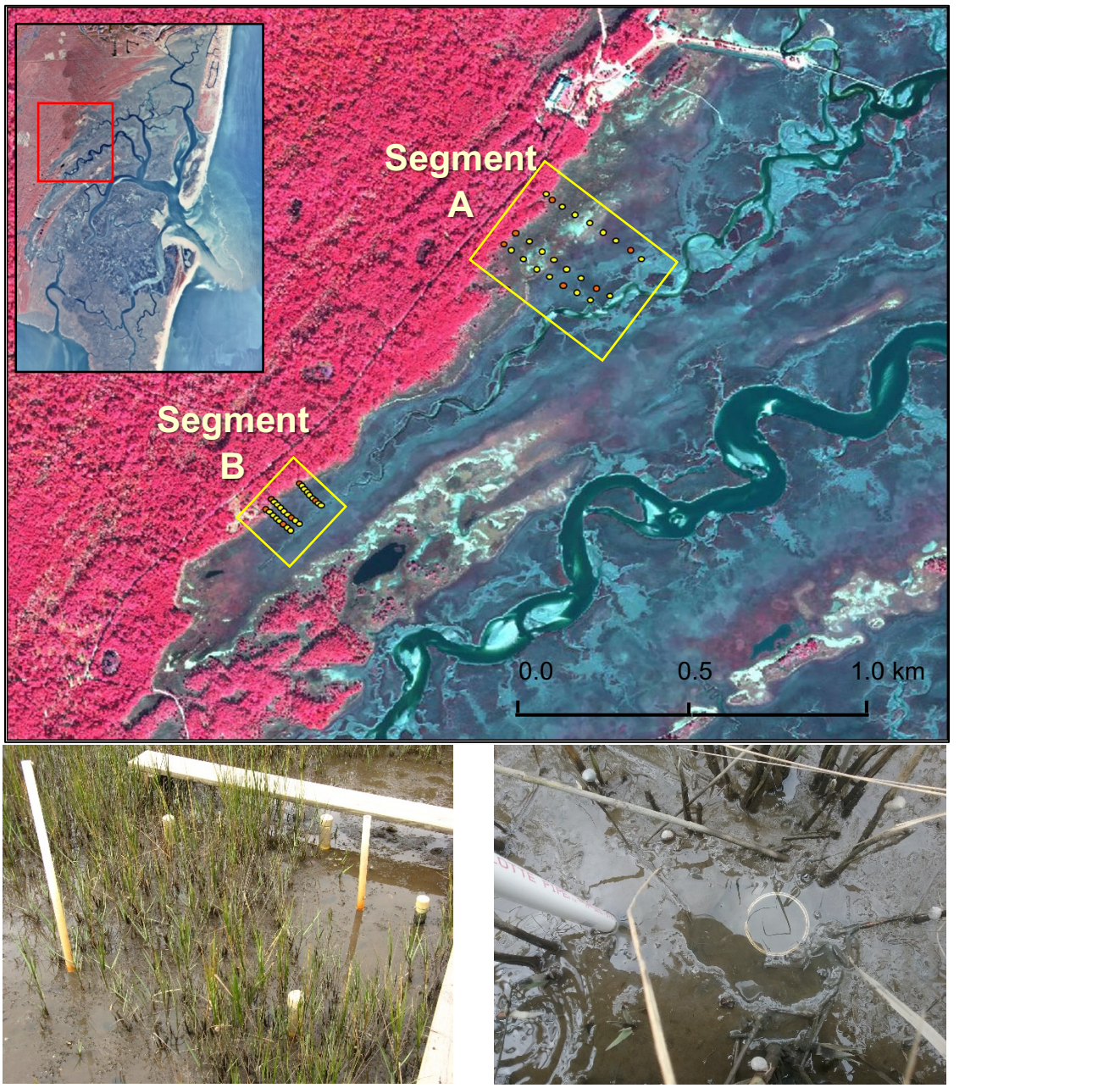

Figure S1. Top: aerial view of Crab Haul Creek in North Inlet estuary (South Carolina, USA) and areas of the marsh platform (yellow boxes, Segments A and B) where the North Inlet – Winyah Bay National Estuarine Research Reserve has implemented 50 permanent marsh monitoring plots. Parameters collected at each plot (see bottom left) include the environmental variables discussed here (elevation, % cover *Juncus*, % cover *Salicornia*, % cover *Spartina*, % cover bare, porewater salinity, sediment bulk density, and % clay in the sediment) as well as salt marsh crab pitfall trapping (see bottom right) and burrow counts. Distance between plots ranges from ~5 m to >30 m due to the different widths of the marsh zones.

