



Climate, Sea Level Rise and Planning for the Future

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Foreseeability and the Chicago Flooding: April 2013

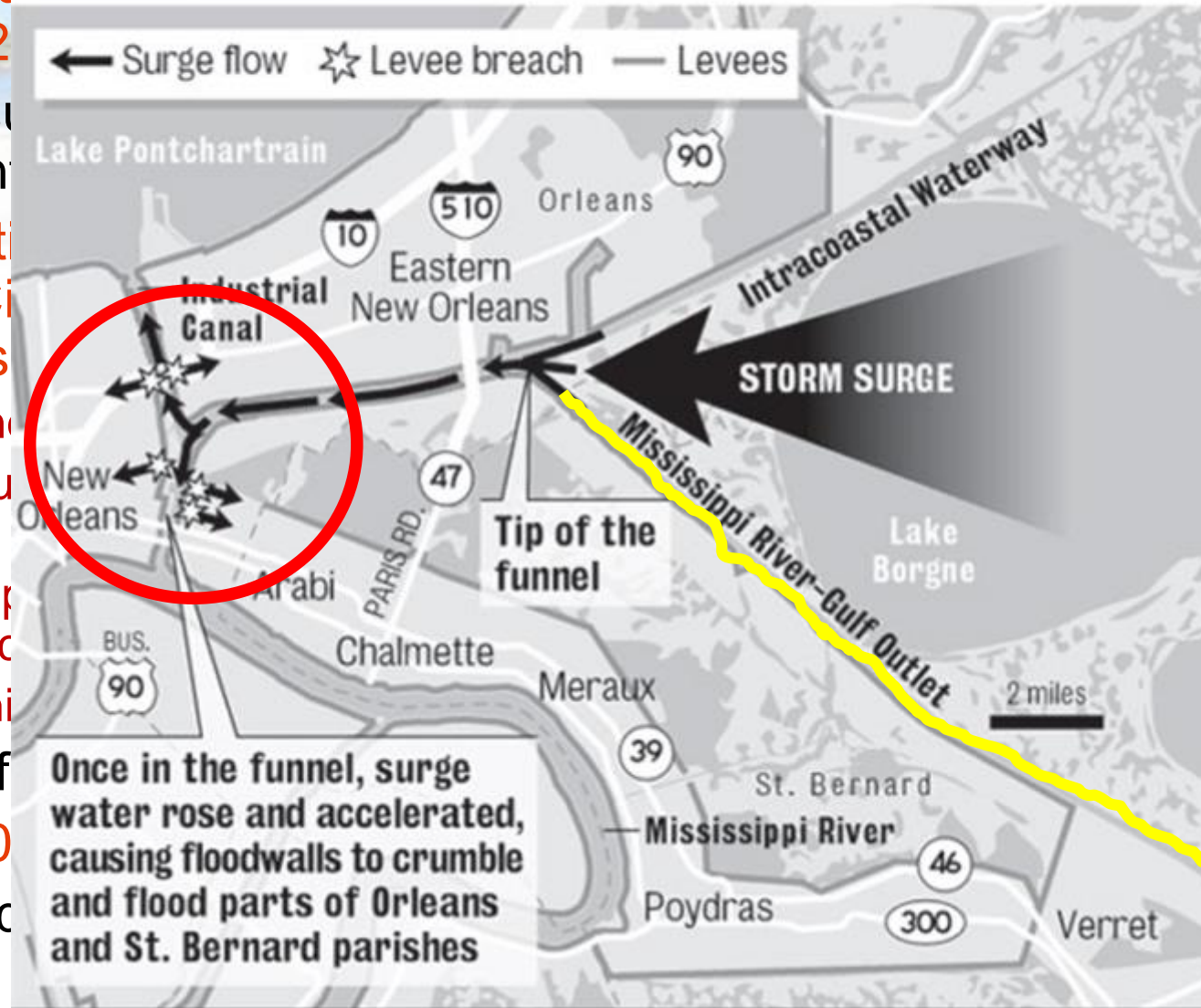
Farmers
Insurance
lawsuit



- *In re Katrina Casualties*, 644 (E.D. La. 2005)
- 400+ plaintiffs sued for mismanagement
- 7 of these plaintiffs filed appeals to 5th Circuit claiming negligent (gross negligence)
 - No defense under Louisiana law
 - No exception under Louisiana law (effect)
 - Should have upgraded levees to a changing climate
 - Negligence (this was the only one that survived)
- Scientific data “flooded” the court
- Just under \$720 million in damages
- Corps dismissed

STORM SURGE DURING HURRICANE KATRINA

Much of the area's flooding from Katrina resulted from storm surge that rocketed through a narrow “funnel” created where the Mississippi River-Gulf Outlet (MR-GO) joins the Intracoastal Waterway (GIWW).



STAFF GRAPHIC BY EMMETT MAYER III

647 F. Supp.2d

Corps'

s win, Corps
there & Corps was

against storm surge

to consider adapting

court

New Life for Katrina Theories-Takings (St. Barnard Parish v. US)

- Case originally filed 2005. Federal judge Friday (5/1/15) rules that Corps' construction and absent maintenance of MRGO created a "ticking time bomb"
- "Temporary taking" of the value of residential, business and parish-owned property
- MR-GO contributed to increased **salinity** and loss of **habitat**, including wetlands, eroding **natural protection** and increasing **flooding risk**
- "Certainly by 2004, the Army Corps no longer had any choice but to recognize that a hurricane inevitably would provide the meteorological conditions to trigger **the ticking time bomb** created by a substantially expanded and eroded MR-GO and the resulting destruction of wetlands that had shielded the St. Bernard Parish for centuries," Braden wrote
- May 4, 2016 Judge rules that Corps' liability for lost property values in St. Bernard Parish and the Lower 9th Ward of \$3.16 million plus interest to six landowners (temporary taking)
- Appeal July 6 by Justice

