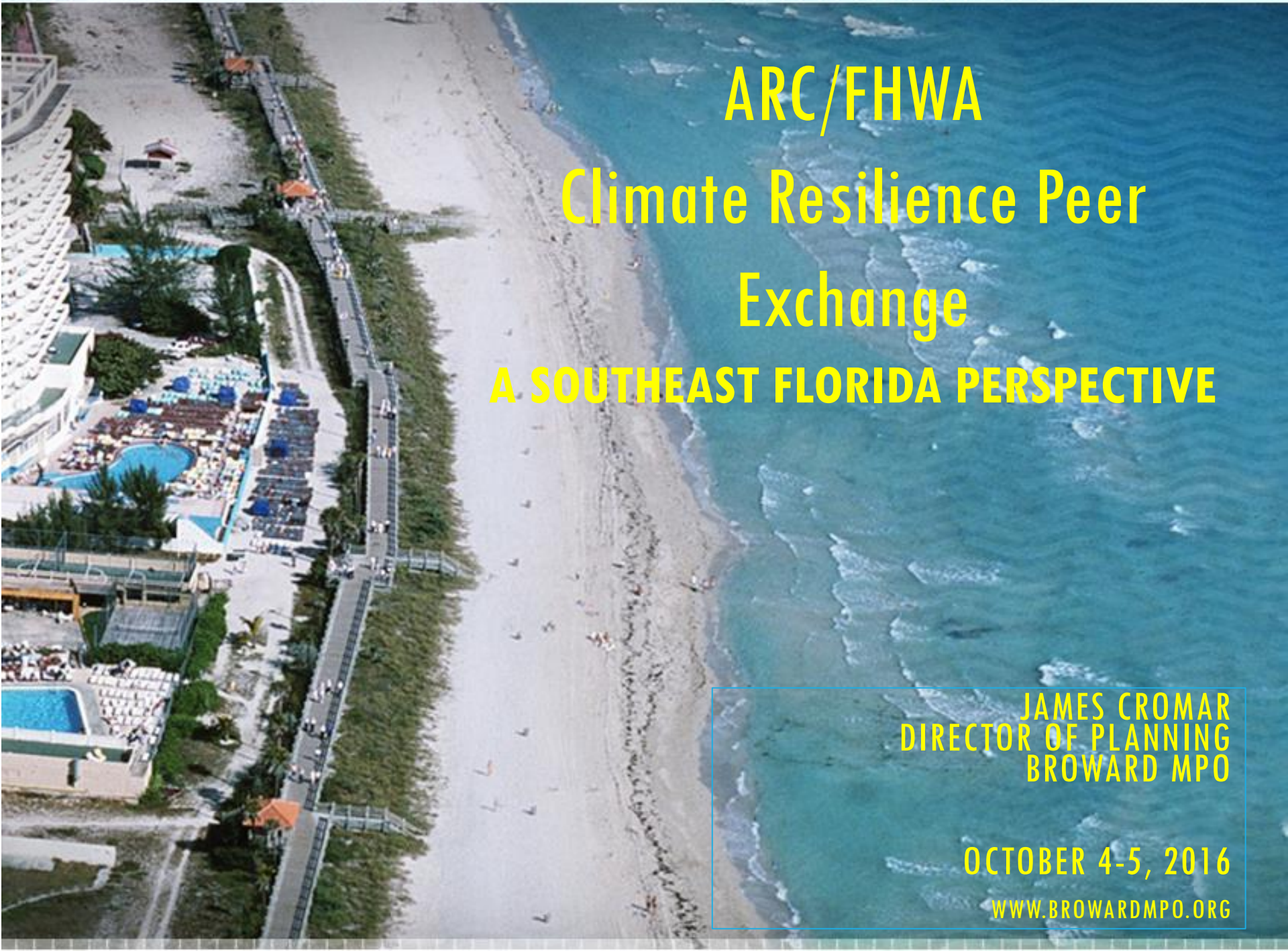


ARC/FHWA Climate Resilience Peer Exchange

A SOUTHEAST FLORIDA PERSPECTIVE

JAMES CROMAR
DIRECTOR OF PLANNING
BROWARD MPO

OCTOBER 4-5, 2016

WWW.BROWARDMPO.ORG

Introduction

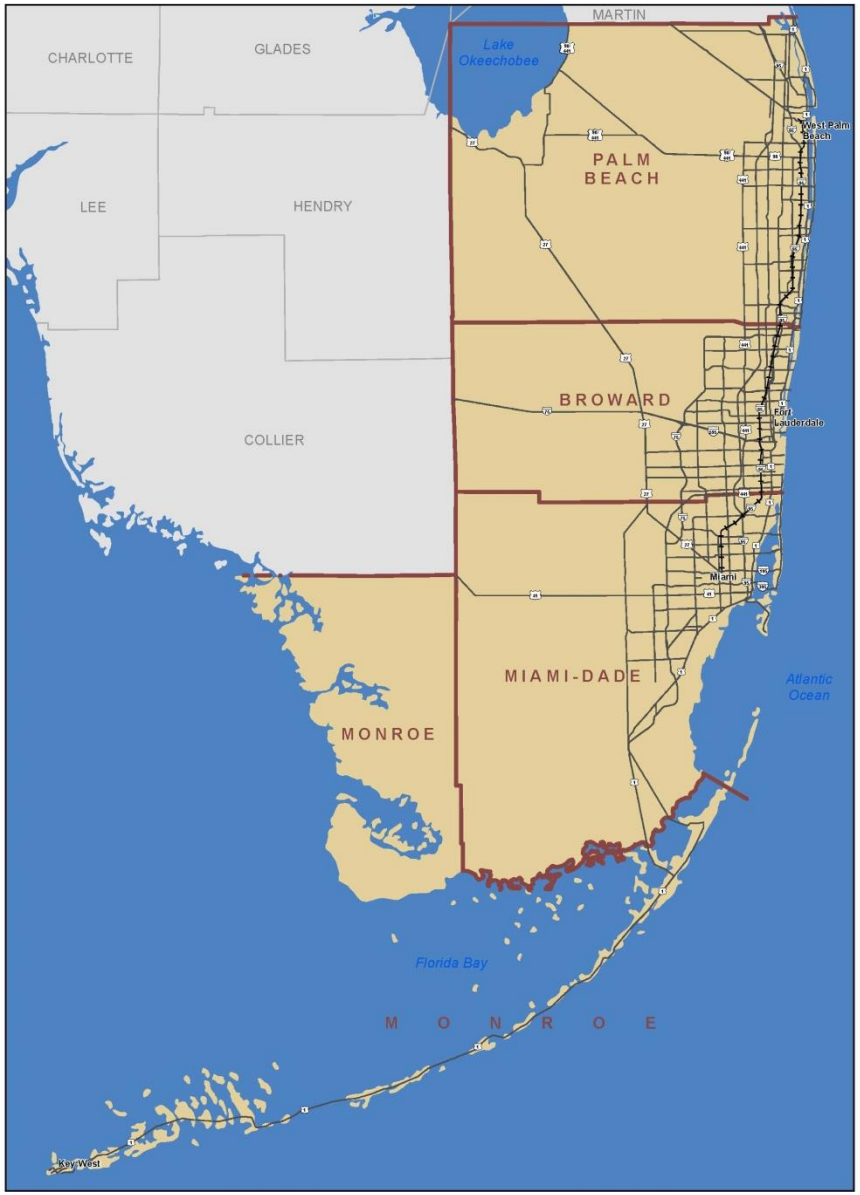
Southeast Florida

Palm Beach County
- Major City: West Palm Beach
- Light urban, mostly suburban, some rural

Broward County
- Major City: Fort Lauderdale
- Light urban, mostly suburban

Miami-Dade County
- Major Cities: Miami, Miami Beach
- Dense urban, mostly suburban, some rural

Monroe County
- Major City: Key West
- Series of islands, and rural



Broward MPO
Metropolitan Planning Organization

Location

Photo credit: Art Seitz

Location

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Location

Lesson Learned:
We were not prepared

Photo credit: Art Seitz

Climate Change Planning in South Florida

Climate Change planning efforts/events:

Regional efforts:

Southeast Florida Regional Climate Change Compact

Transportation focus:

FHWA Climate Change Pilot Project

Long range planning:

FDOT Storm Surge and Network Disruption

Emergency actions:

A1A washout and reconstruction

Implementation programs:

"Miami Beach Rising Above"

Climate Change Planning in South Florida

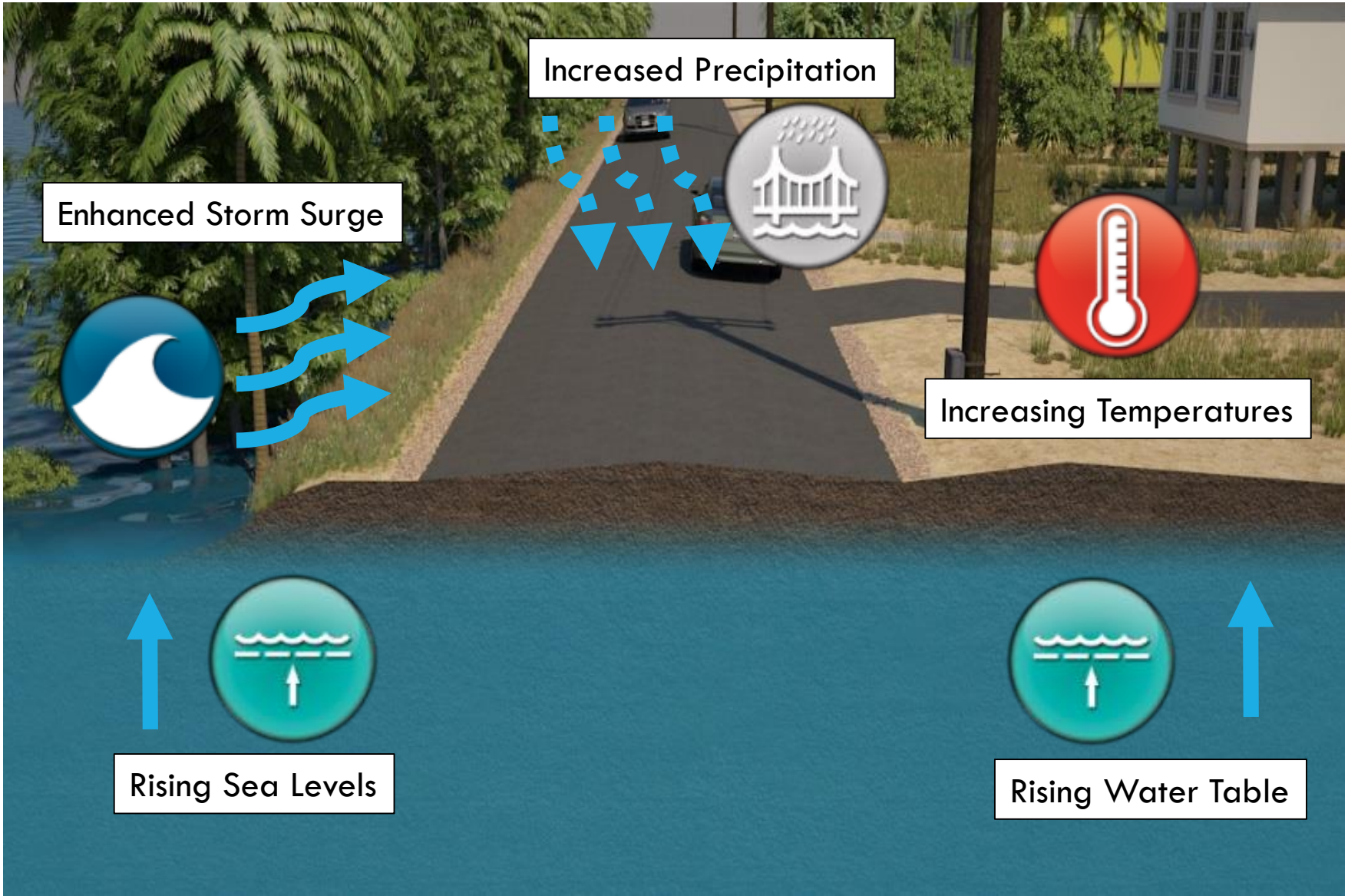
Sea Level Rise

Increasing Temperatures

Storm Surge

Inland Flooding

Climate Change Planning in South Florida



Regional Efforts: Climate Change Planning

