Barrier Islands

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THE NORTH CAROLINA NATIONAL ESTUARINE RESEARCH'S COASTAL TRAINING PROGRAM & CAPE FEAR 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

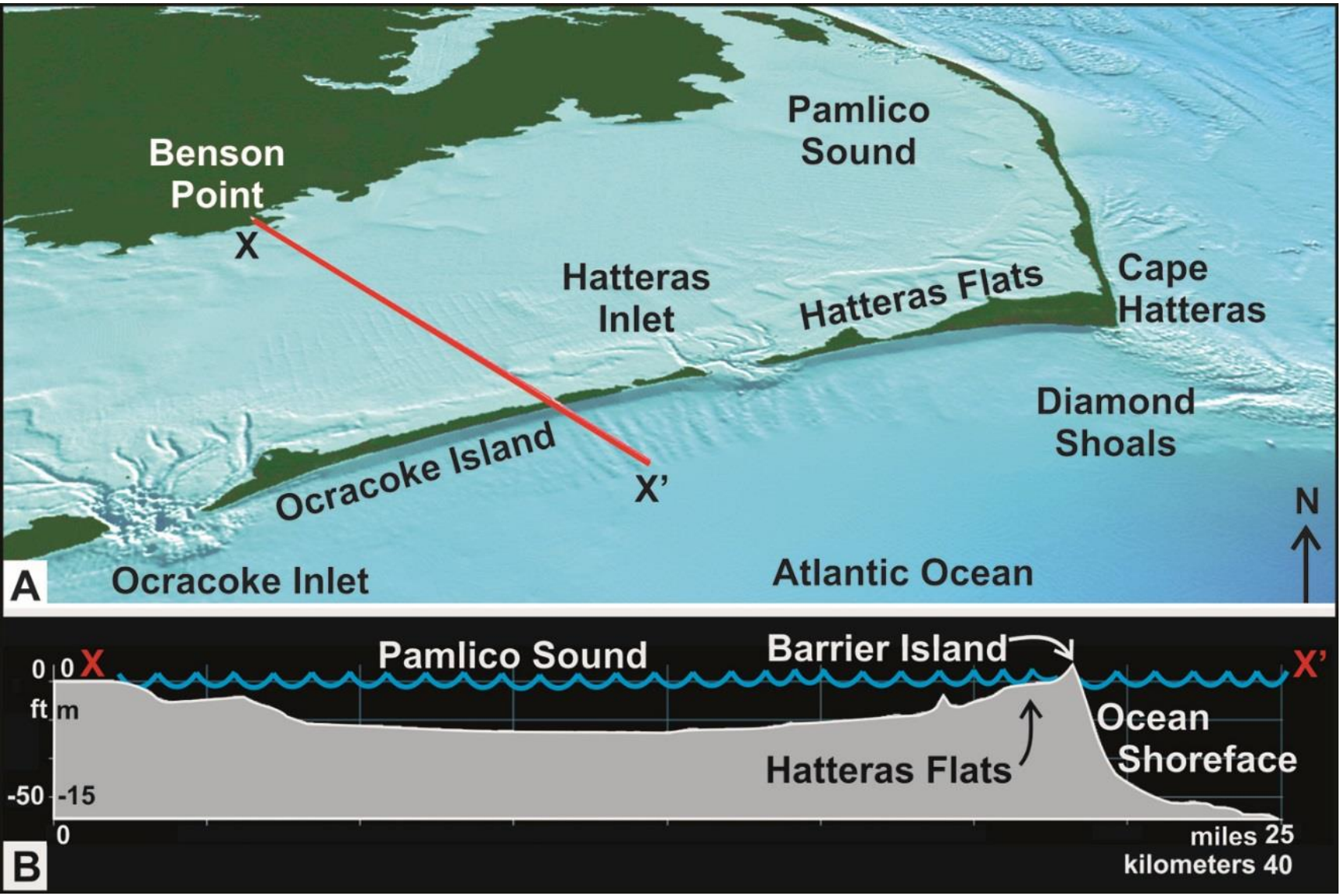
Protect mainland from waves and surge

Long, narrow offshore sand deposits

Parallel to the coast

Separated from mainland by a bay/lagoon/sound

Separated from each other by tidal inlets



Barriers 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

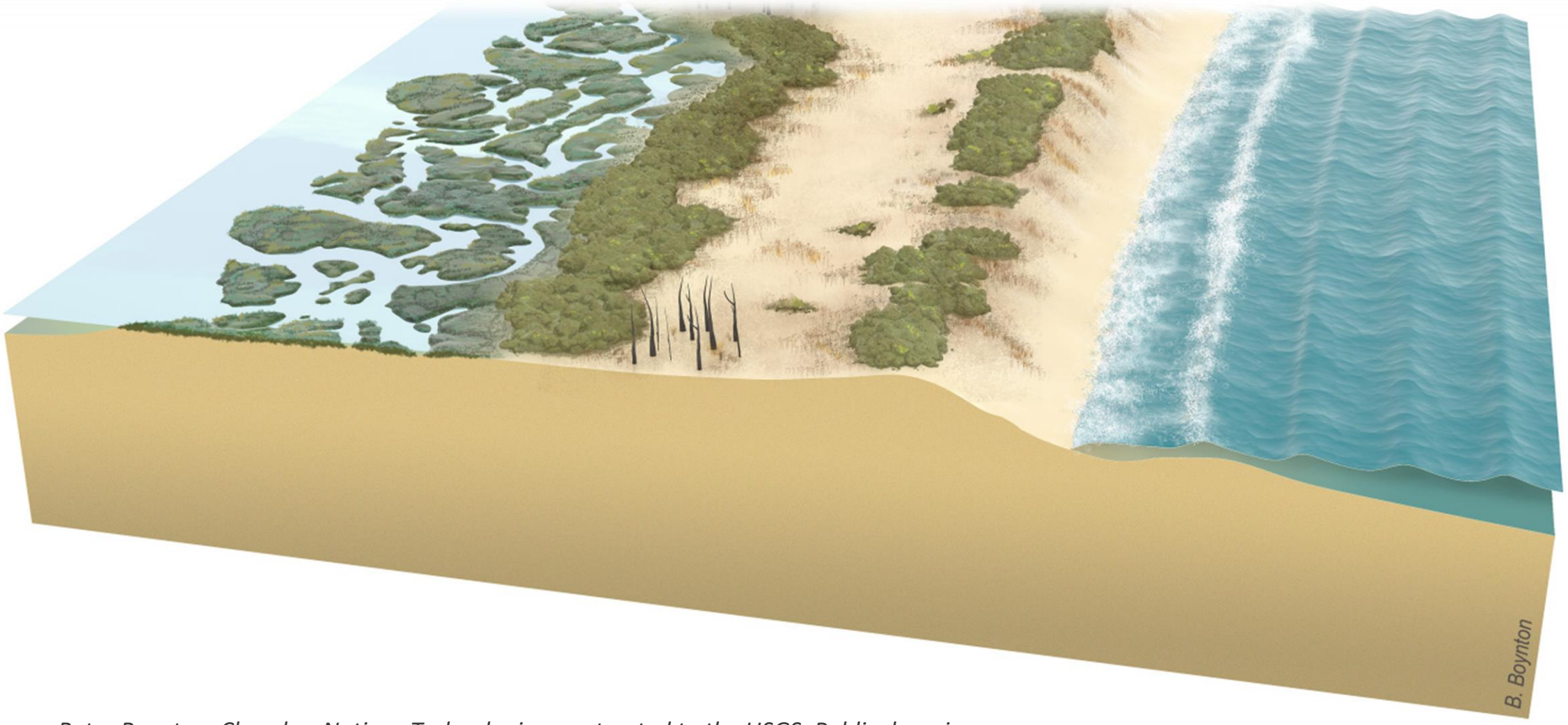
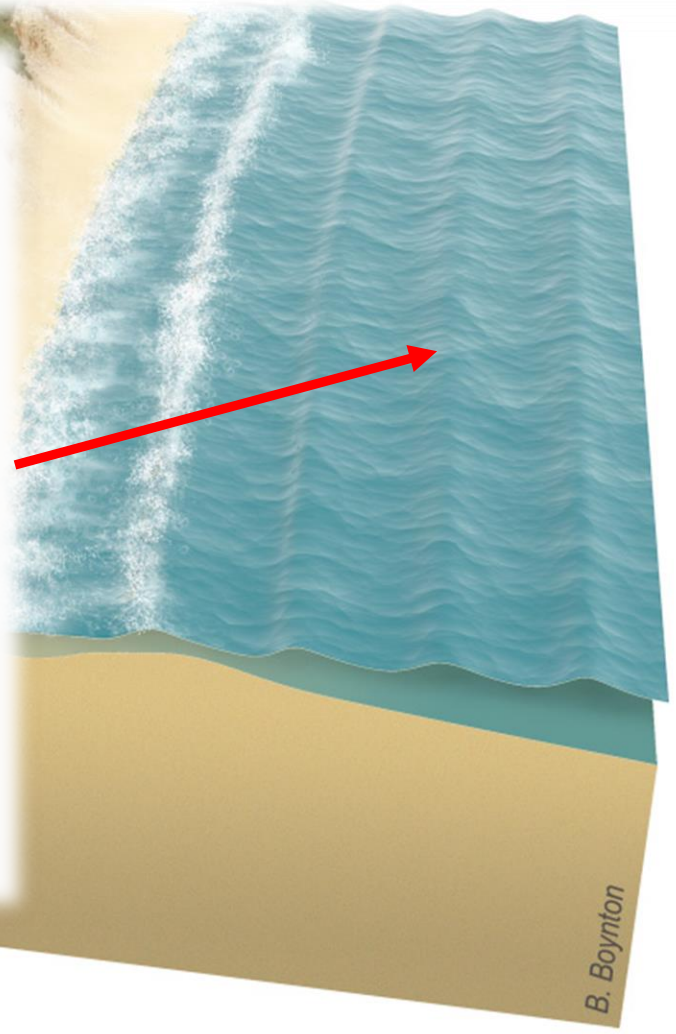