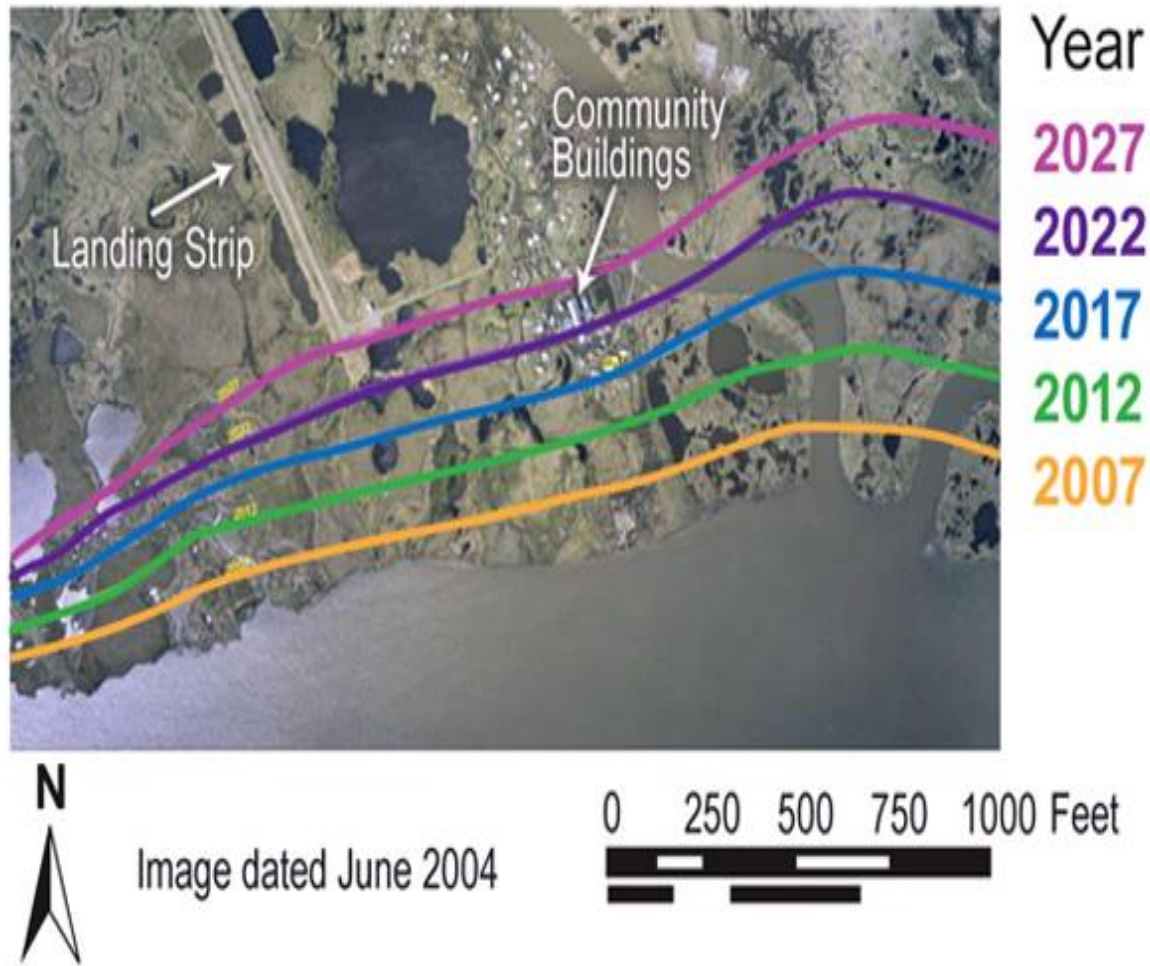
BURNSIDE
CHICAGO INDUSTRIAL CORRIDOR
Richard M. Daley Mayor

14'-2"

SPEED LIMIT
30



Case Studies in Relocation



could become environmental refugees by 2050

Planning for New Transportation Systems



Newtok, AK
Charles Mason
NY Times
In Planning August/
September 2016

Kivalina & Steadfast- Who is Going to Move the Alaskan Tribe?

- Nuisance claim for “up to” \$400M from the energy industry for flooding damage caused by climate change.
- Supreme Court passes May 20, 2013 on reconsideration of appellate dismissal (political question)
- “...if an individual driving a car (and thus contributing to emissions) could also be a defendant, and if so, **how court could determine who was liable**”? - CAUSATION
- Steadfast had no duty under the CGL policies issued by it to defend its insured, AES Corp., against climate change/global warming-based causes of action (Vacated, Rehearing and Reaffirmed 4/20/12)
- Steadfast: did the damage result from an “occurrence”? Answer: No (x2)
- “If an insured **knew or should have known** that certain results would follow from his acts or omissions, **there is no 'occurrence' within the meaning of a CGL policy**...”



Kivalina, Alaska

Other Evolving Legal Aspects

NFIP Reform

- FIRM Existing Flood Risk
- Technical Mapping Advisory Council
- Future flood risk

CRS

- Sea Level Rise Credits ~ 500 pts.
- Mapping
- Improvement of rating score

Corps of Engineers

- Corps “(Engineer Technical Letter 1100-2-1) covering “Procedures to Evaluate Sea Level Change: Impacts, Responses and Adaptation” (July 2014)
- Previous “Incorporating Sea-Level Change Considerations in Civil Works Programs”

NEPA

- Agency experience and expertise to determine whether an analysis of GHG emissions/climate change impacts would be useful
- “Rule of reason” to ensure that the type and level of analysis is appropriate for the anticipated environmental effects of the project.
- 8/2/16 Guidance- # on GHGEs if feasible & indirect effects

