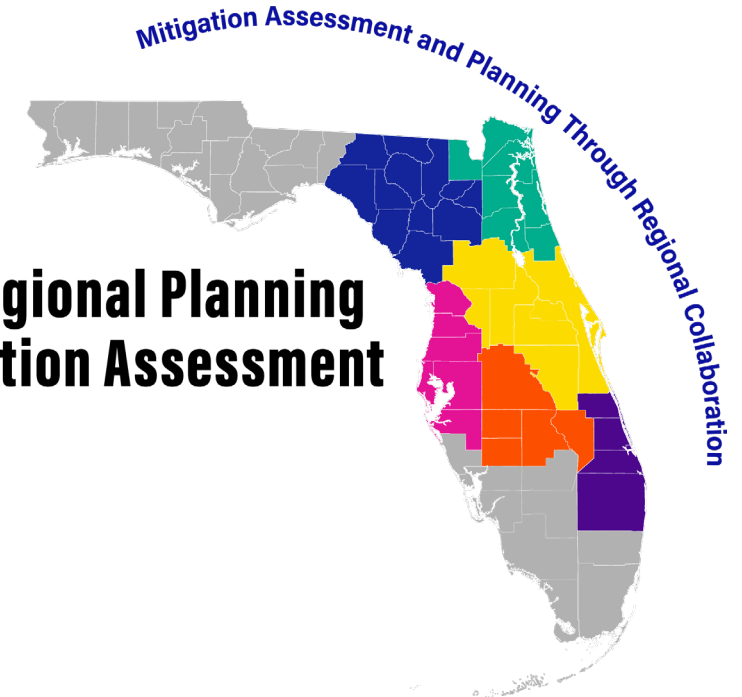




# Planning for Future Extreme Rainfall

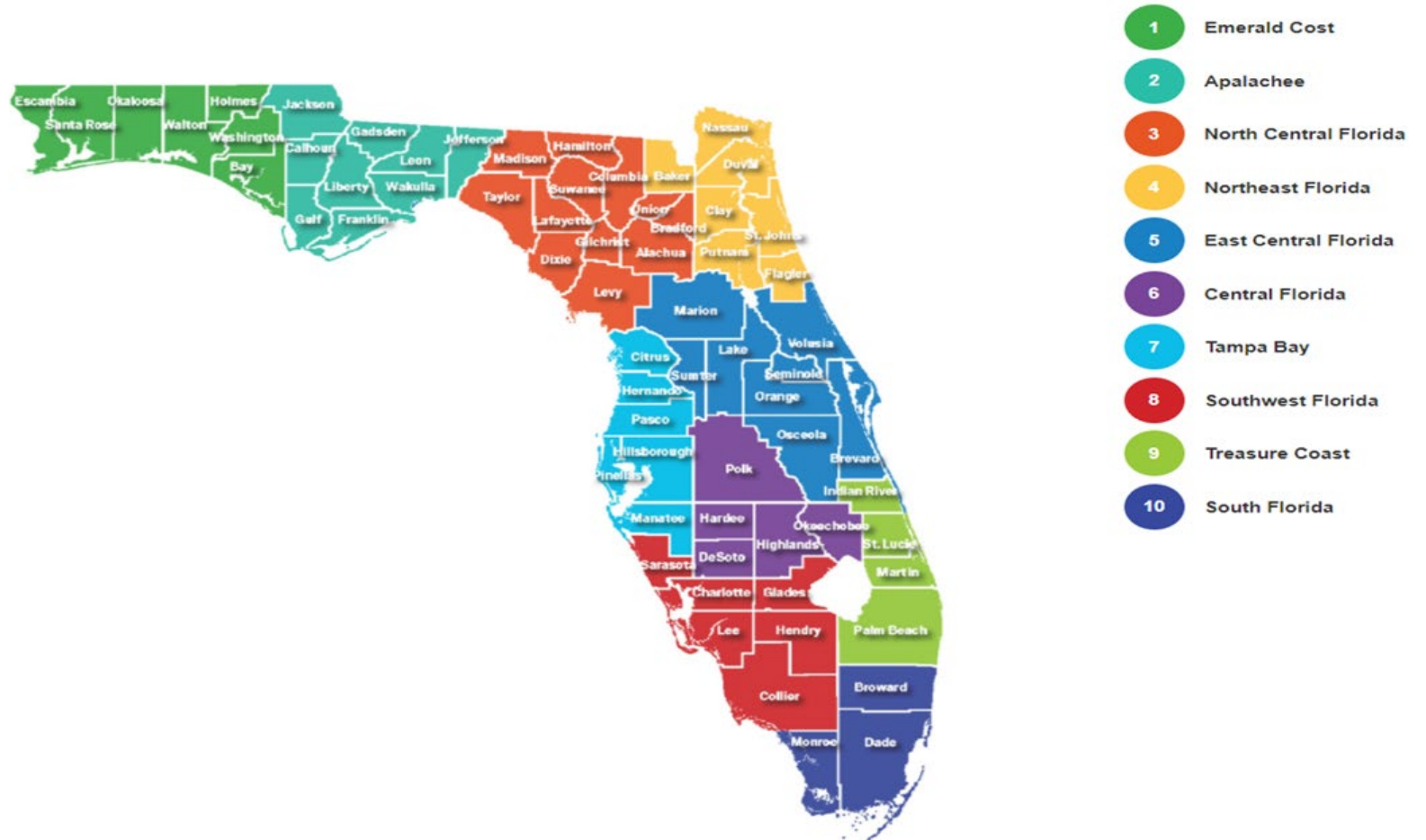
Joshua Sheldon, GIS Director  
East Central Florida Regional  
Planning Council