Image: Betsy Boynton, Cherokee Nations Technologies, contracted to the USGS. Public domain.

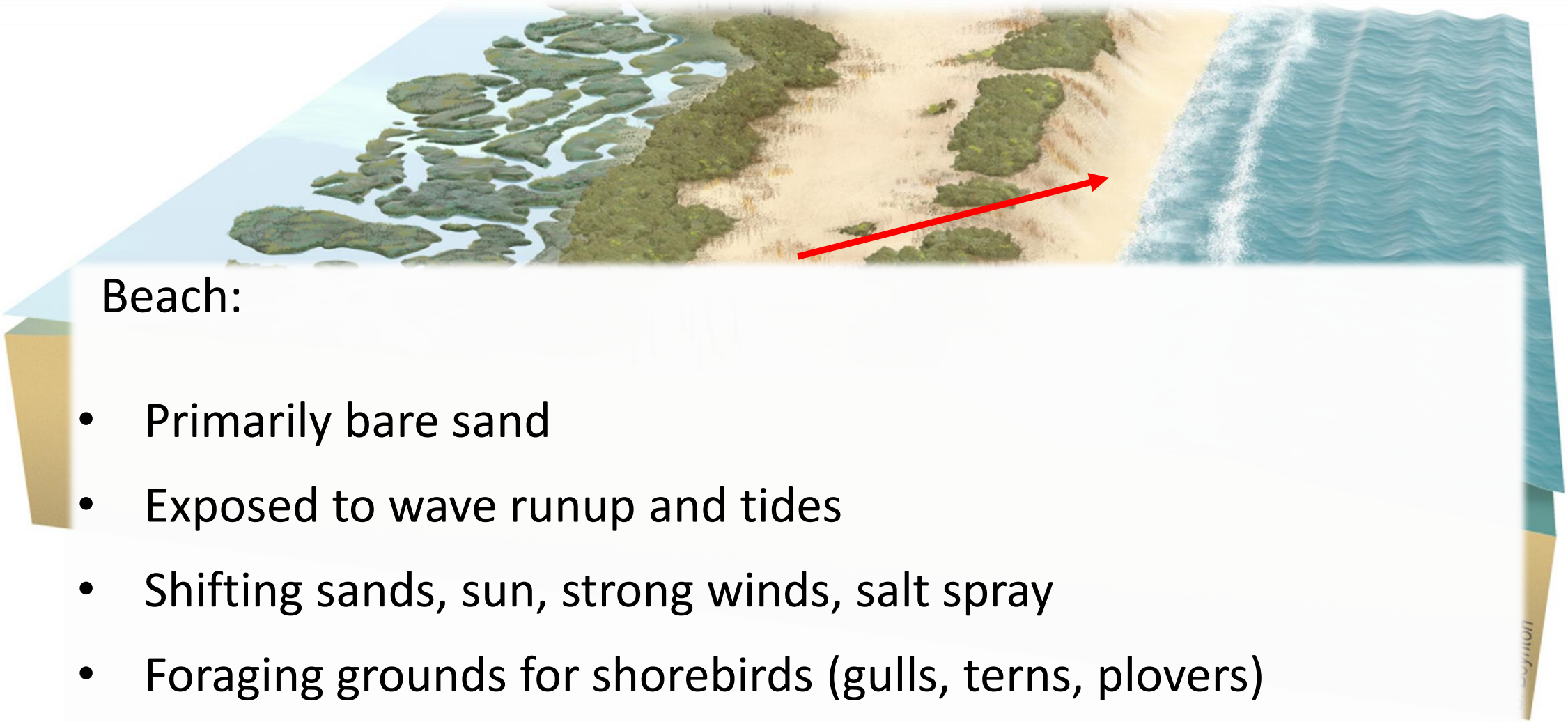
Parts of Barrier Island

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:

