Supplementary material to the article:

Can managed realignment buffer extreme surges? The relationship between marsh width, vegetation cover and surge attenuation.

In

Estuaries & Coasts

by

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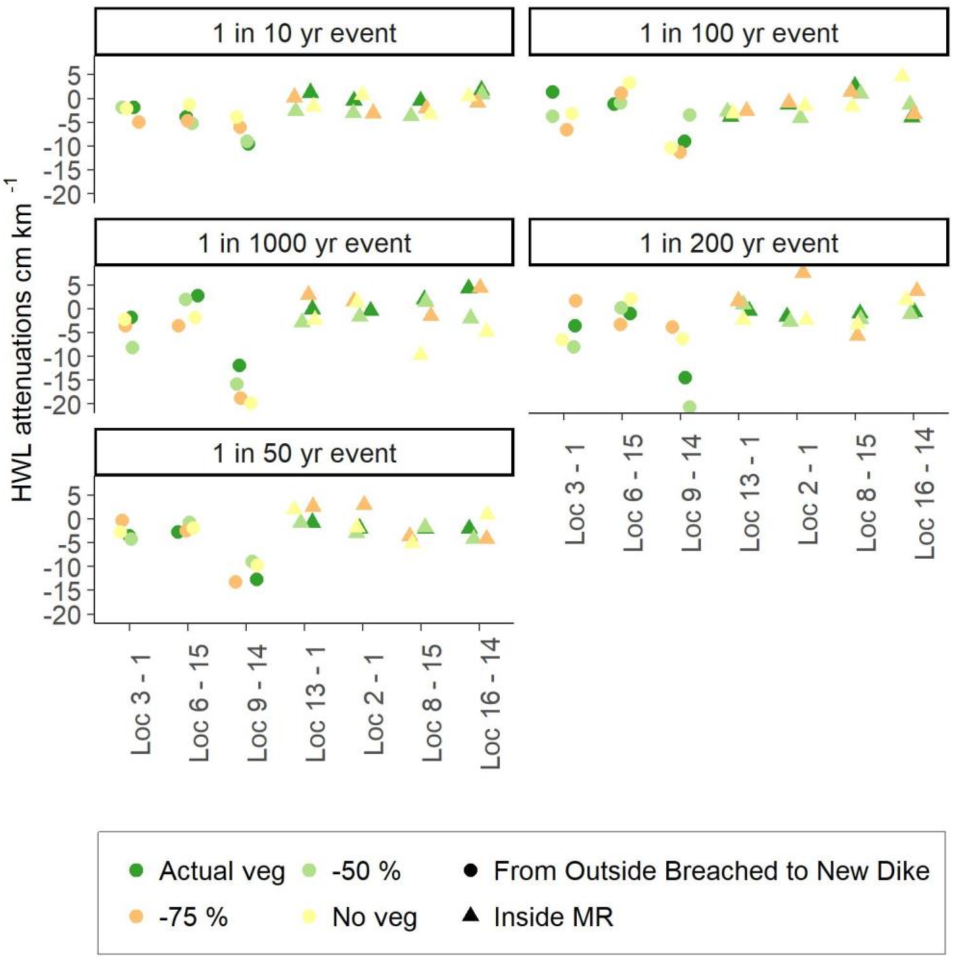

Figure S1 *HWL attenuation rates for the Freiston Shore MR site plotted per transect*

