

Some Social and Policy Implications of Shore Erosion

James G. Titus
U.S. Environmental Protection Agency

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- a. Da-Wu
- b. Dutch drainage canal and windmill
- c. Noah's Ark
- d. Roman ruins

Early commentary on coastal construction

“... shall be likened unto a foolish man man, which built his house upon the sand.” --- Mathew 7:26.

Outline

- Three response pathways (CCSP report)
- Business-as-usual expectations
- Institutional barriers (CCSP report)
- Property-rights cases

Chapters 6: Protection and Retreat

Three Responses to Coastal Erosion

- Retreat
- Hold Back the Sea:
 - Armor the Shore (e.g. dikes) *or*
 - Replace lost sediments



Retreat in North Carolina

June 2002



The sandbags protect the septic tank.

October 2002



June 2003



Chapters 6: Protection and Retreat

Three Responses to Coastal Erosion

- Retreat
- Hold Back the Sea:
 - Armor the Shore (e.g. dikes) *or*
 - Replace lost sediments



Galveston, Texas



Near Surfside Texas



Bolivar Peninsula, Texas



Peconic Estuary, New York



Chapters 6: Protection and Retreat

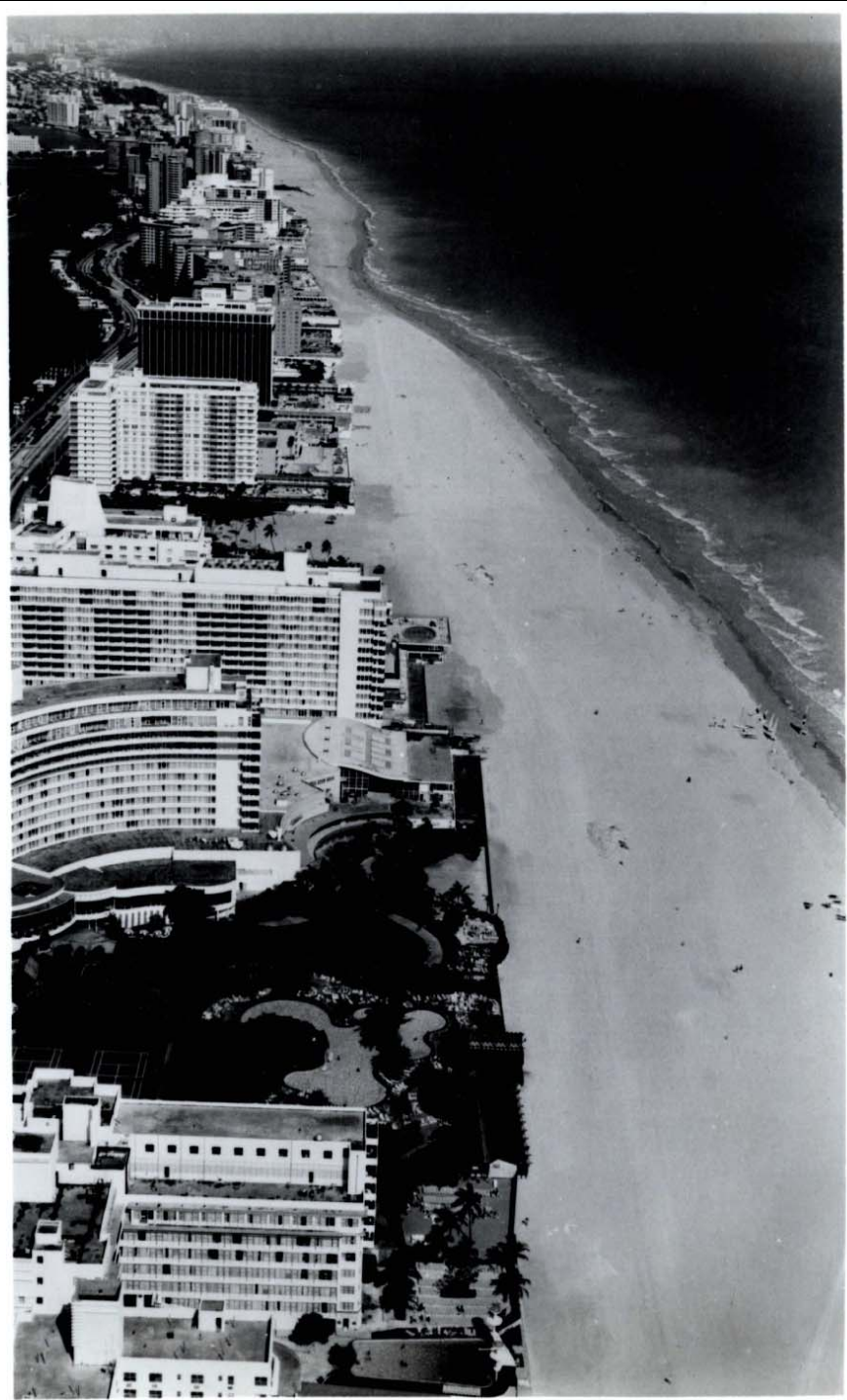
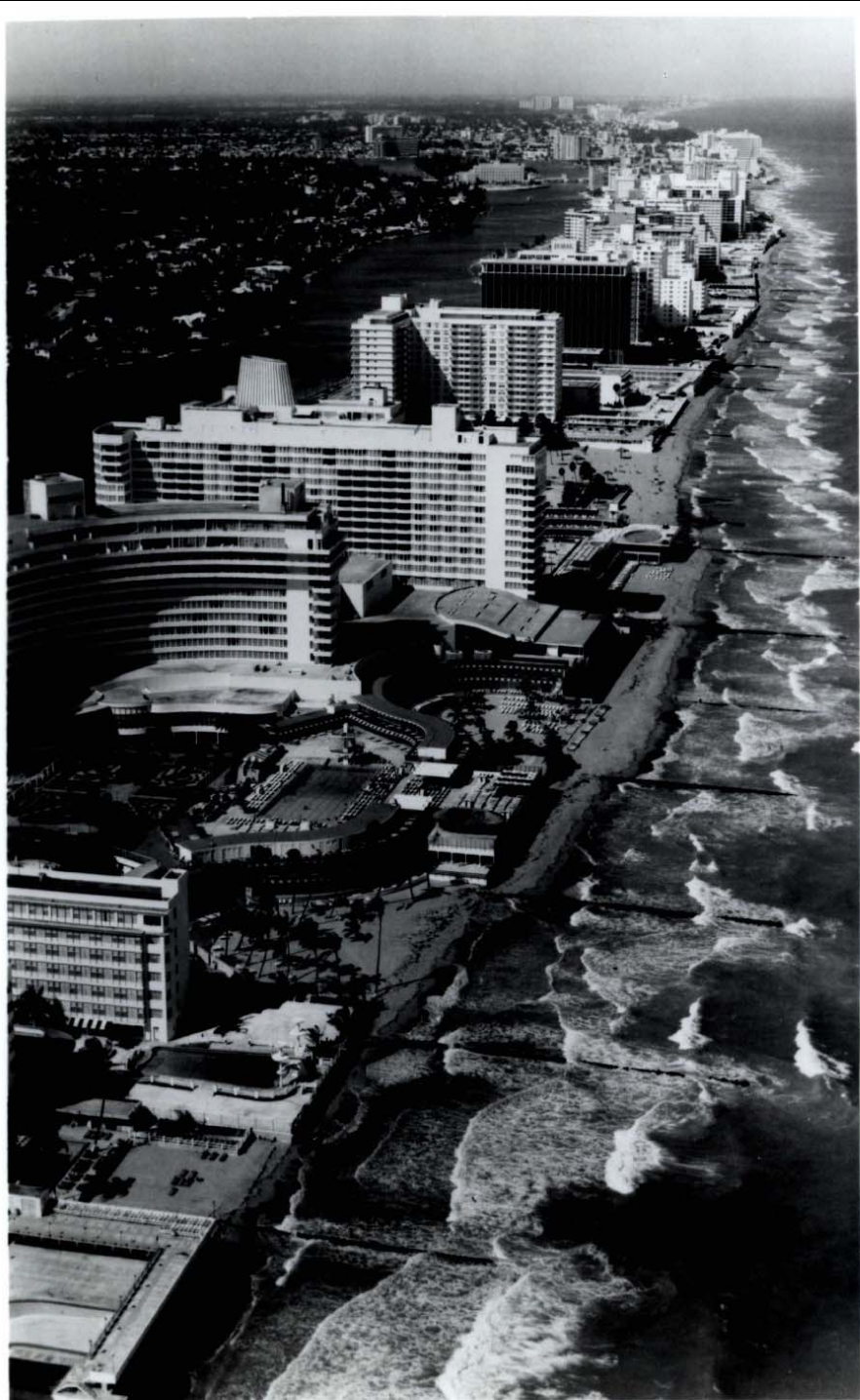
Three Responses to Coastal Erosion