FFRMS

- Federal investments implemented through Hazard Mitigation Assistance Grants and the Public Assistance Program
- FEMA grants for construction activities in or affecting a floodplain
- Land, land use, construction for “federal projects”

Federal Flood Risk Management Standard

- Expands and modifies 1977 Exec. Order on floodplains
- Larger floodplain, higher standards when federal funding or support involved



FEMA

The Applicability of Executive Order (E.O.) 11988/13690 to FEMA Programs

Introduction

On January 30, 2015, the President signed Executive Order (E.O.) 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, which amended E.O. 11988, Floodplain Management, issued in 1977. Once



U.S. ARMY CORPS OF ENGINEERS

Background

On January 30, 2015, the president signed Executive Order (E.O.) 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, which amended E.O. 11988, Floodplain Management, issued in 1977. Once implemented by Federal agencies, the Federal Flood Risk Management Standard (FFRMS) is intended to reduce the risk and cost of future flood disasters by ensuring that Federal investments in and affecting floodplains are constructed to better withstand the impacts of flooding.

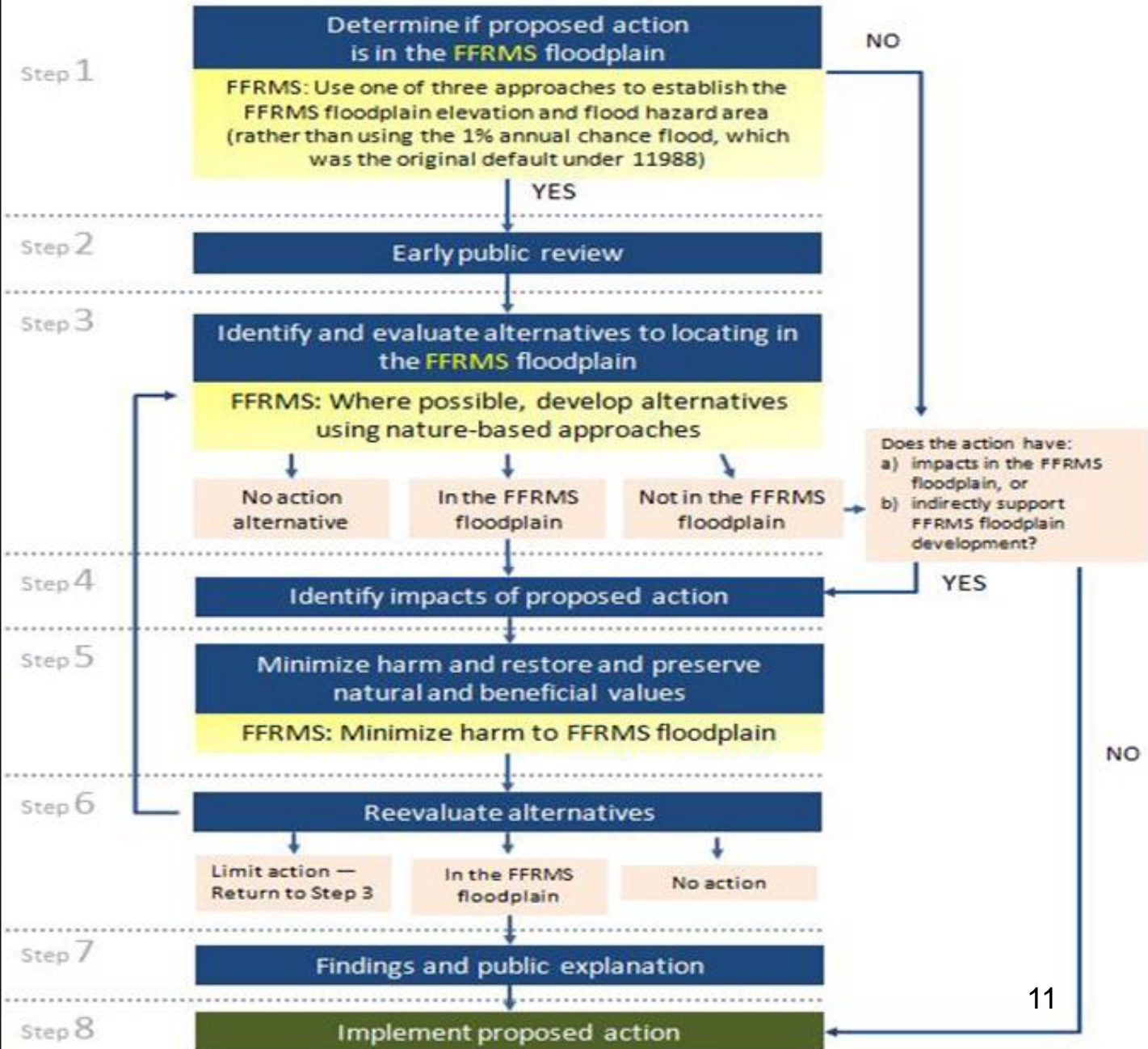
Applicability of Floodplain Management and FFRMS Executive Orders to USACE Permitting Authorities

BUILDING STRONG®

FFRMS

- Redefines floodplain:
 - Climate-informed science, or
 - Freeboard (2 or 3 ft), or
 - 500-year (.02% chance) flood
- EO has received significant public input
- Not yet implemented, but agencies working on it

Eight-step Decision-making Process for EO 11988 incorporating FFRMS



Florida Laws

- Reduction of emissions to 2000 levels by 2017, to 1990 levels by 2025, and by 80% of 1990 levels by 2050.
- Florida adopted California vehicle emission standards reductions (22% by 2012 and 30% by 2016).
- Building Efficiencies/Code, Chapter 553, F.S. increasing standards
- HB 7123: Model Green Building Code (2007)
- HB 697 (GHG reduction strategies in local government's Comprehensive Plan). Some requirements later eliminated.
- HB 7135 (State and Local Government Buildings "greener")
- HB 7179 (PACE)- wind resistance/energy efficiency initiatives for financing (future use for flood mitigation?)
- **Adaptation Action Areas (2011)**
- HB 7117 (Energy Bill- 2012)
- Virtually nothing 2013/2014
- 2015- 5 Bills Passing Related to flood insurance, wind insurance, construction standards/building codes, Citizen's insurance, **Peril of Flood (SB 1094)**

Florida's Law: How Far Does it Go?

