

An aerial photograph of a coastal area, likely Frying Pan Shoals, showing a sandy beach, buildings, and the ocean. The image is dark and serves as a background for the text.

*[Almost]* **40 Years of Shifting Shoals:**  
*Trends in Coastal Change at Frying Pan Shoals*

Joe Long, Alex Chinigo



COASTAL ENGINEERING



500 m

0000 ft

How has the visible part of FPS changed in the last 40 years?

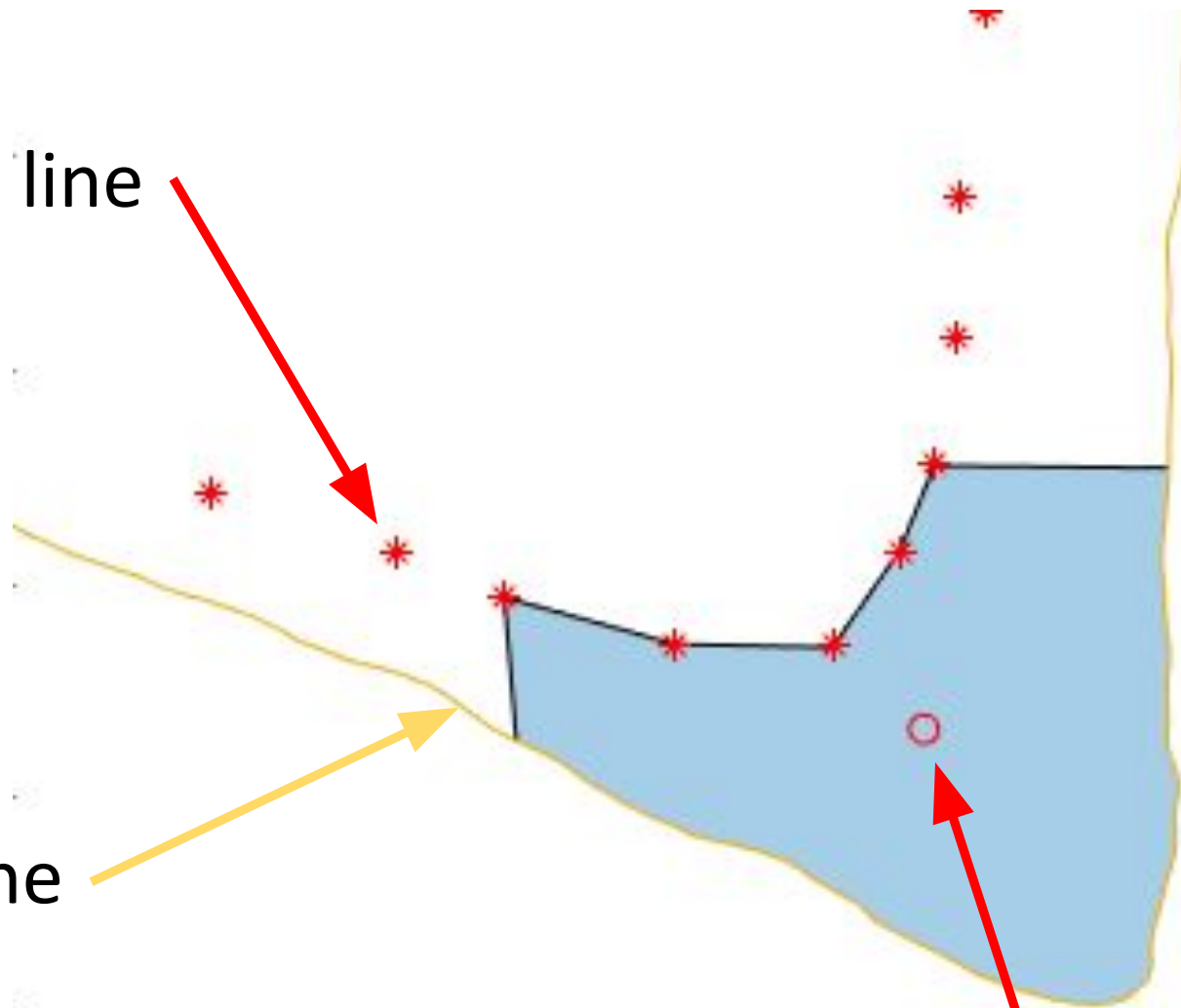


Does that suggest what it will look like 40 years from now?

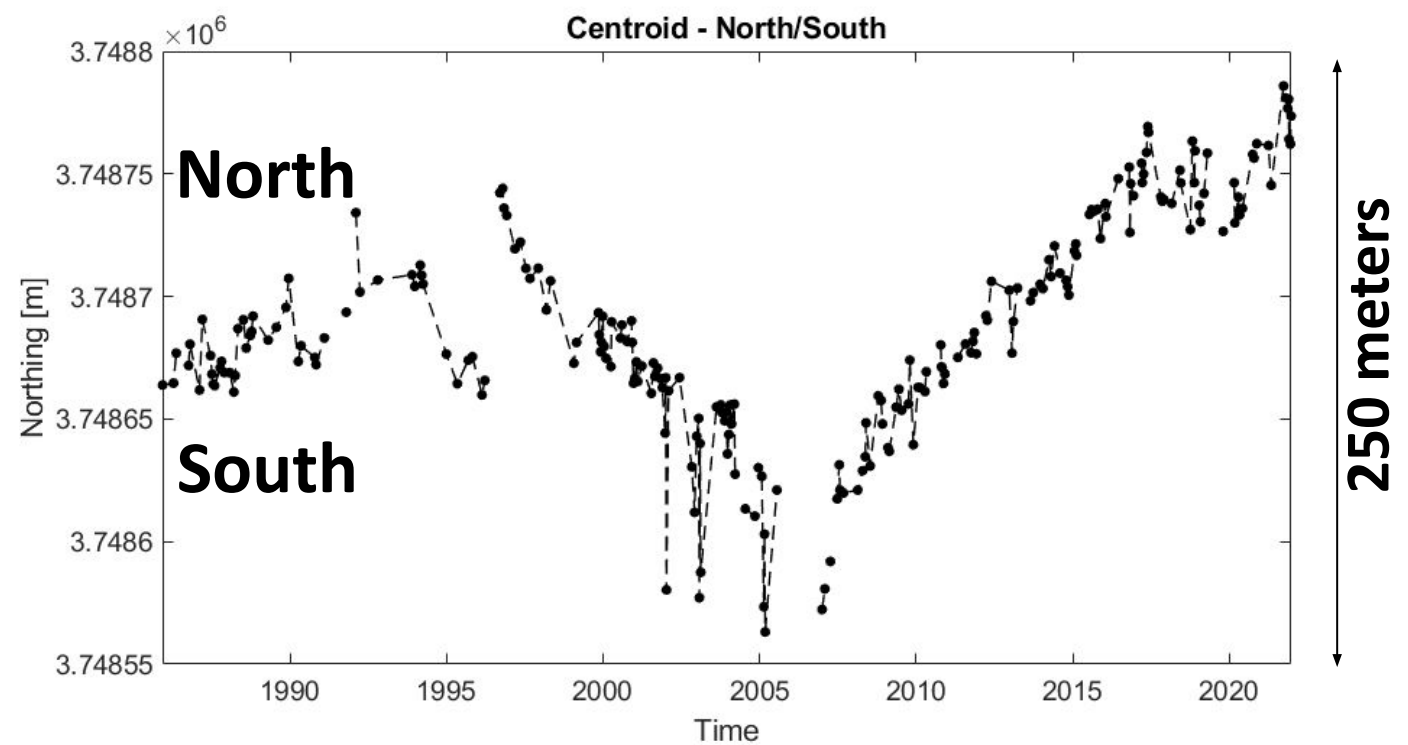
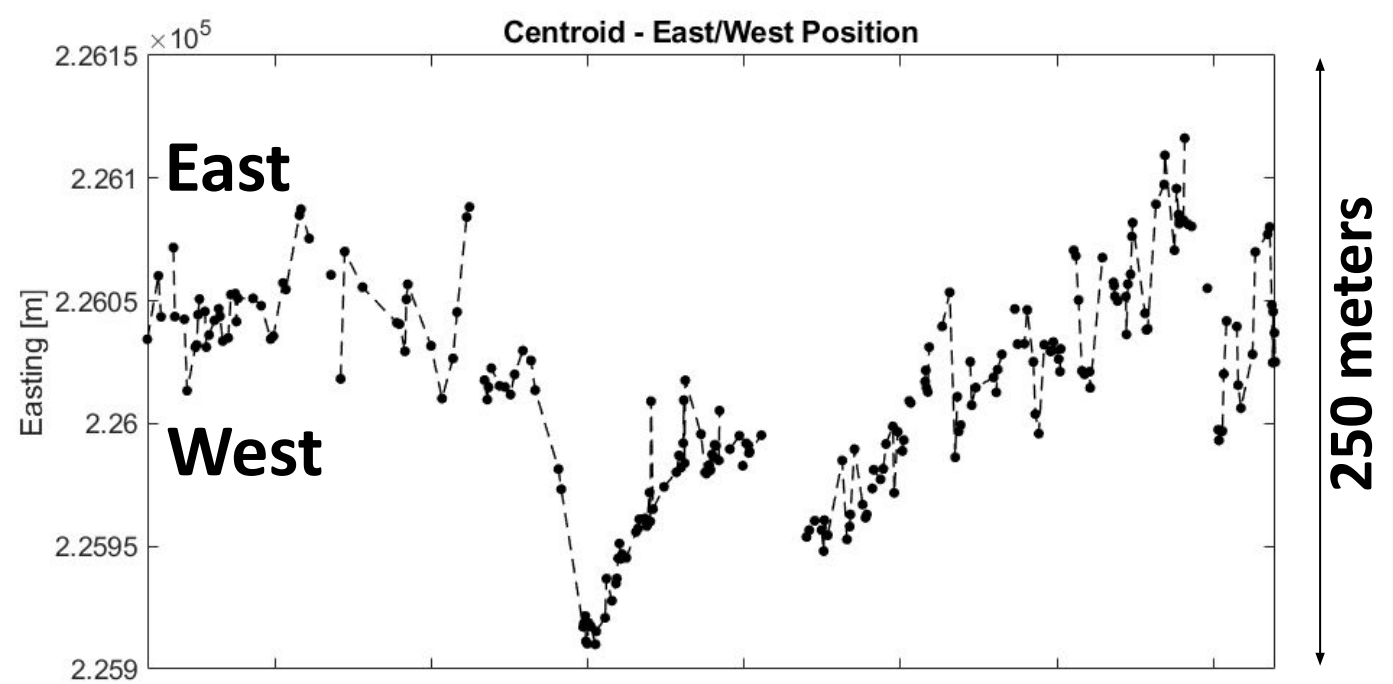
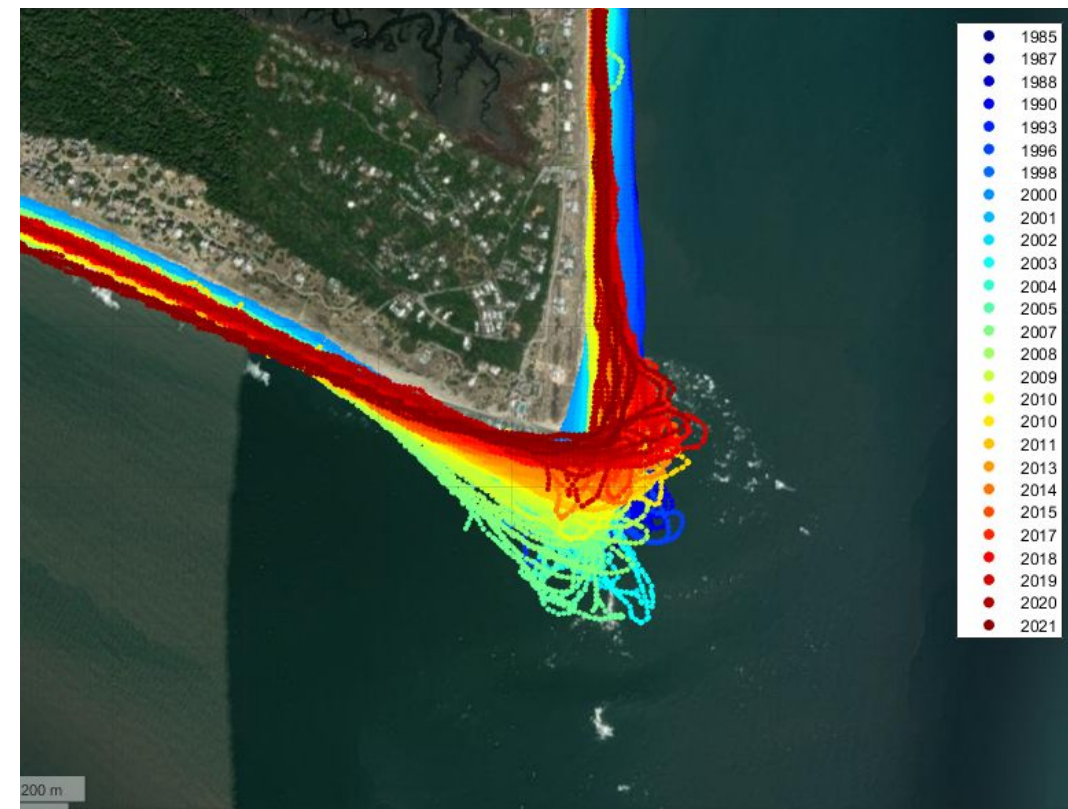