- Retreat
- Hold Back the Sea:
 - Armor the Shore (e.g. dikes) *or*
 - Elevate/Replace lost sediments



North Beach, Maryland





Chapters 6: Protection and Retreat

Three Responses to Coastal Erosion

- Retreat
- Hold Back the Sea:
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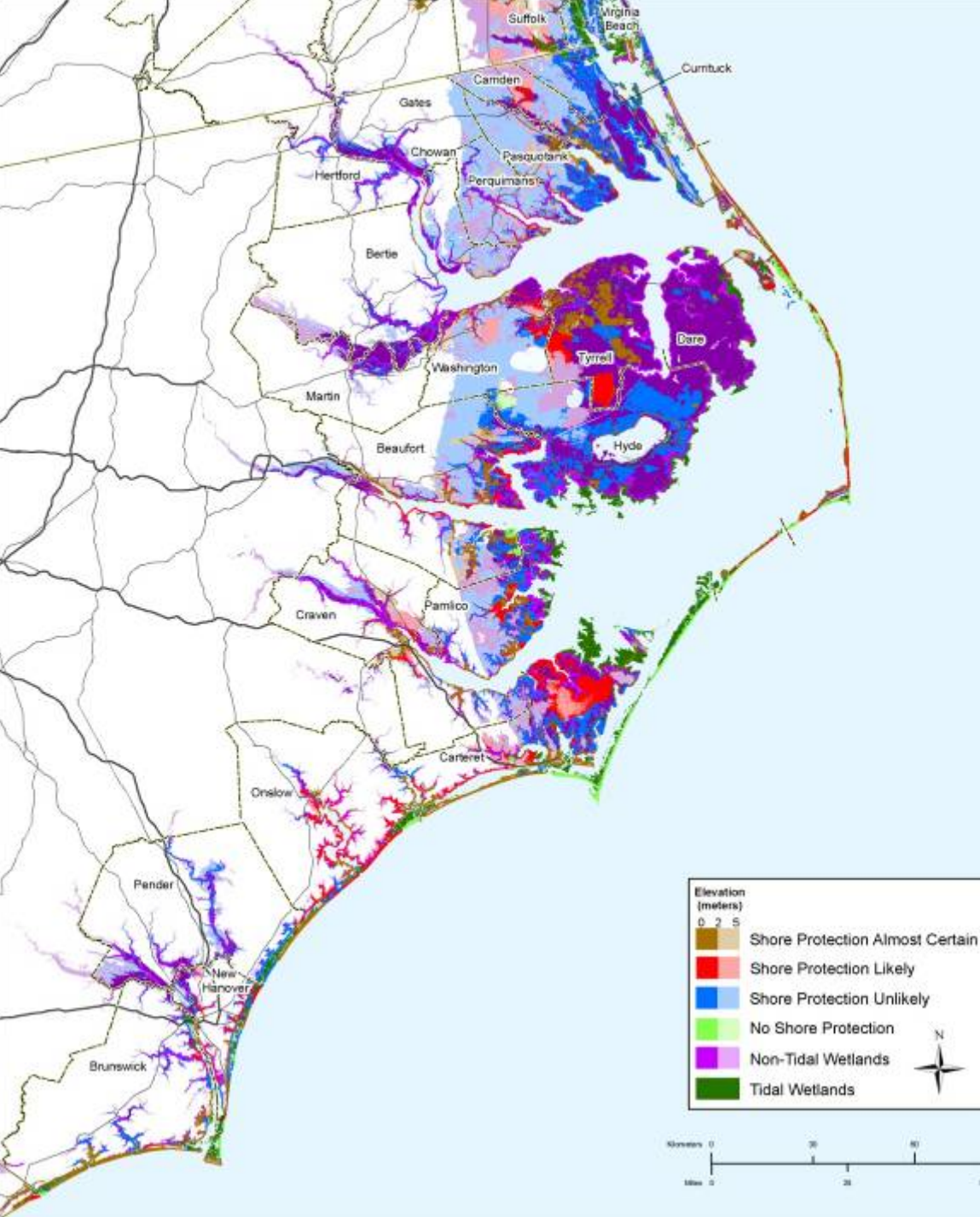
Initial assessment of long-term response to shore erosion: Atlantic Coast

