

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

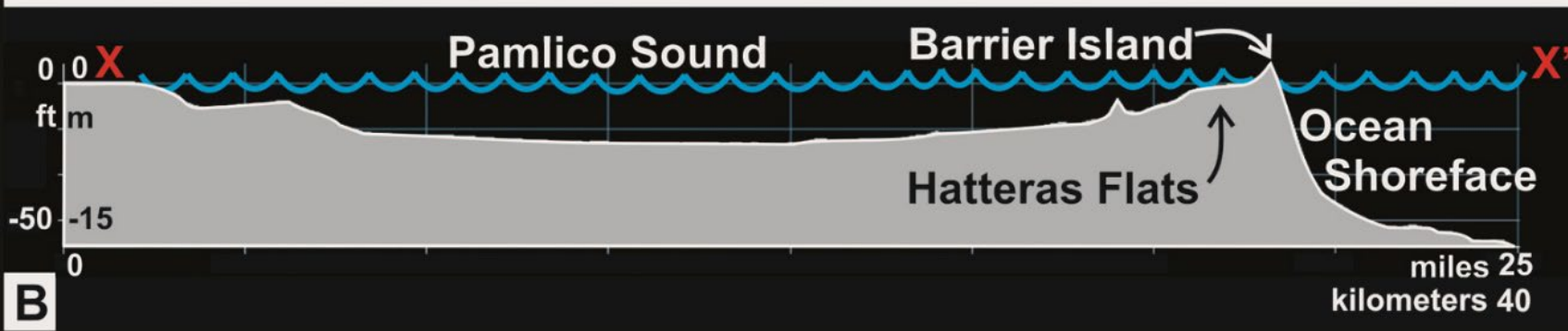
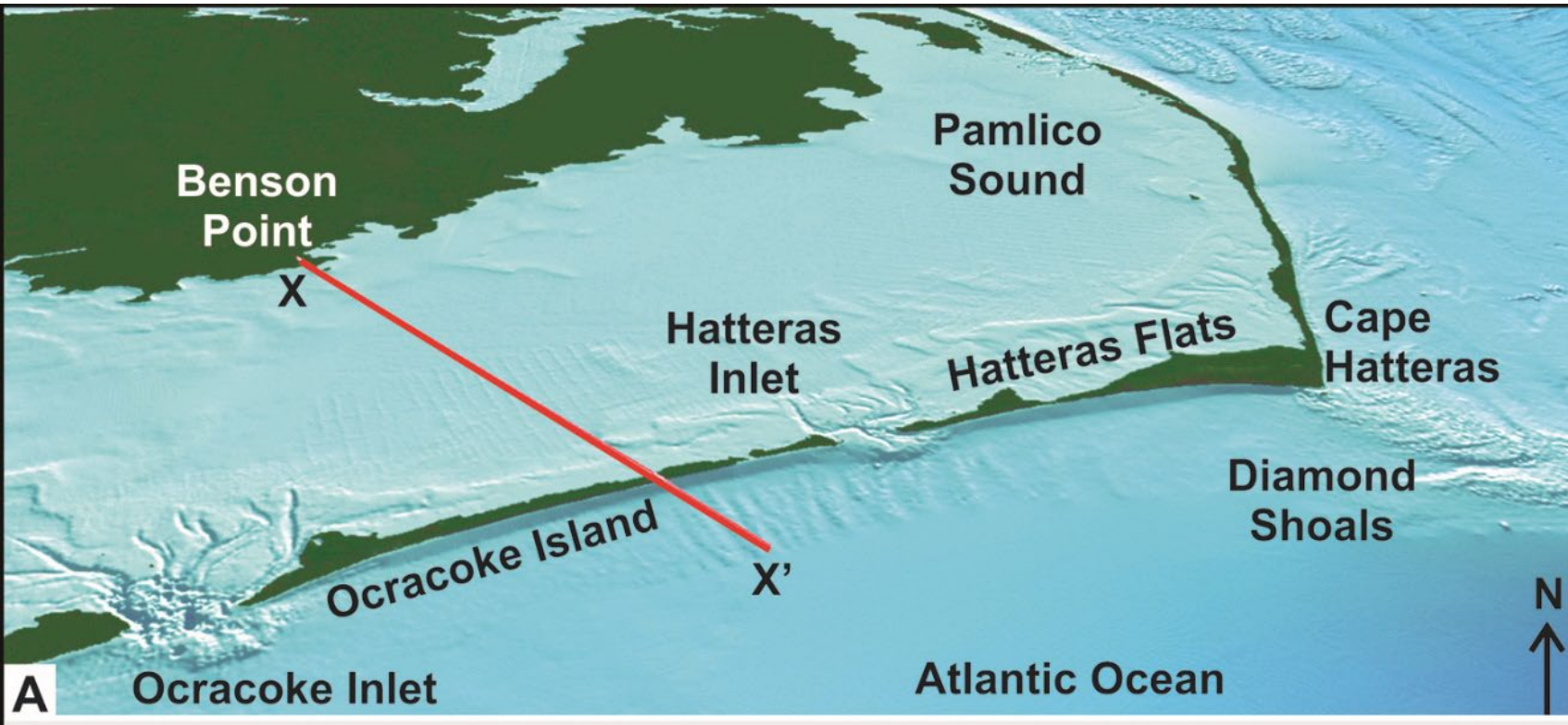


Long, narrow offshore sand deposits

Parallel to the coast

Separated from mainland by a bay/lagoon/sound

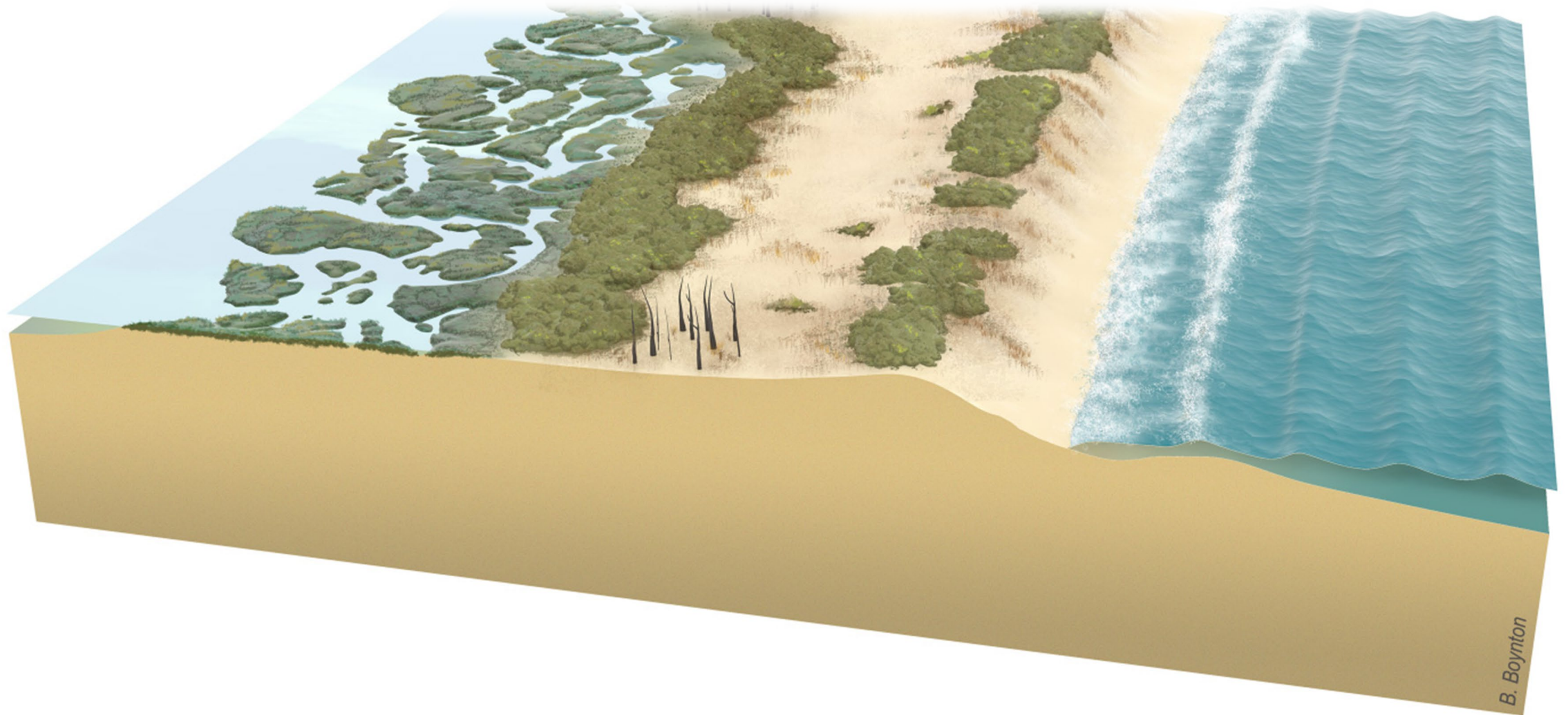
Separated from each other by tidal inlets



