

Below the Surface: Striving to Maintain Climate Ready and Productive Estuaries



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Carolyn Currin is a research scientist at NOAA's National Ocean Service in Beaufort, NC. Her recent work has focused on the response of salt marshes to sea level rise, and the ability of adaptive management approaches, such as living shorelines and thin-layer application of dredged sediment, to provide long-term resiliency to coastal ecosystems. Currin recently led a multi-institutional Coastal Wetlands Research group investigating climate change impacts and the carbon cycle in salt marshes for the Department of Defense at Marine Corps Base Camp Lejeune, and is a member of the North Carolina Sentinel Site Management Team. Her education includes a Bachelor of Science in Zoology from North Carolina State University and Ph. D. in Marine Sciences from University of North Carolina-Chapel Hill.

Coastal Wetlands and Resiliency

Carolyn Currin



Protection, Resilience..... and Vulnerability

Fringing Salt Marshes occupy 65% of the NC estuarine shoreline (8000 miles of marsh)



Salt marshes provide habitat and nursery grounds for fish and wildlife

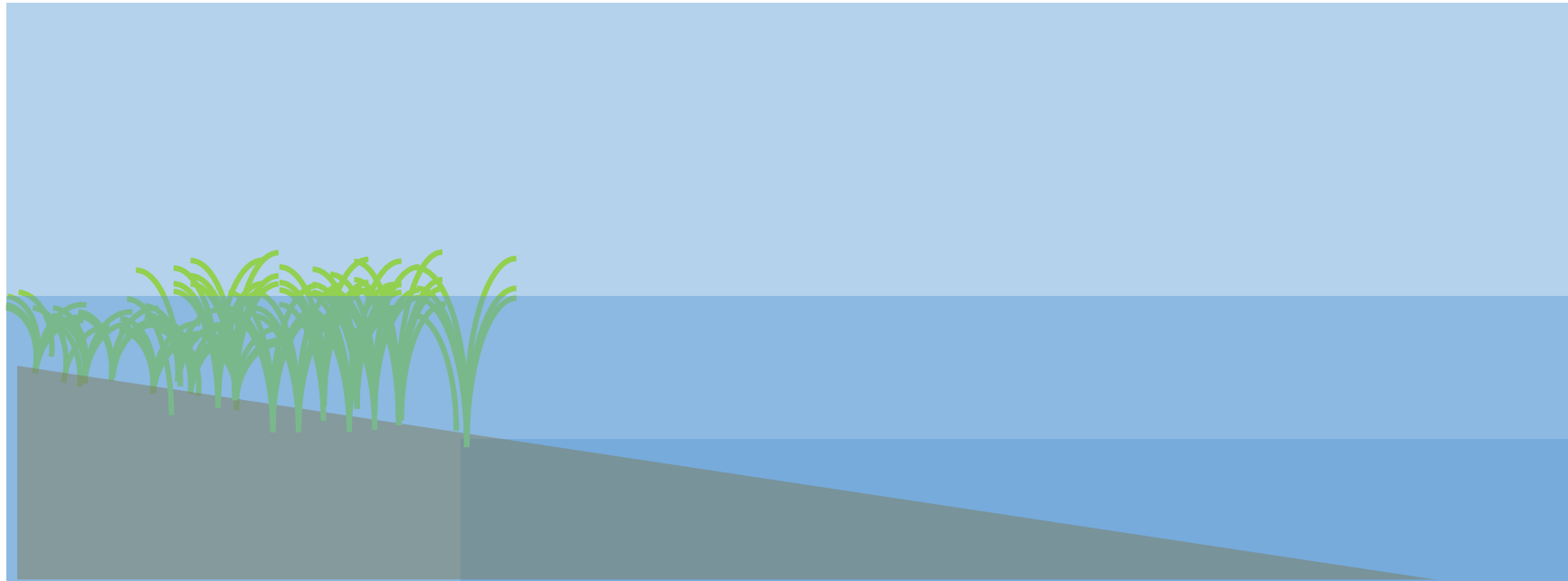
Salt marshes trap sediments and improve water quality

