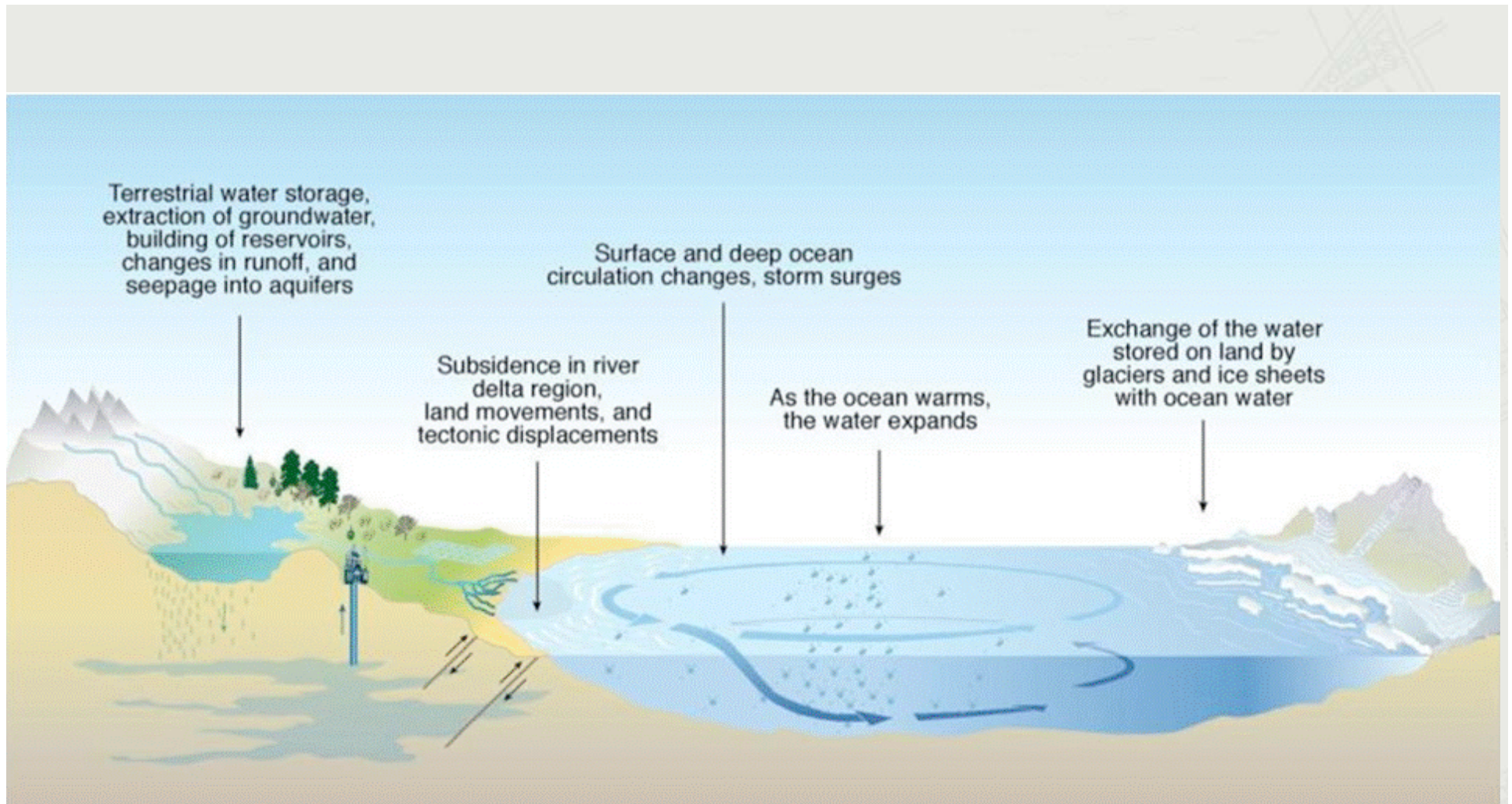


# Smart Growth and Coastal Communities: Adapting to Sea Level Rise

New Partners for Smart Growth  
Kenneth Walker, NOAA  
February 4, 2011

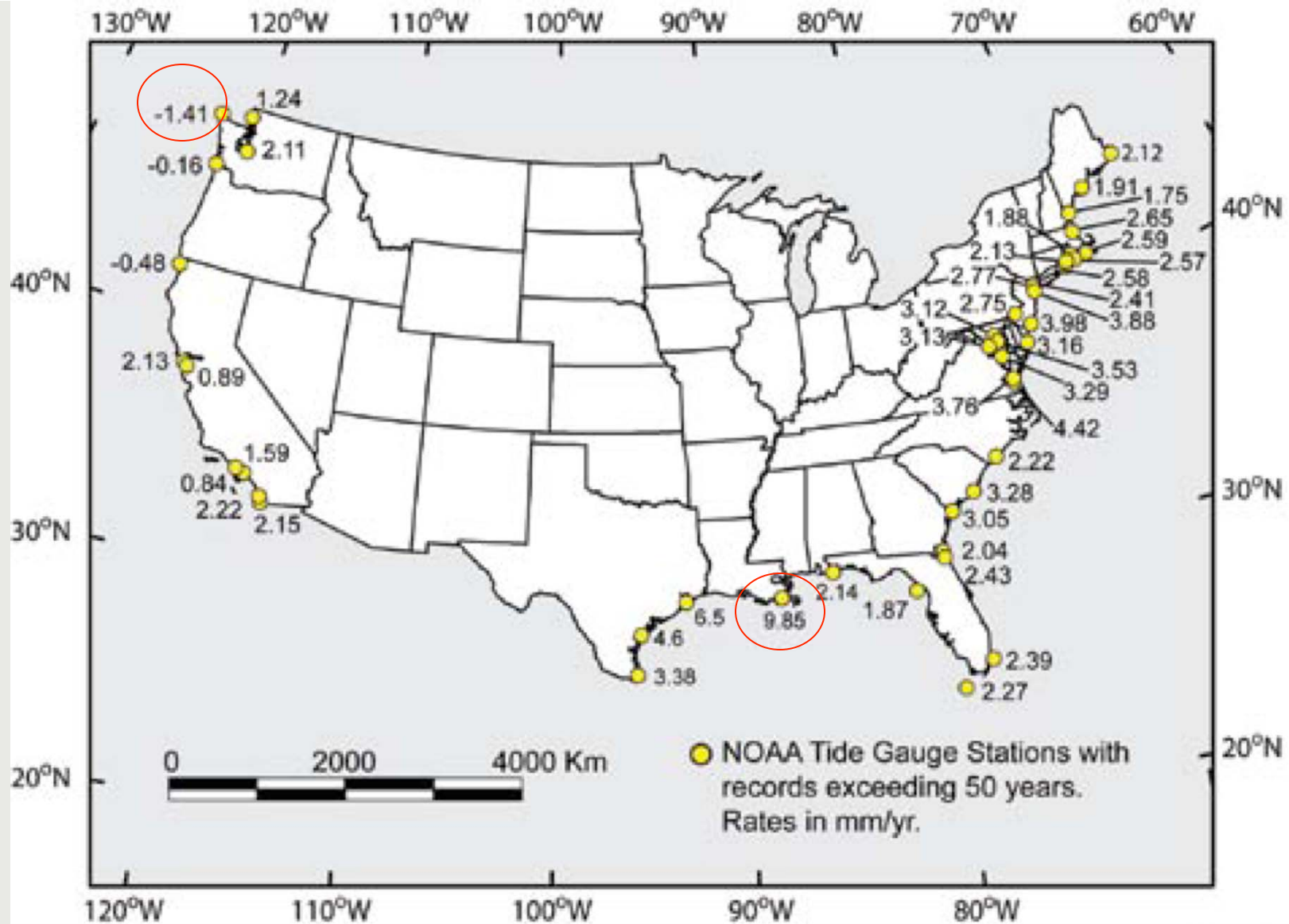




## What causes Sea Level to Rise?

# Sea Level Rise

- “Absolute” sea levels are rising
- IPCC: estimates range from 7-23 inches by 2100
- “Relative” sea level rise or rate of local change is most important to local decision makers



Map of 20<sup>th</sup>- century annual relative sea-level rise rates around the U.S. coast. Source: Titus