Southeast Florida Regional Climate Change Compact

4 Counties

- Southeast Florida Transportation Council & South Florida Regional Transportation Authority
- Monroe County
- Palm Beach County
- Broward County
- Miami-Dade County
- Palm Beach MPO
- Broward MPO
- Miami-Dade MPO

2 RPCs

- South Florida Regional Planning Council
- Treasure Coast Regional Planning Council

2 FDOT Districts

- District IV
- District VI

Lesson Learned:
Collaborate at different levels of government

Transportation Focus: Climate Change Planning

Southeast Florida Regional Climate Change Compact

FHWA Climate Change Pilot Project

4 Counties

2 RPCs

2 FDOT Districts

Southeast Florida Transportation Council & South Florida Regional Transportation Authority

Monroe County

South Florida Regional Planning Council

Treasure Coast Regional Planning Council

District IV

District VI

Palm Beach County

Broward County

Miami-Dade County

Palm Beach MPO

Broward MPO

Miami-Dade MPO

SEFTC Southeast Florida Transportation Council

Transportation Focus: FHWA Climate Change Pilot Project

GOALS

- Build upon existing vulnerability assessments.
- Minimize impacts of extreme climate events and Sea Level Rise (SLR) on **regional transportation network**.
- Develop tools that integrate climate change adaptation goals into the transportation decision making process.
- Prepare a climate change adaptation model for other public transportation agencies.

