

# Case Study: Lake Okeechobee Study Outreach



Emily Schmidt, CFM  
GIS Specialist II, AECOM

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# Flood Insurance Study Outreach

- Risk MAP: Communicate Risk
- Current Outreach Requirements Insufficient

**FEMA**

## What is Risk MAP?

**Risk Mapping, Assessment, and Planning (Risk MAP)** is the Federal Emergency Management Agency (FEMA) Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take actions to better protect their citizens. Through more precise flood mapping products, risk assessment tools, and planning and outreach support, Risk MAP strengthens local ability to make informed decisions about reducing risk.

**The Risk MAP Vision**  
Through collaboration with State, Tribal, and local entities, Risk MAP delivers quality data that increases public awareness and leads to actions that reduce risk to life and property. Risk MAP focuses on products and services beyond the traditional Flood Insurance Rate Map (FIRM) and works with officials to help put flood risk data and assessment tools to use, effectively communicating risk to citizens and making communities to enhance their mitigation plans and actions.

**Risk MAP Solution**  
Building on the Risk MAP Multi-Year Plan, FEMA has developed a Risk MAP Solution to achieve the Program's vision. The Solution identifies new strategies and products designed to address project prioritization, elevation data acquisition, a watershed study approach, engineering and mapping, risk assessment, mitigation planning support, and risk communications. The following sections provide the overall objectives of each of these strategies.

**Vision**  
Risk MAP will deliver quality data that increases public awareness and leads to action that reduces risk to life and property

**Risk MAP Program Measures**

Multi-Year Plan		Risk MAP Program Measures	
Goal 1: Data Gaps Address gaps in flood hazard data	Goal 2: Awareness & Understanding Effectively increase public awareness & understanding	Goal 3: Mitigation Planning Use effective engagement in Mitigation Planning	Goal 4: Digital Platform Provide an enhanced digital platform
		Goal 5: Synergistic Programs Align Risk Mapping programs and services	

**FEMA's Risk MAP Multi-Year Plan and FY12 Report to Congress**  
On March 16, 2009, Congress approved the Risk MAP Multi-Year Plan for fiscal years 2010 to 2014. The document outlines the goals, objectives, and strategies for Risk MAP and summarizes FEMA's strategic planning approach and stakeholder roles and responsibilities. For more information please visit: <http://www.fema.gov/national-flood-insurance-program/our-risk-map-flood-hazard-strategy-report>

**FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) Fiscal Year 2012 Report to Congress**, dated February 23, 2012, provides an update on FEMA's strategic approach, program budget and measures, and implementation for Risk MAP. For more information about the report please visit <http://www.fema.gov/library/viewLibraryItem.do?libid=2424>

**RiskMAP**  
Increasing Resilience Together

[www.fema.gov/rmm/ra](http://www.fema.gov/rmm/ra) 1-877-FEMA MAP

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**Project Prioritization**  
Guide FEMA's investments in engineering, mapping, assessment, and planning support in order to achieve Risk MAP objectives

- Applies a quantitative approach to determine which communities FEMA will study

**Elevation Data Acquisition**  
Improve engineering data and supports risk assessment data development

- Elevation data is essential to the accuracy and reliability of flood based data
- Updated digital elevation data enables better risk assessment
- Detailed, digital elevation data supports innovative risk communication products

**Watershed Study Approach**  
Improve engineering credibility and opens the door to understanding risks to a more holistic, comprehensive way

- Encourages work across community boundaries and a result of more comprehensive assessment of flood hazards as a result of more comprehensive assessment of stream and tributary relationships
- Provides a framework to evaluate flood risk, engineering need, elevation data acquisition availability and gaps, and availability of community contribution by watershed

**Engineering and Mapping**  
Identify flood hazards, provides local floodplain management data, supports the National Flood Insurance Program (NFIP), and provides data for risk assessments and mitigation plans for flood-prone areas

- Includes the scientific collection, processing, and analysis of flood based data to provide communities with accurate flood maps and risk assessment products
- Engineering and mapping data provide the foundation for more effective risk communications through assessments and also enable effective mitigation at the local level
- Includes significant investments in the flood mapping of areas impacted by levees and coastal flood hazard

**Risk Assessment**  
Allows communities to make informed mitigation decisions by providing products and technologies that communicate and visualize risks

- Engage communities with the information and tools they need to develop effective mitigation plans
- Provides communication with flood risk information through a Flood Risk Report, Flood Risk Map, and Flood Risk Database

**Mitigation Planning Support**  
Provide technical assistance, increase risk reduction activities at the local level, and develop the programmatic infrastructure to monitor community efforts

- Enables communities to assess risks and identify actions to reduce vulnerability to those risks
- Encourages collaboration with and among local stakeholders risk and facilitate mitigation planning and local risk reduction efforts
- Incentivizes local effective mitigation planning and risk reduction activities

**Risk Communications**  
Motivate citizens to make informed decisions regarding their risks and encourage communities to take the lead in protecting their constituents

- Enhances local capabilities to communicate effectively with constituents about risk
- Allows for an exchange of information about risk between FEMA and other stakeholders
- Provides customizable communication plans, key messages, and materials to communities
- Facilitates national and local collaboration through key partnerships

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- What else can we do?
- Hold Public Flood Risk Open House Meetings
- Increase communication with community stakeholders prior to PDCC and Open House Meetings
- FEMA Region IV Outreach Guidance is underway
  - Lake Okeechobee success story

# Lake Okeechobee

- Second largest freshwater lake entirely within the United States
- Protected by the Herbert Hoover Dike
  - Earthen dike system
  - 140 miles around
  - U.S. Army Corps of Engineers, Jacksonville District
- Kissimmee-Okeechobee-Everglades system