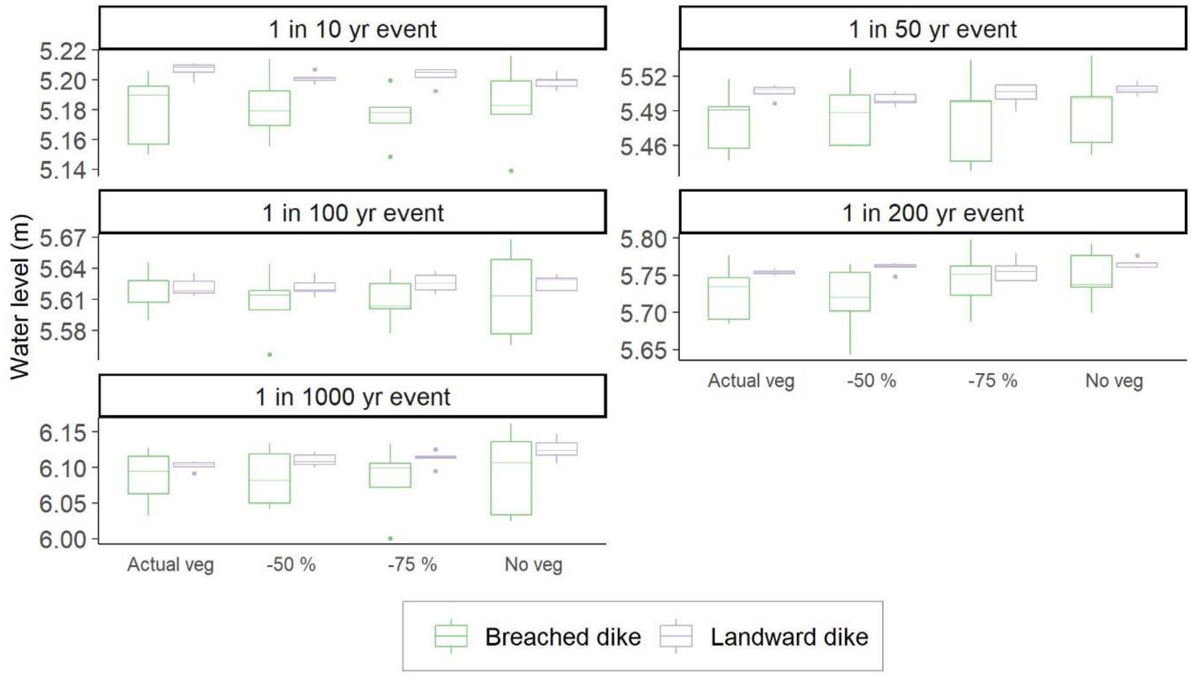

Figure S2 *High water levels (referenced to ODN) in front of the breached, seaward and landward lines of defence of the Freiston Shore MR site*

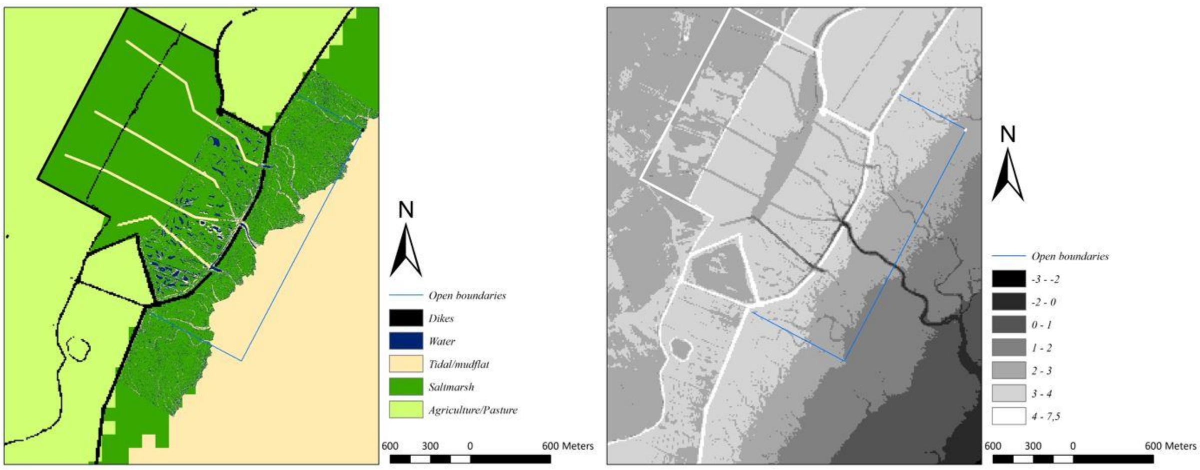

Figure S3 *Elevation and landcover maps of scenario 1.4 with additional tidal creeks. We used this additional scenario to investigate differences in HWL attenuation rates between a large MR site with and without tidal creeks. Tidal creeks were created by extending those of the original Freiston Shore MR site. The new, extended tidal creeks have a width of 10 m and a depth of ca. 1 m for most of the length, but decreasing depths to the landward ends of each creek. Thus, the additional creeks are substantially wider compared to those of the original MR site*