**Multi-Regional Planning  
& Mitigation Assessment**



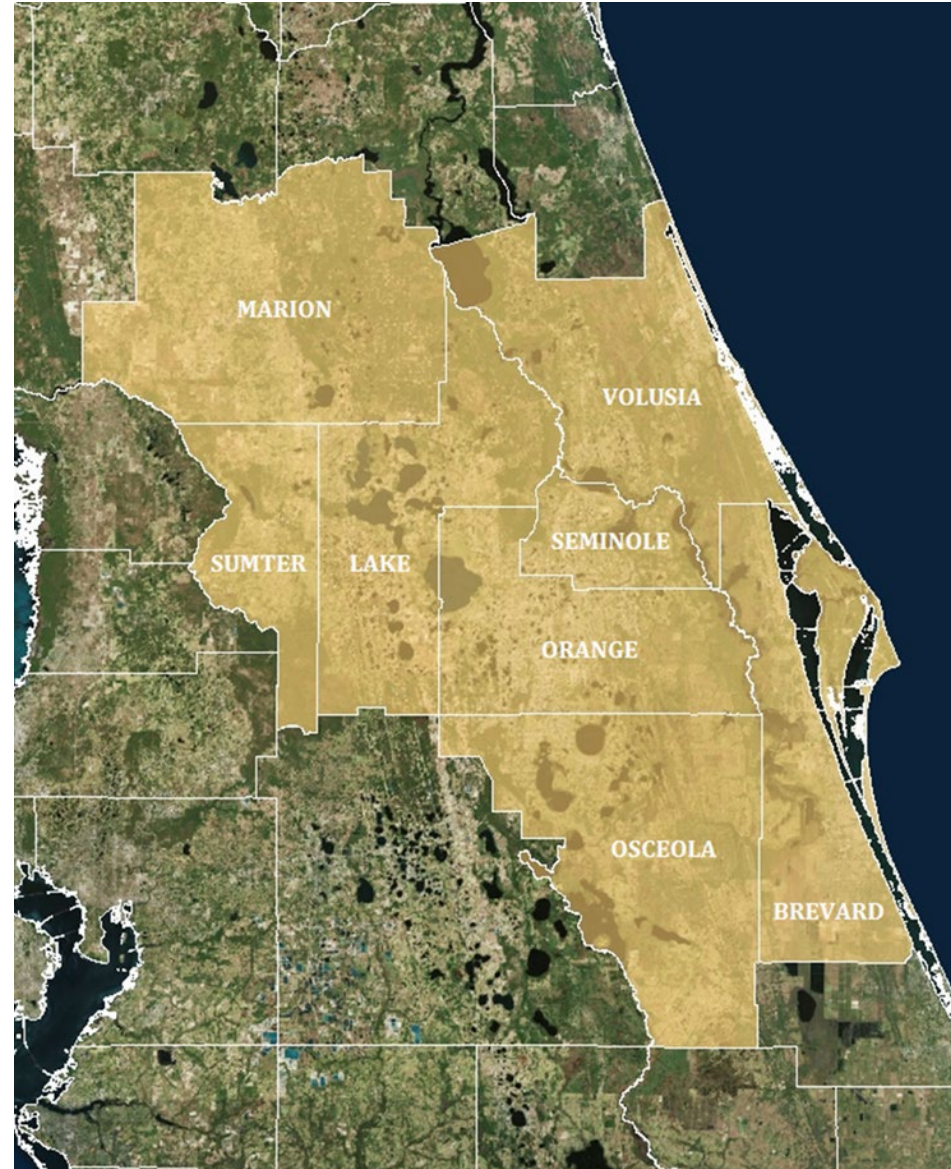
# Organization Overview

- 10 Regional Planning Councils Statewide
- Established in 1962 as an area-wide association of governments
- Convene, Assist, Inform, Plan, Collaborate



# ECFRPC

- Serve 8 Counties
  - Brevard, Lake, Marion, Orange, Osceola, Seminole, Sumter and Volusia
- 2<sup>nd</sup> in population; 1<sup>st</sup> in area



# Major Program Areas

Community  
Development

Economic  
Development

Health and  
Food  
Systems

GIS

Emergency  
Preparedness

Resilience

# Project Overview

## Community Development Block Grant – Mitigation (CDBG-MIT)

- Rebuild Florida Program resulting from Hurricane Irma

In 2022, ECFRPC  
awarded \$1.499 million

- Project started in April 2022 and will end in September 2025

## Six Regional Planning Councils

- East Central
- North Central
- Central Florida
- Tampa Bay
- Treasure Coast
- Northeast



# Background

## In 2021...

- The Resilient Florida legislation required future rainfall to be analyzed to the extent possible by vulnerability assessments, *including* inland counties.

## Since 2015...

- The “Peril of Flood” State Statute moved toward future conditions (sea level rise, future flood risk, and more intense rain events) in coastal planning efforts





# Project Purpose

- Why Future Extreme Rainfall?
  - Increased flood risk is not isolated to the coast
    - Evidenced by hurricanes Irma, Ian, and Milton
  - Understanding of future rainfall fosters appropriate planning, policy decisions, and emergency preparedness protocols.
  - Reduces impacts to people and property
  - Provides opportunities for collaboration

# Goals and Value

- Build Regional stakeholder collaboration
- Develop technical applications to analyze vulnerabilities to extreme rainfall flooding
- Complements Vulnerability Assessments
- Develop a regional approach to mitigation planning that lead to innovative mitigation projects
- Create a consistent statewide regional framework to mitigation and resiliency planning



# Project Activities

- Stakeholder engagement
- Extreme future rainfall impacts
- Regional mitigation needs assessment
  - Regional Mitigation project list
  - Mitigation priority areas
- Interactive mitigation based best practice application
- Conceptual Small Area mitigation plans
- Web-Based regional resilience exposure tool