# Adaptation Options:

- Adaptation: adjustment in natural or human systems in response to actual or expected climatic changes;
- Three primary options:
  - Shoreline Protection
  - Accommodation
  - Relocation



## Protection: Hard Shoreline Stabilization



# Protection: Soft Shoreline Stabilization

# Shoreline Protection:

- Allows businesses/residents continued use of property/infrastructure
- May keep/encourage investment in harm's way
- May impact coastal processes





# Accommodation

- Elevating buildings and infrastructure
- Floodproofing
- Siting critical facility infrastructure above flood levels

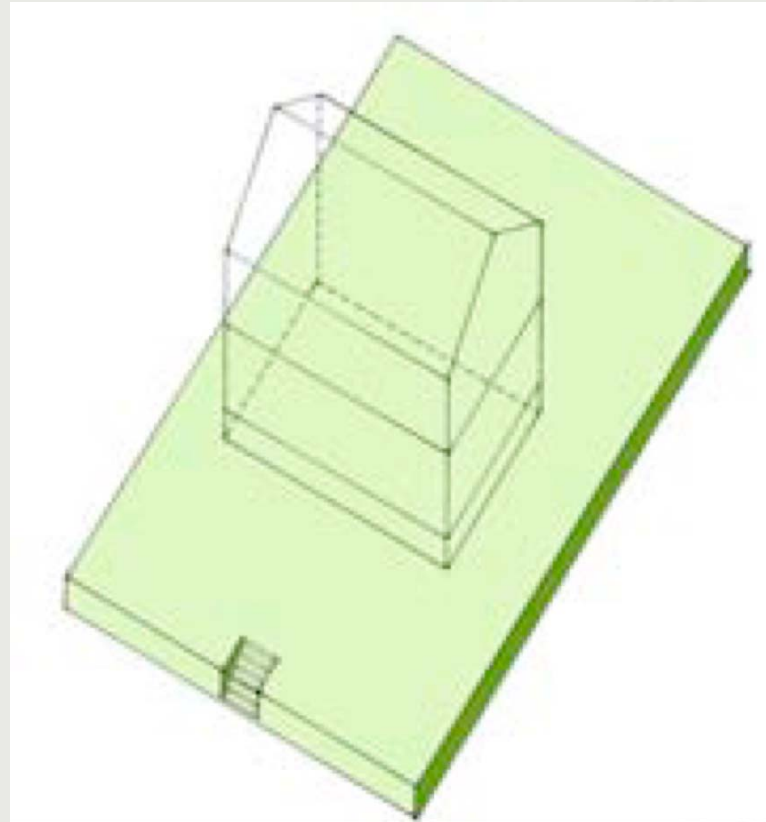
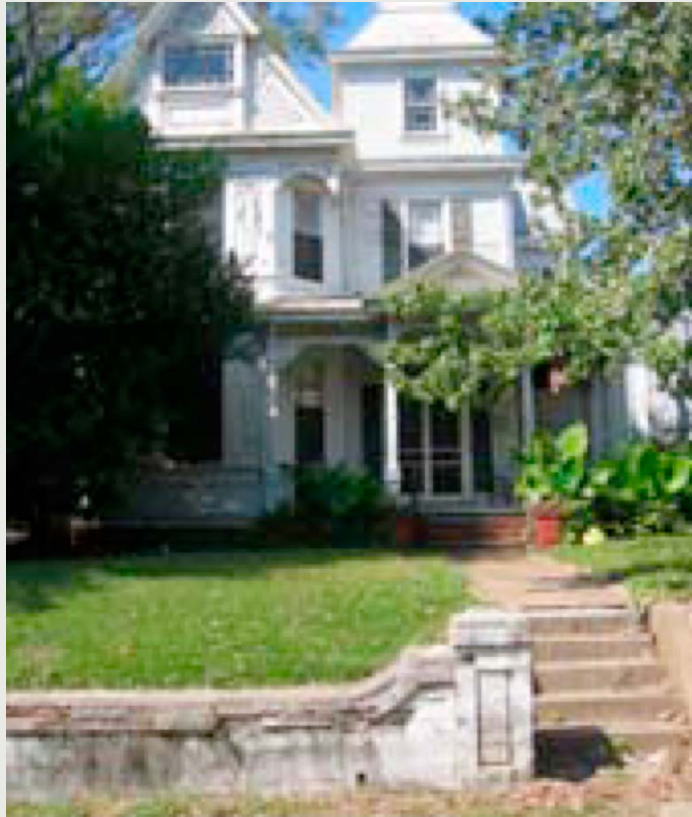