Land use	Study assumption: shore protection is*	% of low land**
Developed	Almost certain	42
Development expected	Likely	15
Undeveloped	Unlikely	33
Conservation land	Precluded	9

Source: Titus et al. 2009; *Environmental Research Letters*. <http://risingsea.net/ERL>

* Assumptions also incorporated site-specific shore protection policies; level of development necessary for shore protection greater along ocean than along estuaries

**Percentages do not add up to 100% due to truncation.



Caveat: This map is based on land planning data and land use policies, which are continually changing. Map is valid for an overall assessment, not site-specific predictions.

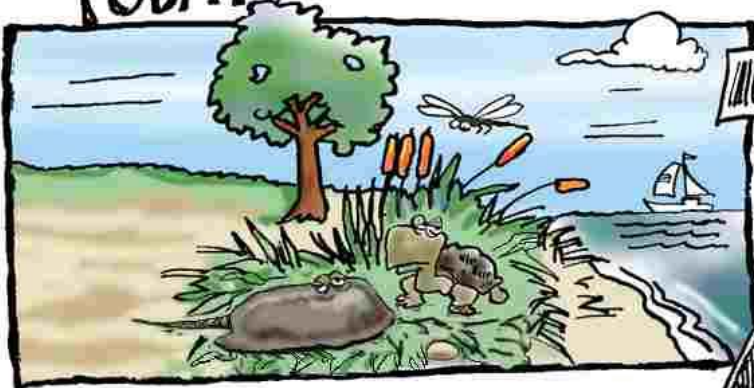
Source: Environmental Research Letters 2009

Hard to Prepare Unless You Know Which Path You Are On

Decision:	Dike	Elevate	Retreat
Rebuild drainage systems	Checkvalves, holding tanks, pumps	No change needed	Install larger pipes, larger rights of way for ditches
Replace septic with public sewer	Extending sewer helps drainage	Mound; extending sewer okay	Extending sewer undermines policy; mounds system ok
Rebuild roads	Keep roads at same elevation; owners will not have to elevate lots	Rebuild road higher, motivate property owners to elevate	Elevate roads to facilitate evacuation
Location of roads	Shore-parallel road needed for dike maintenance	No change	Shore parallel road will be lost; all must have access to shore-perpendicular road,
Setbacks/ Subdivision	Setback from shore to leave room for dike	No change	Erosion-based setbacks
Shoreline Easements	Easement or option to purchase land for dike	No change	Rolling easements to ensure that wetlands and beaches migrate

More Institutional Barriers

TODAY



Your proposal to fill the wetlands violates the Public Trust Doctrine, the Tidal Wetlands Act, and §404 of the Clean Water Act!



BUT... THIRTY YEARS LATER



MUCH BETTER!



SOME PLAN!

Development, Protection, and Moral Hazard

Anticipating Sea Level Rise is Logically Justified

- Sea level rise changes merits of
 - Shore protection
 - Home elevation
 - Coastal development
- Flood insurance
 - Can ensure that risks are reflected in the cost of coastal habitation
 - key tool for ensuring safe construction (e.g. floor elevation)

Institutional Biases:

- Policies encourage development
 - Local policies
 - Development a route to federal subsidies
- Federal safety net for development
 - Subsidized shore protection
 - FEMA programs that pay for shore protection, home elevation, relocation
- Flood Insurance
 - Grandfathering of assumed risk:
 - Sea level rise not included in flood mapping.

5th Amendment: “...nor shall private property be taken for public use, without just compensation ”

Common Law since Roman Empire

(Institutes of Justinian)

- Public Trust Doctrine:
 - Public owns the waters
 - Right to use the shore
- Law of Accretion and Reliction:
 - Gradual erosion boundaries move
 - New inlet or channel (avulsion): boundaries do not move
 - Storm erosion (avulsion in some states)
 - English common law: doctrine seemed to suggest boundary does not move—focus was on King's need to own sudden accretion
 - Florida: Boundary does not move
 - Texas: Boundary moves

5th Amendment: “...nor shall private property be taken for public use, without just compensation ”

- Regulatory taking
- Physical Invasion

Is there a property right to hold back the sea?

