



Defining Inlet Hazard Areas (IHA) Using a 30-Year Risk Line

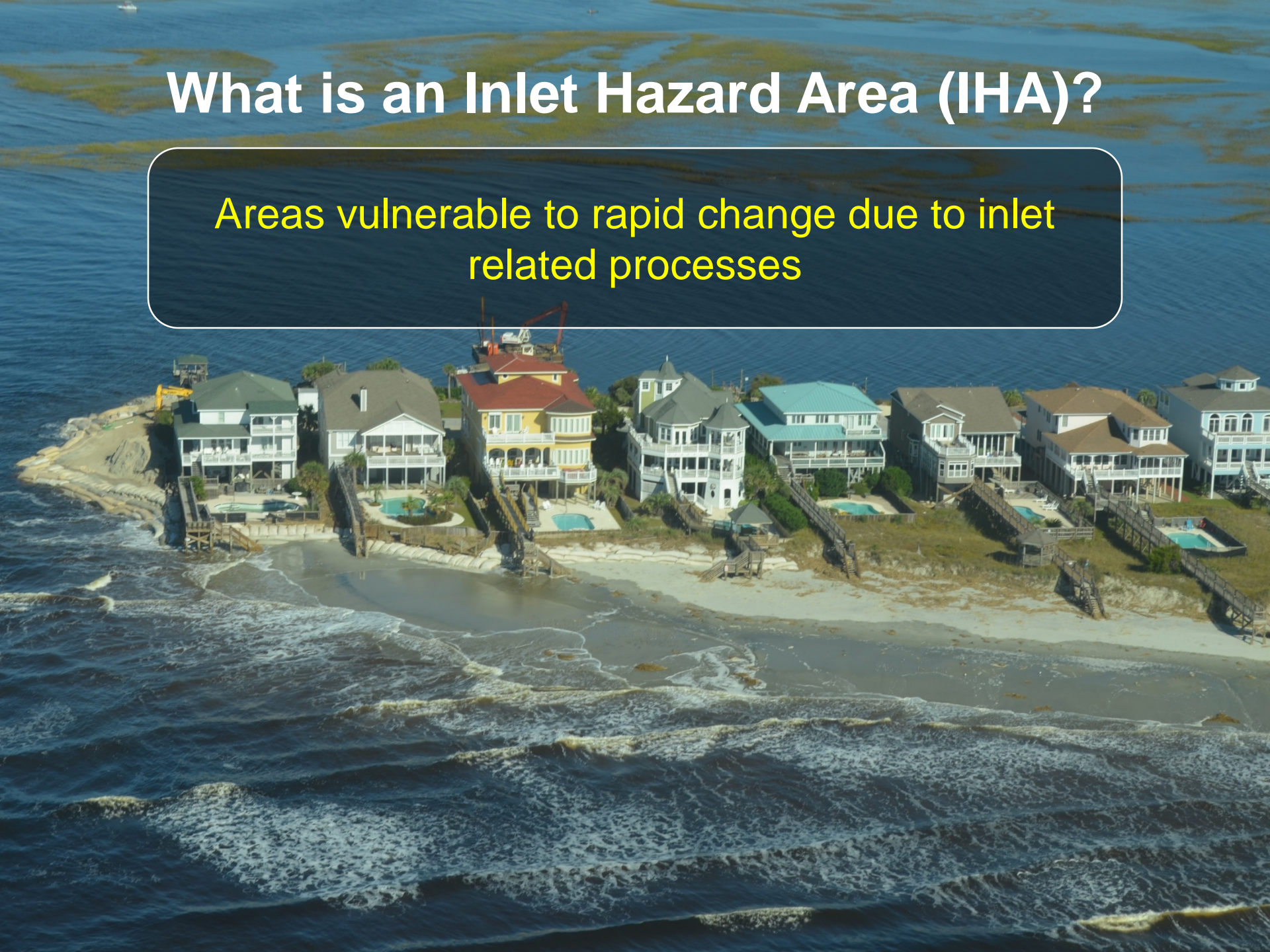
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North Carolina Division of Coastal Management
2017 Coastal GeoTools