# Elevation of structures and infrastructure

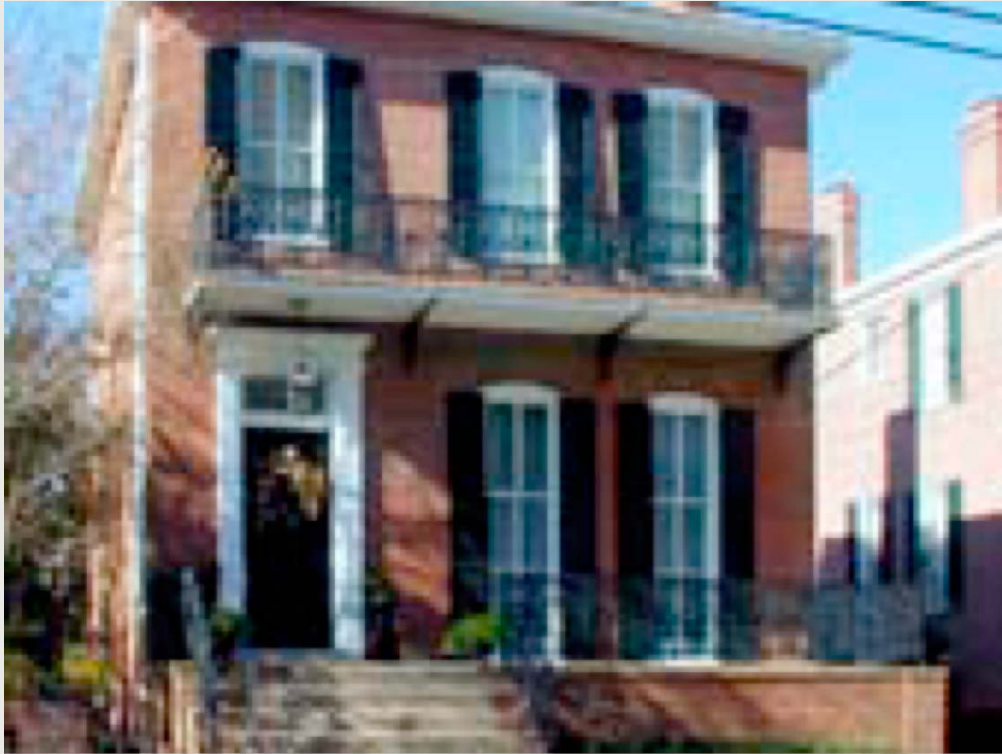
- Provides temporary safety and continued use for residents/businesses
- May impact community design, access & sense of place
- Effectiveness may be limited if ALL structures not elevated



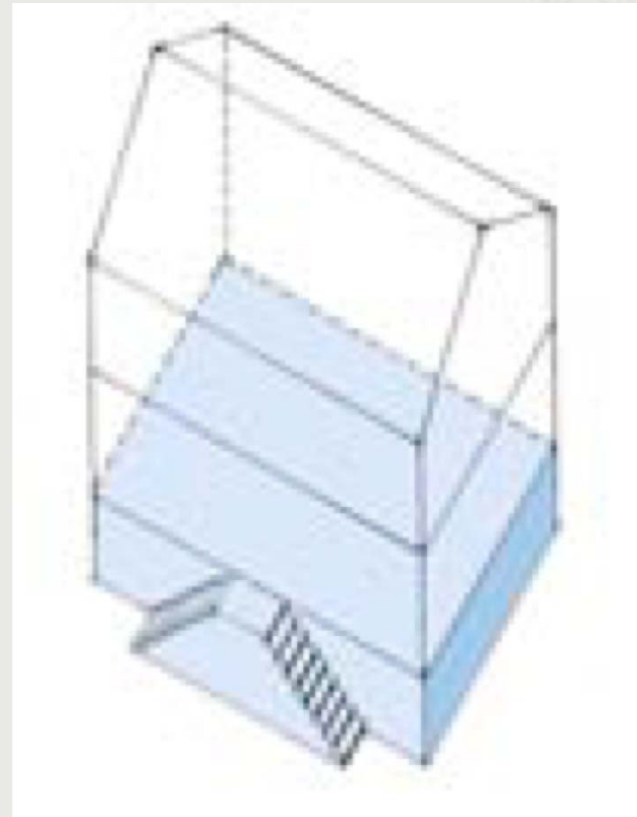
Following Hurricane Georges, the City of Pascagoula, MS, established an elevation standard of 13.1 ft. above sea level.