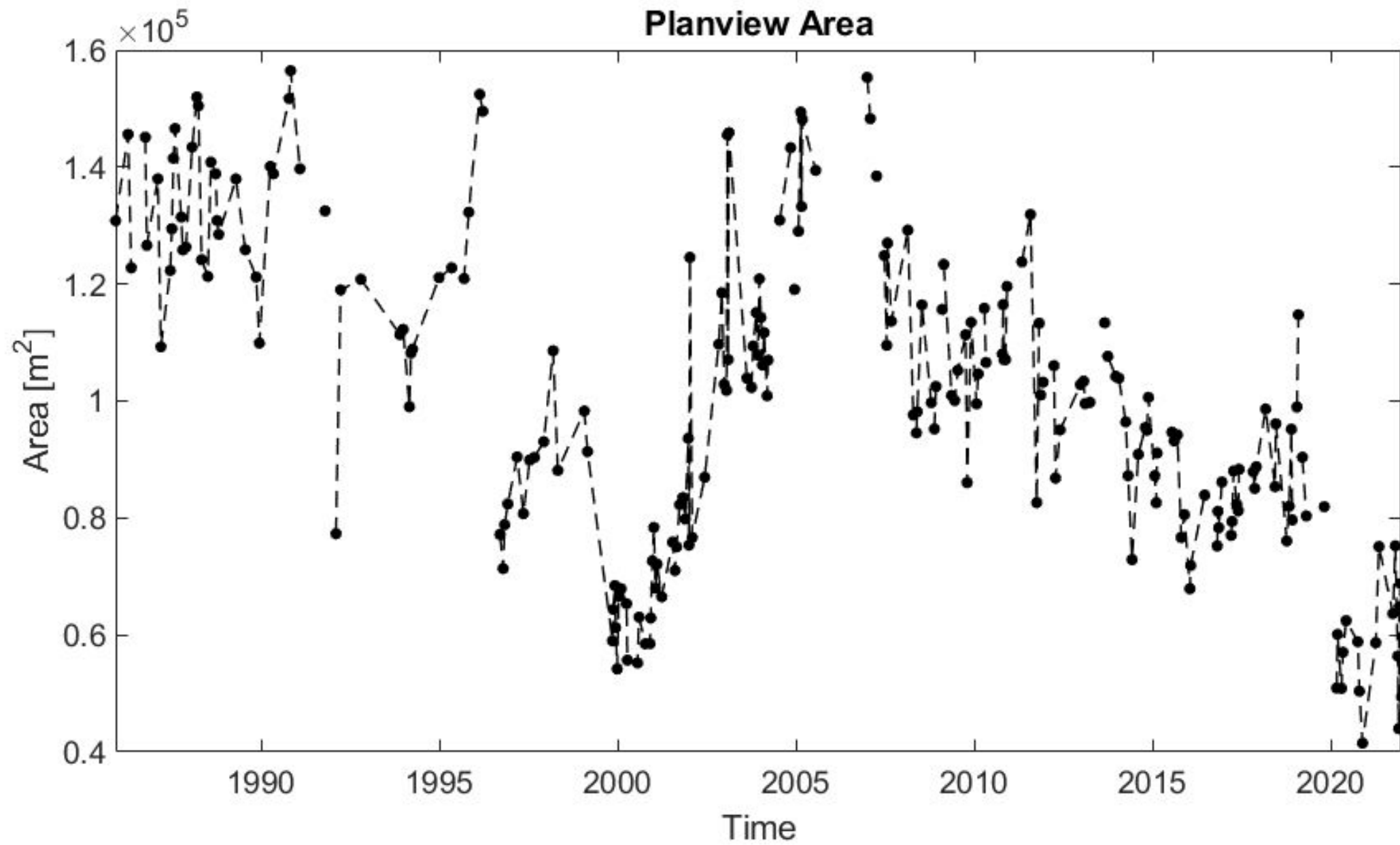
Static vegetation line

Dynamic shoreline



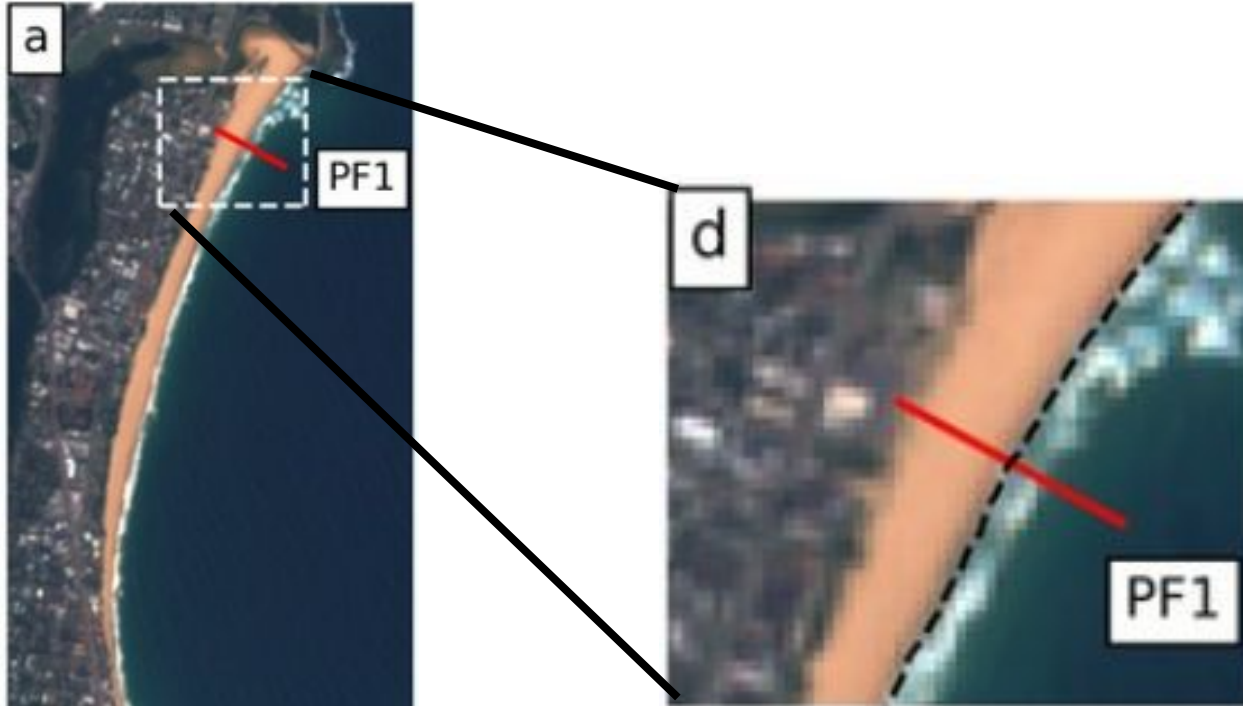
Centroid





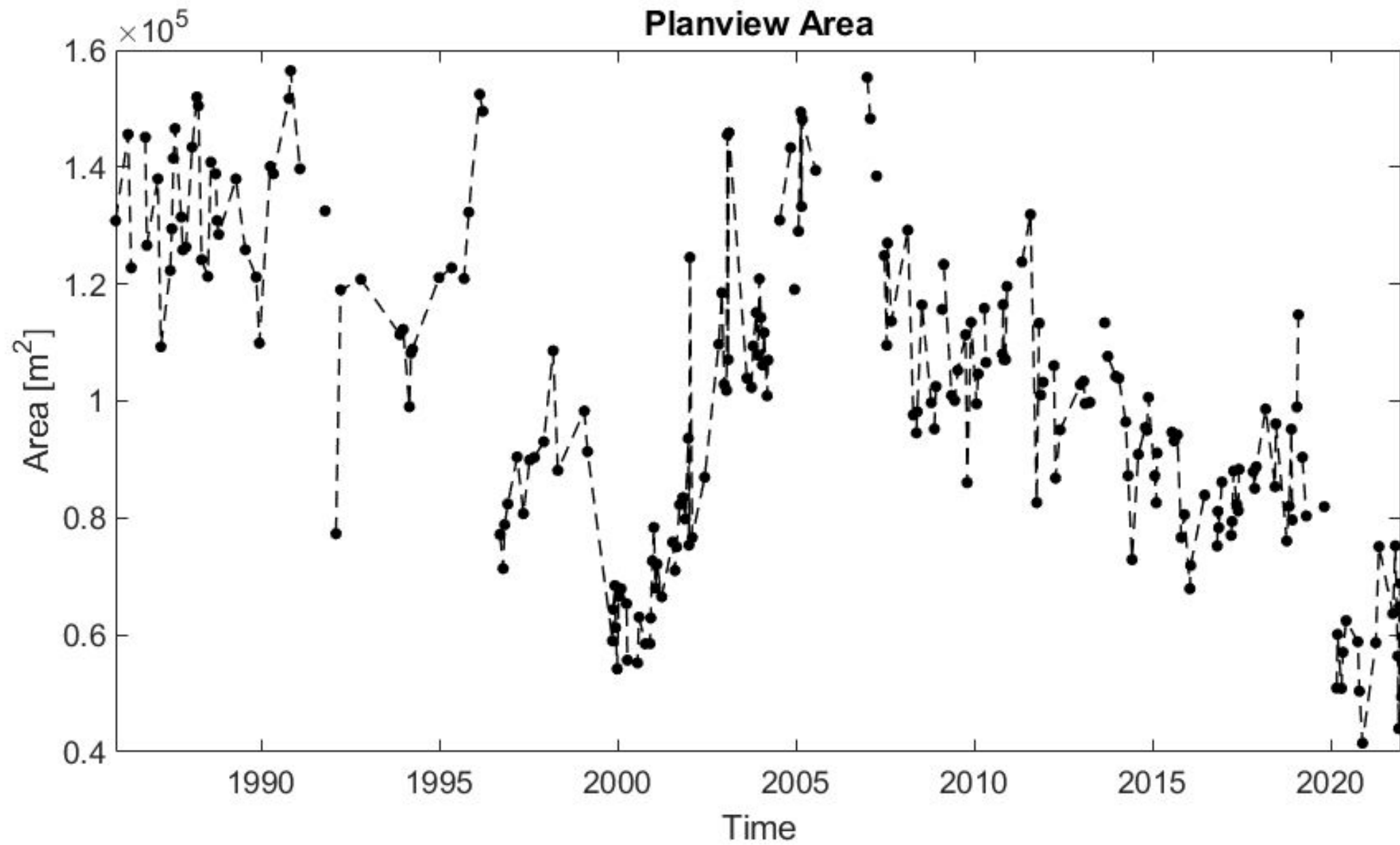
# Signal or Noise: What can we believe?

