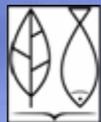




# Accreted Land Management Plan

Draft Report – Review And Community Forum  
4 August 2009 - Sullivans Island



**SABINE & WATERS**  
Natural Resource Consultant Firm



**Dewberry**



COASTAL SCIENCE & ENGINEERING

# Forum Outline

- WELCOME – Mayor Carl Smith
- PURPOSE – Dr. Pat O’Neil (Chair, Real Estate Committee)
  - Introduce Study Team
- OVERVIEW OF DRAFT REPORT – Dr. Kana
- FOUR MANAGEMENT ALTERNATIVES – OVERVIEW
- SPECIFIC MANAGEMENT ELEMENTS – Discussion
  - with respect to each alternative
  - Future Land Stability (CSE – Tim Kana)
  - Accreted Land Habitats (Sabine & Waters)
    - Existing conditions (John Sabine)
    - Future conditions
  - Role of Biodiversity (Bart Sabine)
  - Storm Impacts (Dewberry)
    - Existing conditions (Chris Mack)
    - Future conditions
    - Role of dunes
  - Fire Hazards (Bart Sabine)
  - Pest Control (Bart Sabine)
  - Views, Beach Access, Public Safety



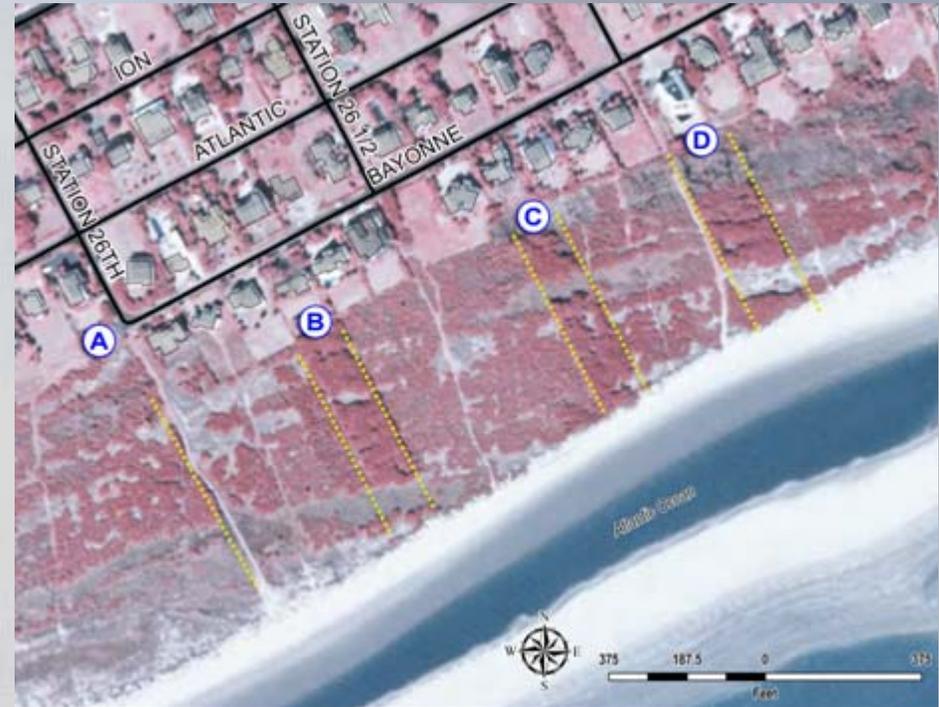
The Goal

TO DEVELOP CONSENSUS ON A  
MANAGEMENT APPROACH\* TO  
THE ACCRETED LAND

*\* The Approach May Vary From  
One Part of the Island to Another!*



# The Problem



- Extensive Accretion Since the 1940s
- Forest Vegetation Becoming Dominant
- Loss of Ocean views
- Extensive Shrub Pruning by some property owners is flanked by unpruned vegetation (areas A, B, C, etc)

# The Problem



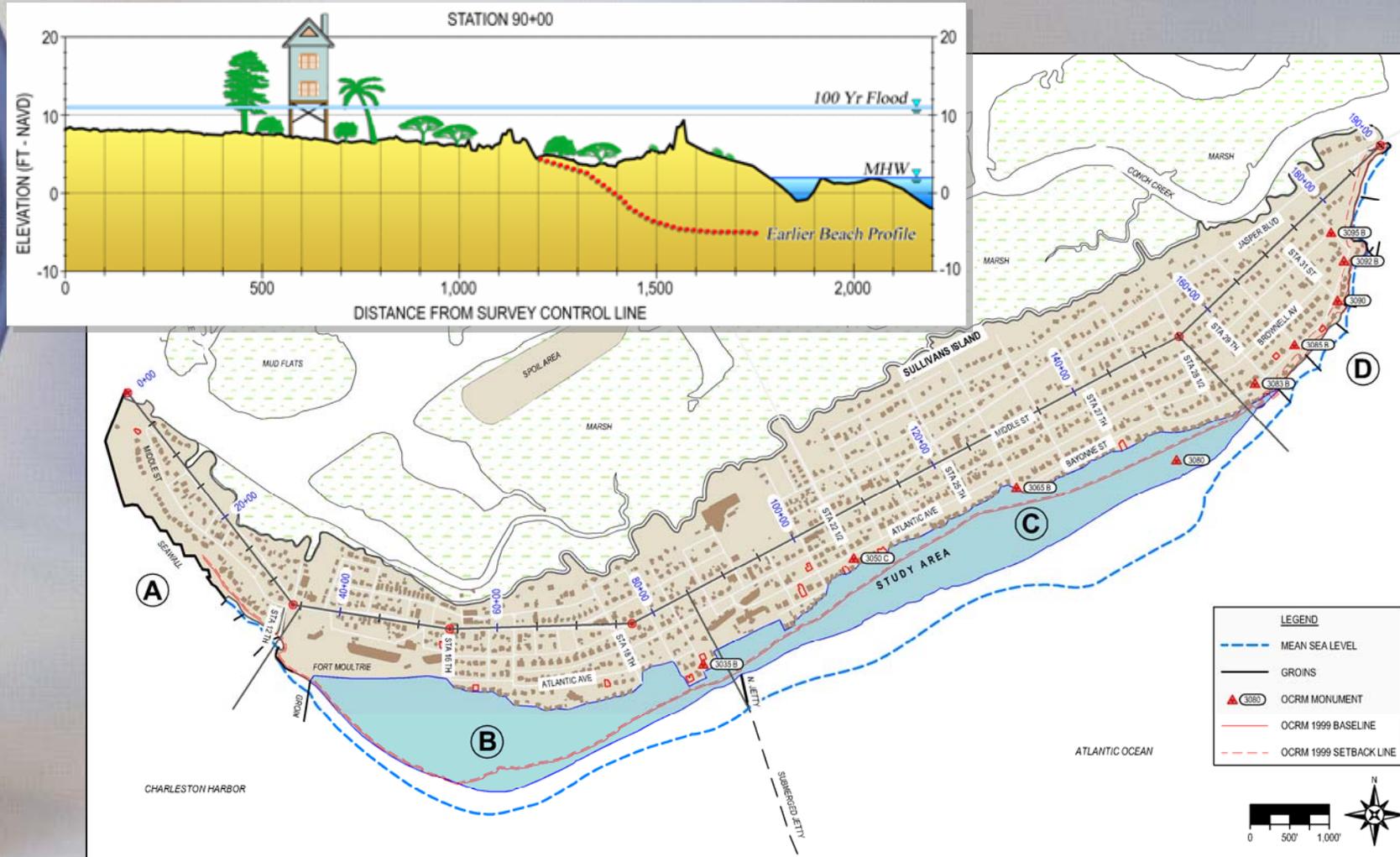
(Con't)

- Dense Undergrowth – Fire Hazards
- Narrow, Dark Paths – Personal Safety Issues; Beach Access Issues
- Infestation of Rodents
- Wet swales are Mosquito breeding grounds
- Low elevations and relief offer limited storm surge protection
- Changed Character of Ocean-front Properties



# HISTORY OF THE LAND

- 60-years of Rapid Accretion
- Low, Hummocky Dunes – Inadequate Storm Protection
- Vegetation is Changing The Character of the Oceanfront



# CHAPTER 2 – SETTING & HISTORY

– General Background

Topics Covered:

– Geography, geology & coastal processes

– Sea-level rise



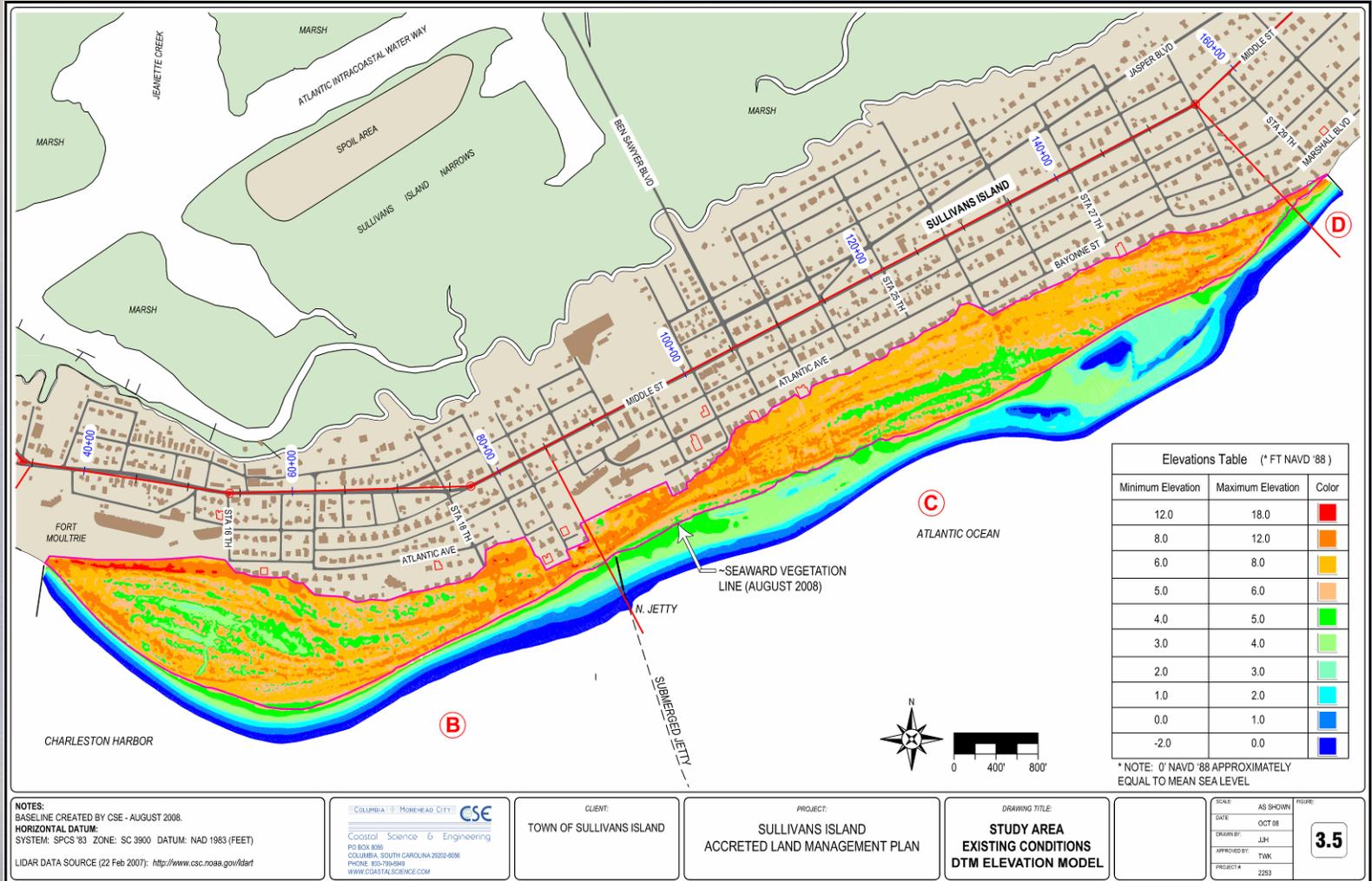
## CHAPTER 2 – SETTING & HISTORY



- Sand Sources & Inlet Sand Bypassing
- Influence of Charleston Harbor
- Barrier Island Ecology

# CHAP 3 – EXISTING CONDITIONS

## Topographic Surveys



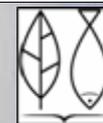
Digital Terrain Model  
 Low Dune Ridges and “Wet” Swales

# CHAP 3 – EXISTING CONDITIONS

## Vegetation Surveys



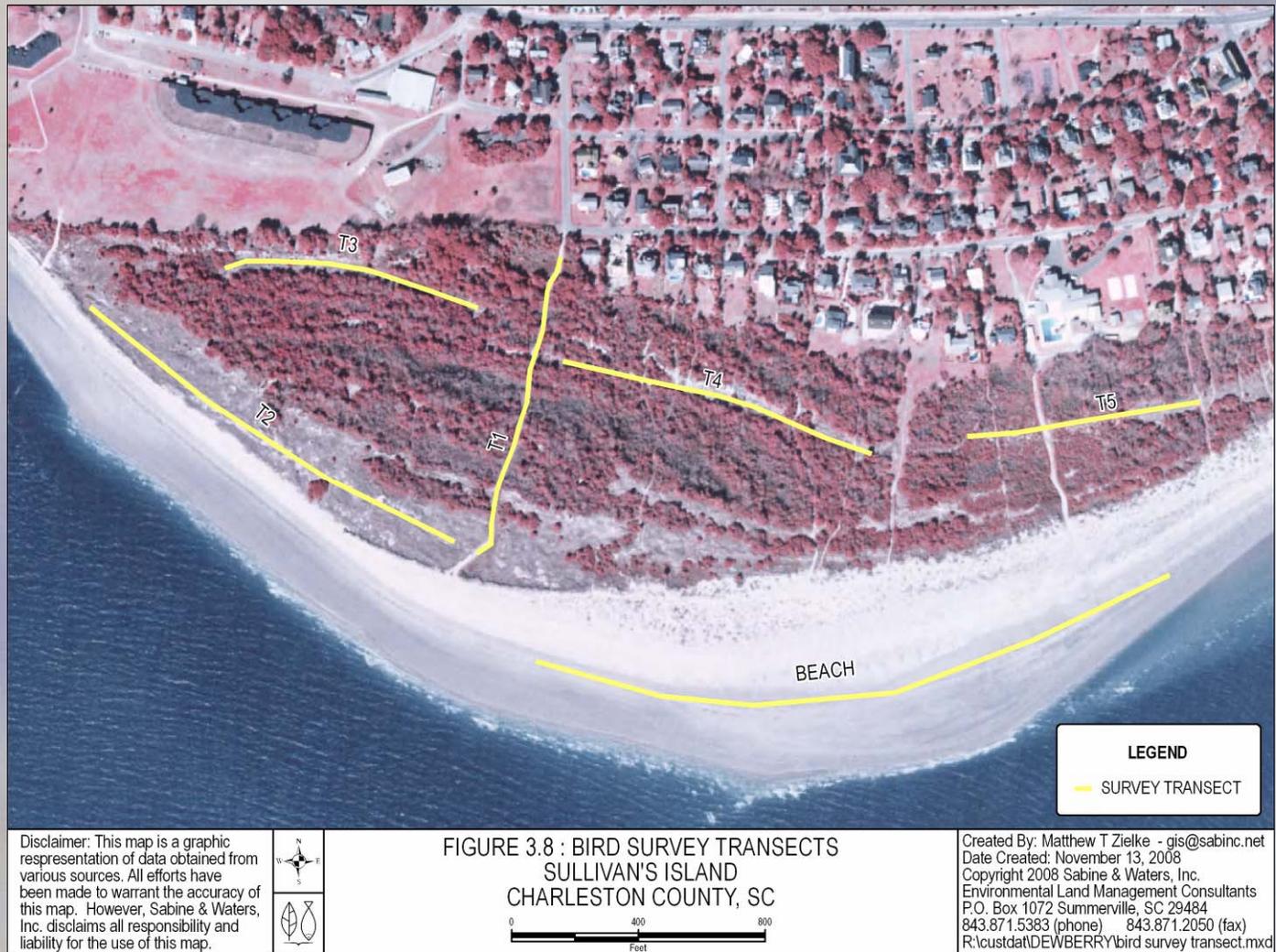
~Nine Habitats Identified



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# CHAP 3 – EXISTING CONDITIONS