Option 1: Building Site Raised 4 feet



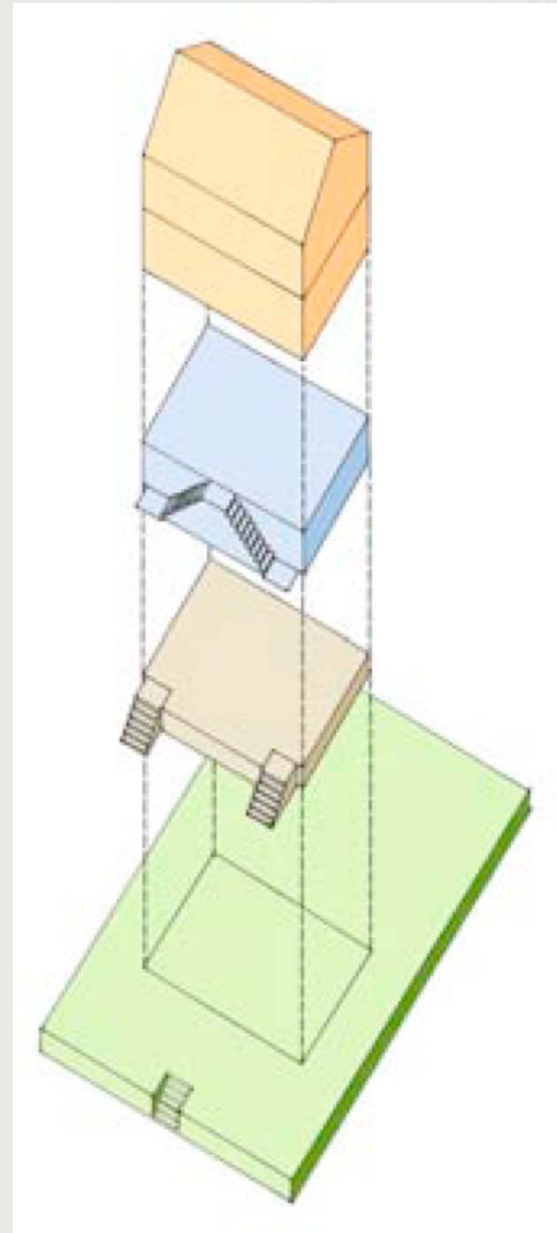
Option 2: Finish Floor 4 feet above grade



Option 3: Raise house 8 feet above finish grade

Options 1-3 can be used in combination to reach up to 16 feet above original site grade.

Note: Images and Options from *A Pattern Book for Gulf Coast Neighborhoods*





← Flood Depth

Historic Structure Received Minimal Damage In  
Hurricane Katrina (Mandeville, LA)



