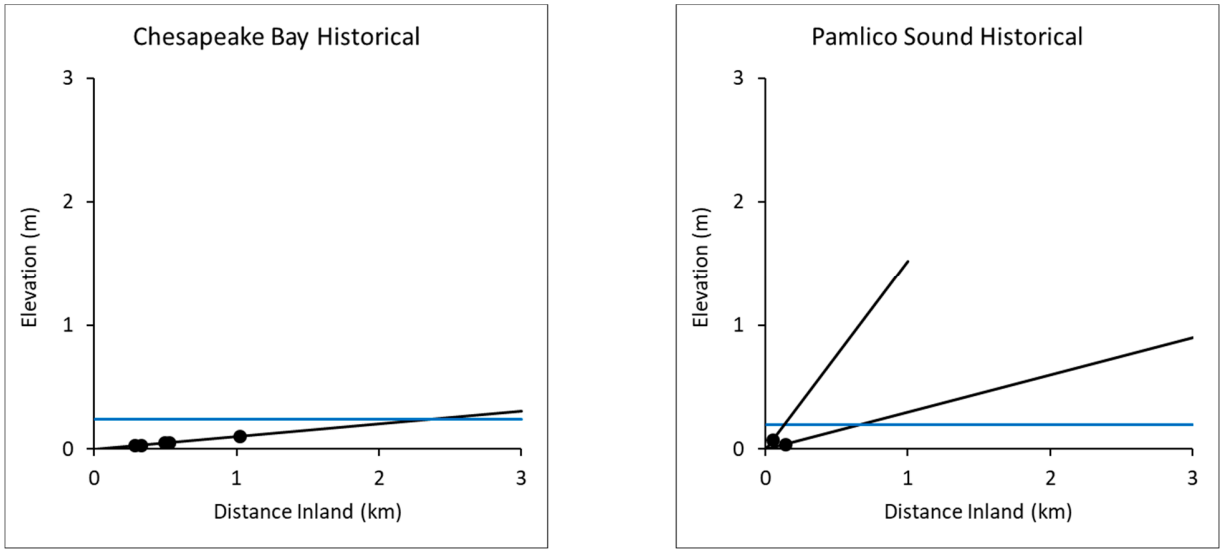
Parkinson, Randall W., 2024, Horizontal Rates of Wetland Migration Appear Unlikely to Keep Pace with Shoreline Transgression under Conditions of 21st Century Accelerating Sea Level Rise, Mid-Atlantic and Southeastern, U.S.A. Coasts.

Supplementary Materials

Supplementary Materials Figure S1. Hindcast results of historical marsh migration and contemporaneous sea level rise using data provided in Supplementary Materials Table 3. Axes ordinates are shoreline location (x) and sea level elevation (y) 150 yrs before present (2020). Black line is landscape slope. Blue line is sea level elevation at present. Black dots indicate the distance of upslope horizontal migration of marsh over past 150 yrs. Distance between marsh migration location and intersection of landscape slope with sea level is the predicted gap between existing marsh and present shoreline.



Supplementary Materials Table S1. Slope values utilized in the investigation. All sources are USGS 7.5' topographic maps unless otherwise noted.

Region of Focus	Study area	Geographic location	Land slope (m/km)	Source of slope value
Delaware Bay	1A	Cumberland & Cape May Counties, NJ	0.8	Heirlerville, NJ
	1B	Stow Creek, NJ	0.3	Canton, NJ
	1C	Bombay Hook, DE	0.3	Bombay Hook, DE
Chesapeake Bay	2A1	Hell Hook Marsh, MD	0.1	Honga and Golden Hill, MD
	2A2	Cedar Creek Marsh, MD	0.1	Blackwater River and Wingate, MD
	2B	Goodwin Island, VA	0.1	Poquoson West, VA
Pamlico Sound	3A	Long Shoal River, NC	0.3	Engelhard NE and Long Shoal Point, NC
	3B1	Cedar Island, NC	1.5	Atlantic, NC
	3B2	Long Bay, NC	1.1	Value defined by original authors
	3B3	Nelson Bay, NC	0.7	Value defined by original authors
South Florida	4A	Southeast Saline Everglades, FL	0.1	Biscayne Bay, Arsenicker, and Homestead, FL
		Southeast Saline Everglades, FL	0.1	Biscayne Bay, Arsenicker, and Homestead, FL
	4B	Southeast Saline Everglades, FL	0.1	Joe Bay and Palm Bay SE, FL
	4C	Ten Thousand Islands, FL	0.1	Royal Pine Hammock and Belle Meade SE, FL
Northwest Florida	5	Big Bend, FL	0.4	Value defined by original authors

Supplementary Materials Table S2. Median sea level elevation, relative to 2020, and associated average rate of rise (2020 – 2050) corresponding to NOAA's high scenario-based trajectory in 2050 [49].

		Elevation (m)			Average rate of rise (mm yr^{-1})	
Area of Focus	**Station**	**2020**	**2050**	**2100**	**2020-2050**	**2050-2100**
Delaware Bay	Cape May, NJ	0.15	0.55	2.12	13.2	31.4
Chesapeake Bay	Lewisetta, VA	0.16	0.57	2.16	13.6	31.8
Pamlico Sound	Beaufort, NC	0.13	0.51	2.10	12.7	31.8
South Florida	Key West, FL	0.12	0.47	2.16	12.0	33.0
Northwest Florida	Cedar Key, FL	0.11	0.46	2.08	12.2	32.2

Supplementary Materials Table S3. Summary of data used to hindcast interaction of historical (i.e., extending back 150 yrs) rates of horizontal marsh migration and shoreline transgression organized by geographic location. Also shown are vertical sediment accumulation rates calculated using ^{210}Pb and ^{137}Cs radioisotope geochronologies and therefore representative of historical conditions. na = not applicable because historical horizontal marsh migration data was not identified.

Region of focus	Study area	Average rate of historical sea rise (mm yr^{-1})[a]	Average rate (m y^{-1}) of historical shoreline transgression[b]	Distance (m) of historical shoreline transgression[c]	Distance (m) of historical wetland migration[d]	Distance (m) between migrating wetland and transgressing shoreline[d]	Sediment accumulation rate (mm yr^{-1})	Source
Delaware Bay	na						2.8	[52]
Chesapeake Bay	2A1a	1.6	16	2362	525	1837	2.2	[28]
	2A1b	1.6	16	2362	330	2032		
	2A2a	1.6	16	2362	1020	1342	2.5	[28]
	2A2b	1.6	16	2362	285	2077		
	2B	1.6	16	2362	495	1867		
Pamlico Sound	3A	1.3	22	650	138	512		
							2.6	[53]
	3B1	1.3	4	128	51	77		
South Florida	na							
Northwest Florida	na							

[a]Based upon historical sea level as reported in Table 1.

[b]Calculated using land slope (Table 2) and average rate of historical sea level rise.

[c]Calculated using average rate of historical rate of sea level rise and a time interval of 150 yrs (i.e., Chesapeake Bay 1850-2000 or 1872-2015, Pamlico Sound 1872-2015; Table 1).

[d]Calculated using rate of horizontal wetland migration (Table 1) and a time interval of 150 yrs.

Supplementary Materials Reference List

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53. Corbett, D.R.; Vance, D.; Letrick, E.; Mallinson, D.; Culver, S. Decadal-Scale Sediment Dynamics and Environmental Change in the Albemarle Estuarine System, North Carolina. *Estuarine, Coastal and Shelf Science* **2007**, *71*, 717–729, doi:10.1016/j.ecss.2006.09.024.