Transportation Focus: FHWA Climate Change Pilot Project

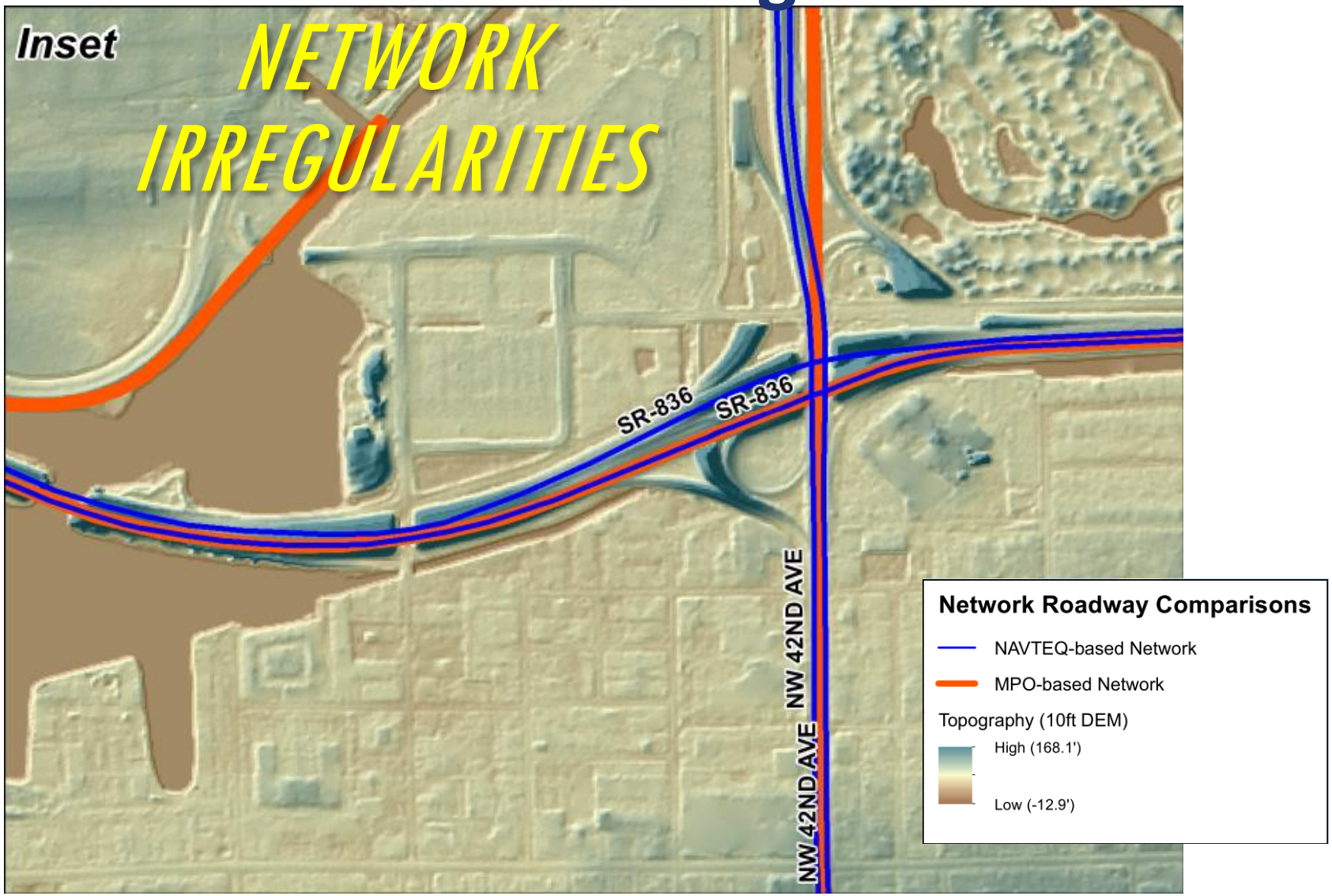
Inventory and exposure assessment

Examine adaptive capacity

Assess risk

Integrate into decision making

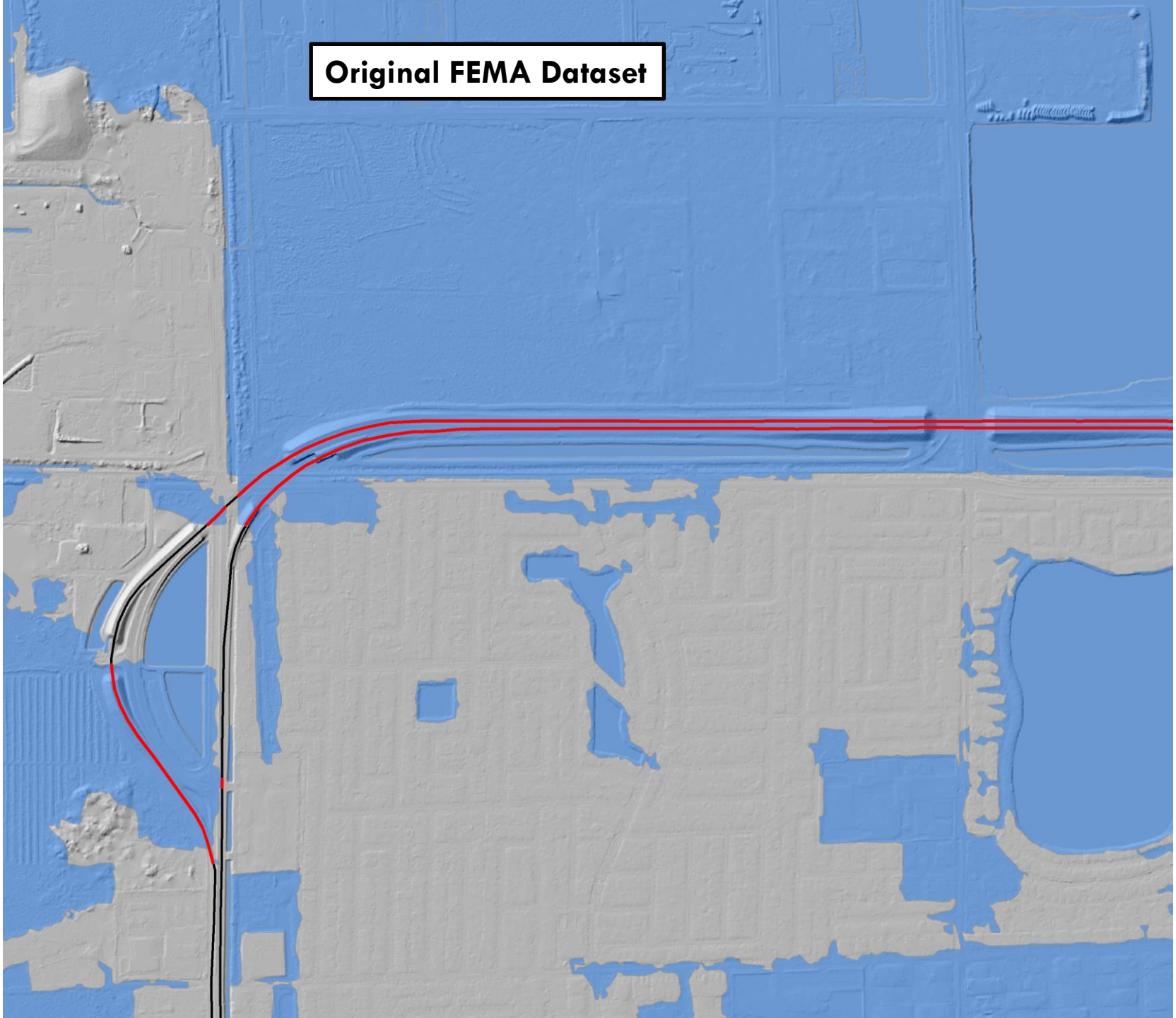
Challenges in Planning for Climate Change

