

# Barrier Islands

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THE NORTH CAROLINA NATIONAL ESTUARINE RESEARCH'S COASTAL TRAINING PROGRAM & BRUNSWICK COUNTY ASSOCIATION OF REALTORS PRESENT:

*Living on a Barrier Island – A Workshop for Real Estate Professionals*



**2149 barrier islands worldwide**

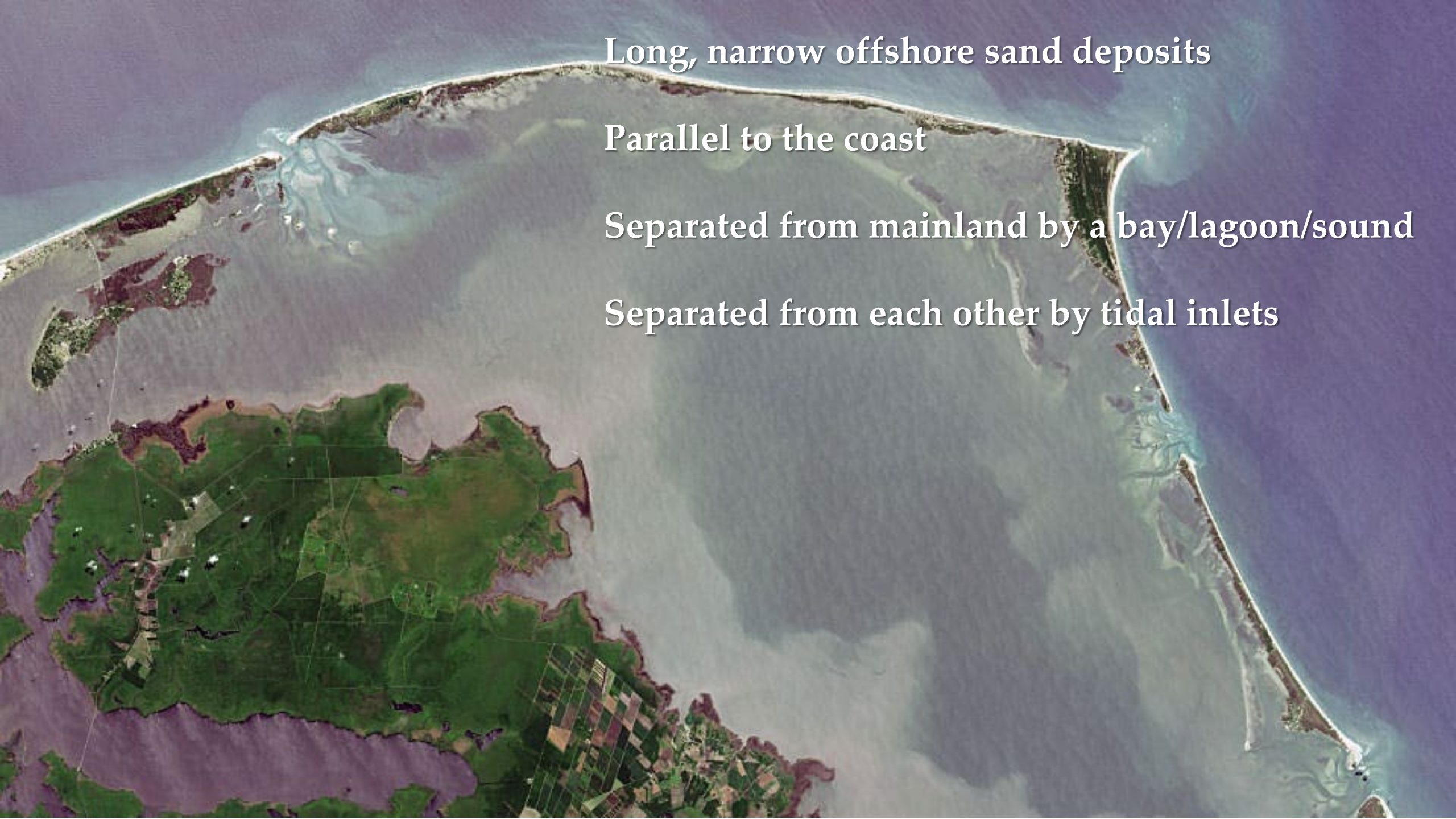
**300 ring the Atlantic and Gulf coasts of the US**



**Low-lying**

**Ecologically diverse and important**

**Protect mainland from waves and surge**

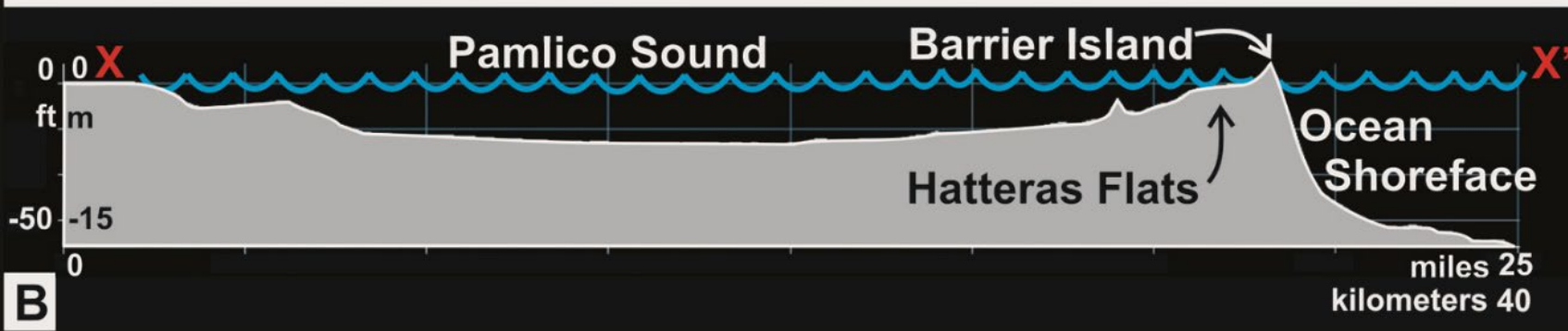
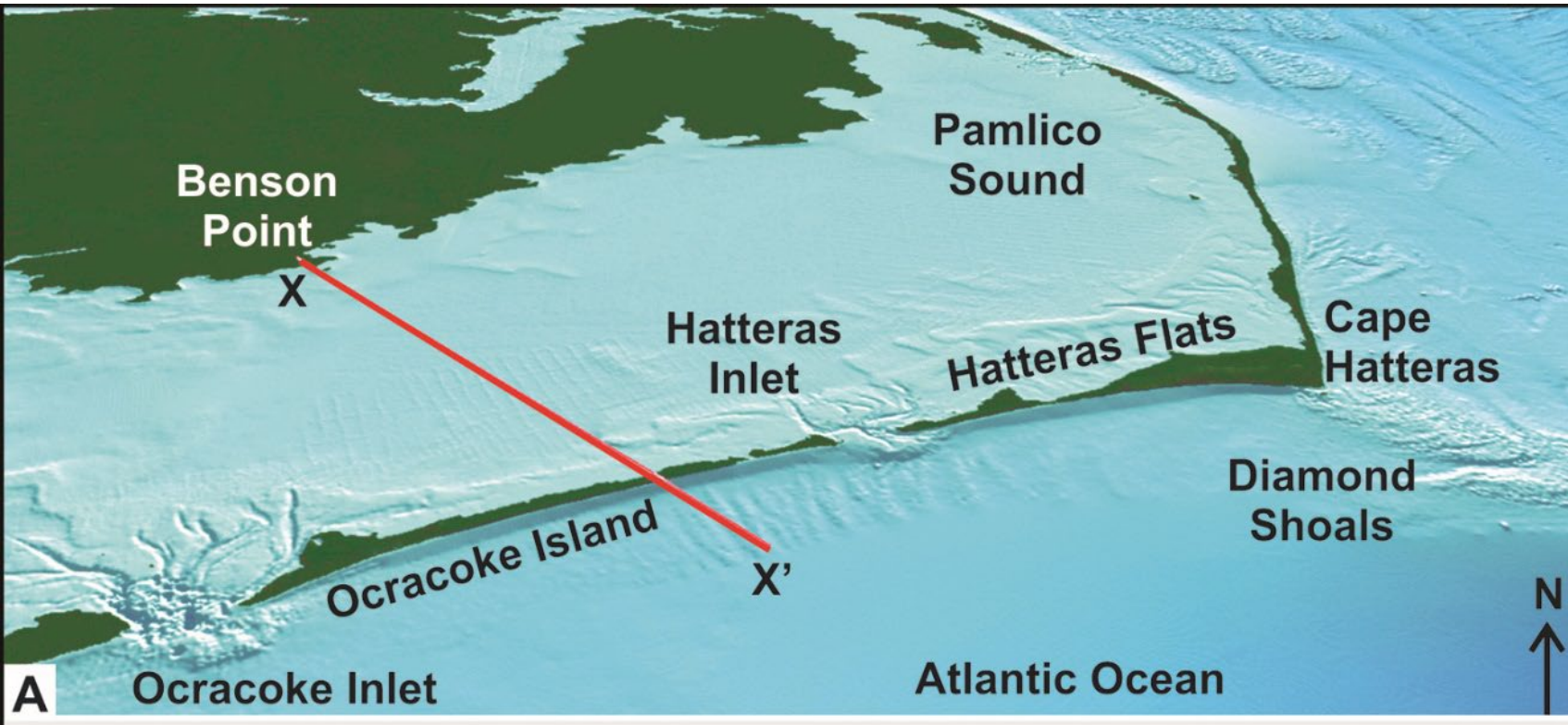