Photo: Google Earth

# Five Counties

Okeechobee

Glades

Martin

Lake  
Okeechobee

Hendry

Palm Beach

# Herbert Hoover Dike Built After Disaster **AECOM**

- September 1926
  - Lake Okeechobee without the HHD
  - Hurricane winds pushed a wall of water that killed nearly 400 people in the town of Moore Haven
- September 1928
  - Nearly 2,000 people killed by waters driven out of the lake by the hurricane winds
  - Clewiston and Belle Glade
  - Federal Involvement
- 1932 USACE construction of Herbert Hoover Dike

# Time has taken its toll

- 140 miles of dike
- Built to specifications designed in 1930s
- Diligent maintenance and repair schedule (USACE)
- 1974 North Shore Dike Breach
- 1979 Florida Power & Light Dike Failure



# High Water Events

- 1995
  - 18.6 feet
  - Substantial distress, did not breach
  - Problem areas identified
- 1998
  - 18.5 feet
  - Did not breach
  - Worsening overall / cumulative damage
  - 1995 problems areas – boil formation & seepage

# Major Rehabilitation Evaluation

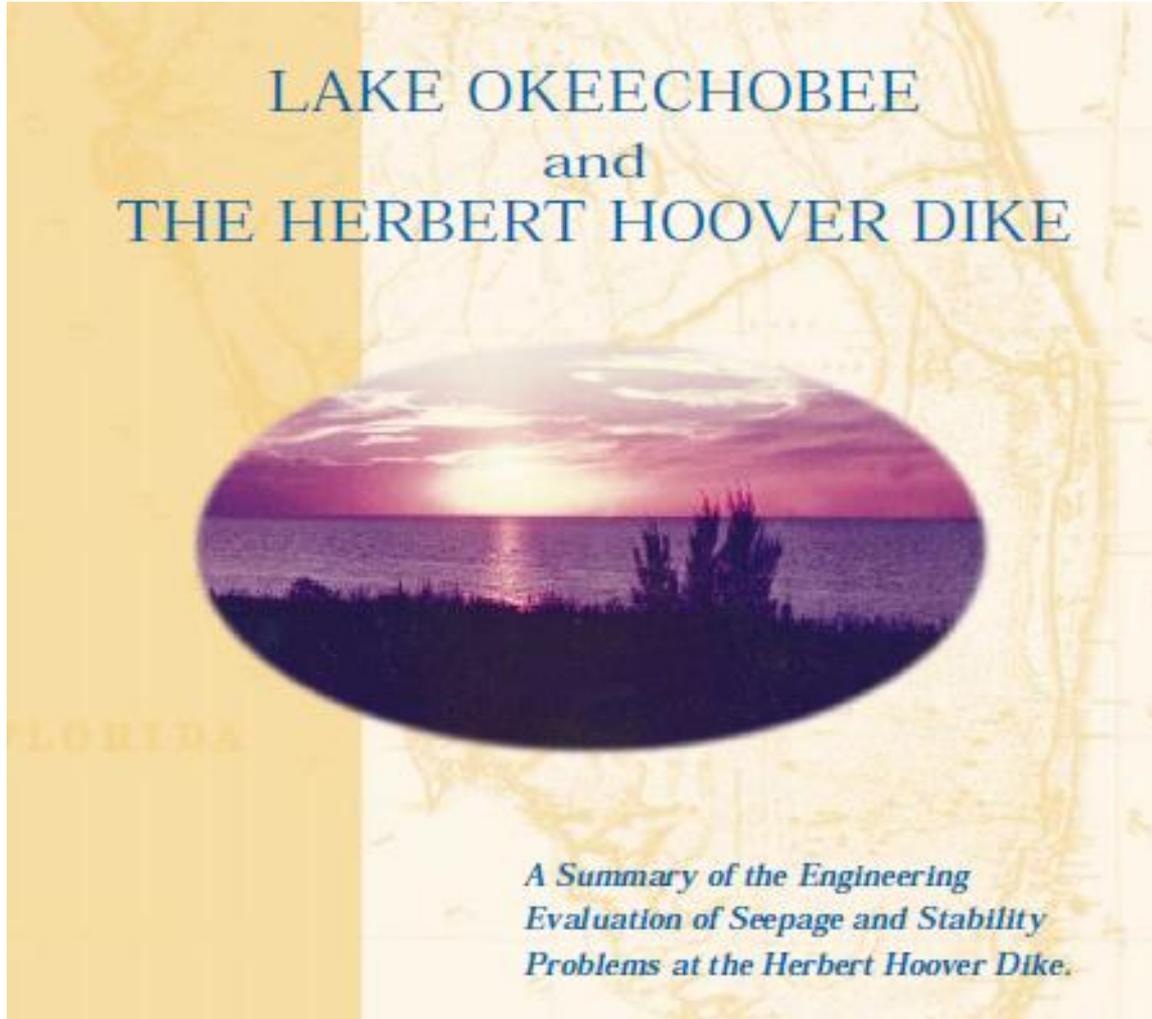
- U.S. Army Corps of Engineers
  - Engineering
  - Economic
  - Environmental

# Report Findings

- Severe Flooding & Limited Warning Time
- Limited potential for failure below 18.5 feet
  - 18.6 and 18.5 levels in 1995 and 1998 (30 yr event)
- -Likely failure of multiple locations at 21 feet
  - USACE analytical studies
- Rehabilitation efforts are warranted

# Repair Options

- Keep the Lake Below 18.5 Feet
- Permanently Lower the Lake Level
- Build Relief Wells
- Build Ring-Dikes and Increase the Tailwater
- Build a Cutoff Wall to Hold Back the Lake Waters
  
- Build a Seepage Berm, with Relief Trench and Drainage System along the Landside Toe



*This publication is furnished by:*



U. S. Army Corps of Engineers  
Jacksonville District  
P.O. Box 4970  
Jacksonville, Florida 32232-0019  
904-232-1650

# Lake Okeechobee Levee Analysis

- USACE could not certify the Herbert Hoover Dike to project against the 1% annual chance storm
- FEMA determined the 1% annual chance flood risk associated with Levee Failure and mapped the risk in all 5 counties.



