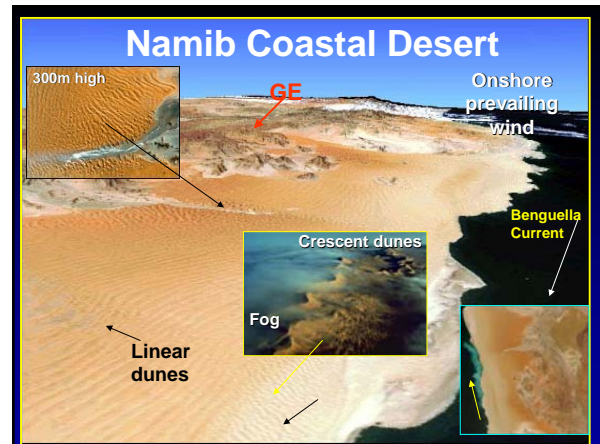


## Gly 558

### Introduction to Coastal Management

#### Aeolian Processes and Dunes



### What Can Dunes Tell Us About the Coastal System?

Their presence can provides clues about:

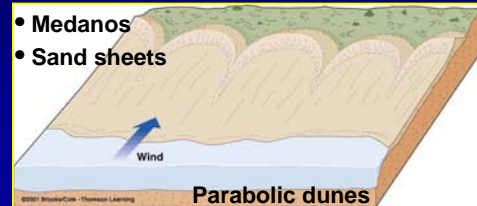
- Wind direction
- Sand supply,
- Storm history (scarps & washovers)
- Erosion history
- Sea level change
- Shoreline stability (with vegetation)
- Relative age
- Presence of inlets
- Man's influence

### Dune Types and Morphology

- Along NC coast there are two major types of dunes and several variations.



- Transverse
- Parabolic



### Dune Types and Morphology



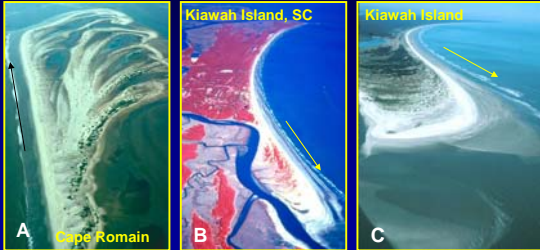
### Recurved Dunes and Spit Growth

Recurved dune ridge complexes typically develop on the updrift side of migrating inlets.



## SC Spits and Recurved Dune Lines

Large sand supply at migrating inlets leads to development of a variety of recurved dune complexes.



## Modified Dune Ridges

- Vegetation has been stripped on some dune ridges (on regressive barriers). Results in remobilization of sand.
- Vegetation changes due to fires, hurricanes, man's activities (timber for boats & grazing).
- Remobilization of sand leads to different dune morphology (plan view and height).



## Complex Parabolics



## Ilha de Florianópolis – SC

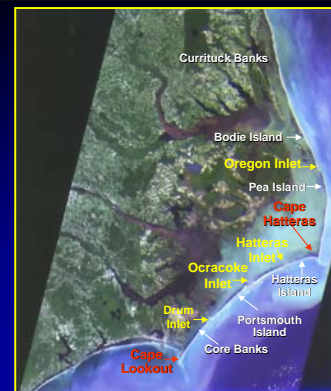


Migrating and arrested parabolics

## Praia Ingleses, SC, Brazil

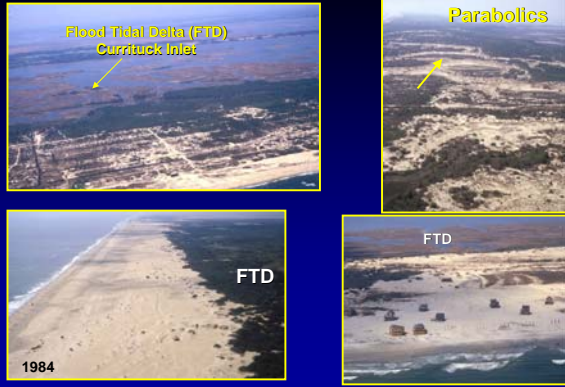


## Outer Banks of North Carolina





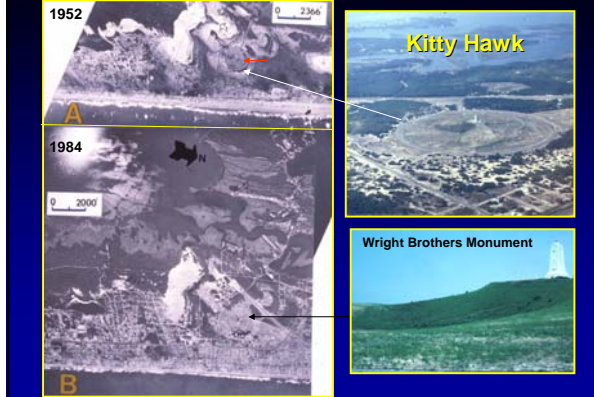
## Outer Banks, NC (Currituck Spit)