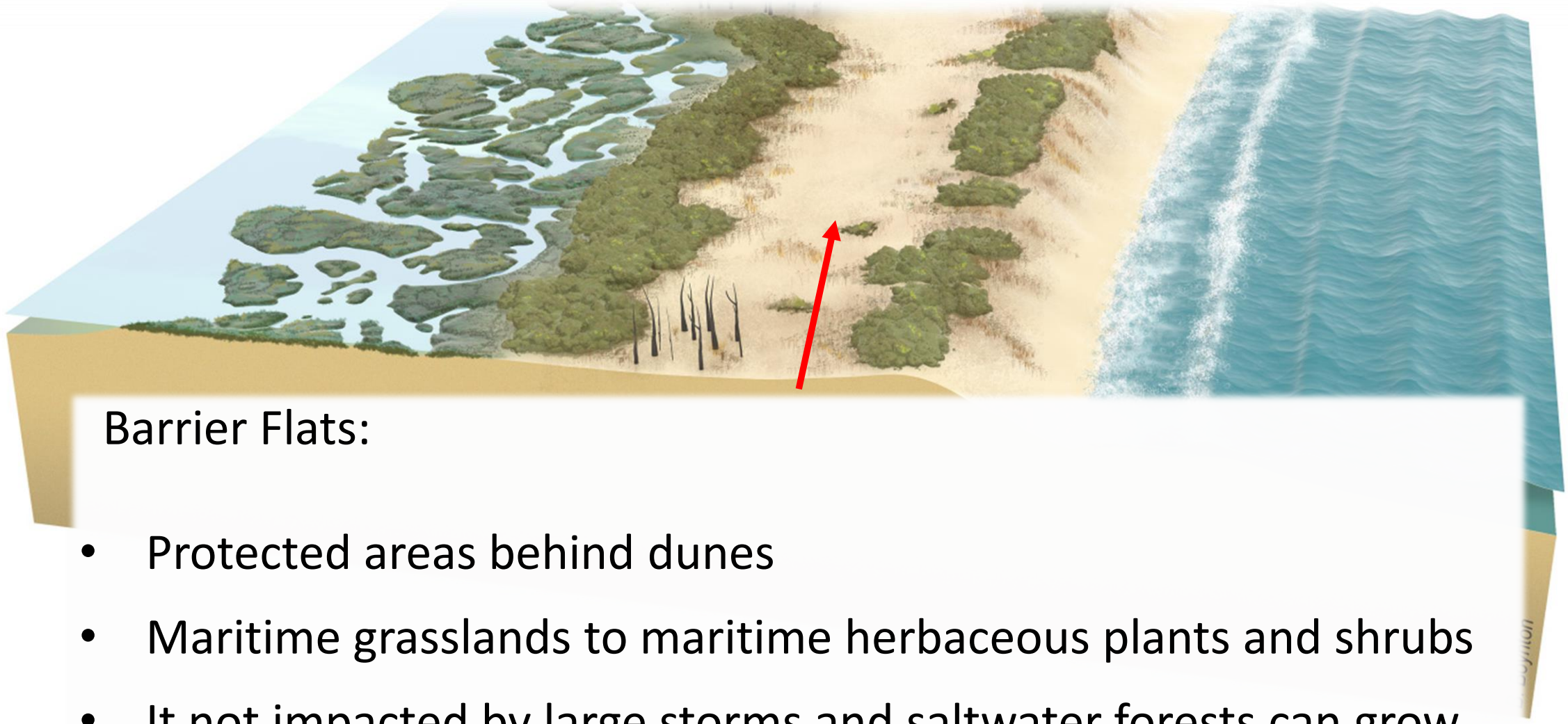
- Primarily bare sand
- Exposed to wave runup and tides
- Shifting sands, sun, strong winds, salt spray
- Foraging grounds for shorebirds (gulls, terns, plovers)
- Sea turtle nesting areas

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:

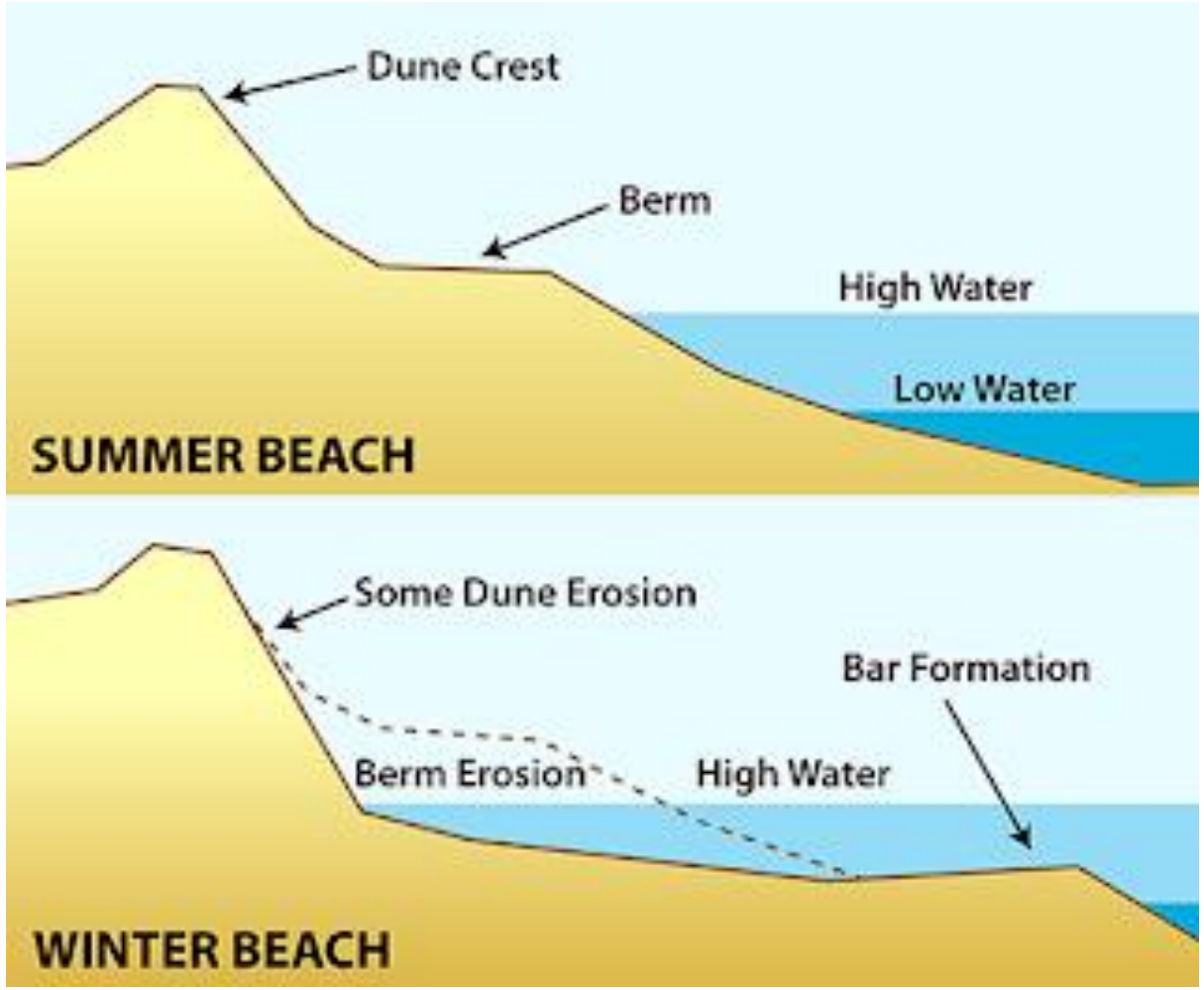
- High marsh – flooded only at high tide
- Low marsh – flooded at almost any tide level
- Plants that cannot regulate high salinity compete for higher ground
- Cordgrasses are common