Long, narrow offshore sand deposits

Parallel to the coast

Separated from mainland by a bay/lagoon/sound

Separated from each other by tidal inlets



Barrier islands persist because;

- 1) Gently sloping coastal plain-continental shelf
- 2) Adequate sediment supply
- 3) Rising sea level
- 4) High energy storms to move redistribute sediment

# Parts of Barrier Island

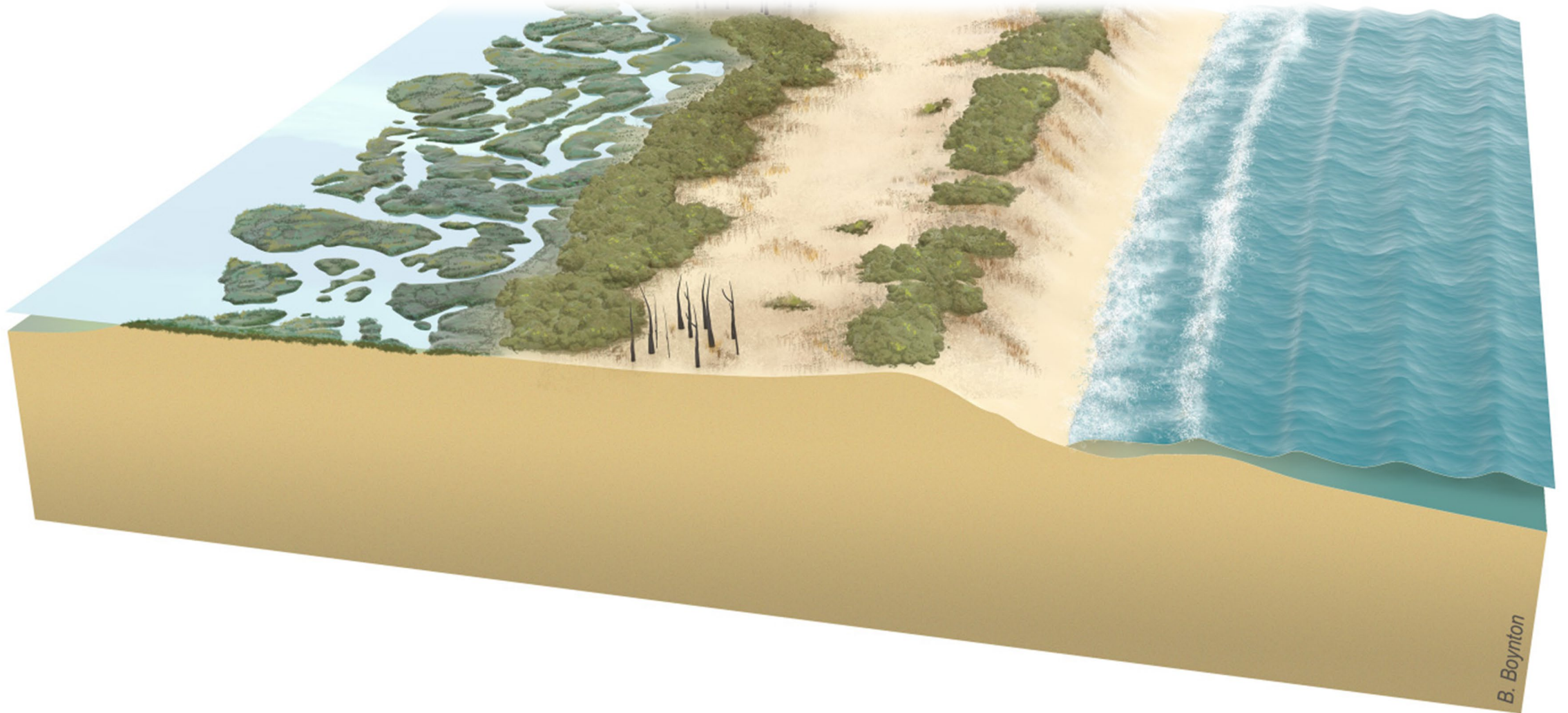
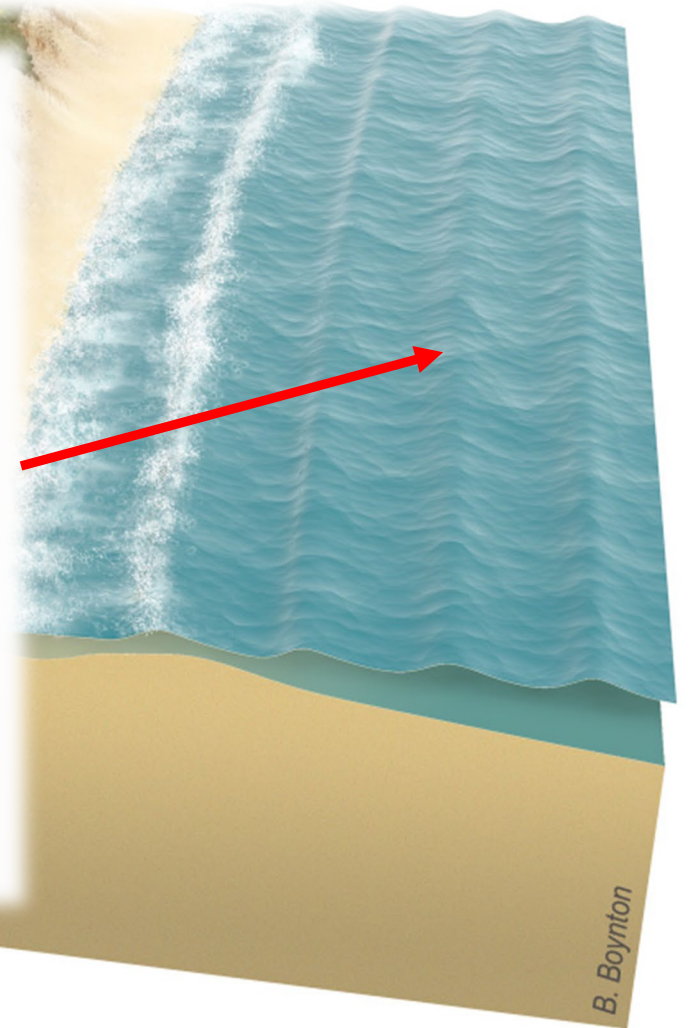


Image: Betsy Boynton, Cherokee Nations Technologies, contracted to the USGS. Public domain.

