Why are Barrier Islands Unique?

Ken Richardson – NC Division of Coastal Management

March 2, 2022

Beach Erosion & Nourishment: Outline

Erosion

Beach Erosion in North Carolina

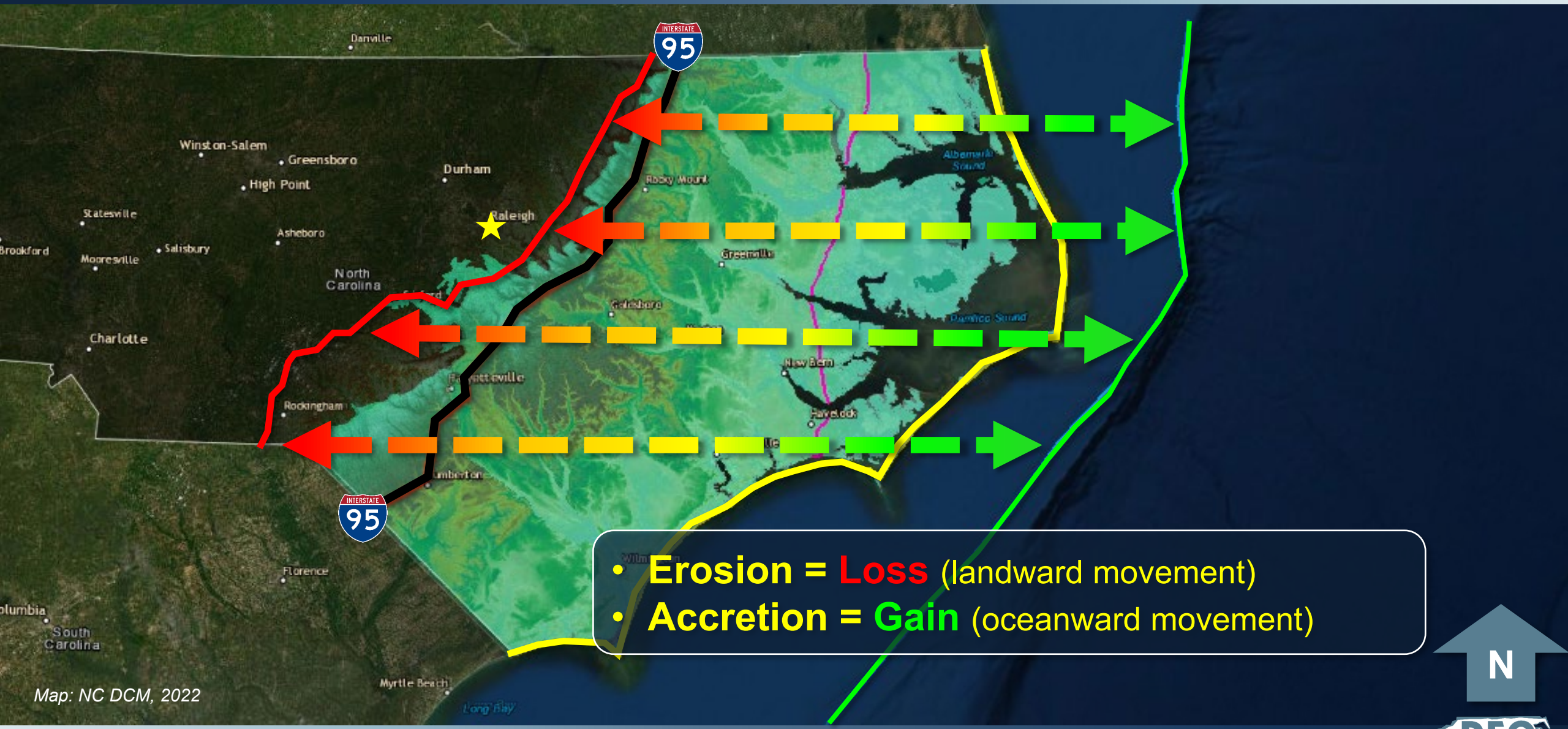
- Erosion vs. Accretion
- Long-Term vs. Short-Term
- Rules & Policies

Nourishment

Beach Nourishment in North Carolina

- Erosion Mitigation
- Rules & Policies

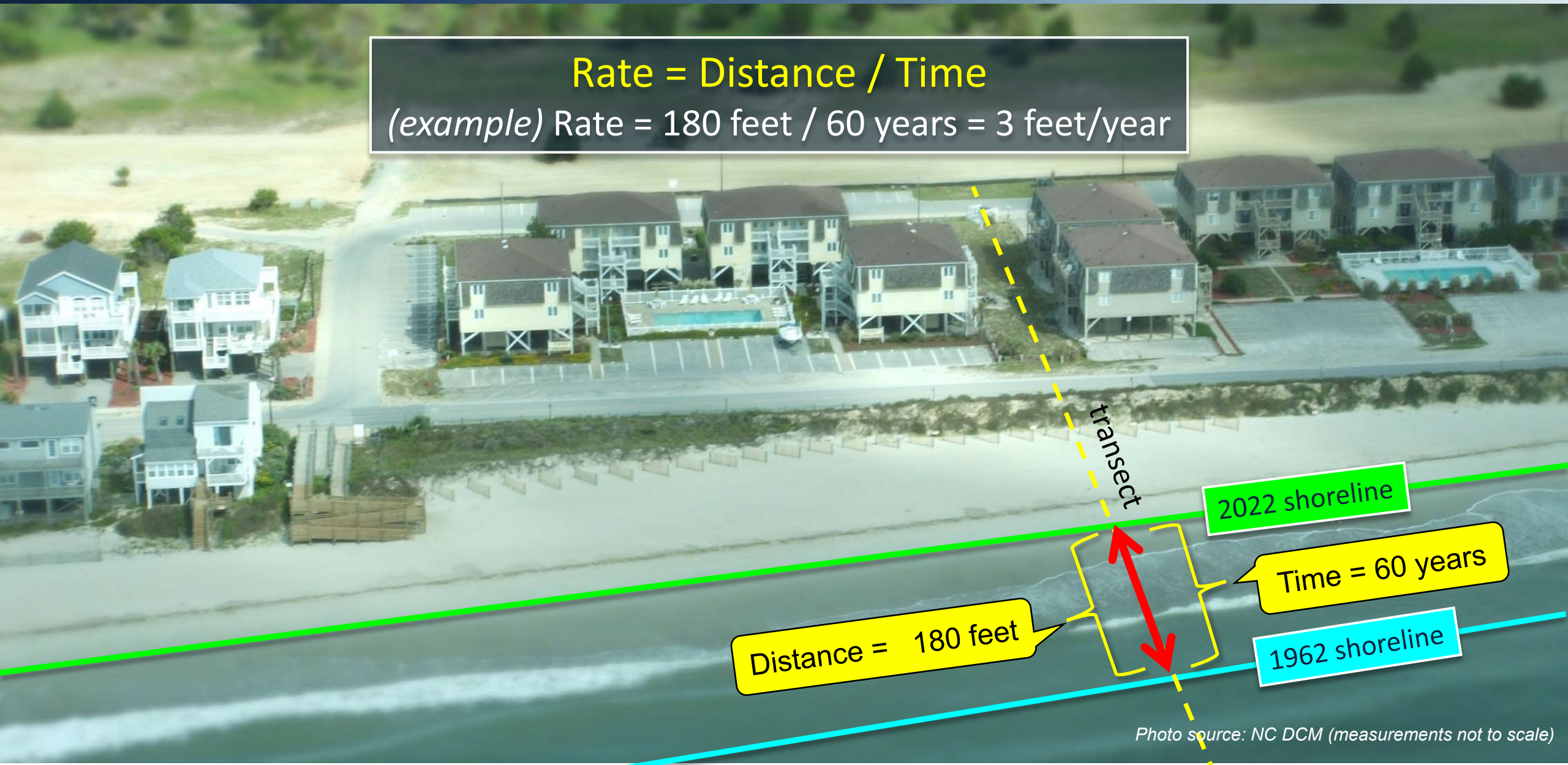
Beach Erosion (-) & Accretion (+) - Geological Overview