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

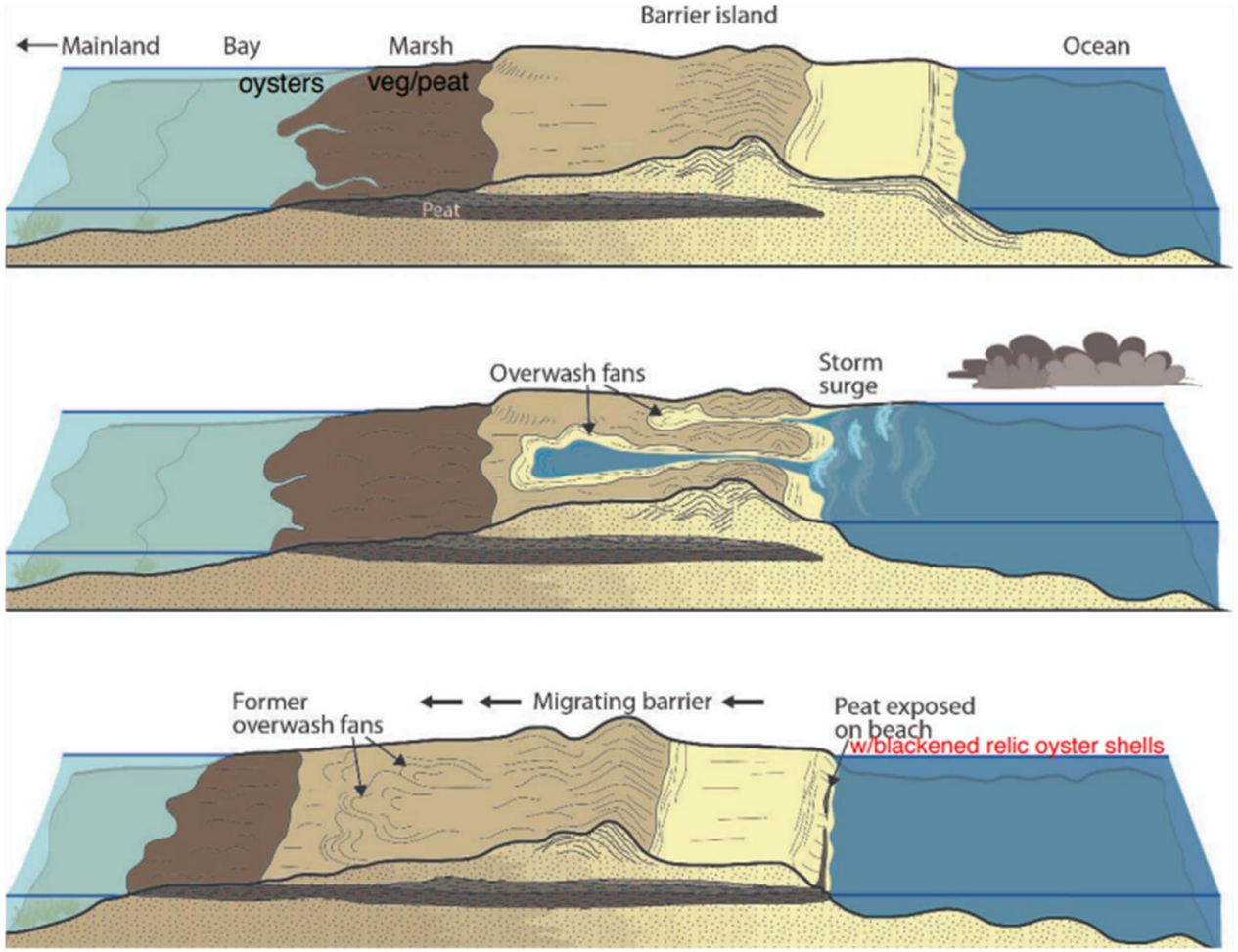
Summer:

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

Winter:

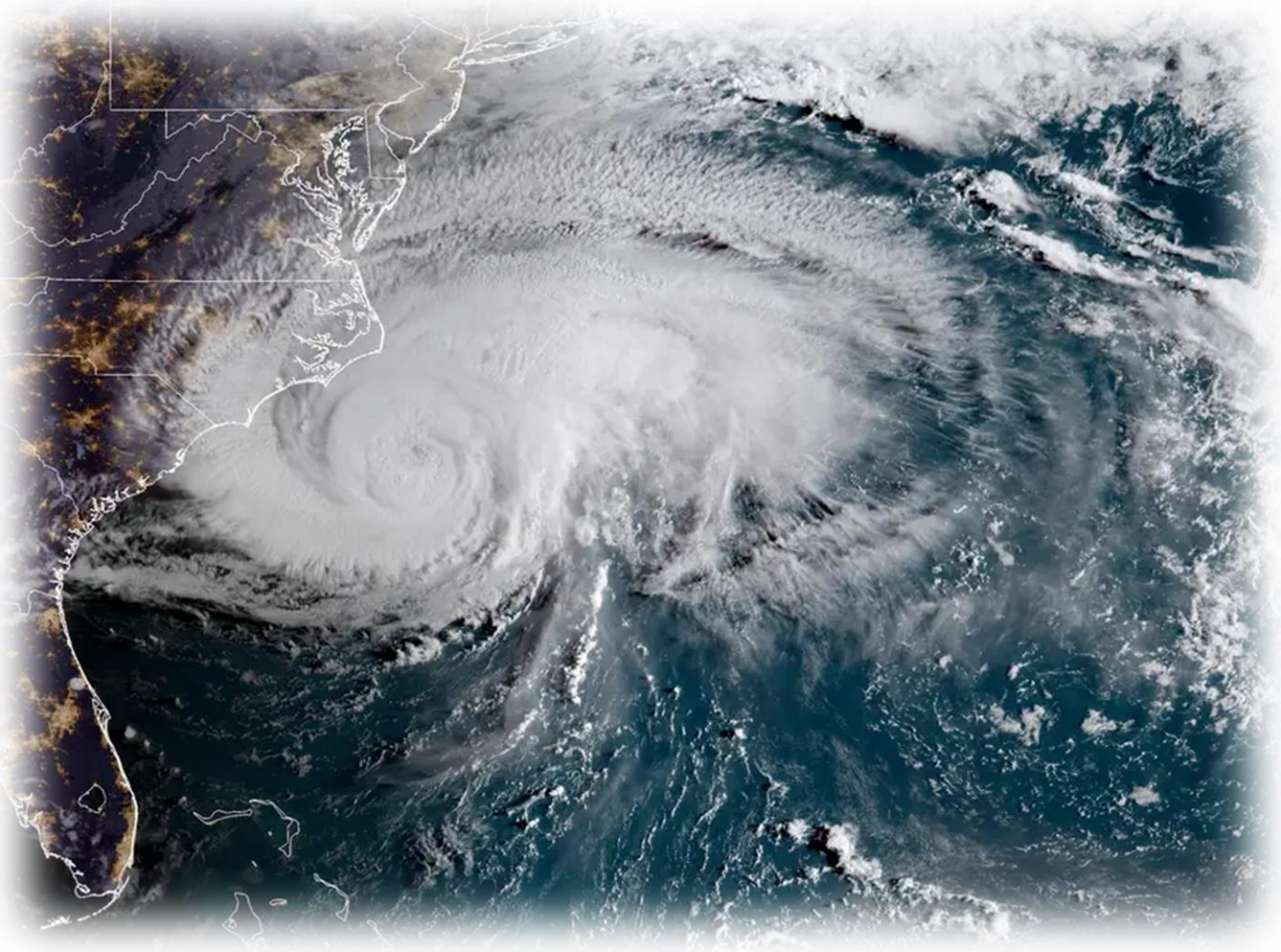
- Larger waves take sand from the beach and ‘store’ it in the sandbar
- Narrow berm/beach