# Parts of Barrier Island

## Nearshore:

- High energy environment
- Wave breaking and wave runup
- Cross-shore and alongshore sand transport
- Sand bars and troughs
- Home to small fish, shellfish, mole crabs



# Parts of Barrier Island



## Beach:

- Primarily bare sand
- Exposed to wave runup and tides
- Shifting sands, sun, strong winds, salt spray
- Foraging grounds for shorebirds (gulls, terns, plovers)
- Sea turtle nesting areas



# Parts of Barrier Island



## Dune:

- Large sand ridges; highest part of the barrier island
- Formed by aeolian transport (sand moved by winds)
- Stabilized by vegetation; roots catch and hold sand
- Sea oats, American beachgrass and other species

# Parts of Barrier Island



## Barrier Flats:

- Protected areas behind dunes
- Maritime grasslands to maritime herbaceous plants and shrubs
- It not impacted by large storms and saltwater forests can grow

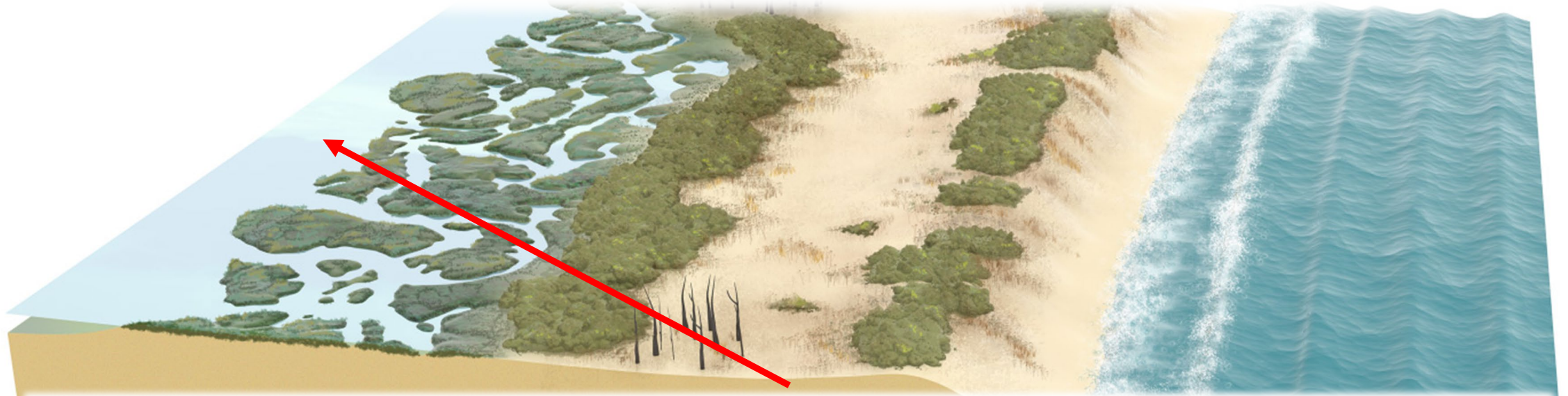
# Parts of Barrier Island



## Salt Marsh:

- High marsh – flooded only at high tide
- Low marsh – flooded at almost any tide level
- Plants that cannot regulate high salinity compete for higher ground
- Cordgrasses are common

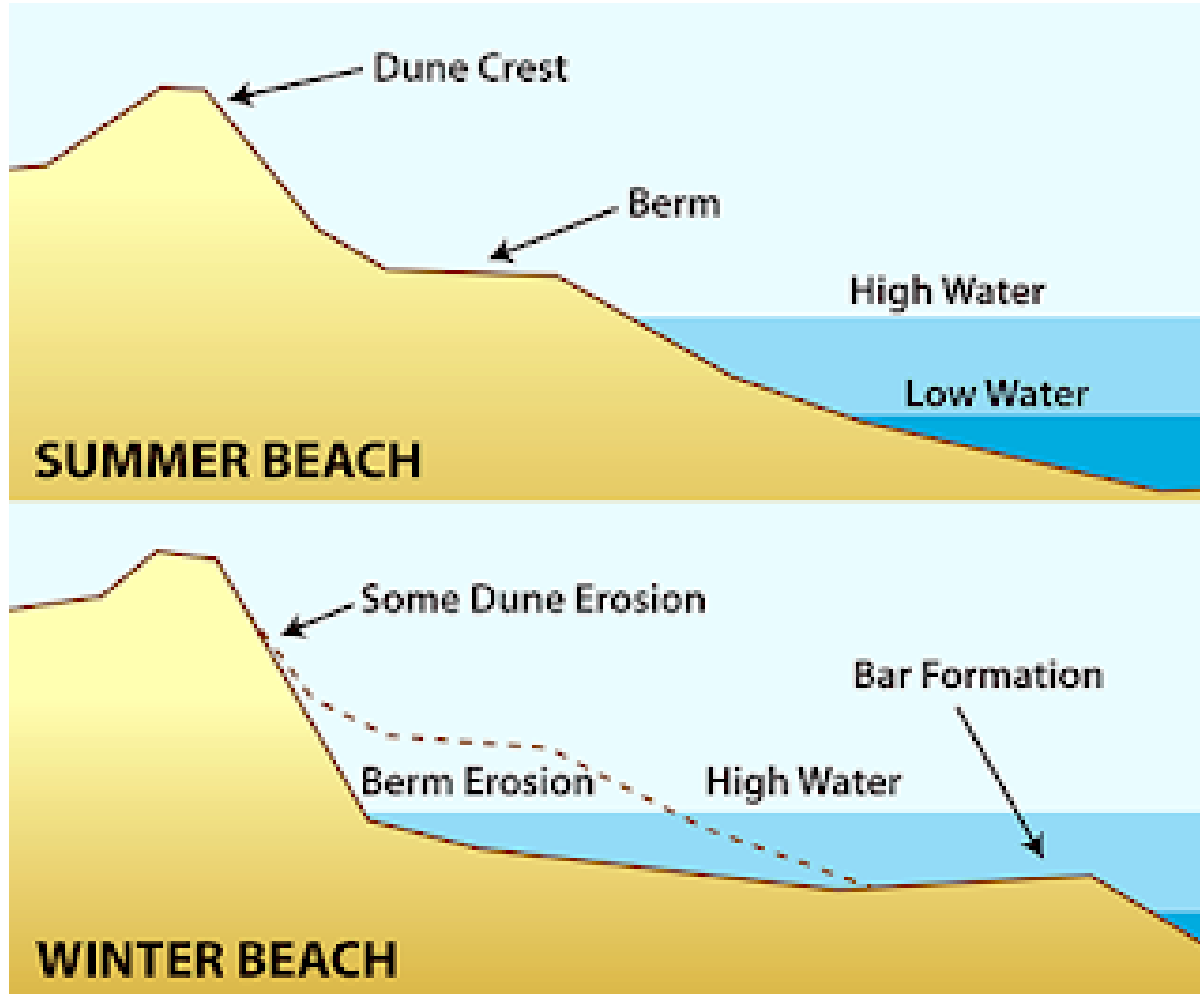
# Parts of Barrier Island



## Lagoon:

- Sheltered from waves
- Variable salinity values
- Estuarine waters support species like diamondback terrapin and fish