# Outdated Effective Maps

County	Effective FIRM Date
Hendry	5/17/1982
Glades	5/17/1982
Okeechobee	2/4/1981
Martin	10/4/2002
Palm Beach	10/15/1982

- Dam breach hydrodynamic analyses
  - Simulate breach evolution, flow paths, water levels
- Statistical analyses
  - Calculate frequency of water surface elevations
- Mapping
  - Interpretation and mapping of results
- Outreach and coordination
  - Multiple stakeholder groups

# HHD Dam-Break Analysis

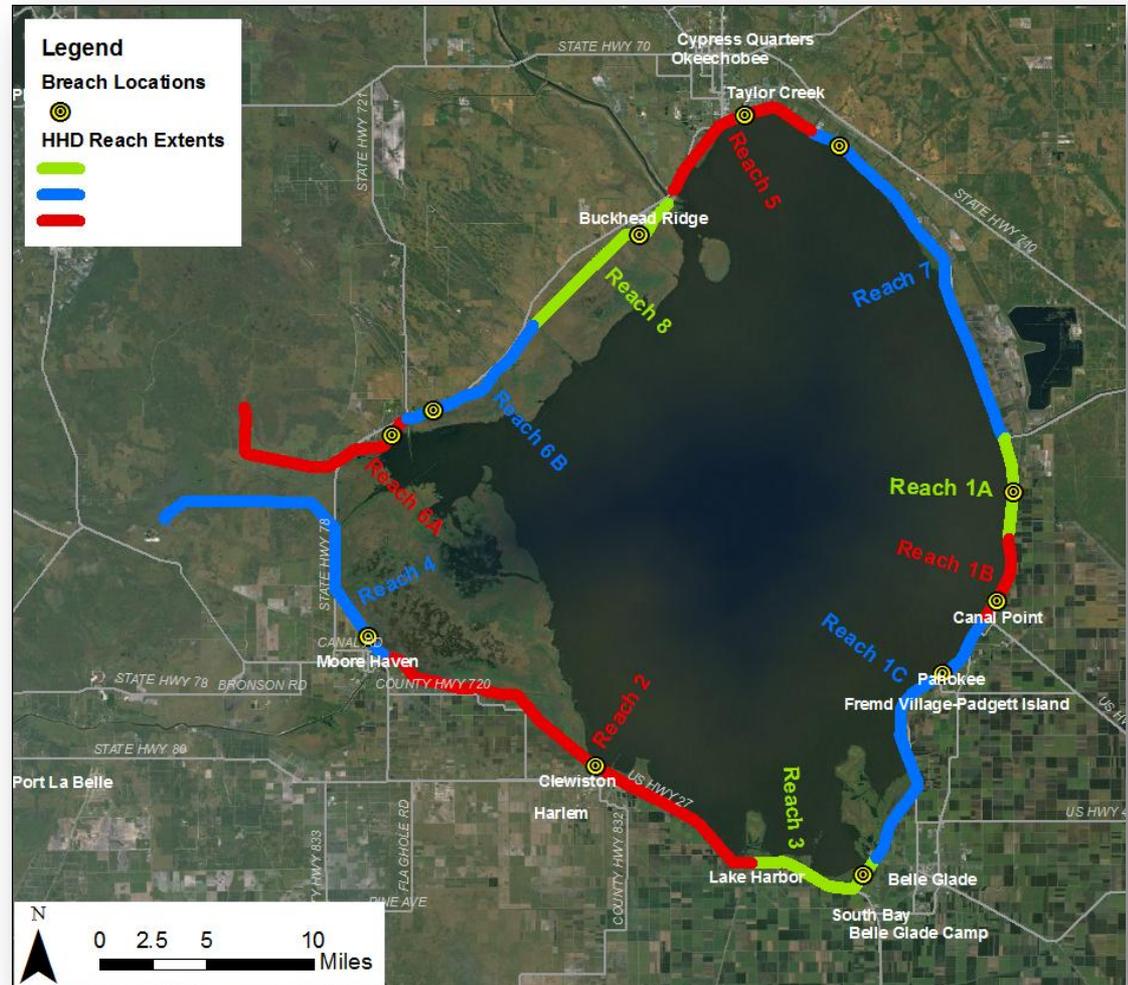
- Taylor Engineering, Jacksonville District USACE
  - Began in 2008
  - Breach evolution modeling
  - 2-D dam-break modeling
- Taylor Engineering/  
AECOM, FEMA
  - Began in 2011
  - Additional 2-D dam-break modeling
  - Joint probability method analysis
  - Mapping



Photo: Google Earth

# Dam-Break Analysis

- Use of MIKE software
- USACE-defined reaches
  - Simulations at lake levels 14 – 21 ft NAVD (at every foot)
- LiDAR available

