

What causes chronic shoreline erosion?



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**It is not storms
alone...**

August 2012



After Sandy:
November 2012



**If sea level wasn't rising, the
beach would rebuild naturally.**

North View

It is not storms alone...

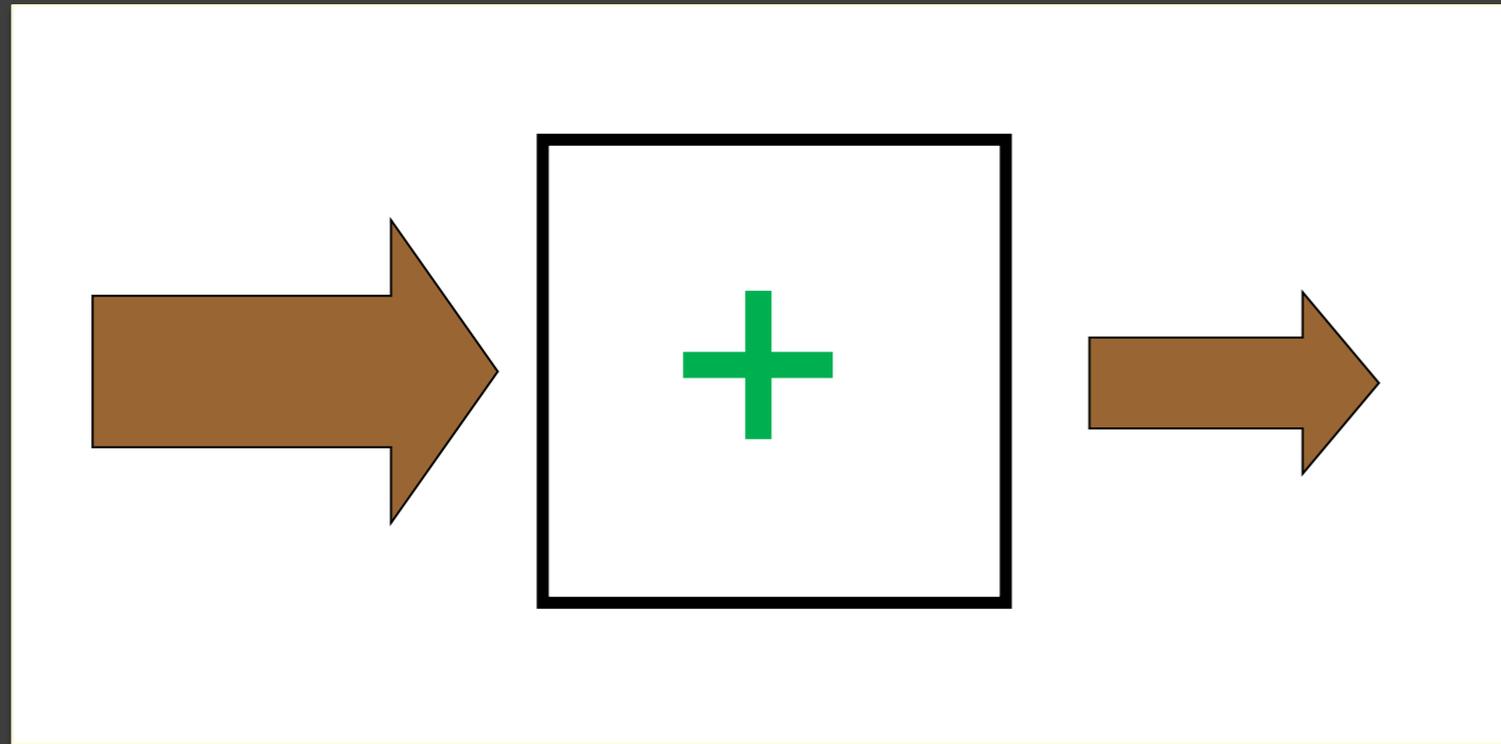


Near the Pony Preserve at
Tom's Cove after Sandy

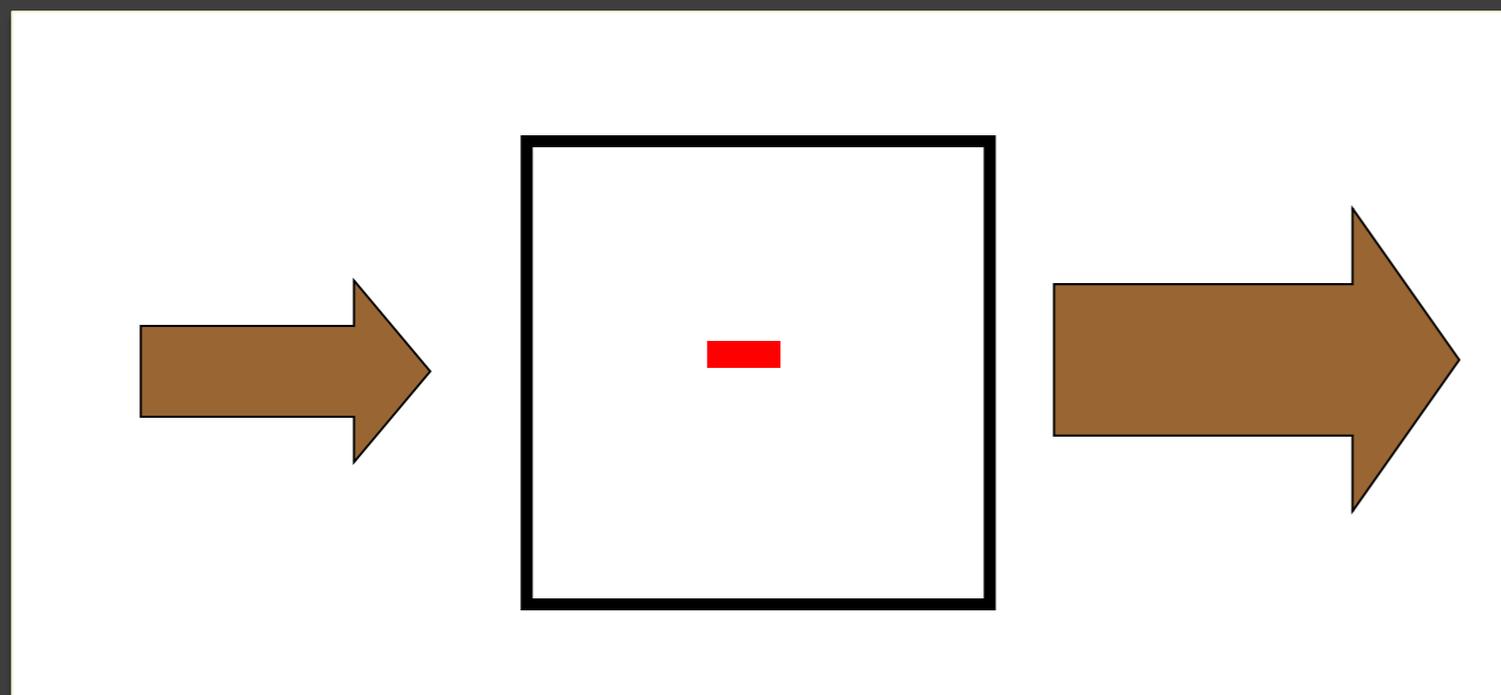
Photo: Chincoteague
Emergency Operations
Center

Of course, short-term impacts can be significant (even in absence of sea-level rise).