- **Comp Planning standards on data:** “Appropriate” and “professionally accepted” data (science on GHG emissions and climate change?)
- **Types of principles in planning:** “Use ecological planning principles and assumptions in the determination of the suitability of permitted development.”
- **Its “sprawl” if:** (VIII) plan or plan amendment allows for land use patterns or timing which disproportionately increase cost in time, money or energy of providing & maintaining facilities / services, including roads, potable water.
- **“Discourage the proliferation” of sprawl if:** project incorporates a development pattern or urban form that achieves four (4) or more of the following.... (IV) promotes conservation of water and energy.
- **Conservation element:** must contain principles, guidelines and standards for conservation that provide long term goals to protect air quality ...
- **Use of mapping tools:** CHHAs and AAAs? Define and provide permissive designations of areas.

Other Authority Related to Planning

- Section 163.3177, F.S. – limit expenditures & protect human life in coastal areas
- Section 163.3178, F.S. – restrict development activities; hazard mitigation; redevelopment; coastal high hazard areas (below Cat 1 storm determined by SLOSH); levels of service for infrastructure
- Section 163.3177, F.S. requires annual reviews of the Capital Improvements Elements to update the Five-Year Capital Improvement Schedule with projects to ensure that adopted level of service standards for public facilities will be achieved and maintained for the five-year period



What are local governments doing?

How local governments are addressing sea level rise

- Comprehensive Planning

- Adaptation Action Areas (“AAAs”) – adopted in 2011; gives local governments option to designate AAAs
- SB 1094: Peril of Flood - enacted 2015; new mandate on local governments to consider sea level rise and other factors that increase flood risk
 - Required in the Coastal Management Element



Photo: www.volusia.org

Flood Peril Legislation (SB 1094)

What are the principle requirements?

- Development and redevelopment principles, strategies, and engineering solutions that reduce flood risks and losses
- Elevation certificates submitted to DEM
- “Flexible” flood insurance coverage
- Other provisions such as flood insurance policy requirements

1. Development and redevelopment **principles and strategies**, that reduce the flood risk in coastal areas from high-tide events, storm surge, flash floods, stormwater runoff, and **the related impacts of sea-level rise**.
2. **Best practices** for the removal of coastal real property from FEMA flood zones
3. **Site development techniques** that may reduce losses and claims made under flood insurance policies
4. Be consistent with, or more stringent than, the flood-resistant construction requirements **in the Florida Building Code** and flood plain regulations
5. Construction activities consistent with **Chapter 161**.
6. Encourage local governments to participate in the National Flood Insurance Program **Community Rating System**

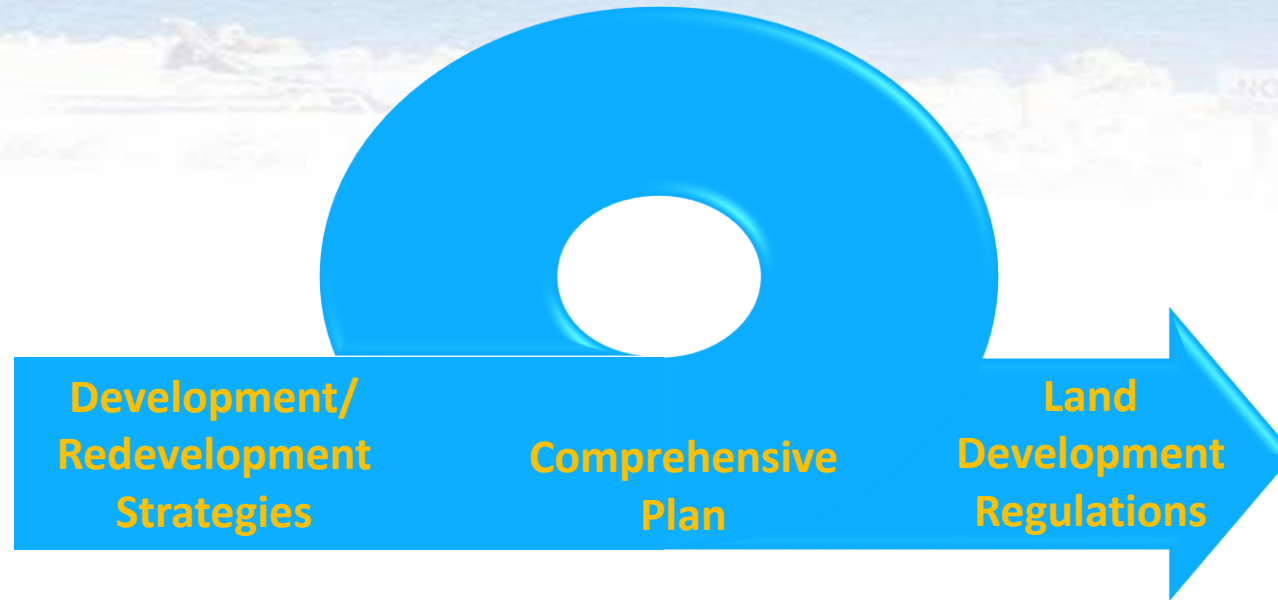
What are local governments doing?