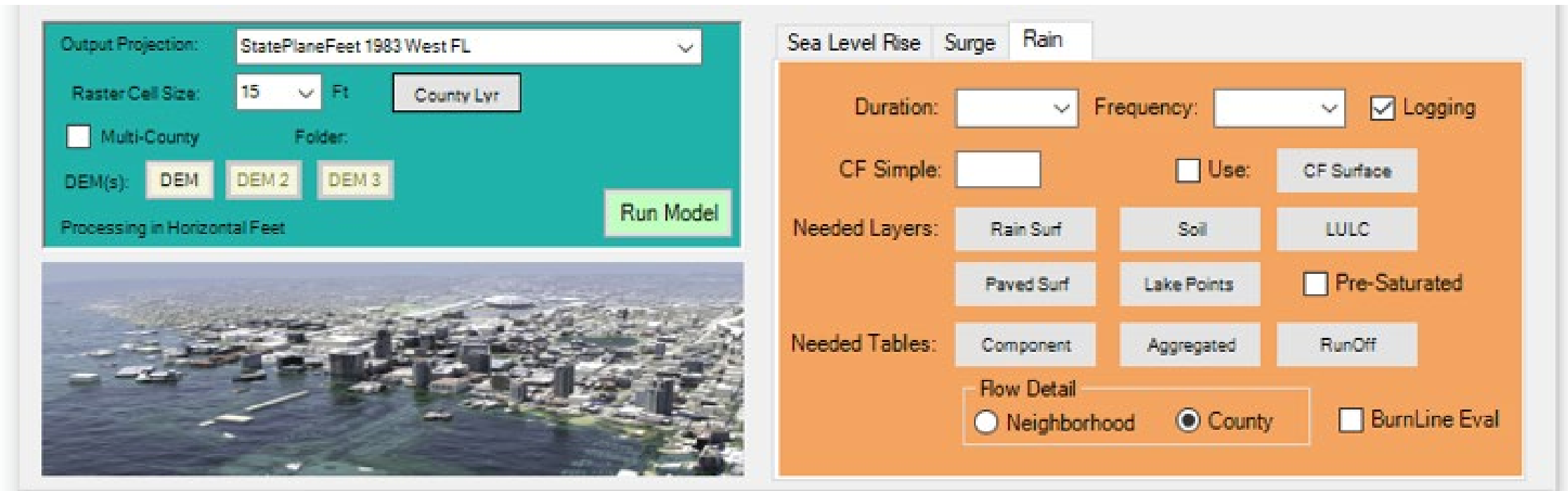


# Stakeholders

- Technical Advisory Meetings
  - Consisted of floodplain managers, water management districts, climatologists, etc.
  - Discussed methodology and data that would be used in the rainfall model
    - E.g., climate model discussions, change factors, duration/frequency

# Extreme future rainfall impacts

- Inundate! Tool, developed by FlynnMetrics
  - Planning and spatial analysis data framework to identify and delineate areas exposed to future extreme rainfall
  - Tool generates, visualizes and summarizes areas exposed to future extreme rainfall
  - NOT an H&H model; Soley for planning purposes



The screenshot displays the Inundate! Tool interface, which is divided into two main sections: a teal-colored input panel on the left and an orange-colored configuration panel on the right.

**Input Panel (Left):**

- Output Projection:** A dropdown menu set to "StatePlaneFeet 1983 West FL".
- Raster Cell Size:** A dropdown set to "15" followed by "Ft".
- Multi-County:** An unchecked checkbox.
- Folder:** A text input field containing "County Lyr".
- DEM(s):** Three buttons labeled "DEM", "DEM 2", and "DEM 3".
- Processing in Horizontal Feet:** A label at the bottom left.
- Run Model:** A green button at the bottom right.

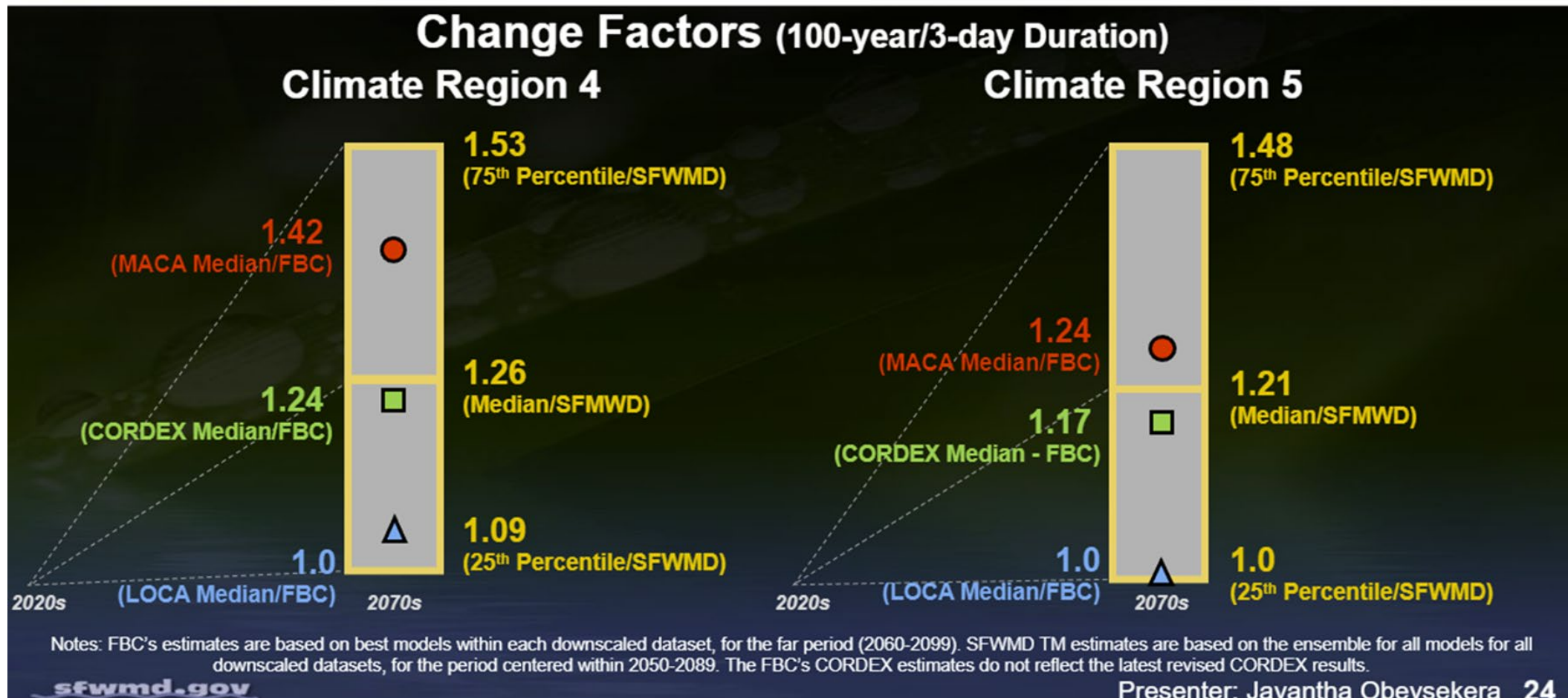
**Visualization:** Below the input panel is a 3D rendering of a cityscape partially submerged in water, illustrating the potential impact of extreme rainfall.