February 9, 2017

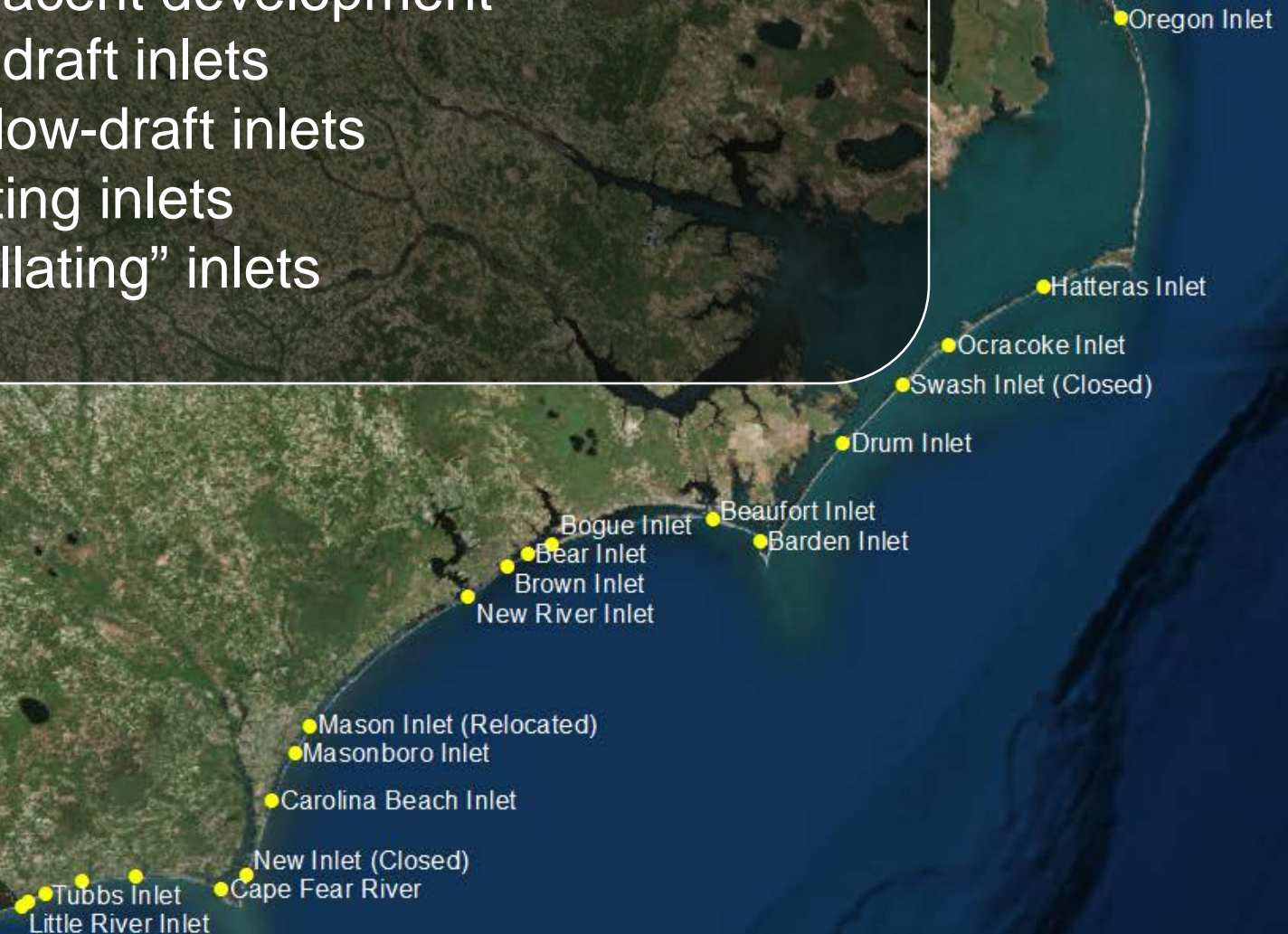
What is an Inlet Hazard Area (IHA)?

Areas vulnerable to rapid change due to inlet related processes



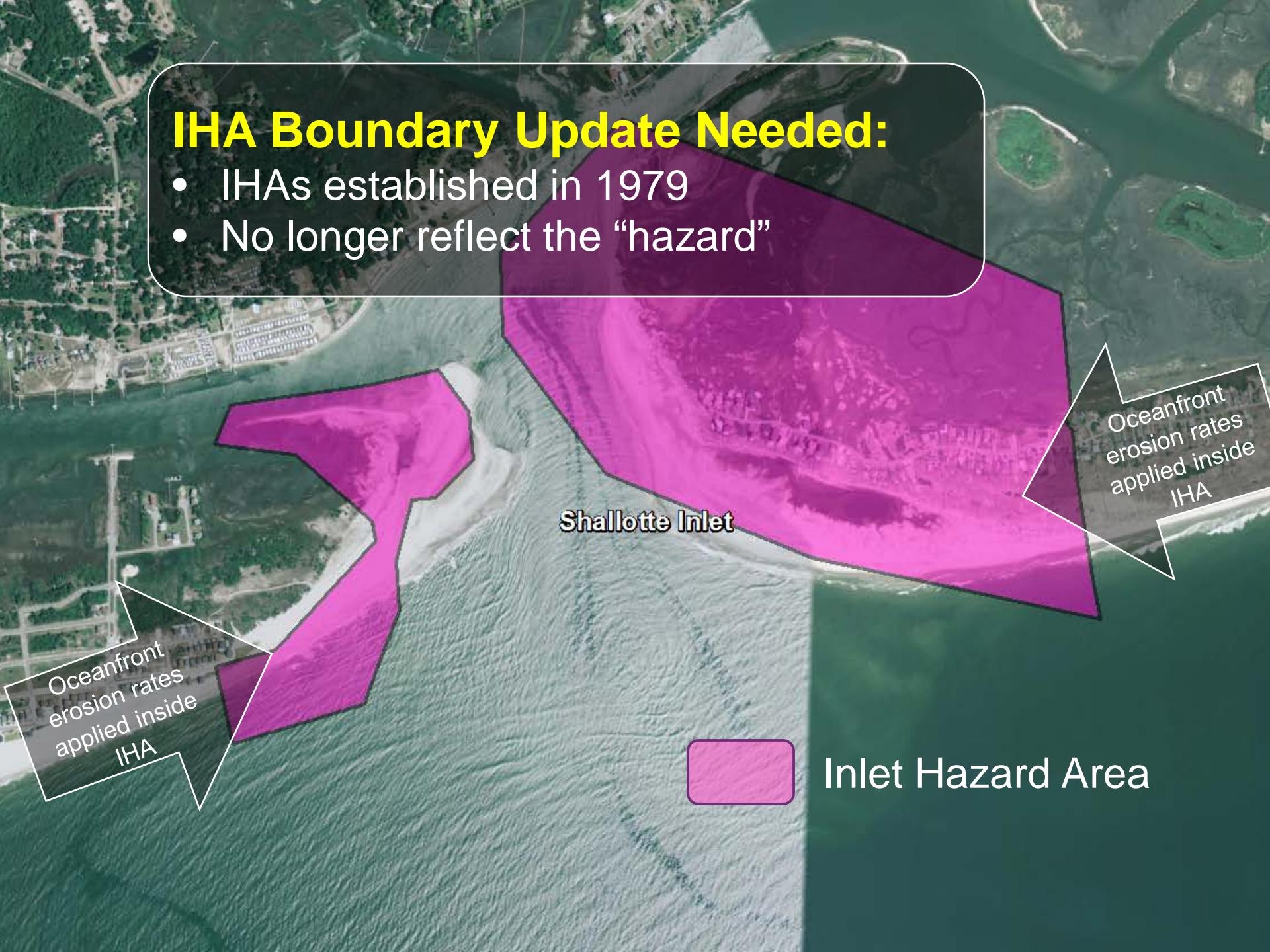
North Carolina has 19 active inlets:

- 12 with adjacent development
- 7 no adjacent development
- 2 Deep-draft inlets
- 17 Shallow-draft inlets
- 4 Migrating inlets
- 15 “oscillating” inlets



IHA Boundary Update Needed:

- IHAs established in 1979
- No longer reflect the “hazard”



Shallotte Inlet

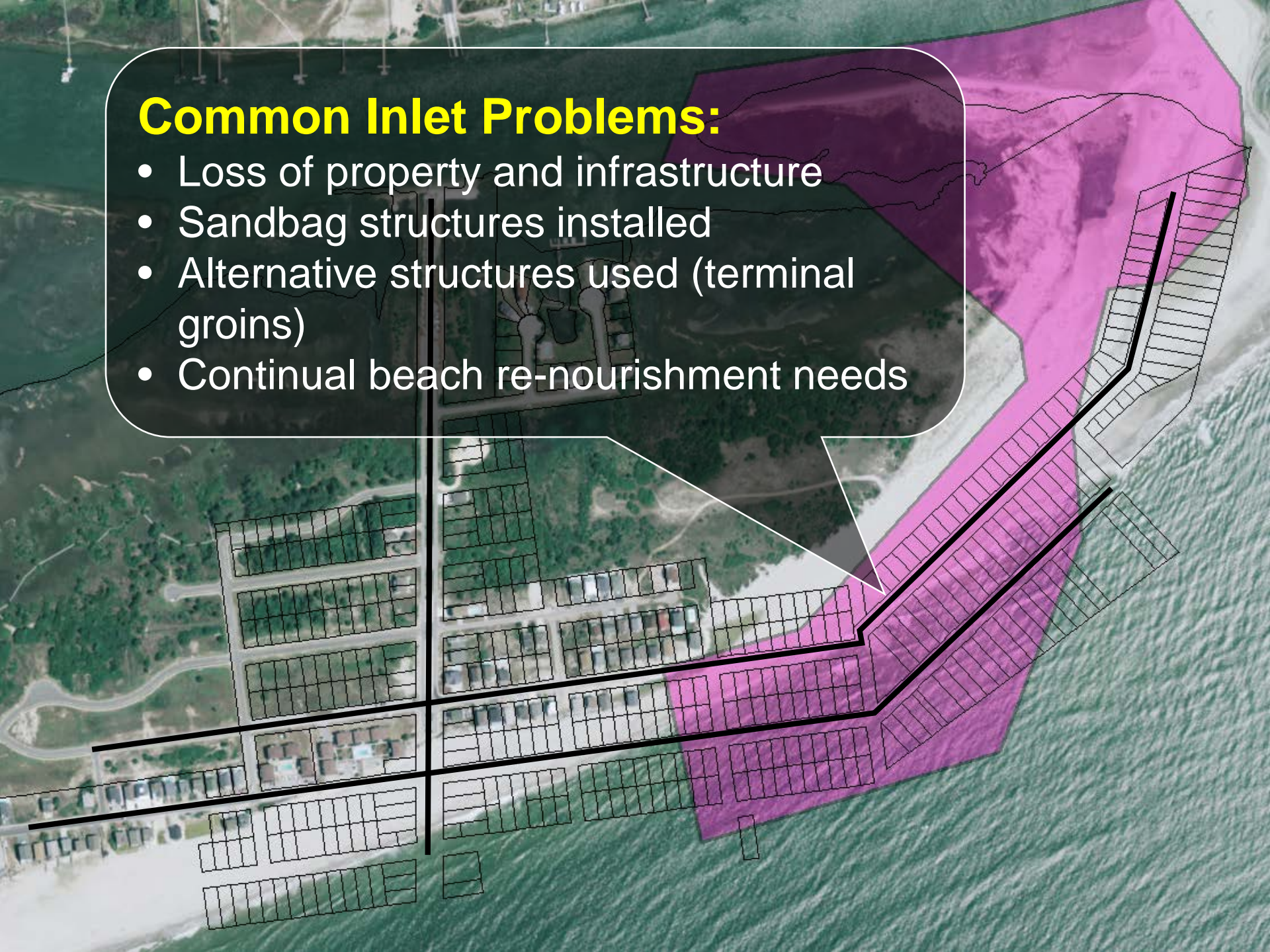
Oceanfront
erosion rates
applied inside
IHA

