SW ME Tidal Gage	Lake Erie Surge Study	SFL Surge Study	Oregon Studies
SC Surge Study	Lake Michigan Surge Study	SWFL Surge Study	California Studies
GA-NEFL Surge Study - GA	Lake Huron Surge Study	WFL Surge Study	NWFLWMD PanHandle Surge Study
Lake Superior Surge Study	Lake St. Clair Surge Study	Big Bend Surge Study	



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# Questions?

## PTS Providers - Coastal CNMS Contacts

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