**Configuration Panel (Right):**

- Tab Selection:** Three tabs are visible: "Sea Level Rise", "Surge", and "Rain" (which is selected).
- Duration:** A dropdown menu.
- Frequency:** A dropdown menu.
- Logging:** A checked checkbox.
- CF Simple:** A text input field.
- Use:** An unchecked checkbox.
- CF Surface:** A button.
- Needed Layers:** Three buttons labeled "Rain Surf", "Soil", and "LULC".
- Paved Surf:** A button.
- Lake Points:** A button.
- Pre-Saturated:** An unchecked checkbox.
- Needed Tables:** Three buttons labeled "Component", "Aggregated", and "RunOff".
- Flow Detail:** A section containing:
  - Neighborhood:** An unchecked radio button.
  - County:** A selected radio button.
  - BurnLine Eval:** An unchecked checkbox.

# FBC's Statewide Study

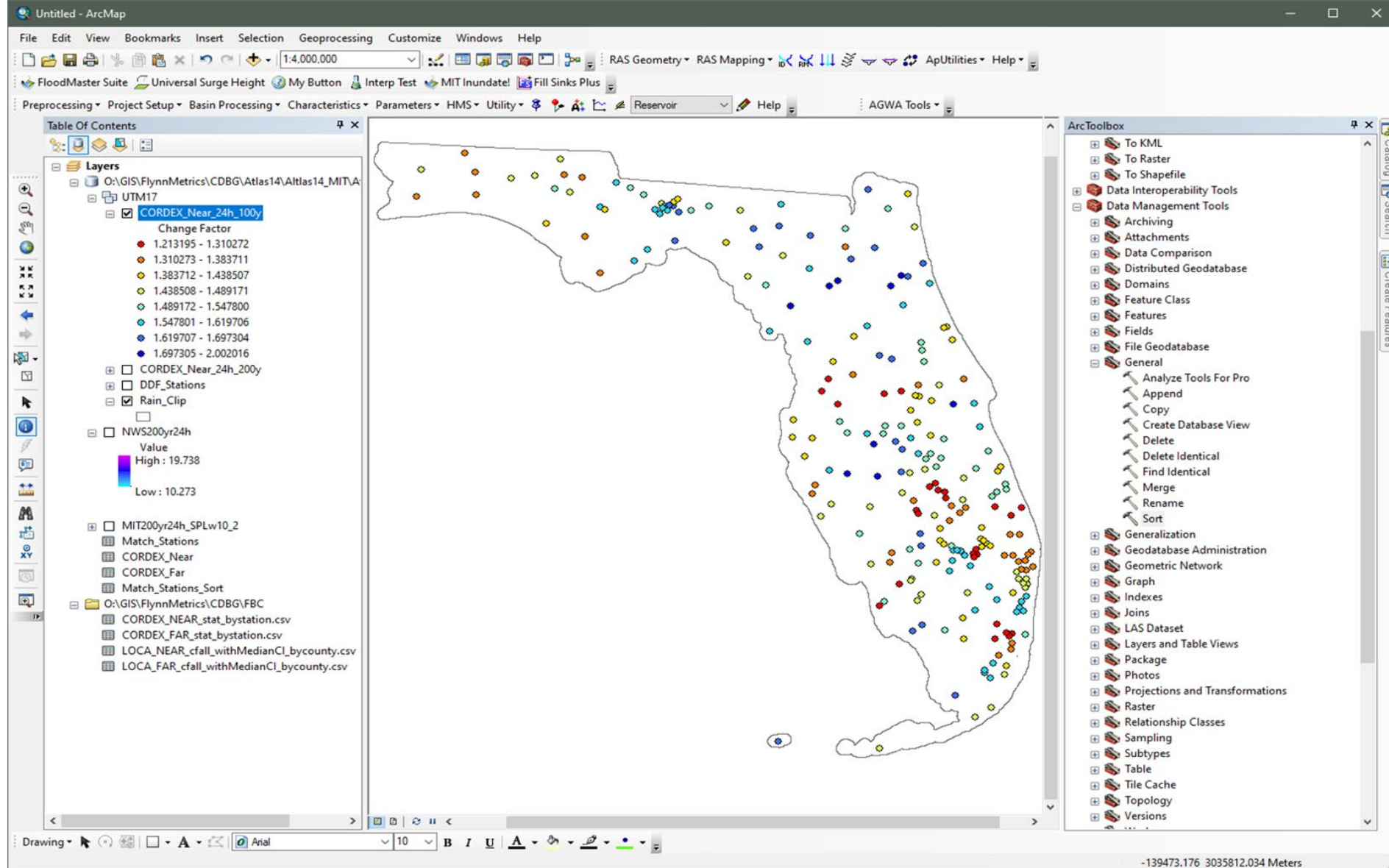
## High Level Results Comparison to SFWMD TM Results



