

**PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS**

WORKSHOP SUMMARY

Meeting Date: September 22, 2020

Department: Administration

I. EXECUTIVE BRIEF

Title: Review and Evaluation of FEMA's Coastal Flood Risk Study


Summary: In December 2019, the Federal Emergency Management Agency (FEMA) published preliminary Flood Insurance Rate Maps (FIRMs) and associated Flood Insurance Study (FIS) reports for eastern Palm Beach County. In January 2020, Palm Beach County issued a task order to an engineering consultant to review and evaluate the data and methods used by FEMA for the preparation of the preliminary FIRMs. Specific objectives of the consultant's scope of work included reviewing FEMA's data and documents for accuracy and appropriateness, summarizing key information and methods used to prepare the preliminary FIRMs, evaluating the application of methodologies used by FEMA, identifying technical issues or concerns, providing recommendations on future coordination with FEMA, including submitting comments on the preliminary FIRMs and FIS reports, and assisting the County in determining whether to proceed with a formal appeal. Staff will provide an overview of the results of the engineering consultant's review and evaluation of FEMA's Coastal Flood Risk Study and discuss potential forward paths. Districts 1, 2, 3, 4, 5 and 7 (MJ)

Background and Policy Issues:

The National Flood Insurance Program (NFIP) is a voluntary Federal program intended to reduce future flood damage through community floodplain management ordinances and provide protection for property owners by enabling the purchase of flood insurance. FIS reports and FIRMs provide information on the existence and severity of flood hazards that are used to establish flood insurance premiums. FEMA is responsible for administering the NFIP and as such periodically updates information on flood hazards. FEMA's most recent coastal storm surge analysis for south Florida used data and tools from the 1970s. So in 2013, FEMA initiated the Coastal Flood Risk Study Project for the South Florida Study Area (Coastal Study), which includes Palm Beach, Broward, Miami-Dade and Monroe Counties. The Coastal Study was intended to better define flood risk by utilizing updated ground elevation data, new climatological data, improved computing resources, updated coastal hazard methodologies and modeling, and improvements in technologies that improve coastal mapping accuracy.

Attachments:

1. Memorandum on the County's Review and Evaluation of FEMA's Coastal Flood Risk Study dated September 15, 2020

Recommended by:  9-2-20
County Water Resources Manager **Date**

Approved By:  9/2/20
County Administration **Date**

II. FISCAL IMPACT ANALYSIS

A. Five Year Summary of Fiscal Impact:

Fiscal Years	2020	2021	2022	2023	2024
Capital Expenditures					
Operating Costs					
External Revenues					
Program Income(County)					
In-Kind Match(County)					
NET FISCAL IMPACT					
#ADDITIONAL FTE POSITIONS (CUMULATIVE)					

Is Item Included in Current Budget? Yes X No
 Does this item include the use of federal funds? Yes No X

Budget Account No:
 Fund 3904 Dept 601 Unit 2010 Object 3401

B. Recommended Sources of Funds/Summary of Fiscal Impact:

C. Departmental Fiscal Review:

III. REVIEW COMMENTS:

A. OFMB Fiscal and/or Contract Dev. and Control Comments:

<p><u>Debra Hawes</u> 9/3/2020 OFMB (2) 9/3</p>	<p><u>Jim S. Jacobson</u> 9/4/2020 Contract Dev. & Control 9-3-20 TW</p>
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B. Legal Sufficiency

Debra Caldwell 9-8-2020
 Assistant County Attorney

C. Other Department Review

 Department Director

(THIS SUMMARY IS NOT TO BE USED AS A BASIS FOR PAYMENT.)



**INTEROFFICE COMMUNICATION
PALM BEACH COUNTY**

County Administration

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**Palm Beach County
Board of County
Commissioners**

Dave Kerner, Mayor

Robert S. Weinroth, Vice Mayor

Hal R. Valeche

Gregg K. Weiss

Mary Lou Berger

Melissa McKinlay

Mack Bernard

County Administrator

Verdenia C. Baker

TO: Mayor Dave Kerner and Members of the Board of County Commissioners

THRU: Patrick Rutter, Assistant County Administrator

FROM: Jeremy McBryan, County Water Resources Manager

DATE: September 15, 2020

RE: REVIEW AND EVALUATION OF FEMA'S COASTAL FLOOD RISK STUDY

The National Flood Insurance Program (NFIP) is a voluntary federal program intended to reduce future flood damage through community floodplain management activities and provide protection for property owners by enabling the purchase of federally-backed flood insurance. The Federal Emergency Management Agency (FEMA) is responsible for administering the NFIP. Flood Insurance Study (FIS) reports and Flood Insurance Rate Maps (FIRMs), prepared by FEMA, provide flood hazard information that is used in conjunction with property characteristics to establish flood insurance premium rates.

In December 2019, FEMA published preliminary FIRMs and associated FIS reports for eastern Palm Beach County (County). In January 2020, the County initiated an effort to review and evaluate the accuracy and appropriateness of the data and methods used by FEMA for the preparation of the preliminary FIRMs. On September 22, 2020, staff will provide an overview of the effort, present information on FEMA's process to finalize the FIRMs and request direction from the Board of County Commissioners on future County activities.

Key findings from the County's review and evaluation of FEMA's data and methods and other relevant information are summarized below:

- Differences between the County's ground surface elevation data (from 2016-2017) and the elevation data used by FEMA (from 2001 to 2007) were observed. While 74 percent of the area within the preliminary 2019 FIRM panels was within ± 0.5 feet of the County's elevation data, County elevations were ≥ 0.5 feet above FEMA elevations for 18 percent of the area and County elevations were ≥ 0.5 feet below FEMA elevations for 8 percent of the area.

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- There was a net increase of 1,900 acres of land added to the Special Flood Hazard Area (SFHA). Properties with mortgages that are within the SFHA are required to have flood insurance.
- FEMA defines base flood elevations (BFEs) within the SFHA. BFEs are elevations to which the surface water is anticipated to rise to or exceed during the base flood (aka the 1 percent annual chance flood or 100-year flood) and can have significant impacts on building requirements. While BFEs decreased in some areas of the County, many areas have higher BFEs as compared to the 2017 FIRMs.
- FEMA's modeled 1 percent annual chance stillwater elevations (SWELs) are used by FEMA to define BFEs within the SFHA. While BFEs increased and decreased as compared to the 2017 FIRMs, FEMA's SWELs may not have sufficiently represented storm surge due to issues identified with FEMA's model validation and setup.
- The design elevation is the elevation that all new and substantially improved buildings must be elevated to in order to lower the risk of flood damage. Design elevations are typically higher than the BFE.
- Higher BFEs can result in non-conforming structures that may prevent property owners from making improvements to their existing structures. Non-conforming structures also face significant increases in flood insurance premium rates.
- The hurricanes selected by FEMA to validate the storm surge model [Betsy (1965), David (1979), Andrew (1992), Georges (1998), and Wilma (2005)] may not have been appropriate given the magnitude of the storm surge generated, the regional extent of the storm surge, the locations of water level measurements and the limited measured data.
- Agreement between measured water levels and water levels simulated for the five validation storms was less than favorable and suggests the processes associated with storm surge may not be sufficiently represented by FEMA's model.
- The cumulative contributions of FEMA accepting increased model uncertainty during model validation and including west coast (exiting) storms were estimated to have increased FEMA's SWELs by approximately 1.3 feet.
- The wind and pressure field model grid resolution was insufficiently coarse for the northern 32 miles of the County which limited the FEMA model's ability to accurately simulate storm surge.
- There were several locations in the County where FEMA's model was insufficient to accurately model hydrodynamic and coastal flooding processes.

As final deliverables are completed, they are posted for stakeholder review and download to the County's Flood Information webpage located at:
<https://discover.pbcgov.org/pzb/building/Pages/Flood-Information.aspx>

REVIEW AND EVALUATION OF FEMA'S COASTAL FLOOD RISK STUDY

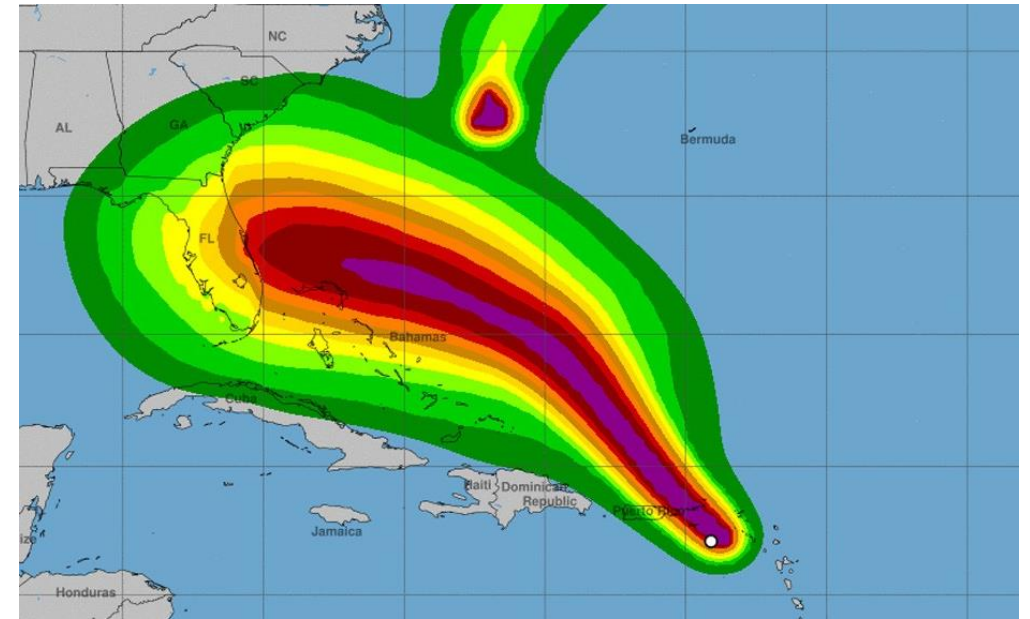


BCC Workshop
September 22, 2020

Baird.
Innovation Engineered.