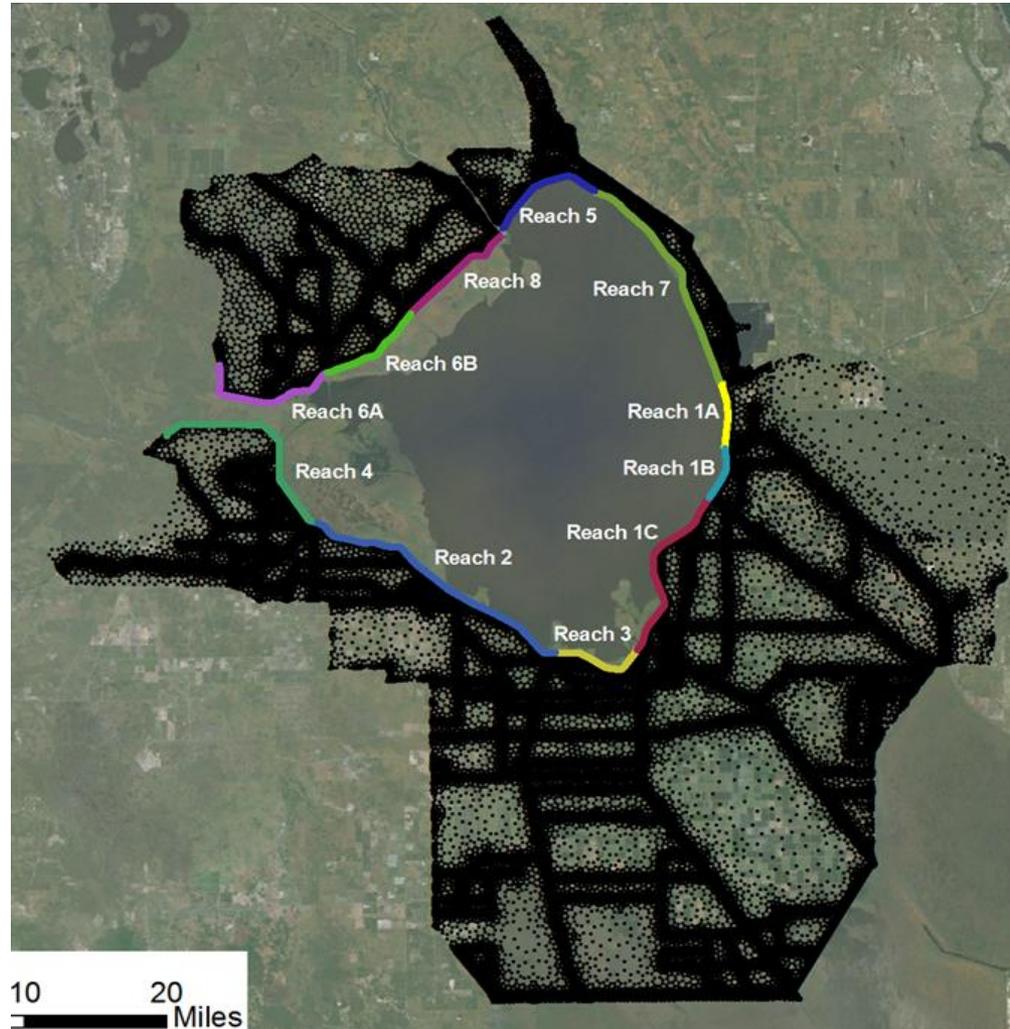


- The statistical analysis helps produce the 1% annual chance flood elevation or flood depth

Three components:

1. Stage-frequency analysis for Lake Okeechobee
2. Dike fragility curves for every reach
3. Joint probability analysis

# Statistical Analysis

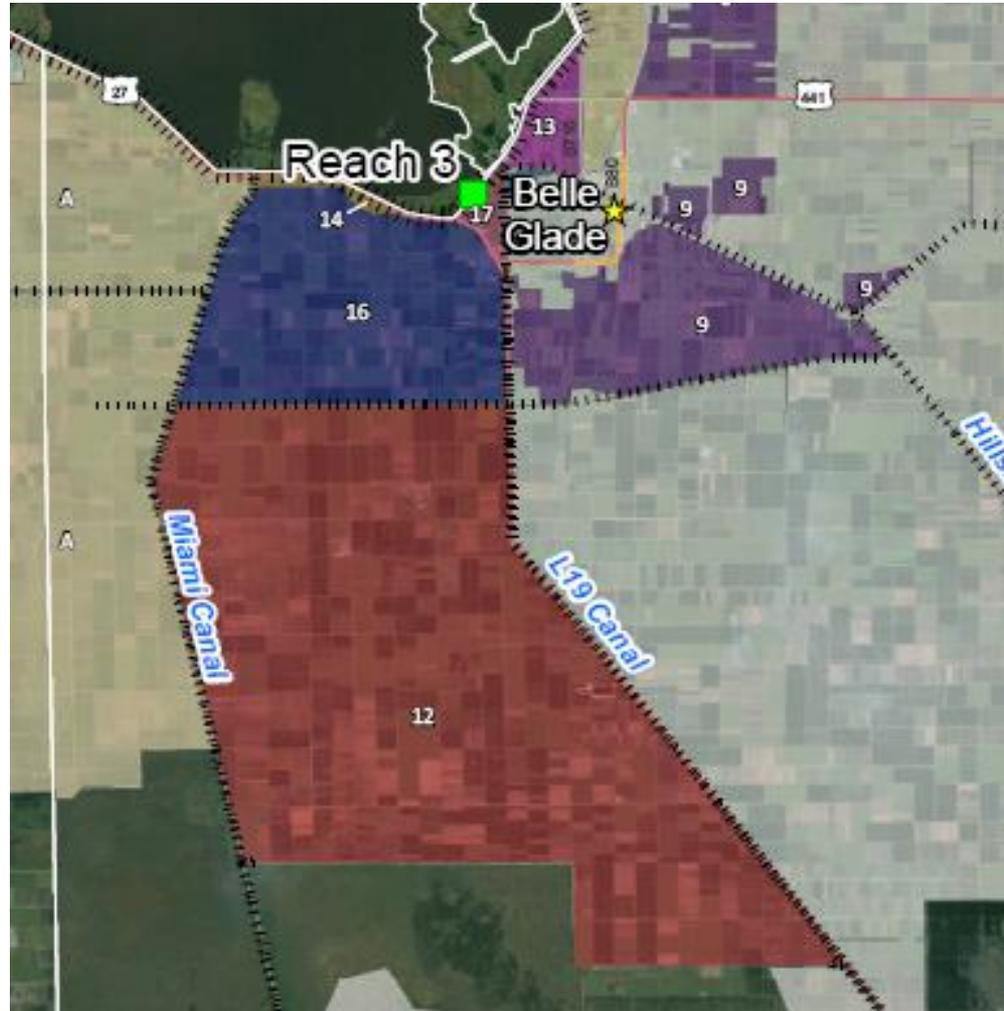


# Floodplain Mapping

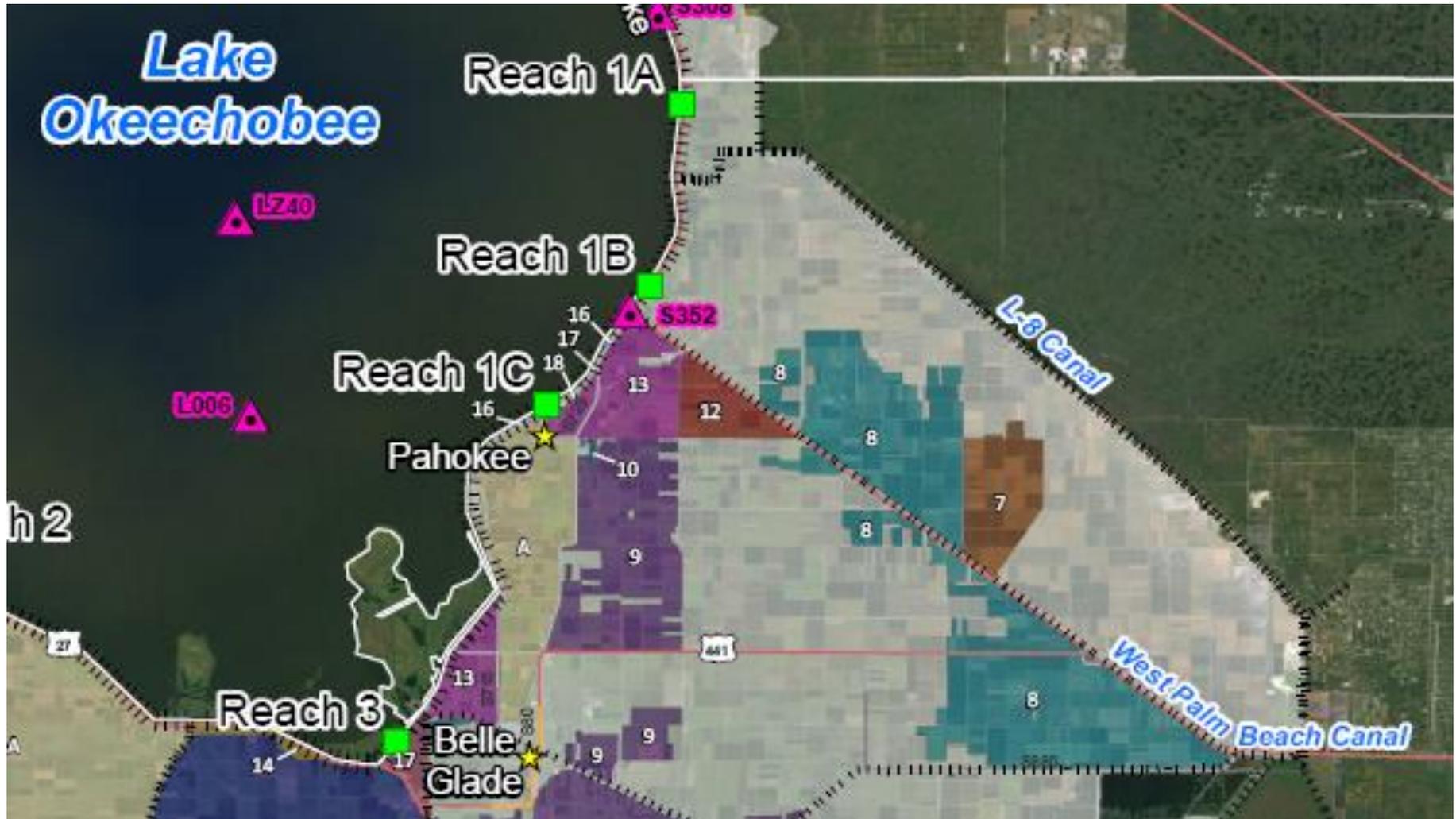
Used results at each node to delineate draft flood hazards



# Floodplain Mapping



# Floodplain Mapping



# Regional Outreach Overview

- Stakeholders
- Preliminary Issuance
- Stakeholder Outreach Coordination Calls
- Preliminary DFIRM Community Coordination Meeting (PDCC)
- Public Flood Risk Open House Meetings
- Post Preliminary Timeline

# Stakeholder Involvement

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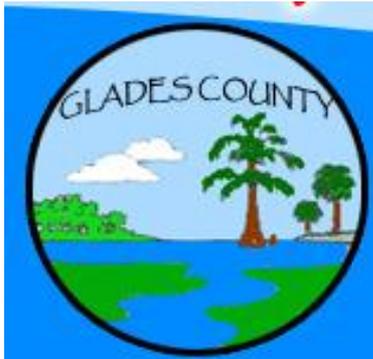