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



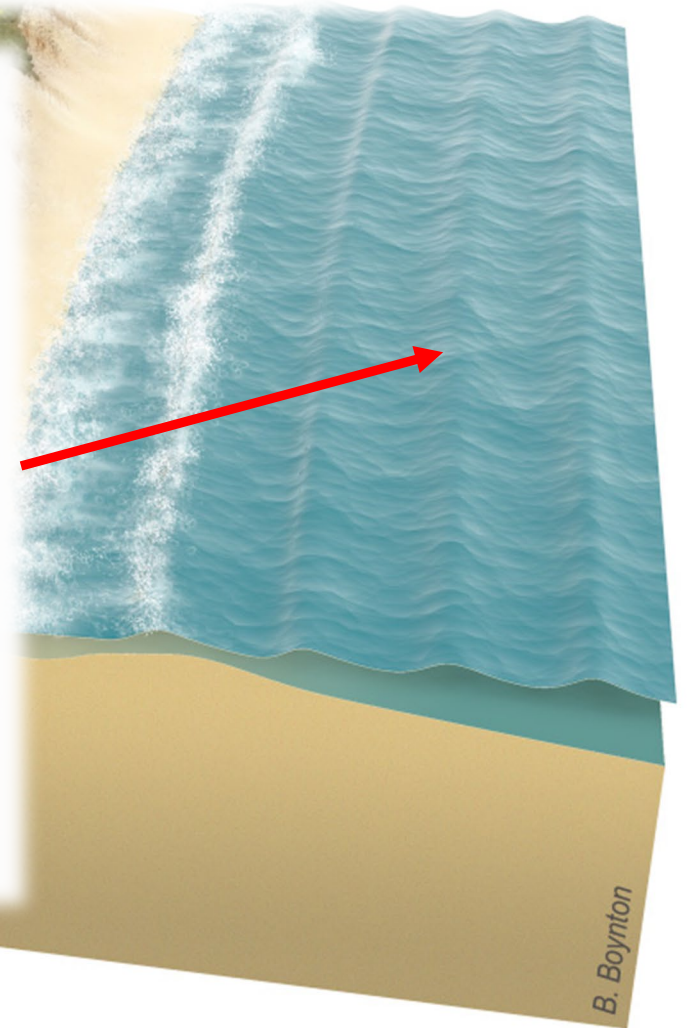
B. Boynton

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

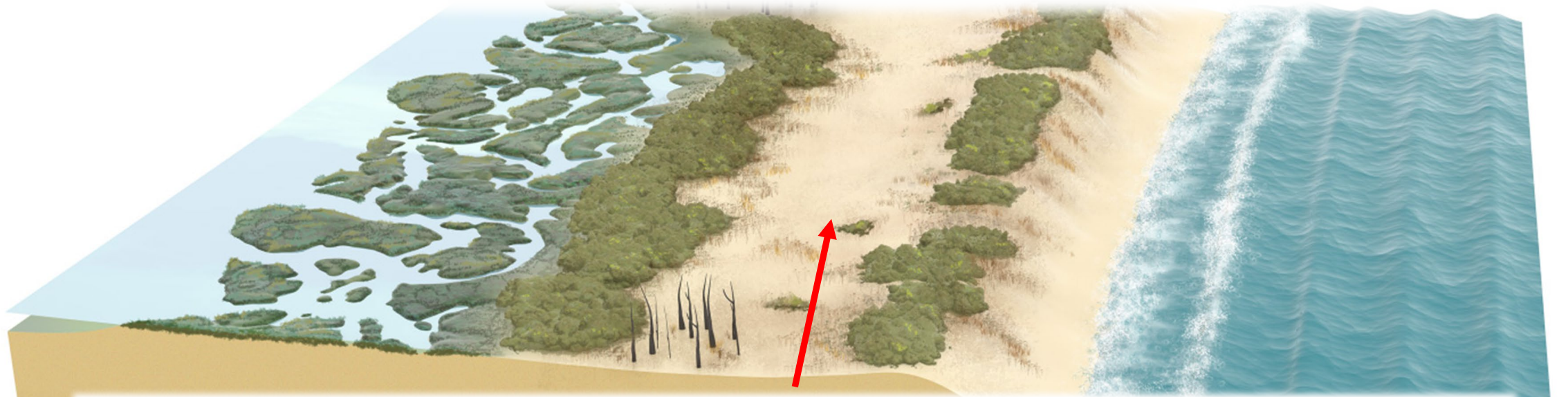
Parts of Barrier Island



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