Salt marshes effectively attenuate wave energy and reduce erosion



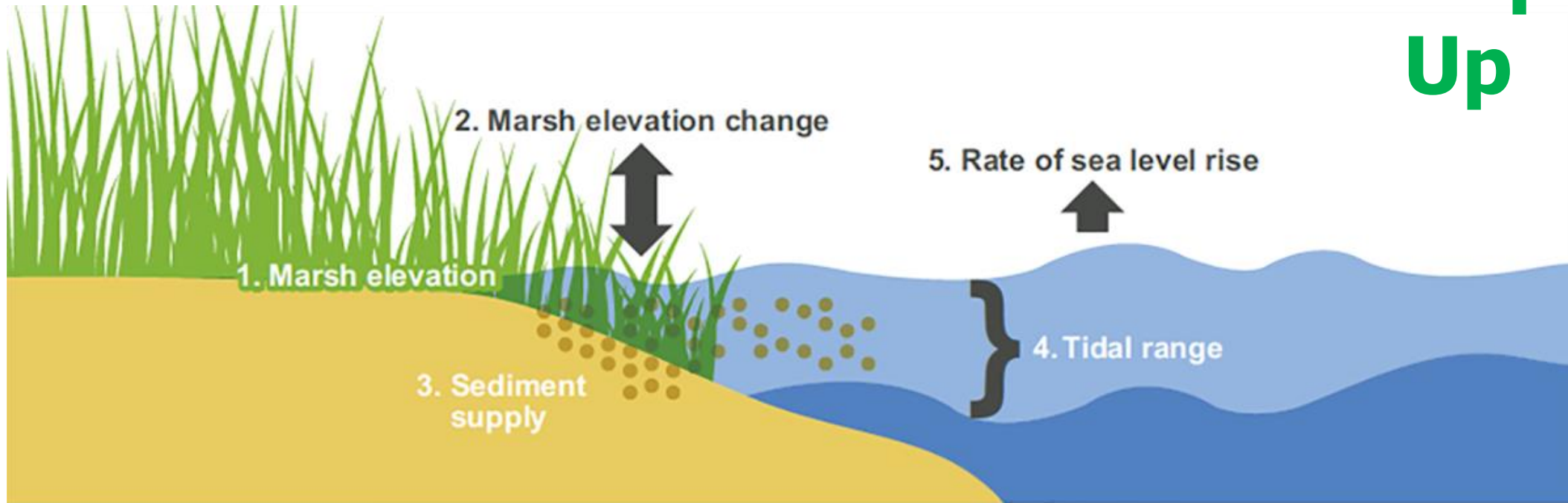
Wave attenuation by *Spartina alterniflora*

- 50% of wave energy reduced within 15' of marsh edge; >90% by 75' of marsh
- Wave energy reduction decreases as inundation depth exceeds canopy height



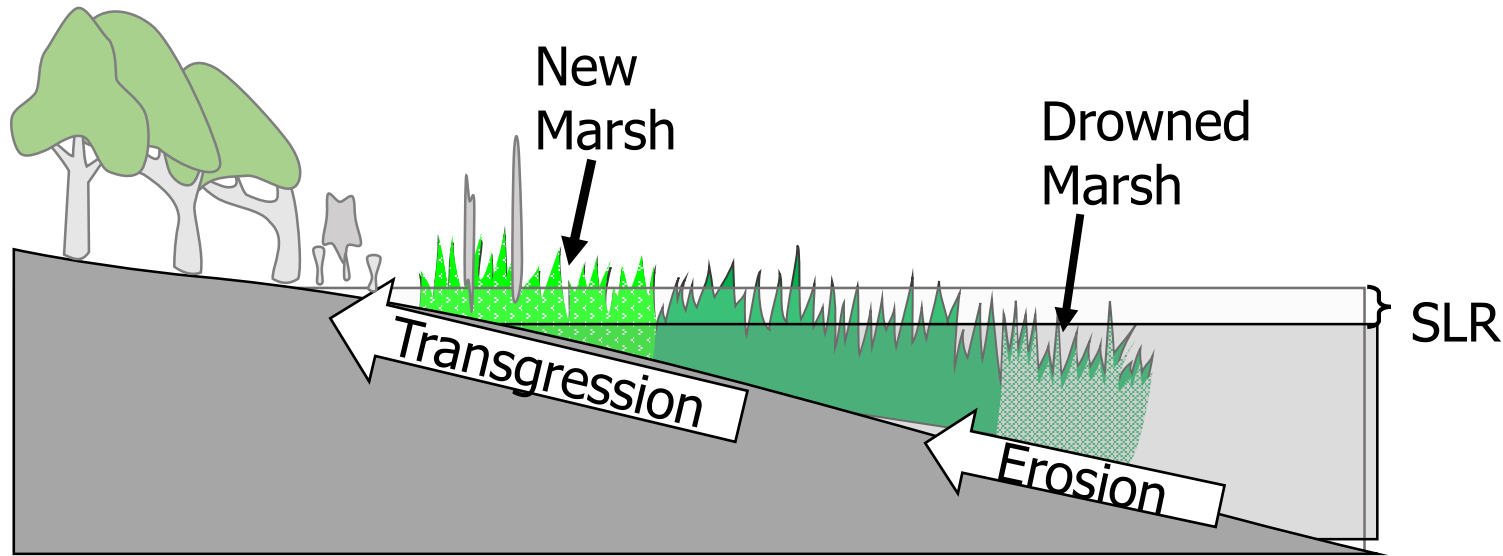
Marsh response to Sea Level Rise

Keep
Up



If enough sediment is available, marshes can maintain their position by keeping up with SLR