# Barrier Islands are small, but DYNAMIC



Beach changes seasonally

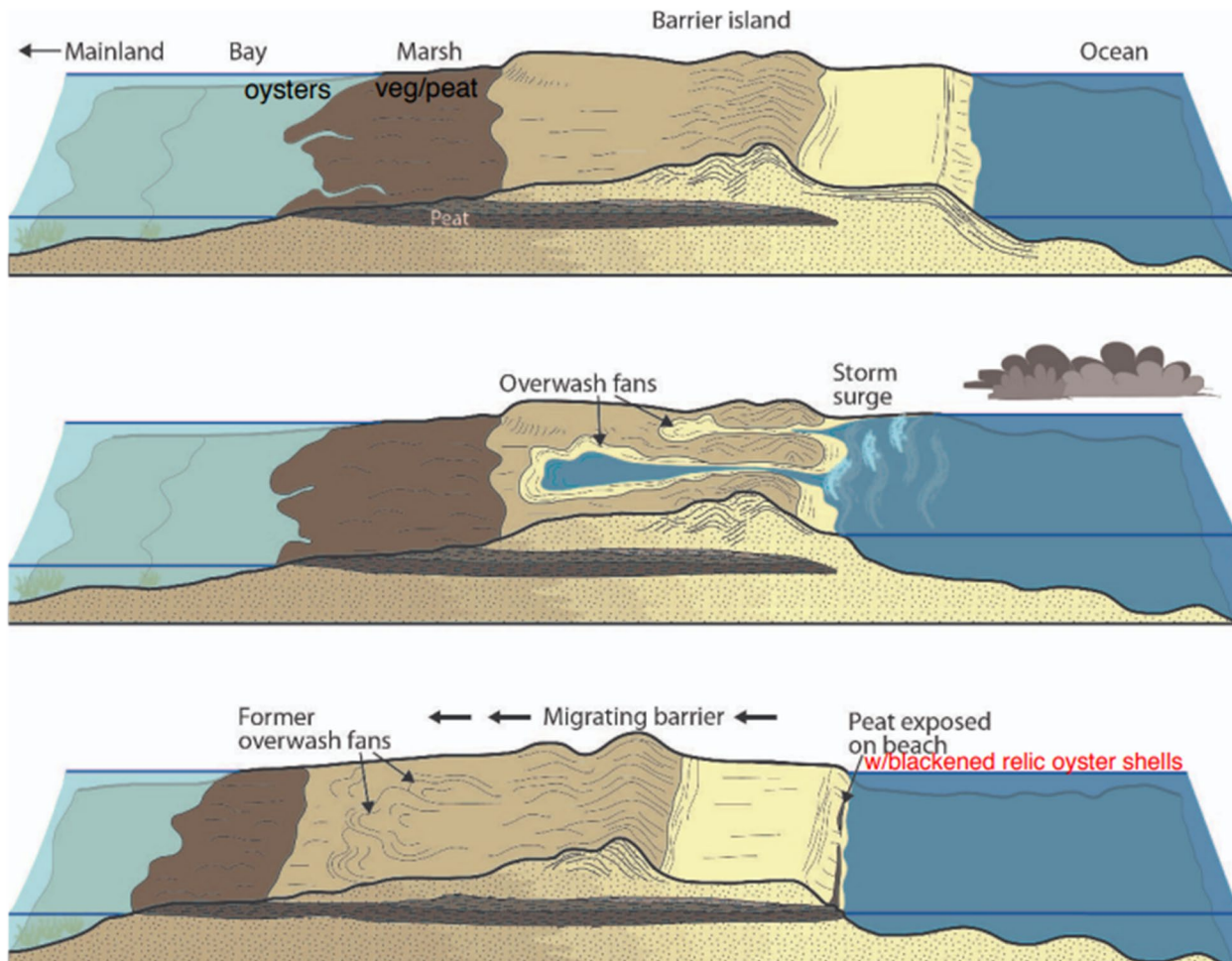
Summer:

- Waves push sand from the bar up onto the beach
- Wide berm

Winter:

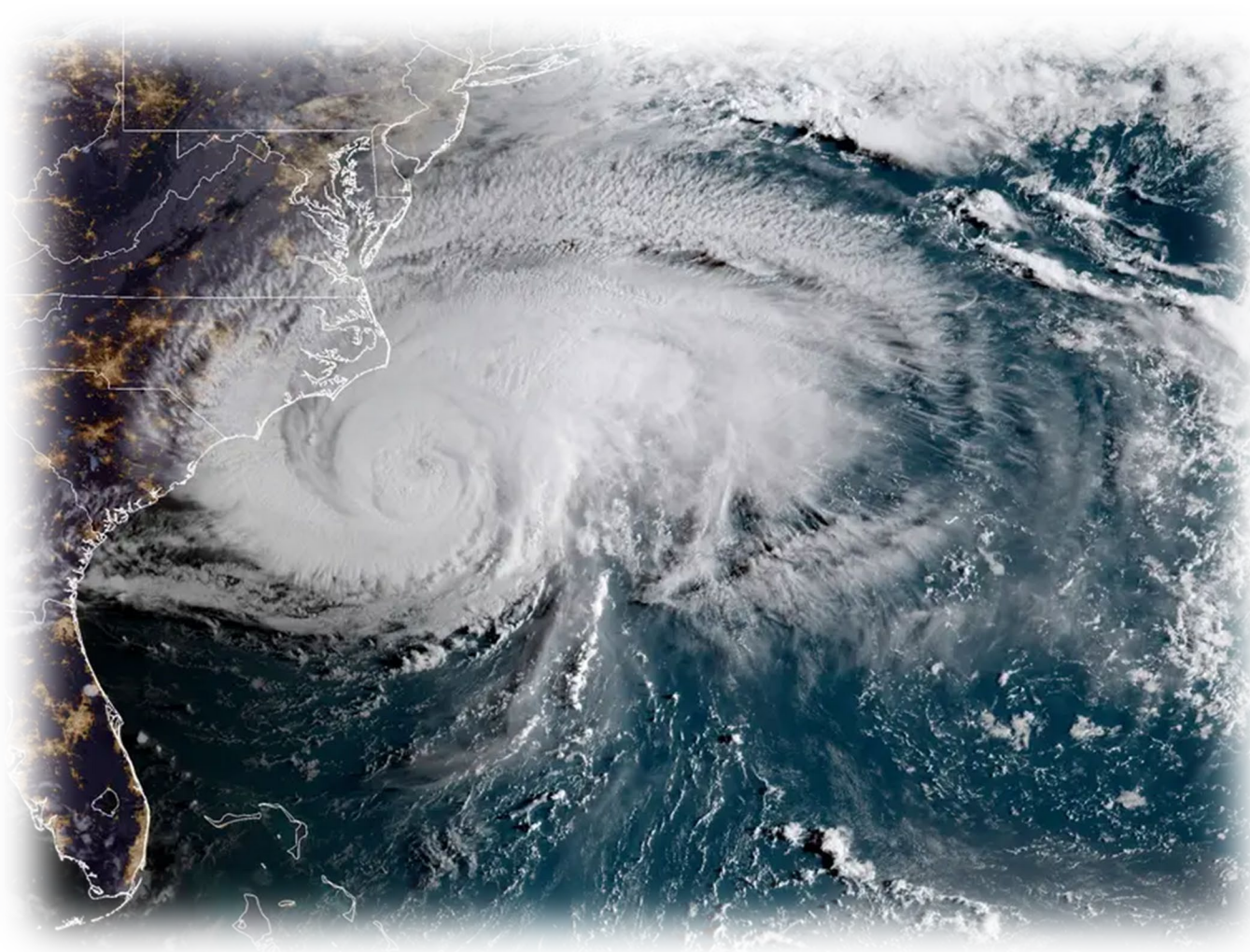
- Larger waves take sand from the beach and 'store' it in the sandbar
- Narrow berm/beach