Oceanfront
erosion rates
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IHA

Inlet Hazard Area

Common Inlet Problems:

- Loss of property and infrastructure
- Sandbag structures installed
- Alternative structures used (terminal groins)
- Continual beach re-nourishment needs



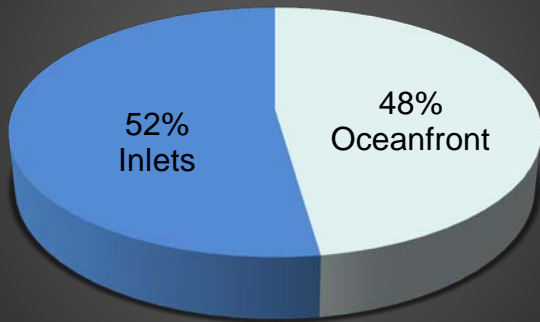
Inlets Areas Subject to Rapid Change



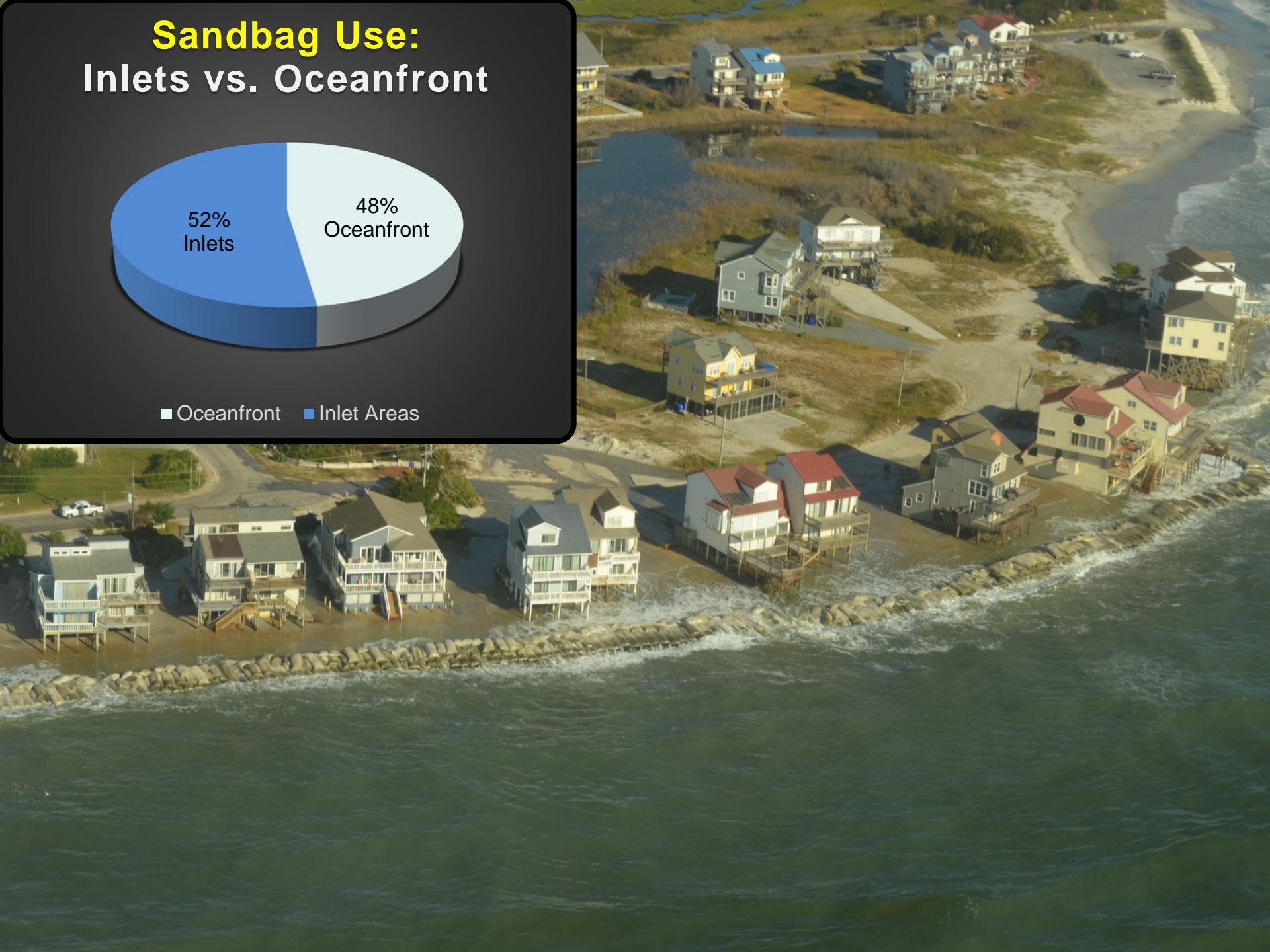
Constructed on Lea-Hutaff Island in 1990, this private home sat 500 feet from the ocean