AGENDA

- Background and History
- FEMA's Coastal Study
- Review and Evaluation Tasks
- Key Findings
- Process and Appeals
- Activities of Other Affected Counties
- Completed and Future Coordination
- Direction Requested / Discussion



BACKGROUND AND HISTORY

The National Flood Insurance Program (NFIP) is a voluntary Federal program intended to:

- Reduce future flood damage through community floodplain management ordinances, and
- Provide protection for property owners by enabling the purchase of flood insurance

The Federal Emergency Management Agency (FEMA) is responsible for administering the NFIP

Flood Insurance Study (FIS) reports and Flood Insurance Rate Maps (FIRMs), prepared by FEMA, provide flood hazard information that is used to establish flood insurance premiums

FEMA periodically updates information on flood hazards

BACKGROUND AND HISTORY (CONT'D)

The most recent coastal storm surge analysis for south Florida used data and tools from the 1970s

In 2013, FEMA initiated the Coastal Flood Risk Study Project for the South Florida Study Area (Coastal Study), which includes Palm Beach, Broward, Miami-Dade and Monroe Counties

In December 2019, FEMA published preliminary FIRMs and FIS reports for coastal Palm Beach County

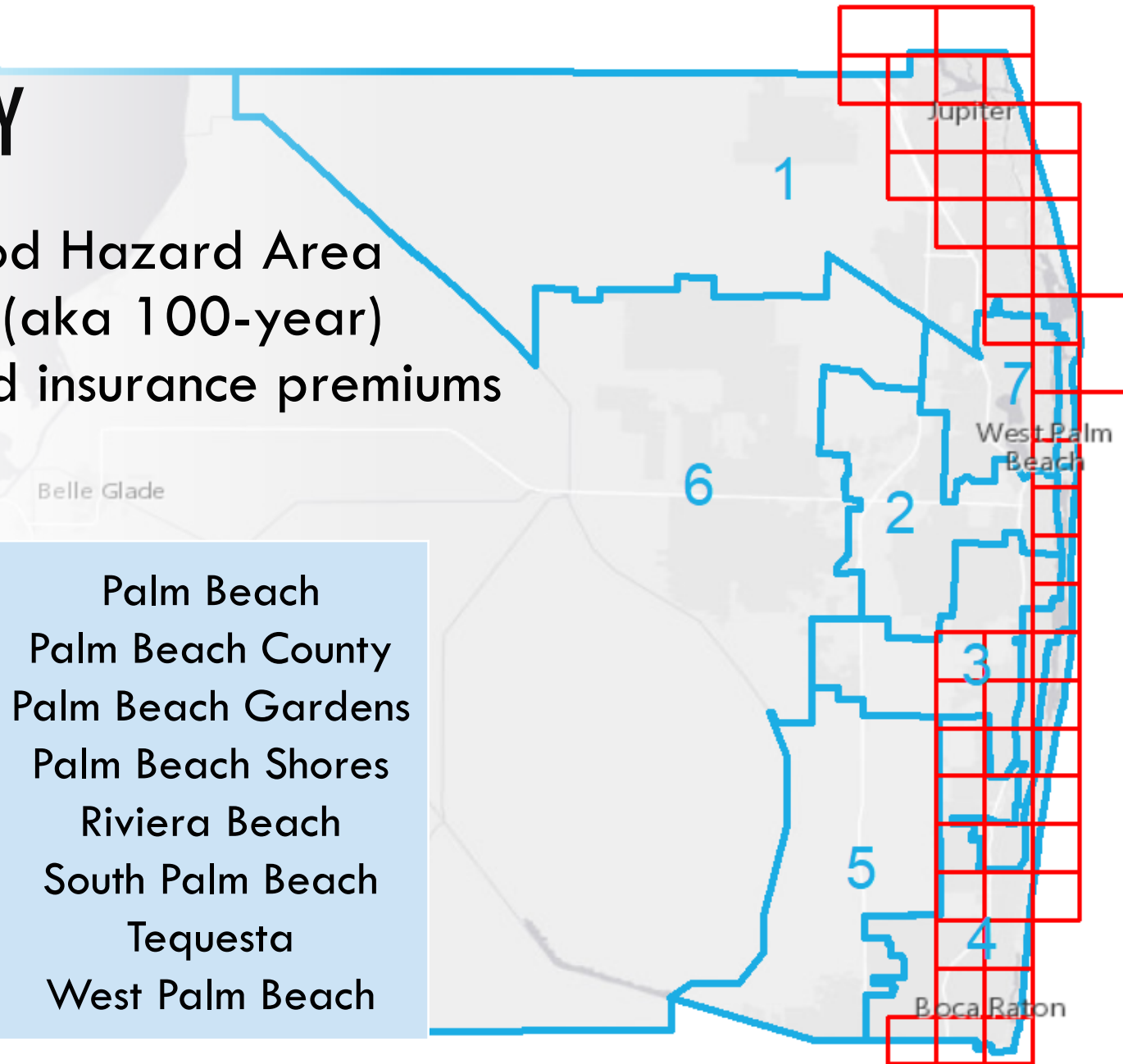
In January 2020, the County issued a task order to an engineering consultant to review and evaluate the data and methods used by FEMA

FEMA'S COASTAL STUDY

FEMA is updating the Special Flood Hazard Area (SFHA) for the 1% annual chance (aka 100-year) event – which is the basis for flood insurance premiums

Municipalities Affected:

Boca Raton	Jupiter	Palm Beach
Boynton Beach	Jupiter Inlet Colony	Palm Beach County
Briny Breezes	Lake Park	Palm Beach Gardens
Delray Beach	Lake Worth Beach	Palm Beach Shores
Gulfstream	Lantana	Riviera Beach
Highland Beach	Manalapan	South Palm Beach
Hypoluxo	North Palm Beach	Tequesta
Juno Beach	Ocean Ridge	West Palm Beach





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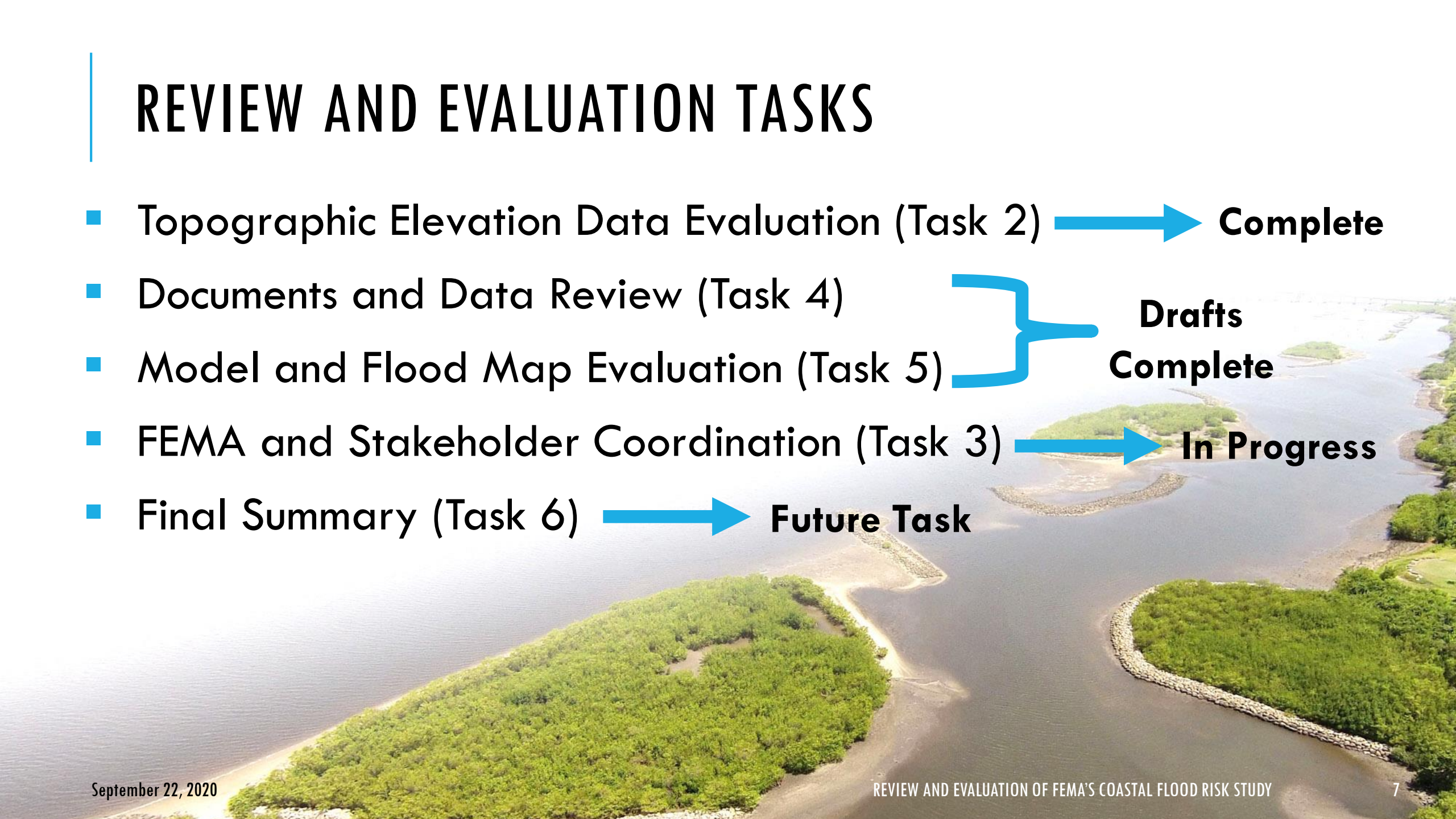
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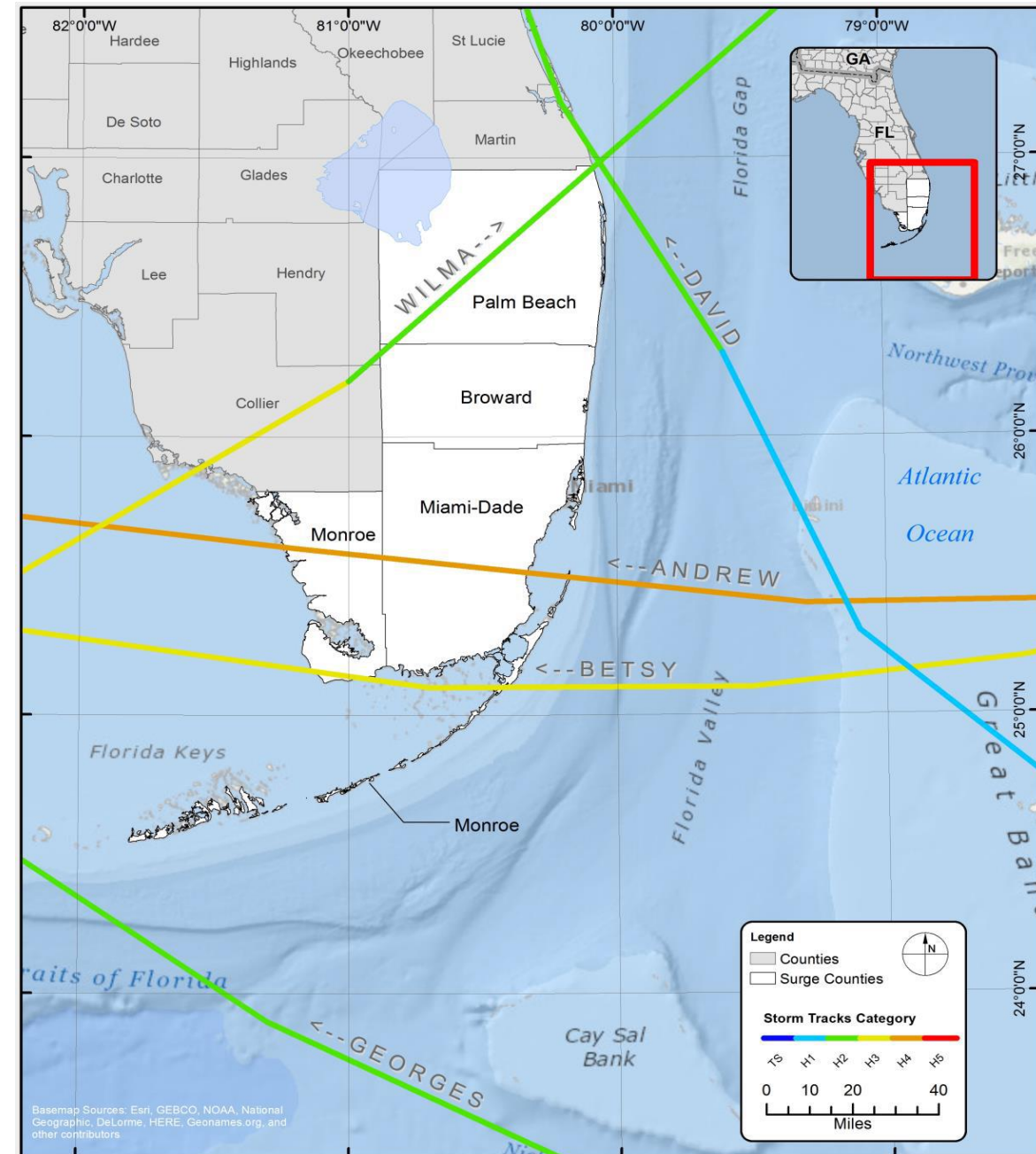
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REVIEW AND EVALUATION TASKS