## Bird Surveys & Nuisance Fauna



- ~76 Bird Species Present in Four Principal Habitats:
- Beach, Dune Grassland, Manipulated Areas, Maritime Forest

# CHAP 3 – EXISTING CONDITIONS

Primary vegetation types

Grasslands



Shrubland



Maritime forest



Manipulated  
shrub land



Interdunal  
Wetland

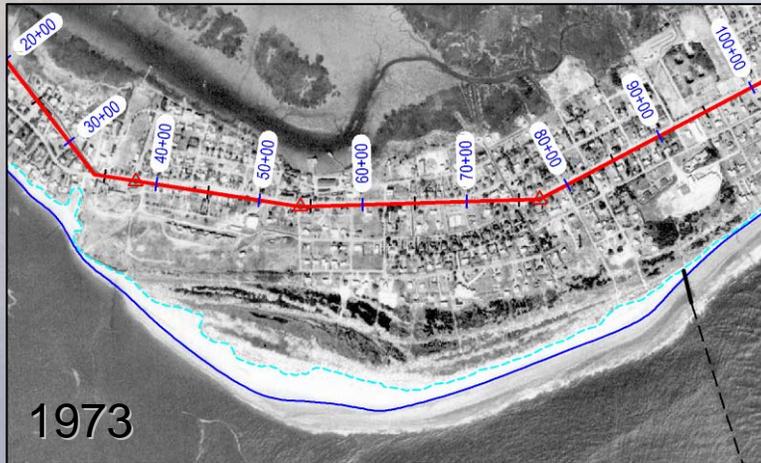


Pathways & Lawns

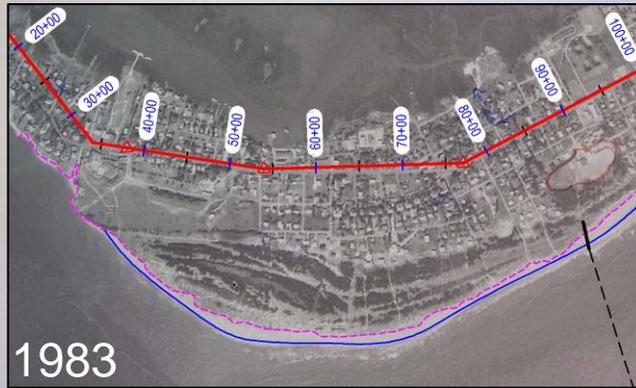


# CHAP 4 – HISTORICAL CHANGES

- Shoreline
- Storm Histories
- Vegetation Succession



# CHAP 4 – HISTORICAL CHANGES

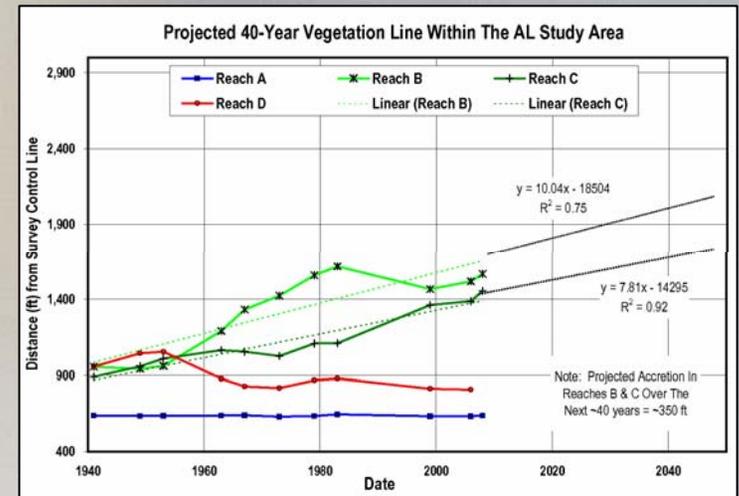
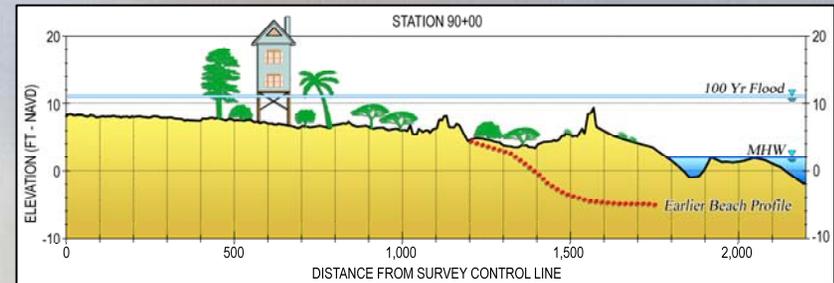


# CHAP 5 – FUTURE CHANGES

## Land and Vegetation Evolution



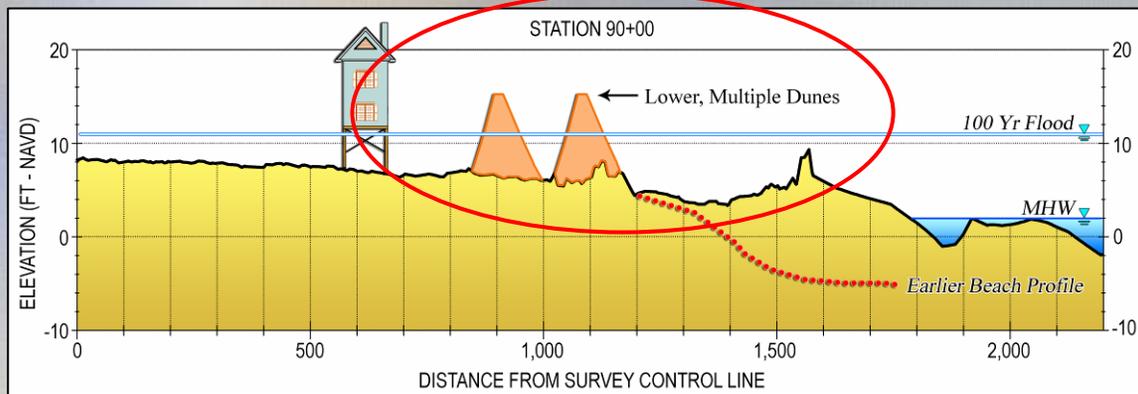
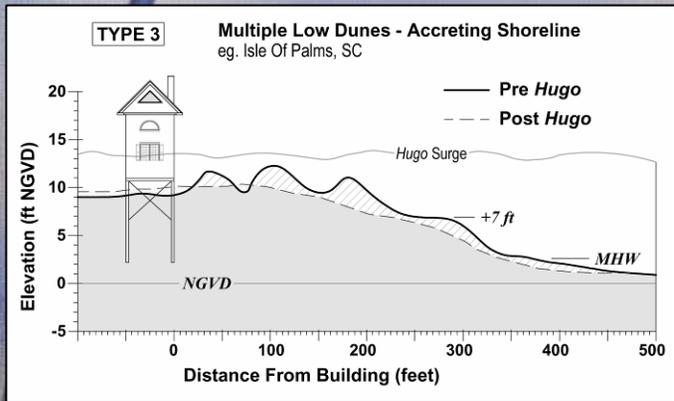
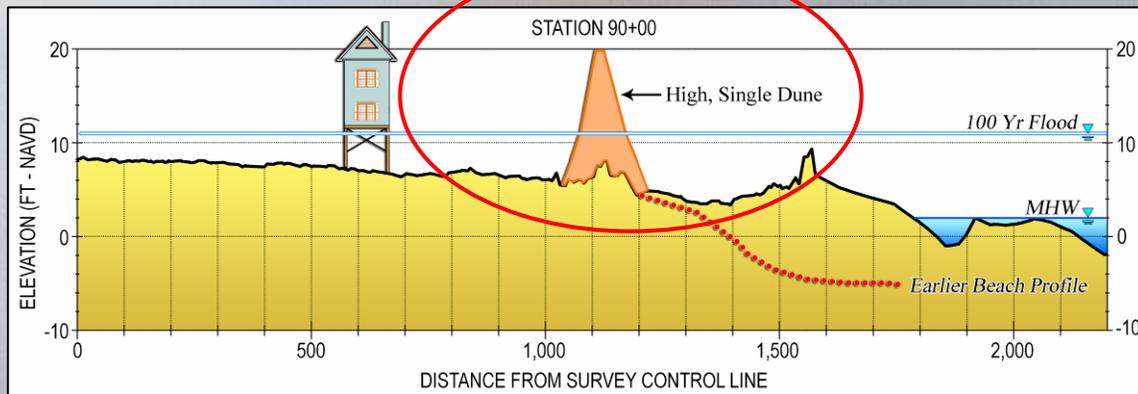
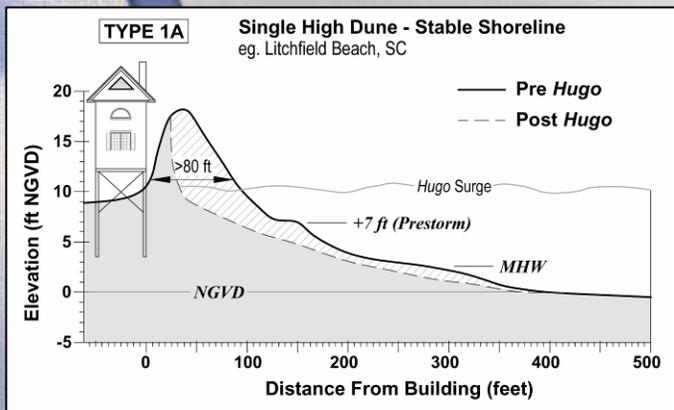
### *Future of Sullivan's Island?*