- **Erosion = Loss** (landward movement)
- **Accretion = Gain** (oceanward movement)

Map: NC DCM, 2022

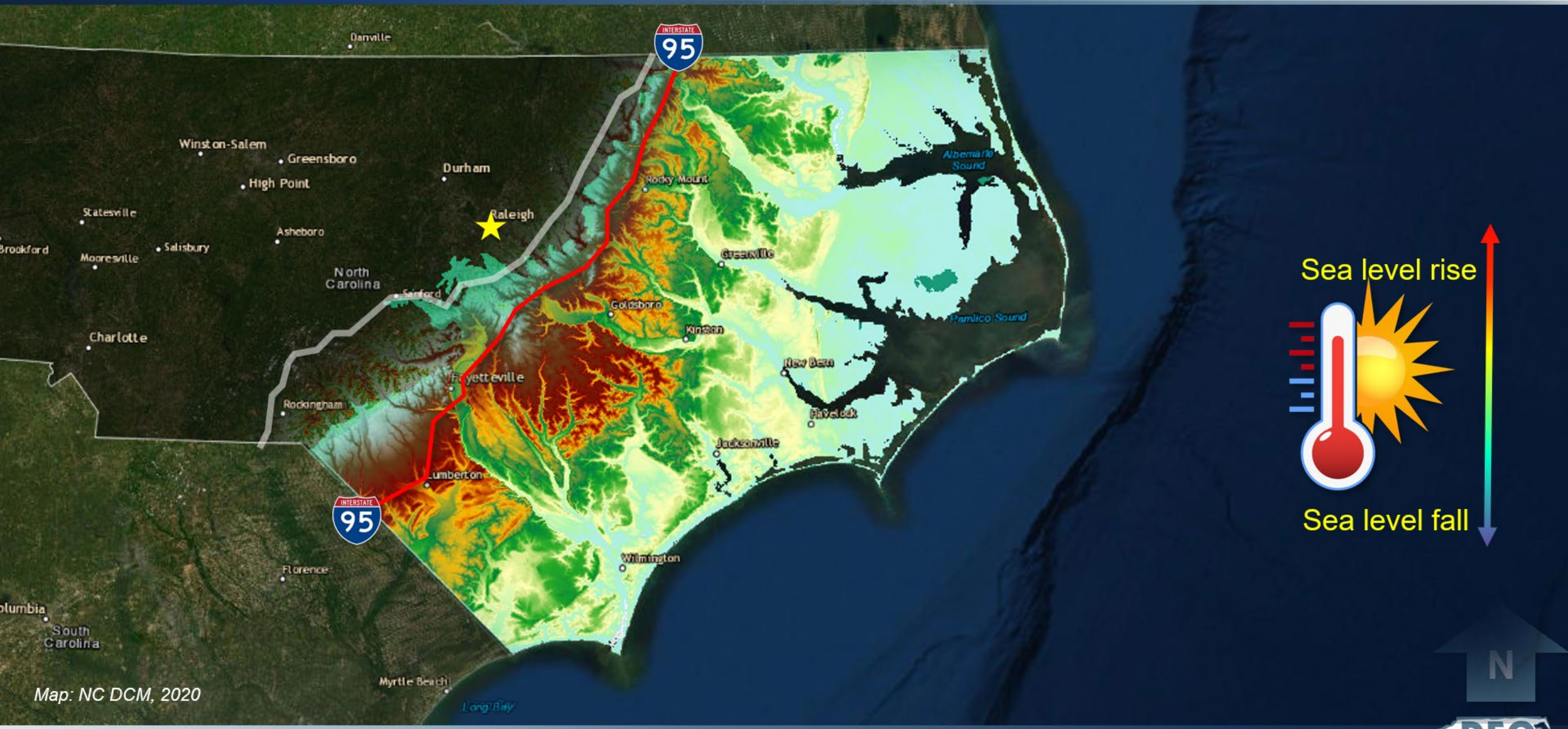
Shoreline Change Rates Using End-Point Method



Beach Erosion: 2020 Update Study

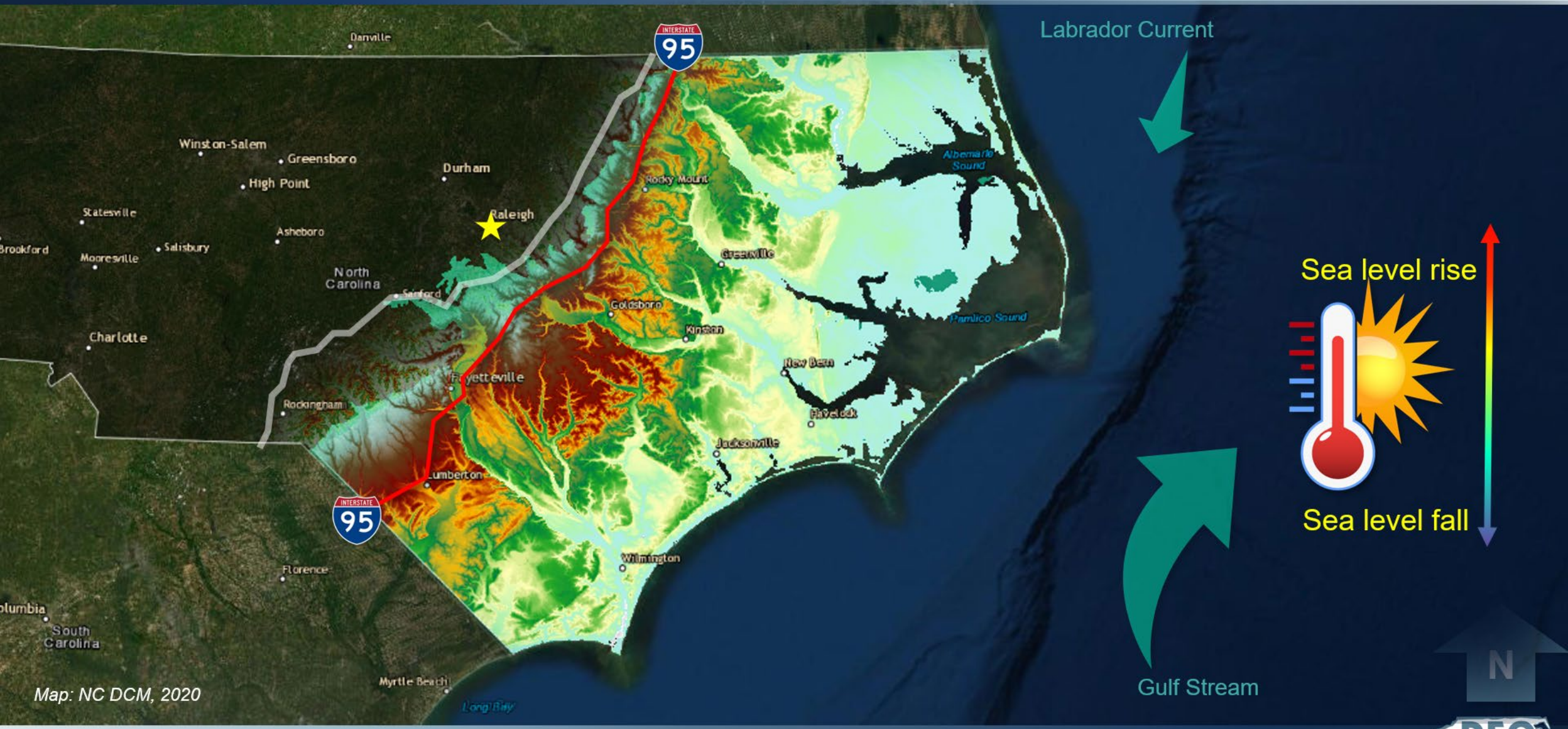
Results	Shoreline Length & Rate Comparison		
	South-Facing Beach Miles (% of total)	**East-Facing Beach** Miles (% of total)	**Total Shoreline** Miles (% of total)
Miles of Shoreline Mapped & Analyzed	103.7 (34.1%)	200.8 (65.9%)	304.5
Measured Accretion (+)	45.8 (+) (44.2 %)	53.6 (+) (26.3%)	103.7 miles (+) (34.1%)
Measured Erosion (-)	56.3 (-) (54.3%)	147.1 (-) (72.2%)	200.9 miles (-) (65.4%)
No Output (*Data Gap*)	0.8 (<1%)	2.8 (1%)	2.8 (>1%)