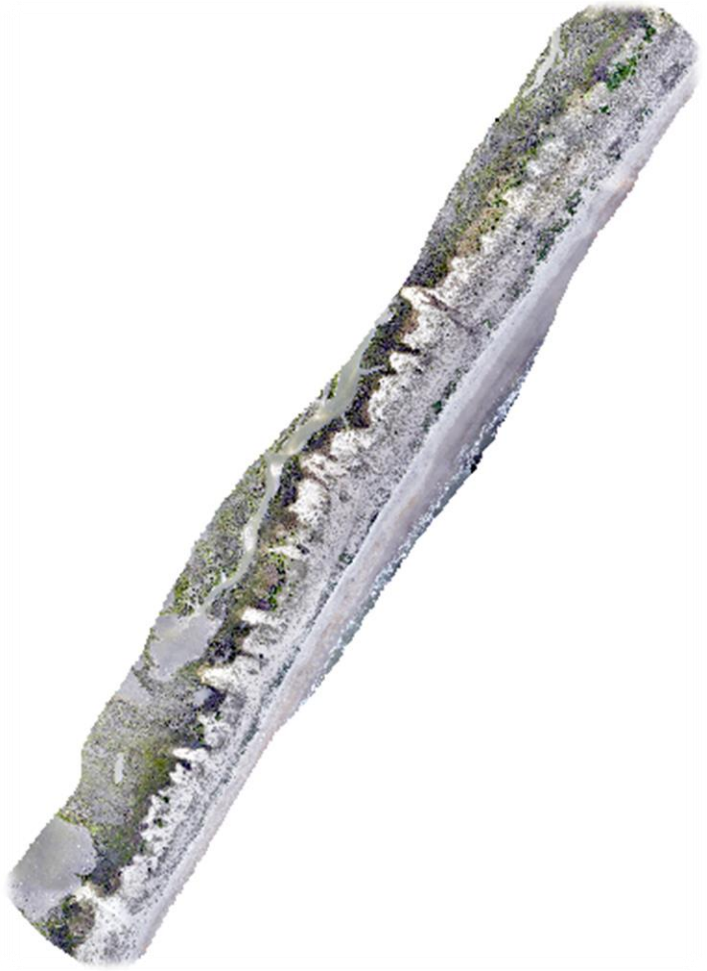
Barrier Islands are small, but DYNAMIC

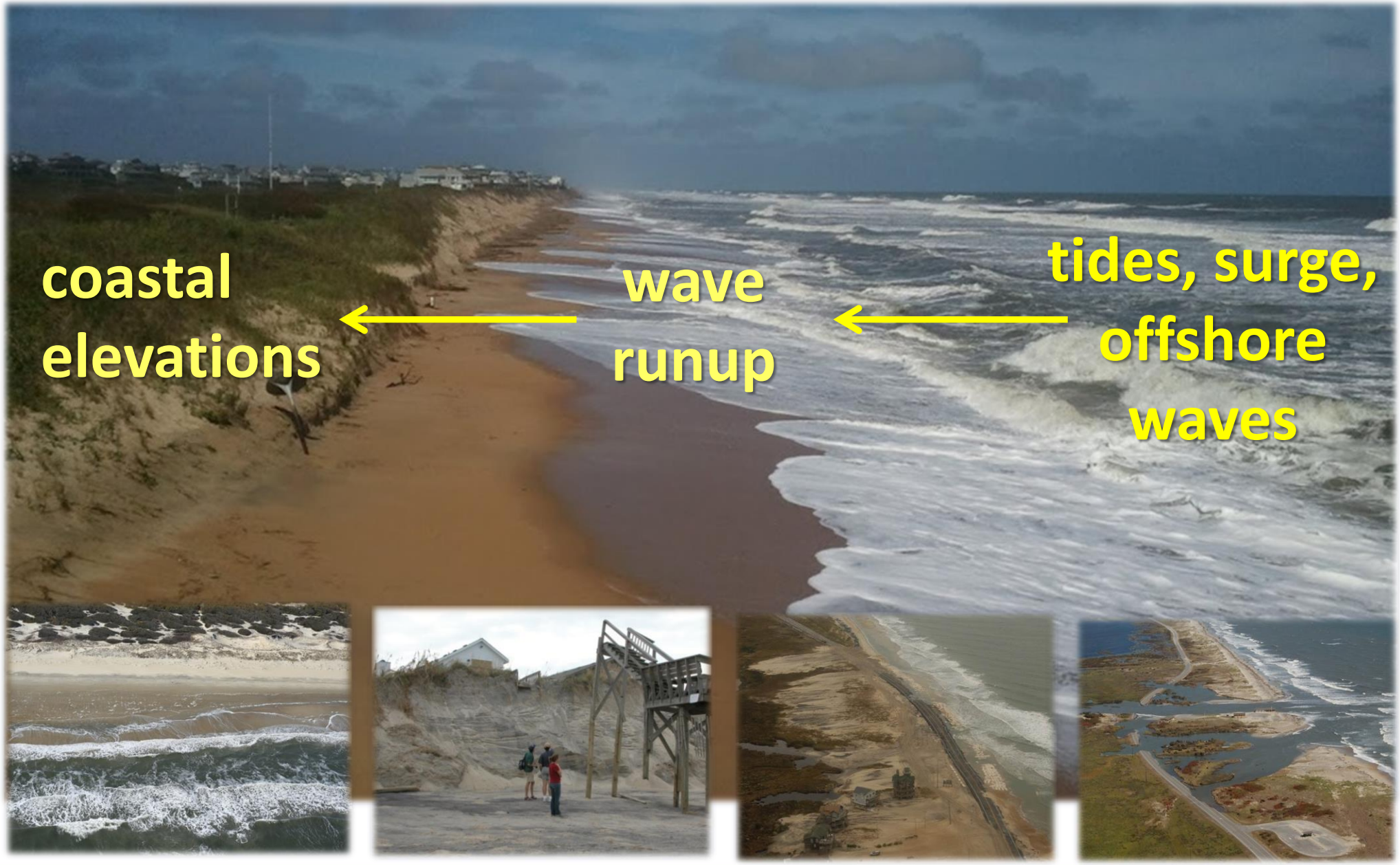


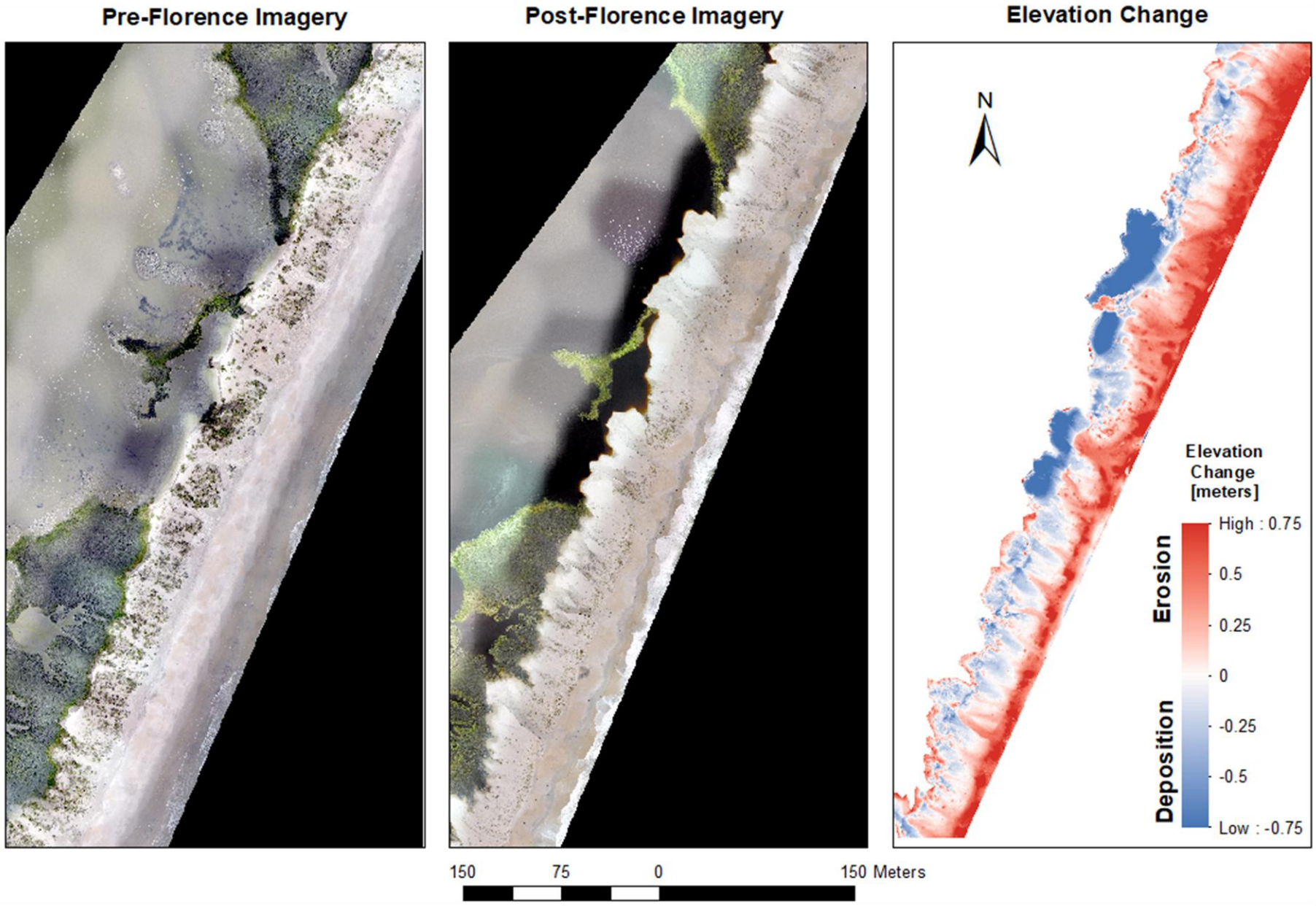
- Over longer time periods, barrier islands respond to storms by ‘rolling-over’
- High water levels and wave push sand from the beach and dune to the barrier flat or lagoon
- Over decades the barrier island marches landward