Extreme future  
rainfall impacts

- Coordinated Regional Climate Downscaling Experiment (CORDEX) change factors





# Extreme future rainfall impacts

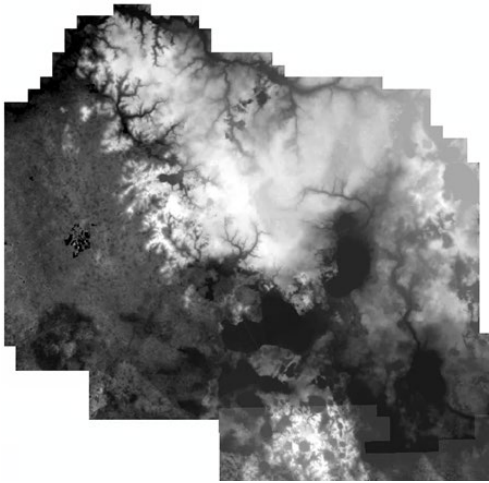
- Coordinated Regional Climate Downscaling Experiment (CORDEX) change factors

# Extreme future rainfall impacts

- Layers for Modeling Input
  - Atlas 14 Rain Surface for each scenario (2040-24h-100y/2070-24h-100y)
  - Change Factor Layer
  - SSURGO Soils
  - LULC
  - Lake Points
  - Major Roads
  - Burn Lines
  - DEM