# CHAP 5 – FUTURE CHANGES

## Dune Protection Levels

### FEMA Dune Criteria – Recommended Volume Above 100-yr Flood Level

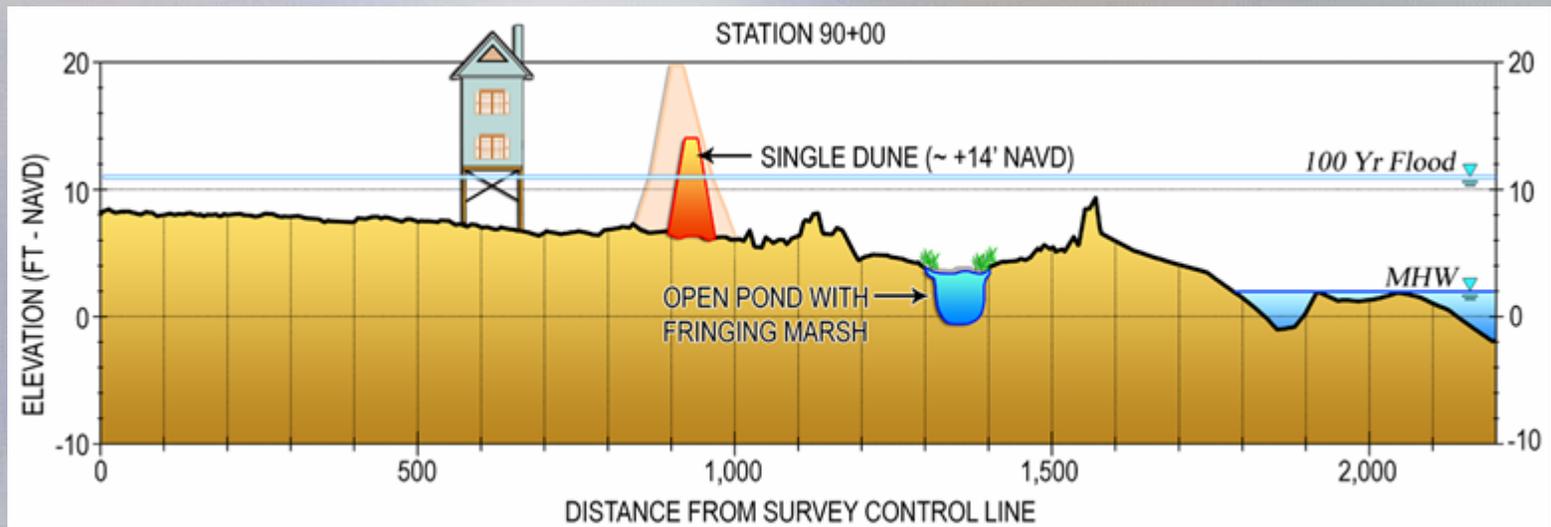


Note: Vertical Exaggeration

# CHAP 5 – FUTURE CHANGES

## Storm Impacts - Scenarios

- Existing Conditions
- Scenario 1 – Add A Beneficial Dune
- Scenario 2 – Reduce Vegetation Density



Size of Scenario 1 Dune:

Height: ~4 to 6 ft above existing land

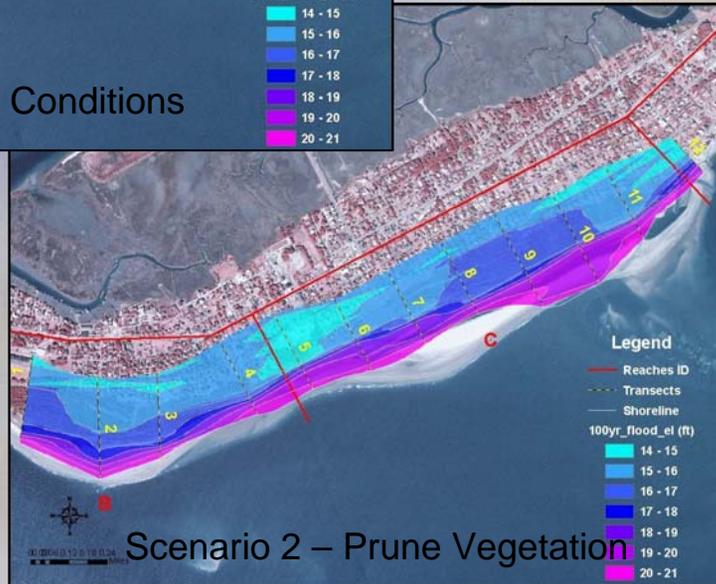
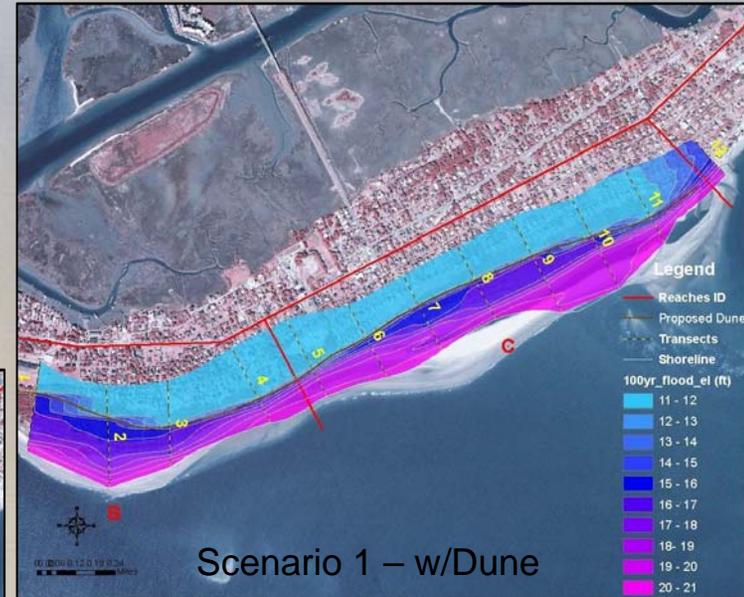
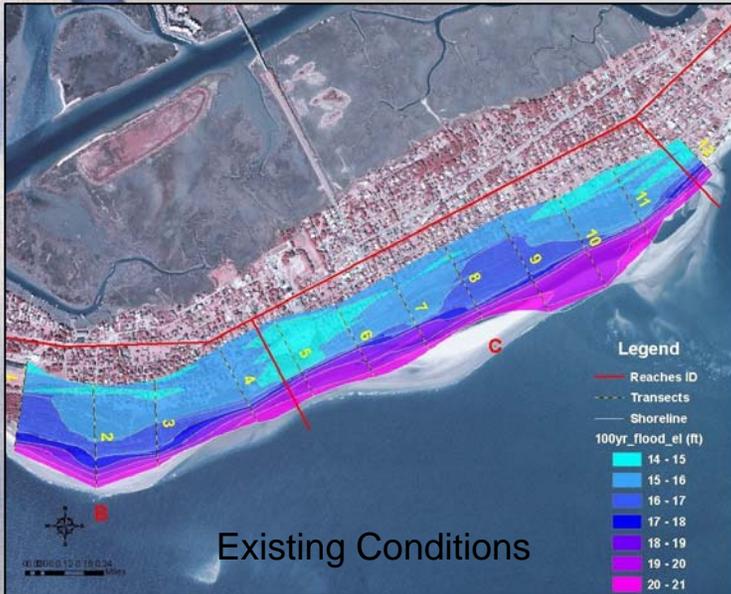
Width: ~50-75 ft at base