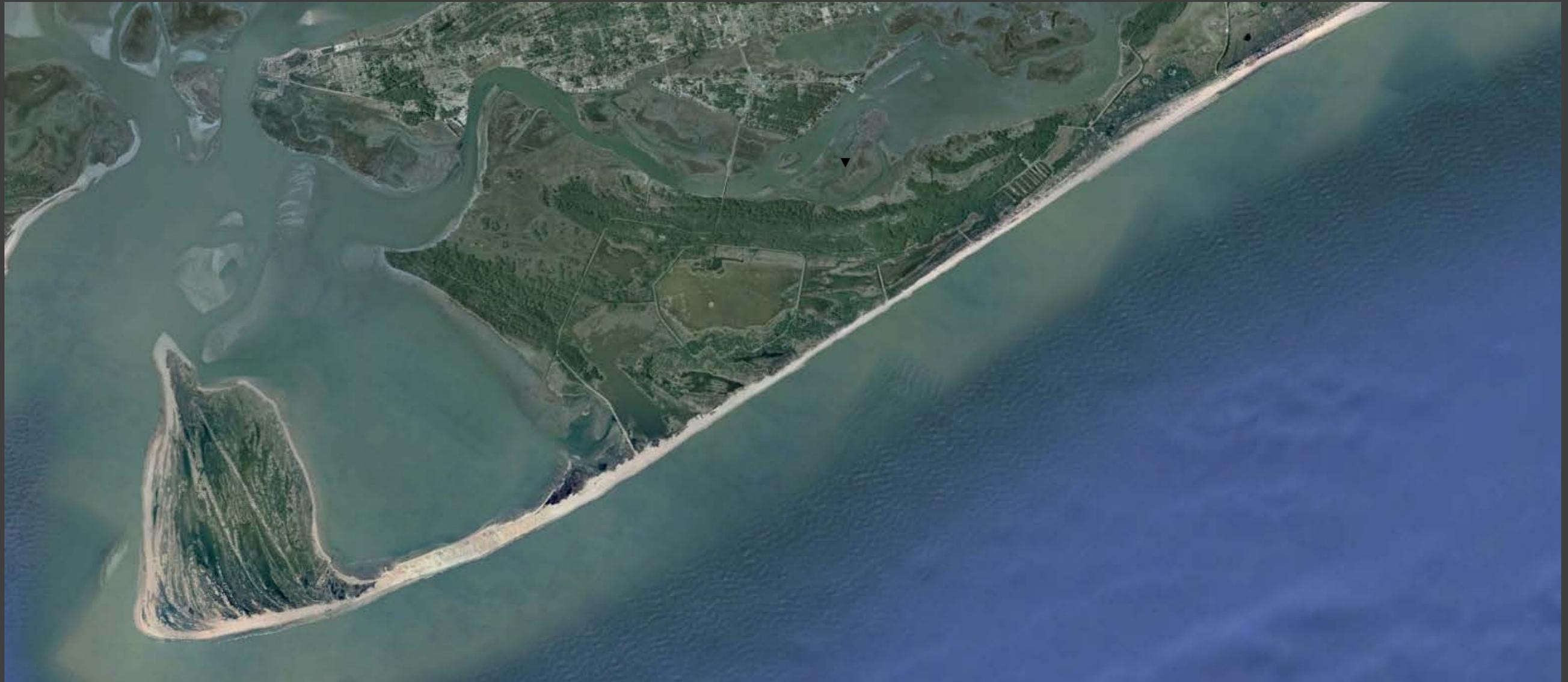
Shoreline change determined by a balance between losses and gains of sand



Positive
Balance =
Accretion



Negative
Balance =
Erosion



Factors that affect this balance....