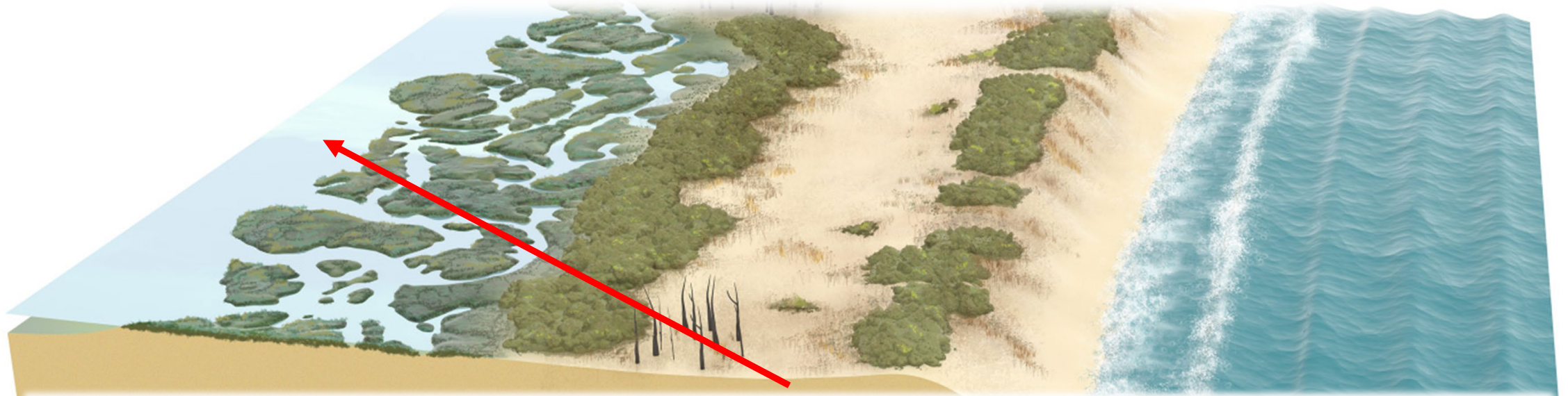
Parts of Barrier Island



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

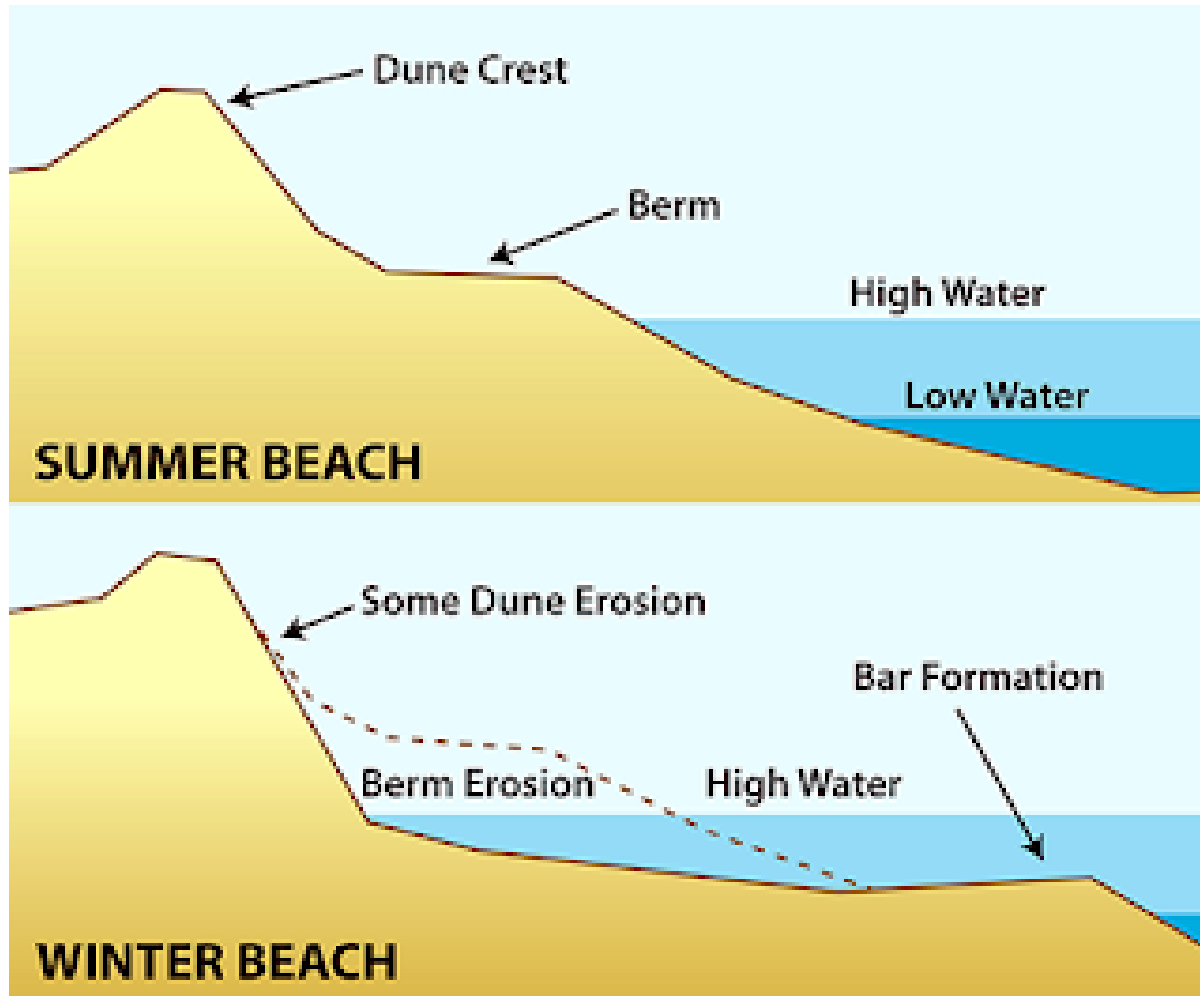
Parts of Barrier Island



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

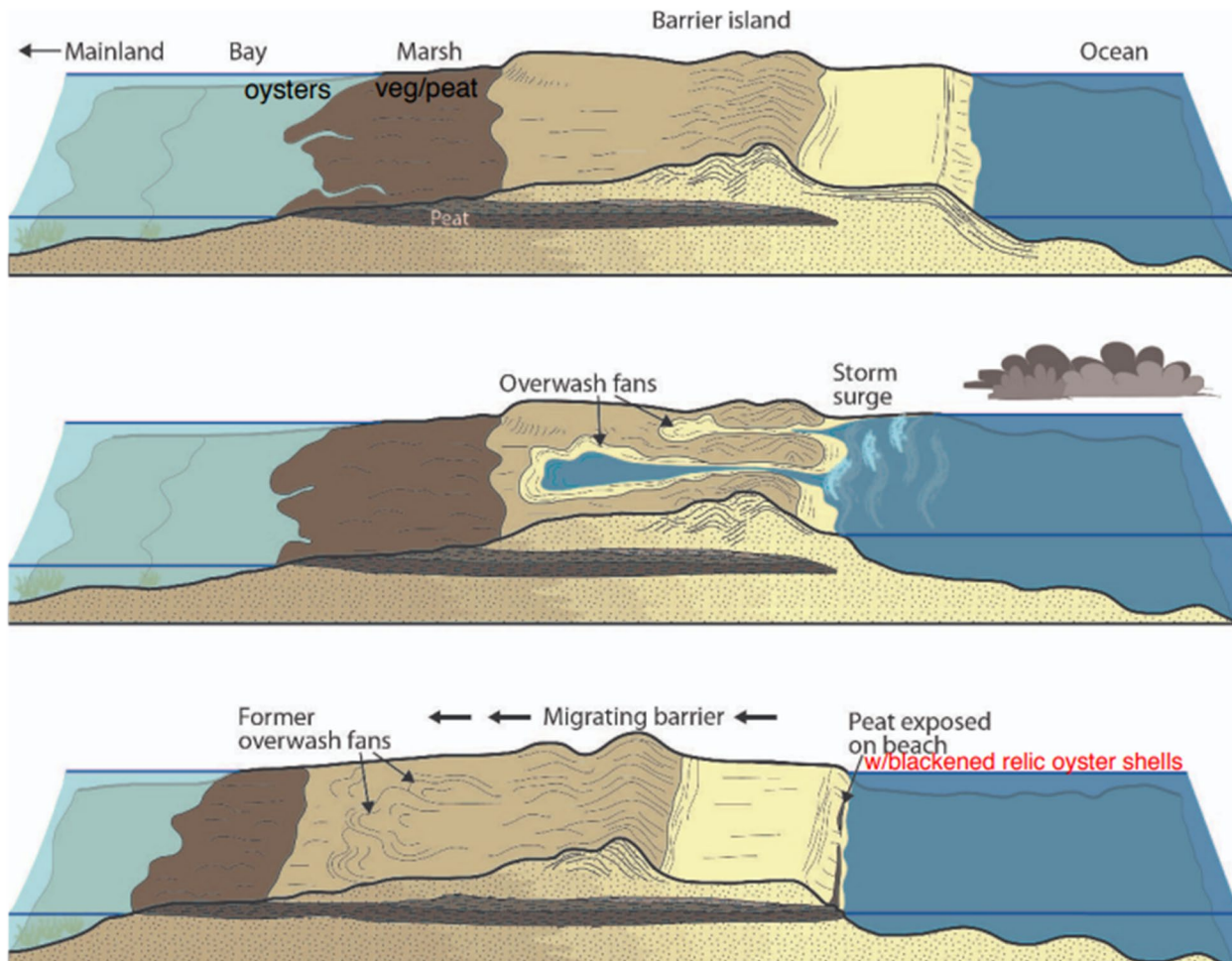
Summer:

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

Winter:

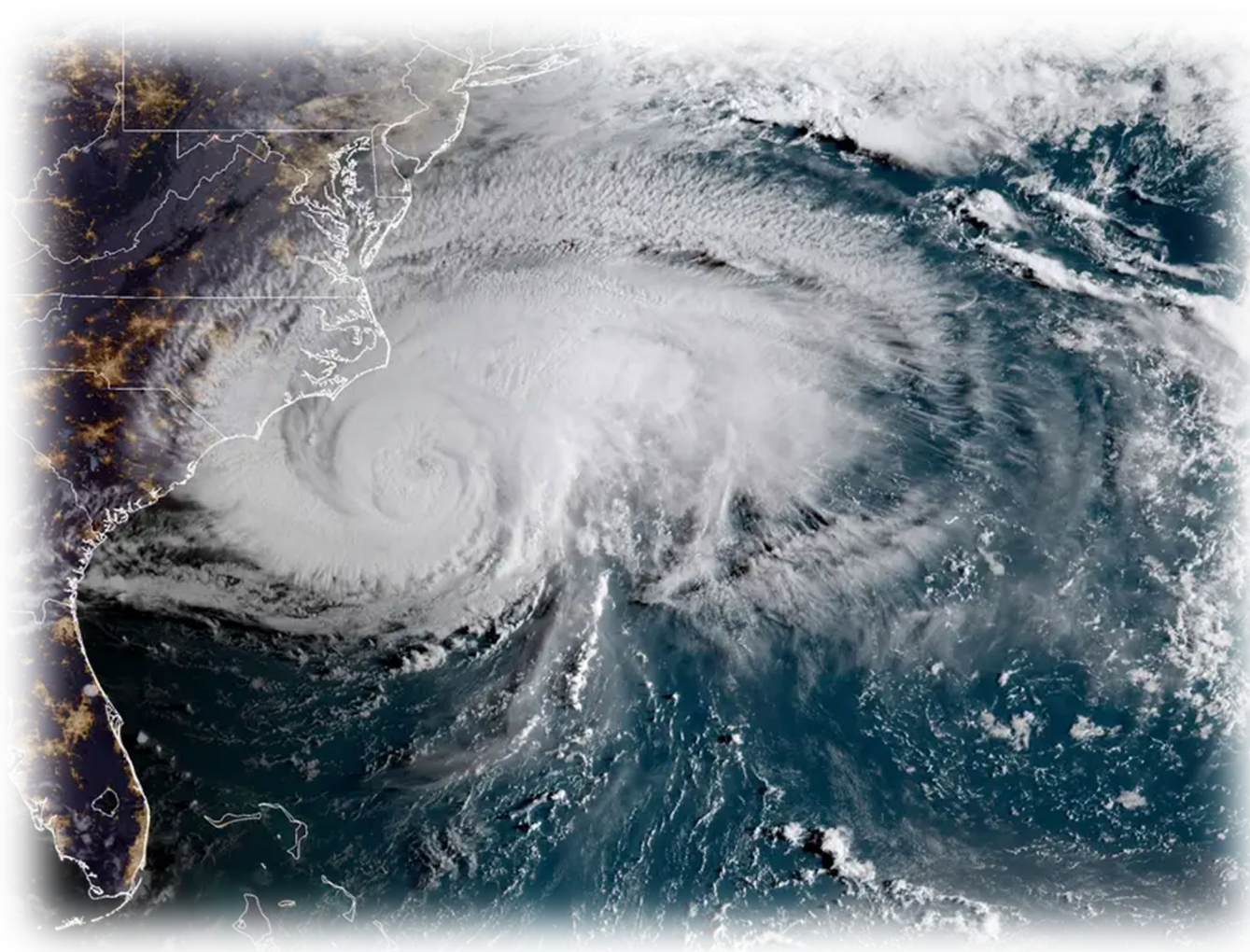
- Larger waves take sand from the beach and 'store' it in the sandbar
- Narrow berm/beach