Storms Promote Barrier Island Rollover





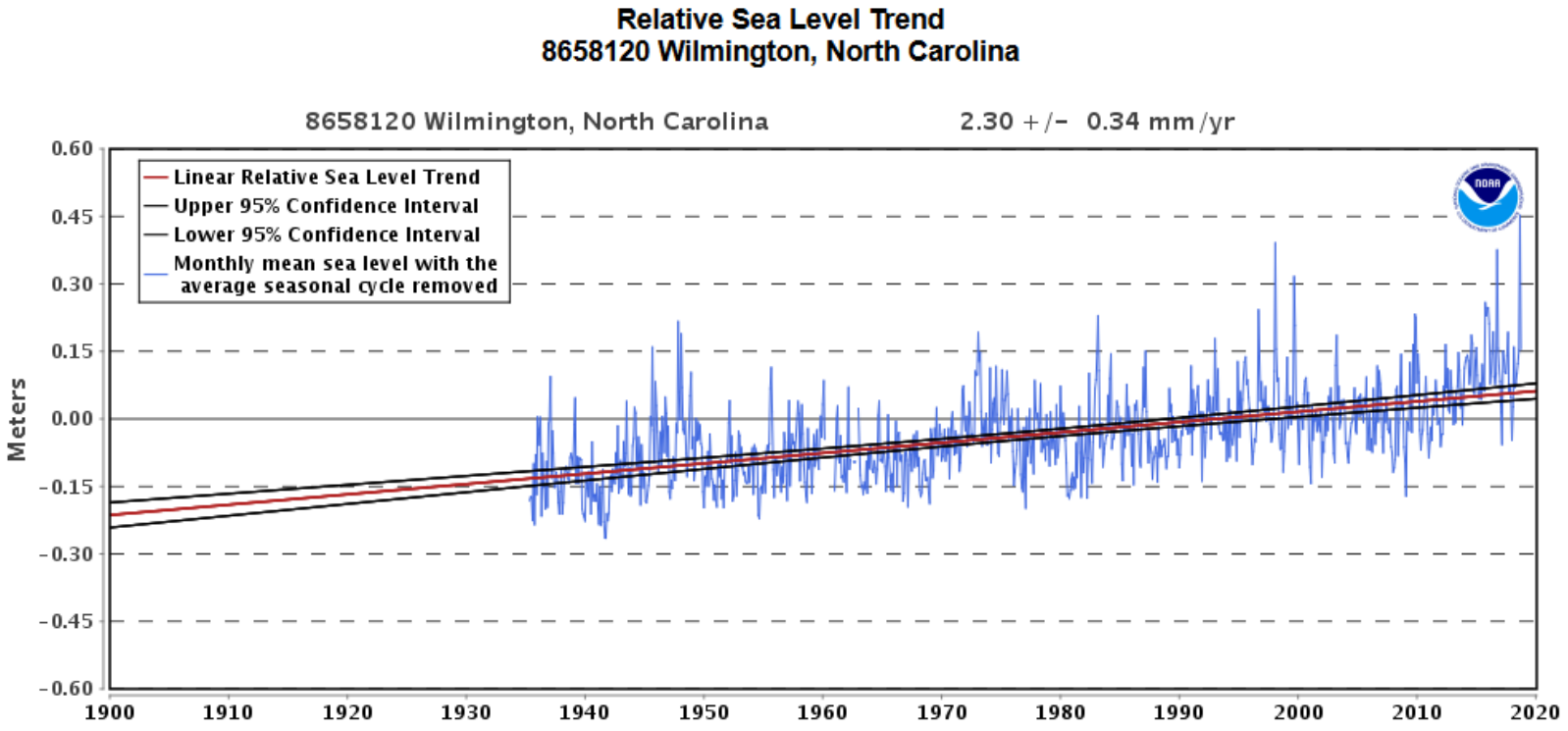

coastal elevations
wave runup
tides, surge, offshore waves


Pre-Florence Imagery
Post-Florence Imagery
Elevation Change
N
Elevation Change [meters]
High : 0.75
0.5
0.25
0
-0.25
-0.5
Low : -0.75
Erosion
Deposition
150
75
0
150 Meters

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

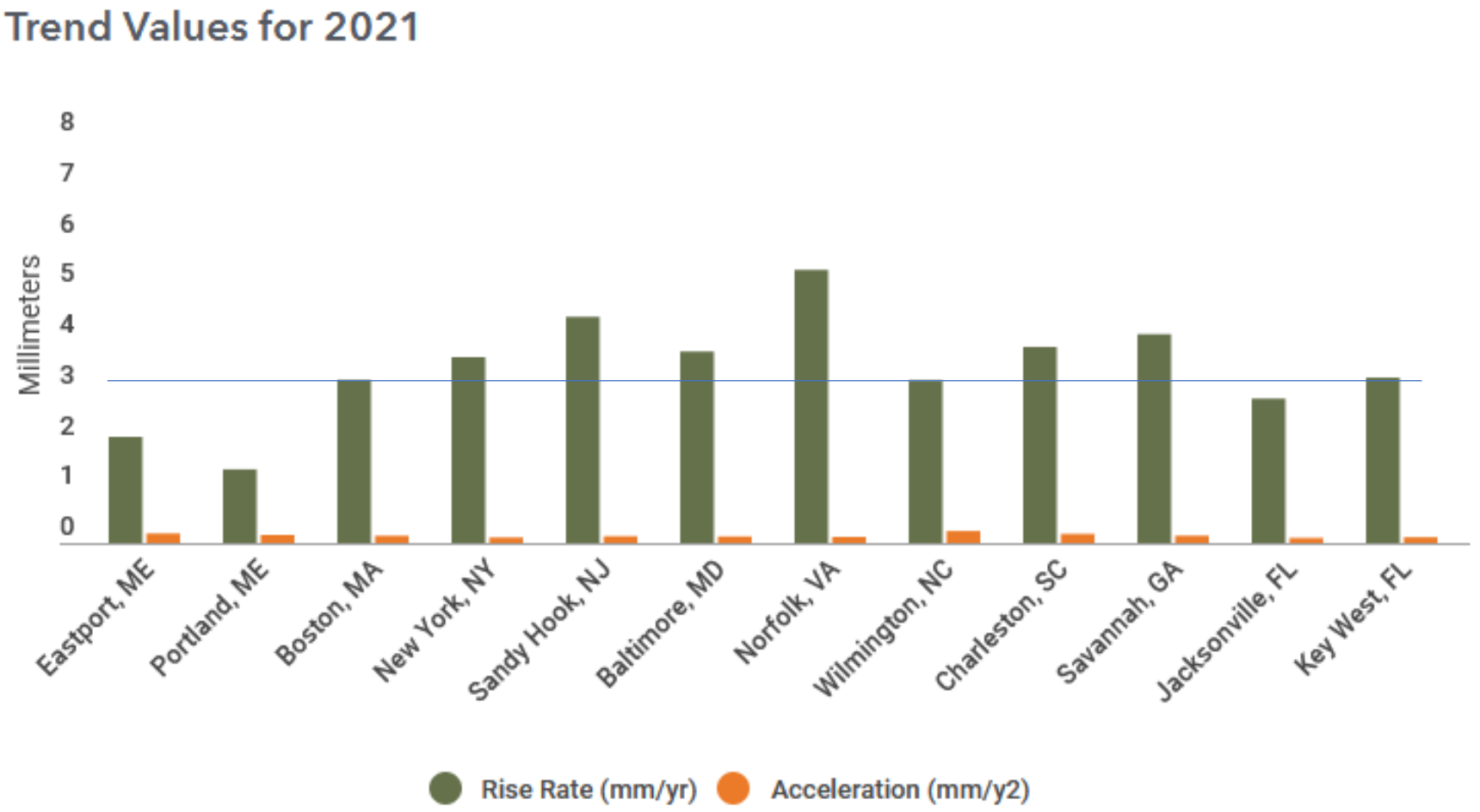
Sea level will impact barrier island rollover