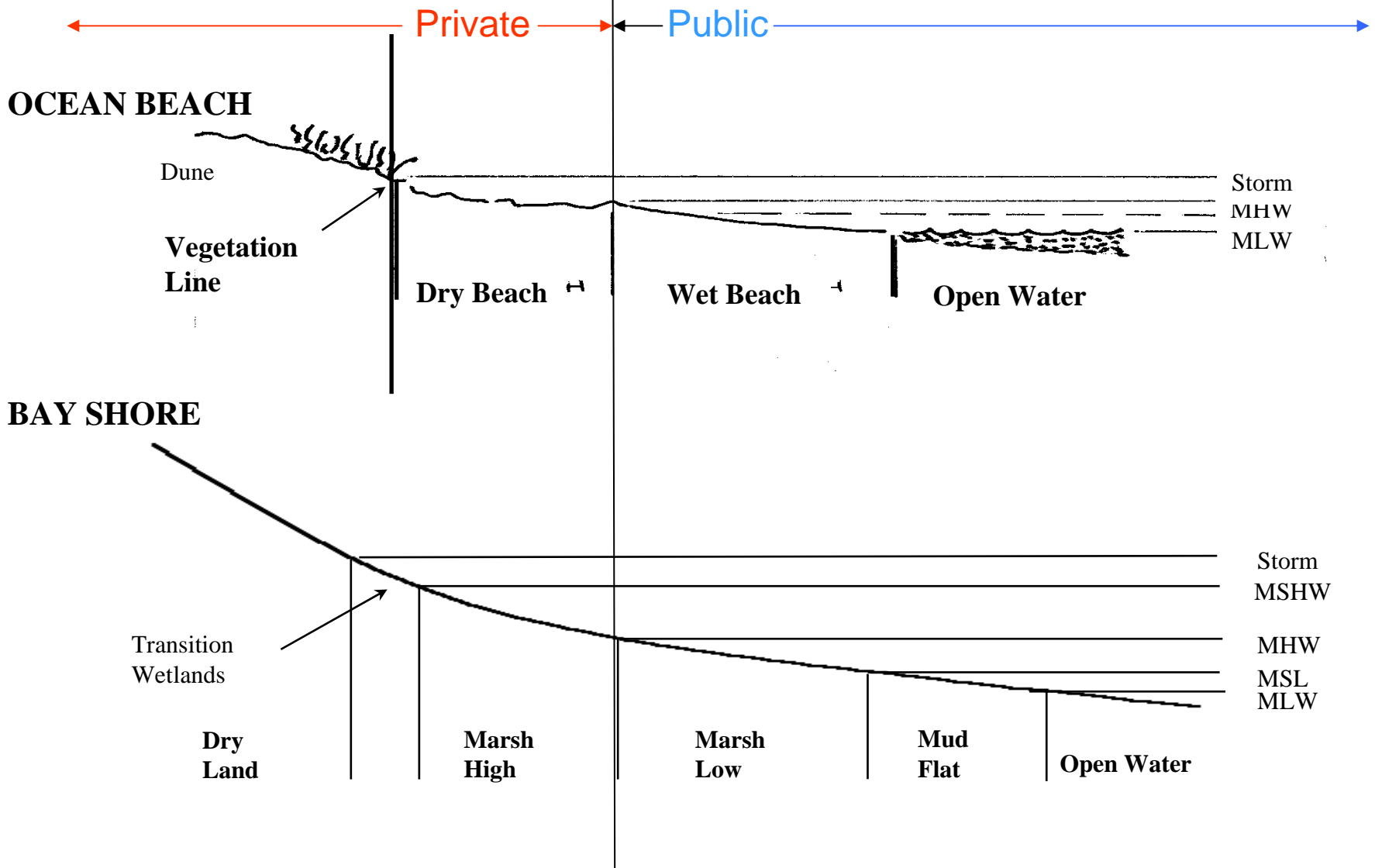
Regulatory taking: Under *Lucas v South Carolina Coastal Council* a regulation that totally destroys the property value is a taking unless it merely prohibits something that was never the owner's right to begin with (i.e. preventing a common law nuisance)

A fence across an easement is a common law nuisance? Query: How about a seawall that eliminates public beach easement?