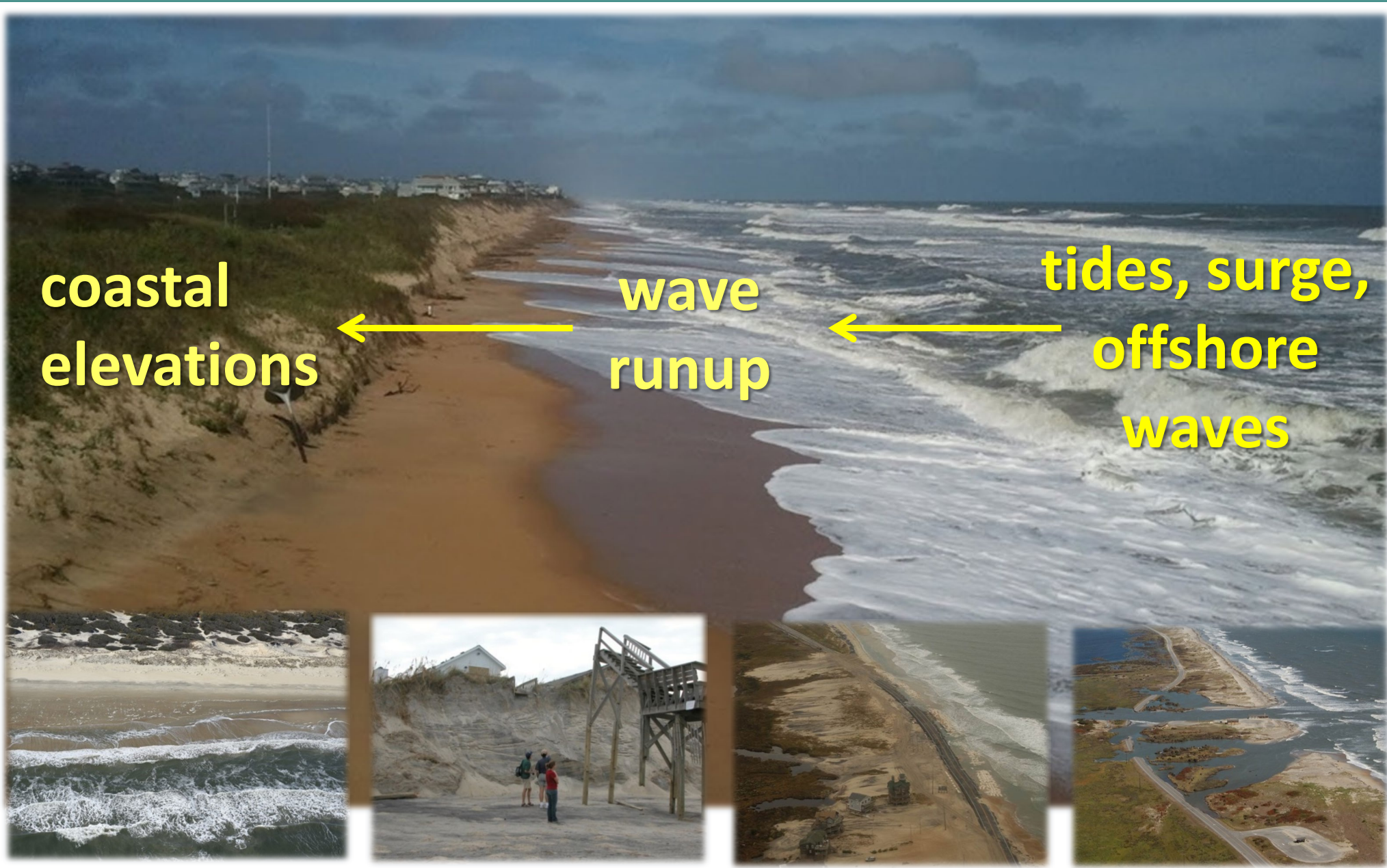
# Barrier Islands are small, but DYNAMIC



- Over longer time periods, barrier islands respond to storms by 'rolling-over'
- High water levels and wave push sand from the beach and dune to the barrier flat or lagoon
- Over decades the barrier island marches landward