- Topographic Elevation Data Evaluation (Task 2) → **Complete**
 - Documents and Data Review (Task 4)
 - Model and Flood Map Evaluation (Task 5)
 - FEMA and Stakeholder Coordination (Task 3) → **In Progress**
 - Final Summary (Task 6) → **Future Task**
- Drafts Complete**
- 

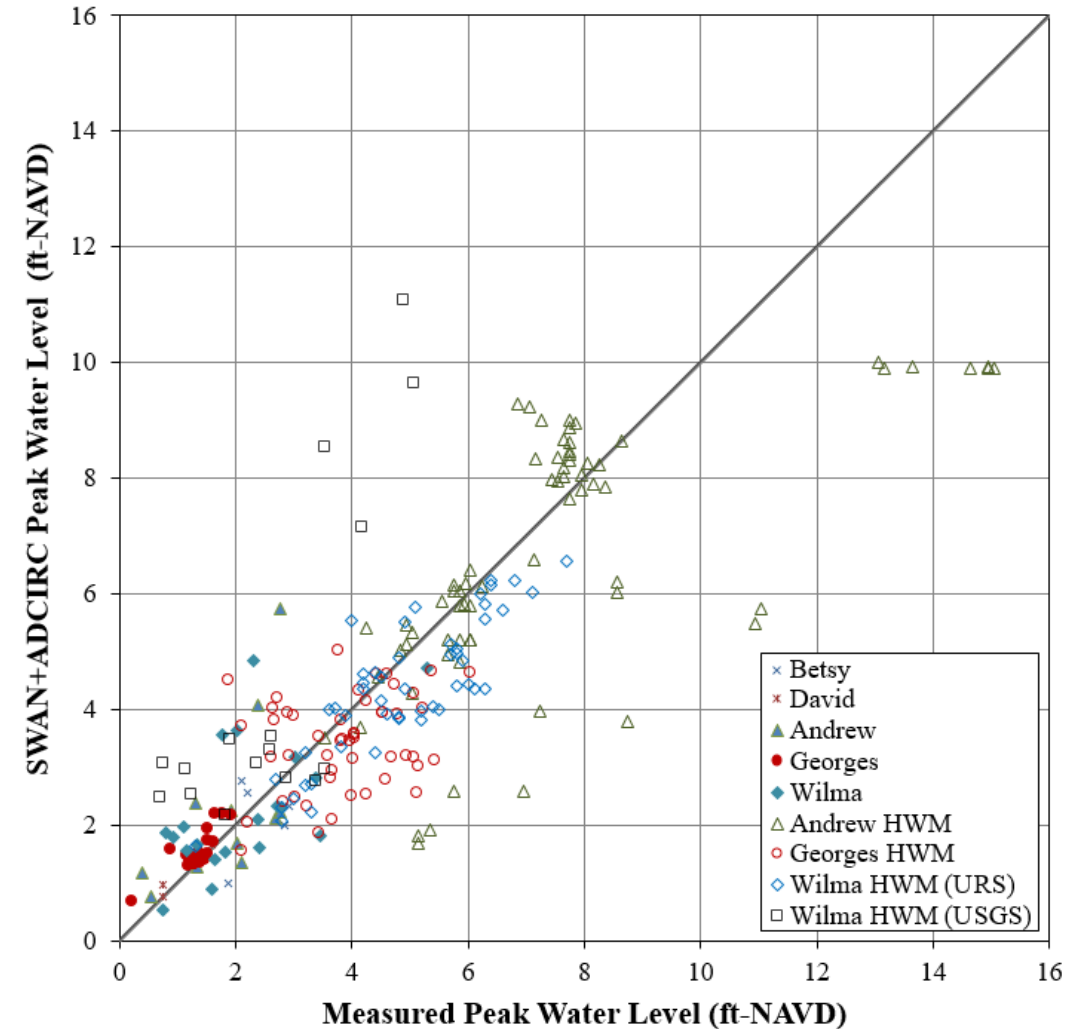
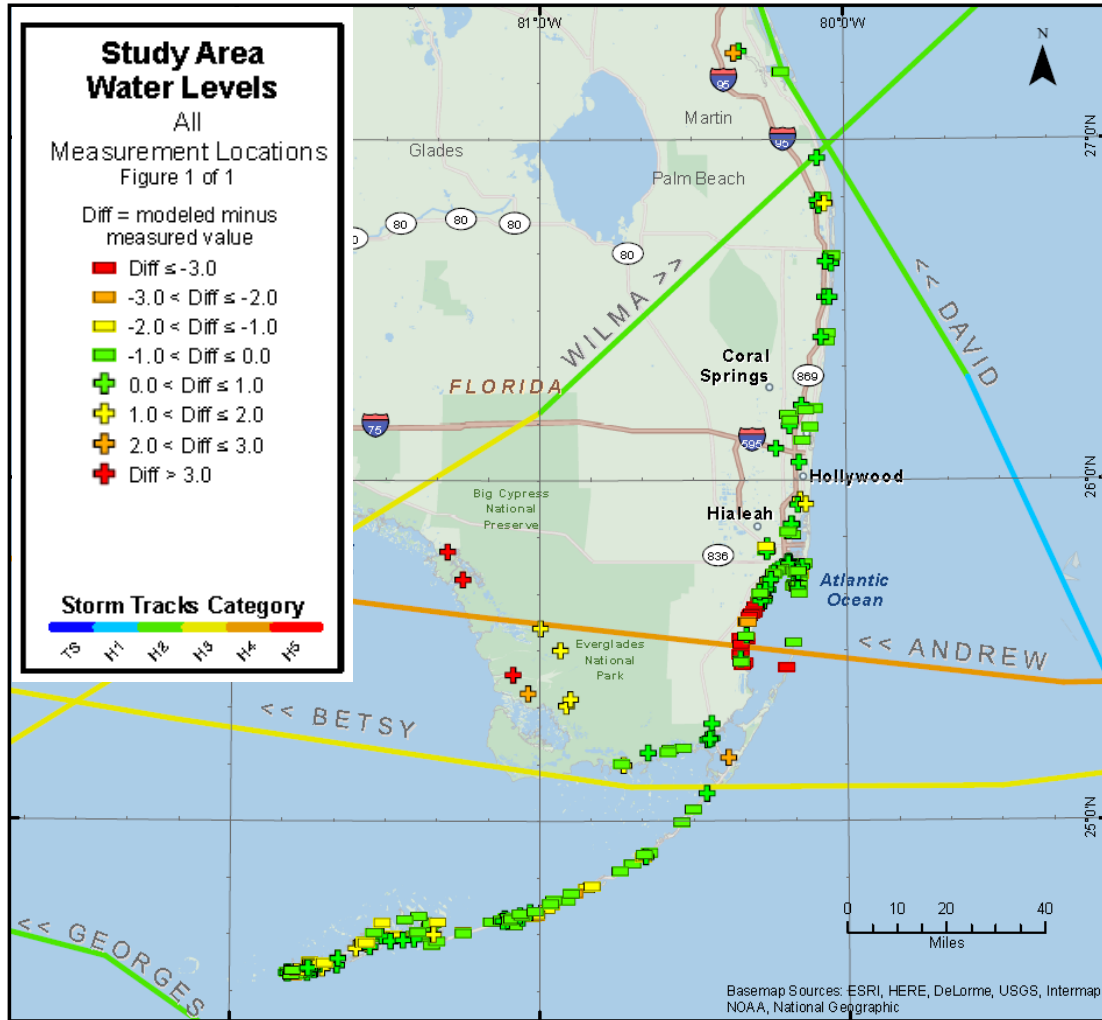
KEY FINDINGS

- FEMA's validation storms are not representative for Palm Beach County
- Hurricane Betsy (1965)
- Hurricane David (1979)
- Hurricane Andrew (1992)
- Hurricane Georges (1998)
- Hurricane Wilma (2005)



KEY FINDINGS (CONT'D)

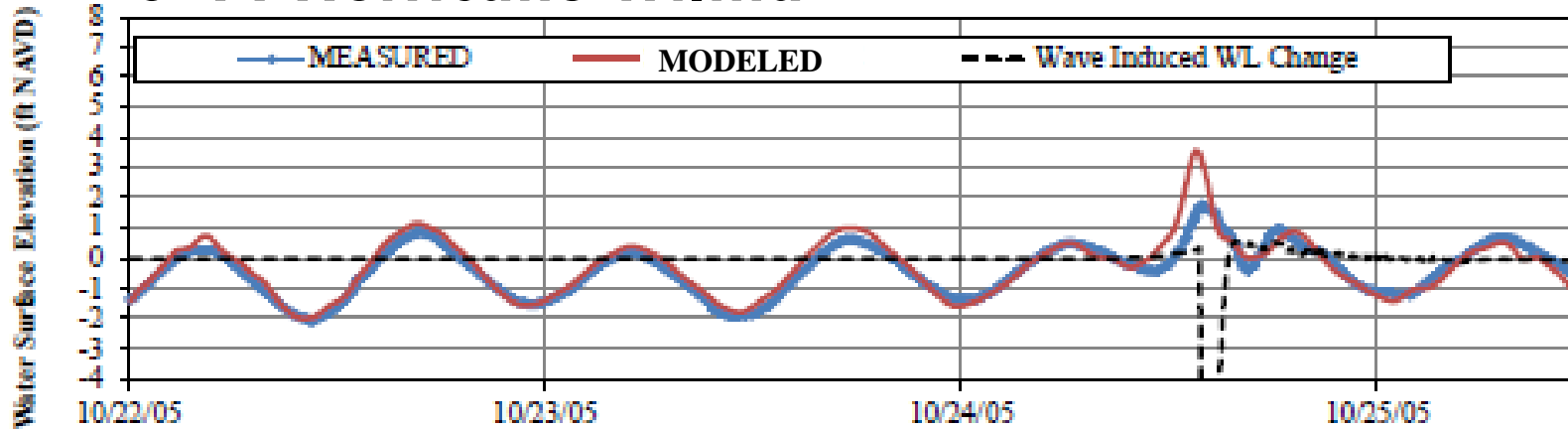
- FEMA's model setup had limited accuracy in simulating storm surge