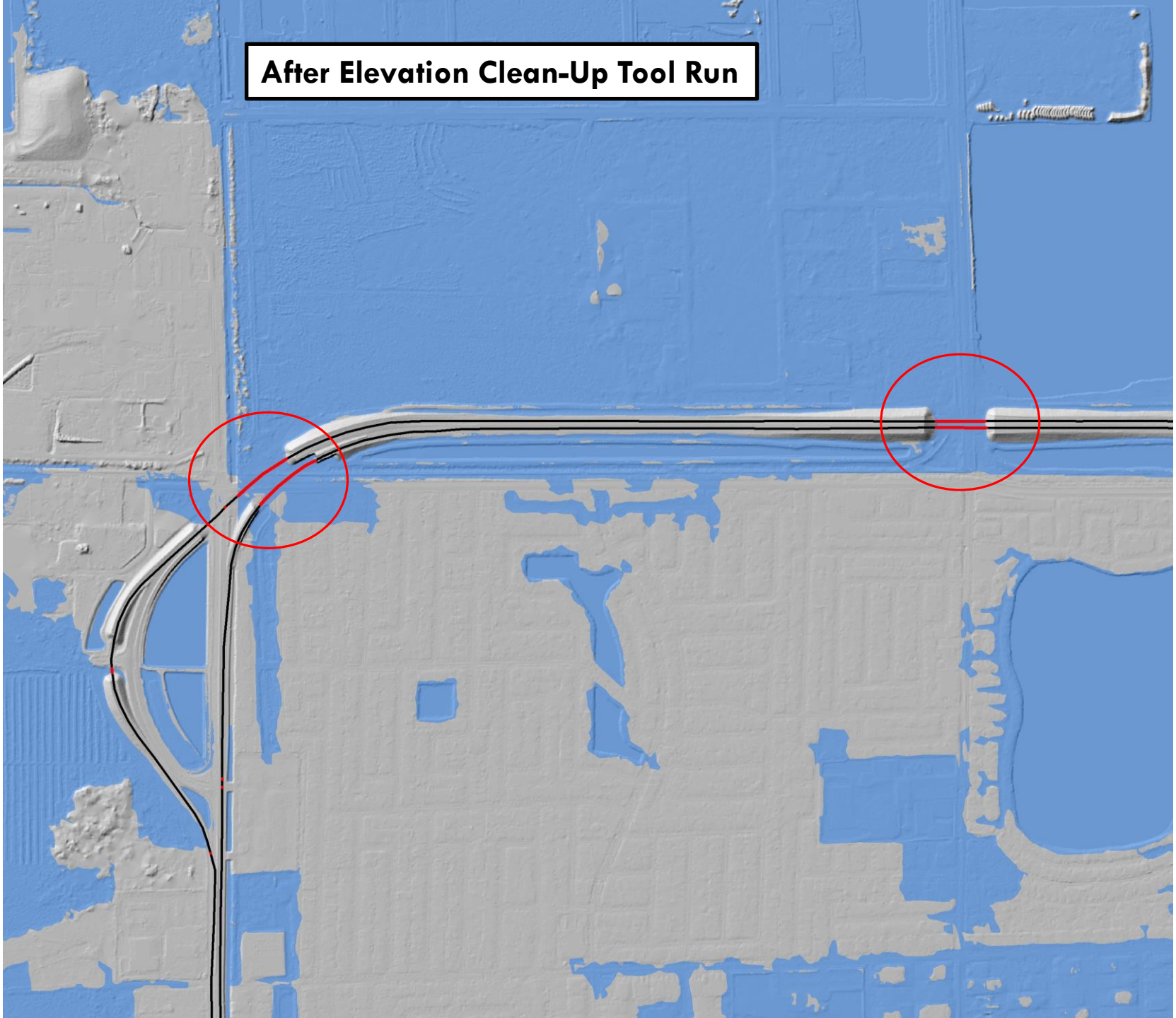


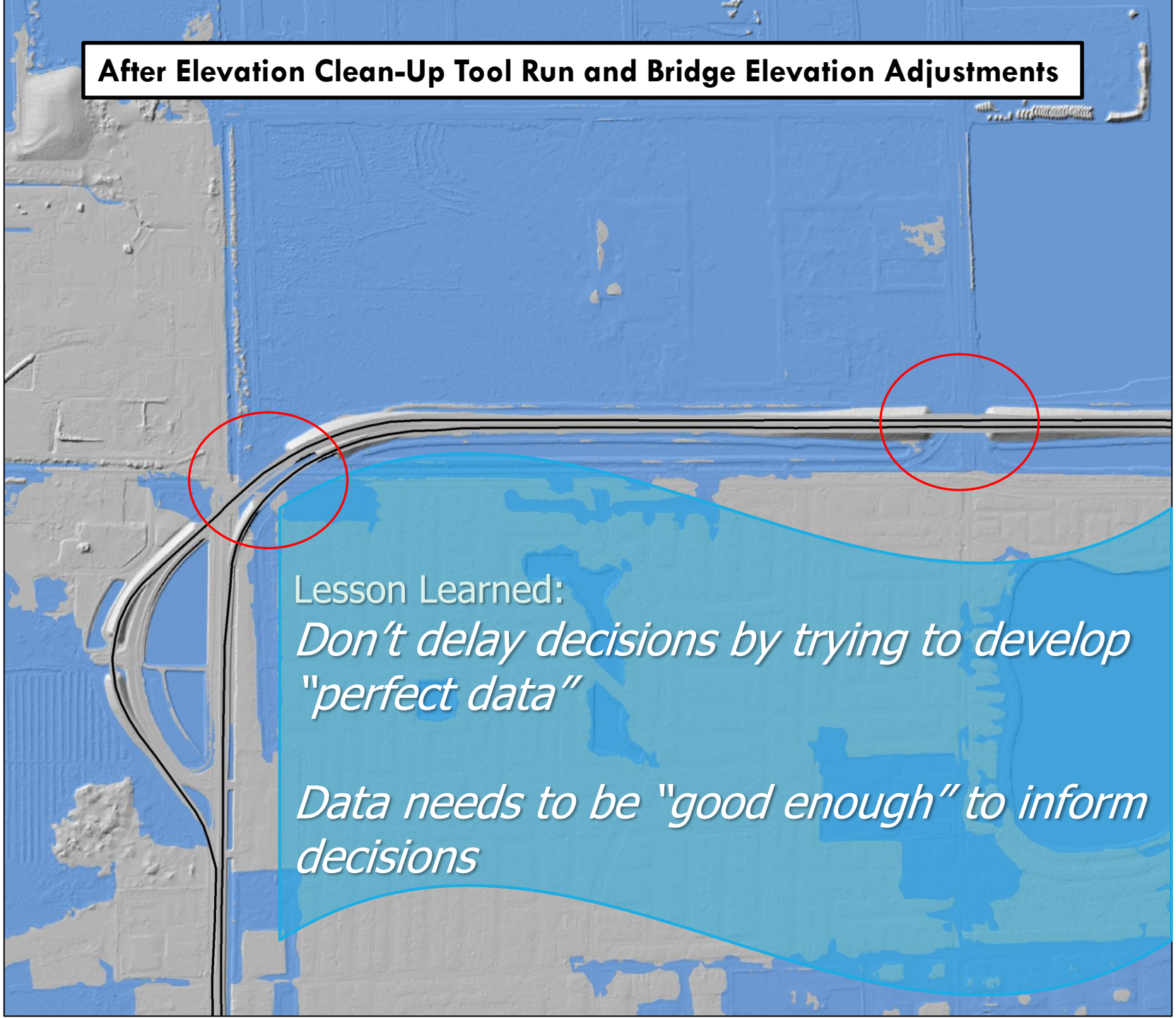
Challenges in Planning for Climate Change

FEMA DATA EXAMPLE

False inundation examples (road on embankment)


Original FEMA Dataset


After Elevation Clean-Up Tool Run


After Elevation Clean-Up Tool Run and Bridge Elevation Adjustments
Lesson Learned:
Don't delay decisions by trying to develop "perfect data"
Data needs to be "good enough" to inform decisions

ASSESSING RISK

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Identify Assets of Interest

Regional road network

Tri Rail network

Calculate the Vulnerability Scores for Each Asset

Sensitivity

- Pavement condition rating (weighted average by segment) (roads)
- Bridge condition index
  - Number of bridges per segment
  - Scour rating (roads)