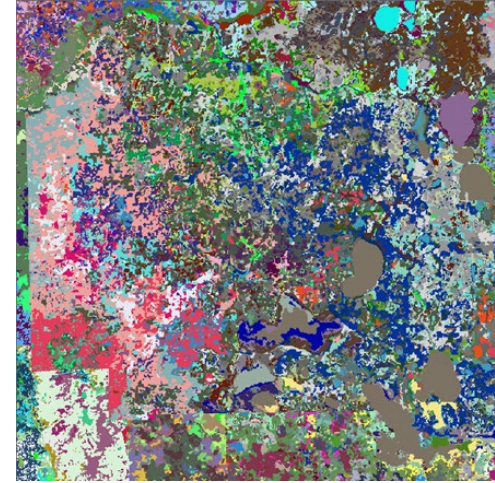
# Extreme future rainfall impacts



DEM



Change Factor



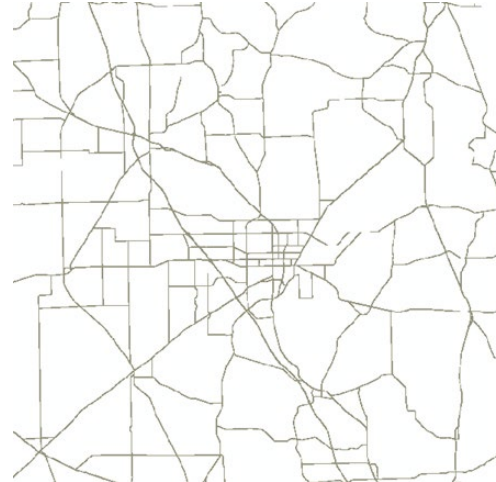
SSURGO Soils



LULC



Lake Points



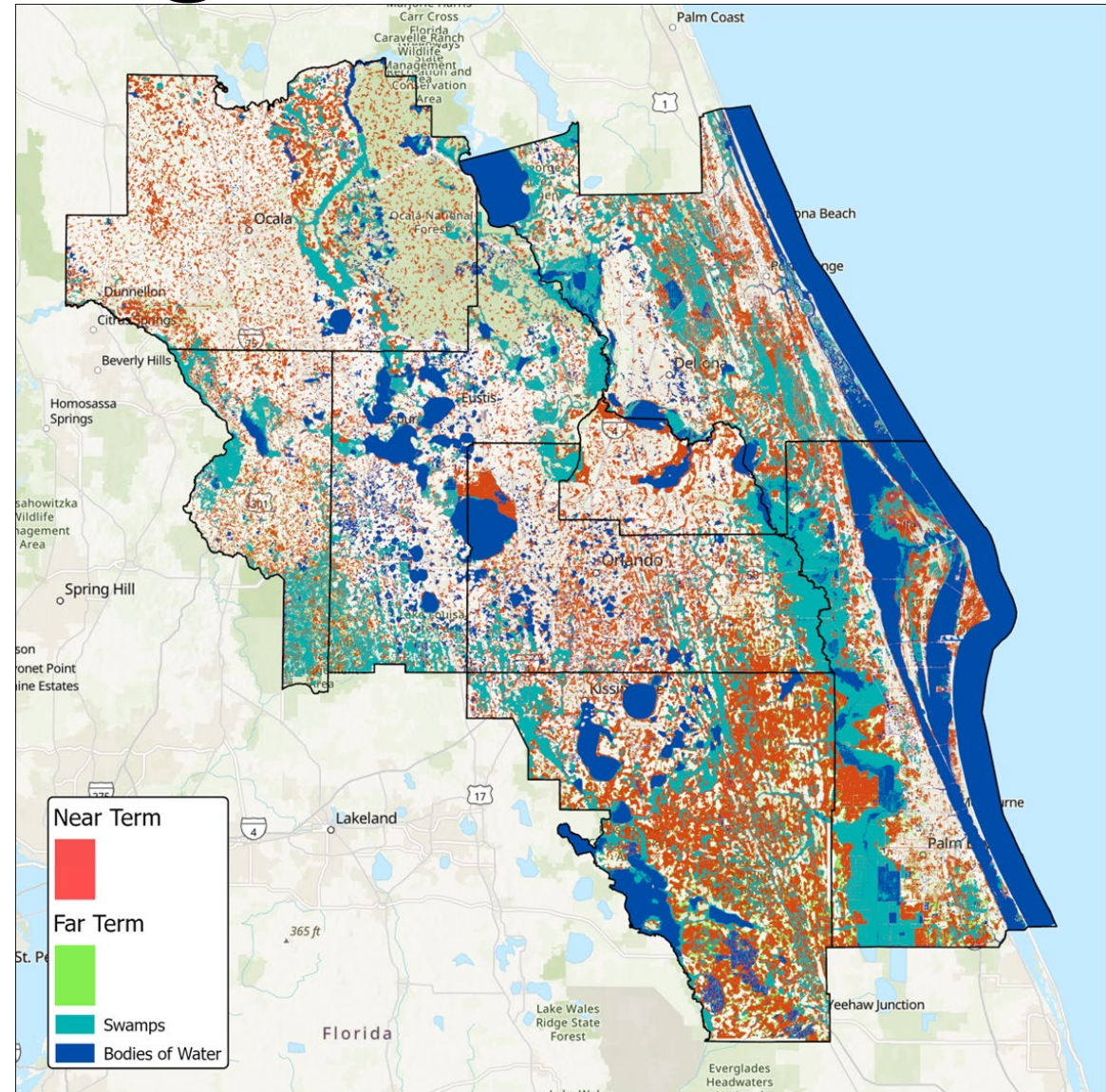
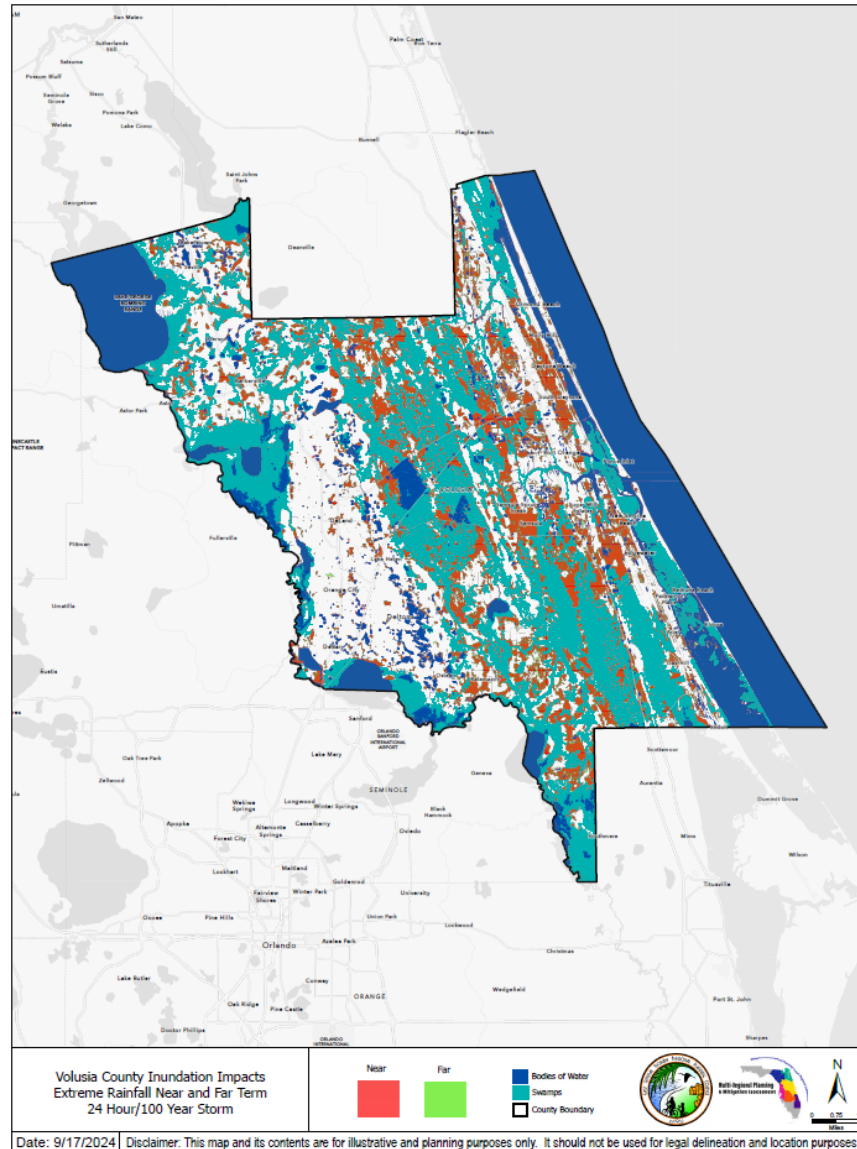
Impervious Surfaces