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





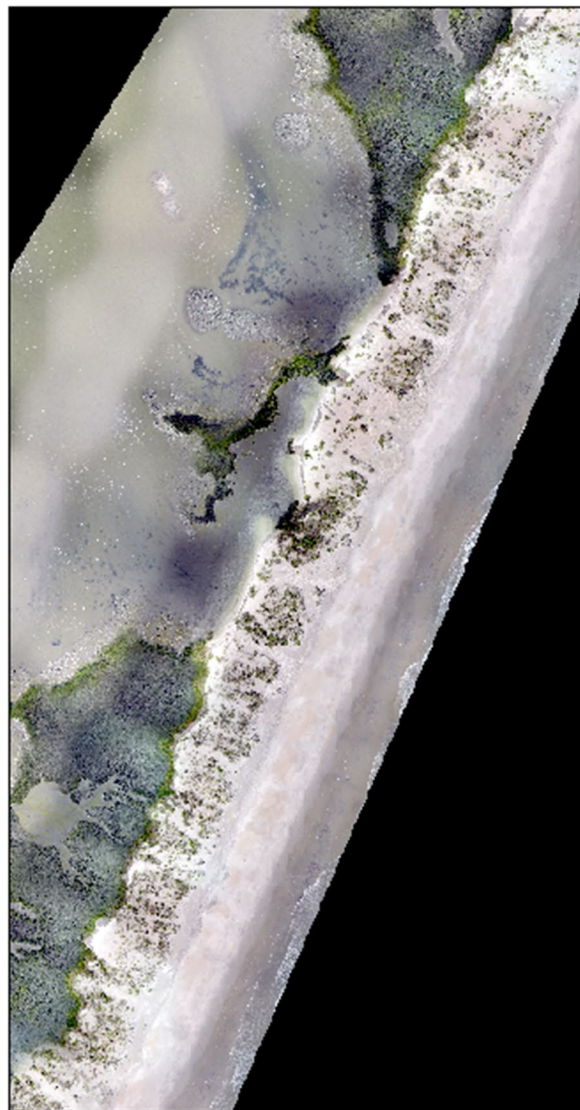
coastal elevations

wave runup

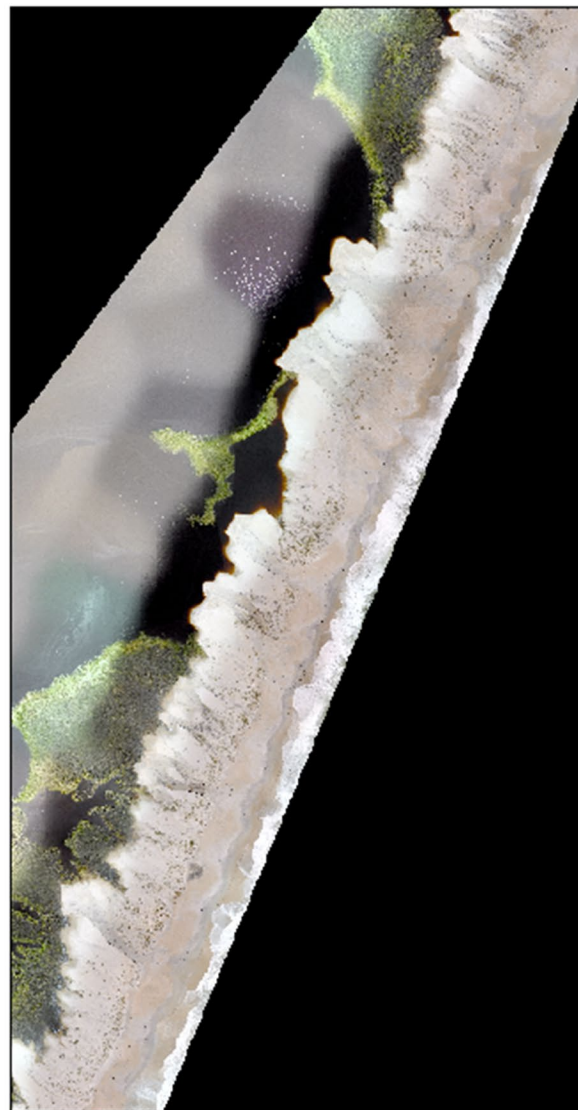
tides, surge, offshore waves



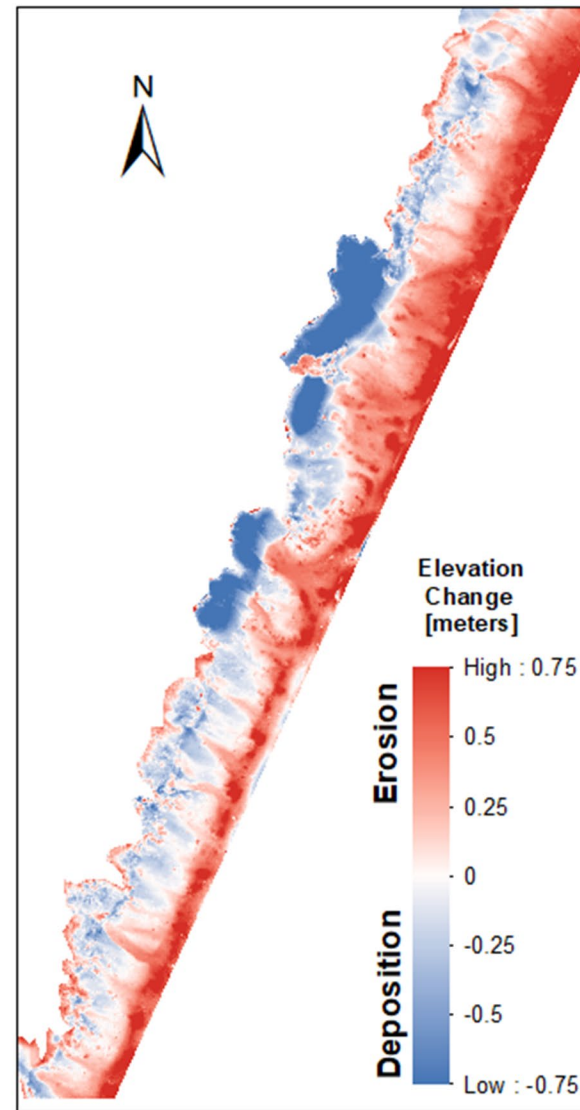
Pre-Florence Imagery



Post-Florence Imagery