Beach Erosion: Short- & Long-Term Influences



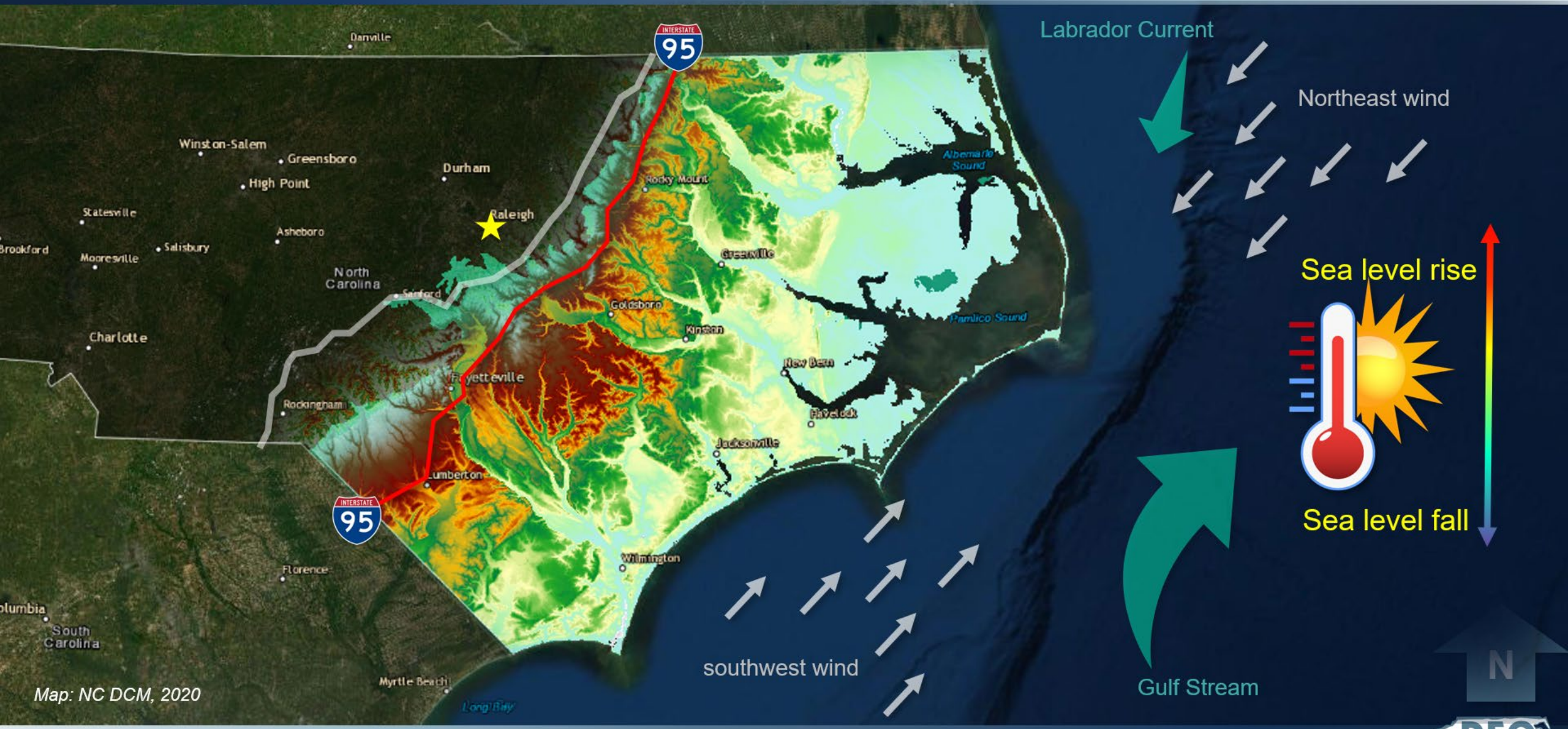
Map: NC DCM, 2020

Beach Erosion: Short- & Long-Term Influences



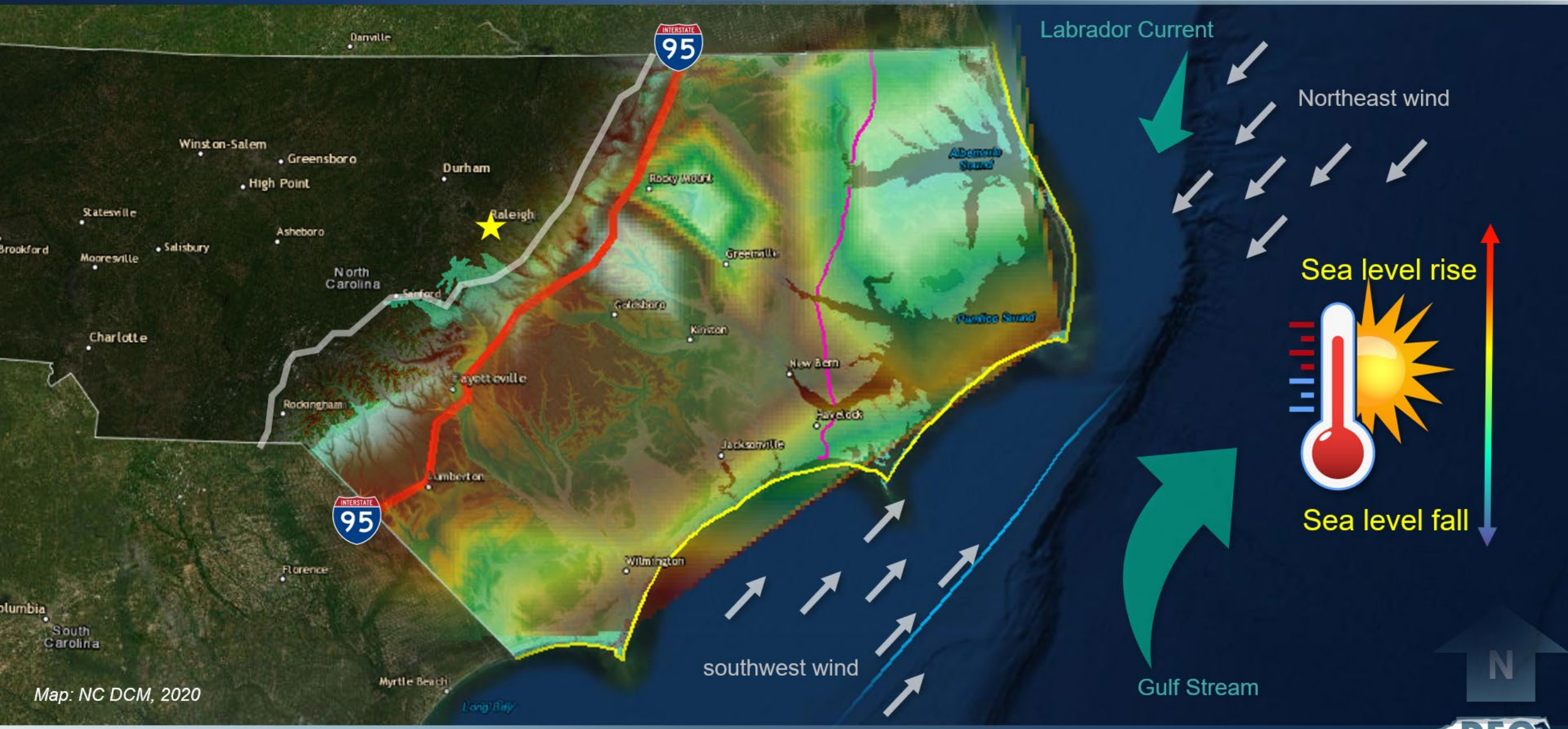
Map: NC DCM, 2020

Beach Erosion: Short- & Long-Term Influences



Map: NC DCM, 2020

Beach Erosion: Short- & Long-Term Influences



Map: NC DCM, 2020

Beach Erosion: Short- & Long-Term Influences