Adaptation Action Areas

- 195 local governments have Coastal Management Element
 - 161 municipalities and 34 counties
- As of November 2015:
 - Approximately 26 (14%) explicitly mention or address **sea level rise in their Comprehensive Plans**
 - Eight (8) mention **AAAs** in their Comprehensive Plans (6 of these are located in Southeast FL)
 - Four (4) have a physical designation:
 - **Satellite Beach** designates Coastal High Hazard Areas as AAAs
 - **Village of Pinecrest** designates AAAs
 - **Broward County** sand bypass project at Port Everglades
 - **Ft. Lauderdale** 16 areas 38 stormwater projects

Sample Compliance Strategy

How do these requirements relate to or affect planning activities and infrastructure investments in the short- and mid-term?



Short Term

- Compliance Strategy (timeline and scope)
- Frame “development”
- Short term capital projects
- AAAs

Mid Term

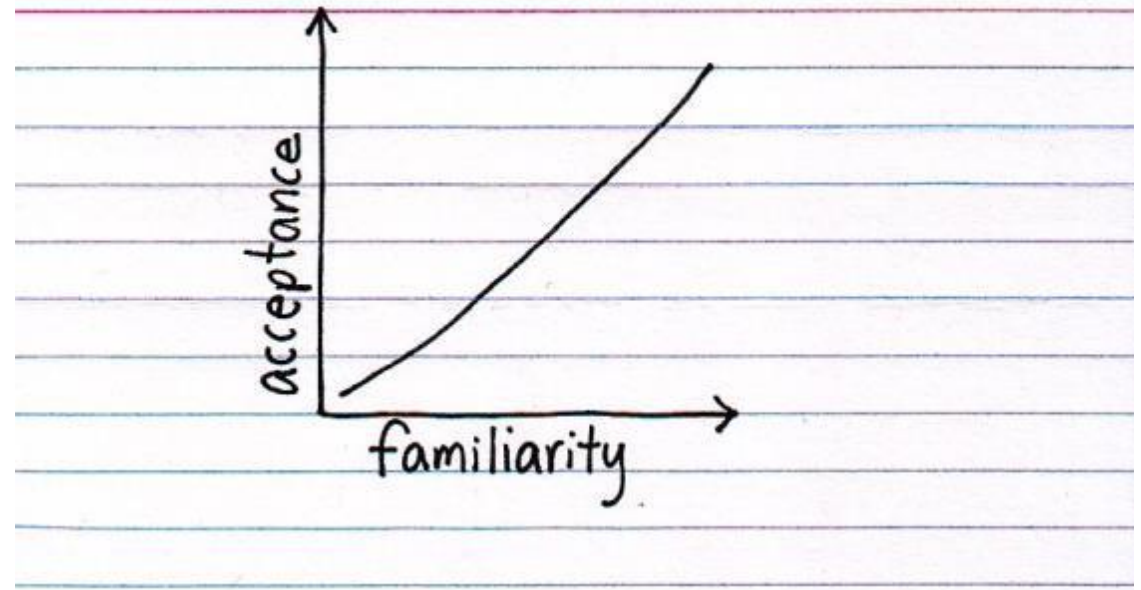
- Comp Plan Goals, Objectives and Policies
- Review land uses

Long Term

- LDRs: Development / design standards
- Areas subject to flooding
- ESLs
- Infrastructure LOS

What **Doesn't** the legislation do?

- No timeline for compliance
 - Local governments have to reconsider their Comprehensive Plans every seven (7) years
 - No indication from DEO that local governments will have to make special amendments to Comprehensive Plans to address SB 1094 – just do it in next scheduled revision
 - This gives the local governments plenty of lead time to work on how to address
- Doesn't specify review criteria for compliance
- We are just starting to see what compliance looks like



Recent and Current EAR Based Amendments

Initiated for 1094	
North Miami	6/23
Miami Beach	IP
Lake Park	IP
Ponce Inlet	IP
Sunny Isles Beach	IP
St. Petersburg	😊
Treasure Island * Litigation	2020
Boynton Beach	IP
Jupiter Inlet Colony	IP

Amendments Initiated but 1094 Not Raised	
Oldsmar	No changes for 1094
Lauderdale by the Sea	No changes for 1094
Volusia County	No changes for 1094
Indian Shores	1094 Not basis for amendments
Miami	1094 Not basis for amendments

New Starts: West Palm, Levy and Santa Rosa
List does not indicate others deemed in
compliance due to timing of amendments &
passage of bill

St. Petersburg

- Submitted proposed comprehensive plan amendment, reflecting Ordinance 201-H on December 28, 2015
 - Specifically amended Policy CM11.14 to address sea level rise
 - City also notes hiring of a Sustainability Coordinator and formation of an Energy, Natural Resources & Sustainability Committee to continue to work with regional partners to address sea level rise
 - NFIP benefits from participating in CRS
- DEO approved amendments February 3, 2016