  - Substructure condition rating (roads)

Exposure

- % of segment inundated by SLR (1, 2, & 3 Ft.)
- % of segment inundated by 100-yr surge (current, +1, +2, & +3 Ft. SLR)
- Inland flooding index (current, +1, +2, & +3 Ft. SLR)
  - Groundwater table depth
  - SLR impact distance-decay factor
  - Elevation & distance relative to FEMA 100-yr precip floodplain
- Location in VE zone
- Previous flooding issues

Adaptive Capacity

- Average annual daily traffic (roads)
- Heavy commercial average daily traffic (roads)
- Bus ridership on segment (roads)
- Tri-Rail ridership on segment (rail)
- Detour length (roads)
- Maximum volume / capacity ratio on detour route (roads)

Rank Flood Vulnerabilities by County

Future Flooding

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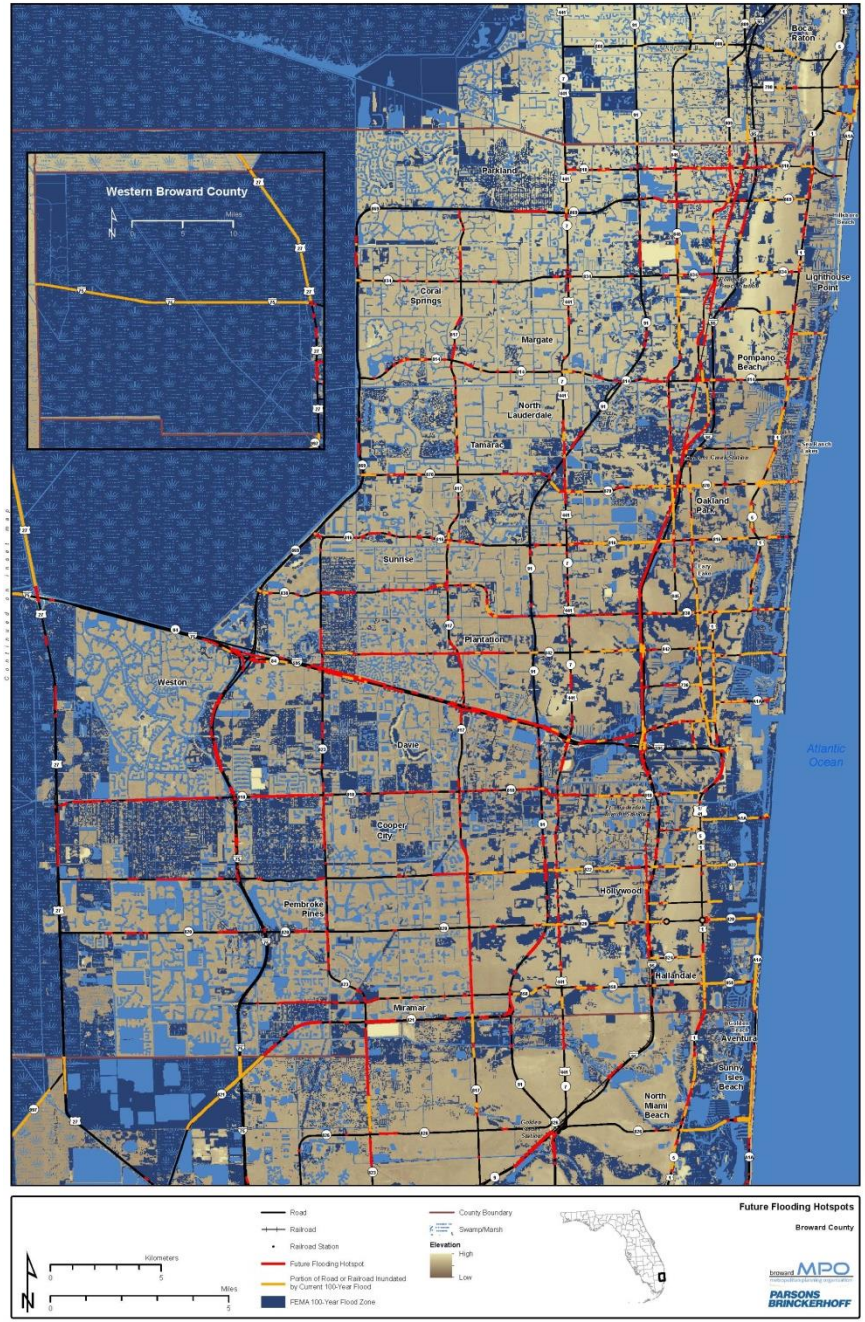

