The following supplement accompanies the article

Soil erodibility differs according to heritable trait variation and nutrient-induced plasticity in the saltmarsh engineer *Spartina alterniflora*

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Table S1. Pairwise Ritland and Lynch relatedness metrics (RLMs) between *Spartina alterniflora* individuals from Bay Jimmy (LA1), Catfish Lake (LA2), and New York (NY), as well as the Vermilion (C1) and CP (C2) cultivars. Each group is composed of individuals sharing a "primary" genotype, designated "1". Four additional individuals possessed unique "secondary" genotypes, designated "2". The primary LA2 genotype was identical to the C1 genotype. Bold values indicate the highest measure of relatedness for each individual, which always occurred between individuals from the same provenance.

	LA1-1	LA1-2	LA2-2	C1-1	C2-1	C2-2	NY-1	NY-2
LA1-1	0.00							
LA1-2	**0.11**	0.00						
LA2-2	-0.03	-0.04	0.00					
C1-1	0.00	0.03	**0.41**	0.00				
C2-1	-0.09	-0.10	-0.06	-0.14	0.00			
C2-2	-0.05	-0.06	-0.06	-0.15	**0.39**	0.00		
NY-1	-0.19	-0.21	-0.26	-0.26	-0.19	-0.22	0.00	
NY-2	-0.19	-0.15	-0.24	-0.18	-0.18	-0.20	**0.33**	0.00

Table S2. ANOVA results testing the effect of provenance, nitrate treatment, the interaction the two, and randomized block on *Spartina alterniflora* plant traits. Bold indicates significance ($\alpha = 0.05$). Abbreviations and acronyms refer to: above- (AG) and belowground (BG), carbon and nitrogen mass or ratio (e.g., C:N), BG rhizome (rhizome), number (no.), intrinsic (int.; i.e., controlling for area), ultimate tensile strength (UTS), and nitrate (NO_3^-).

Variable	Provenance				Nitrate				Provenance x Nitrate				Block				Error
	df	F	p	${}_p\eta^2$	df	F	p	${}_p\eta^2$	df	F	p	${}_p\eta^2$	df	F	p	${}_p\eta^2$	df
AG biomass	4	5.41	**0.001**	0.28	1	6.35	**0.02**	0.10	4	0.52	0.72	0.04	4	3.23	**0.02**	0.19	55
BG biomass	4	3.95	**0.01**	0.23	1	13.39	**0.001**	0.20	4	0.52	0.72	0.04	4	3.02	**0.03**	0.18	54
shoot:root	4	11.69	**< 0.001**	0.46	1	1.62	0.21	0.03	4	1.41	0.24	0.09	4	1.52	0.21	0.10	54
C:N AG	4	1.15	0.35	0.08	1	0.00	1.00	0.00	4	5.79	**0.001**	0.30	4	1.38	0.26	0.09	55
C:N BG	4	19.44	**< 0.001**	0.59	1	3.48	**0.07**	0.06	4	0.13	0.97	0.01	4	1.33	0.27	0.09	54
Shoot density	4	9.59	**< 0.001**	0.41	1	9.47	**0.003**	0.15	4	0.72	0.58	0.05	4	4.88	**0.002**	0.26	55
Shoot diameter	4	55.45	**< 0.001**	0.80	1	6.07	**0.02**	0.10	4	0.80	0.53	0.06	4	0.59	0.67	0.04	55
Shoot height	4	55.14	**< 0.001**	0.80	1	7.29	**0.01**	0.12	4	1.17	0.34	0.08	4	0.81	0.53	0.06	55
Leaves per shoot	4	17.41	**< 0.001**	0.56	1	0.01	0.92	0.00	4	0.88	0.48	0.06	4	2.01	0.11	0.13	55
Root:Rhizome	4	17.96	**< 0.001**	0.57	1	0.31	0.58	0.01	4	1.10	0.37	0.08	4	9.32	**< 0.001**	0.41	54
BG depth ratio	4	9.94	**< 0.001**	0.42	1	0.61	0.44	0.01	4	0.37	0.83	0.03	4	4.73	**0.002**	0.26	54
Seed mass	4	23.14	**< 0.001**	0.63	1	27.68	0.13	0.04	4	1.07	0.38	0.07	4	0.95	0.44	0.06	55
No. seed heads	4	16.47	**< 0.001**	0.55	1	0.26	0.62	0.01	4	0.49	0.74	0.03	4	0.72	0.58	0.05	55
Rhizome diameter	4	23.86	**< 0.001**	0.65	1	3.94	0.05	0.07	4	2.51	0.05	0.16	4	1.29	0.29	0.09	52
Peak load	4	16.66	**< 0.001**	0.57	1	2.24	0.14	0.04	4	0.32	0.86	0.03	4	1.37	0.26	0.10	65
UTS	4	5.24	**0.001**	0.29	1	0.09	0.77	0.00	4	0.84	0.51	0.06	4	1.46	0.23	0.10	51
Soil depth	4	1.23	0.31	0.08	1	5.31	**0.03**	0.09	4	1.93	0.12	0.12	4	3.20	**0.02**	0.19	55
Soil shear (0 cm)	4	7.52	**< 0.001**	0.35	1	4.53	**0.04**	0.08	4	0.93	0.67	0.04	4	3.42	**0.01**	0.20	55
Soil shear (10 cm)	4	4.24	**0.01**	0.24	1	8.00	**0.01**	0.13	4	0.45	0.77	0.03	4	3.63	**0.01**	0.21	55
NO_3^- abundance	4	0.33	0.33	0.05									4	1.31	0.27	0.06	91