# FEMA

## Florida DEM



## US Army Corps of Engineers®

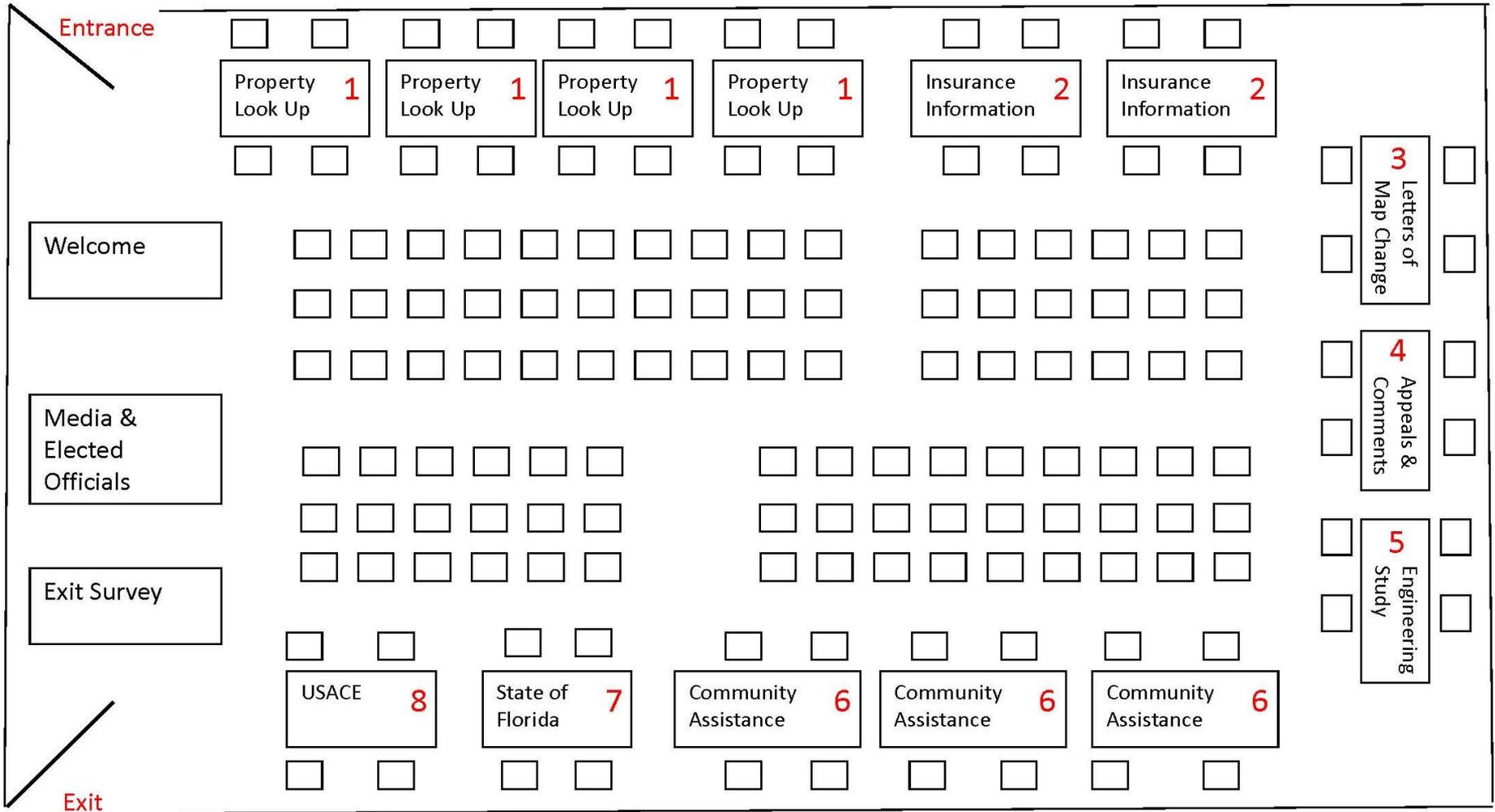


# Regional Outreach

- Outreach led by Henrietta Williams, FEMA IV
- Technical Work Map Meeting
  - April 29-30, 2013
- Preliminary Products Distributed
  - May 31, 2013

- Stakeholder Outreach Calls (**Round 1**)
  - June 4, 2013 Palm Beach
  - June 5, 2013 Martin & Okeechobee
  - June 6, 2013 Glades & Hendry
- Map Adoption Process & Outreach Objectives
- PDCC and Open House Planning Discussion
  - Date/Time/Venue
  - Staffing/Security
  - Floor Plan Review
  - Special Needs Access
- Publications
  - Acceptance of Shipment
  - Electronic Documents

# Open House Layout



- Stakeholder Outreach Calls (**Round 2**)
  - June 24, 2013 Glades, Hendry, Okeechobee, & Martin
  - June 27, 2013 Palm Beach
- PDCC and Open House Venue Confirmation
  - Floor Plan Review - Station Assignments
  - Staffing, Security, Multilingual Staff Assignments, and Special Needs Access Confirmations
- Publications Order Status
- External Affairs Coordination

# Publications

- FEMA 495
- F-084
- F-441
- F-002
- F-217
- F435
- F-695

National Flood Insurance Program

Adopt Insurance Participation  
FEMA 495 / September 2012

National Flood Insurance Program

My Home My Insurance

The Bottom Line: Flood Insurance Versus...

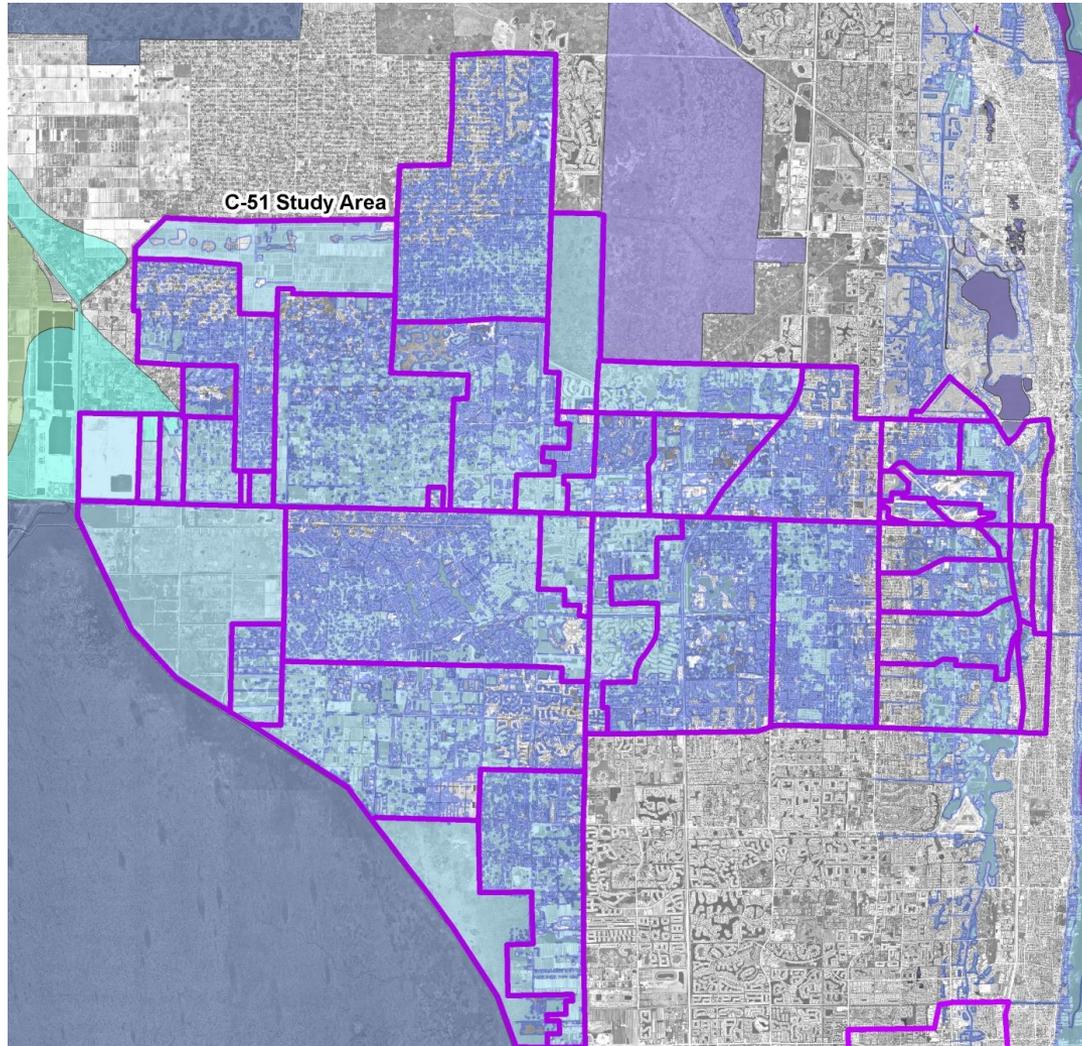
National Flood Insurance Program  
Flood Insurance Requirements for Recipients of Federal Disaster Assistance