*Note: Vertical Exaggeration*

# CHAP 5 – FUTURE CHANGES

## Storm Impacts

- Existing Conditions
- Scenario 1 – Add A Beneficial Dune
- Scenario 2 – Reduce Vegetation Density – Reach C



Predicted 100-yr Flood Levels

# CHAP 6 – MANAGEMENT ALTERNATIVES

Alternative 1 – DO NOTHING

Alternative 2 – CONTINUE PRESENT PRACTICES

Alternative 3 – IMPLEMENT EXTENSIVE VEGETATION MANAGEMENT

Alternative 4 – MODIFY TOPOGRAPHY & IMPLEMENT EXTENSIVE VEGETATION MANAGEMENT



*A Diversity of Habitats at Hunting Island*

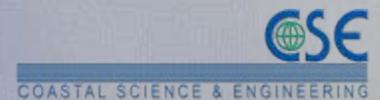
## Management Elements

- Fire Control
- Pest Control
- Bird Habitat Enhancement
- Selective Vegetation Removal
- Limited Dune & Pond Construction

# APPENDICES



- Bios of Preparers
- Deed Restrictions
- Protected Species
- Wetland Definition
- Invasive Species
- Flora and Fauna Lists
- Historical Shorelines
- Potential Grant Sources



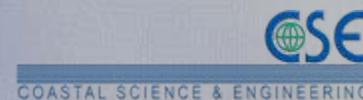
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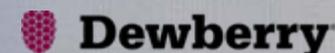
# DISCUSSION

## Specific Management Elements

- Future Land Stability (CSE)
- Accreted Land Habitats – Existing & Future (S&W)
- Role of Biodiversity (S&W)
- Storm Impacts – Existing & Future (Dew)
- Fire Hazards (S&W)
- Pest Control (S&W)
- Views, Beach Access & Public Safety
- Other



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# DISCUSSION

- Future Land Stability

Alternative 1 – Do Nothing?

Capers Is 2007

Sullivans Is 2008

Alt 4 – Dune, Ponds,  
Manage Vegetation?

Hunting Is 2008



# Ecological Communities



- Maritime Foredune Grassland
  - Adjacent to beach
  - Extreme environment
    - salt spray, heat, drought, burial, dry
  - Grasses and forbs
    - Sea oats
  - Dune formation
  - Songbird foraging habitat
    - Over 30 species
    - Least tern and painted bunting
  - Few Reptiles
    - Sea turtle nesting
    - Island glass lizard
  - Few Mammals
    - Rodents, Raccoons



# Ecological Communities



- Maritime Shrubland
  - Intermediate successional stage between grassland and maritime forest
  - Dense, impenetrable thicket
  - Blocks wind and salt spray
    - Allows greater diversity of plant and animal life
    - Amphibian population tied to water source
    - Bird nesting habitat
    - Low Mammalian diversity
  - Chinese tallow found here
- Manipulated MS
  - Hedge-like appearance
  - Less plant diversity
  - Haven for rats



# Ecological Communities



- Maritime Wetlands
  - flats and interdunal swales behind foredune ridge
    - Kept in early successional stage by harsh conditions
    - High variability due to wide range of conditions
    - Grasses, sedges, rushes, forbs, pioneer woody shrubs
  - Maritime Hardwood Depression
  - Important source of freshwater for wildlife
  - Occurrence increases diversity
    - Food source
    - Amphibian spawning



# Ecological Communities



- Maritime Forest
  - Climax community
  - Oldest habitat in area
  - Farthest inland
  - Soil stabilization
  - Diverse wildlife
    - All herpetofauna use maritime forest
    - Vertical zonation
    - Refuge for migratory birds
    - Marsh rabbits, foxes
  - Many exotic species
  - In early stage at Sullivan's Island



# Future of the Accreted Area?



# Future of the Accreted Area?



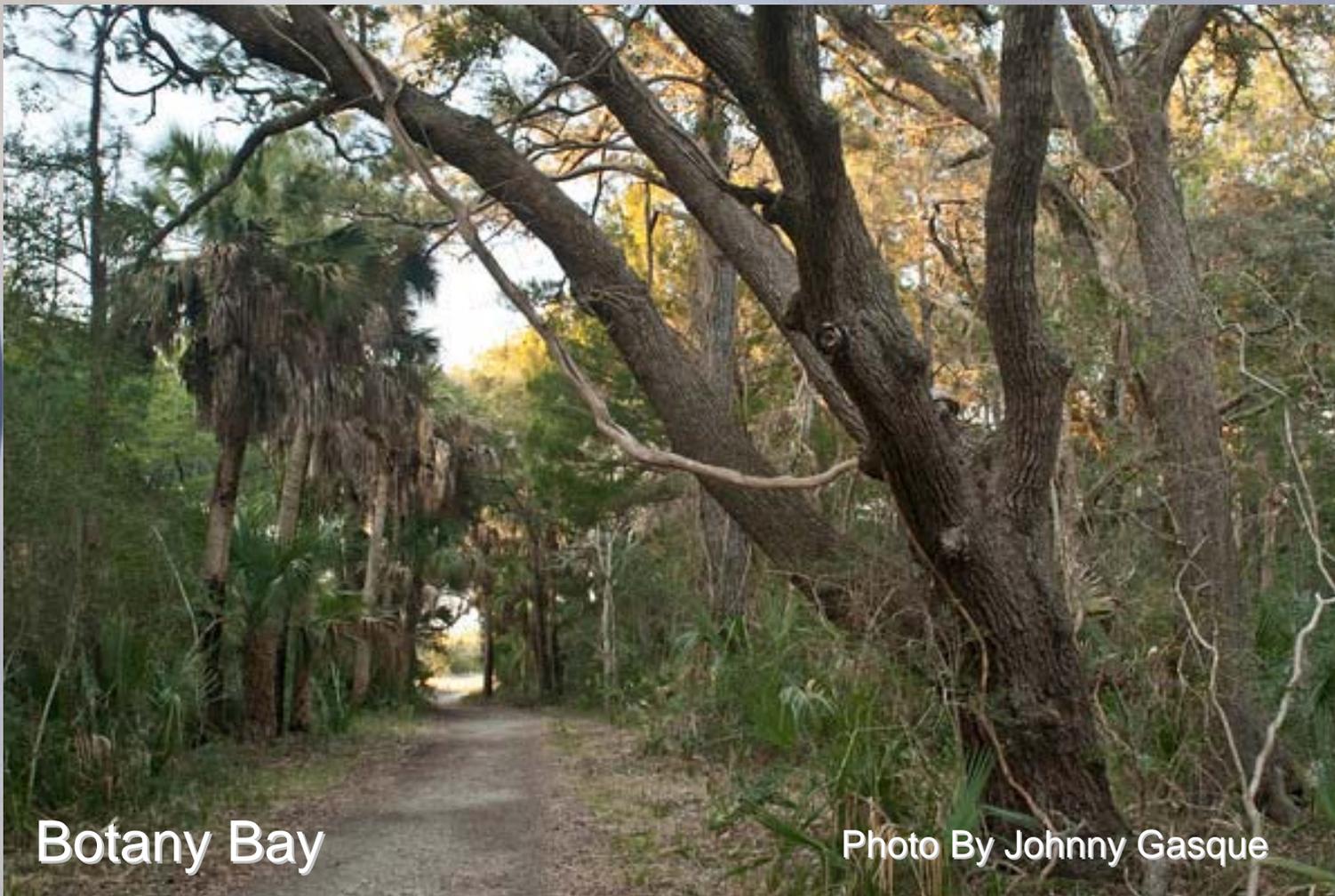
Hunting Island

Photo By Jim Crotty



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# Future of the Accreted Area?