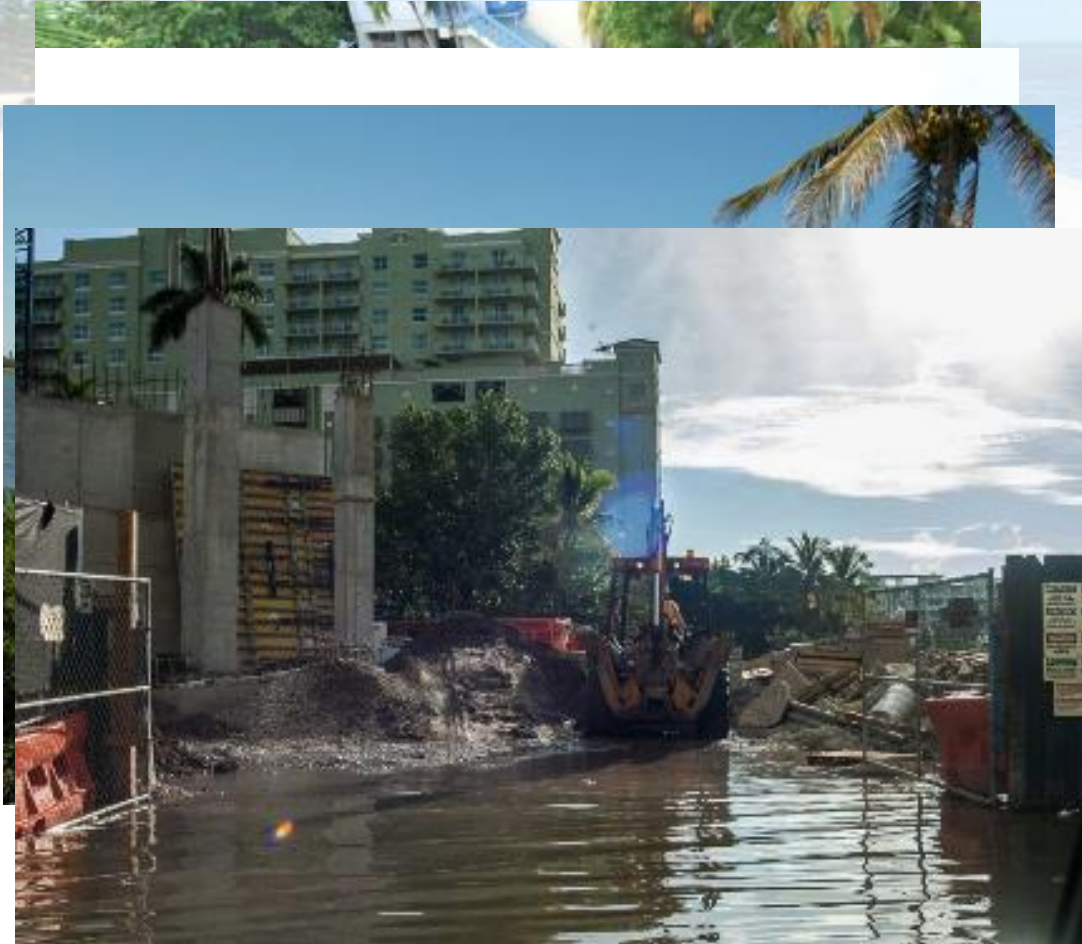


City of West Palm Beach



- Goal 6: The City shall coordinate development and redevelopment activities to address reduction of current and future flood risk and to eliminate inappropriate and unsafe development in the coastal areas
- Objective 6.1: Create new strategies to reduce flood risk from high tide, storm surge and sea level rise and remove property from exposure in FEMA flood zones
 - Policy 6.1.1: Update Stormwater Master Plan
 - Policy 6.1.2: Revise and develop new regulations and policies that reduce water quality and quantity impacts and create new stormwater projects to mitigate flood risk
 - Policy 6.1.3: Freeboard standards established within 1 year (consider implications with historic properties)
 - Policy 6.1.4: Update floodplain management regulations
- Objective 6.2: Site development technique and best practices to reduce flood loss and claims
 - Policy 6.2.1: Revise stormwater regulations to include low impact development and consider impacts to adjacent properties, historic properties, private and public development and infrastructure projects
 - Policy 6.2.2: Stormwater Manual to guide development review
- Objective 6.3: Continue and enhance participation in CRS
 - Policy 6.3.1: Strive to improve score in CRS (currently a 6 and going for a 4)
 - Policy 6.3.2: Prioritize public outreach to residents, business and development community on importance of mitigation flood risk
- Also developing Climate and Resiliency Element of Comp Plan

What Would we do Differently if the Legislation were Fully Implemented?



- Road design for future flood risk
- “Resilient” construction standards (ie; FORTIFIED)
- Encouraging or enhancing buffering and natural shoreline protection strategies
- Discouraging or modifying regulations that result in “hard” protection strategies
- Harmonizing stormwater regulations for future conditions (ERP/404 also)

Toth v. City of Treasure Island

Amended Complaint Dec Judgment filed 7/27

- Crux of argument is failure to comply with SB 1094 (one FLUE-related allegation)
- Linkage to Community Resilience Initiative Study (alleged data to support Coastal Element update) (Section 309 Grant funds through DEO for planning)
- Alleged failure to apply DEO's comments regarding Coastal Element compliance
- DEO correspondence states that the City must address SB 1094 requirements by November 2020 (EAR Notification due date) and has no comments related to important state resources or facilities
- DEO further comments on SB 1094-related issues in the form of a "technical assistance comment"
- Motion to Dismiss filed 8/5 (jurisdiction and standing)