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

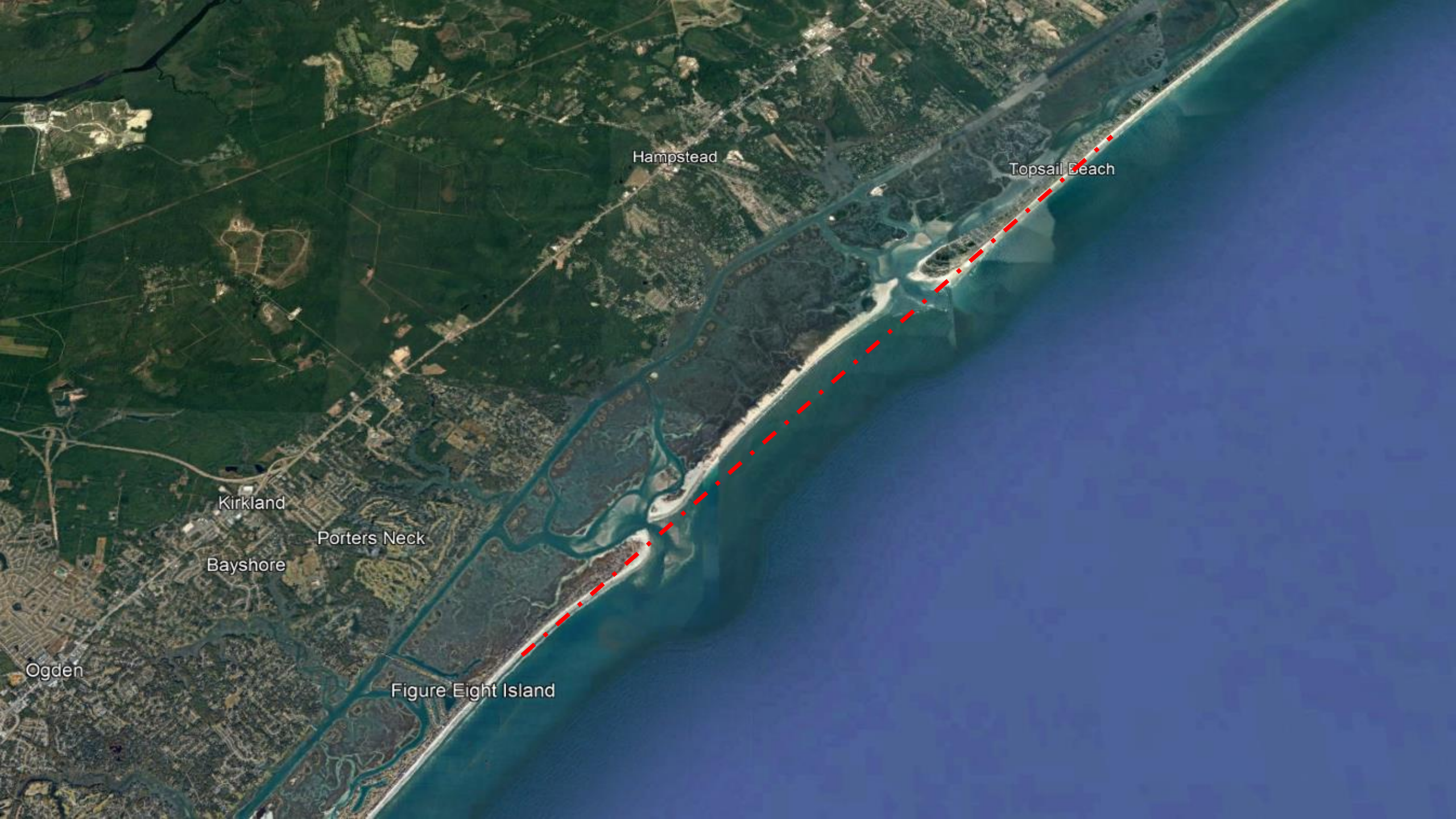
Can barrier islands rollover fast enough?

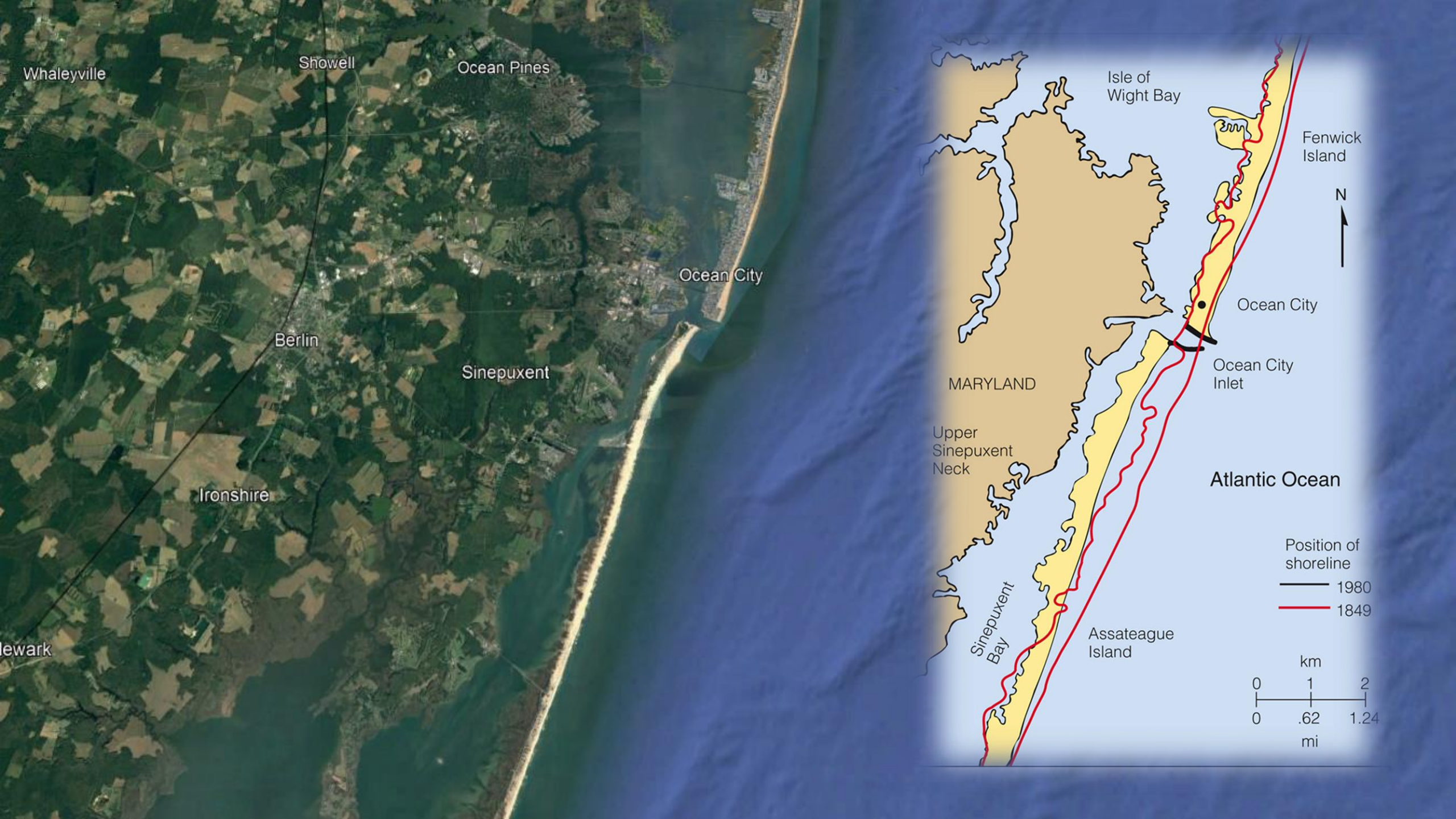
Sea level will impact barrier island rollover