## Parabolics/Medanos



## Parabolic Dune Migration



## Nags Head Area

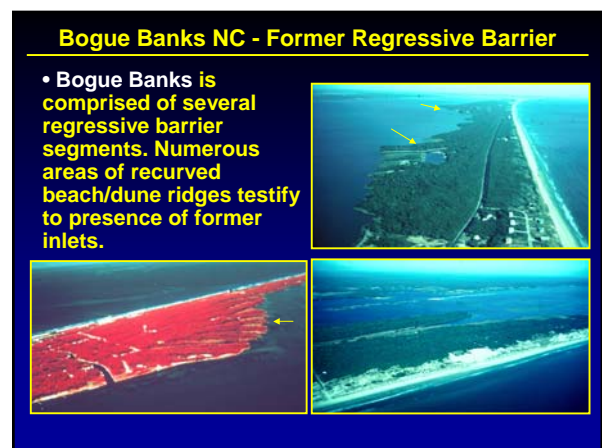


## Hatteras Lighthouse / Buxton Area



## Hatteras Island







## Forested Dune Ridges

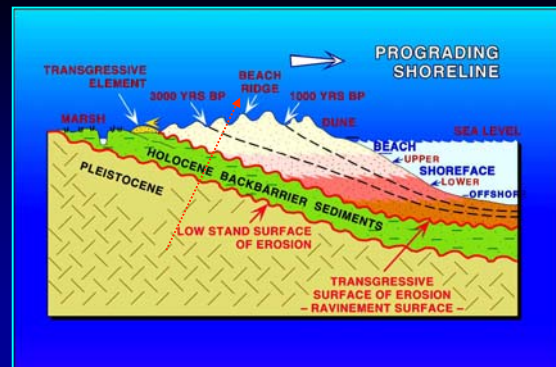


Maritime forest colonized sequence of high dune ridges



Emerald Isle, NC (Bogue Banks)

## Sand Rich Barriers



## Bogue Banks (East View 1975)



Bogue Inlet

## Browns & Bear Islands



Sand Rich Modified Dune/Beach Ridge Barriers



## Inlet Influence and Hurricane Response



Hurricane Fran  
9/7/96



Hurricane  
Bonnie 8/28/98

## Onslow Beach

- Impact of USMC amphibious exercises
- Loss of dune integrity
- Overwash & erosion

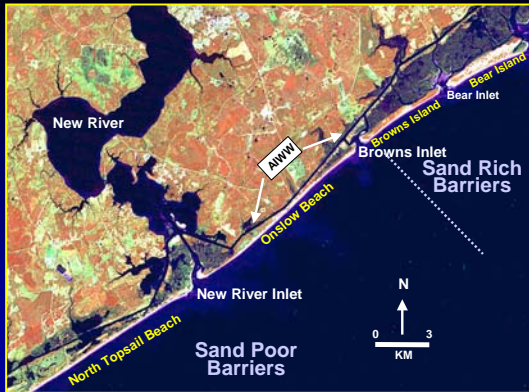


Post Hurricane  
Fran Oct 1996

AIWW



### New River Headland Area



### North Topsail Beach



### North Topsail Beach



### Hurricane Fran (Sept. 5, 96)



### Topsail Island



### North Topsail Beach & Surf City

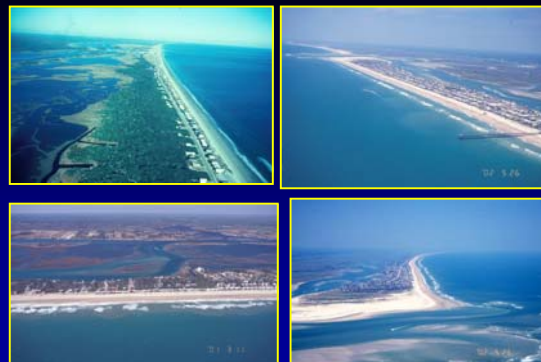




## Surf City, March 10th, 2001



## Topsail Beach



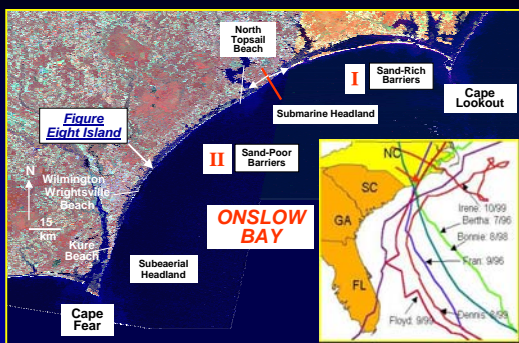
## New Topsail Inlet, NC



## Topsail Beach Chronic Erosion



## SE North Carolina



## Lea & Hutaff Islands



Figure Eight Island



North End Figure 8 Island



F8I North End Erosion (8/02)