Map: NC DCM, 2020

Beach Erosion: Short-Term vs. Long-Term

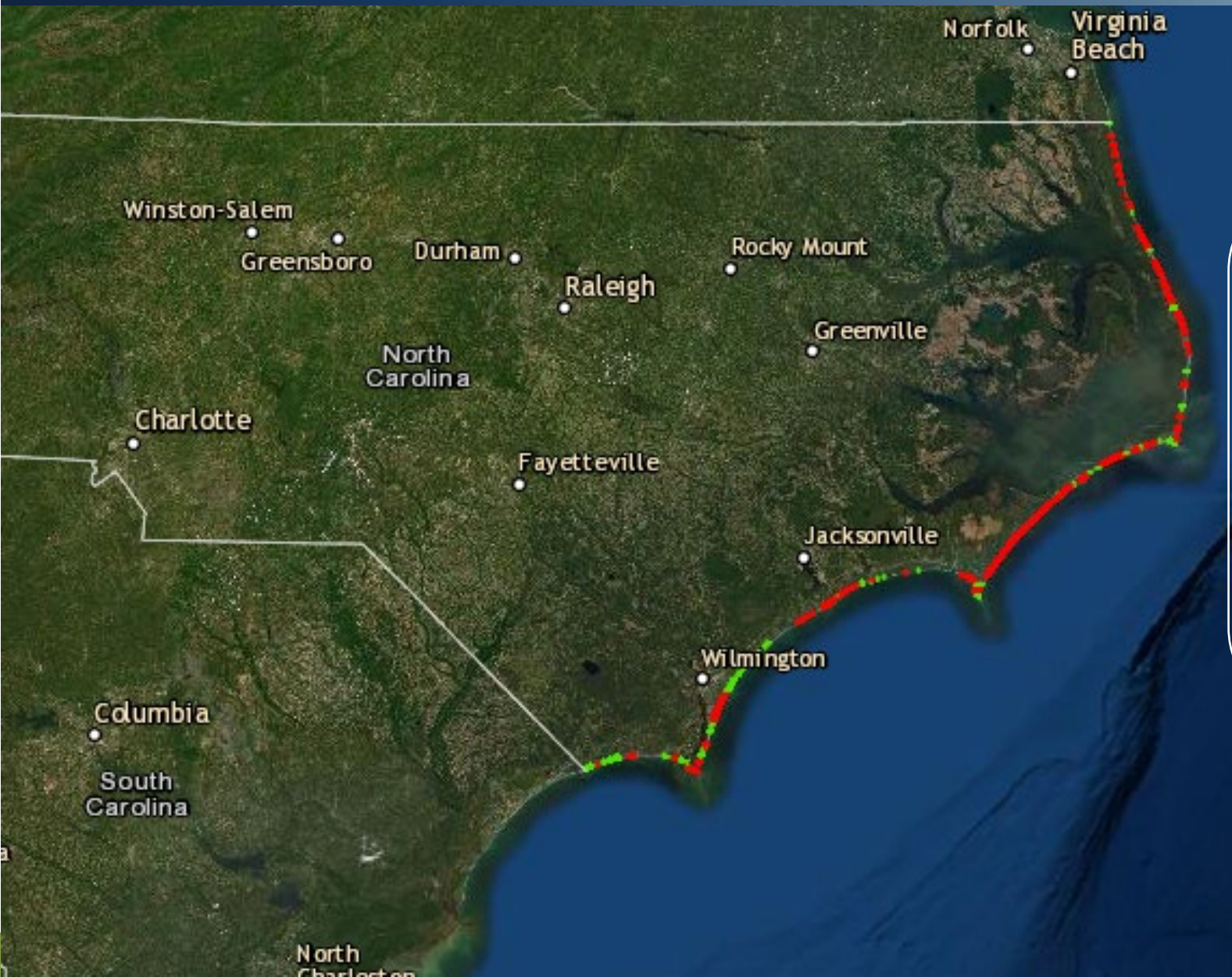
Map Image: NC DCM

Beach Erosion: Short-Term vs. Long-Term

Map Image: NC DCM

Image: USGS

Beach Erosion: Rules & Policies



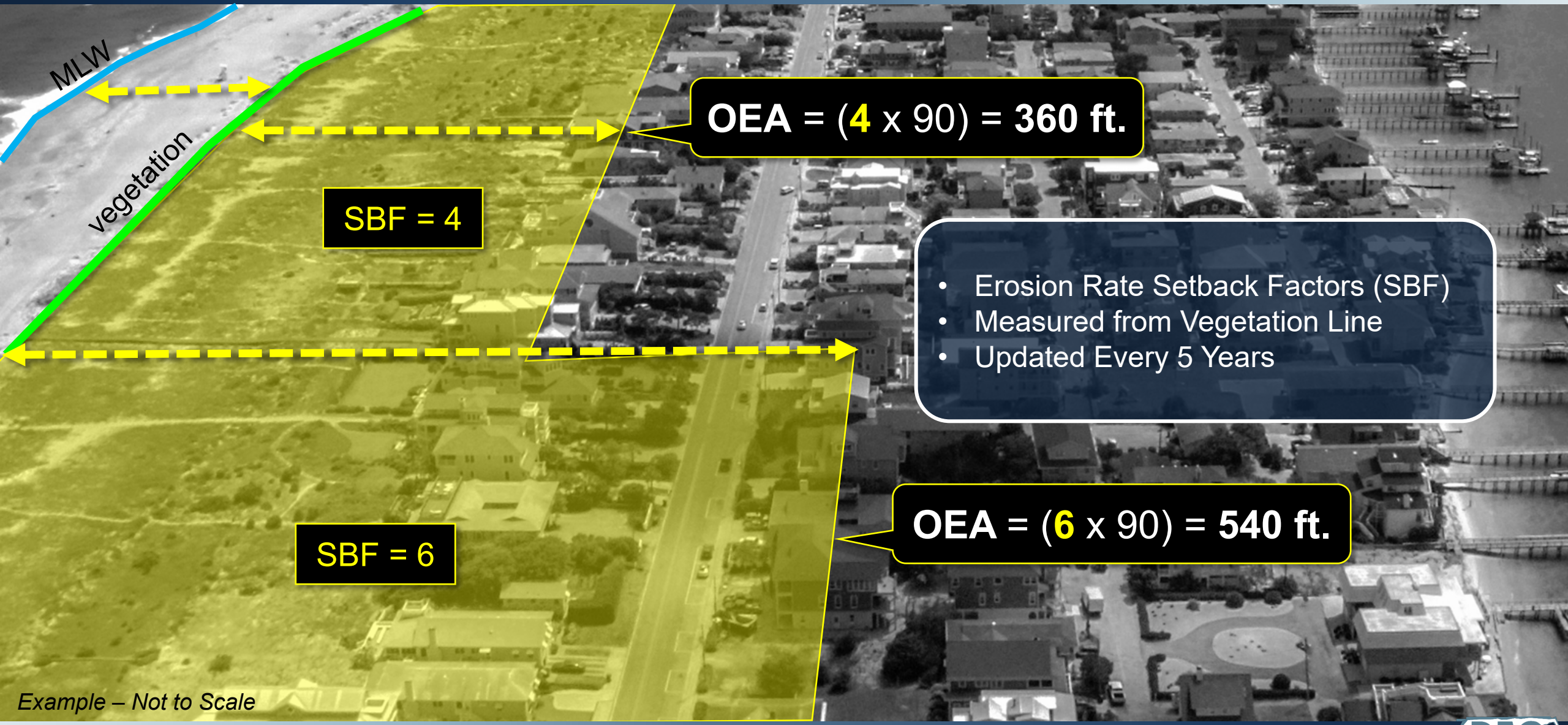
Oceanfront Erosion Rates

- Calculated ~ 5 years
- Ocean Erodible Area
- Oceanfront Construction Setbacks