FEMA

# Regional Outreach

- Supplemental Technical Meeting
  - July 31, 2013 Palm Beach
- Risk Map Process
- Project Scope
- Open House
- Communities & Local Engineers Responses
- Outcomes
  - PDCC & Open House Meetings Postponed
  - Additional Technical Data Due November 30, 2013

# Palm Beach County - C51 Basin Study



- Intergovernmental Briefing
  - August 13, 2013 Palm Beach
  - August 19, 2013 Glades, Hendry, Okeechobee, & Martin
- Congressional Briefing
  - August 13, 2013
- PDCC Invitations Distribution
  - August 19, 2013

***Best Practice -  
Intergovernmental  
and Congressional  
Briefings should be  
held on the same day***

- **Stakeholder Outreach Call (Round 3)**
  - Sept. 3, 2013 Glades, Hendry, Okeechobee, & Martin
- **External Affairs Distribution**
  - Sept. 10, 2013 News Releases & Advisories
  - Drive Time Radio Spots - Week of Open House Meetings
- **PDCC & Public Flood Risk Open House Meetings**
  - Sept. 16, 2013 Glades
  - Sept. 17, 2013 Hendry
  - Sept. 18, 2013 Okeechobee
  - Sept. 19, 2013 Martin

# Public Flood Risk Open House Meetings **AECOM**

Glades County

Okeechobee County



Over 400  
residents  
attended

# Regional Outreach

- Palm Beach Schedule Reminder
  - October 2, 2013 – 60 Day Reminder
- PDCC Meeting Minutes Distribution
  - October 7, 2013 – Glades, Hendry, Okeechobee, & Martin
- Palm Beach Response Letters
  - October 31, 2013
- Palm Beach Schedule Reminder
  - November 1, 2013 – 30 Day Reminder

- Palm Beach Supplemental Data Collection Meeting
  - November 20, 2013
- Data Submittal Deadline Extended
  - Extended from November 30, 2013 to February 28, 2014
- Revised Preliminary Issuance
  - Estimated for Spring/Summer 2014
  - Continued to receive technical data through July 2014

# Regional Outreach

- FL Association of Counties Briefing
  - March 14, 2014
- Stakeholder Outreach Call (**Round 3**)
  - June 13, 2014 – Palm Beach County
- Intergovernmental & Congressional Briefings
  - July 1, 2014 – Palm Beach County
- Supplemental Briefing – City of South Bay
  - August 5, 2014 – Town Council Meeting

- Stakeholder Outreach Call (**Final**)
  - August 15, 2014 – Palm Beach County
- Revised Preliminary Issuance
  - August 18, 2014
  - 181 printed Flood Insurance Rate Maps (FIRMs)
    - 96 revised (dated 8-18-14)
    - 85 unrevised (dated 5-31-13)

- Stakeholder Outreach Distribution
  - August 22, 2014
  - News Release
  - Open House Location Slides
  - Open House Layout
  - Various Fact Sheets
- Drive Time Radio Spots and Interviews
  - Weekend Prior and Week of Sept. 8-11, 2014
- PDCC Meeting
  - September 8, 2014