Elevation Change

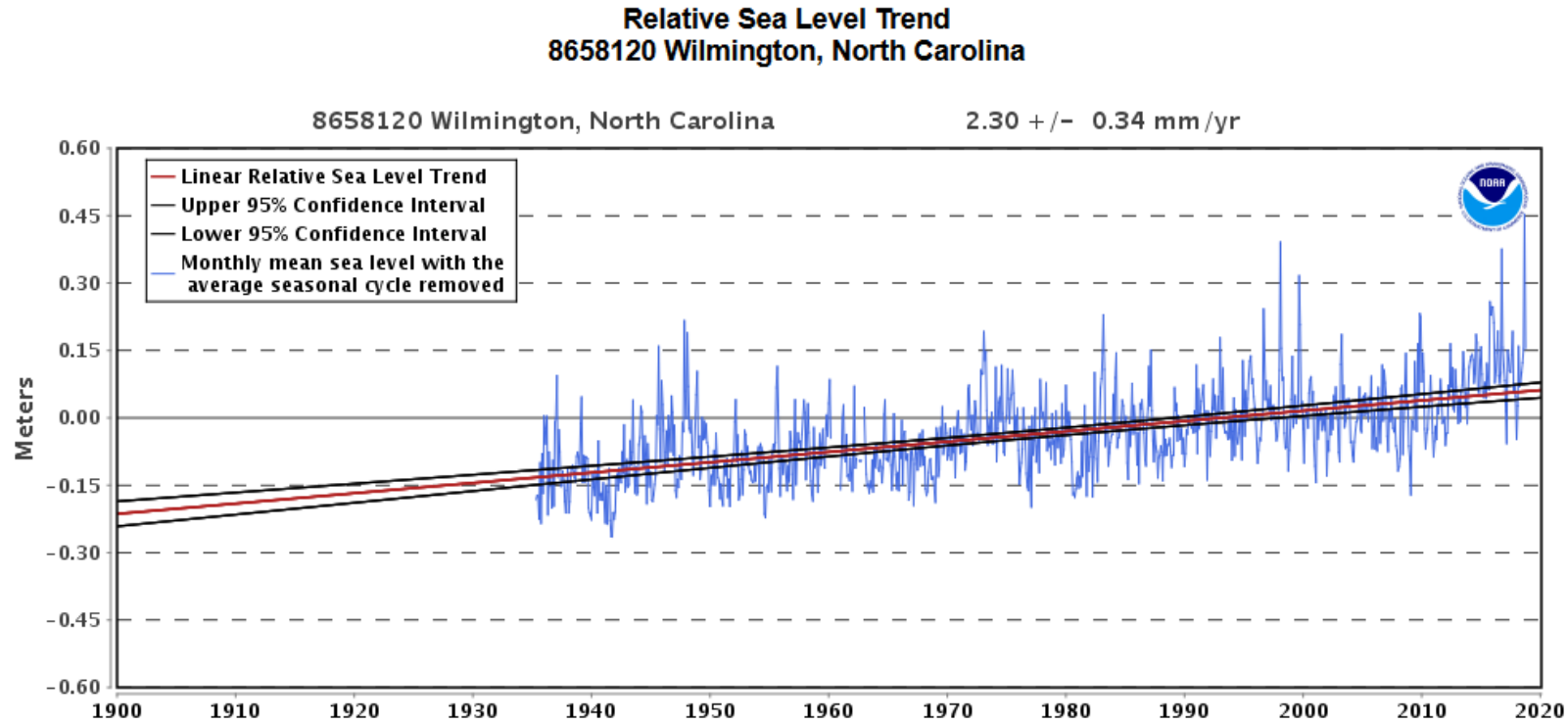


Overwash



- 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

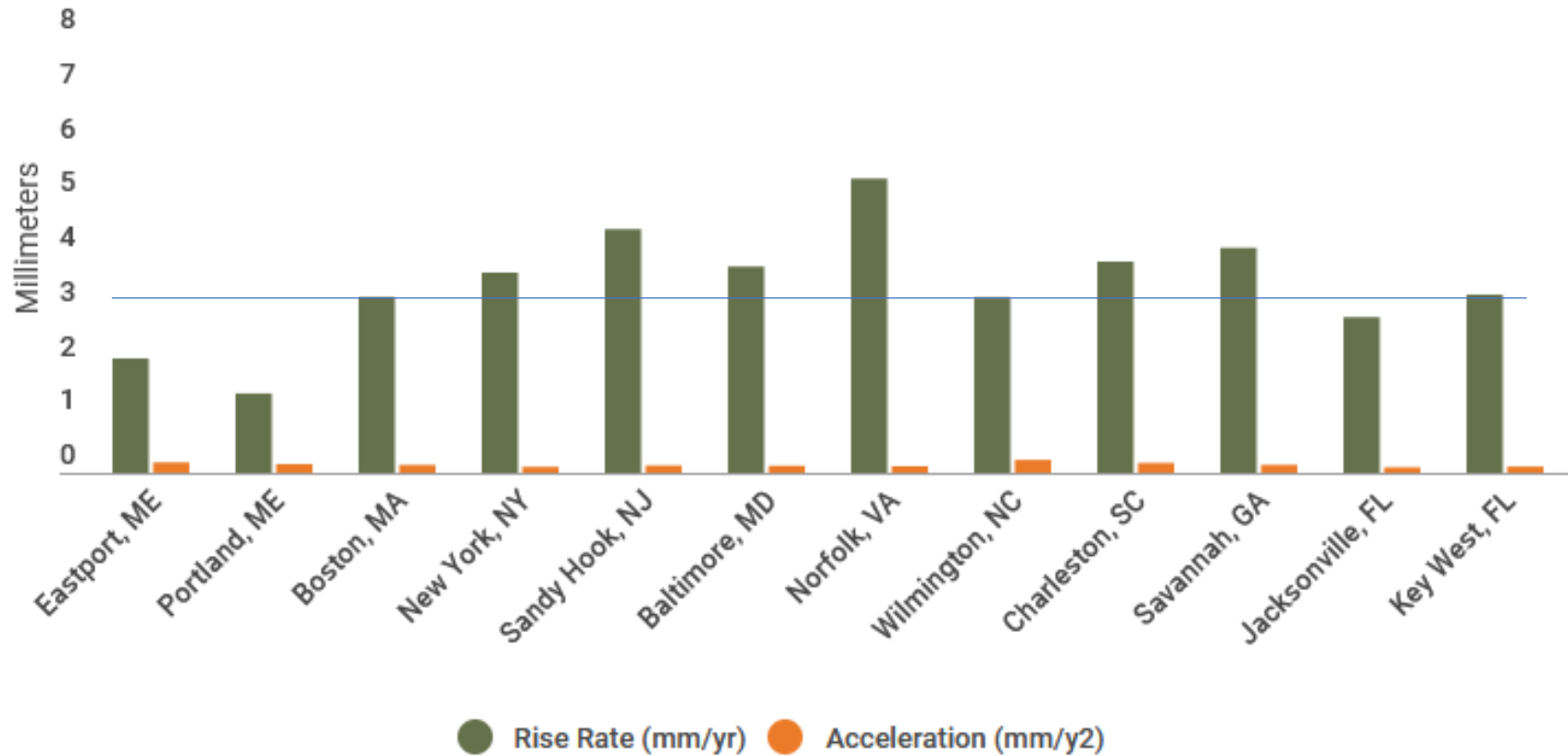


Higher sea level leads to more overwash even for less severe storms

Can barrier islands rollover fast enough?