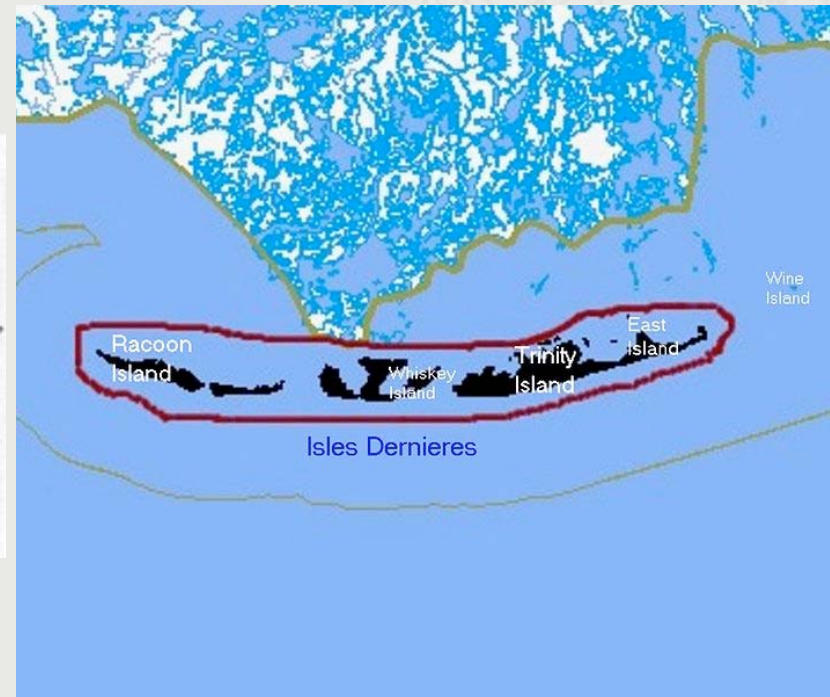
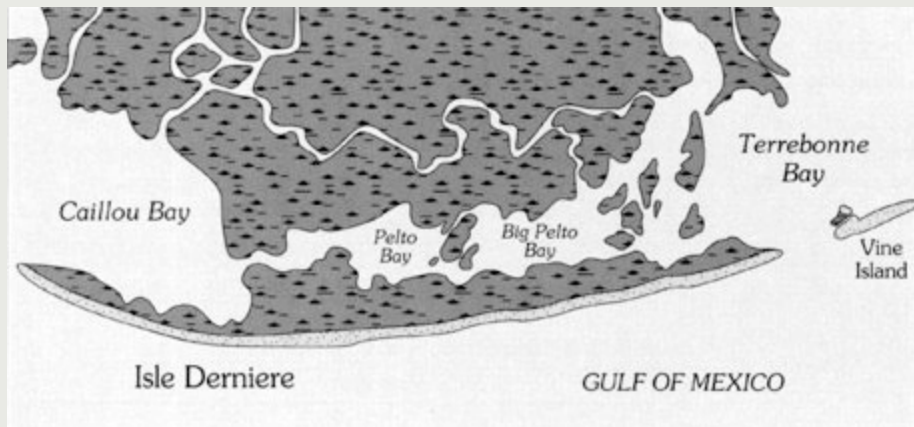


← Flood Depth

This neighboring structure was heavily damaged in Katrina (Mandeville, LA)