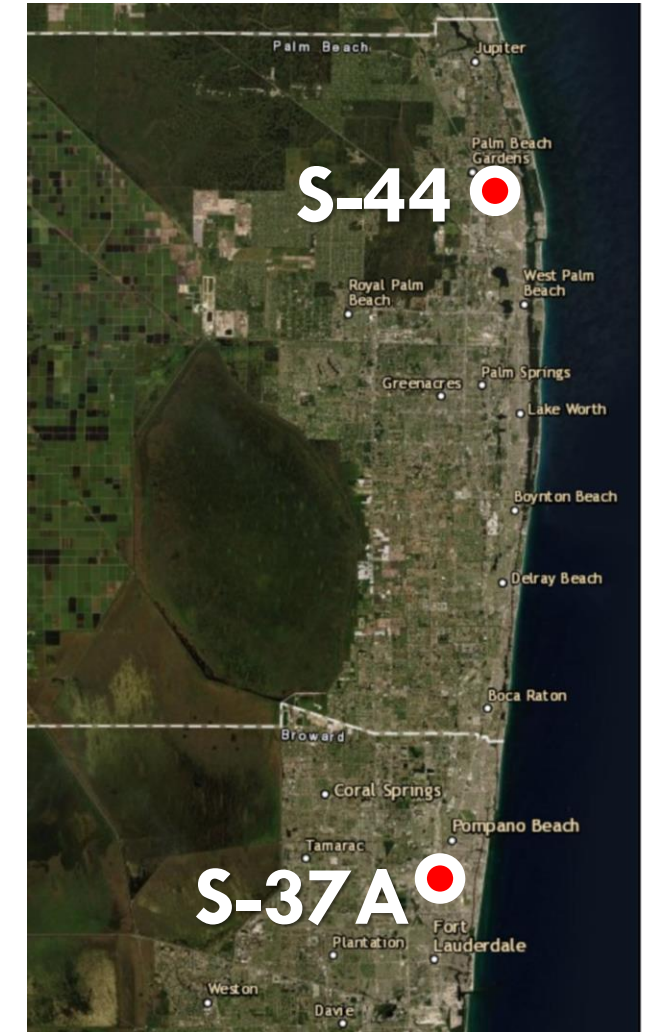
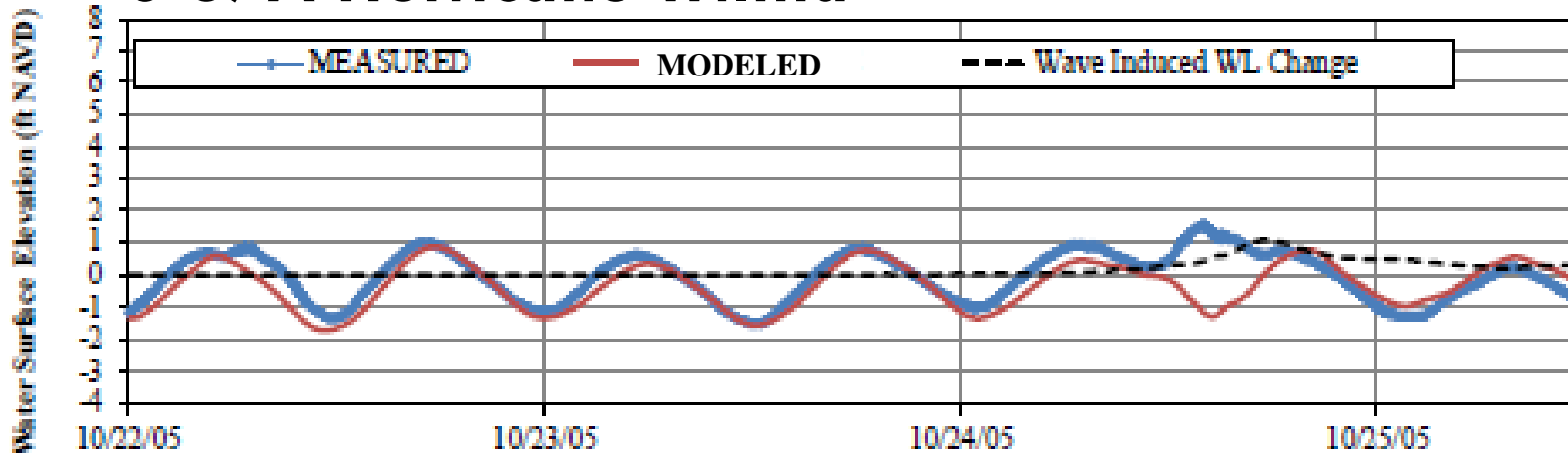
KEY FINDINGS (CONT'D)

- FEMA's model setup had limited accuracy in simulating storm surge (cont'd)

S-44 Hurricane Wilma

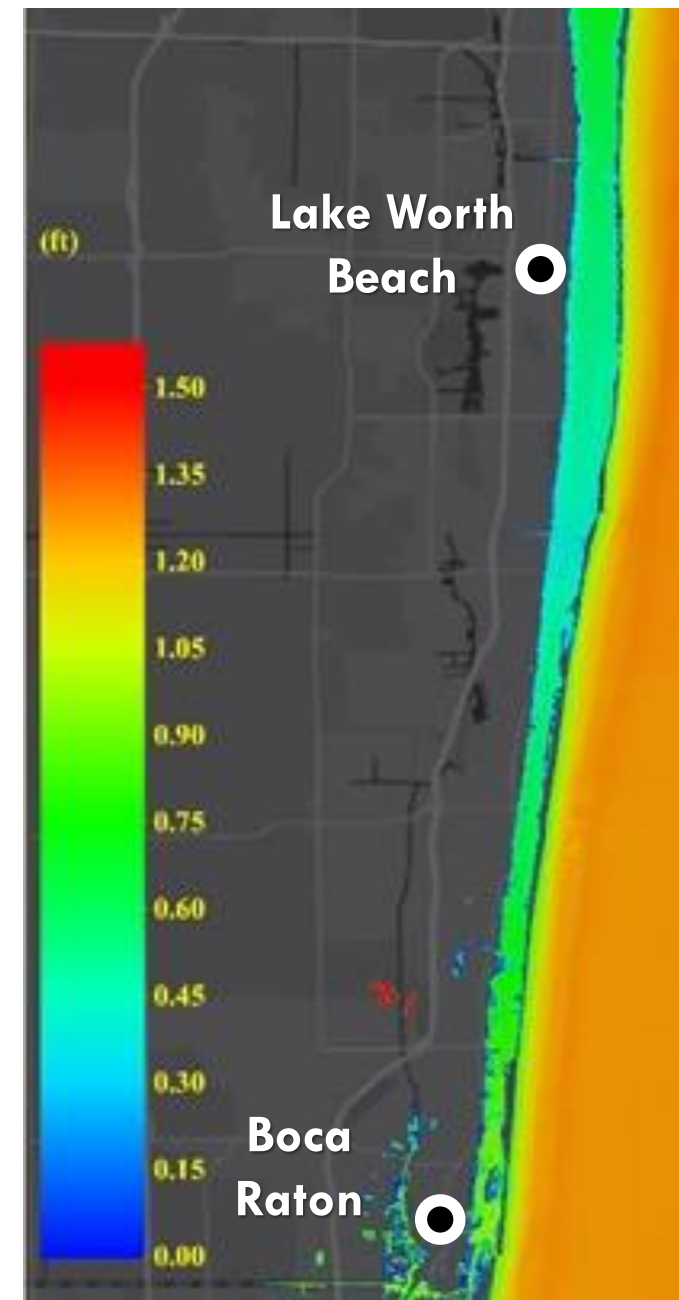
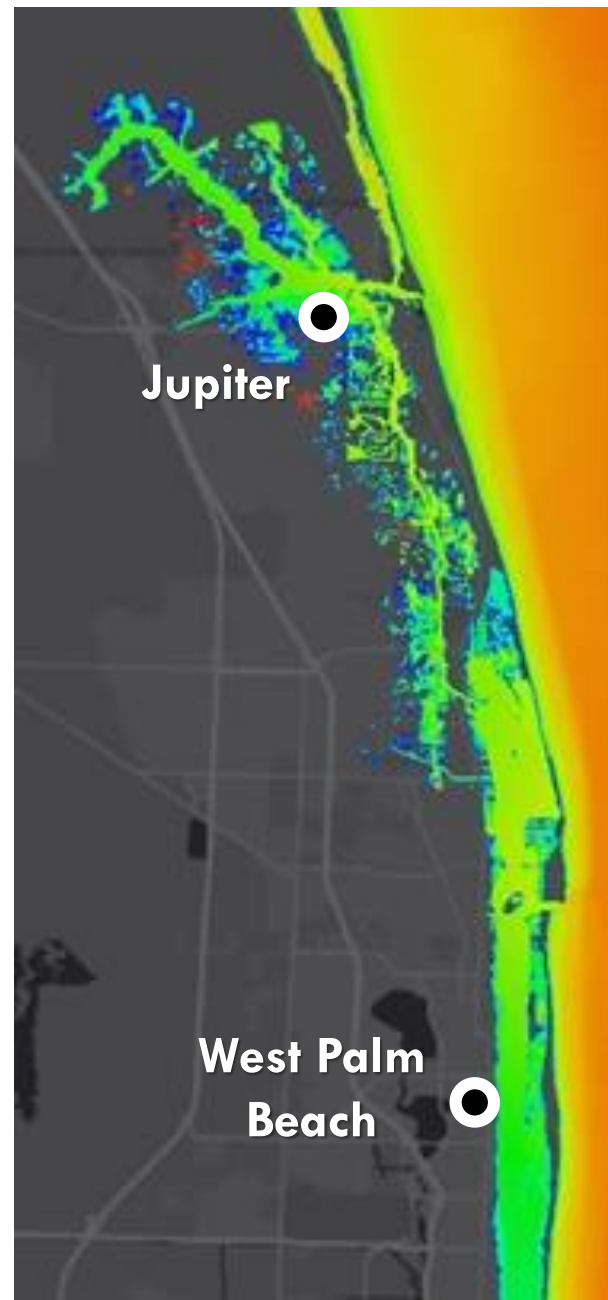