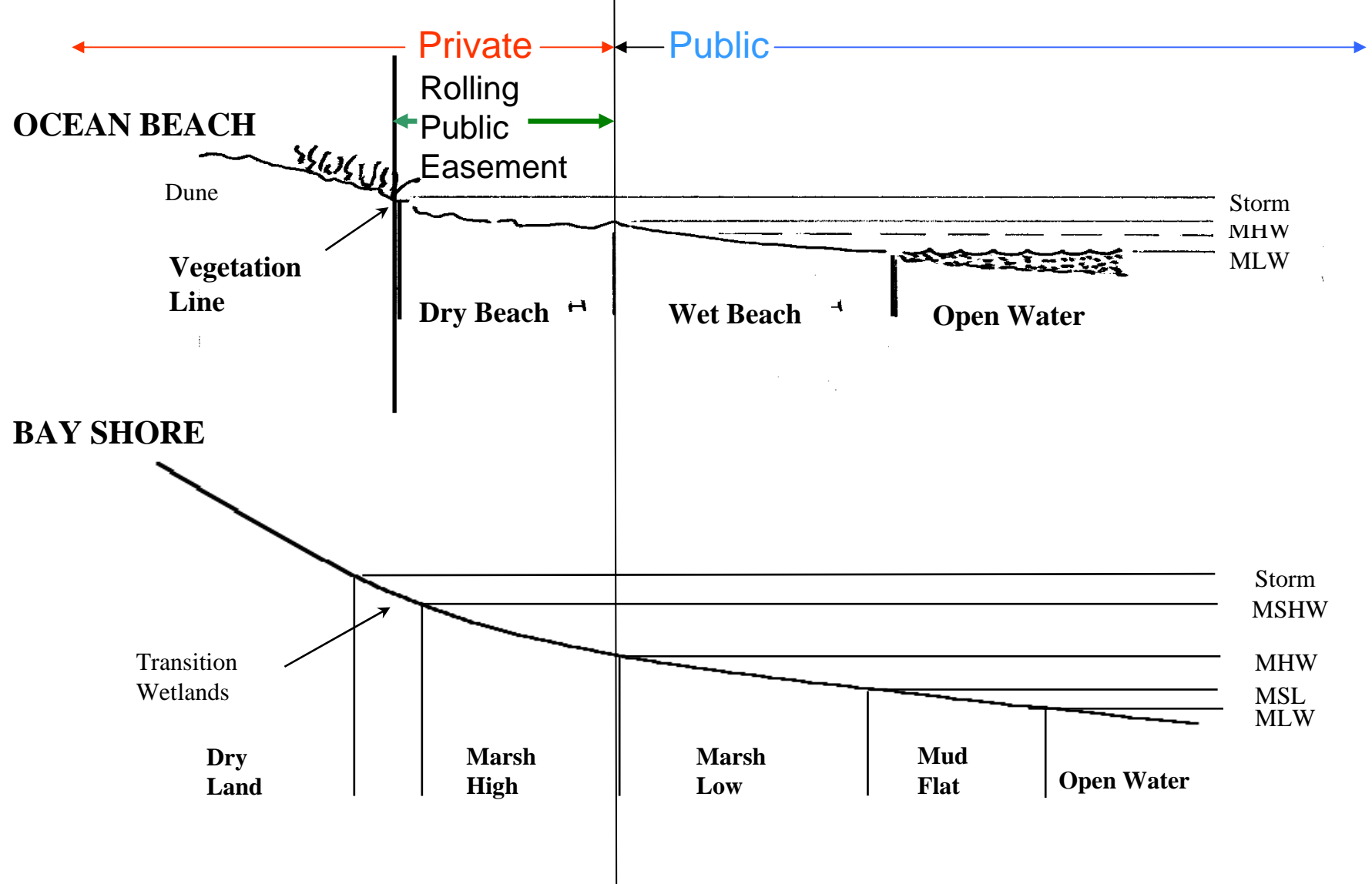
Which right is superior? Migrating beach or a home in a fixed location?

Severance v. Patterson (Texas GLO), 5th Circuit

(We'll skip the 4th amendment seizure issue)



MSL = Mean Sea Level
 MLW = Mean Low Water
 MHW = Mean High Water
 MSHW = Mean Spring High Water
 Storm = Average Annual Storm Tide