# Relocation

- Incremental & wholesale relocation



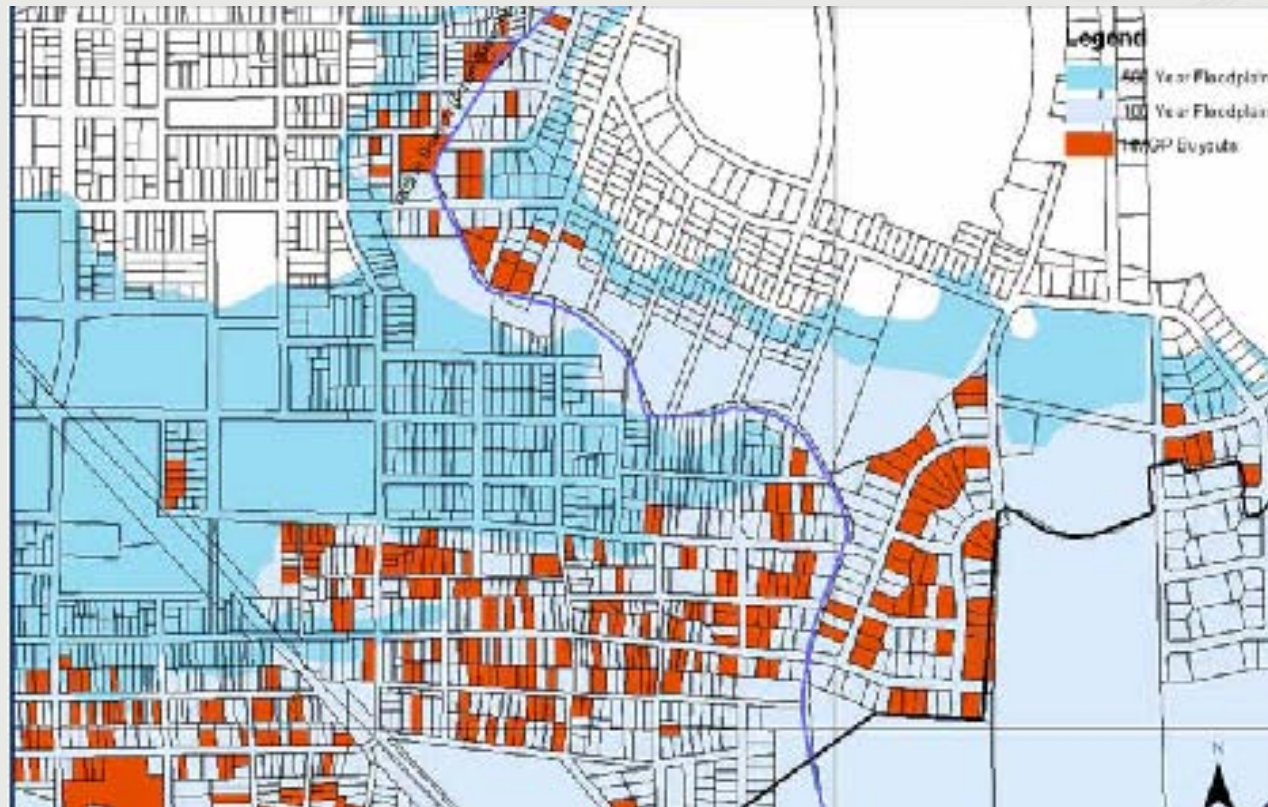
# Kinston/Lenoir Co, NC



## Hurricane Floyd

Source: FEMA

# Kinston/Lenoir County, NC



Buy out areas in red

Source: NC Division Emergency Mgmt

# Kinston/Lenoir Co, NC

## Smart Growth Benefits

- Residents received assistance to relocate in City of Kinston
- Safety
- Tax Base
- Neighborhoods & social networks preserved
- Floodplain part of green infrastructure for region

# Relocation

- Long term safety of residents & businesses
- Political support & expense
- Smart growth techniques can be incorporated into new development

# Sea Level Rise Adaptation & Smart Growth

- Three coastal community adaptation options
- Each has different impacts on the built and natural environment
- Coastal communities developing adaptation strategies consider connection to smart growth goals

<http://coastalsmartgrowth.noaa.gov>

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coastal & waterfront **SMARTGROWTH**





coastal & waterfront

# SMARTGROWTH

## ELEMENTS

Mix land uses

1

Take advantage of compact design

2

Provide a range of housing choices

3

Create walkable communities

4

Foster distinctive, attractive communities

5

Preserve open space & critical environmental areas

6

Direct development toward existing communities

7

Provide a variety of transportation options

8

Make development decisions predictable & fair

9

Encourage community & stakeholder collaboration

10



### PROJECT PARTNERS RELEASE REPORT

In August, NOAA, EPA, ICMA and RI Sea Grant are releasing a [report](#) *overviewing Coastal and Waterfront Smart Growth* approaches and implementation techniques described on this website.

Project partners release report...



Smart Growth principles compared

## RESOURCES

## TOOLS

## CASE STUDIES

## DEVELOPMENT at the WATER'S EDGE

Coastal and waterfront communities have a distinctive sense of place created by their history, as well as by their characteristic sights, sounds, and smells. On the coast, the bellow of tugboats and the salty taste of ocean air; along lakes and rivers, the sound of the water and the feel of brisk waterborne winds-all come together to shape our sense of these special places... [more >>](#)

## COASTAL and WATERFRONT CHALLENGES and OPPORTUNITIES

Bounded by water, coastal and waterfront communities are challenged to make the best use of limited land while protecting critical natural resources from the potentially damaging effects of growth. These communities must consider a common set of overarching issues when managing growth and development. [more >>](#)

## SMART GROWTH APPROACHES

How can smart growth strategies help coastal and waterfront communities manage growth and development while balancing environmental, economic, and quality of life issues? How can communities on the water adapt smart growth strategies to fit their unique character? This website will help communities answer these questions. It is specifically targeted to anyone who plans, designs, builds, approves, or has an interest in development at the water's edge. [more >>](#)