1. Alongshore Supply and Loss



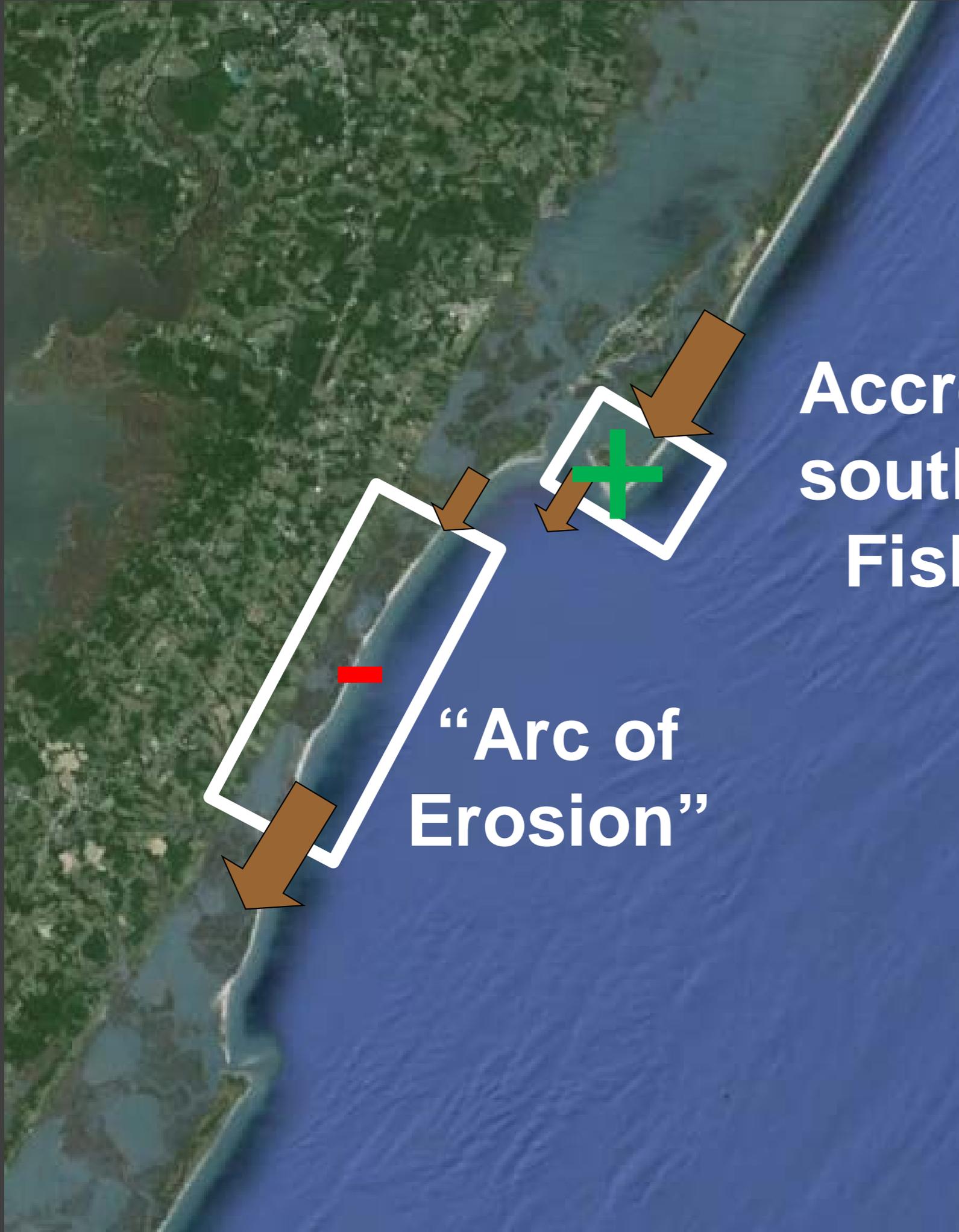
On this day....

Waves push water along shore creating **the alongshore current** which moves sand.



Along the Eastern
Shore...

Net alongshore
transport is to the
south.



Accretion at the southern end of Fishing Point

“Arc of Erosion”

Patterns of shoreline change arise from effects of coastline shape on transport.



Nor'easter wave crests

How much sand the alongshore current carries is determined, in part, by coastline shape.

Management efforts also affect the amount of sand transported.

