

Supplemental information

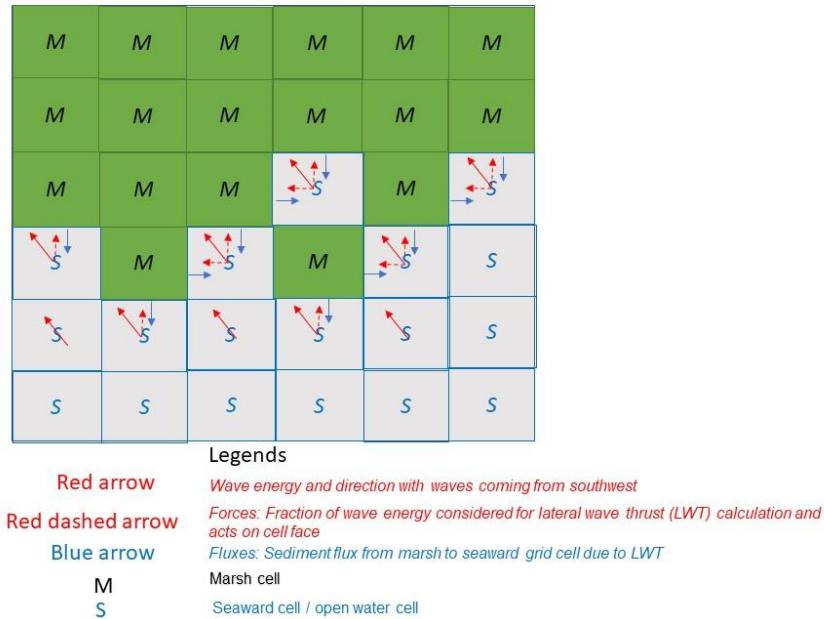


Figure S1: Schematic showing the application of lateral wave thrust (LWT) on marsh cells.

Table S2: Model parameters for high resolution (HR) (1 m) idealized domain to test marsh lateral retreat.

Model parameter	Value
Sediment grain size	0.2 mm
Sediment critical stress	0.07 N m ⁻²
Sediment erosion rate	5.0 x 10 ⁻⁵ kg m ⁻² s ⁻¹
Sediment settling velocity	5.0 mm s ⁻¹
Sediment density	2650 kg m ⁻³
Bed thickness	1.0 m
Bed porosity	0.5
Marsh lateral erodibility coefficient	0.6e ⁻⁶ m ⁻¹ s
Vegetation density	1000.0 stems m ⁻²
Vegetation height	0.2 m
Vegetation diameter	2.0 mm
Vegetation thickness	0.2 mm
Vegetation drag coefficient	1.0

Table S3: Sediment transport and vegetation parameters for the Reedy and Dinner Creek simulations.

Model parameter	Value
Marsh sediment grain size	0.0078, 0.0078, 0.0078 mm
Marsh sediment critical stress	0.06, 0.06, 0.06 N m ⁻²
Marsh sediment erosion rate	0.01 x 10 ⁻⁵ , 0.01 x 10 ⁻⁵ , 0.01 x 10 ⁻⁵ kg m ⁻² s ⁻¹
Marsh sediment settling velocity	0.1, 0.1, 0.1 mm/s
Estuary sediment grain size	0.0078, 0.055, 0.126 mm
Estuary sediment critical stress	0.06, 0.11, 0.15 N m ⁻²
Estuary sediment erosion rate	8.0 x 10 ⁻⁵ , 8.0 x 10 ⁻⁵ , 8.0 x 10 ⁻⁵ kg m ⁻² s ⁻¹
Estuary sediment settling velocity	0.1, 1.7, 8.8 mm/s
Bed thickness	1.0 m
Marsh sediment bed porosity	0.9
Estuary sediment bed porosity	0.5
Sediment density	2650 kg m ⁻³
Marsh lateral erodibility coefficient	0.6e ⁻⁸ m ⁻¹ s
Vegetation density	248.0 stems m ⁻²
Vegetation height	0.5 m