  - Average erosion rate ~ 2 feet/year
  - Higher rates at inlets & Capes

Erosion

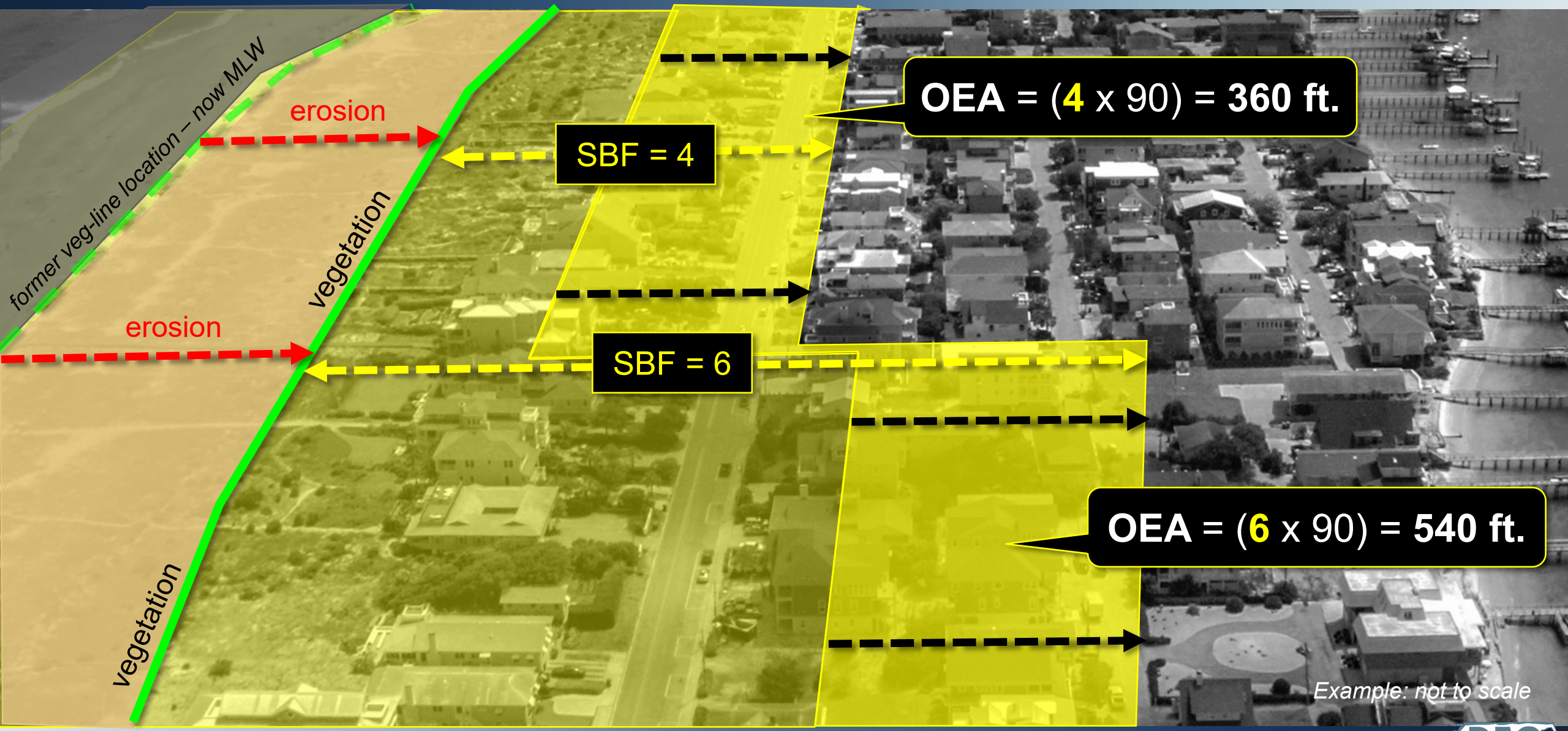
Accretion

Beach Erosion: Rules & Policies



- Erosion Rate Setback Factors (SBF)
- Measured from Vegetation Line
- Updated Every 5 Years

Beach Erosion: Rules & Policies



Beach Nourishment: Erosion Mitigation Strategies

✓ **Do Nothing** ?