Vulnerability

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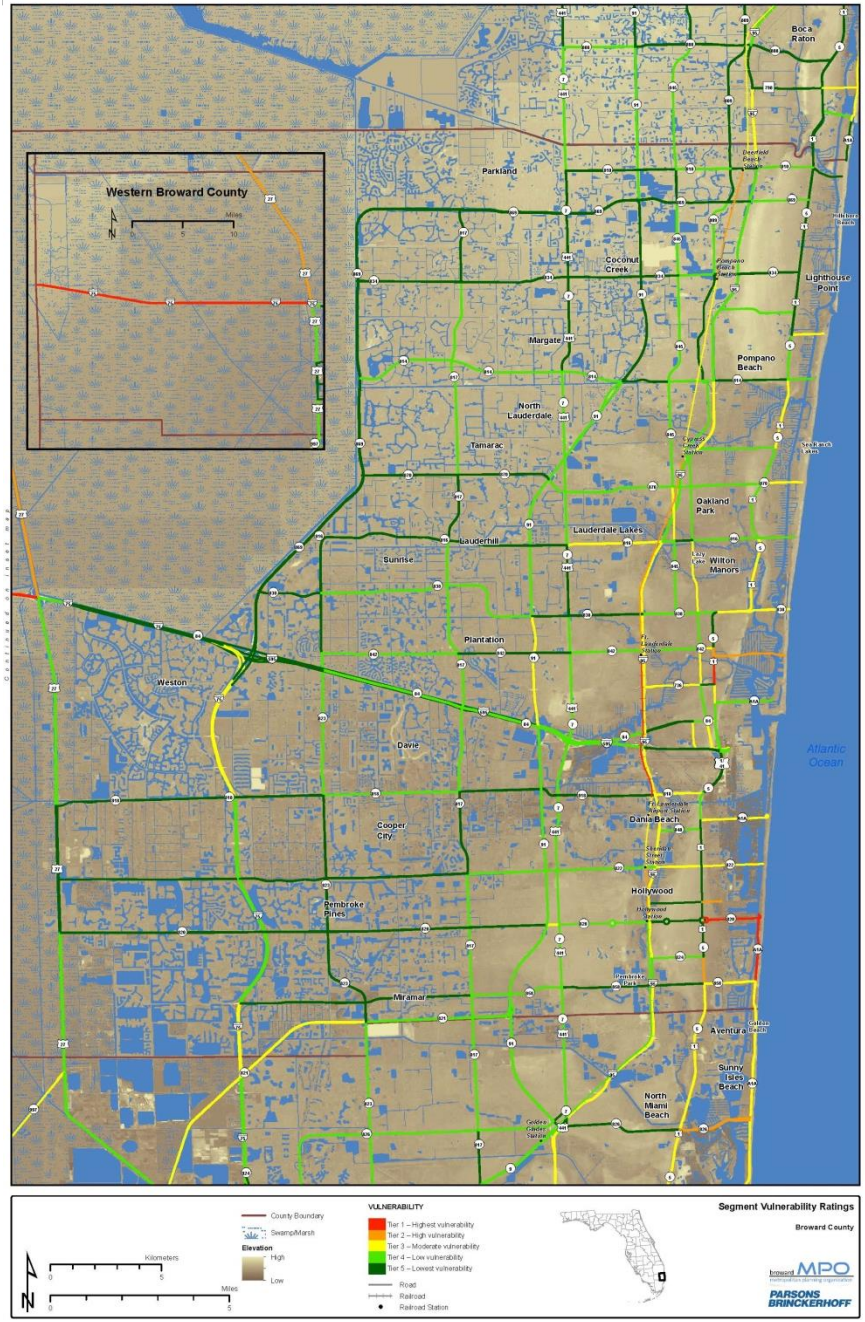
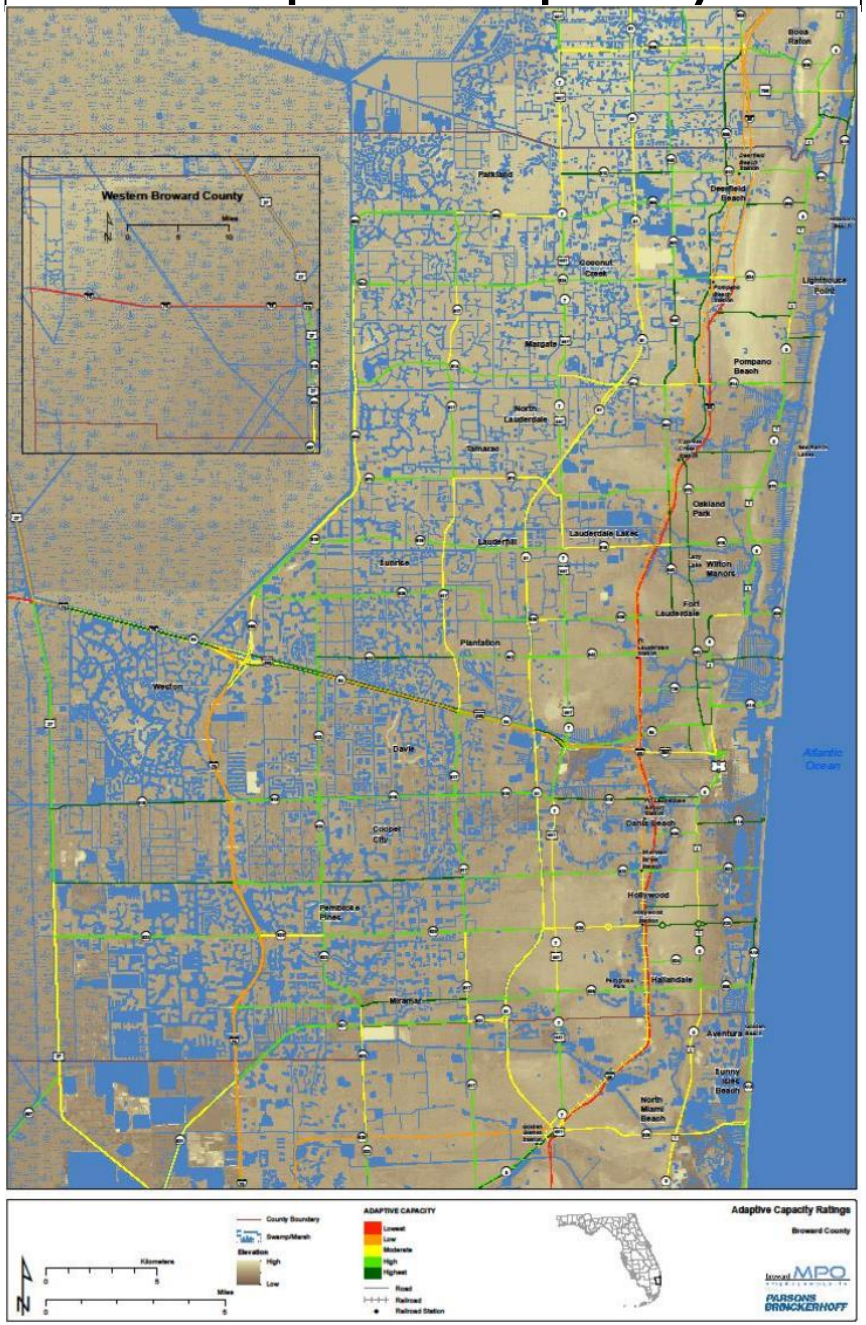