# Storms Promote Barrier Island Rollover





coastal  
elevations

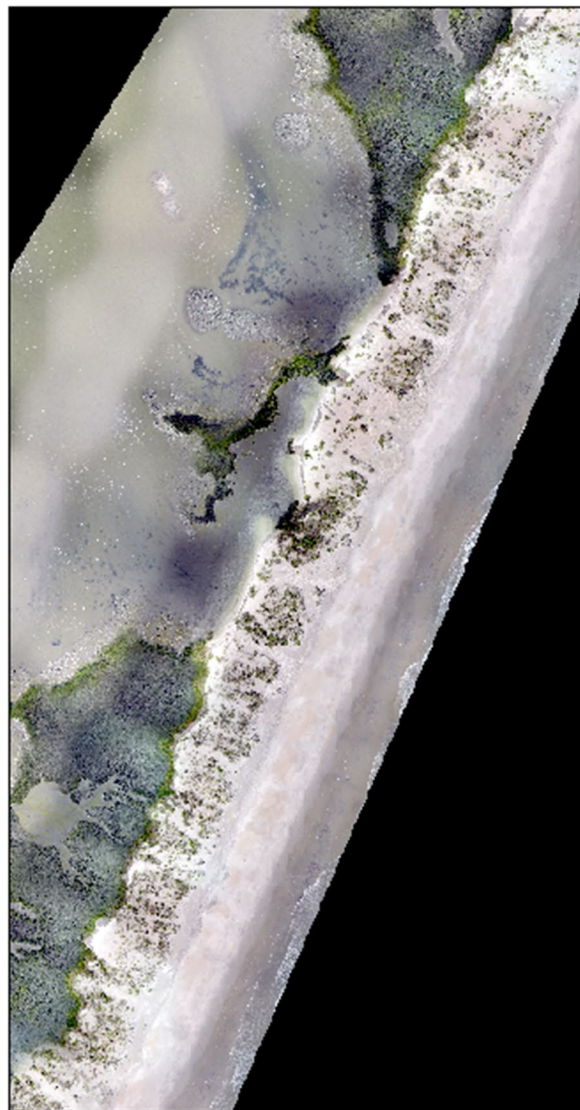
wave  
runup

tides, surge,  
offshore  
waves

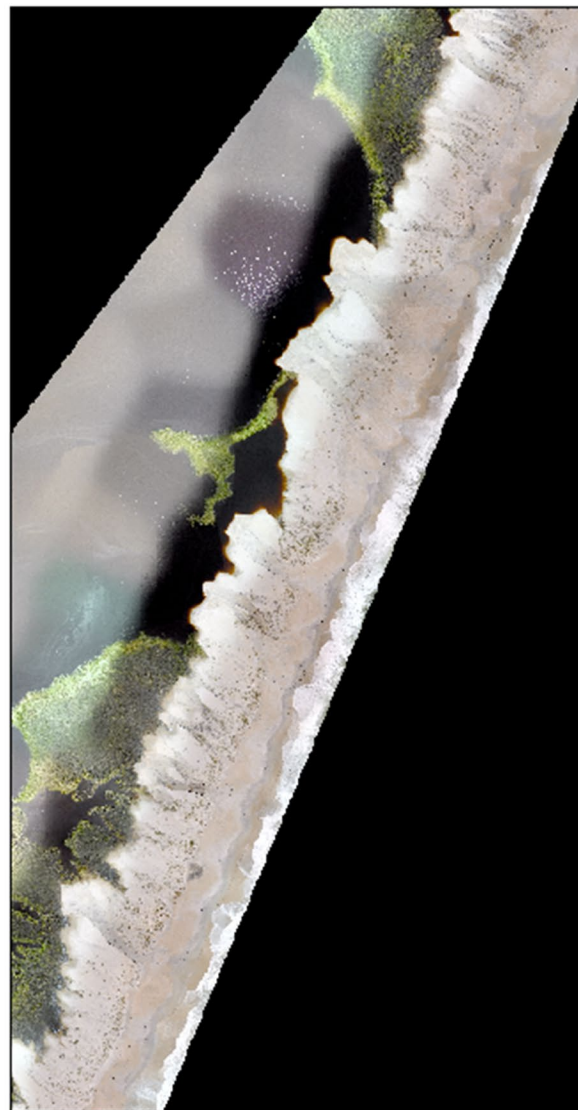




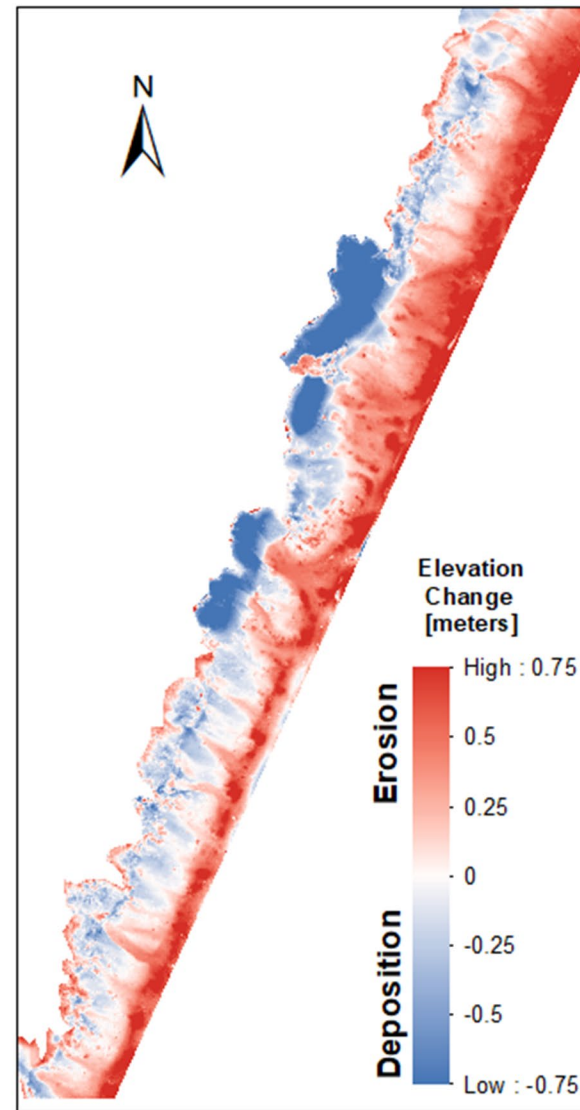
Pre-Florence Imagery



Post-Florence Imagery



Elevation Change

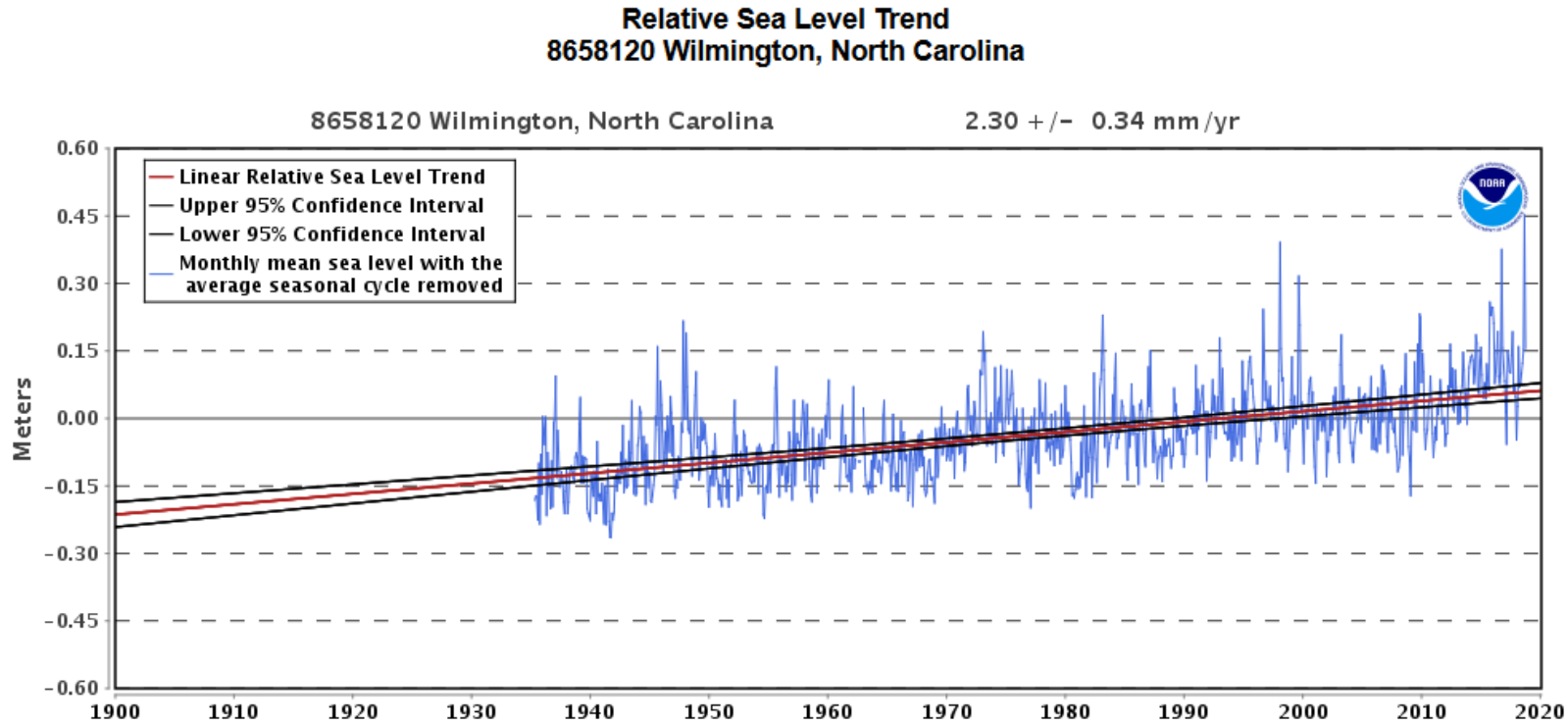


# Overwash



- Overwash is part of the rollover process
- Pushes sand behind the dunes
- Vegetation will reestablish over time
- Some species like overwash 'fans' for habitat