Botany Bay

Photo By Johnny Gasque



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# DISCUSSION Accreted Land Habitats – Existing & Future (S&W)

## Ecological Principles

Biodiversity - variation of life forms in a given area

– often used as a measure of health of biological systems

- **Benefits**

- air and water quality, disease control, pest control, erosion prevention

- drug discovery and the availability of medicinal resources

- wide range of industrial materials are derived directly from biological resources

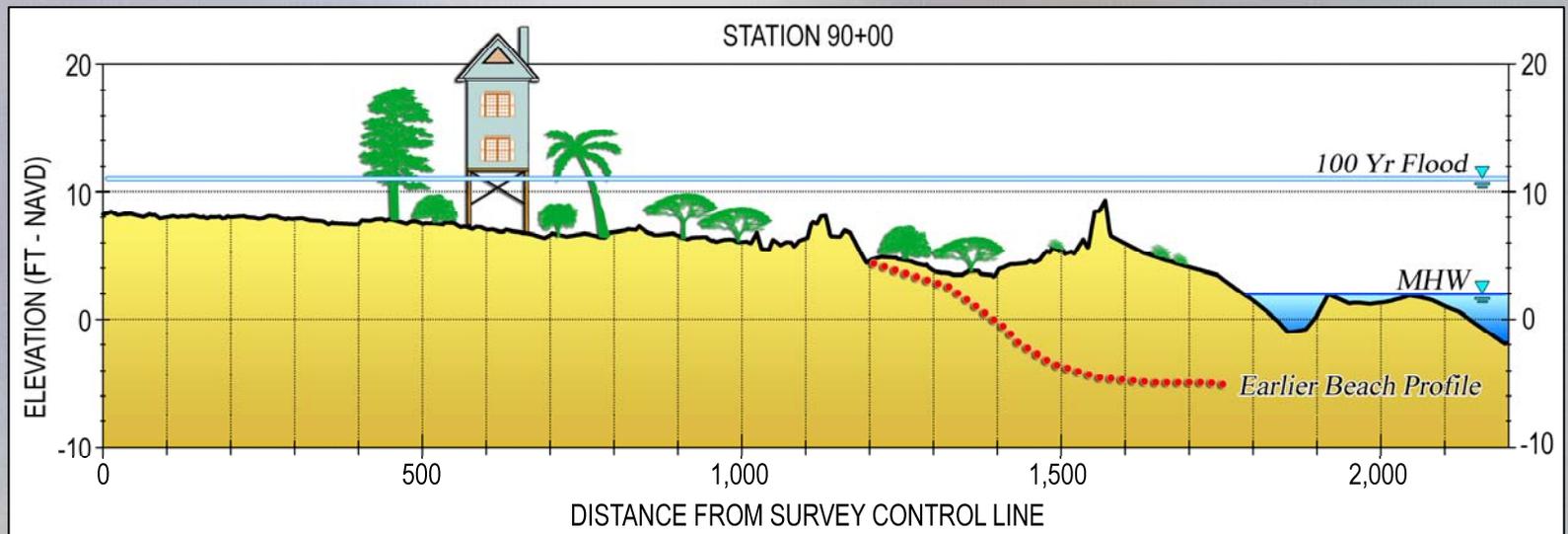
- Leisure, cultural and aesthetic value

- Maximize biodiversity at Sullivan's by maintaining or increasing the diversity of ecological communities



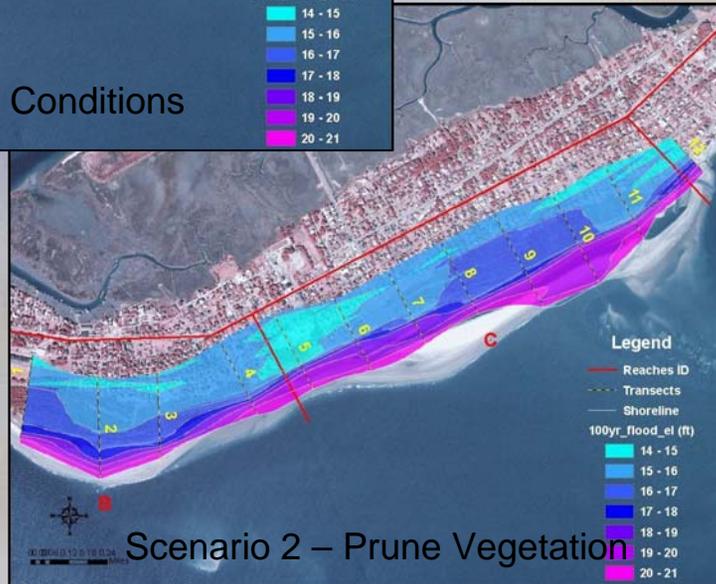
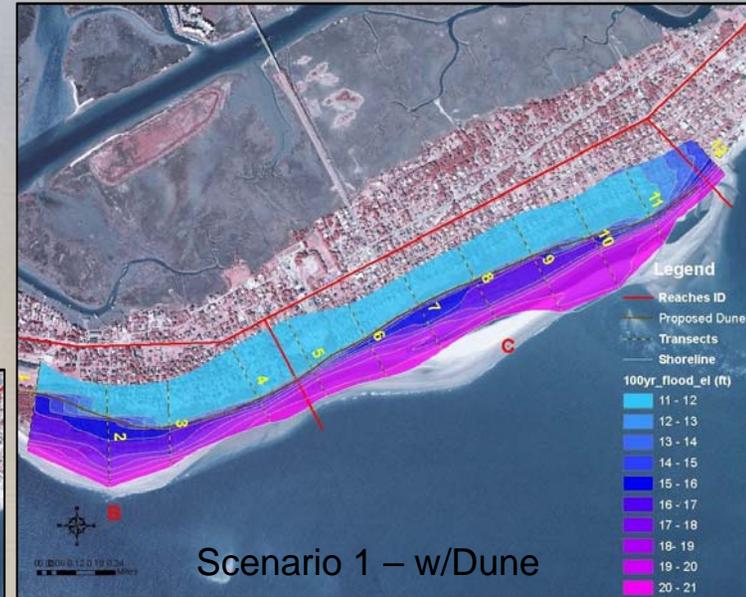
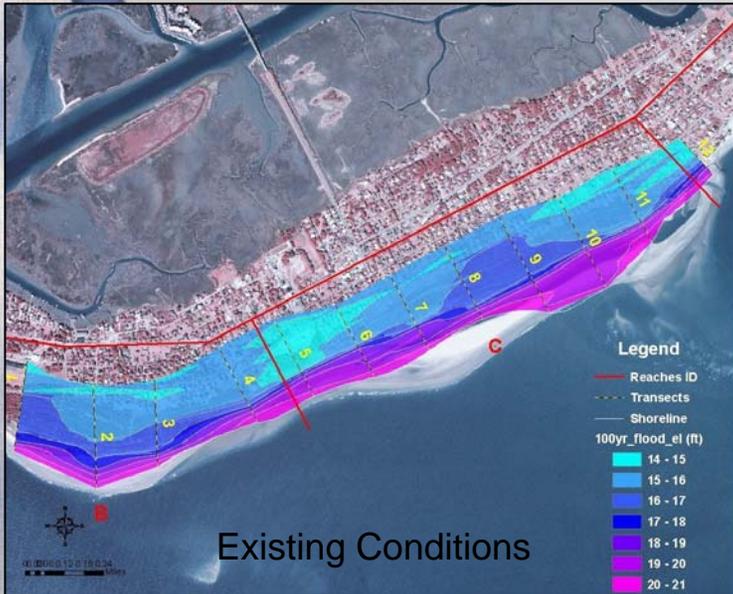
# DISCUSSION

- Storm Impacts – Existing & Future (Chris Mack)



- Existing Conditions
- Scenario 1 – Add A Beneficial Dune
- Scenario 2 – Reduce Vegetation Density – Reach C