The same house sat at the ocean's edge at low tide until finally being destroyed by a storm in 2015

Sandbag Use: Inlets vs. Oceanfront



■ Oceanfront ■ Inlet Areas





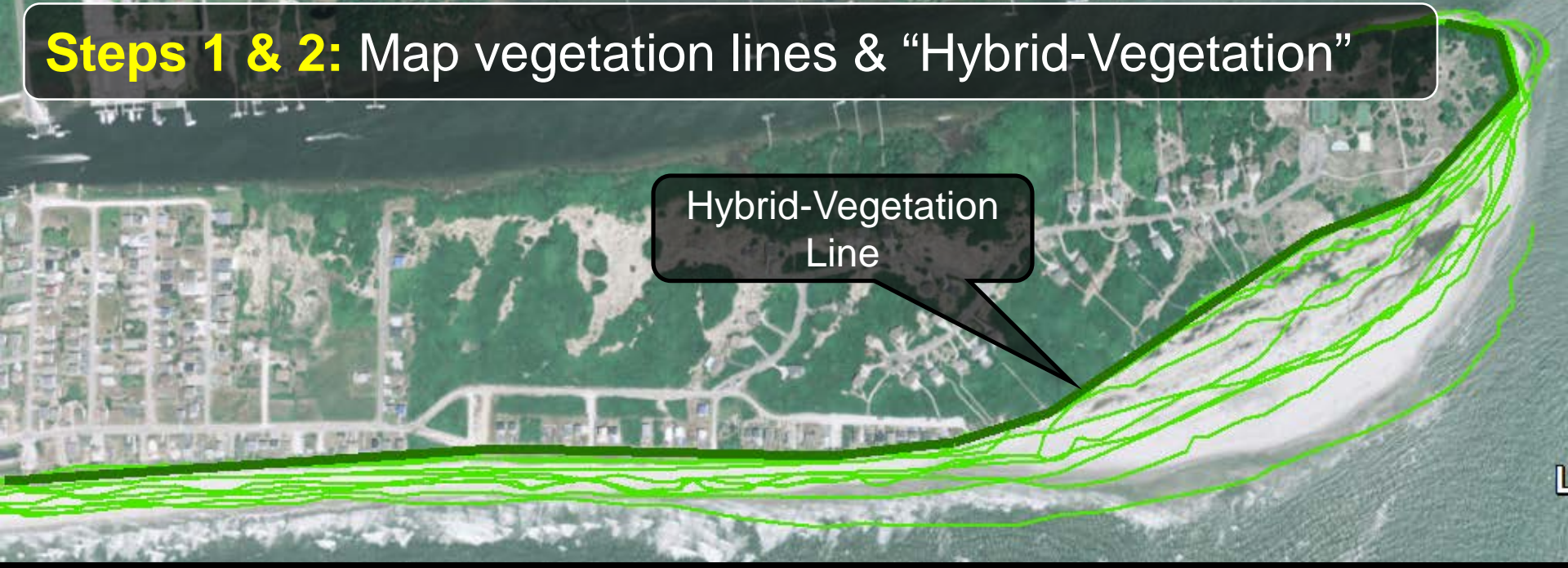
Defining Inlet Hazard Areas Using a 30-Year Risk Line:

- **Step 1:** Map shorelines & vegetation lines
- **Step 2:** Map “Hybrid-Vegetation Line”
- **Step 3:** Analyze shoreline change over time using Linear Regression (1970-2016)
- **Step 4:** Define where inlet processes no longer dominate shoreline location (oceanfront-inlet transition)
- **Step 5:** Calculate & map projected hazard risk (“30 & 90-Year Risk Line”)