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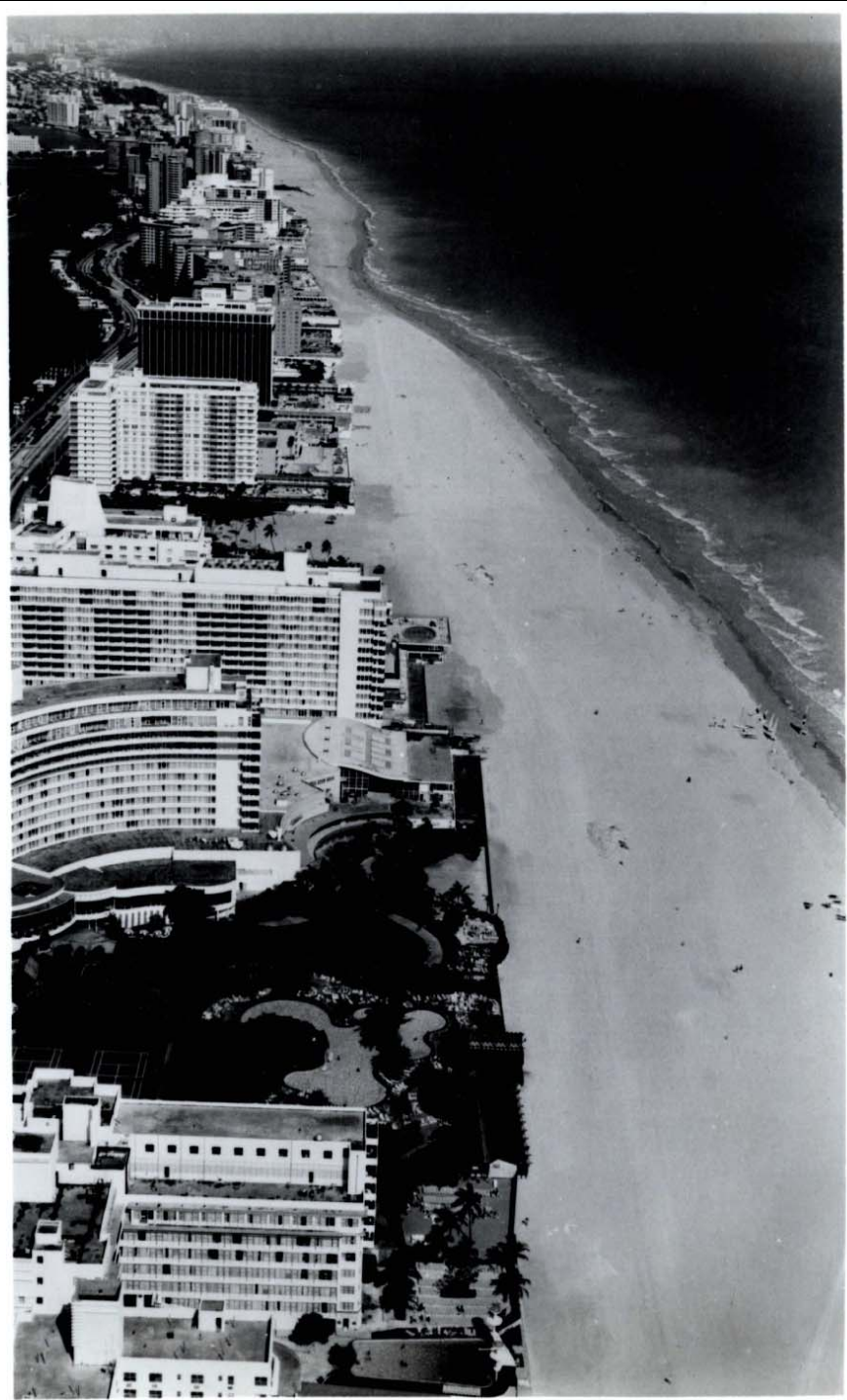
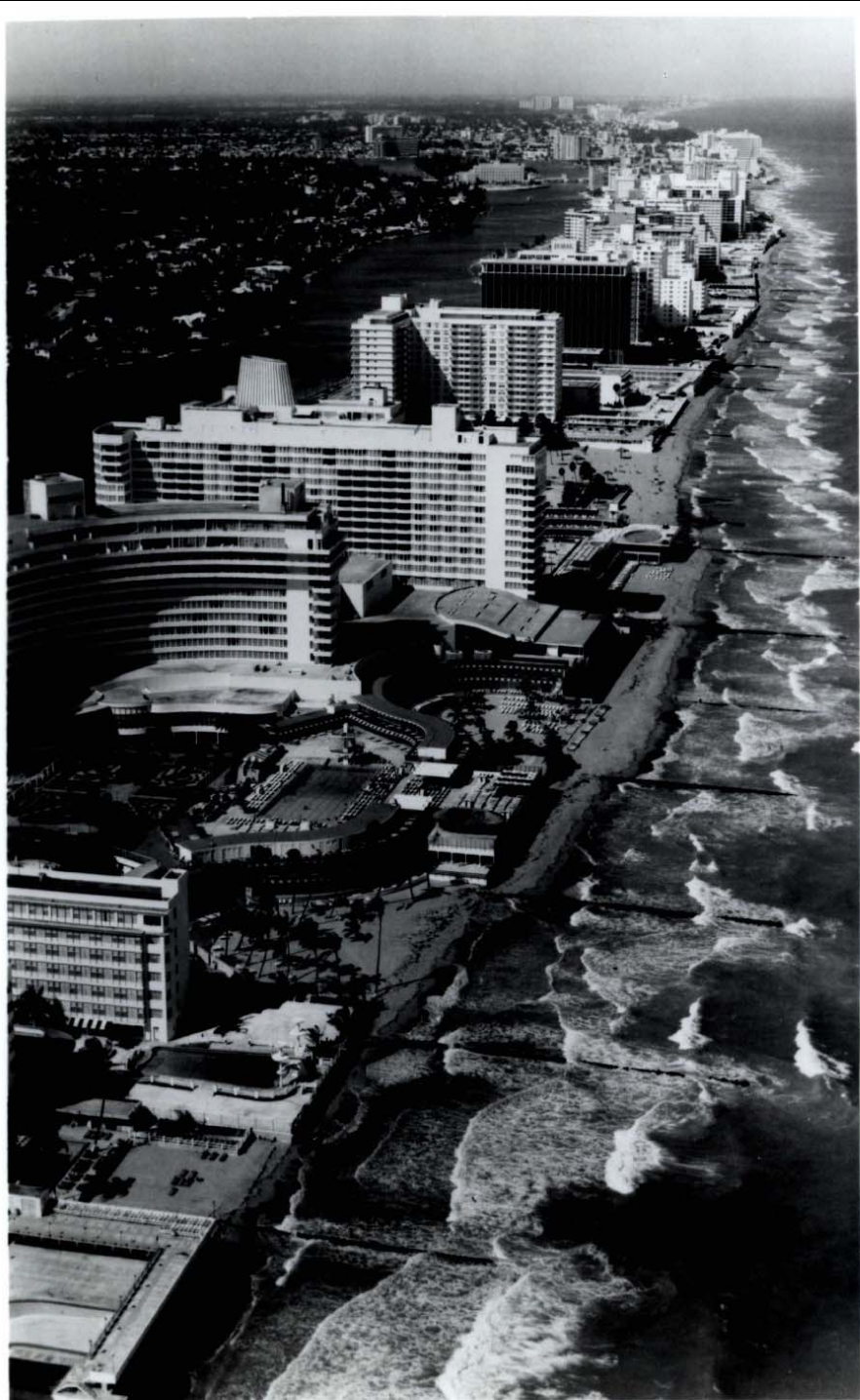