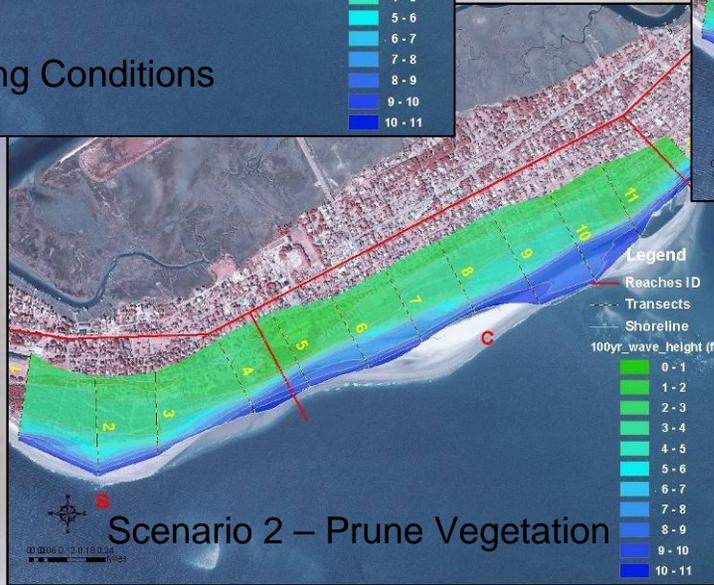
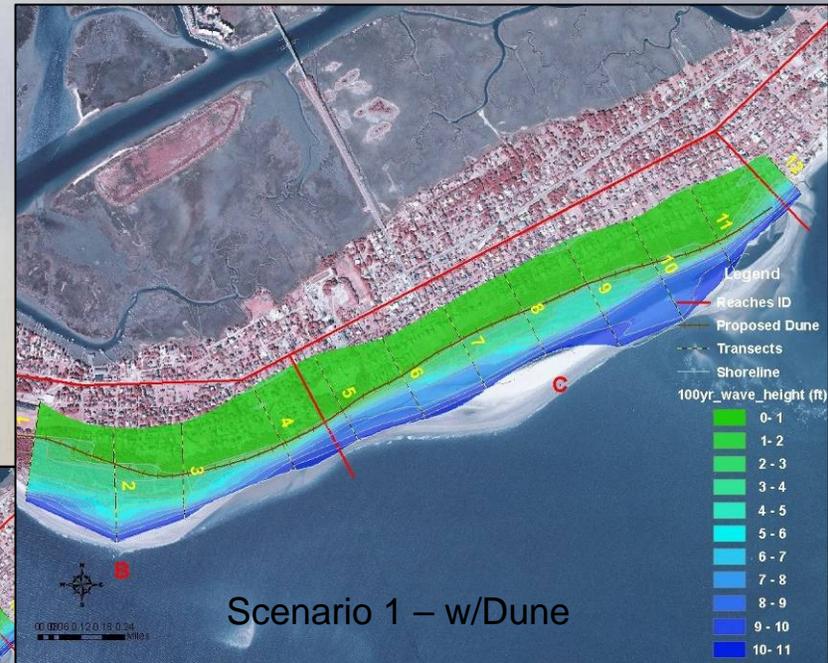
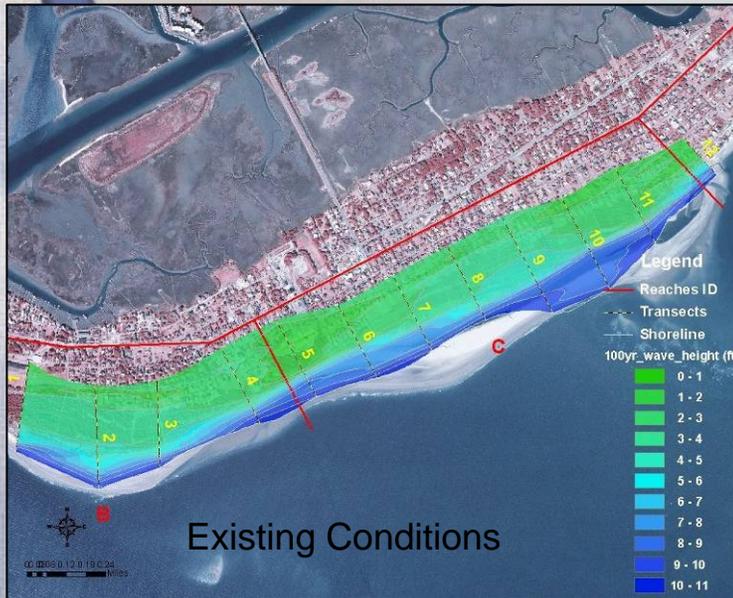
# Storm Impacts



Predicted 100-yr Flood Levels

- Existing Conditions
- Scenario 1 – Add A Beneficial Dune
- Scenario 2 – Reduce Vegetation Density – Reach C

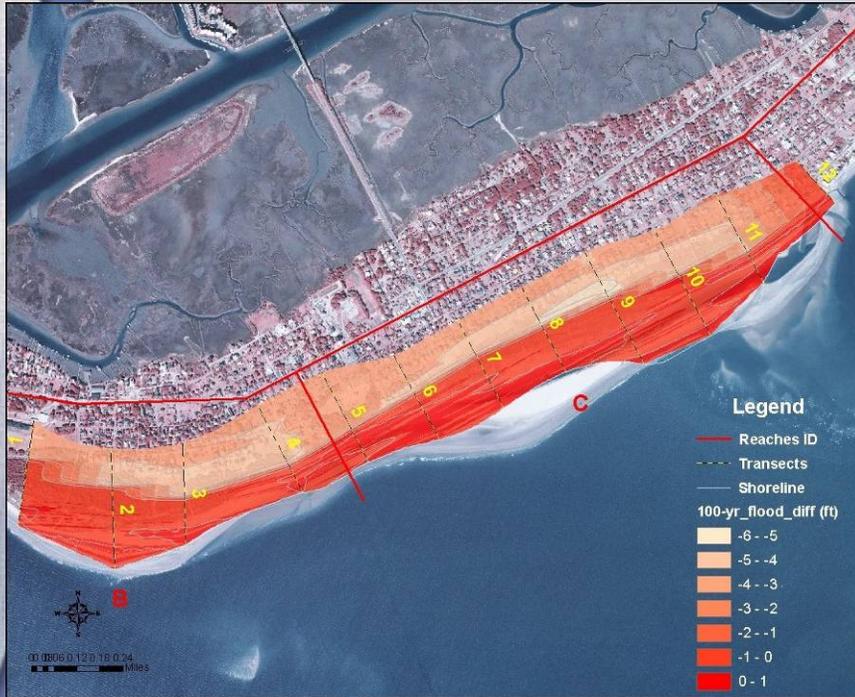
# Wave Impacts



Predicted 100-yr Wave Levels

- Existing Conditions
- Scenario 1 – Add A Beneficial Dune
- Scenario 2 – Reduce Vegetation Density – Reach C

# Change Detection Grids



Existing Conditions vs Scenario 1 (w/Dune)



Existing Conditions vs Scenario 2 (Prune Vegetation)

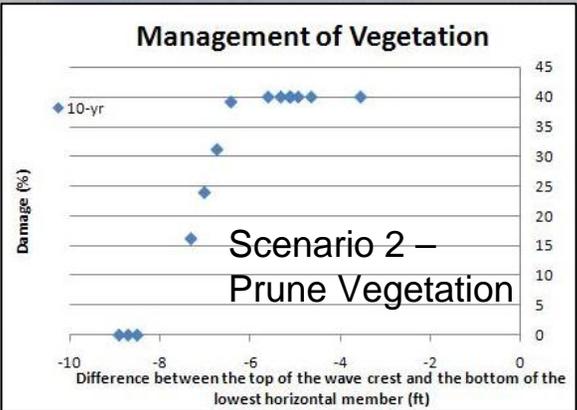
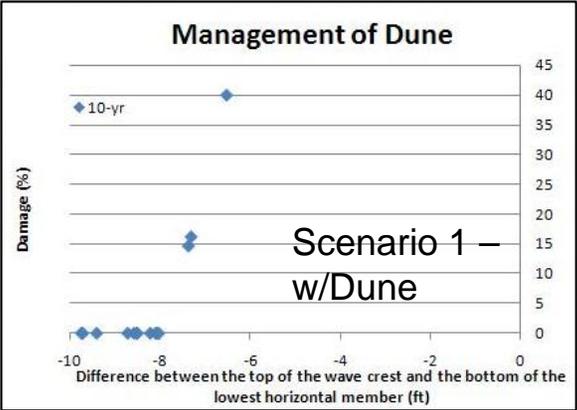
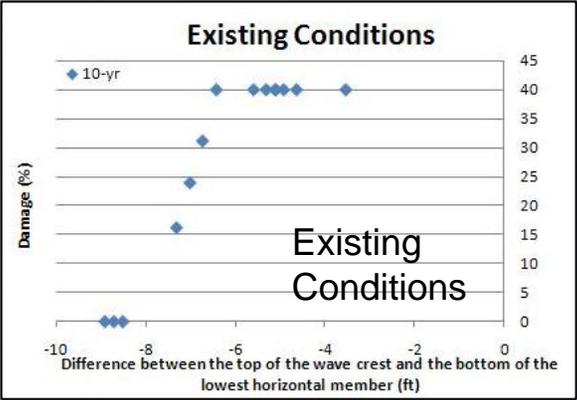
Difference in Predicted 100-yr Total Flood Depths