Adaptive Capacity



FHWA Climate Change Pilot Project

Integrating Data into Decision Making

- Transportation Planning and Prioritization
- Rehabilitation or Reconstruction of Existing Facility in High Risk Areas
- New Facility on New ROW in High Risk Areas
- Operations
- Maintenance

http://www.browardmpo.org/index.php/current-projects-studies/adapting-to-climate-change

FHWA Climate Change Pilot Project

Adaptation Strategies/
Linkage to Decision-Making

Transportation Planning and Prioritization

- Develop a goal statement relating to climate change that can be used as part of the transportation planning process.
- Identify climate change-related prioritization criteria that can be used as part of the project priority/programming process.
- Identify and apply performance measures to promote transportation system resiliency.
- Apply tools to identify and assess continuing climate change-related impacts.

What's Next in Broward MPO

Taking Action in Broward:

- Determine potential roadway impacts in vulnerable areas
- Propose actions to reduce vulnerability
- Prioritize the funding
- Implement projects

Surtax on November 2016 ballot

- ½ cent for Transportation, ½ cent for Infrastructure
- Street flooding as identified target area

What's Next in Southeast Florida

FDOT Storm Surge and Network Disruption

- Utilize data from FHWA Pilot Project
- Overlay historic storm tracks
- Analysis of added impacts of Sea Level Rise
- Initial results show greater impacts on transportation network
- Identification of needs and potential improvements

Lesson Learned:
Work around state level impediments

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What's Next in Ft. Lauderdale

Photo credit: Art Seitz

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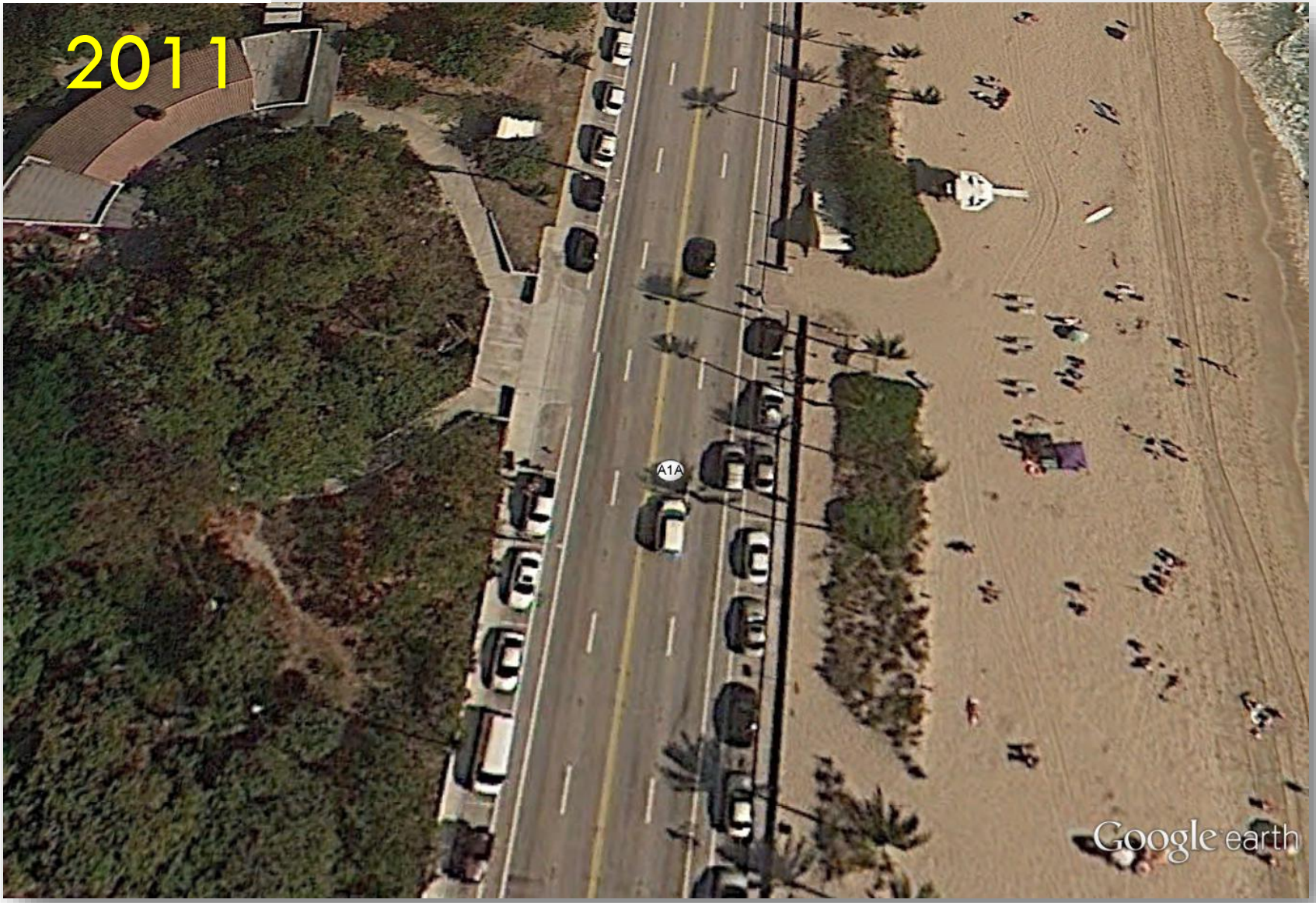
What's Next in Ft. Lauderdale