Compare the amount of relevant signal to the amount of irrelevant signal

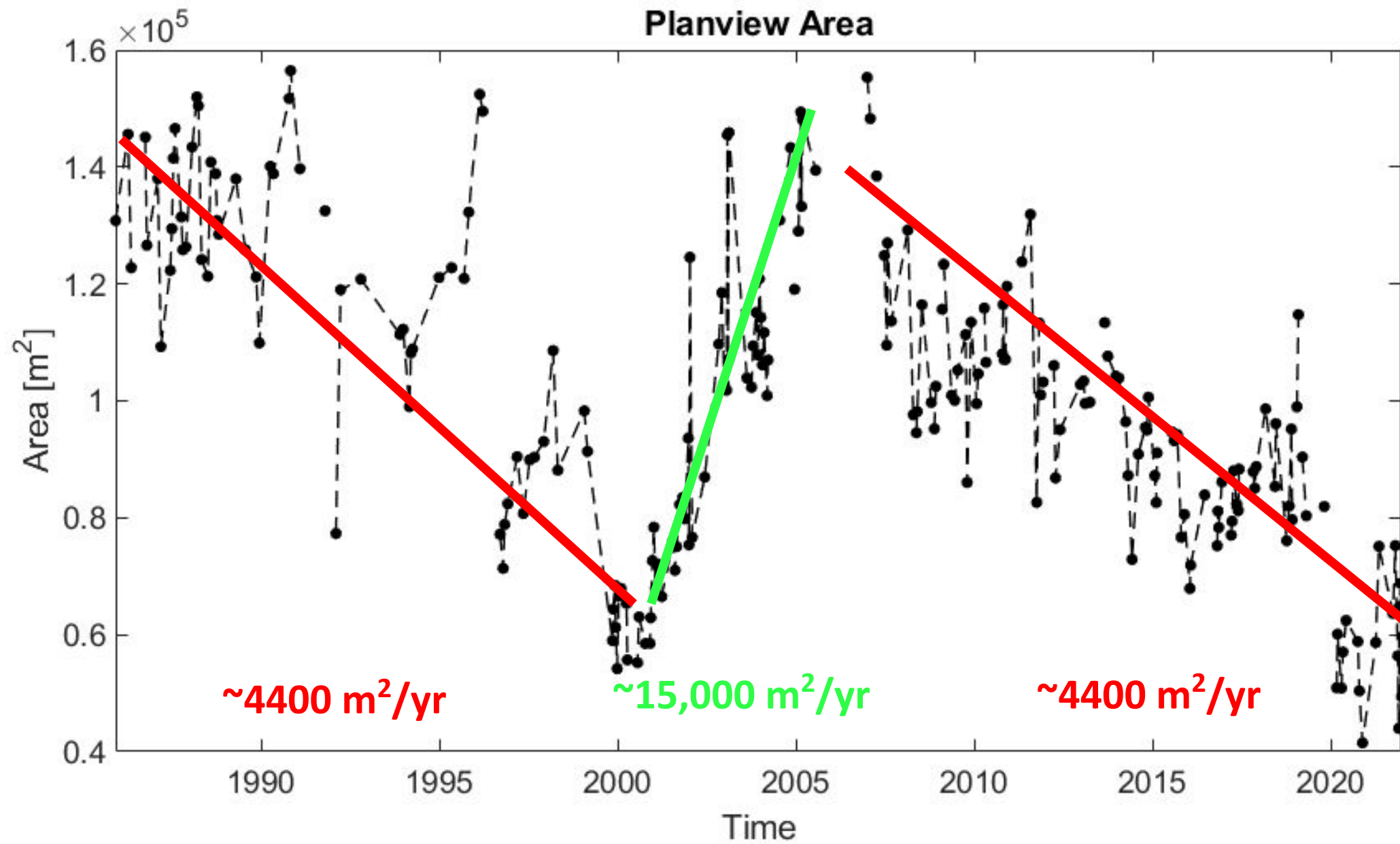


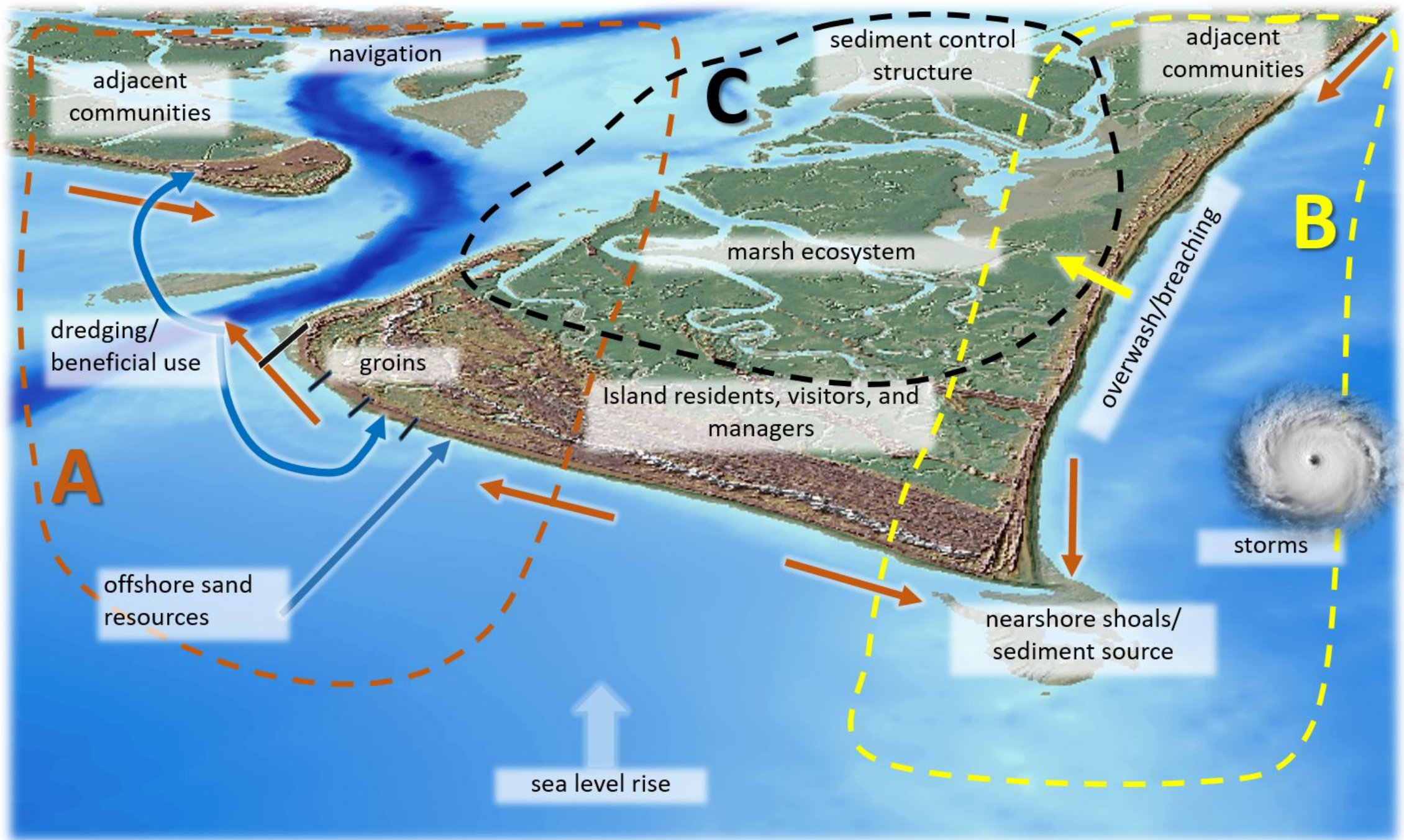
*Vos et al., 2019*

- Images have 30-meter resolution
- Identify year-to-year variations, not day-to-day