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

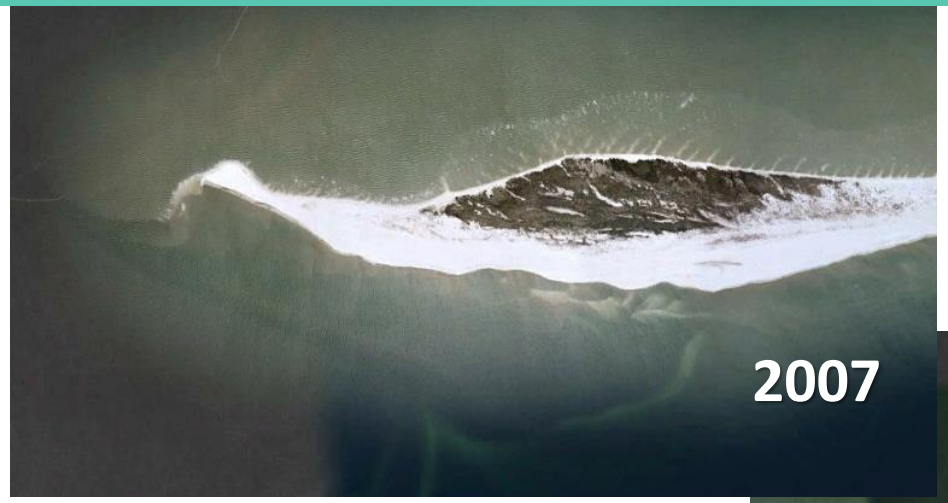
Many barrier islands are narrow but may are HEAVILY populated


Hampstead
Topsail Beach
Kirkland
Porters Neck
Bayshore
Ogden
Figure Eight Island


Whaleyville
Showell
Ocean Pines
Ocean City
Berlin
Sinepuxent
Ironshire
lewark
Isle of
Wight Bay
Fenwick
Island
N
Ocean City
Ocean City
Inlet
MARYLAND
Upper
Sinepuxent
Neck
Atlantic Ocean
Position of
shoreline
1980
1849
Sinepuxent
Bay
Assateague
Island
km
0
1
2
0
.62
1.24
mi

The ends of islands are REALLY dynamic

Longshore currents can move sand towards the ends

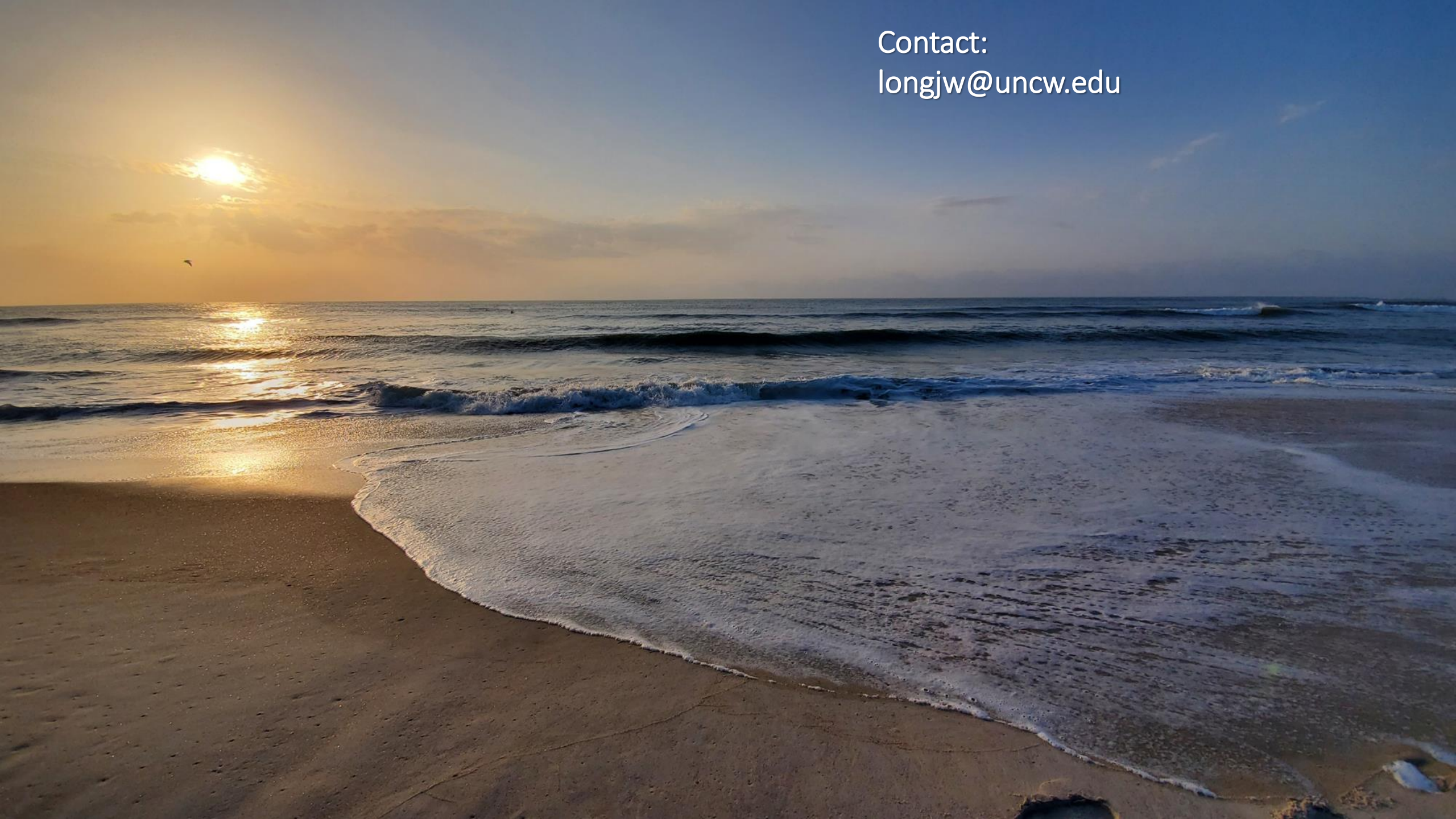


The ends of islands are REALLY dynamic

Combination of tidal currents and alongshore currents

Barrier Islands:

unique, diverse,
dynamic, vulnerable



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