✓ **Soft**
- *nourishment*
- *sandbags*
- *dredging*

★

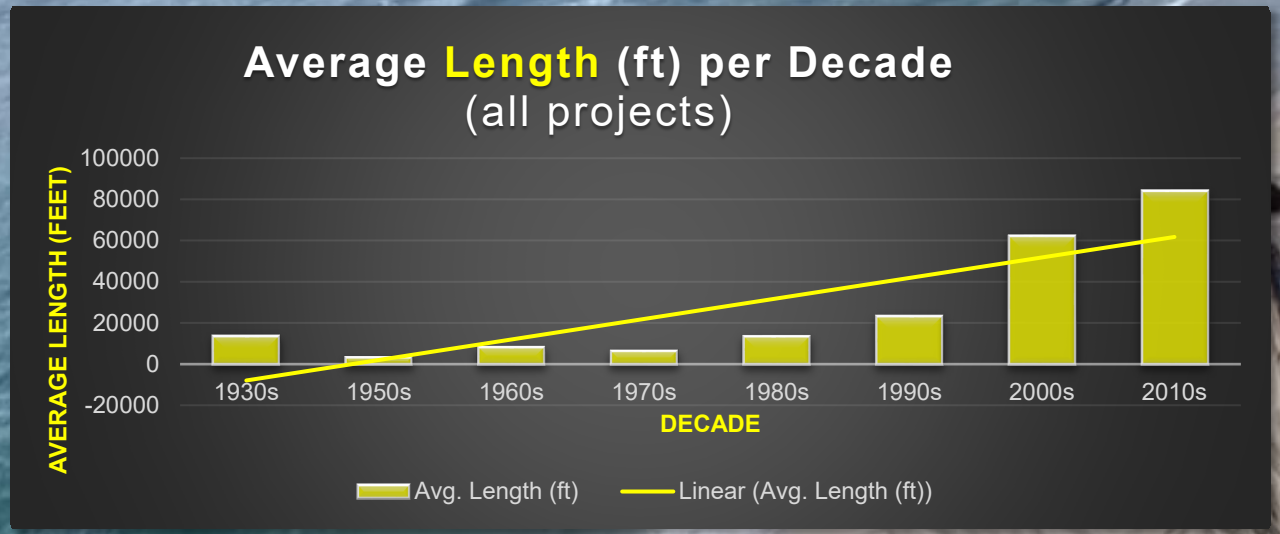
✓ **Hard** ?
- *groin*
- *breakwater*
- *jetty*
- *seawall*

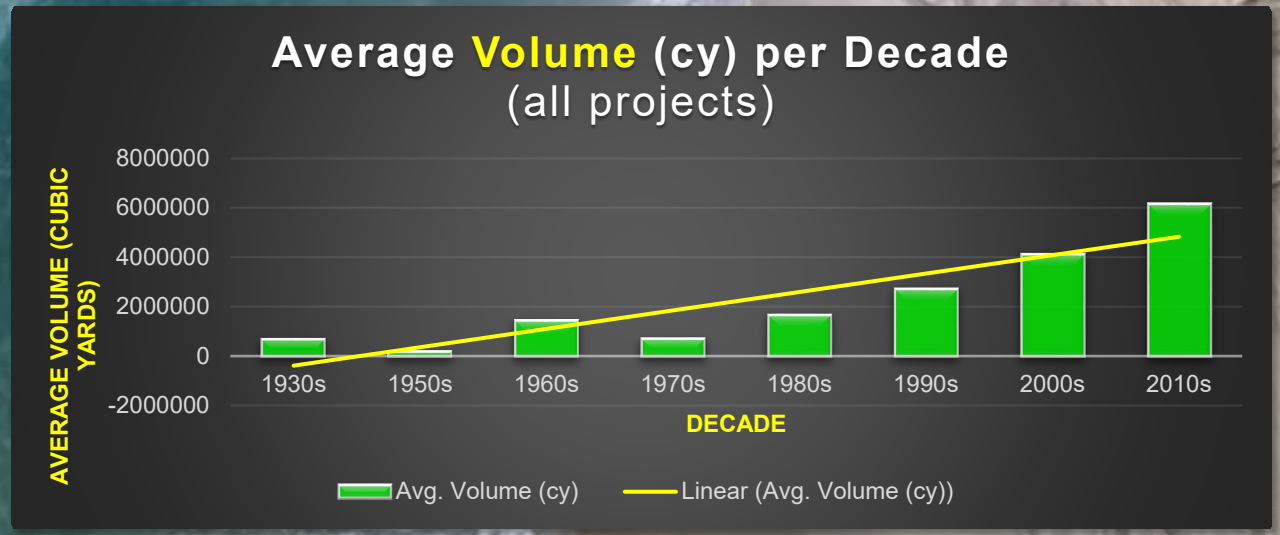
✓ **Retreat** ?

✓ **Combination** *(all the above)* ?