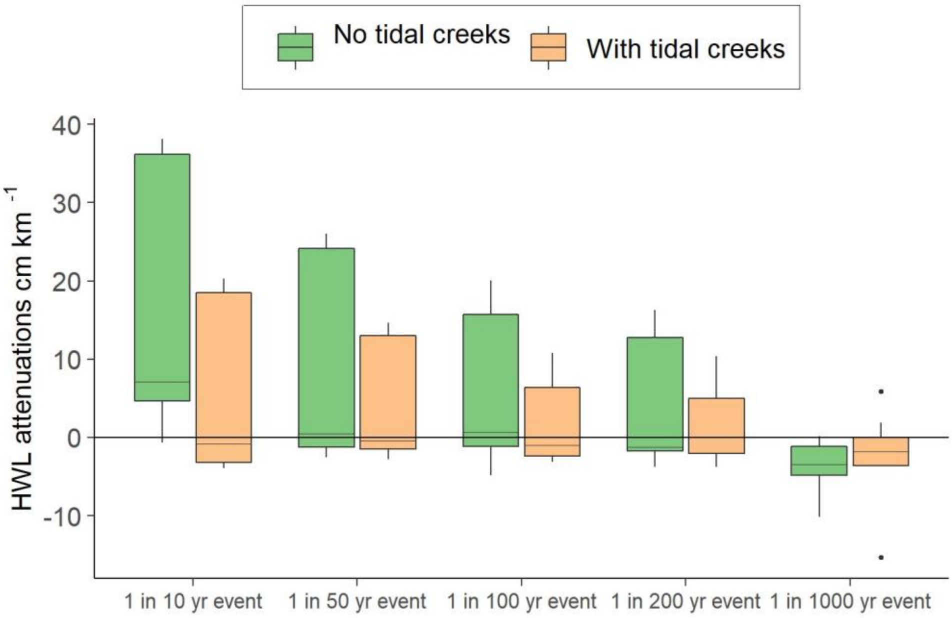

Figure S4 *Boxplots show HWL attenuation rates for scenario 1.4 with and without tidal creeks. Differences between the two scenarios were not statistically significant (Wilcoxon rank sum test p-value = 0.22). Comparing HWL attenuation rates between the Status Quo and scenario 1.4 without tidal creeks suggests statistically significant differences (Wilcoxon-rank-sum-test p-value 0.0008). On the contrary, comparing the Status Quo to scenario 1.4 with tidal creeks indicates no statistical significance (Wilcoxon-rank-sum-test p-value = 0.08, considering only actual (full) vegetation cover)*

Table S1 *Average HWL attenuation rates, standard deviations and p-values for statistical tests for all extreme event and vegetation scenarios of Freiston Shore, scenario 1.1, 1.2, 1.3 and 1.4. Superscript [a] and [b] indicate whether a two-way ANOVA model was calculated, or the non-parametric Kruskal-Wallis-test, respectively.*

		1 in 10-year event				1 in 50-year event				1 in 100-year event				1 in 200-year event				1 in 1000-year event			
		Actual veg	-50%	-75%	No veg	Actual veg	-50%	-75%	No veg	Actual veg	-50%	-75%	No veg	Actual veg	-50%	-75%	No veg	Actual veg	-50%	-75%	No veg
Status Quo	Average HWL attenuation (cm km^{-1})	-2	-3	-3	-2	-4	-3	-3	-3	-2	-2	-3	-2	-3	-5	0	-2	-1	-4	-3	-6
	Standard deviation (cm km^{-1})	4	3	2	2	4	3	5	4	4	2	4	5	5	8	5	3	5	6	8	7
	Vegetation p-value		0.54[a]				0.94[b]				0.93[a]				0.61[b]				0.27[b]		
	Event p-value										0.27[b]										
1.1	Average HWL attenuation (cm km^{-1})	-4				-5				-4				-3				-3			
	Standard deviation (cm km^{-1})	4				8				6				5				5			
	Event p-value										0.77[b]										
1.2	Average HWL attenuation (cm km^{-1})	-2				-5				-3				-5				-5			
	Standard deviation (cm km^{-1})	3				4				6				6				6			
	Event p-value										0.38[b]										
1.3	Average HWL attenuation (cm km^{-1})	6				3				0				1				0			
	Standard deviation (cm km^{-1})	10				6				4				4				5			
	Event p-value										0.41[a]										
1.4	Average HWL attenuation (cm km^{-1})	18	7	5	0	10	3	1	-1	6	1	-2	1	5	3	1	1	-4	-5	-8	-2
	Standard deviation (cm km^{-1})	18	12	9	6	14	6	5	4	10	5	4	5	9	4	3	3	4	3	4	5
	Vegetation p-value		0.06[a]				0.27[b]				0.41[b]				0.02[b]				0.0488[a]		
	Event p-value										0.02[b]										