Vegetation diameter	0.01 m
Vegetation thickness	0.001 mm
Vegetation drag coefficient	1.0

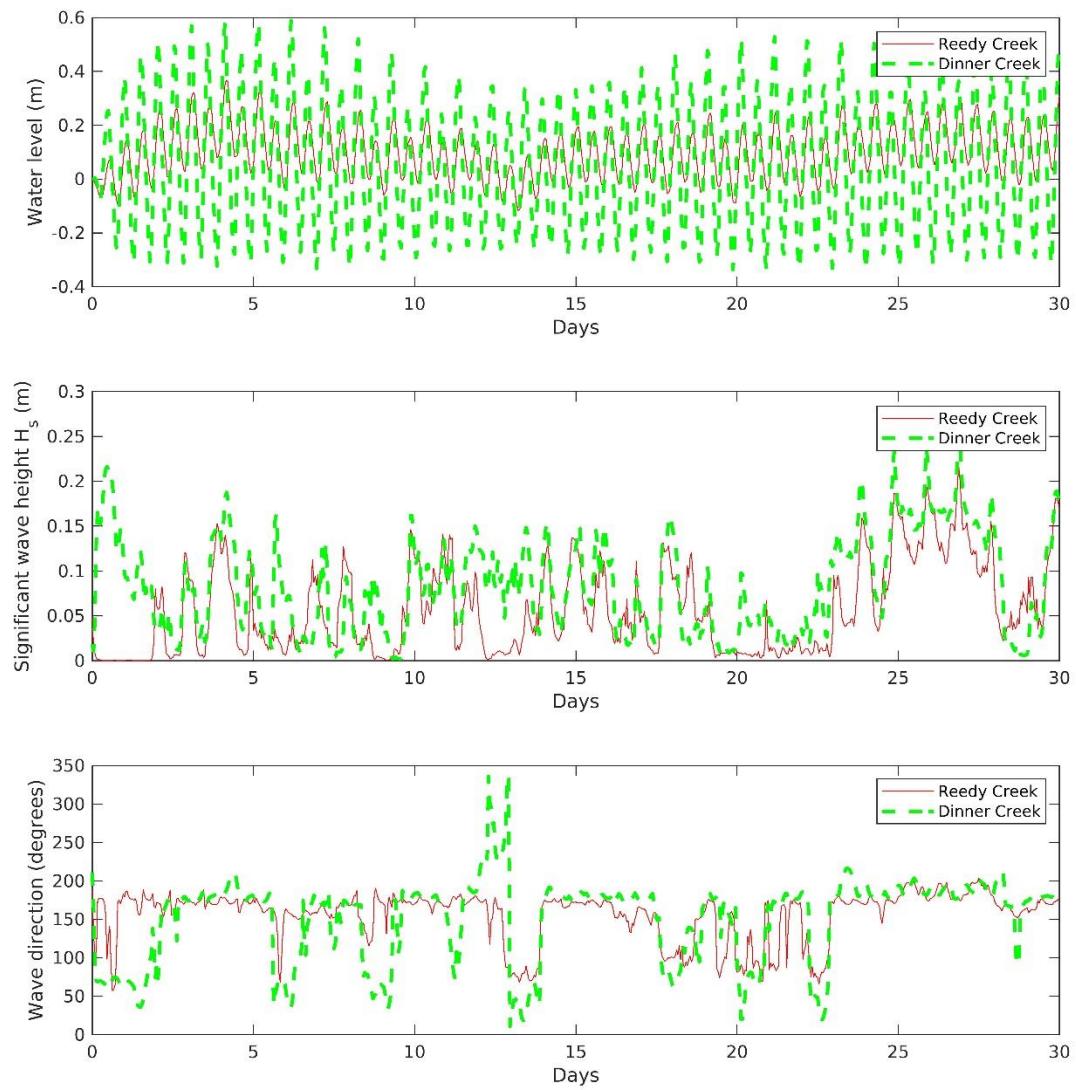


Figure S4: Figure showing the tidal and wave forcing at two points on the Reedy and Dinner Grid domains.