Marsh response to Sea Level Rise



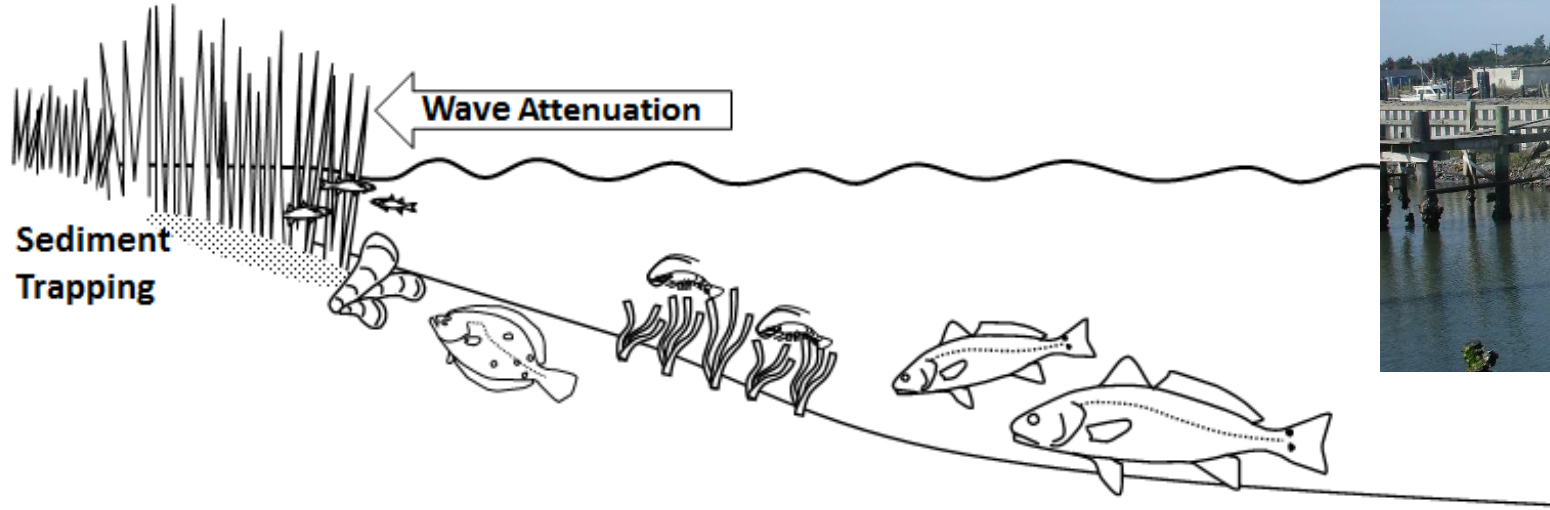
**Move
Landward**



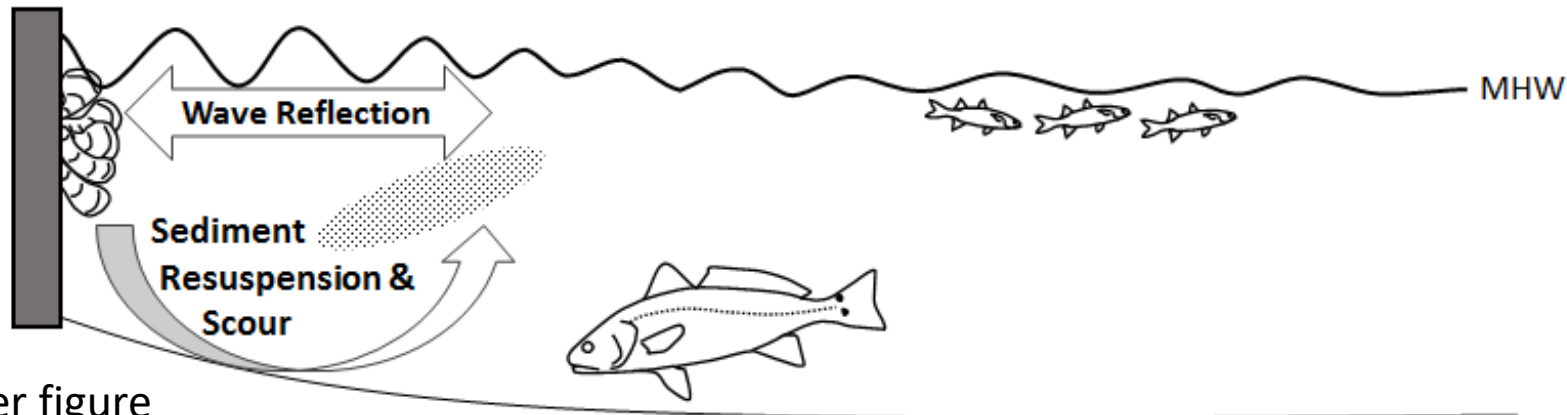
- Landward migration of salt marsh determined by topography and absence of development
- May preserve marsh habitat acreage even with accelerated SLR

Impact of Hardened Shorelines

(a) Natural Shoreline



(b) Bulkhead shoreline



Q. Walker figure



Research

- Provide site-selection and design guidance
- Support permitting and regulatory changes
- Participate in outreach activities

Science



**Policy &
Management**

**Education
& Outreach**