Step 1: Map shorelines

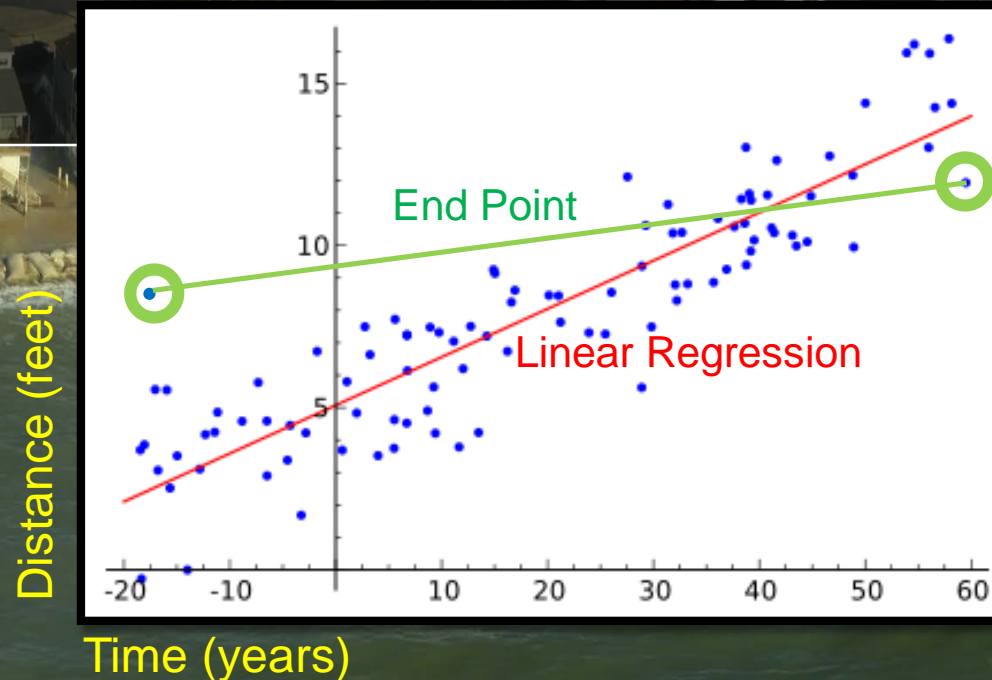


Steps 1 & 2: Map vegetation lines & "Hybrid-Vegetation"