Burn Lines



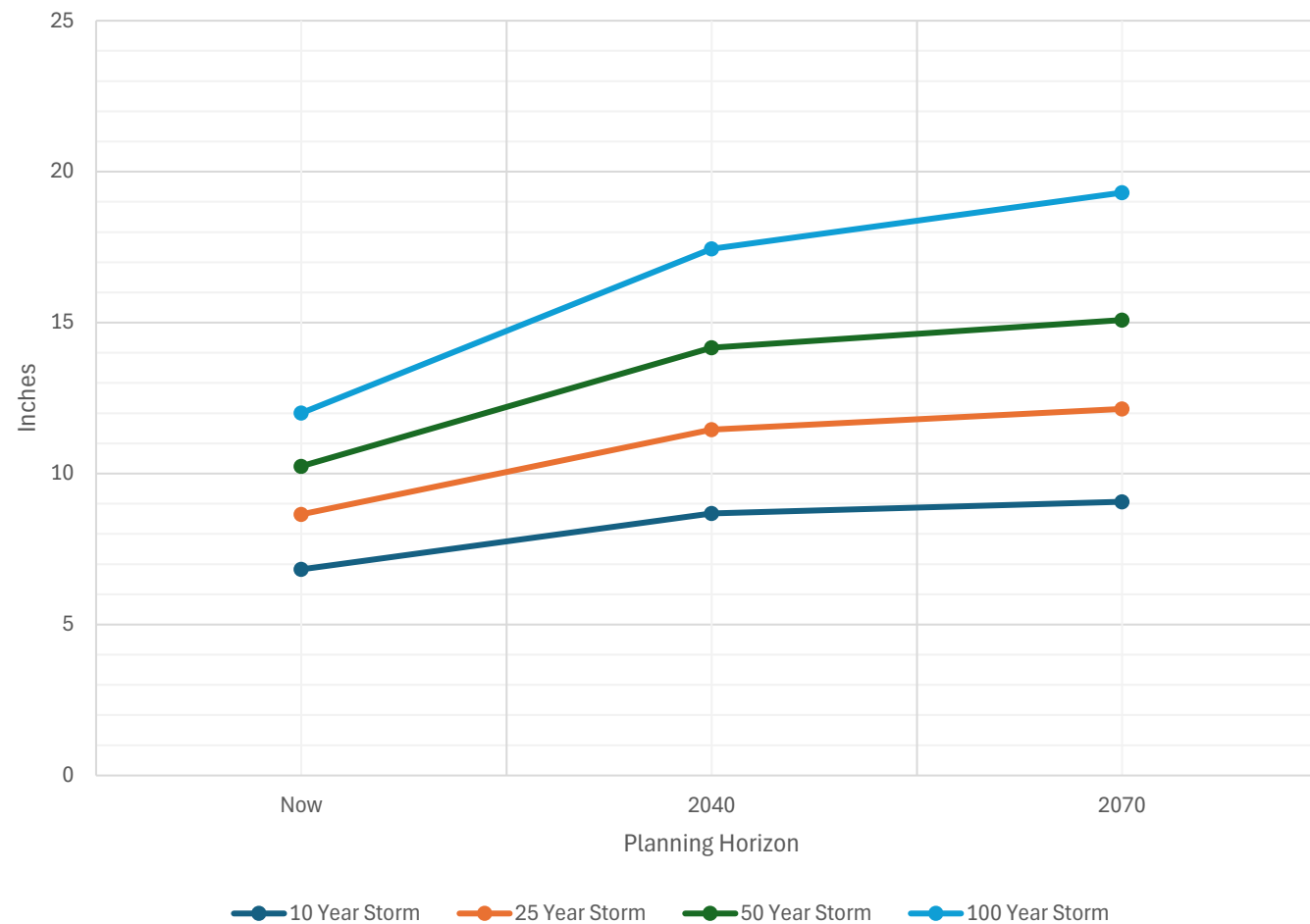
# Flood Modeling Results



# Future Extreme Rainfall

| Volusia County | 10 Year Storm | 25 Year Storm | 50 Year Storm | 100 Year Storm |
|----------------|---------------|---------------|---------------|----------------|
| Now            | 6.8272734     | 8.6491423     | 10.2437019    | 12.004324      |
| 2040           | 8.6834764     | 11.455349     | 14.1707621    | 17.4449844     |
| 2070           | 9.0666971     | 12.1412573    | 15.0866604    | 19.3057728     |