Specific Case Study: Monroe County

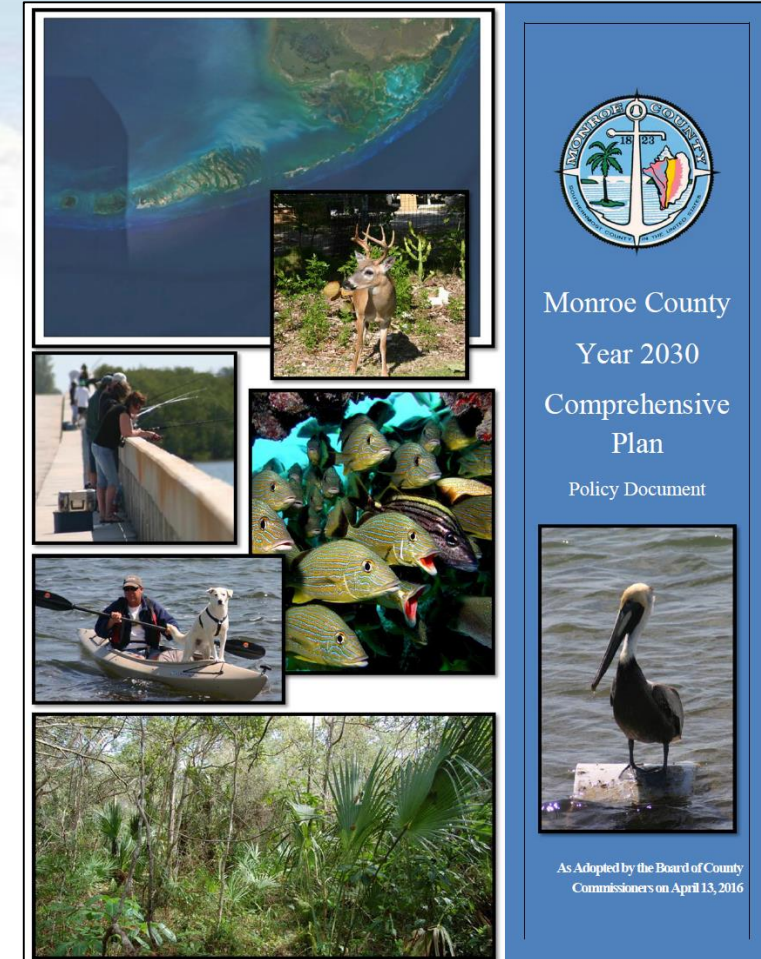


October 2015 King Tide- Key Largo, Shaw Drive
15-18" of saltwater for 3 weeks

- GreenKeys Planning process
 - Vulnerability analysis for all infrastructure, roads, habitat and County facilities
 - “Pilot” Roads project to establish design scenarios in Big Pine and Key Largo (with future LOS)
 - Elevation data – LIDAR countywide
 - Countywide roads/stormwater/tidewater analysis
 - NOAA grant for better vulnerability analysis

Monroe County

- Comprehensive Plan Amendment through 2030 approved by DEO June 2016
- New Energy and Climate Element
- Two (2) specific references to sea level rise in the Coastal Management Element of their updated Comprehensive Plan
- No comments back from DEO on need for further compliance with SB 1094



Data Collected: Climate/Sea Level Rise Analysis

Nuisance Flooding

- NOAA Digital COAST 2030 and 2060 scenarios

Water/ Wastewater

- FCAA As Built Drawings and GIS 2030 and 2060 scenarios

Water Supply

- USGS Integrated surface - groundwater model to determine saltwater intrusion impacts for wellfields at 2030 and 2060

Roads

- FDOT Sketch Tool and County Pavement Condition Index (2014) 2030 and 2060 scenarios

Habitat

- Sea Level Affecting Marsh Model (SLAMM), the Florida Cooperative Land Cover Classification (FCLCC), the Critical Lands and Waters Identification Project (CLIP), Monroe County's "Habitat" shapefile and Strategic Habitat Conservation Area (SHCA)