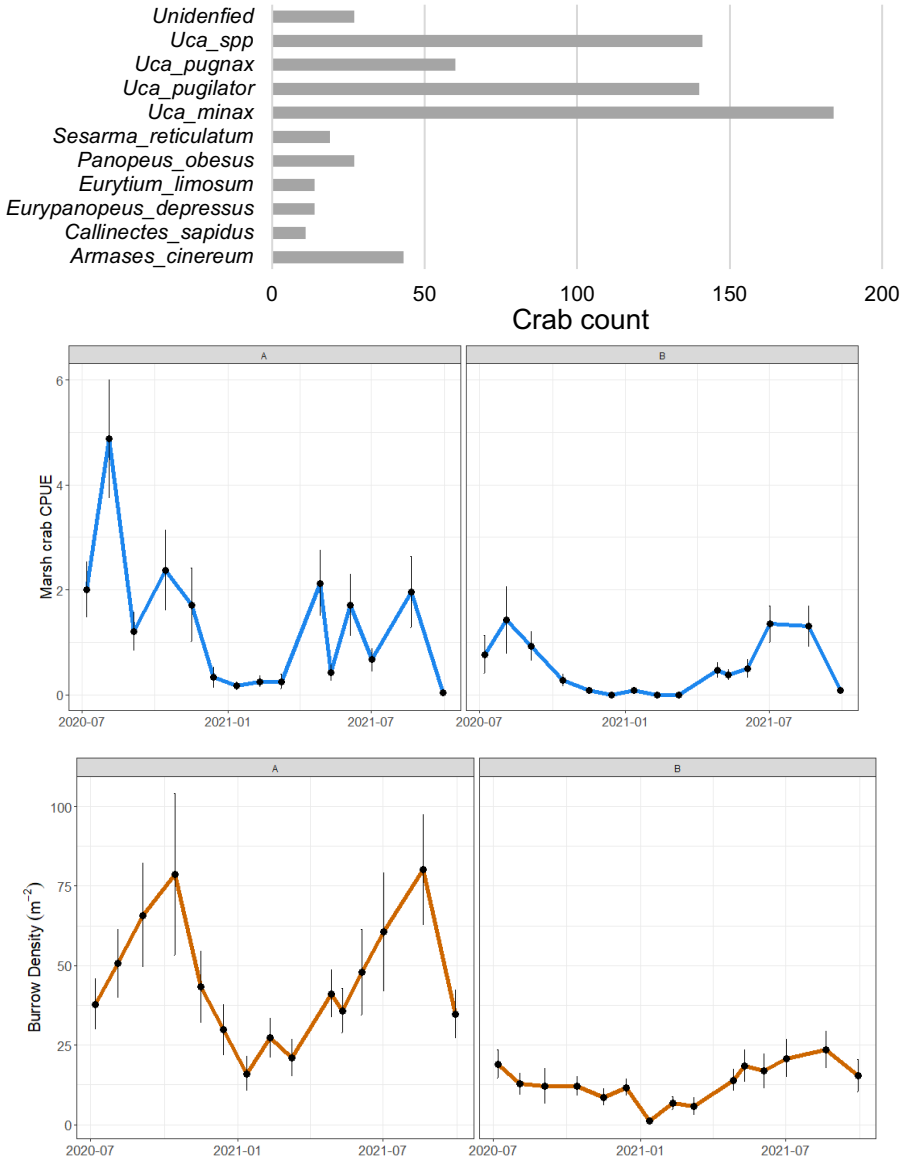

Figure S2. Salt marsh crab count by species (top), catch per unit effort, CPUE, (middle) and burrow density (bottom) from July 2020 – September 2021 from pitfall trapping and burrow counts at 50 permanent sampling plots distributed between two sites ("Segments" A & B) within the North Inlet estuary, SC, USA. Crab CPUE and burrow density are calculated as the means across all plots during one 24 h sampling event each month.