S-37A Hurricane Wilma



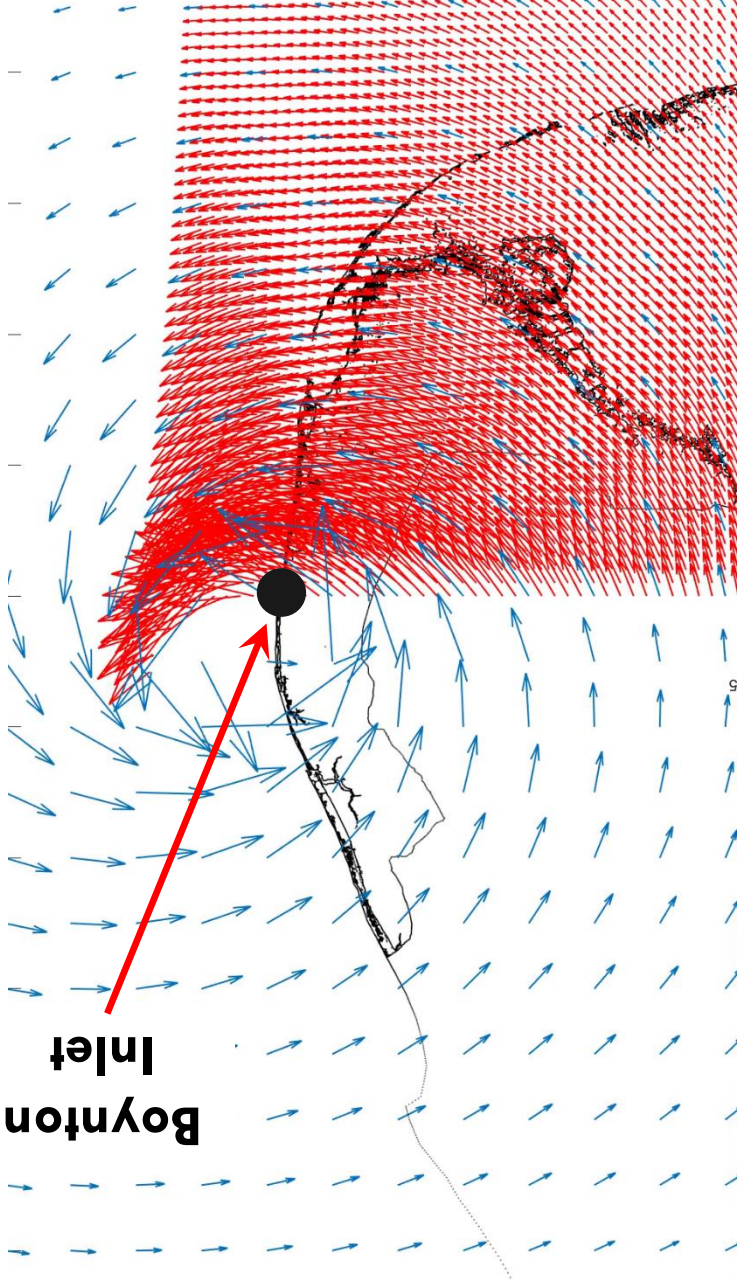
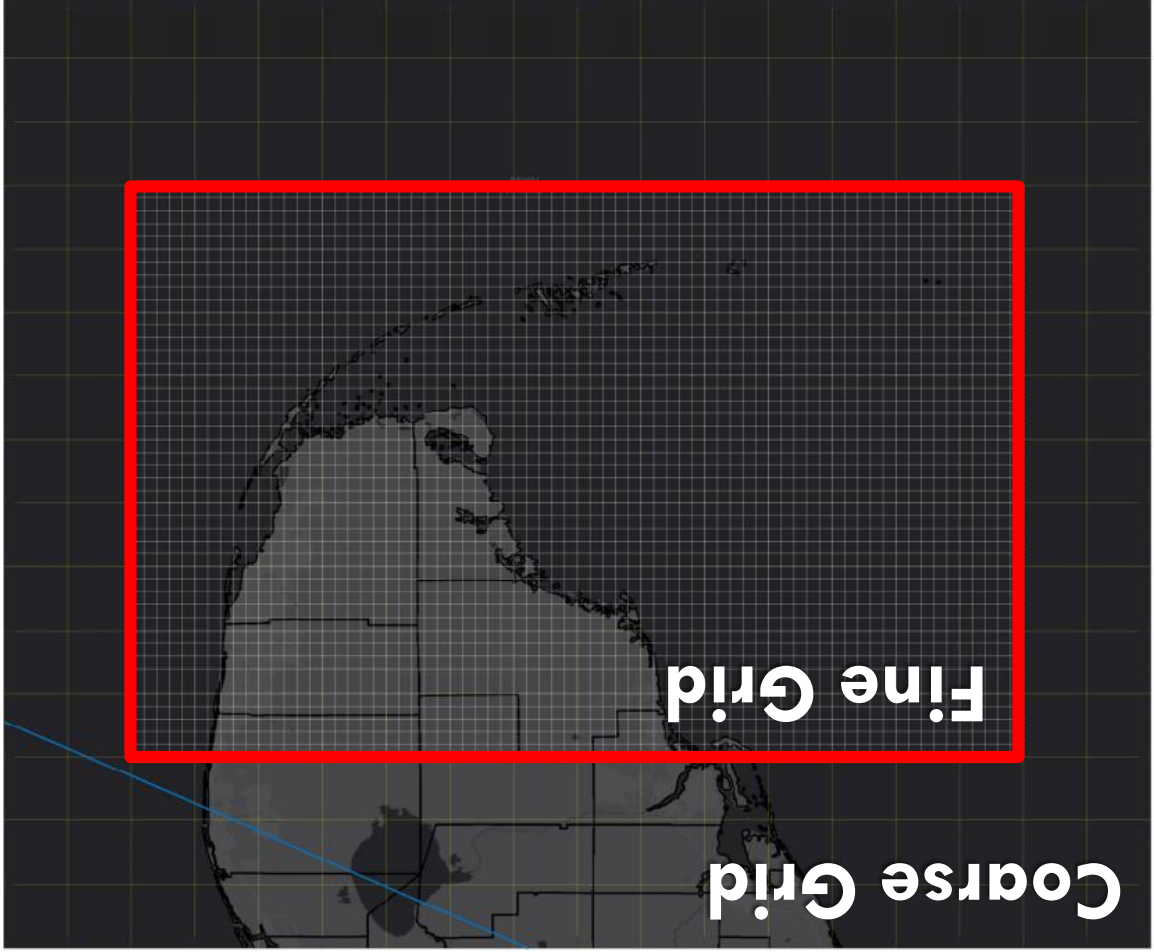
KEY FINDINGS (CONT'D)

- FEMA's 1% annual chance stillwater elevations (SWEL) offshore of Palm Beach County appear high due to combined effects of model validation and inclusion of west coast storms



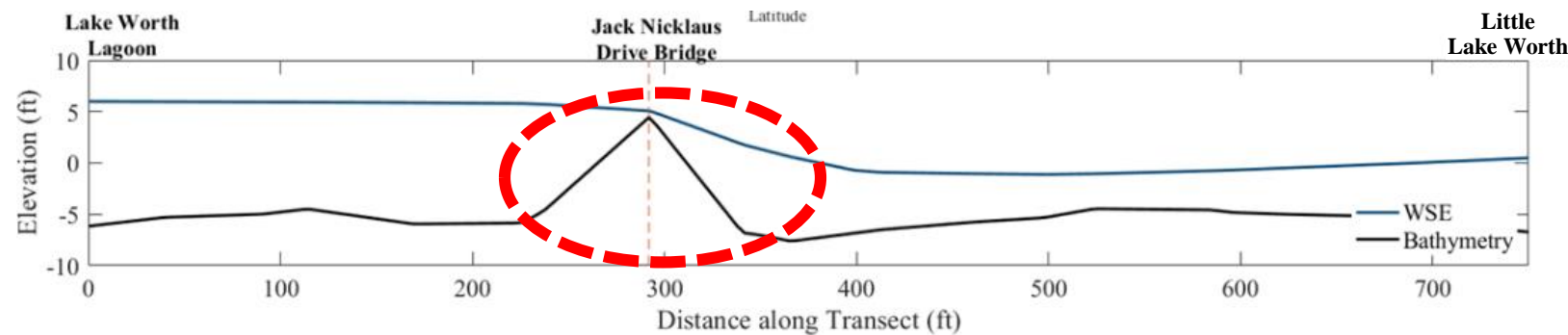
KEY FINDINGS (CONT'D)

- FEMA's results appear to have been impacted by model grids



KEY FINDINGS (CONT'D)

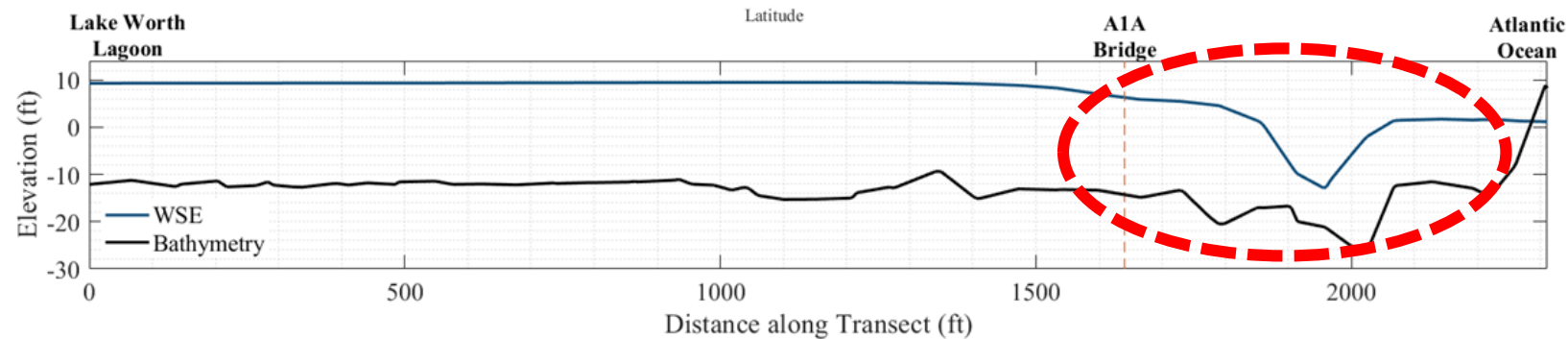
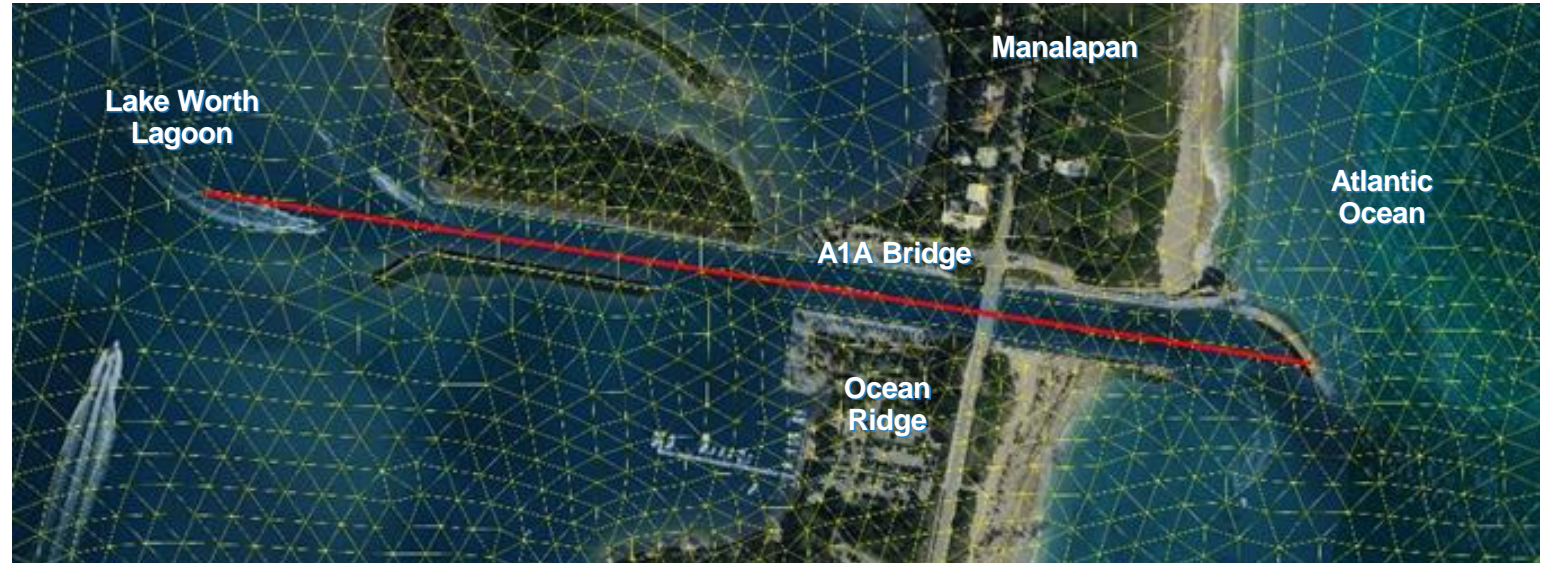
- FEMA's model indicated a channel bottom elevation of +4 feet NAVD88 at **Jack Nicklaus Drive (A1a) Bridge**, which would render the 75+ foot wide channel unnavigable to boat traffic