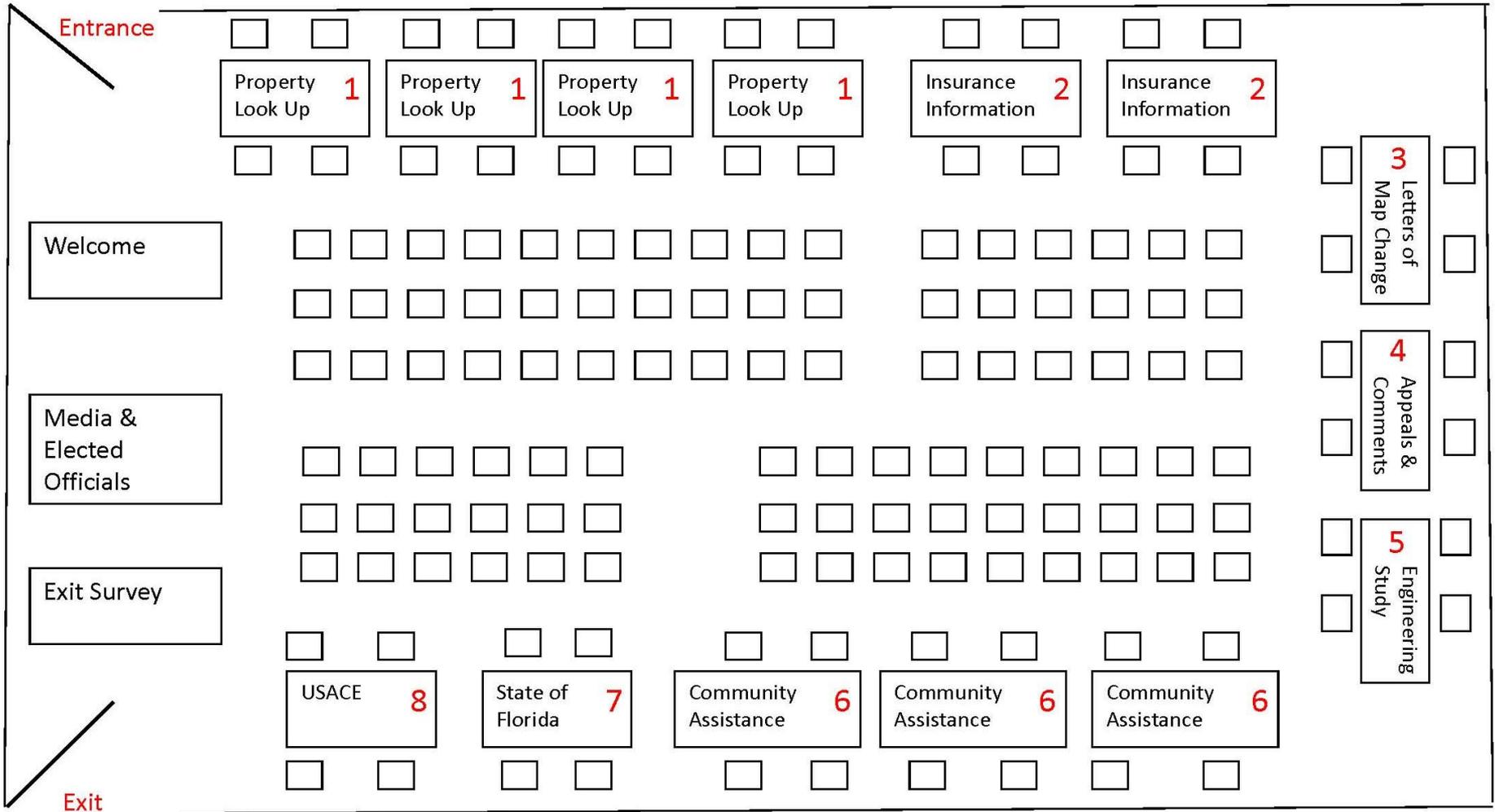
# Palm Beach County PDCC Meeting



- 35 out of 39 municipalities represented

- Public Flood Risk Open House Meetings
  - Sept. 8, 2014 – Southern Area (Boynton Beach)
  - Sept. 9, 2014 – Central Area (West Palm Beach)
  - Sept. 10, 2014 – Western Area (Belle Glade)
  - Sept. 11, 2014 – Northern Area (Jupiter)
- PDCC Meeting Minutes Distribution
  - September 15, 2014

# Open House Layout



# Public Flood Risk Open House Meetings **AECOM**



# Public Flood Risk Open House Meetings **AECOM**



Over 700  
residents  
attended

# Post Preliminary Processing Schedule

- Preliminary Maps Issued

- PDCC Meeting and Public Open House

- End of Appeal & Comment Period

- Letter of Final Determination

- Effective Maps

Preliminary Phase

Meetings

90-Day Appeal & Comment Period

Resolve Appeals & Finalize Map Products

6-Month Compliance Period

# Post Preliminary Processing Schedule



- **Glades County**
  - LFD 3/26/2014
  - Effective 9/26/2014
- **Hendry County**
  - LFD 10/16/2014\*
  - Effective 4/16/2015\*
- **Martin County**
  - LFD 9/16/2014\*
  - Effective 3/16/2015\*
- **Okeechobee County**
  - LFD 12/16/2014\*
  - Effective 6/16/2015\*
- **Palm Beach County**
  - Appeal Period  
Nov 2014 – Jan 2015\*
  - LFD  
June 2015\*
  - Effective  
December 2015\*

\*Projected Date

# Post Preliminary Key Messages

- At LFD

***You have 6 months to work with the State Floodplain management office and your FEMA regional liaison to update your ordinance and remain compliant in the National Flood Insurance Program***

- 3 Months Prior to Map Effective Date

***Preliminary maps will go into effect on \_\_\_\_\_. Please review the maps online or at your local building and permitting office and speak to your insurance agent.***

# Post Preliminary Key Messages

- 30 Days Prior to Map Effective Date  
*Preliminary maps will go into effect on \_\_\_\_\_. If you have not done so, please check the maps online or visit your local building and permitting office. Also, contact your insurance agents to discuss your options.*
- Announcement that Maps Have Gone Effective  
*Preliminary maps are now effective. Maps may now be changed by going through the Letter of Map Change Process. You may receive guidance regarding revising effective maps through the letter of map change Process by contacting your local building and permitting office, or by calling the FEMA map assistance center at \_\_\_\_\_.*

- Current methodologies are inadequate
- Increasing communications throughout the study process creates informed and prepared stakeholders when the study goes effective
- FEMA Region IV is working on putting together an Outreach Guidance for expanded communication on future studies

# Questions?

**Emily Schmidt, CFM**

GIS Specialist II

404-965-7084

[Emily.Schmidt@aecom.com](mailto:Emily.Schmidt@aecom.com)

**AECOM**

1360 Peachtree Street NE

Suite 500

Atlanta, GA 30309

[www.aecom.com](http://www.aecom.com)