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What's Next in Ft. Lauderdale

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What's Next in Ft. Lauderdale

What's Next in Ft. Lauderdale

Adaptation Action Areas (AAA)

2011 - Florida State legislature passes Community Planning Act

- Permits a local government with a Comprehensive Plan Coastal Management Element the ability to include a plan for sea level rise impacts

2013 - City of Fort Lauderdale Pilot Project

2015 - City's Community Investment Plan included a new AAA section

- Includes the identification of the first 16 AAAs
- Identifies 38 projects for funding within those AAAs

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What's Next in Miami Beach

Photo credit: James Cromar

What's Next in Miami Beach

Photo credit: James Cromar

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What's Next in Miami Beach

Photo credit: James Cromar

Summary & Takeaways:

Tools/Resources:

- GIS mapping layers
- Adaptive capacity model

Recommendations:

- Regional collaboration / Local action
- Adopt standards at state level – for long-term infrastructure needs

Summary & Takeaways:

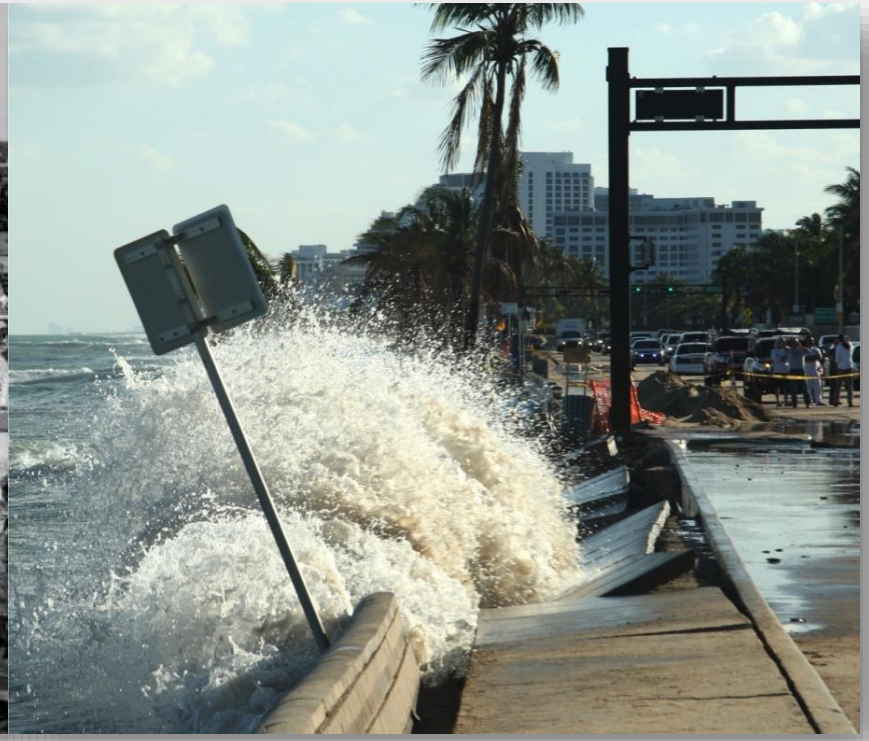

Photo credit: Art Seitz

Summary & Takeaways:

Photo credit: Fort Lauderdale Historical Society

THANK YOU!

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http://www.browardmpo.org/index.php/current-projects-studies/adapting-to-climate-change

Summary & Takeaways:

Adaptation Strategies/
Linkage to Decision-Making

Transportation Planning and Prioritization

- Develop a goal statement relating to climate change that can be used as part of the transportation planning process.
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- Apply tools to identify and assess continuing climate change-related impacts.

Summary & Takeaways:

Adaptation Strategies/

Linkage to Decision-Making

Rehabilitation or Reconstruction of Existing Facility in High Risk Areas

- Harden or armor key infrastructure components (e.g., embankments or bridge piers) against additional extreme weather-related stresses.
- Incorporate "early warning indicators" for potential extreme weather-related risks into asset and maintenance management systems.

Summary & Takeaways:

Adaptation Strategies/

Linkage to Decision-Making

Rehabilitation or Reconstruction of Existing Facility in High Risk Areas

- Consider new road and transit design approaches and standards to minimize potential disruption due to extreme weather events (e.g., profile elevation).
- Near coastal areas and over longer term, consider sea level rise as a "given" in design of coastal facilities.
- Redesign drainage systems to handle larger flows.

Summary & Takeaways:

Adaptation Strategies/

Linkage to Decision-Making

New Facility on New ROW in High Risk Areas

- Apply design criteria - but in addition if possible, consider realignments or relocation

Summary & Takeaways:

Adaptation Strategies/
Linkage to Decision-Making

Operations

- Identify pre-planned detour routes around critical facilities whose disruption or failure would cause major network degradation.
- Although Florida already has well-tested emergency response action plans, in light of the results of this study, coordinate with FDOT and emergency responders to identify potential strategies for dealing with the identified risks.

Summary & Takeaways:

Adaptation Strategies/

Linkage to Decision-Making

Maintenance

- Avoid significant disruptions and maintenance demands by "hardening" such items as sign structures and traffic signal wires.
- Keep culverts and drainage structures debris free and maintained to handle flows.