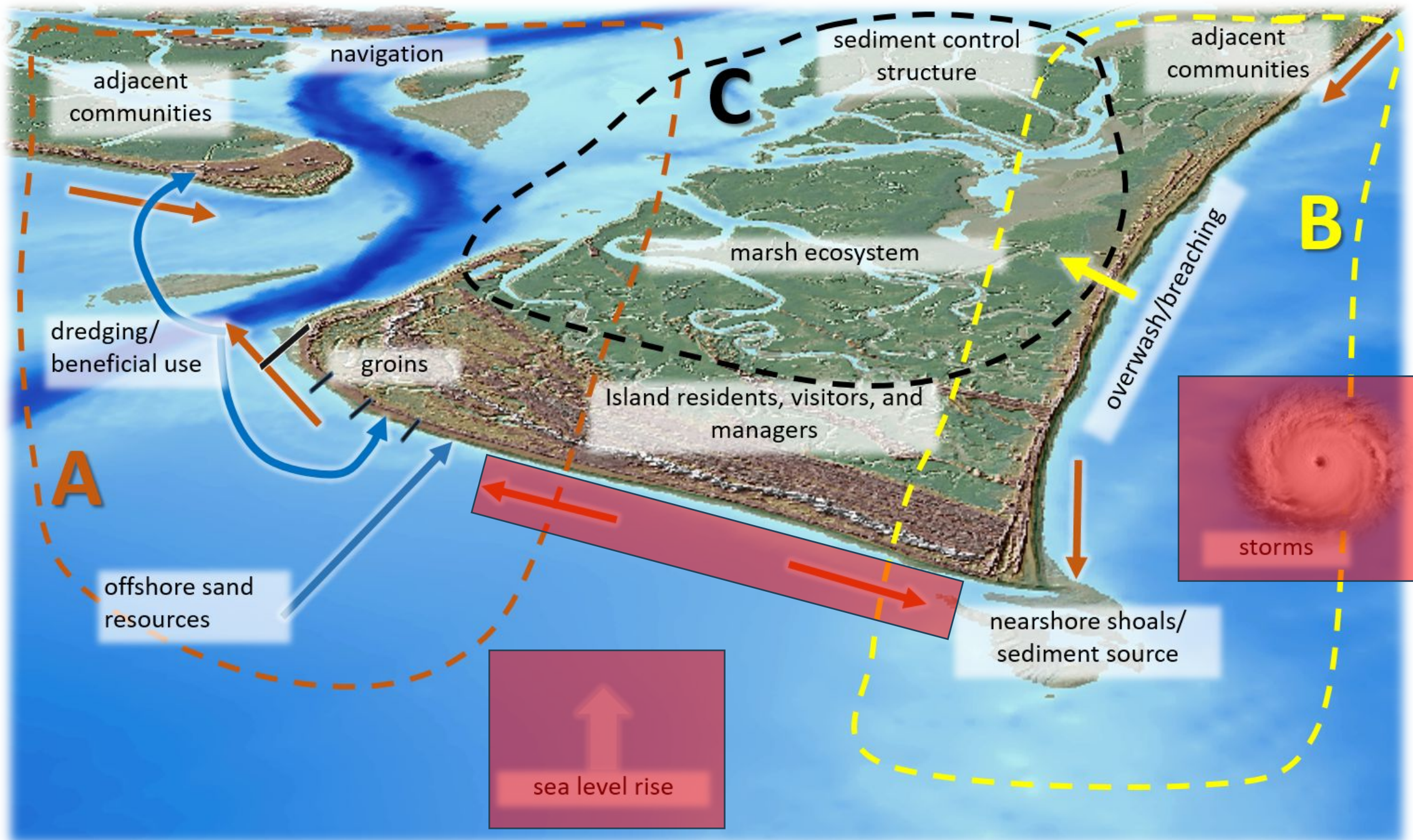




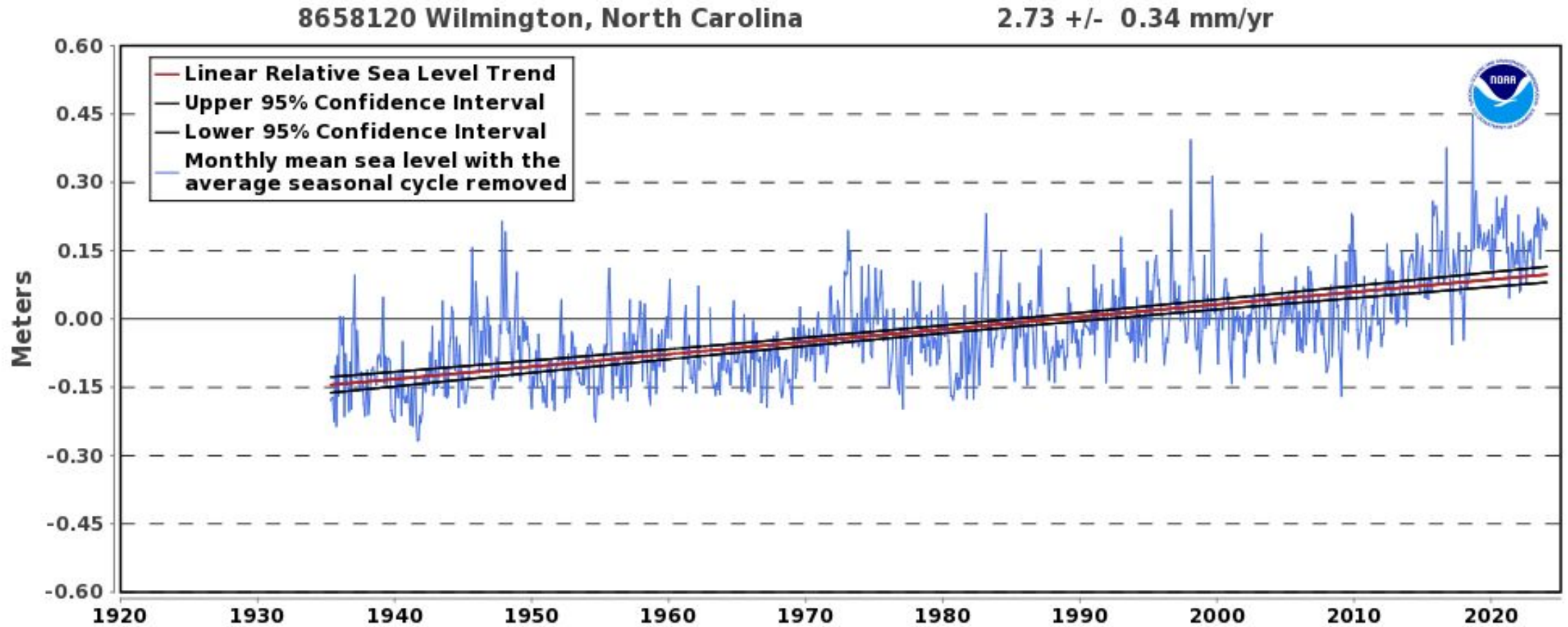






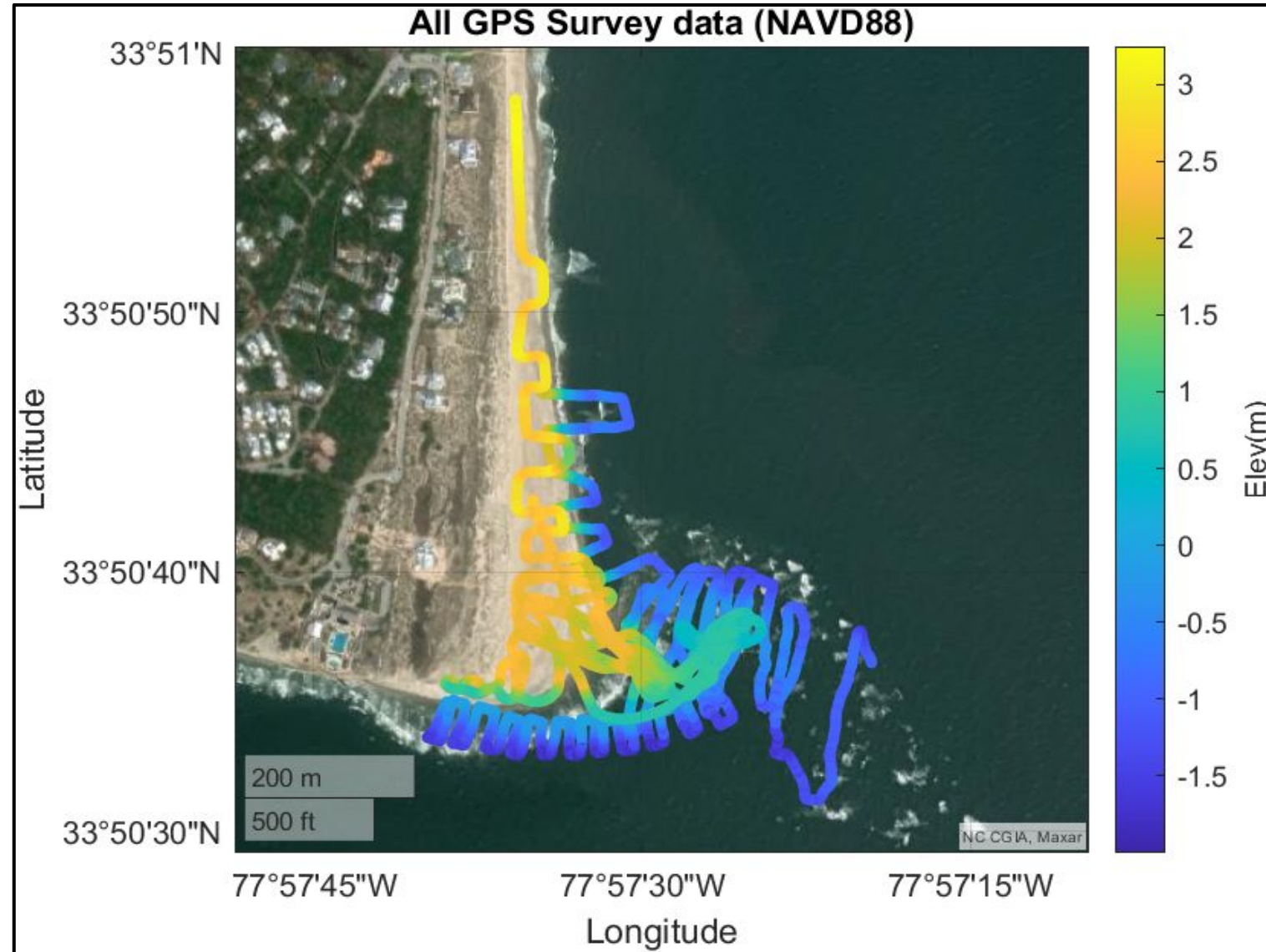