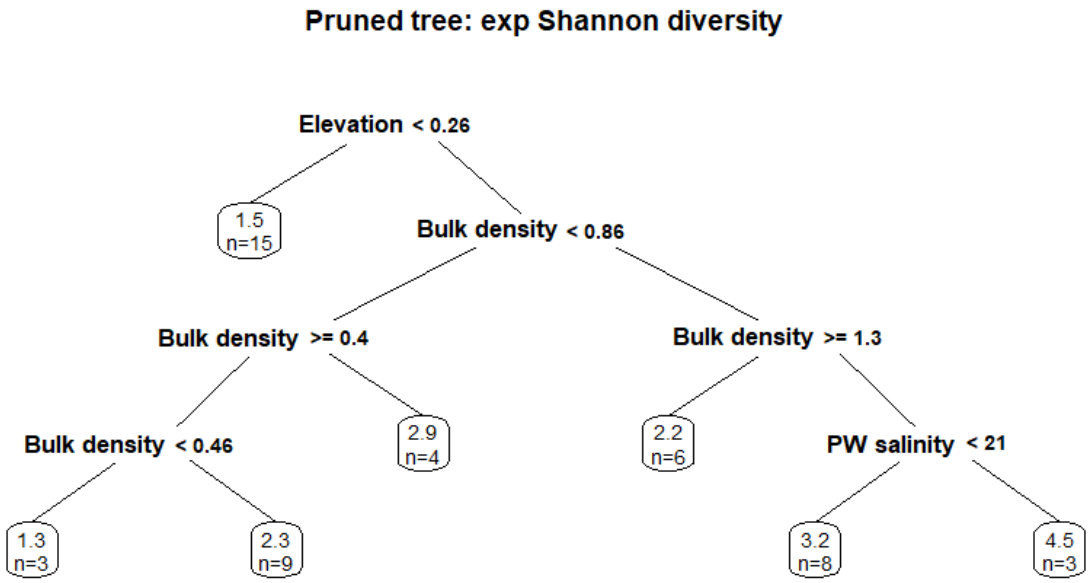

Figure S3. Pruned classification and regression tree for exponential Shannon diversity index. Each 'circle' represents a leaf node; the top line in the leaf is the mean value of all observations in that node, and the bottom line gives the number of observations. The tree was pruned based on cross-validation using cost-complexity penalization. 'Yes' is the left branch coming from a particular breakpoint, 'No' is the right branch.

Table S1. Correlation coefficients for 8 potential predictive environmental variables used in CART analyses.

	Elevation	% *Juncus*	% *Salicornia*	% *Spartina*	% Bare	PW salinity	Bulk density	% Clay
Elevation	1	0.333595	0.221979	–0.53927	–0.16699	0.068825	0.396364	–0.46221
% *Juncus*	0.333595	1	–0.04337	–0.38275	–0.15545	–0.10241	0.183685	–0.23294
% *Salicornia*	0.221979	–0.04337	1	–0.24636	–0.24488	0.2231	0.33373	–0.15779
% *Spartina*	–0.53927	–0.38275	–0.24636	1	–0.41916	–0.12545	–0.47356	0.043184
% Bare	–0.16699	–0.15545	–0.24488	–0.41916	1	0.210837	0.09477	0.376377
PW salinity	0.068825	–0.10241	0.2231	–0.12545	0.210837	1	0.486871	–0.23048
Bulk density	0.396364	0.183685	0.33373	–0.47356	0.09477	0.486871	1	–0.59842
% Clay	–0.46221	–0.23294	–0.15779	0.043184	0.376377	–0.23048	–0.59842	1

Table S2. Crab catch by species & sampling event, pooled across all 50 plots. Sampling duration was ~ 24 hours for each monthly collection event.