WSE = Water Surface Elevation
Bathymetry = elevation of underwater terrain

KEY FINDINGS (CONT'D)

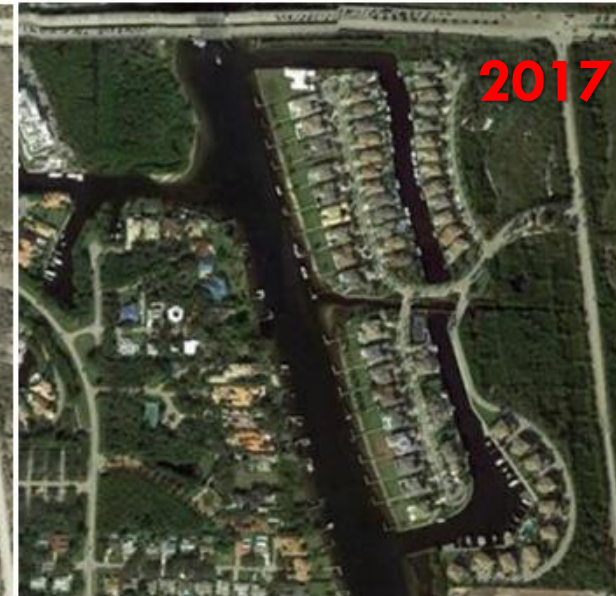
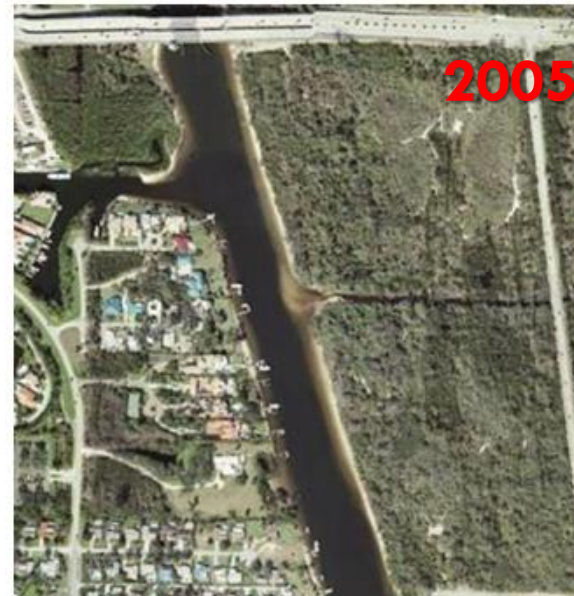
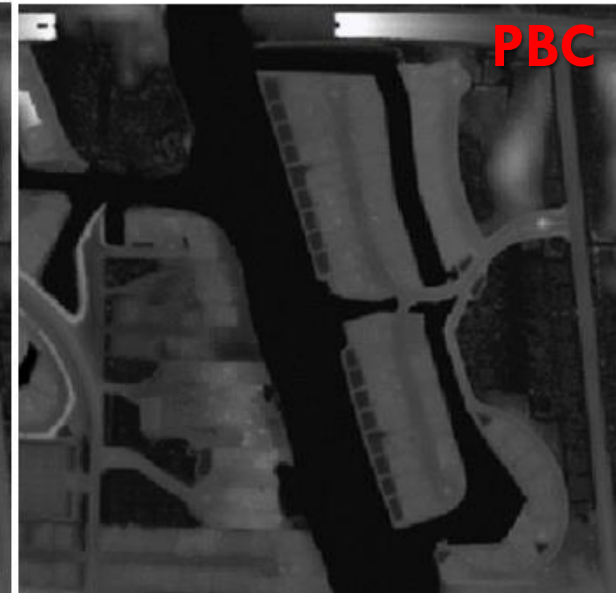
- FEMA's model did not allow water to flow out through the **Boynton Inlet** creating unrealistic water surface elevations in the inlet and **Lake Worth Lagoon**



WSE = Water Surface Elevation
Bathymetry = elevation of underwater terrain

KEY FINDINGS (CONT'D)

- The County's LiDAR-based ground elevation data acquired in 2016-2017 was not able to be used by FEMA
- Differences were observed between the County's elevation data and FEMA's elevation data within the Special Flood Hazard Area (SFHA):
 - 78% of area: within survey tolerance (± 0.5 feet)
 - 15% of area: County elevations are above FEMA elevations (≥ 0.5 feet)
 - 7% of area: County elevations are below FEMA elevations (≥ 0.5 feet)



KEY FINDINGS (CONT'D)

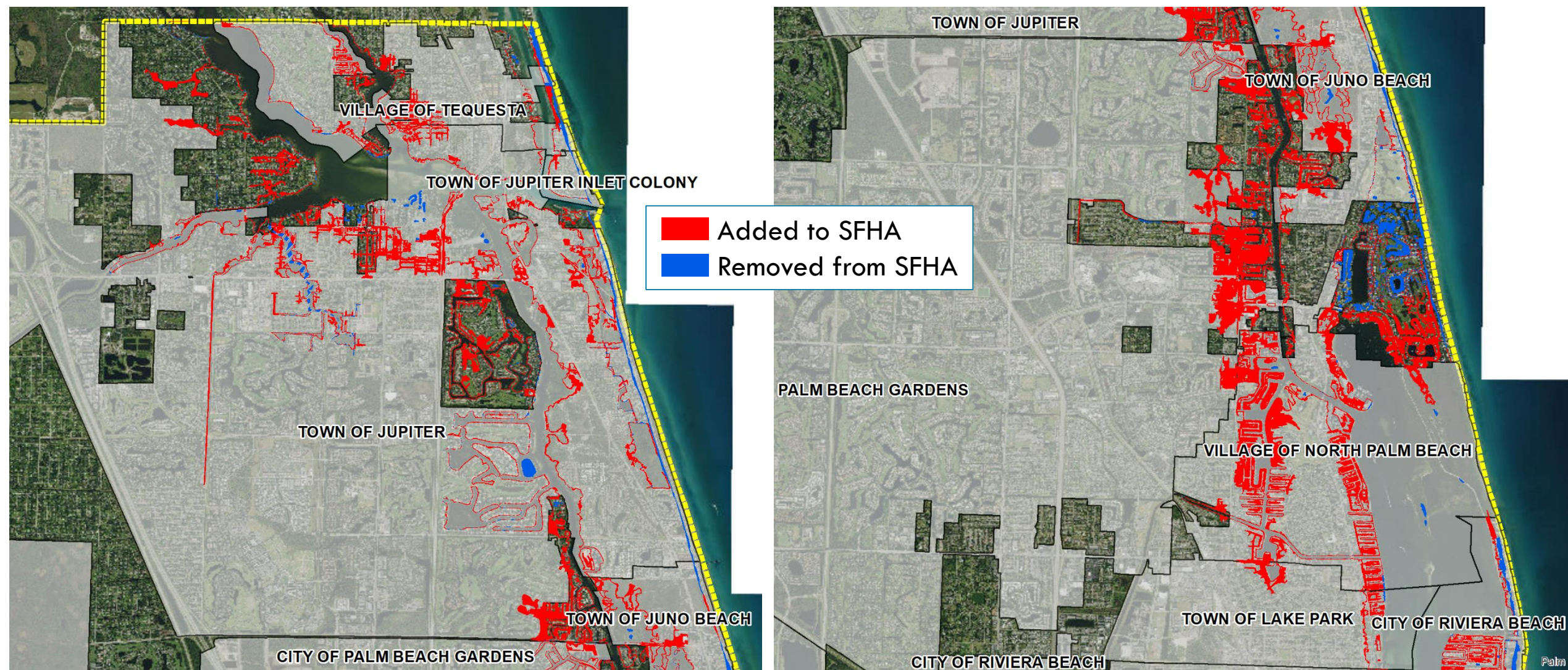


- Special Flood Hazard Area (SFHA) net increase of ~1,900 acres (as compared to 2017 FIRMs)
- Properties with mortgages within SFHA are required to have flood insurance
- Higher flood insurance premiums can be expected for affected properties