# Sea level will impact barrier island rollover

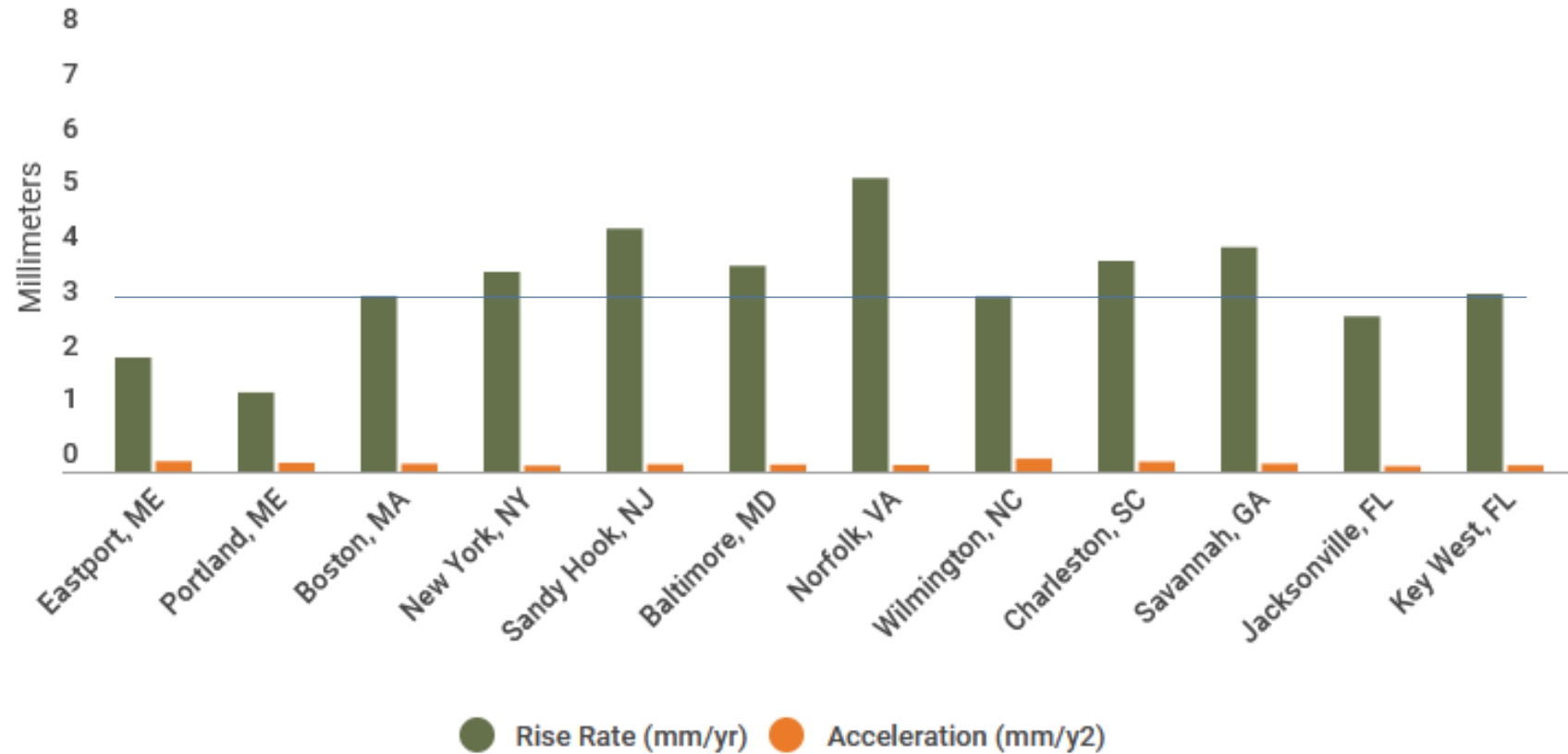


Higher sea level leads to more overwash even for less severe storms

Can barrier islands rollover fast enough?