# Predicted Structural Damages

- Existing Conditions
- Scenario 1 – Add A Beneficial Dune
- Scenario 2 – Reduce Vegetation Density – Reach C



Predicted 10-yr Event

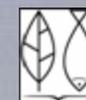


# DISCUSSION

- Fire Hazards (Bart Sabine)



- Basic Premise of Fire Ecology – Agent of Change
- Role of Prescribed Burns
- Plant Susceptibility to Damage
- Where Practiced
- Examples of Damages That Could Have Been Avoided



## Nuisance Species



Black Rat



Norway Rat

## DISCUSSION

### • Pest Control

- Rats
  - Introduced by humans
  - Pruning of vegetation to maintain ocean views provides safe haven
  - Few predators
- Mosquitoes
  - Breed in still, non-permanent water sources
    - puddles, birds bathes, ephemeral wetlands
  - Permanent waters would support predators



# DISCUSSION

- Views, Beach Access & Public Safety



*Example – Open Path*  
Enhances Views,  
Provides Fire Break &  
Increases Public Safety



# DISCUSSION

- Other?



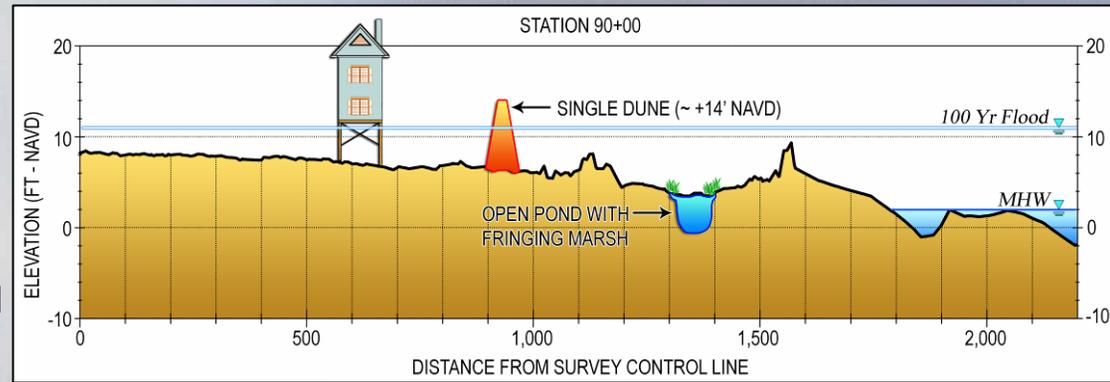
## Alternatives



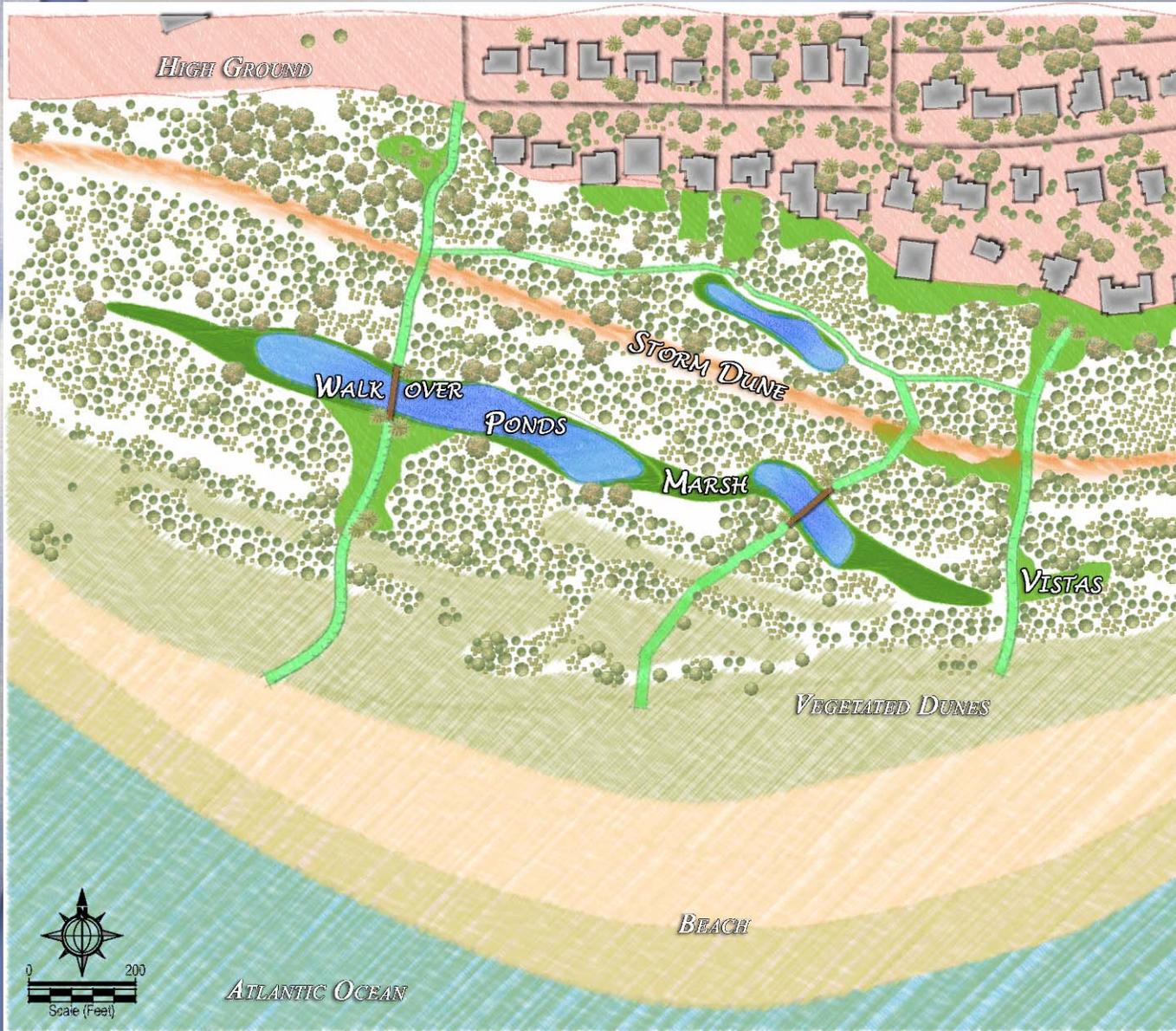
- Alternative 1 - Do Nothing
  - Succession primary driver of change
  - Biodiversity high
  - Reduced rat problem
- Alternative 2 - Present Practice
  - Pruning stops succession on west end
  - Rodent problem will persist
  - Lower biodiversity
- Alternative 3 - Vegetative Management
  - Manage vegetation communities according to Town's goals
  - Artificial manipulation, that must be maintained
- Alternative 4 - Topographic Manipulation
  - Additional habitat type - freshwater pond
  - Create protected zone for increased development of maritime forest
  - Requires some vegetation manipulation to stabilize dune

## Alternative 4 - Concept

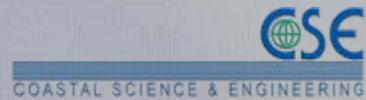
- Small, Protective Dune
- Broad Grass Paths
- Open Water Ponds/Bridges
- Pruned Vegetation to Leave Shrub Hammocks Interspersed With Maritime Forest



# Alternative 4 - Concept



- Small, Protective Dune
- Broad Grass Paths
- Open Water Ponds/Bridges
- Pruned Vegetation to Leave Shrub Hammocks Interspersed With Maritime Forest



Graphic by Trey Hair - CSE