Volusia County Future Extreme Rainfall



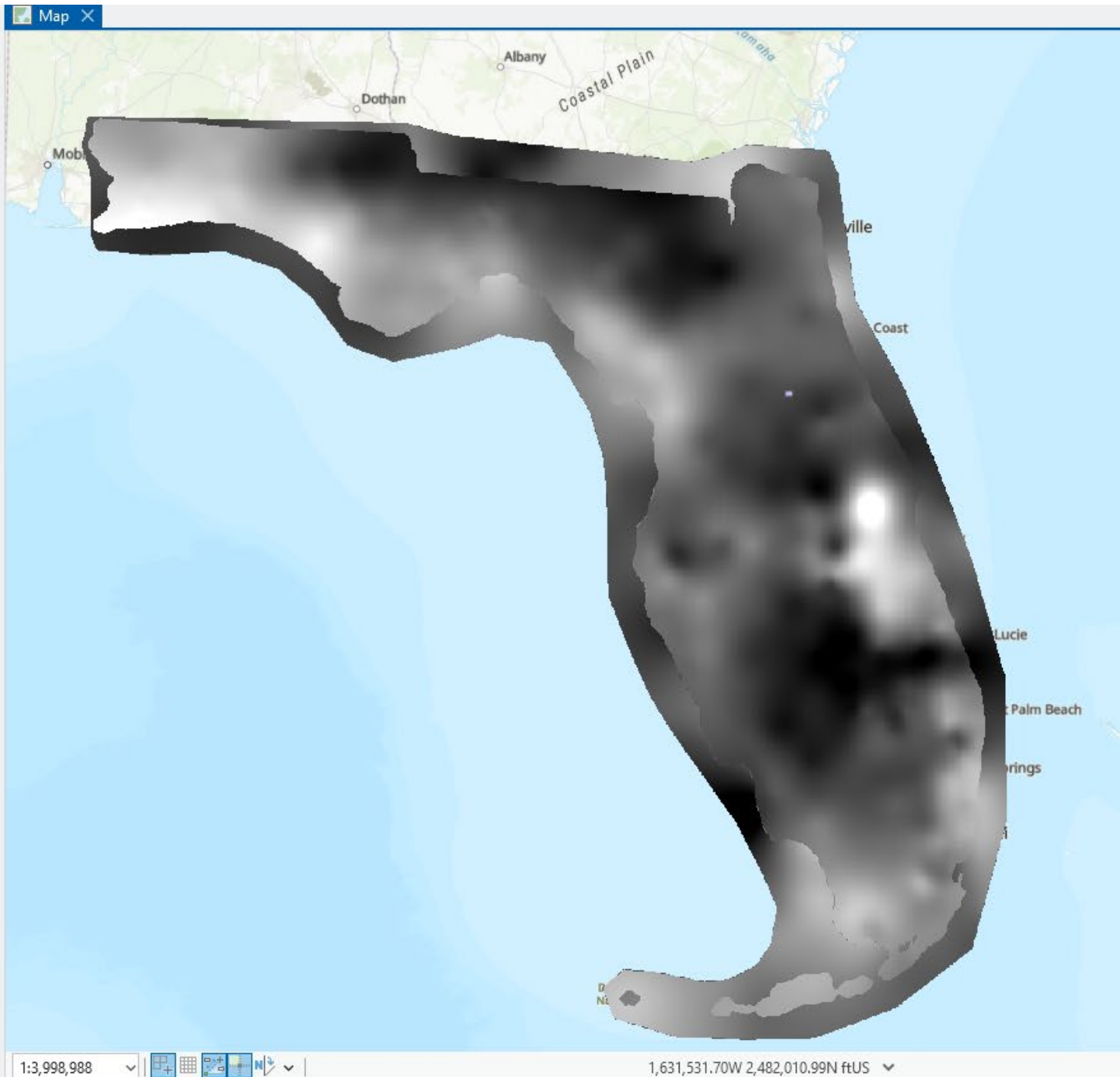
# Contents

Search

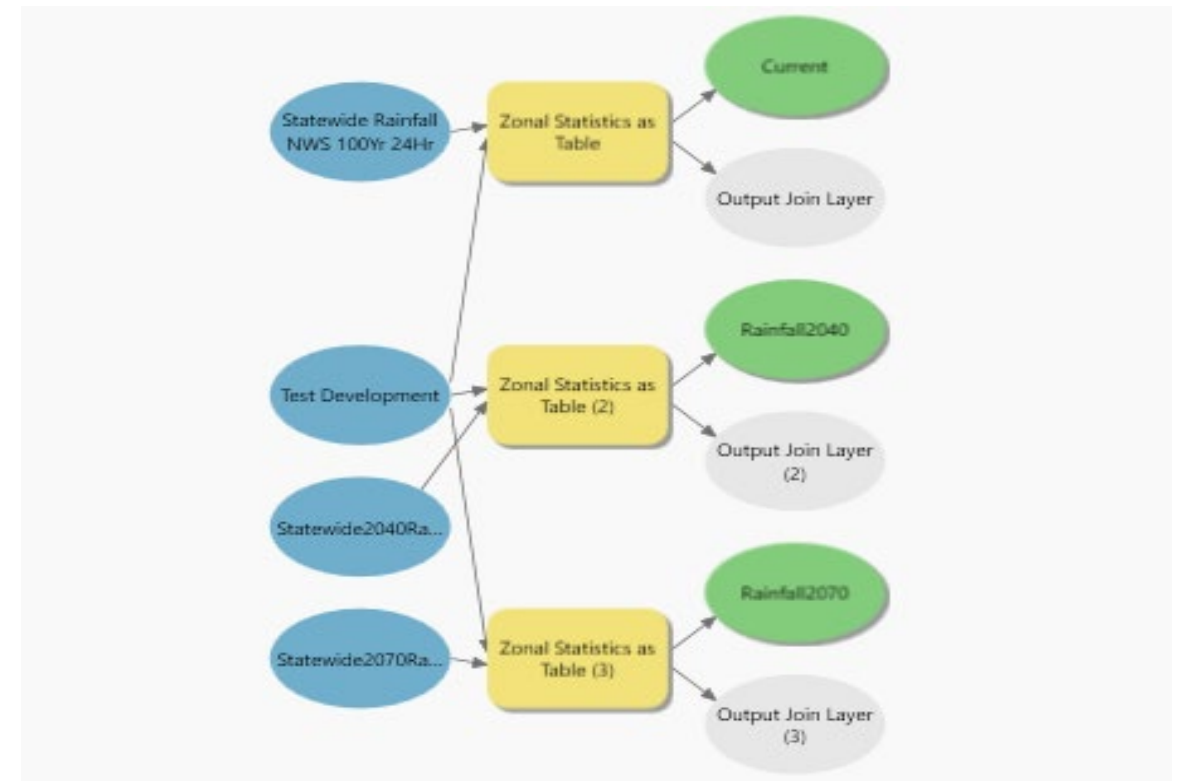


## Drawing Order

- Map
  - ☒ Test Development
    - Value
      - 32.0681
      - 14.5216
  - ☒ Statewide2070Rainfall
    - Value
      - 27.9545
      - 11.3697
  - ☒ Statewide2040Rainfall
    - Value
      - 16.976
      - 9.021
  - ☒ Statewide Rainfall NWS 100Yr 24Hr
    - Value
      - 2.00565
      - 1.15567
  - ☒ CORDEX\_Near\_May24
    - Value
      - 2.64838
      - 1.27436
  - ☐ NWS100yr24h
    - Value
      - 16976
      - 9021
  - ☒ World Topographic Map
  - ☒ World Hillshade







| Volusia County<br>Planning Horizon | Min       | Max       | Mean      |
|------------------------------------|-----------|-----------|-----------|
| Present Day                        | 11.576    | 11.818    | 11.687533 |
| 2040                               | 17.204357 | 17.320299 | 17.264274 |
| 2070                               | 18.222189 | 18.677467 | 18.42829  |

# Looking ahead...

- Select Projects for Regional Mitigation List
- Conceptual Small Area Mitigation Plans
- Web-Based Regional Resilience Exposure Tool
- ArcGIS Pro Inundate! Tool
- Local Implementation and Uses



# Questions?

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