Sea level will impact barrier island rollover

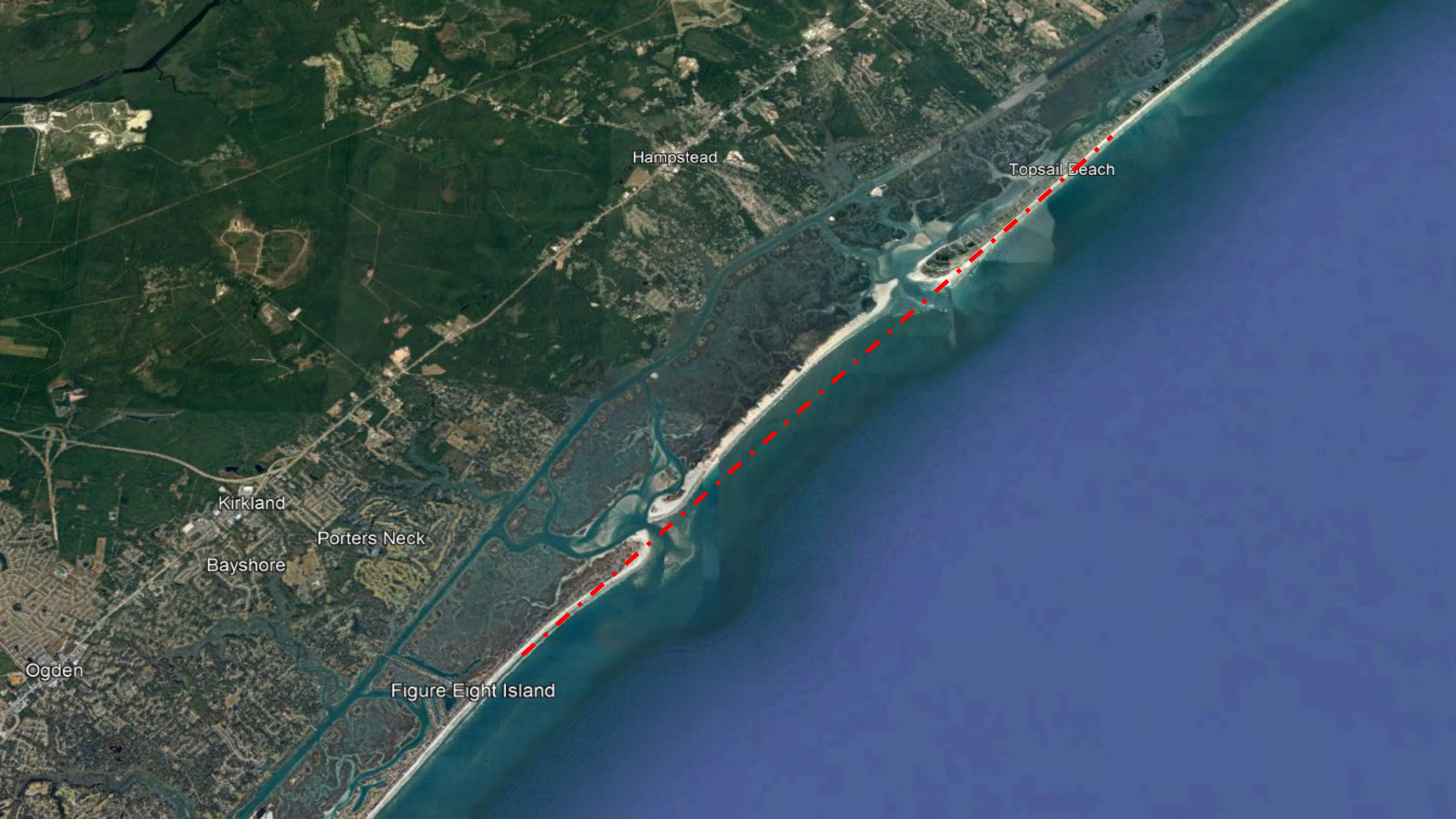
Trend Values for 2021



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

Many barrier islands are narrow but may be HEAVILY populated





Hampstead

Topsail Beach

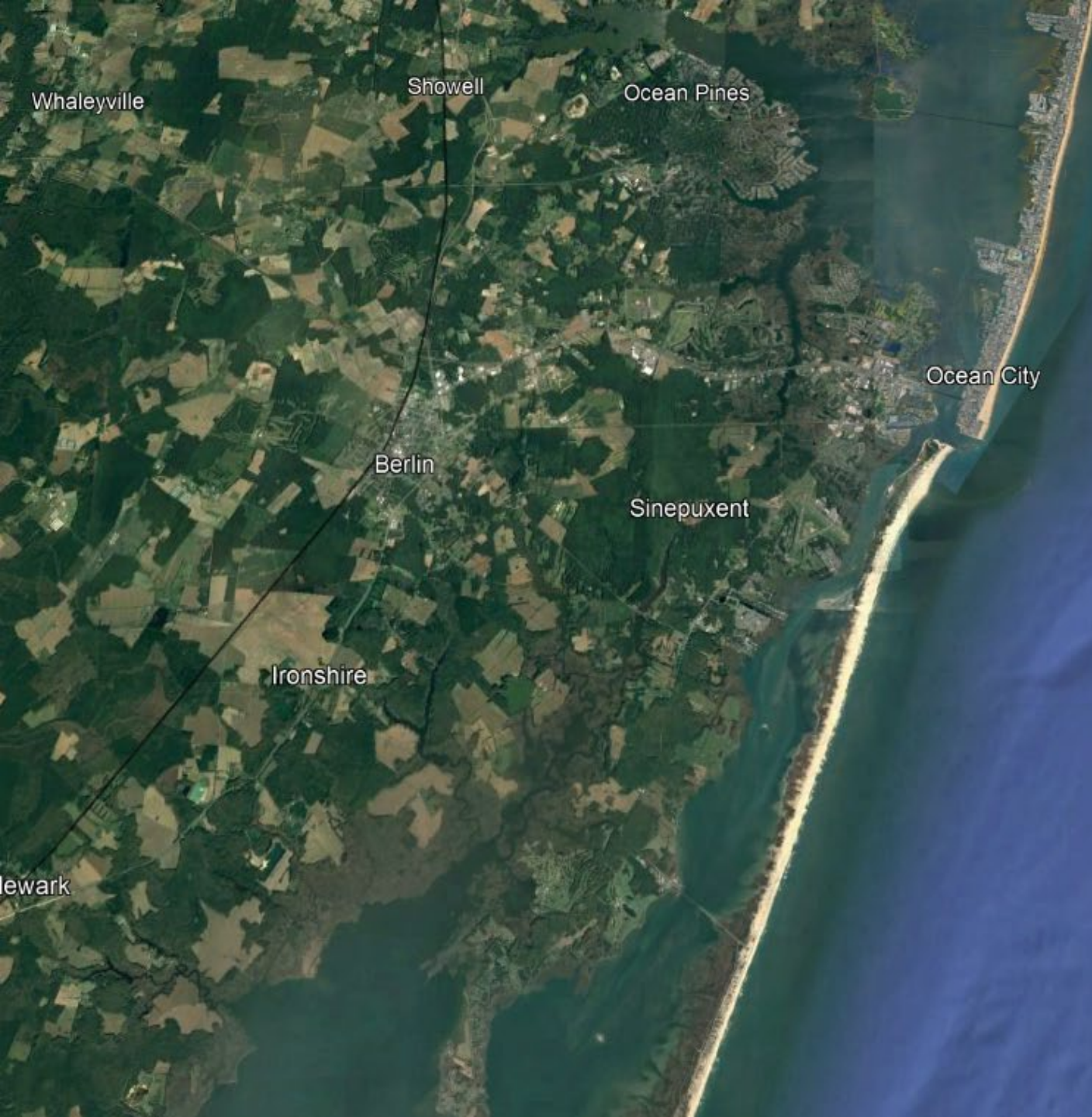
Kirkland

Porters Neck

Bayshore

Ogden

Figure Eight Island