Photo source: dredgingtoday.com

Beach Nourishment



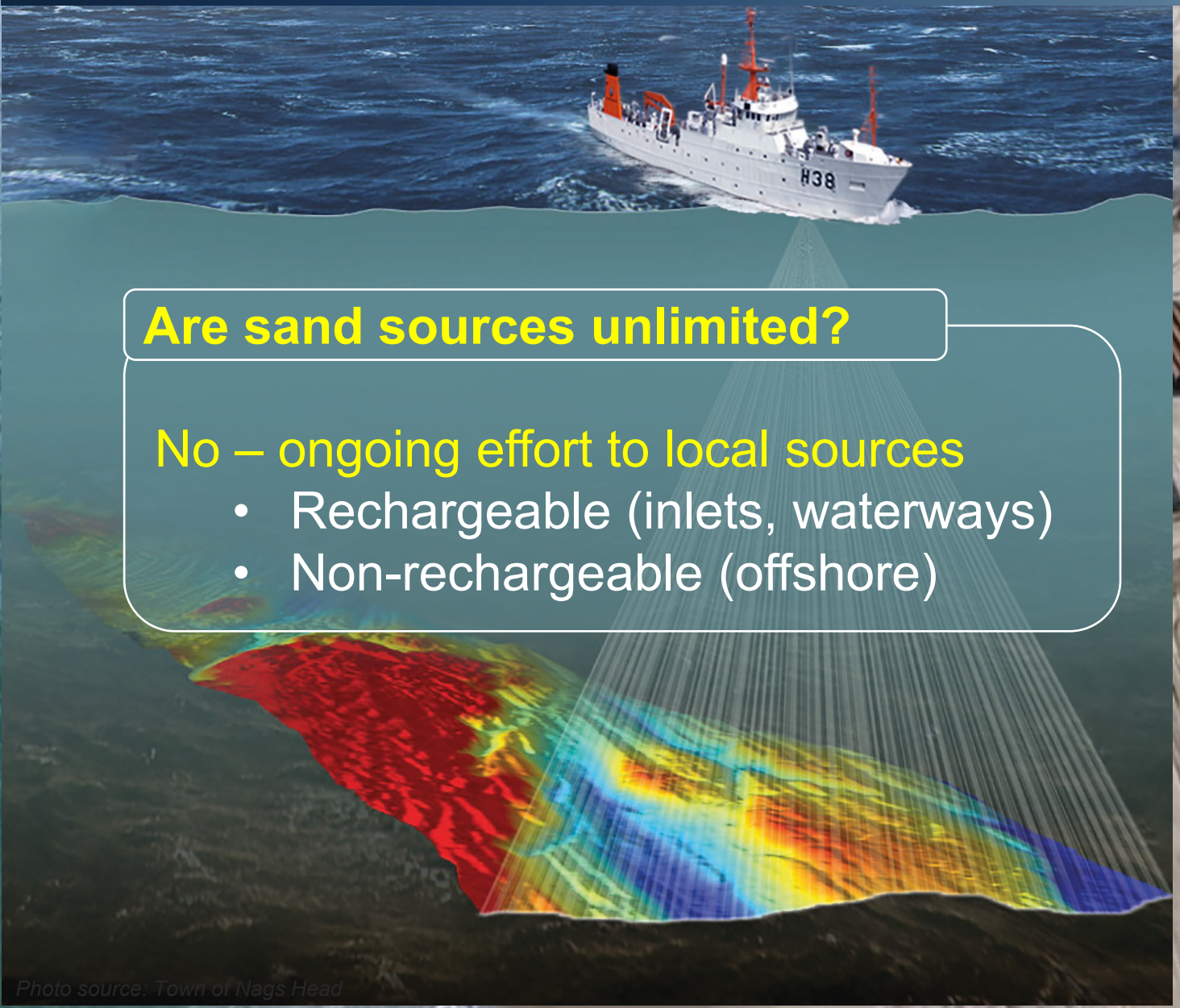


>80% of oceanfront communities

- Identified a reliable tax source
- Identified sand sources
- Performing annual monitoring

Photo source: Town of Nags Head

Beach Nourishment

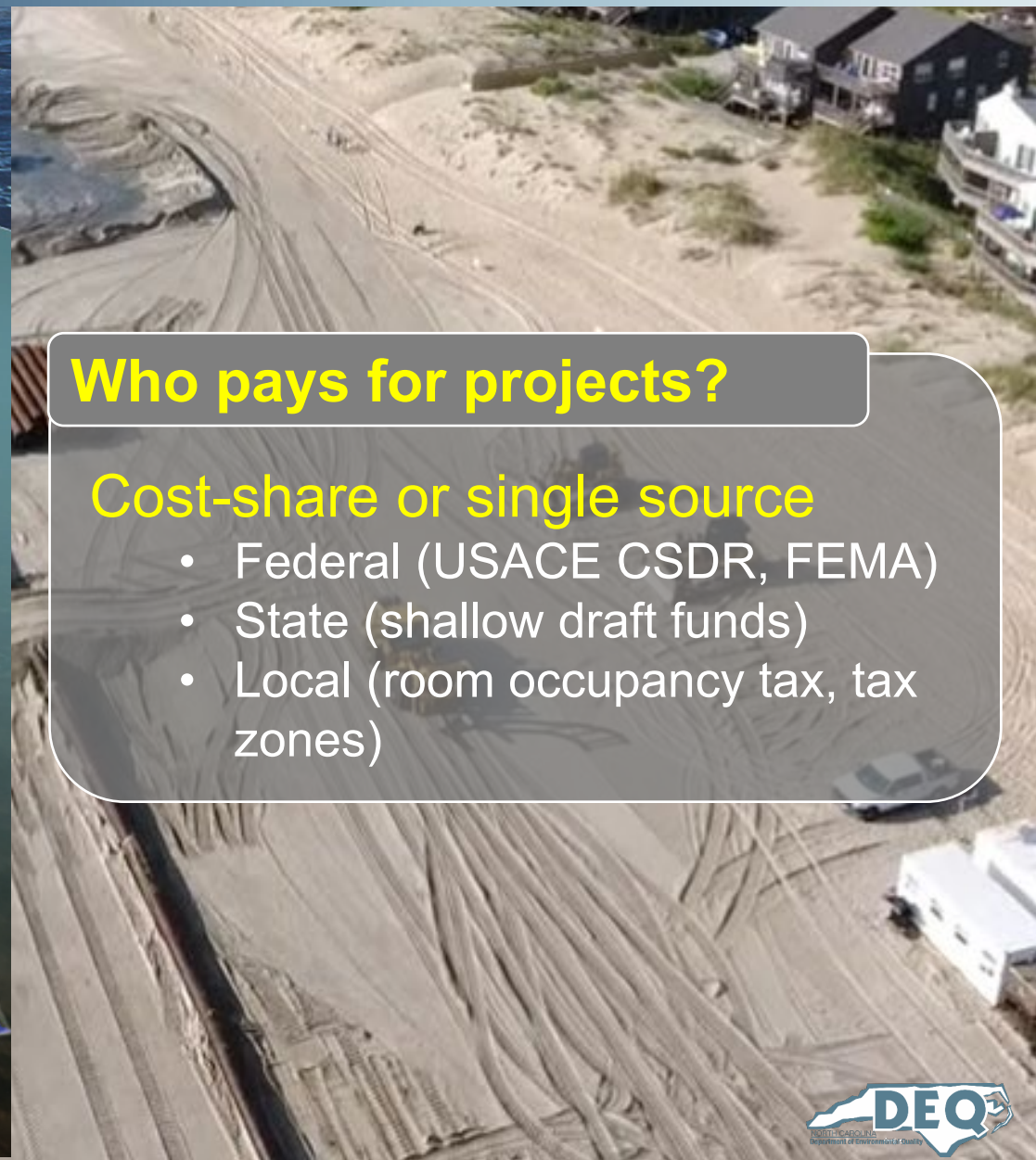


Are sand sources unlimited?

No – ongoing effort to local sources

- Rechargeable (inlets, waterways)
- Non-rechargeable (offshore)

Photo source: Town of Nags Head



Who pays for projects?

Cost-share or single source

- Federal (USACE CSDR, FEMA)
- State (shallow draft funds)
- Local (room occupancy tax, tax zones)

Photo sources: Carteret County Shore Protection Office

Beach Nourishment: Rules & Policies

1. Characterize Native Beach Sediment
2. Characterize Borrow Area Sediment
3. Determine Sediment Compatibility
4. Excavation & Placement of Sediment