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Which right is superior? Migrating beach or a home in a fixed location?

- *Severance v. Patterson* (Texas GLO), 5th Circuit
- Certified to Texas Supreme Court:
 - Is rolling easement common law or 40-year old statute?
 - Did common law easement roll only within the first row of lots, or also the next row back?
- Is aligning property interests with the facts of nature an unconstitutional taking?
 - If the Legislature does it (may arise in *Severance*)
 - If a State supreme court it (judicial taking)



Coming Soon: The judicial taking case: Walton County v. Stop the Beach Renourishment, Inc.

- Physical Invasion: Florida statute authorizing beach nourishment replaces the old rule of migrating property lines with a fixed property line for those beaches that are nourished
- Then state seeks to hold the line.
- But new beaches created seaward of property line are now state-owned
- Littoral owners lose common law right to accretion: Is that a taking?
- Florida Supreme Court says no by declaring that common law does not protect possible future accretion.
- Is it a taking for Florida Supreme Court to “clarify” the common law in that way?

Conclusion

- Rising sea level likely to shift shores inland by a magnitude unprecedented in the history of civilization
- We are not prepared
 - Little or no dialogue → divergent expectations
 - Existing institutions assume most shores are stable
 - Shore protection and retreat are expensive, complicated, and require a long lead time to minimize social and economic cost
- Who will lead the way?
 - land owners
 - local government
 - state government
 - federal government