Species	2020						2021								
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Armases cinereum	4	5	7	2	1	0	0	0	0	5	4	6	6	2	1
Callinectes sapidus	1	1	5	0	0	0	0	0	0	1	2	0	0	0	1
Eurypanopeus depressus	7	0	1	3	2	0	0	0	0	1	0	0	0	0	0
Eurytium limosum	1	1	1	1	1	0	0	0	0	1	1	1	2	3	1
Panopeus obesus	2	1	1	1	0	1	1	0	0	1	6	7	4	2	0
Sesarma reticulatum	1	5	4	0	0	0	0	0	0	5	1	0	1	2	0
Minuca minax	14	32	5	24	4	5	3	1	5	30	3	11	16	31	0
Leptuca pugilator	0	69	13	12	10	0	1	2	0	12	1	4	1	15	0
Minuca pugnax	9	6	3	4	3	0	1	3	1	0	0	9	9	12	0
Uca spp.	19	31	10	17	17	0	0	0	0	7	3	14	9	14	0
Unidentified	10	3	1	0	5	2	0	0	0	0	0	2	4	0	0

Table S3. Crab size by species & sampling event, pooled across all 50 plots. Size is mean with standard error, when more than one crab was collected.

Species	2020						2021								
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Armases cinereum	11.8 (1.64)	11.8 (0.75)	13.41 (0.8)	12.2 (0.8)	16	–	–	–	–	12.44 (0.22)	10.38 (1.59)	11.57 (1.49)	12.25 (1.27)	12.75 (0.65)	13
Callinectes sapidus	55.5	30.4	35.72 (7.22)	–	–	–	–	–	–	35.2	32.35 (0.15)	–	–	–	38.8
Eurypanopeus depressus	13.96 (1.12)	–	10.5	15.4 (3.74)	19.15 (0.25)	–	–	–	–	15.6	–	–	–	–	–
Eurytium limosum	31.7	23.3	24.8	35.7	31	–	–	–	–	24.5	18.4	20.5	24.25 (6.55)	24.87 (2.15)	26.1
Panopeus obesus	27.85 (7.15)	25.1	27.6	35.9	–	45.5	32.7	–	–	20.9	23.43 (3.26)	26.83 (2.04)	21.05 (7.14)	31.4 (0.7)	–
Sesarma reticulatum	17.4	15.92 (0.85)	17.05 (0.8)	–	–	–	–	–	–	15.86 (1.37)	14	–	16.6	15.05 (1.45)	–
Minuca minax	18.29 (1.57)	13.22 (0.82)	16.36 (2.1)	18.3 (0.89)	17.58 (0.38)	18.44 (1.68)	11.03 (1.43)	23.6	15.32 (2.13)	16.65 (0.79)	20.27 (2.61)	16.23 (1.38)	16.14 (1.34)	15.55 (0.88)	–
Leptuca pugilator	–	13.09 (0.44)	12.8 (0.63)	11.65 (0.96)	11.72 (1.09)	–	16.2	7.75 (2.15)	–	14.4 (0.91)	13.5	15.7 (1.33)	15.2	11.43 (0.82)	–
Minuca pugnax	11.27 (0.83)	13.22 (2.26)	13 (2.02)	11.4 (1.26)	9.23 (1.29)	–	10.4	11.53 (1.17)	15.2	–	–	10.94 (0.87)	11.94 (0.51)	11.69 (0.45)	–
Uca spp.	7.18 (0.32)	7.16 (0.38)	5.88 (0.63)	6.26 (0.51)	6.08 (0.38)	–	–	–	–	8.51 (1.38)	10.73 (0.66)	6.51 (0.67)	6.8 (0.81)	6.83 (0.45)	–
Unidentified	4.81 (0.38)	3.43 (0.48)	–	–	3.24 (0.3)	5.3 (0.2)	–	–	–	–	–	5.55 (1.15)	–	–	–

Table S4. Crab catch by species and plot, pooled across all 15 sampling events. Zone codes: H = High marsh, M = Mid marsh, L = Low marsh.