# Sea Level Rise?



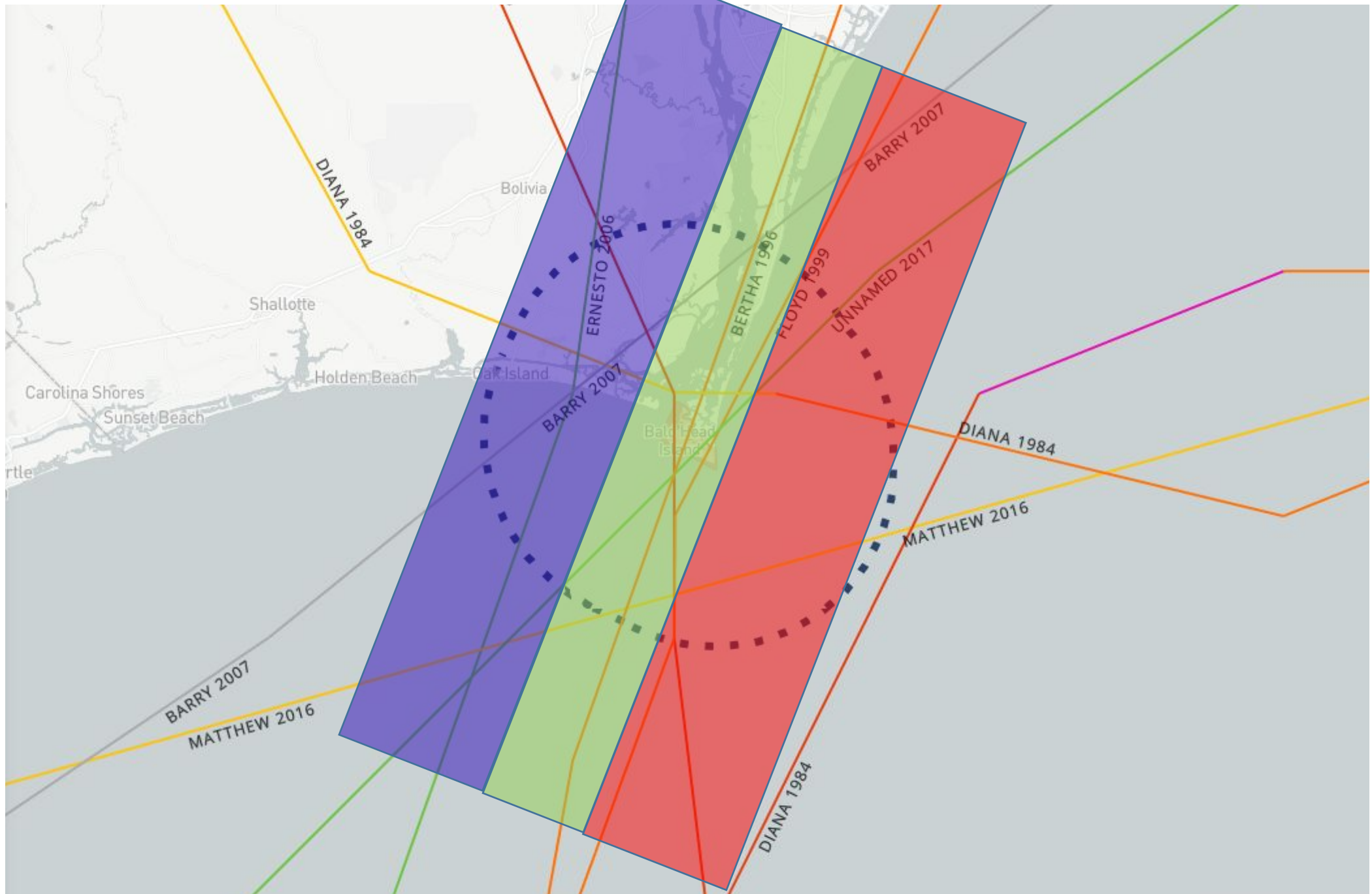


- Survey data collected in April 2023
- In a bathtub approach, SLR explains 7% of the decreased area