■ Added to SFHA
■ Removed from SFHA

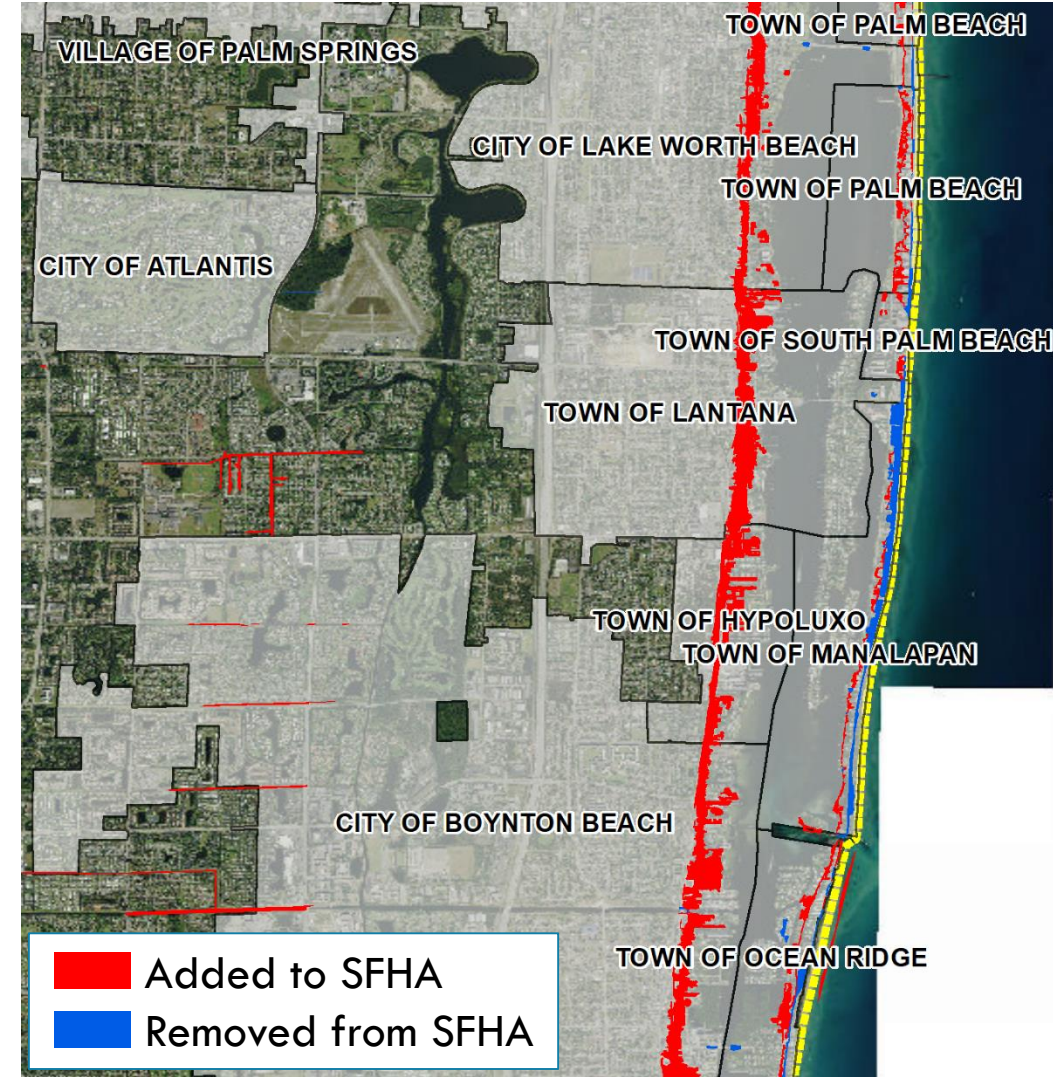
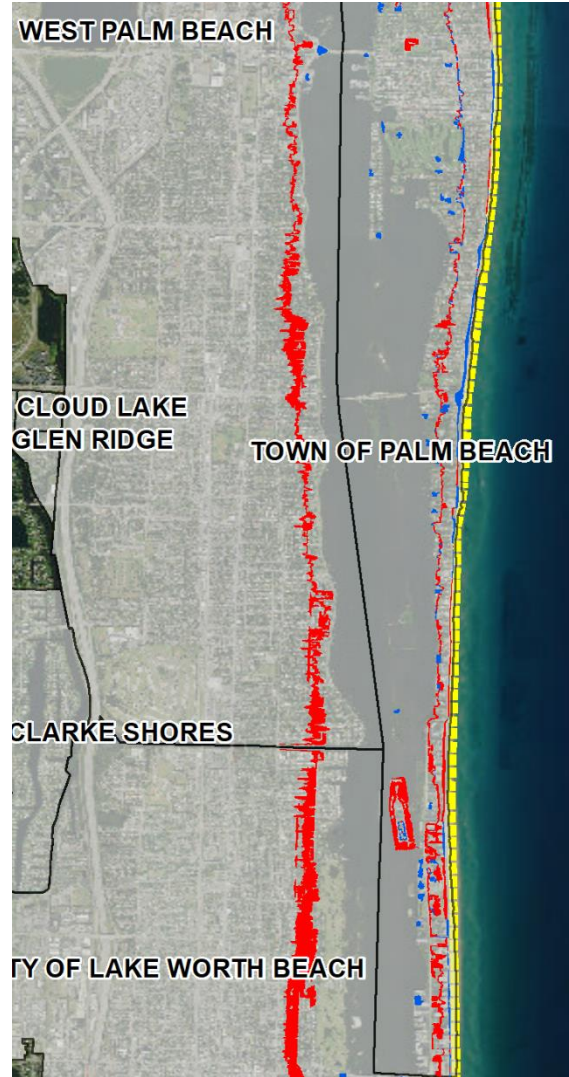
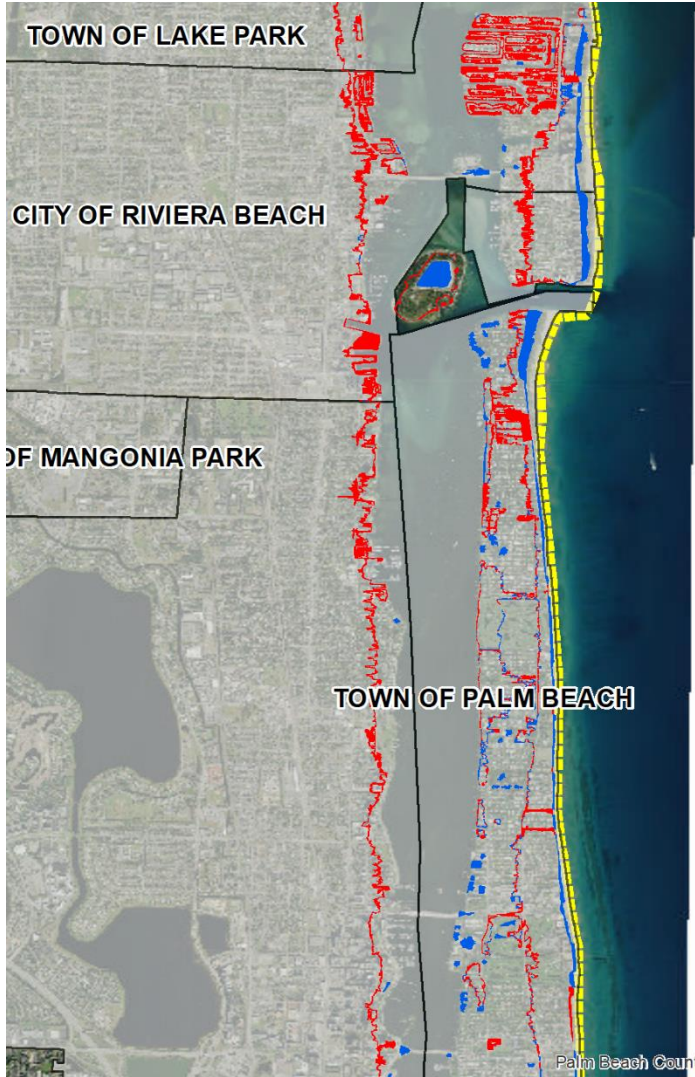
KEY FINDINGS (CONT'D)

SPECIAL FLOOD HAZARD AREA CHANGES SINCE LAST FIRM (1 OF 3)



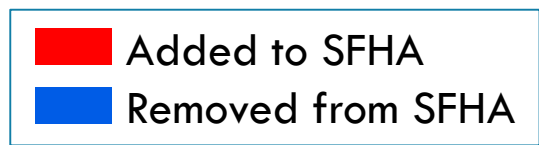
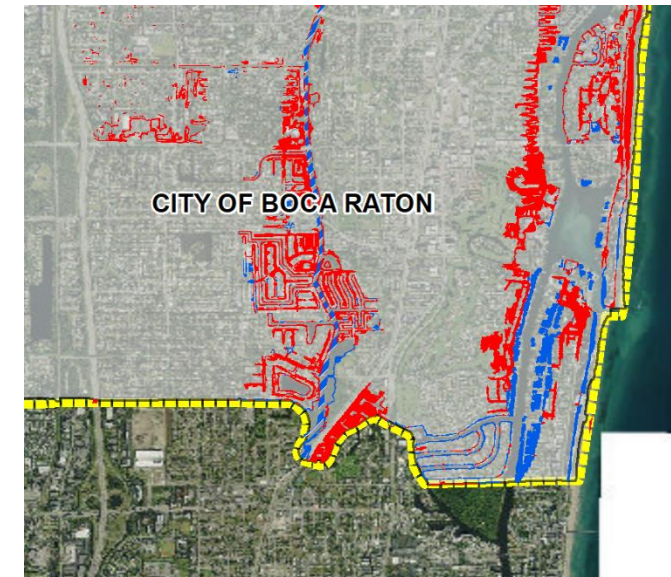
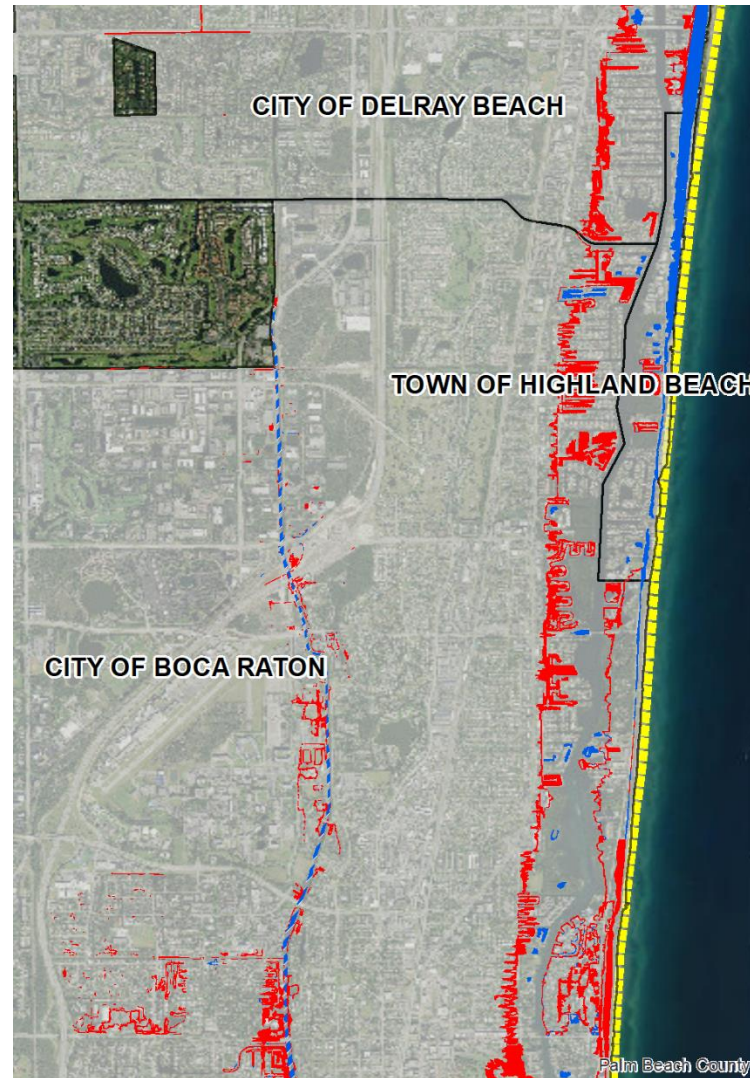
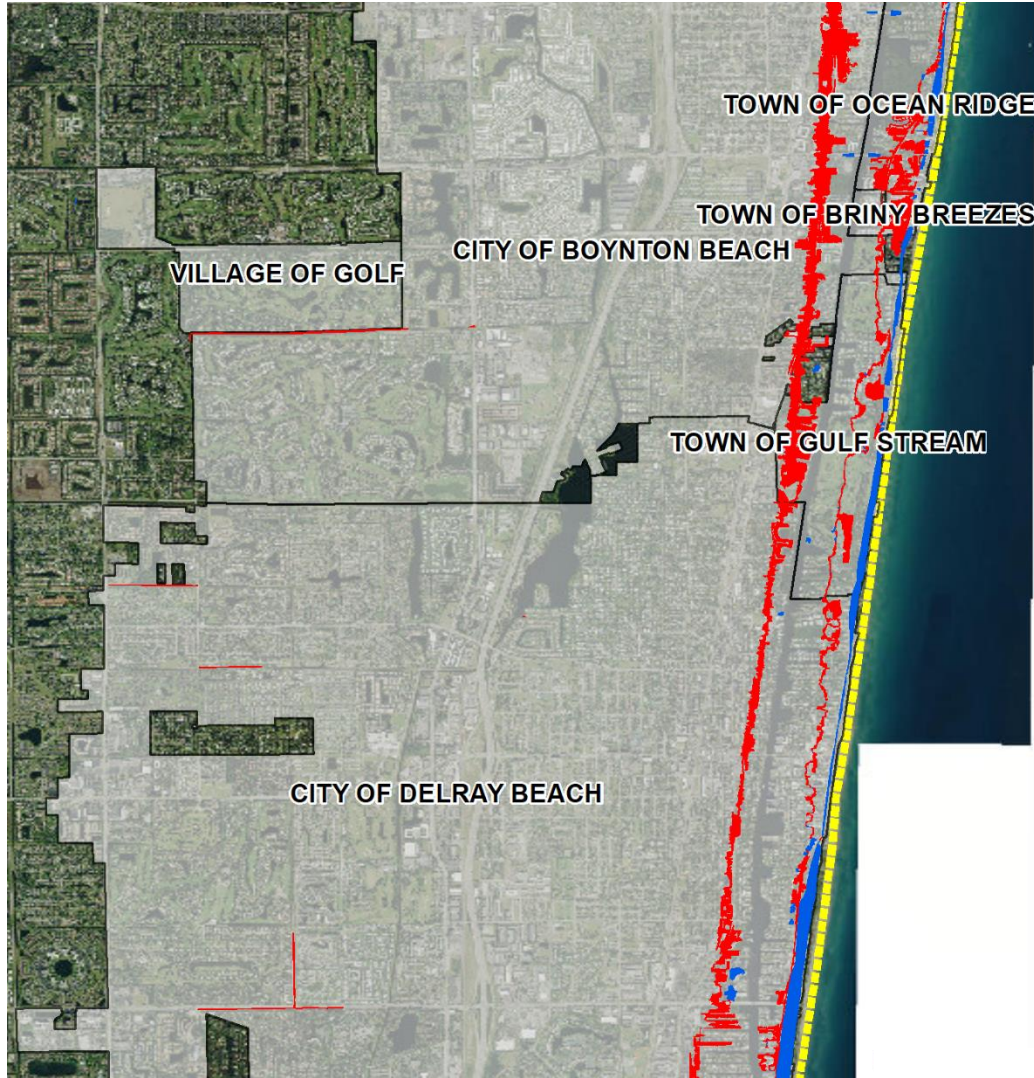
KEY FINDINGS (CONT'D)