Segment	Transect	Plot	Zone	*Armases cinereum*	*Callinectes sapidus*	*Eurytium limosum*	*Eurypanopeus depressus*	*Panopeus obesus*	*Sesarma reticulatum*	*Uca minax*	*Uca pugilator*	*Uca pugnax*	*Uca* spp.	Unidentified
A	1	0	H	1	0	0	0	0	1	15	0	0	1	0
A	1	1	H	2	0	0	0	0	0	19	0	0	5	0
A	1	2	H	1	0	0	0	0	2	9	7	7	18	1
A	1	3	M	3	0	0	0	0	0	7	8	0	9	0
A	1	4	M	0	0	0	0	0	1	0	13	1	3	0
A	1	5	M	0	0	2	1	1	0	1	0	1	0	0
A	1	6	L	0	1	1	0	1	0	0	1	2	3	0
A	1	7	L	0	0	0	1	1	0	0	0	0	0	0
A	1	8	L	0	0	2	3	1	0	0	0	0	0	0
A	2	1	H	0	0	0	0	0	0	16	7	0	1	0
A	2	2	H	1	0	0	0	0	0	14	10	1	1	0
A	2	3	M	1	0	0	0	0	1	3	21	0	5	6
A	2	4	M	0	0	0	0	0	0	0	4	10	12	0
A	2	5	L	0	0	0	0	2	0	0	0	2	0	0
A	2	6	L	0	0	0	2	0	0	0	0	0	0	0
A	2	7	L	0	0	0	0	0	0	0	0	0	0	0
A	2	8	L	0	0	1	0	0	0	0	0	0	0	0
A	3	1	H	2	0	0	0	0	0	3	0	1	0	0
A	3	2	H	0	0	0	0	0	0	10	12	1	6	2
A	3	3	M	6	0	0	0	0	1	1	3	0	2	0
A	3	4	M	1	0	0	0	0	5	0	14	0	1	0
A	3	5	L	0	0	1	0	2	0	0	0	0	0	0
A	3	6	L	0	0	0	0	2	0	0	0	0	0	0
A	3	7	L	0	0	0	1	3	0	0	0	0	0	0
B	1	1	H	4	0	0	0	0	3	11	2	0	2	1
B	1	2	H	4	0	0	0	0	1	2	0	0	3	0
B	1	3	H	1	0	0	0	0	0	3	1	2	4	0
B	1	4	L	1	0	1	0	2	1	0	0	1	3	1
B	1	5	L	0	0	0	0	1	0	1	0	1	0	0
B	1	6	L	0	1	1	0	0	0	0	2	0	2	0
B	1	7	L	0	1	0	0	1	0	0	0	0	0	0
B	1	8	L	0	0	0	0	0	0	0	0	0	0	0
B	1	9	L	0	0	0	0	1	0	0	0	0	0	0

Segment	Transect	Plot	Zone	*Armases cinereum*	*Callinectes sapidus*	*Eurytium limosum*	*Eurypanopeus depressus*	*Panopeus obesus*	*Sesarma reticulatum*	*Uca minax*	*Uca pugilator*	*Uca pugnax*	*Uca* spp.	Unidentified
B	2	1	H	2	0	0	0	0	1	3	2	0	0	0
B	2	2	H	4	0	0	0	0	1	2	0	0	2	4
B	2	3	L	0	0	0	0	0	0	8	0	0	1	0
B	2	4	L	0	1	0	0	1	0	1	1	0	4	0
B	2	5	L	0	0	0	0	1	0	0	0	0	0	0
B	2	6	L	0	1	0	0	0	0	0	0	3	0	0
B	2	7	L	0	2	0	0	0	0	0	0	0	0	0
B	2	8	L	0	1	0	0	0	0	0	0	0	0	0
B	2	9	L	0	0	0	1	0	0	0	0	0	0	0
B	3	1	H	6	0	0	0	0	1	6	4	0	11	5
B	3	2	L	0	1	0	0	1	0	3	0	0	2	0
B	3	3	L	0	0	0	0	0	0	4	0	4	2	0
B	3	4	L	0	0	2	0	2	0	0	0	3	0	0
B	3	5	L	0	1	0	0	0	0	0	3	5	2	0
B	3	6	L	0	1	1	0	0	0	0	0	2	2	0
B	3	7	L	0	0	0	0	1	0	0	0	0	0	0
B	3	8	L	0	0	0	0	0	0	0	0	1	0	0