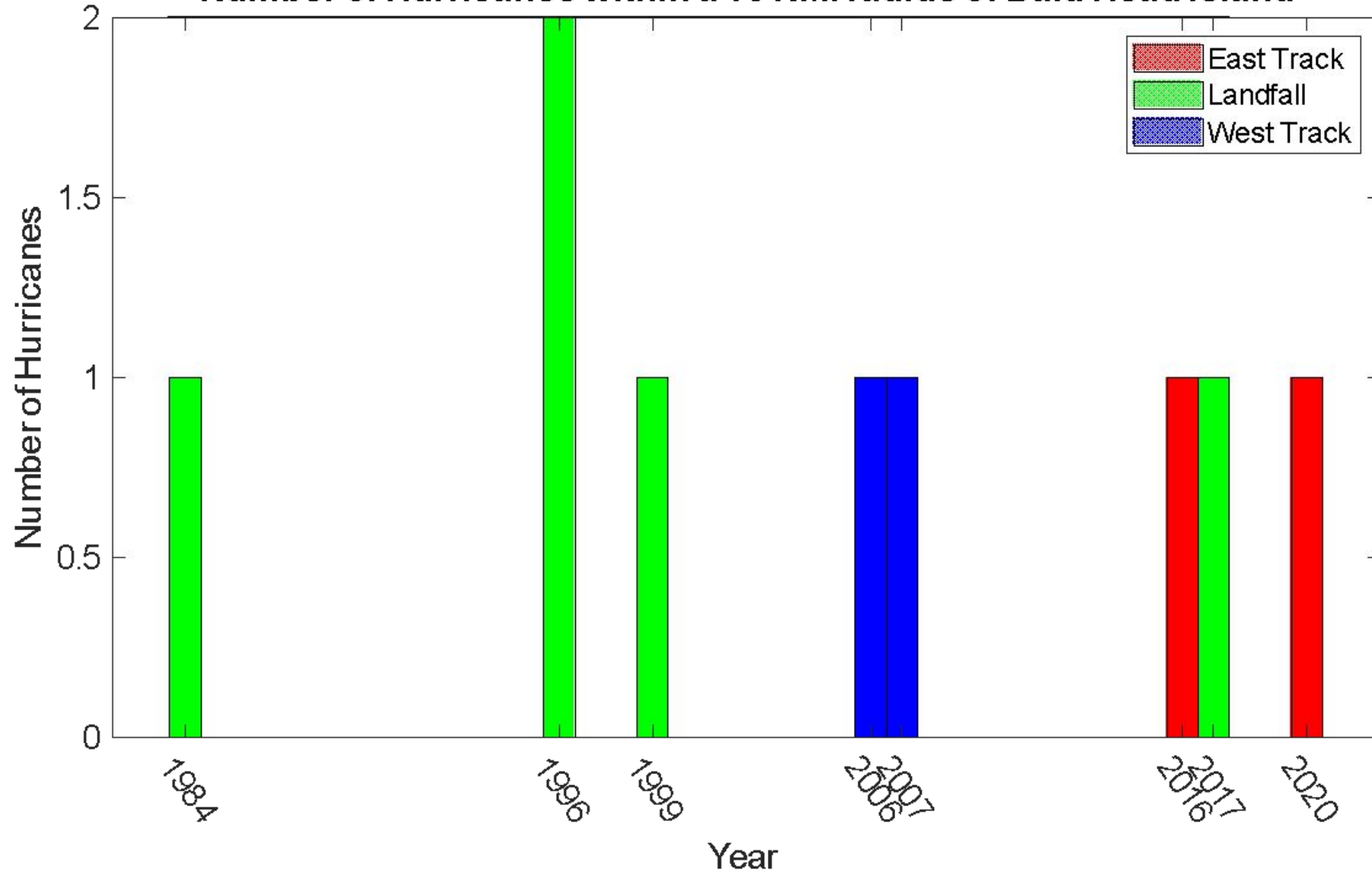






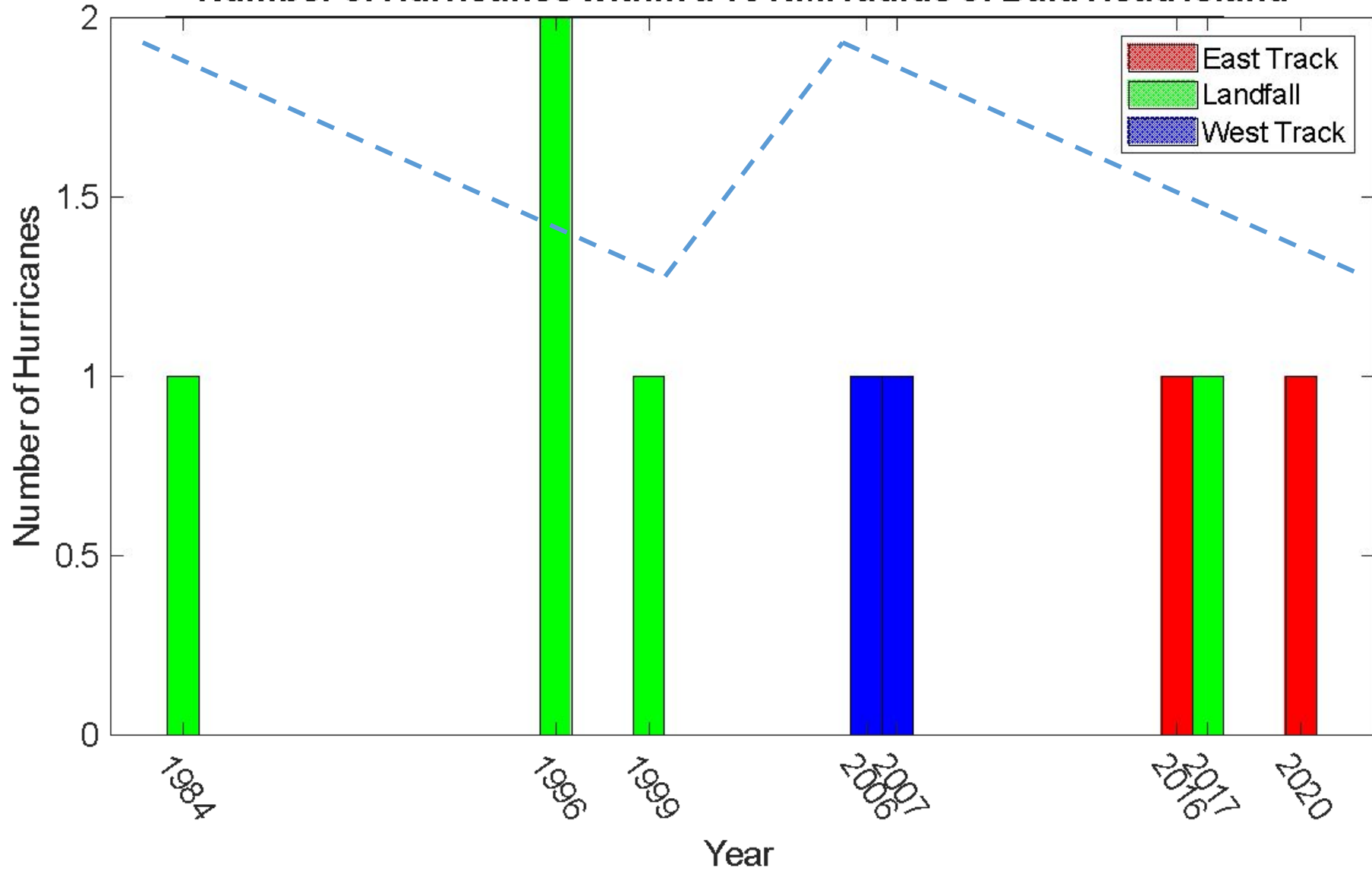


**Number of Hurricanes within a 10 NMI radius of Bald Head Island**

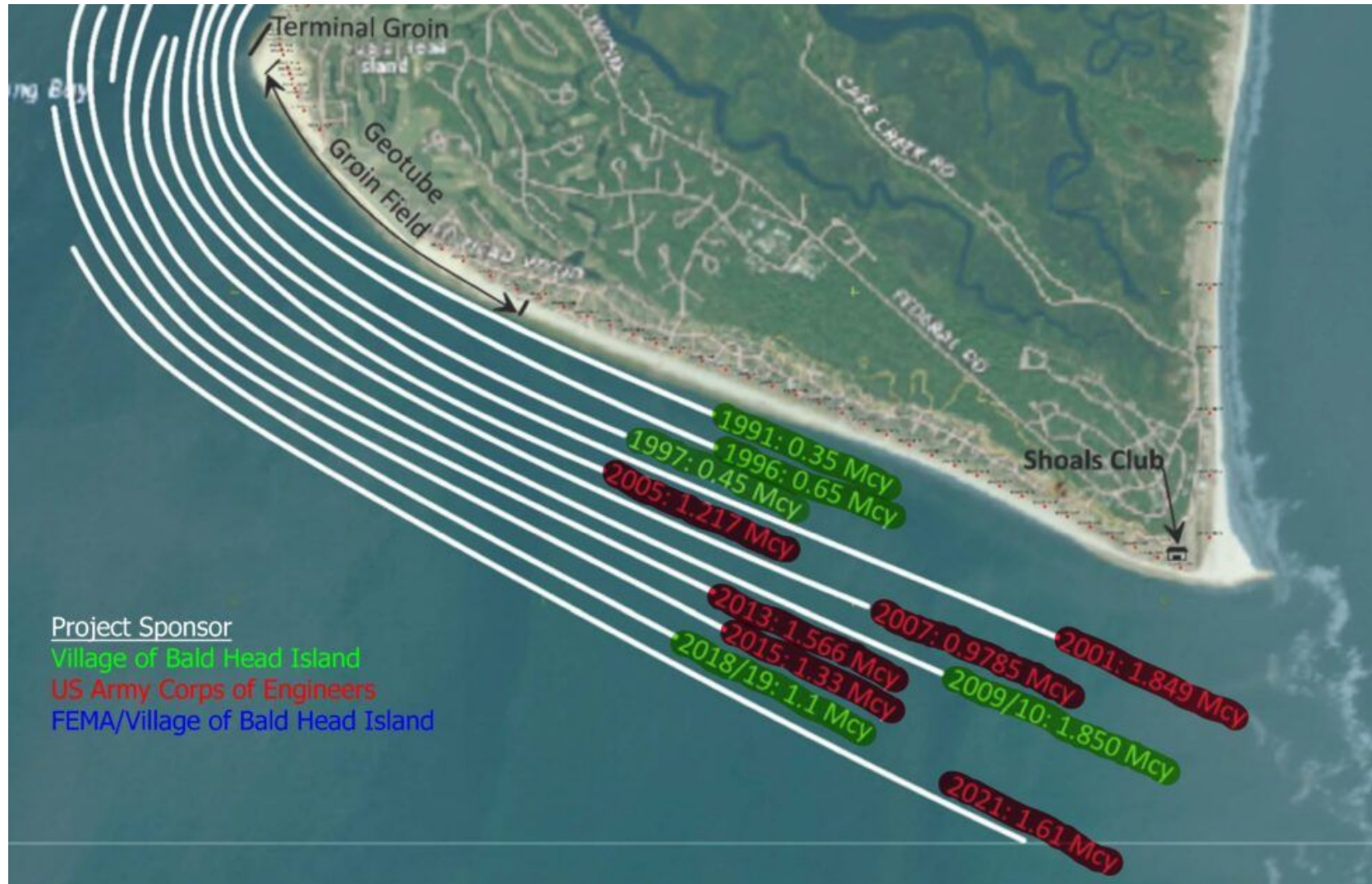




Number of Hurricanes within a 10 NMI radius of Bald Head Island



# Sand Placement?





# Sand Placement?





BALD HEAD ISLAND

"The Point"  
(North of  
Terminal Groin)

"The Point"  
(South of  
Terminal Groin)