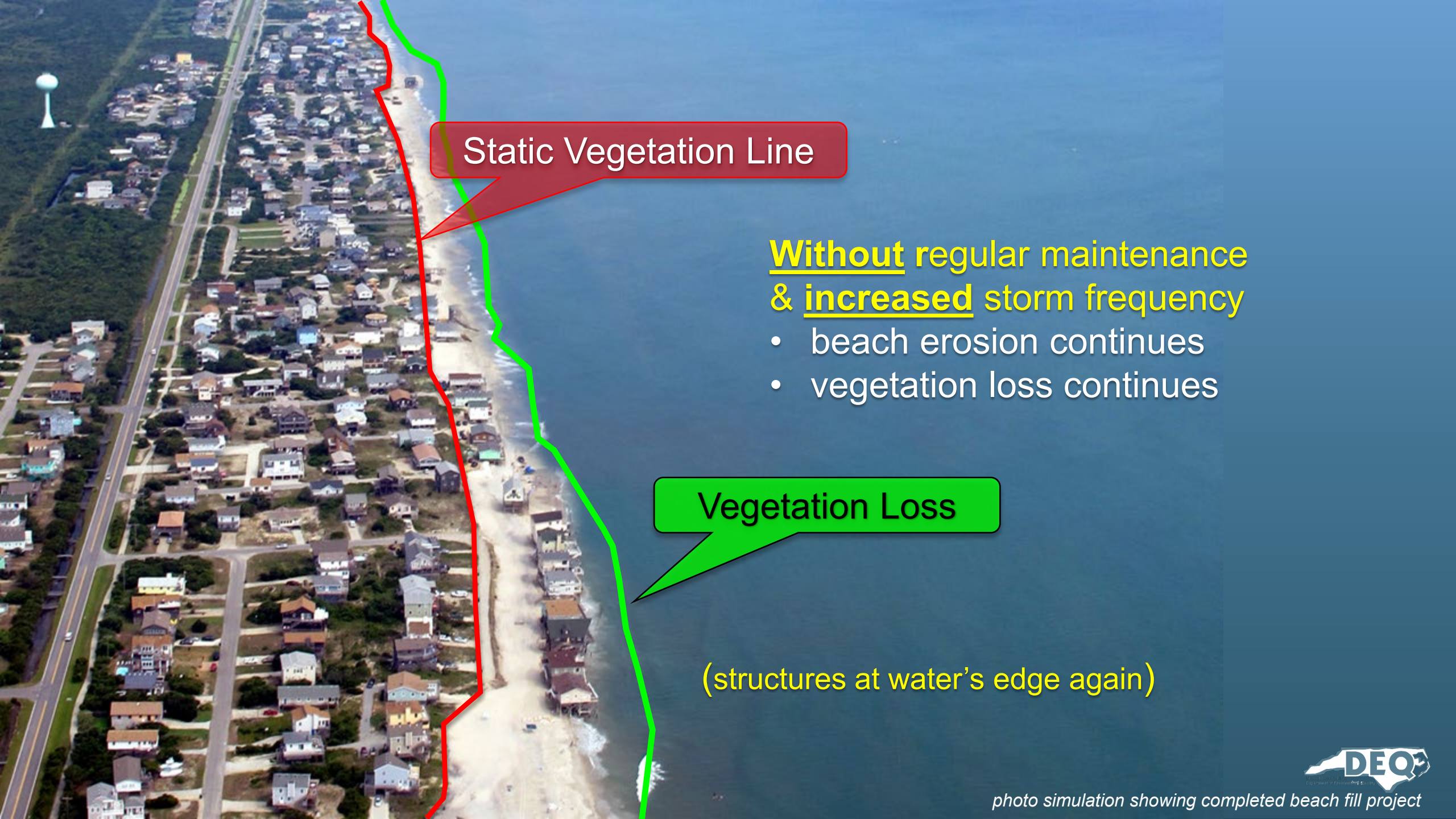
Goal: *ensure that sand used for beach nourishment is compatible with existing sand on the beach.*

Photo source: Town of Nags Head, NC

With regular maintenance
& **reduced** storm frequency

- wide beach maintained
- oceanward vegetation growth

photo simulation showing completed beach fill project



Without regular maintenance & **increased** storm frequency

- beach erosion continues
- vegetation loss continues

(structures at water's edge again)

photo simulation showing completed beach fill project

Minimize Loss of Beach Access & Habitat

Image: North Topsail Beach

Image: NC DCM

Image: coastalreview.org

Minimize Damages & Loss of Property

Image: USGS

Beach Erosion & Nourishment

Key: Maintain a wide and healthy beach

Tourism

Recreation

Employment

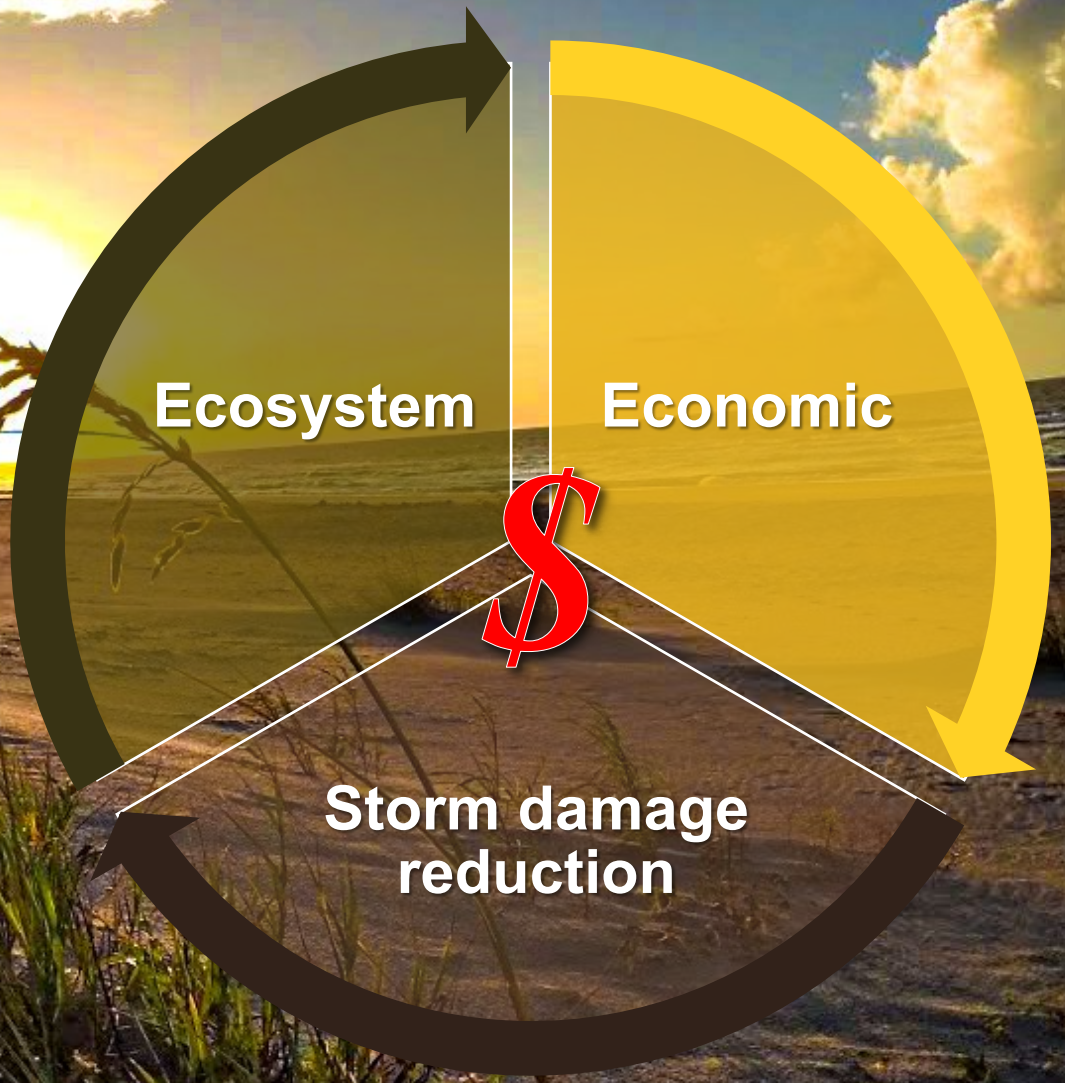
Critical habitat

Less storm damage

Property value

Commercial

Tax revenue



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NORTH CAROLINA
Department of Environmental Quality