Figure Eight Is. Storm Related Damage



Post Hurricane Floyd (9/19/99)

Shell Island

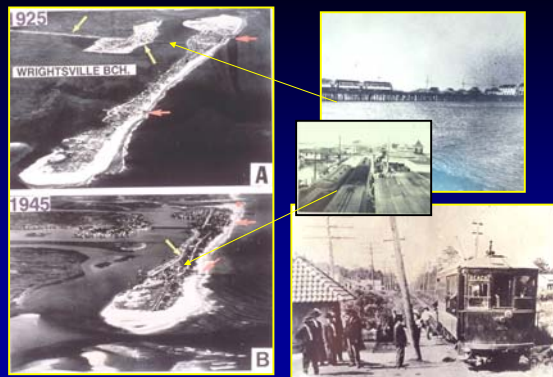


Wrightsville Beach





## Wrightsville Beach



## Old Moore's Inlet



## Masonboro Island



## Mid Barrier Change

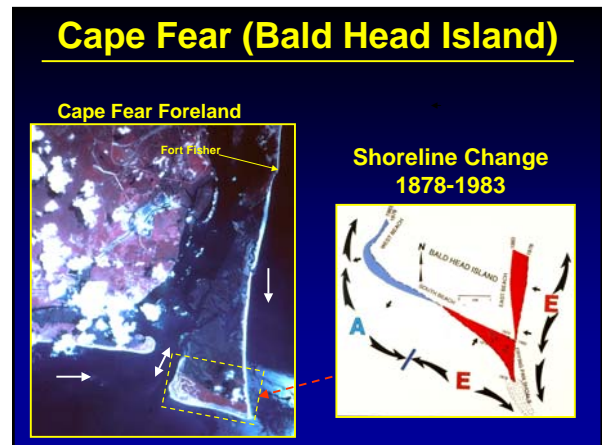
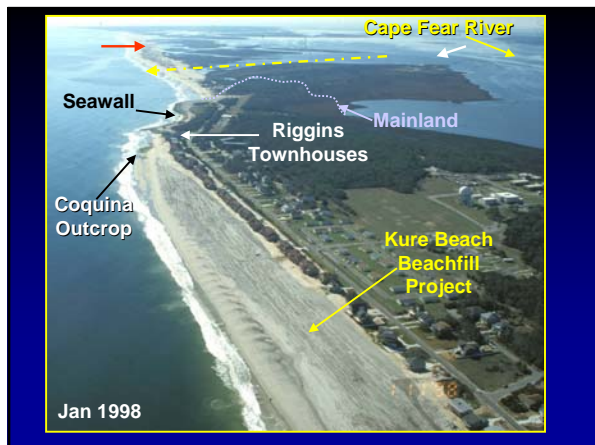
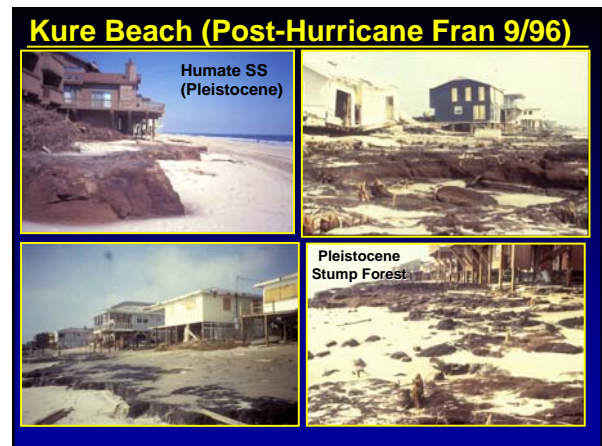


## Masonboro Island



## Carolina Beach







## Eastern Spit (Caswell Beach)



## Western Spit Oak Island (Long Beach)



## Hurricane Floyd (9/99)



## Beach Nourishment

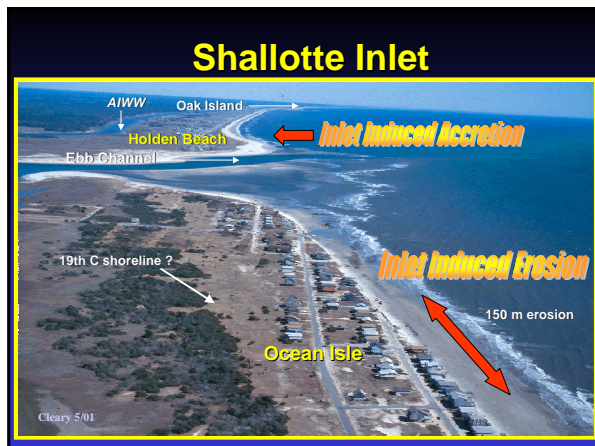


## Holden Beach Inlet-Related Erosion



## Holden Beach Erosion







## Little River Jetties - Bird Island