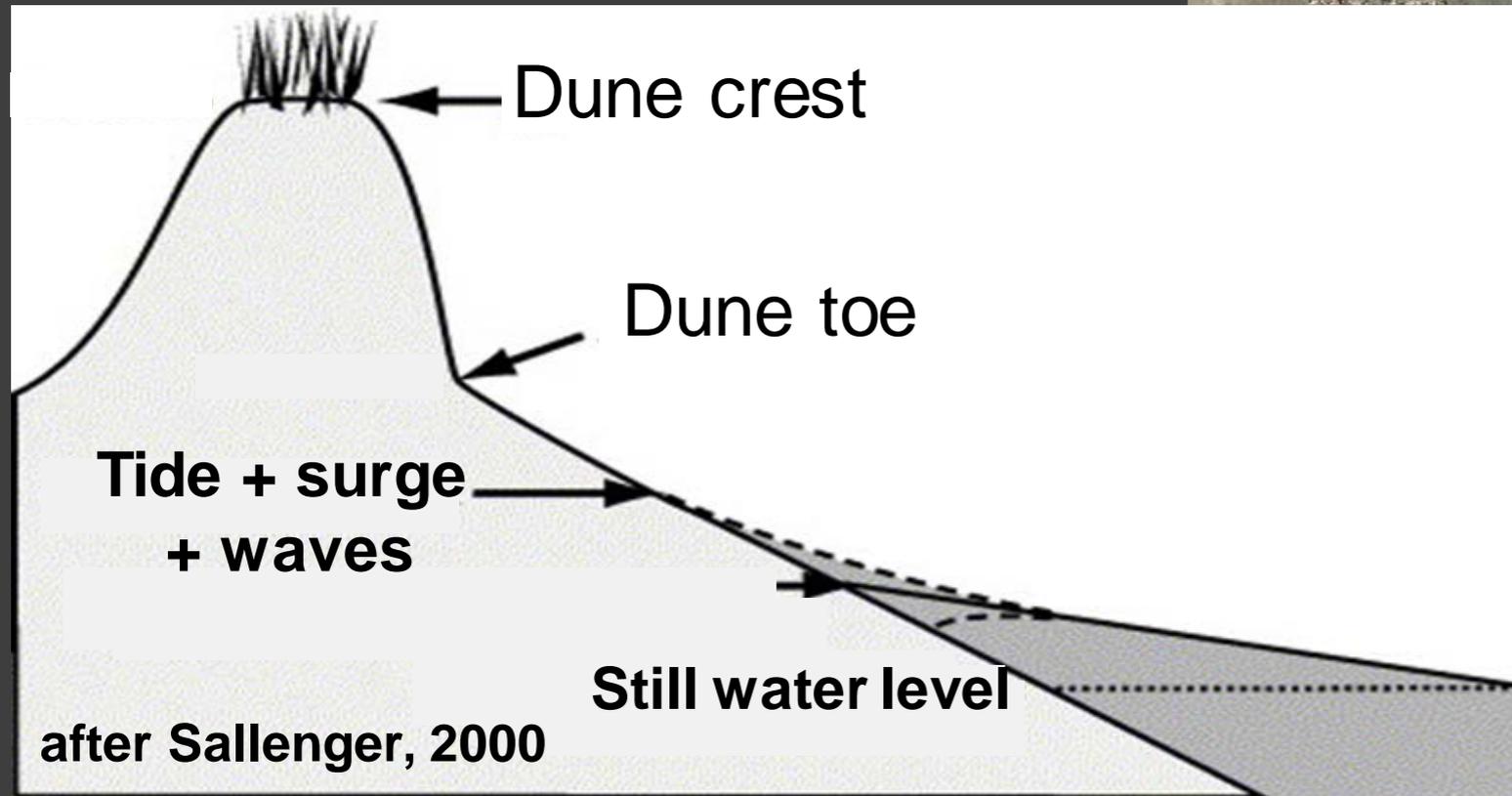


Management efforts also affect the amount of sand transported.



Beach nourishment
= potential **sand gain**

2. Cross-shore Supply and Loss



Storm waves washing over an island deposit sand on the backshore = **sand loss** from beach.



3. Regional Effects



Sand that builds a growing tidal delta comes from surrounding beaches → **sand loss**



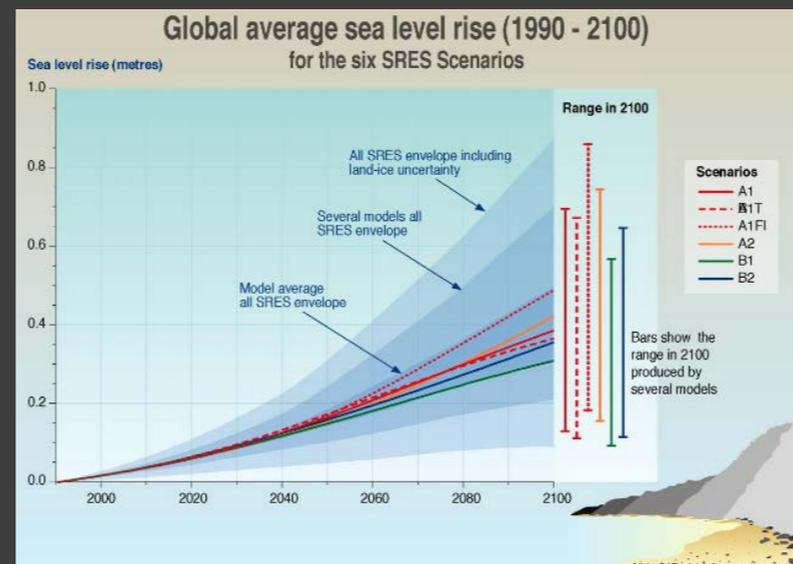
When an inlet closes and the tidal delta is eroded → sand gain