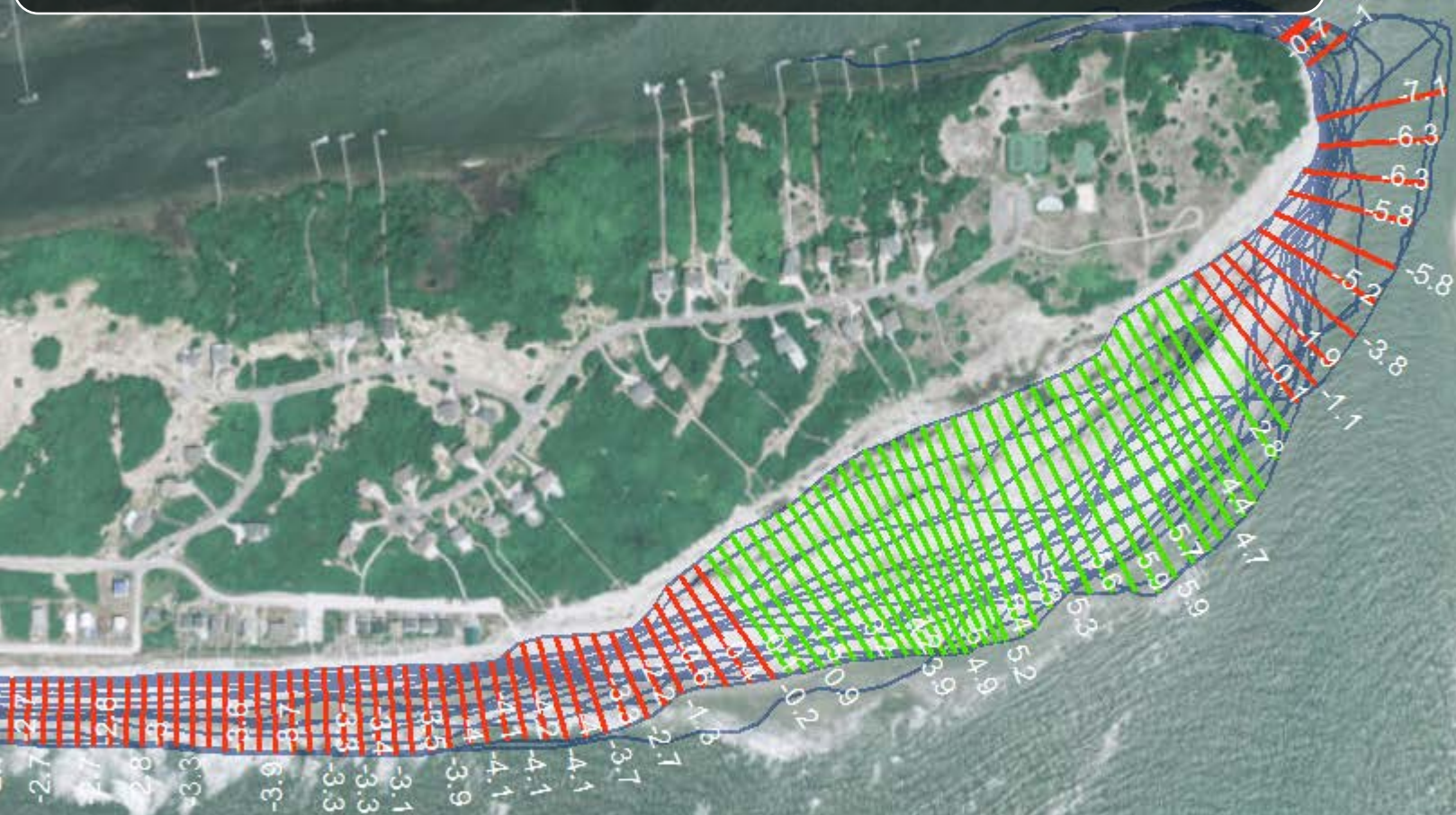


Step 3: Analyze Shoreline Change

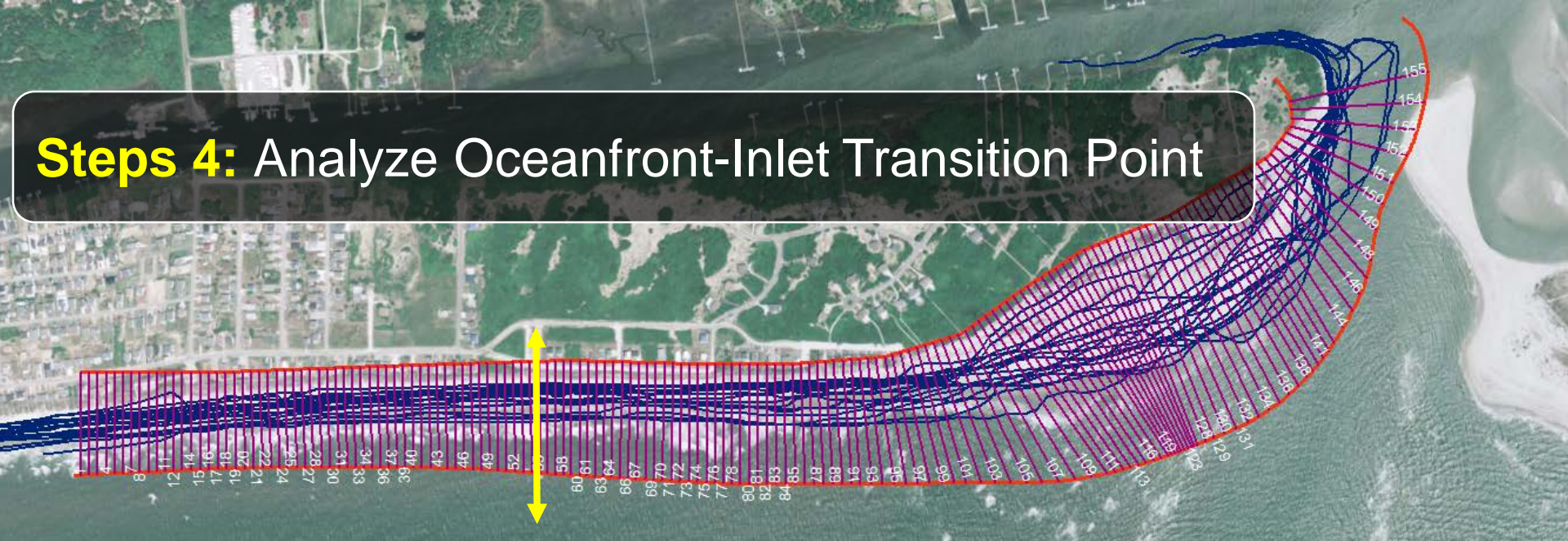
- Transect spacing (50 feet)
- Linear Regression Rate (LRR) (*ESRI's ArcMap & Analyzing Moving Boundaries using R – AMBUR*)
- Smooth Raw Data using 5-Point Running Average (*each transect rate is the average of the transect and the two transects on either side*).



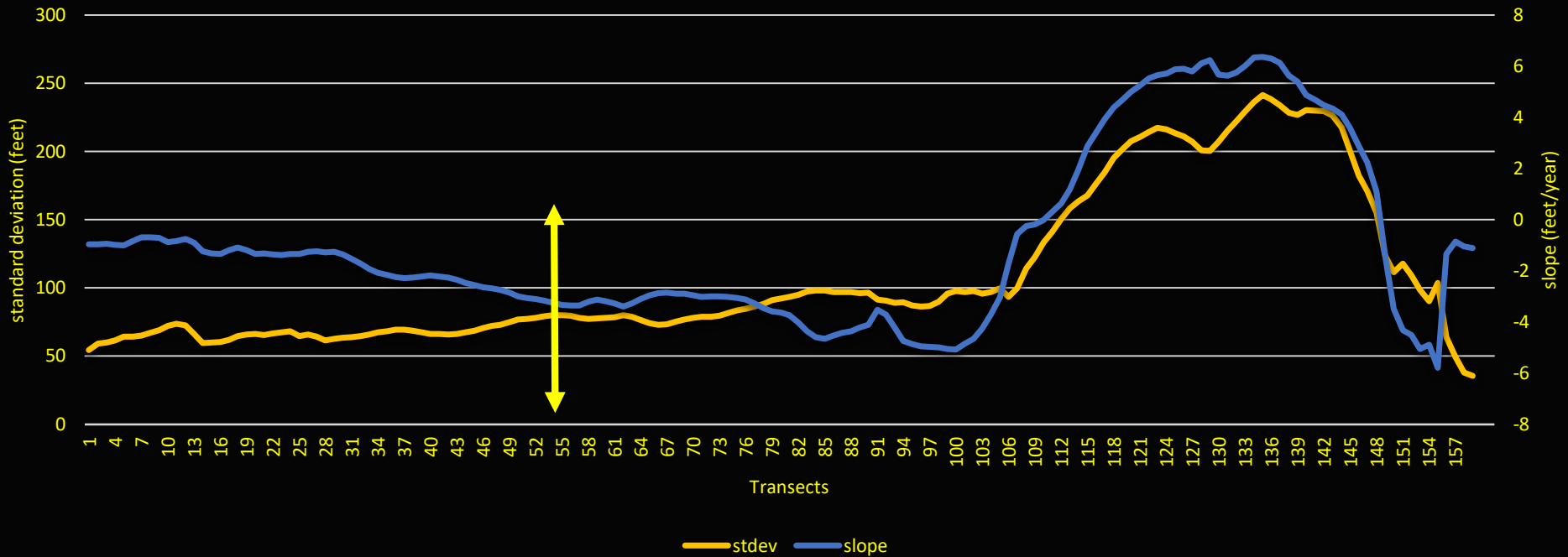
Steps 3: Analyze Shoreline Change



Steps 4: Analyze Oceanfront-Inlet Transition Point



Lockwood Folly - Holden Beach (1970-2016)