SPECIAL FLOOD HAZARD AREA CHANGES SINCE LAST FIRM (2 OF 3)



KEY FINDINGS (CONT'D)

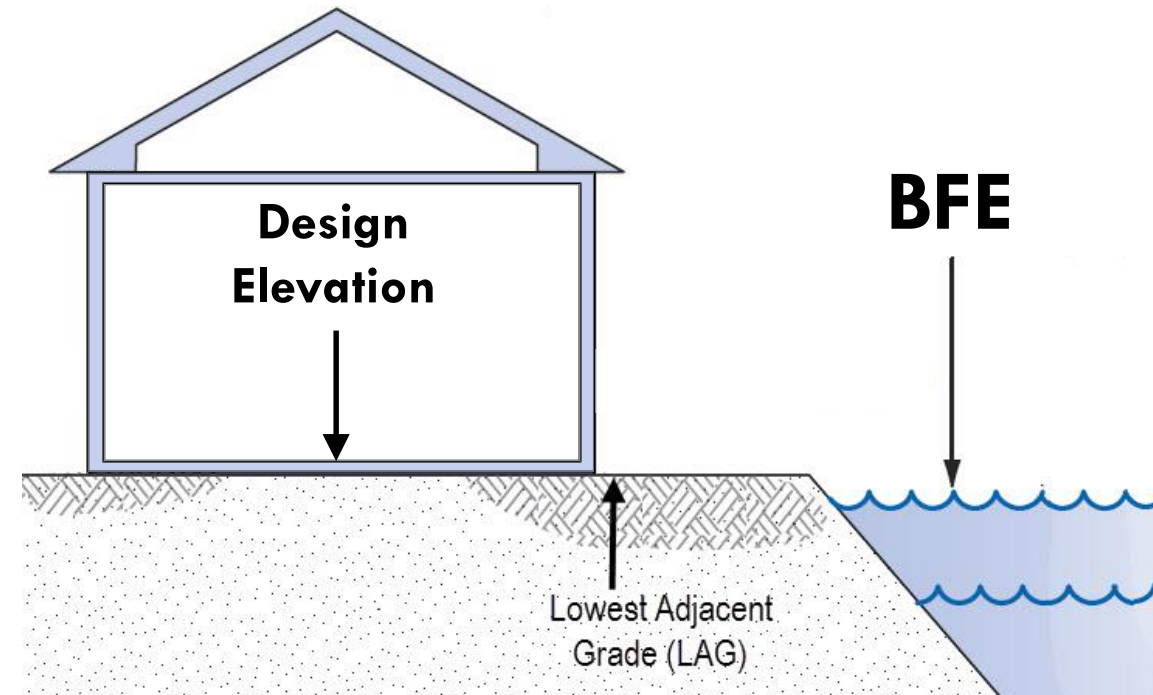
SPECIAL FLOOD HAZARD AREA CHANGES SINCE LAST FIRM (3 OF 3)



KEY FINDINGS (CONT'D)

BASE FLOOD ELEVATIONS (1 OF 3)

- FEMA defines **Base Flood Elevations (BFEs)** within the SFHA
- **BFEs** are elevations to which surface water is expected to rise to or exceed during the base flood (aka 1% annual chance flood or 100-year flood)
- The **design elevation** is the elevation that all new and substantially improved buildings must be elevated to in order to lower the risk of flood damage
- **Design elevations** are typically higher than **BFEs**
- Higher **BFEs** may prevent property owners from making improvements to existing structures



KEY FINDINGS (CONT'D)

BASE FLOOD ELEVATIONS (2 OF 3)

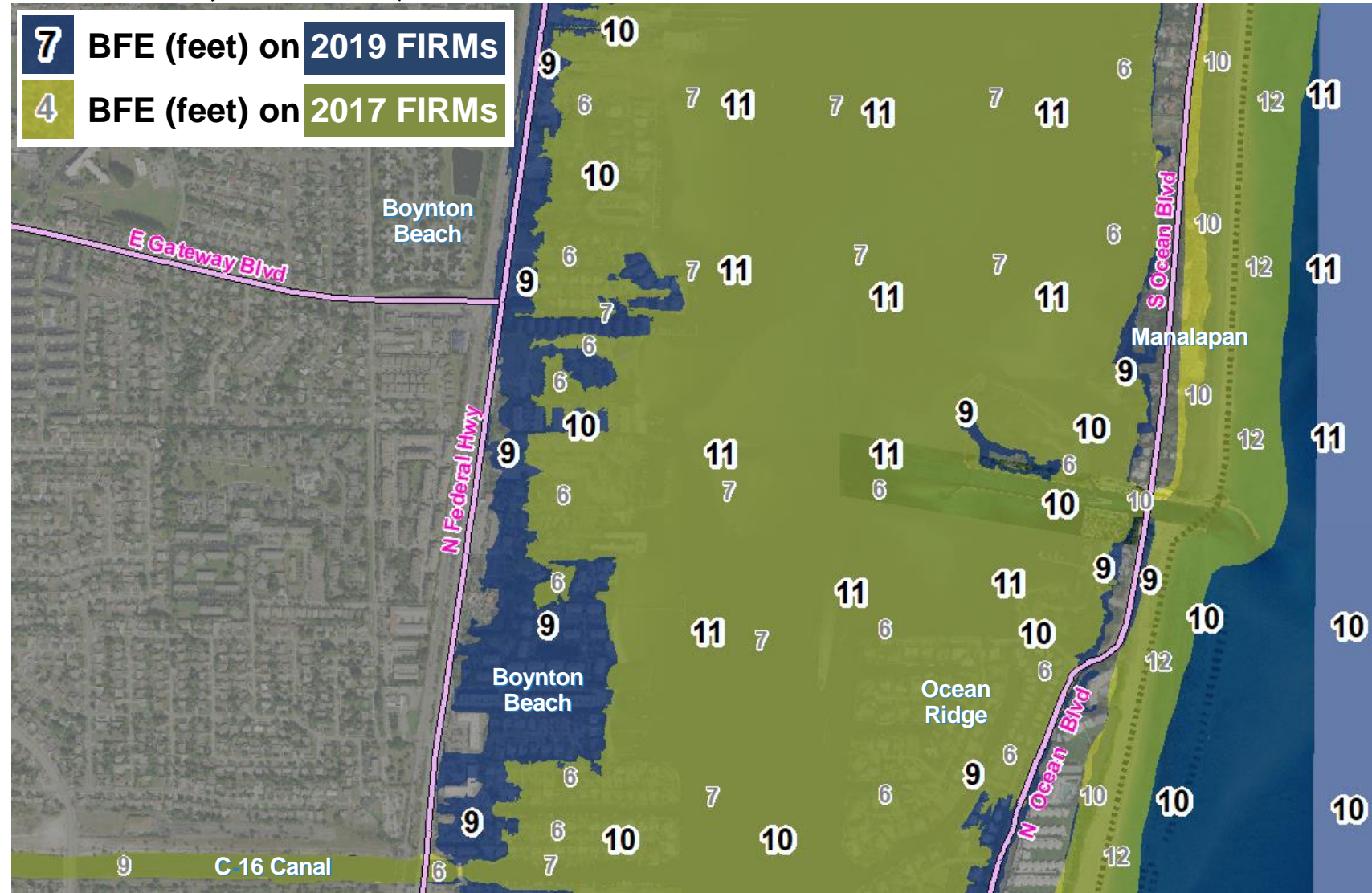
- While BFEs decreased or remained the same in some areas of the County, many areas have higher BFEs as compared to the 2017 FIRM



KEY FINDINGS (CONT'D)

BASE FLOOD ELEVATIONS (3 OF 3)

- While BFEs decreased or remained the same in some areas of the County, many areas have higher BFEs as compared to the 2017 FIRMs



PROCESS AND APPEALS

■ Preliminary Maps Issued – December 20, 2019

■ Consultation Coordination Officer Meeting and Public Open Houses – February 4-5, 2020

■ TBD (late 2020 or early 2021)

■ Begins after 2nd notice published in local newspaper

■ Duration TBD based on appeal(s)

■ Letter of Final Determination

■ Maps and new building requirements are effective; **Communities must adopt FIRMs into floodplain ordinances**

**WE ARE
HERE**



**Preliminary
Phase**

Meetings

**Publish
Federal
Register Notice**

**90-day Appeal
and Comment
Period**

**Resolve
Appeals and
Finalize Maps**

**6-month
Compliance
Period**

PROCESS AND APPEALS (CONT'D)

- Any community or individual property owner can **appeal** proposed changes to flood hazard information or **comment** on preliminary FIRMs and FIS reports
- An appeal must be based on **data and documentation** showing the proposed flood hazard information shown on the preliminary FIRM or in the FIS report is **scientifically or technically incorrect**
- **Appellants need to demonstrate** better methodologies, assumptions or data exists and **provide alternative analyses** that incorporate those methodologies, assumptions, or data if appropriate
- The **results must show an overall change in the flood hazard information** shown on the preliminary FIRM and/or in the FIS report

ACTIVITIES OF OTHER AFFECTED COUNTIES

- **Broward County** – updated topography data and additional modeling information provided to FEMA and additional modeling requested; FEMA declined to do additional modeling and referred Broward County to the appeal process; appeal not expected
- **Miami-Dade County** – many concerns with draft work maps identified; preliminary FIRMs expected to be published in January 2021
- **Monroe County** – sent questions and requested additional information and analyses to FEMA in May 2020; FEMA responded in June 2020 that they would not be revising the study; County Commission voted in June 2020 to prepare an appeal; 90-day appeal period may start as early as Fall 2020

COMPLETED AND FUTURE COORDINATION

- **Water Resources Task Force** briefing – July 23, 2020 **COMPLETED**
- **League of Cities Environmental Committee** briefing – Sep. 2, 2020 **COMPLETED**
- **County Leadership** briefing – Sep. 9, 2020 **COMPLETED**
- **Board of County Commissioners** workshop – Sep. 22, 2020 **TODAY**
- **Stakeholder Coordination** – TBD
- **FEMA Coordination** – TBD



DIRECTION REQUESTED

Staff Recommendation

- Continue to coordinate with local stakeholders and other affected Counties
- Initiate coordination with and transmit consultant's review and evaluation deliverables to FEMA
- Provide future BCC briefing on results of FEMA coordination and potential forward paths related to a formal appeal

REVIEW AND EVALUATION OF FEMA'S COASTAL FLOOD RISK STUDY

DISCUSSION



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