The Effects of Climate Change on Shoreline Erosion

- Storms + SLR → incr. frequency of overwash → incr. loss of sand from beach → incr. erosion



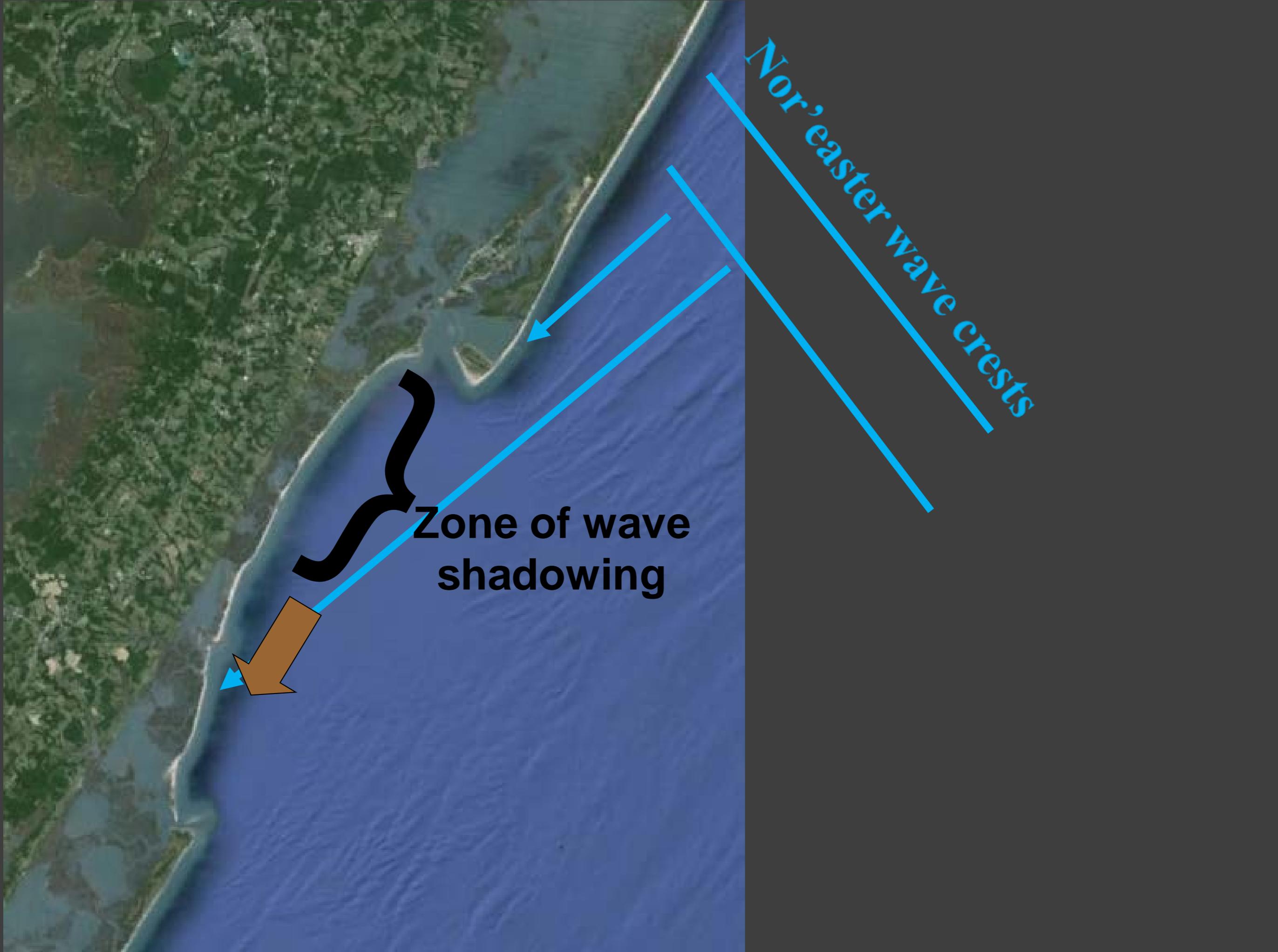
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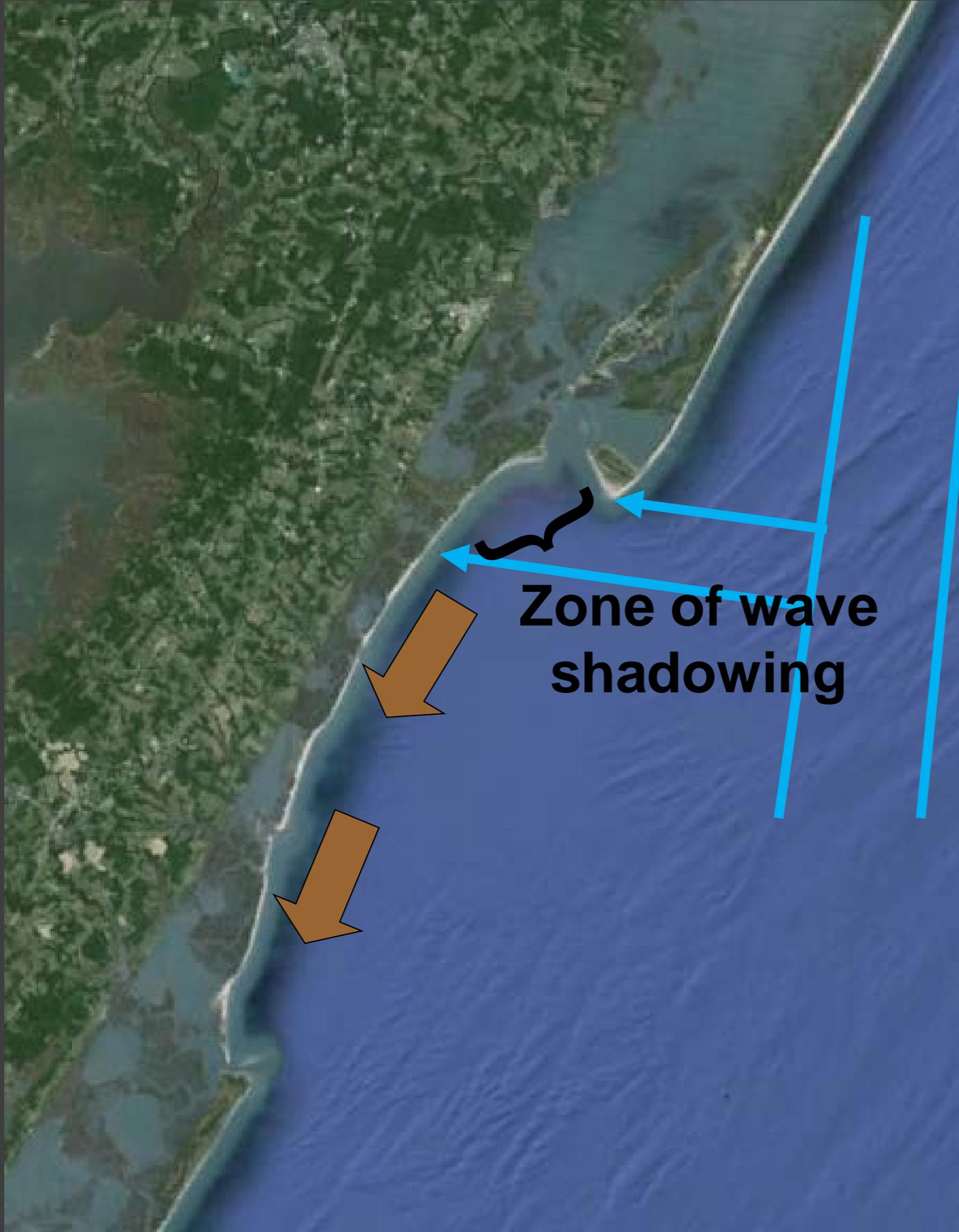


- Changes in storm activity → changes the mix of wave directions over time → alters patterns of shoreline erosion



Zone of wave shadowing

Nor'easter wave crests



New dominant wave direction?

Zone of wave shadowing

For example...changes in storm activity may affect wave shadow zone.

Barriers need to migrate to keep pace with sea level rise. Stabilization efforts prevent this....