# Sea level will impact barrier island rollover

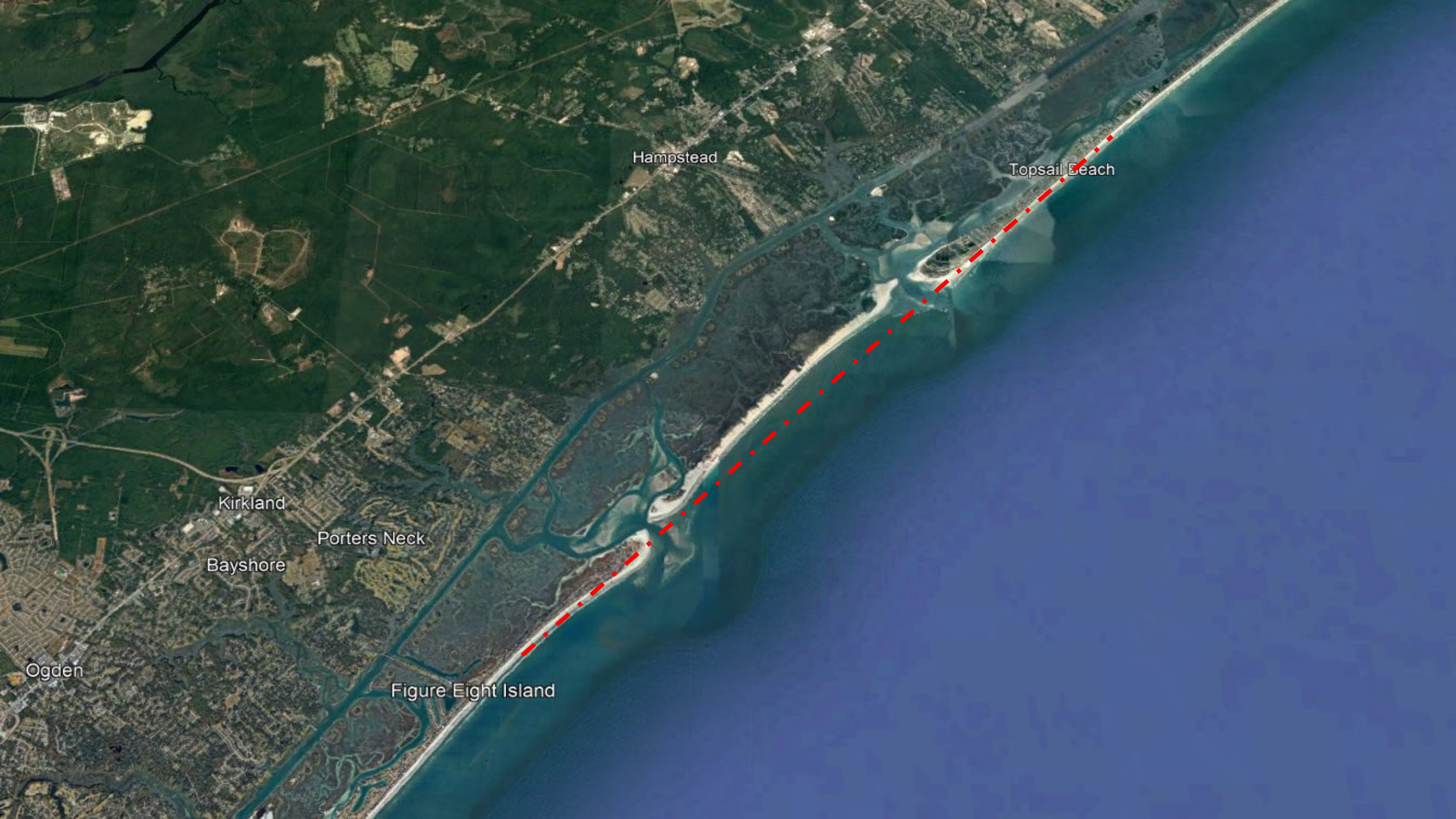
Trend Values for 2021



<https://www.vims.edu/research/products/slrc/index.php>

Many barrier islands are narrow but may be HEAVILY populated





Hampstead

Topsail Beach

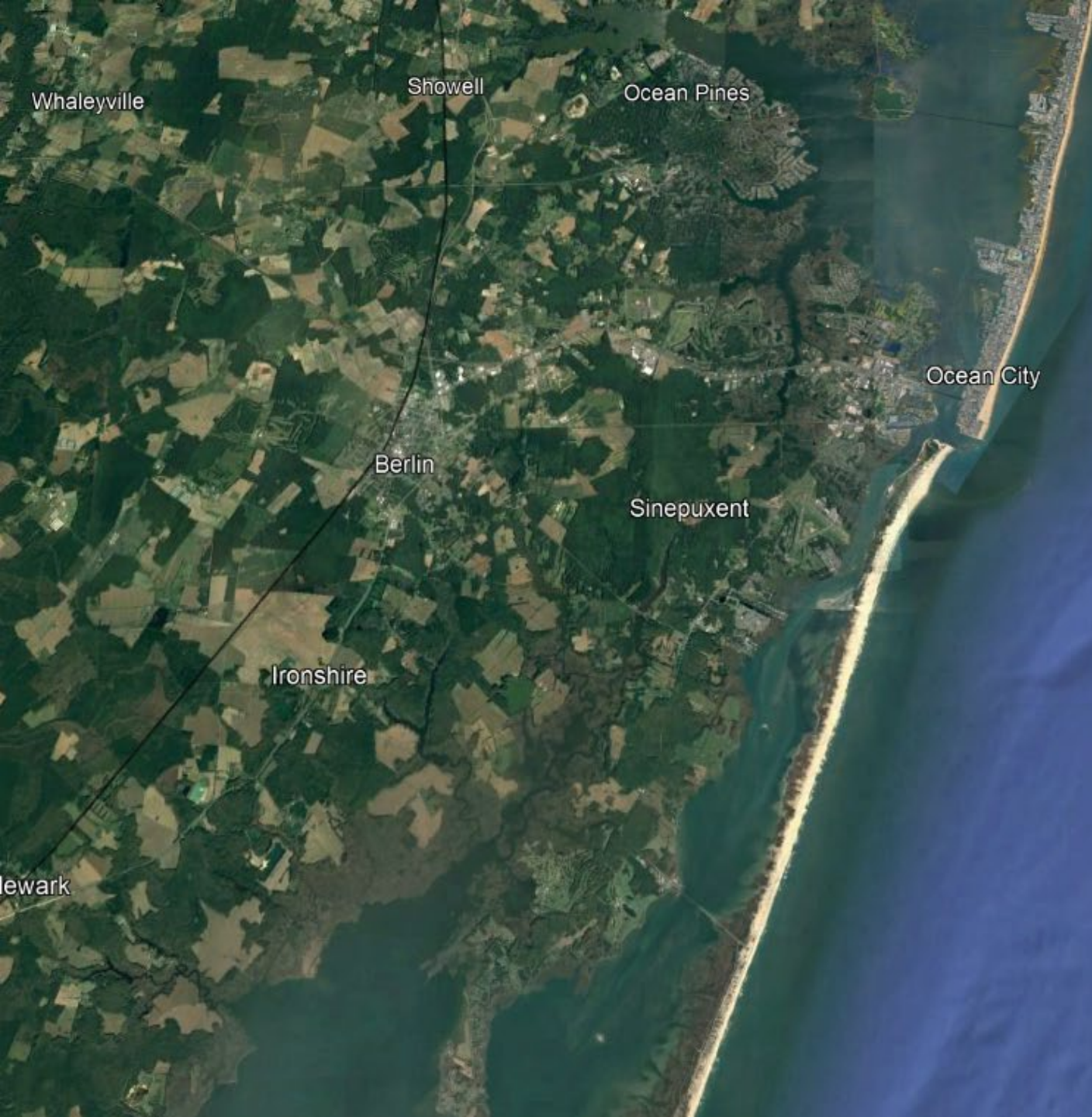
Kirkland

Porters Neck

Bayshore

Ogden

Figure Eight Island



Whaleyville

Showell

Ocean Pines

Ocean City

Berlin

Sinepuxent

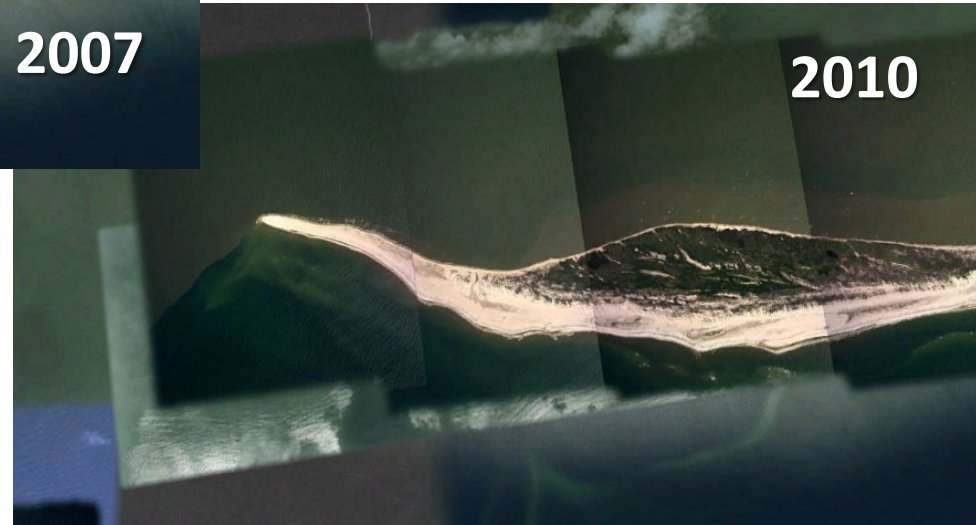
Ironshire

Newark



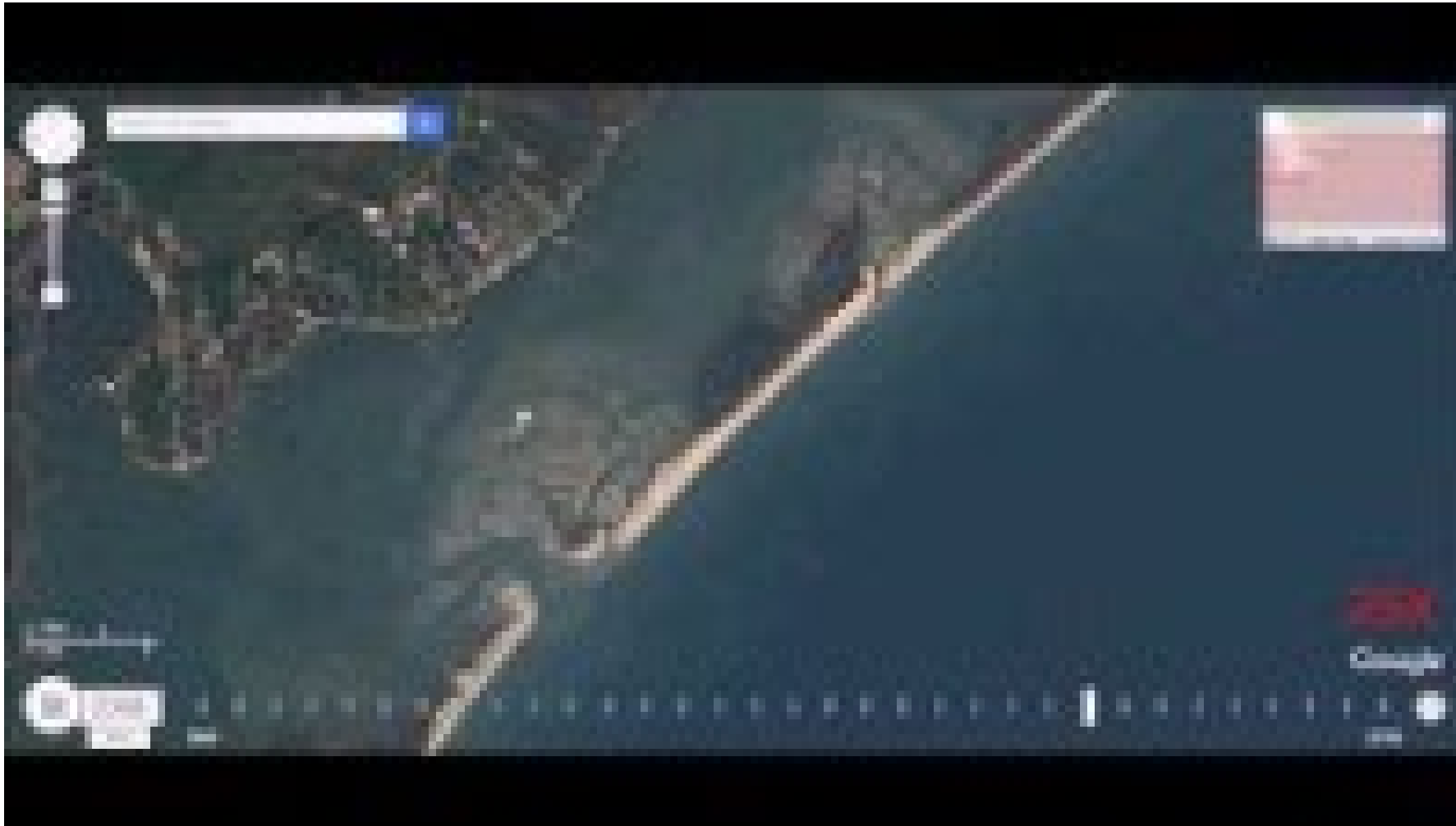
# The ends of islands are REALLY dynamic

Longshore currents can move sand towards the ends





# The ends of islands are REALLY dynamic



Combination of tidal currents and alongshore currents

Barrier Islands:  
unique, diverse,  
dynamic, vulnerable



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