SOUTH BEACH

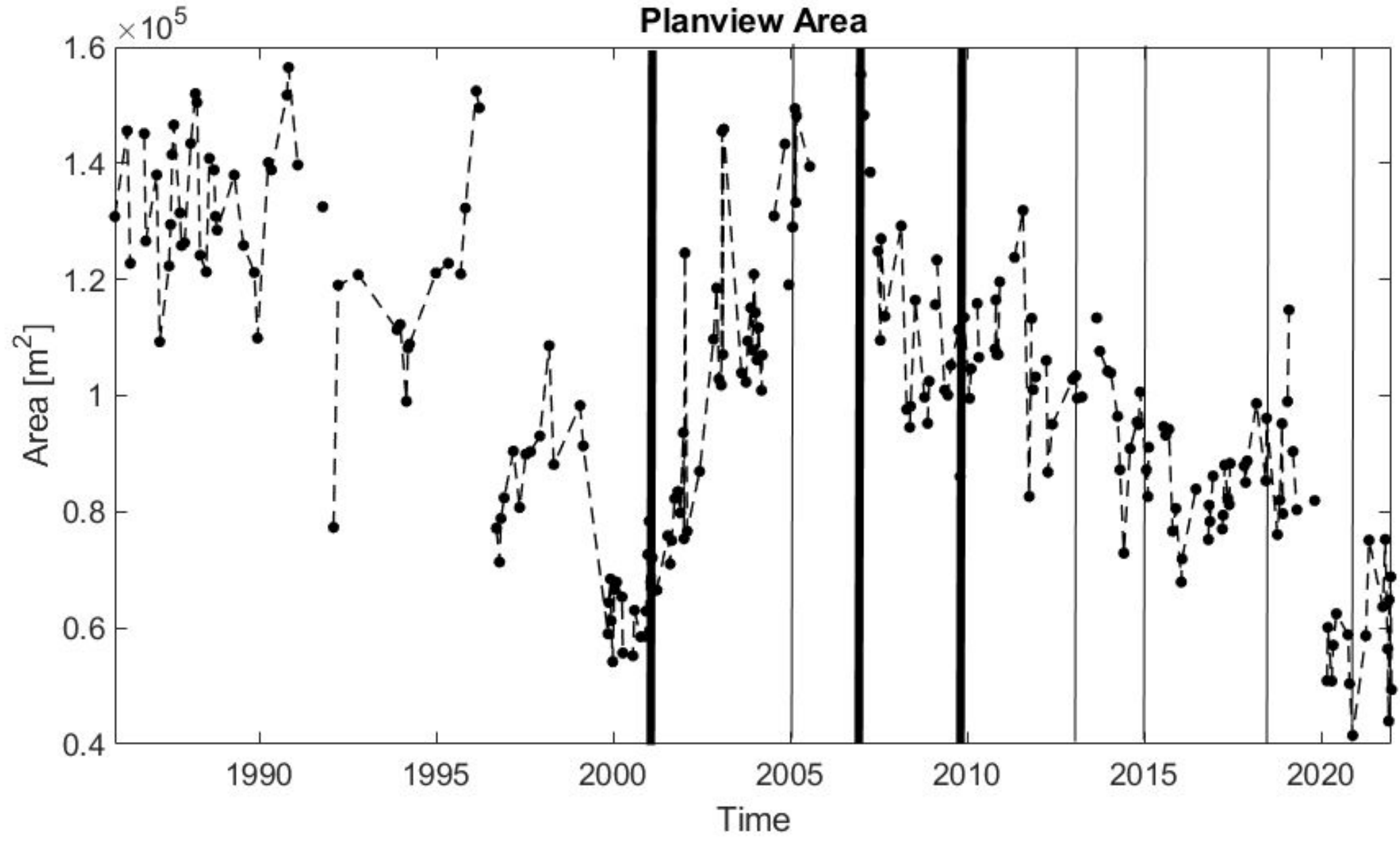
EAST BEACH

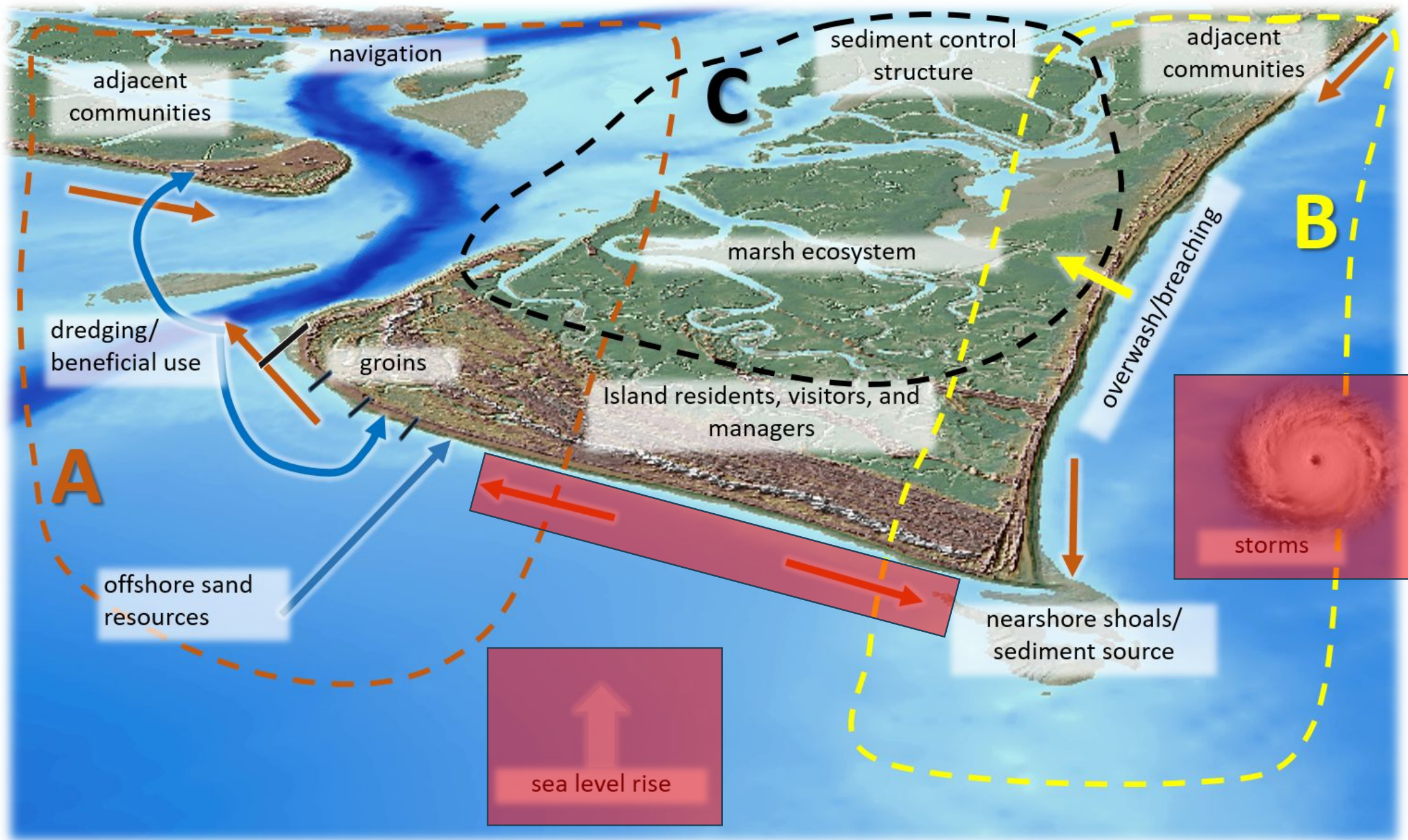
CAPE FEAR

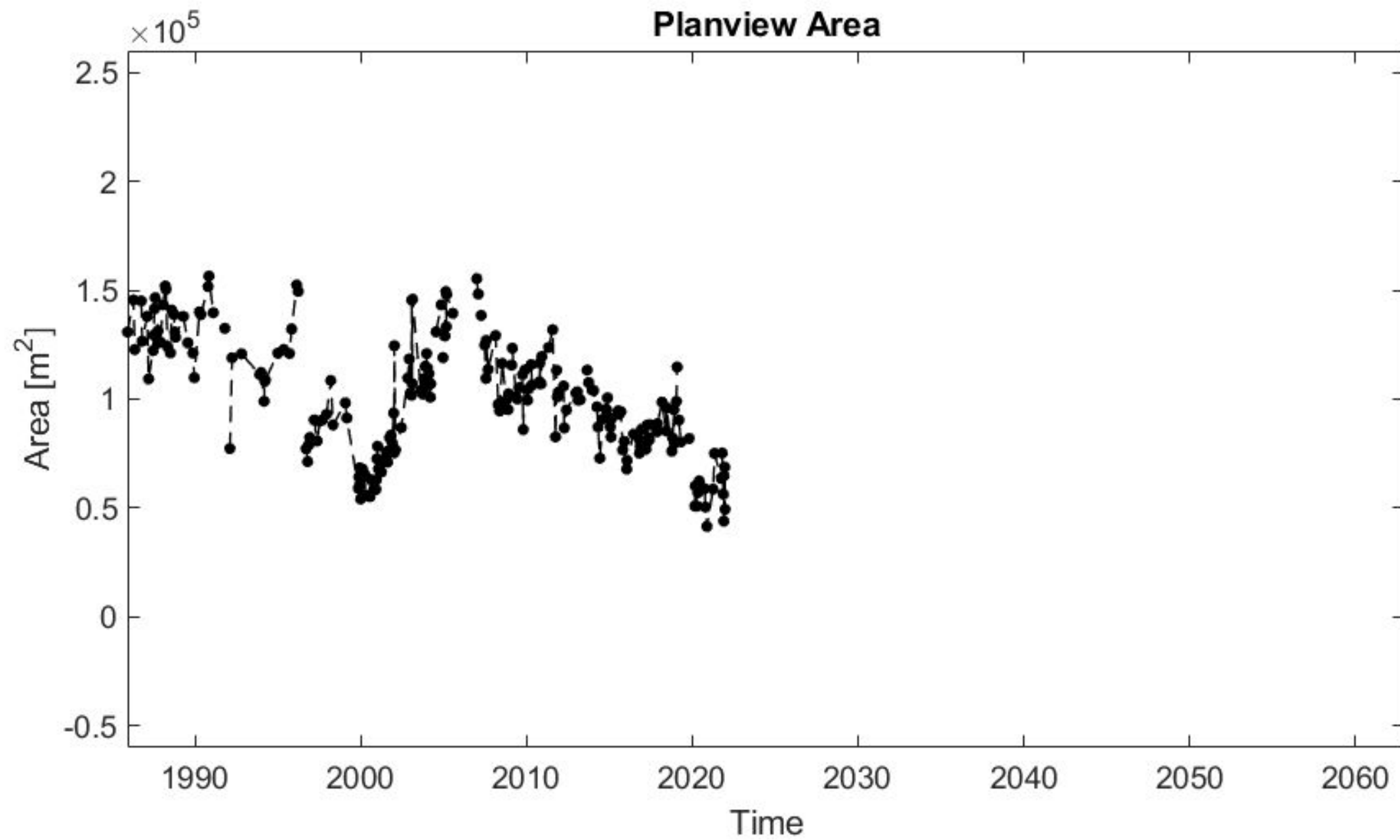
SCALE



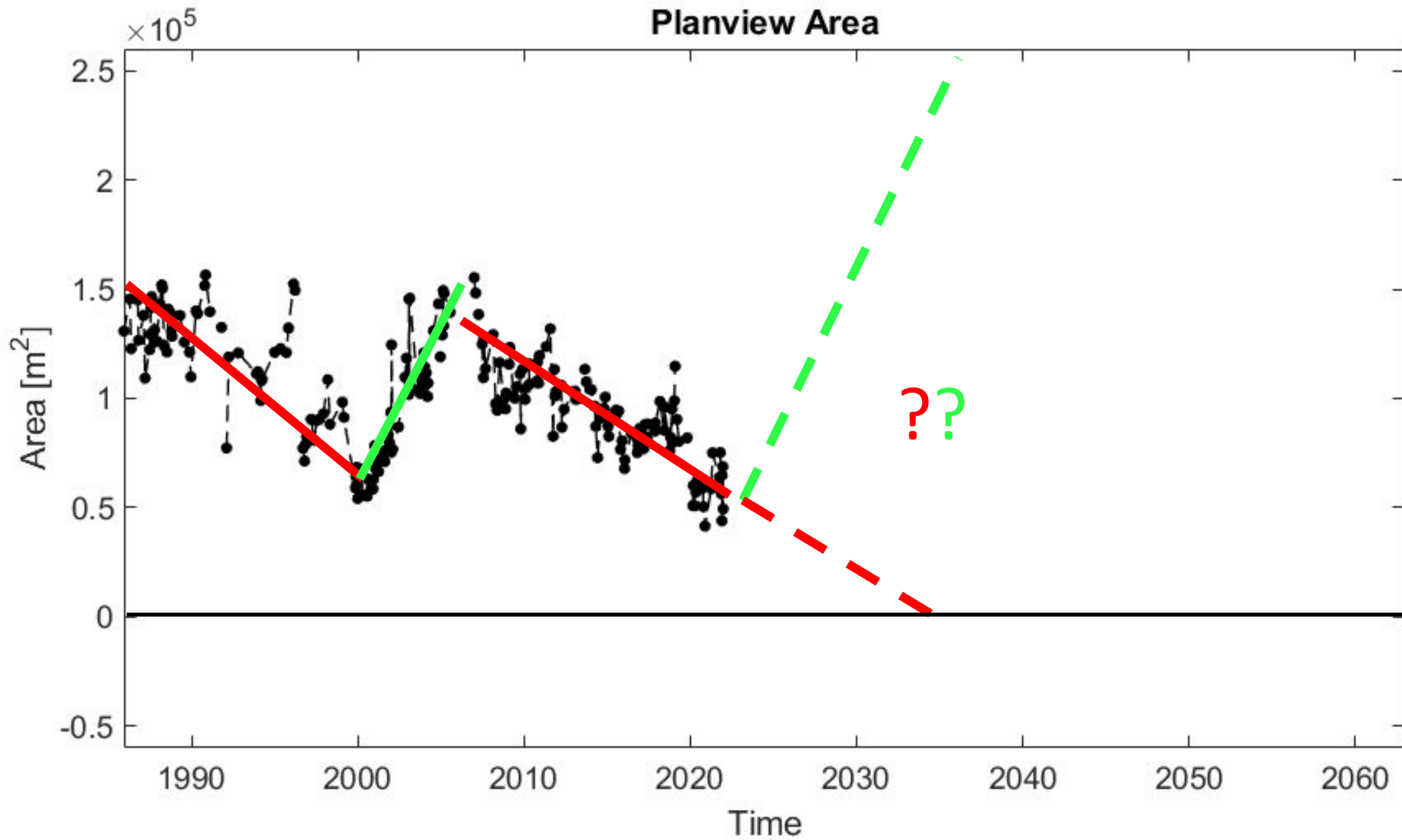
Vertical lines are sand placements  $\sim 1$  mcy or greater  
Bold lines are nourishments extending closest to FPS












The future!



Gessner, David

To  Long, Joseph W.



Wed 4/6/2022 8:26 AM

Dear Joe,

It was great spending time with you these last couple days. Hope to see you back at UNCW.

Here is my attempt to explain the “42” years from now (actually now 41) thing a little better:

*What will the world be like in forty-two years?*

I'm still not sure.....