Step 5: Calculate & map projected hazard risk (“30 & 90-Year Risk Line”)

Measured from “Hybrid-Vegetation”

30-Year Risk Line = 30 x LRR x Multiplier

90-Year Risk Line = 90 x LRR X Multiplier

If accreting: Risk Line = 30 x 2 or 90 x 2

If eroding:

If $SE_{IHA}/SE_A \leq 1$, Multiplier = 1

If $SE_{IHA}/SE_A > 1$, Multiplier = SE_{IHA}/SE_A

Step 5: Defining "Hazard" – 30 & 90 Year Risk Lines

90-Year Risk Line

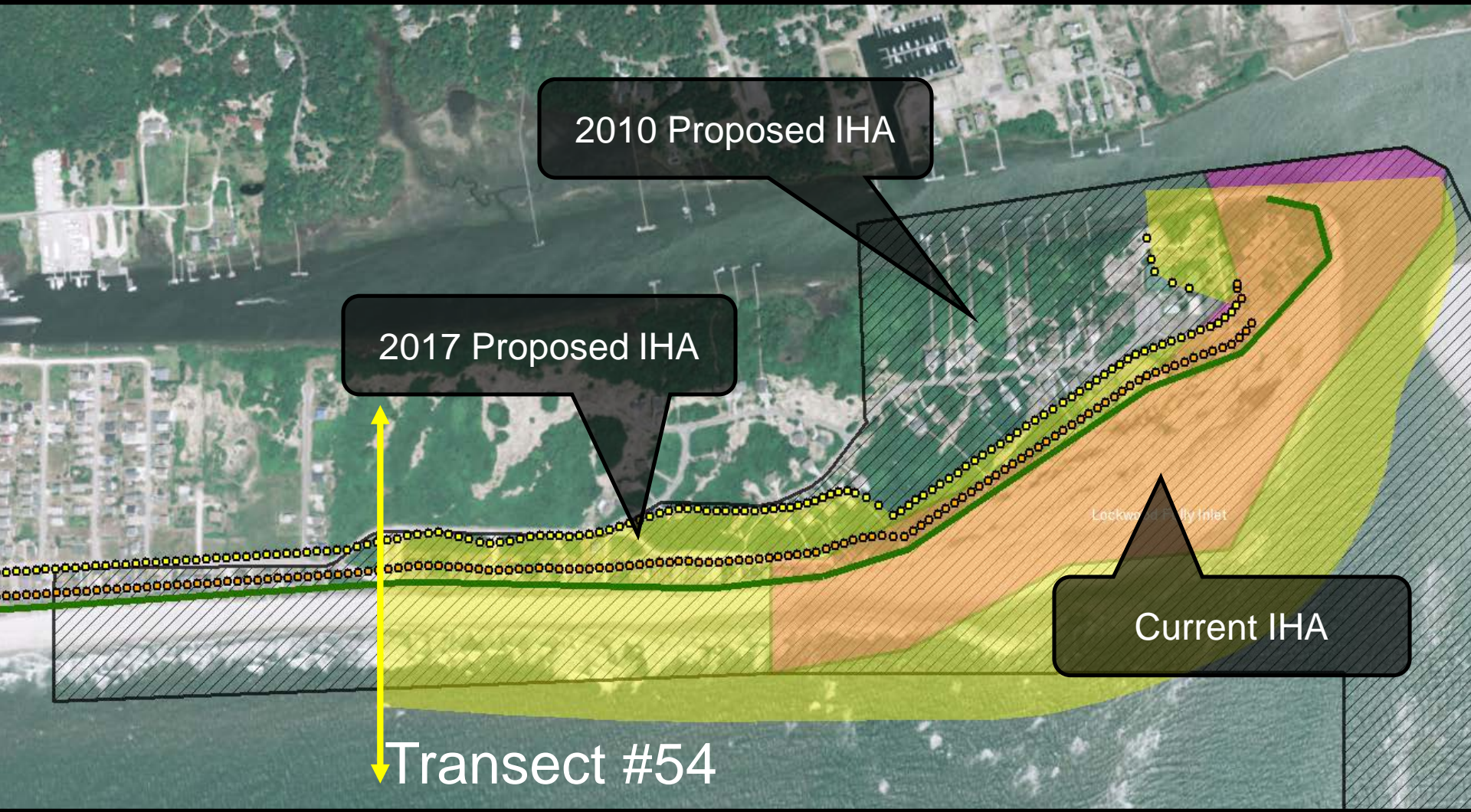
30-Year Risk Line

Hybrid-Vegetation

Transect #54



Inlet Studies: What Next?



An aerial photograph of a coastal residential area. In the foreground, there's a large body of water, possibly a pond or a bayou, with several houses built on stilts or elevated foundations. The houses are mostly multi-story, with various colors like blue, white, and grey. Some houses have porches and balconies. The background shows more houses and a road. The overall scene is a mix of natural water and built-up residential space.

Questions

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