Whaleyville

Showell

Ocean Pines

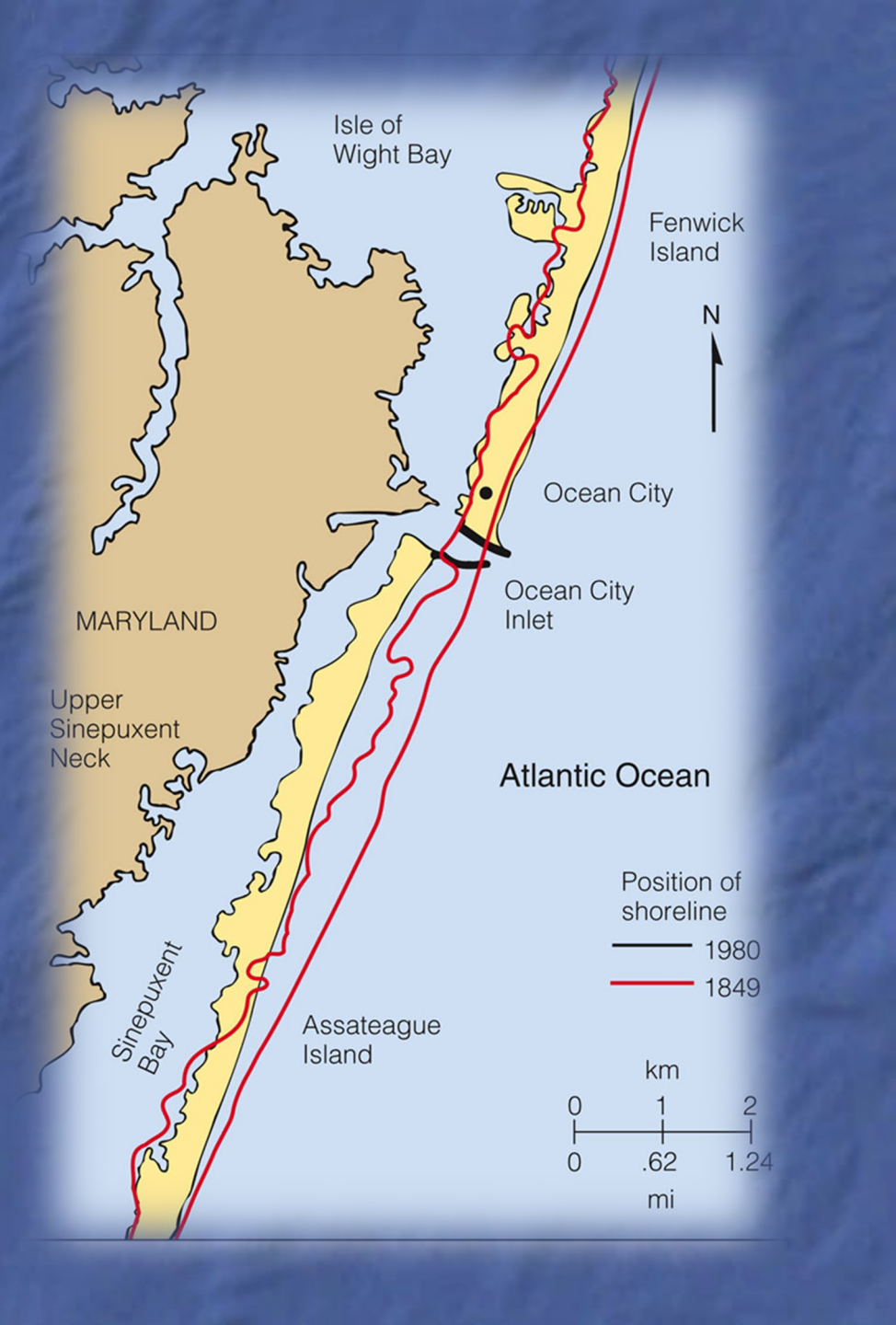
Ocean City

Berlin

Sinepuxent

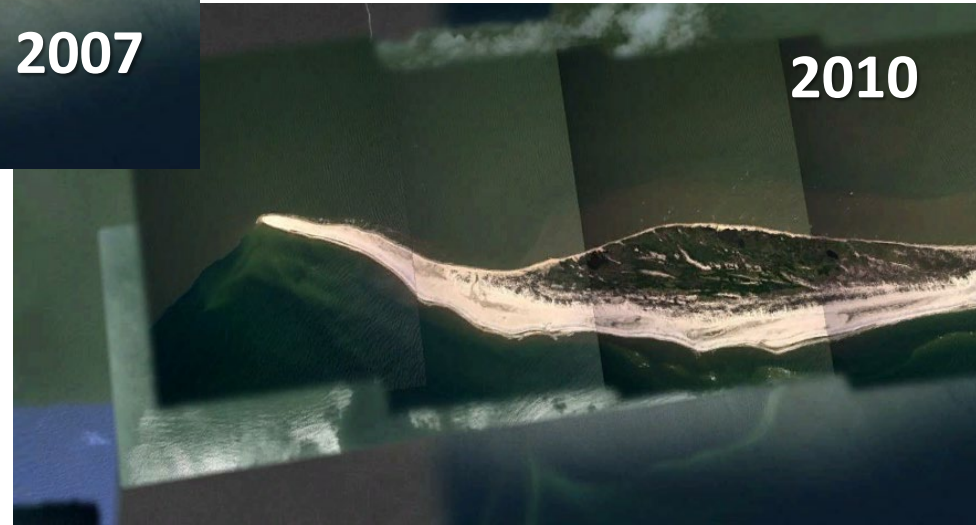
Ironshire

Newark

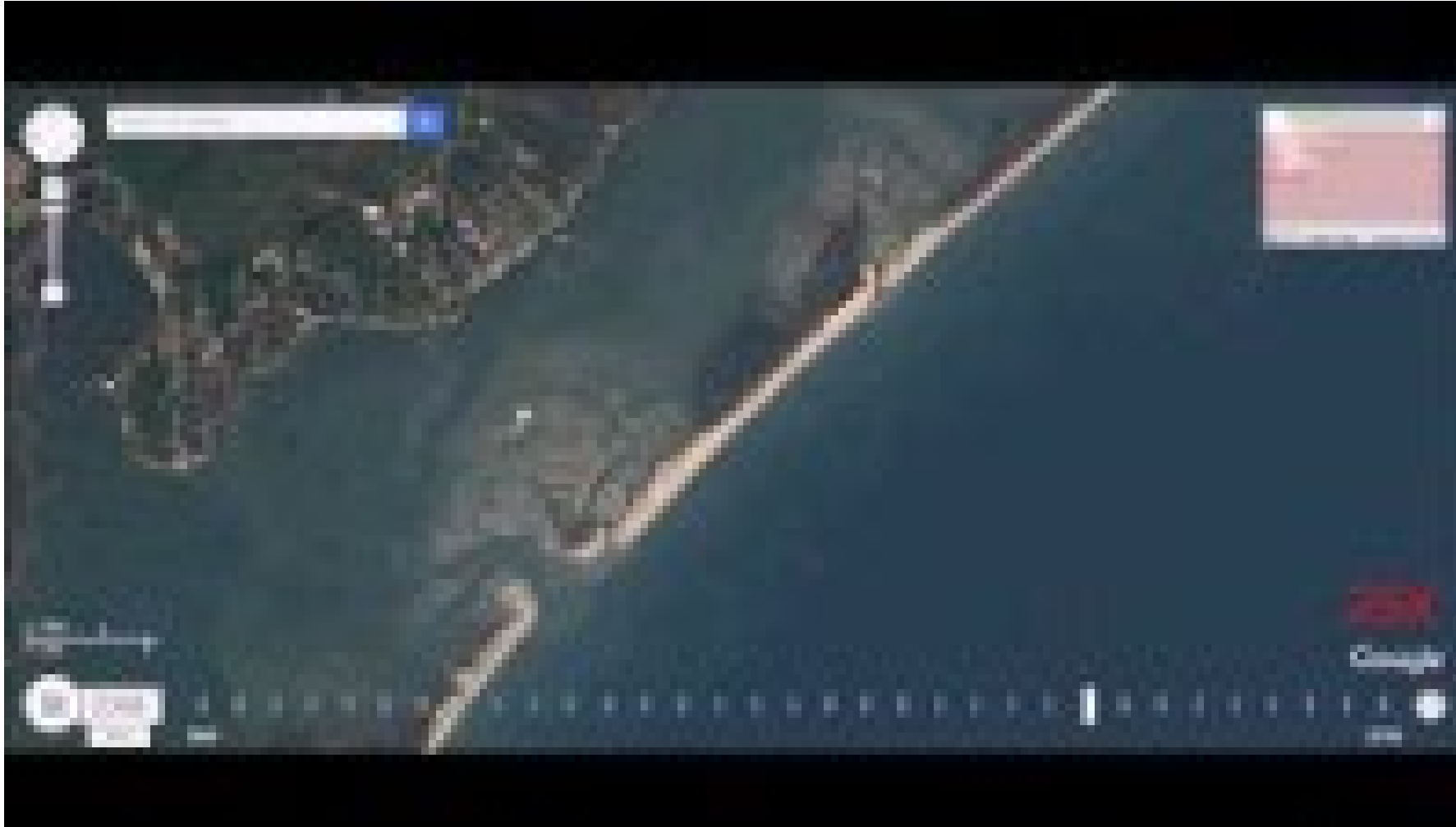


The ends of islands are REALLY dynamic

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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