Electric Utility

- FKEC and Keys Energy facilities data and GIS 2030 and 2060 scenarios

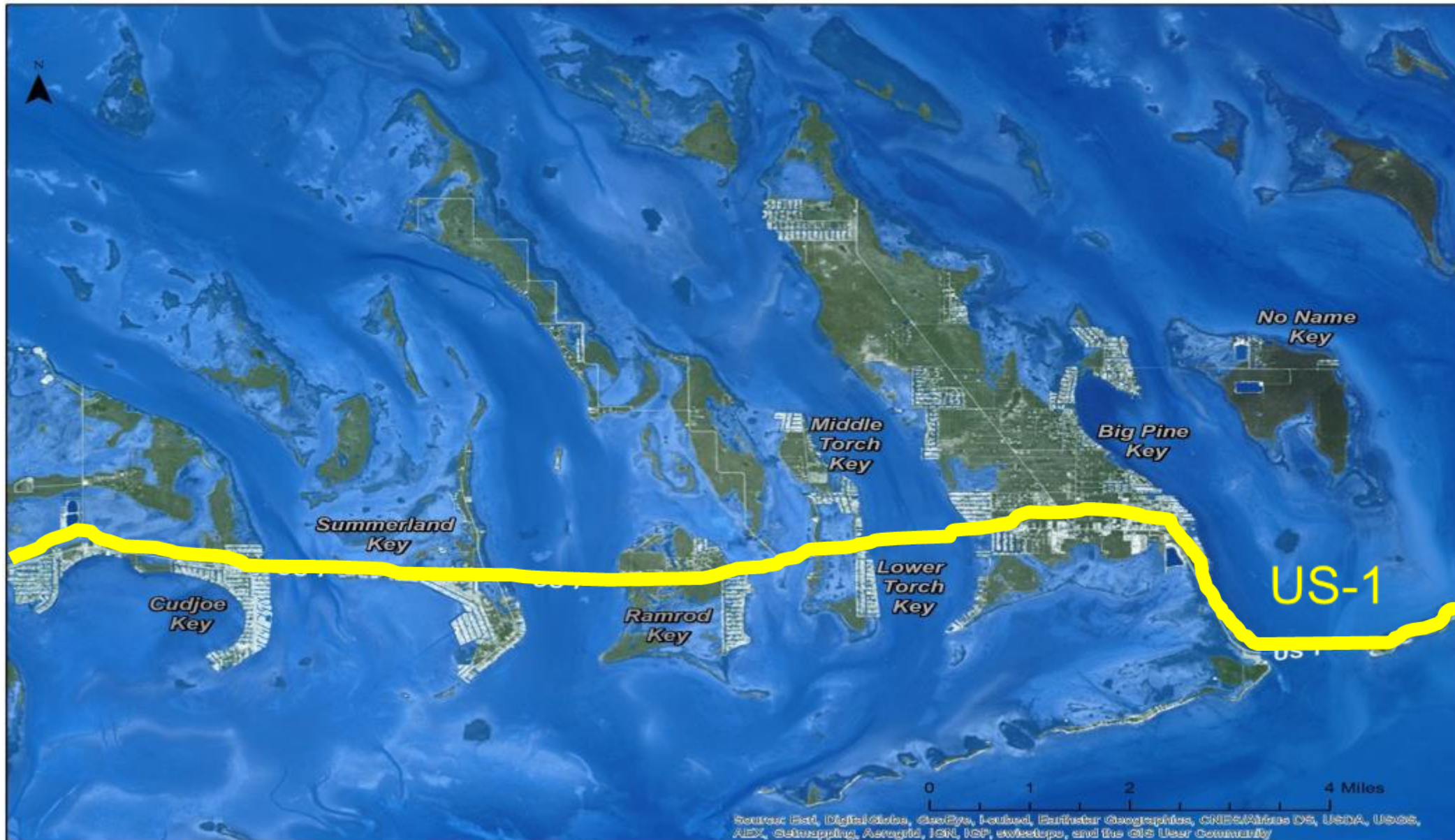
County Facilities

- Point locations of County-owned buildings (2006 GIS Mapping) 2030 and 2060 scenarios

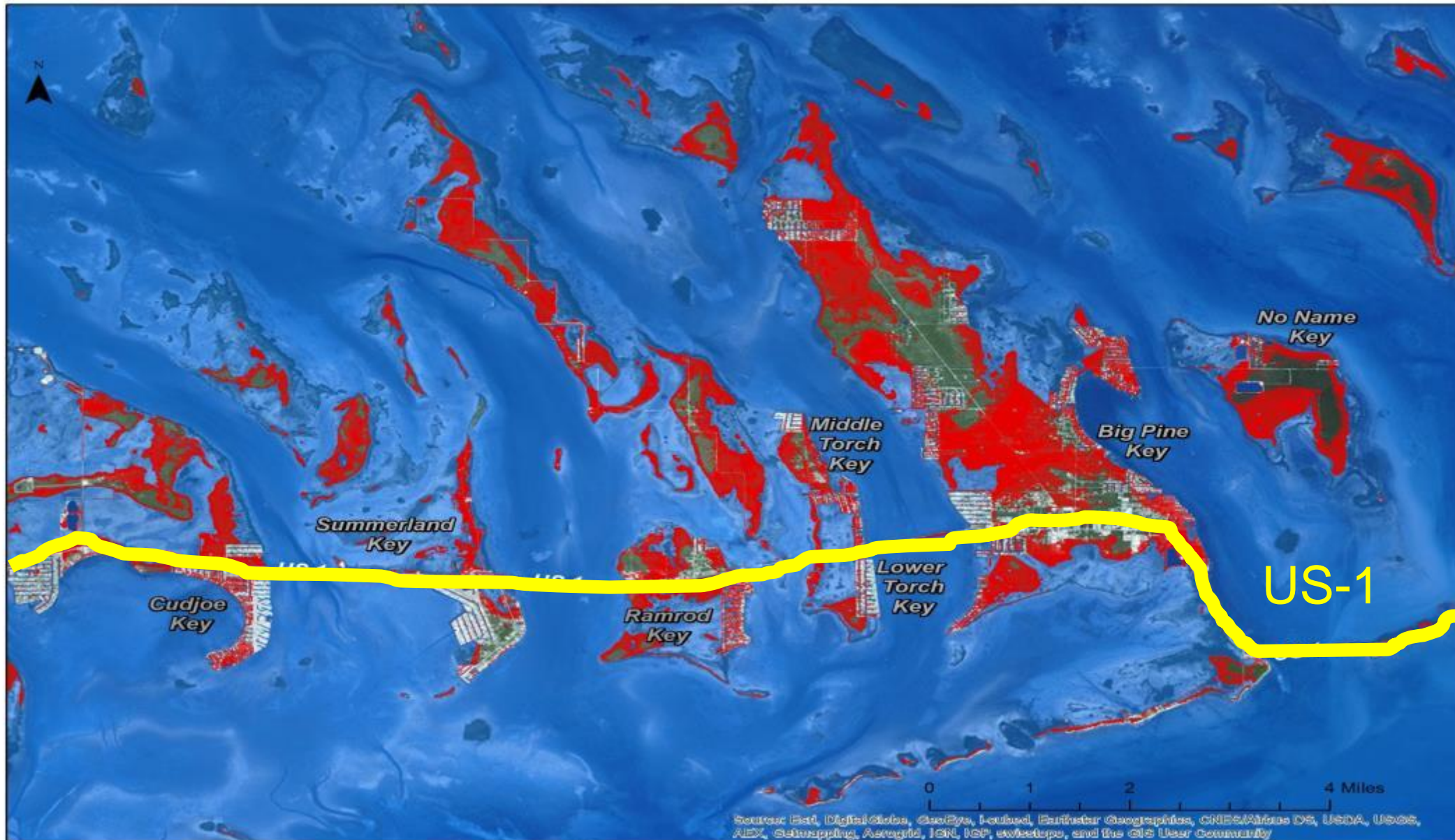
Elevation Data

- 2008 Department of Emergency Management LiDAR (Light Detection and Ranging)

Big Pine Key and Vicinity, Present Day



Big Pine Key and vicinity, 24 inches Sea Level Rise (2060, High Scenario)



Extreme Weather: Louisiana Rains in August

- 13 people have died, and the relief effort to rescue more than 30,000 people has exceeded that of Hurricane Katrina
- 11,000 people sheltered
- 146,000 homes damaged
- 20 parishes declared federal disaster areas
- Officials have already deemed Louisiana's flooding the worst natural disaster in America since Hurricane Sandy in 2012
- 1 in 1,000 year storm event (we typically permit to 100-year 24 hour event)
- 3 times the rain volume of Katrina
- Worst hit areas were NOT coastal
- This was not a hurricane. This was 3 days of rain totaling over 25"



Takeaways & Tips

- Climate infrastru not be p
- Federal have be (incentiv governn recover,
- Data is n preparat



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Thank You

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