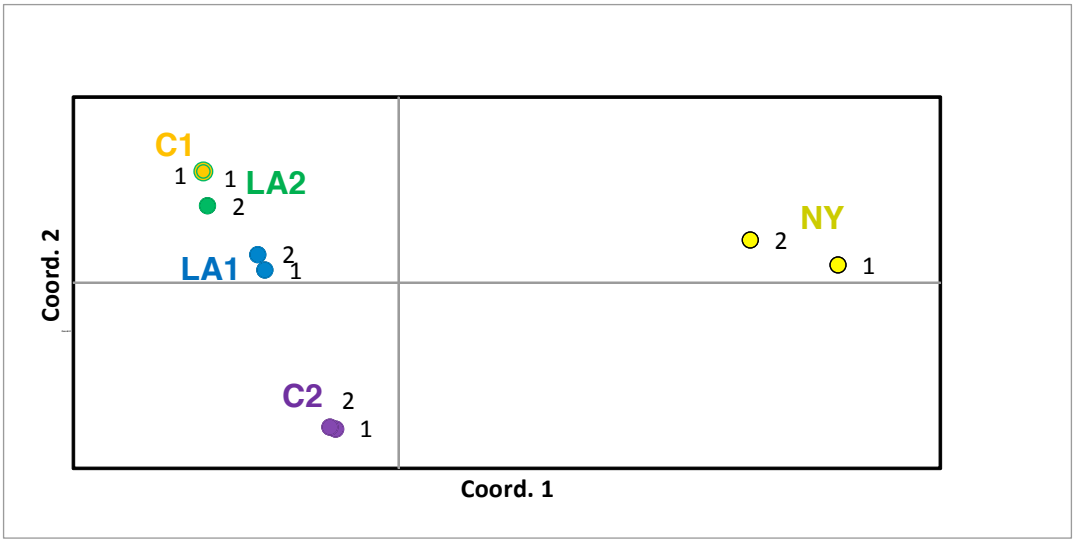

Figure S1. A Principal Coordinates Analysis (PCoA) of genetic variation among *Spartina alterniflora* estimated across eight microsatellite loci; Vermilion (C1) and CP (C2) cultivars and plants from Bay Jimmy, LA (LA1), Catfish Lake, LA (LA2), and Jamaica Bay, NY (NY) are distinguished by labels and marker color. Each group is composed of individuals sharing a "primary" genotype, designated "1". Four additional individuals possessed unique "secondary" genotypes, designated "2". The primary LA2 genotype was identical to the C1 genotype.

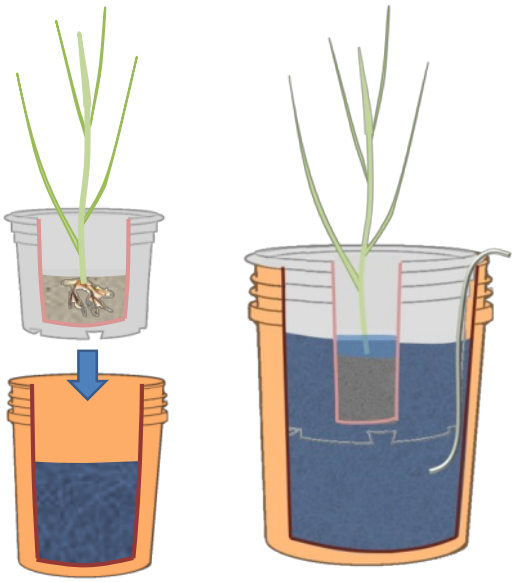

Figure S2. Experimental approach for simulating inflows and outflows.

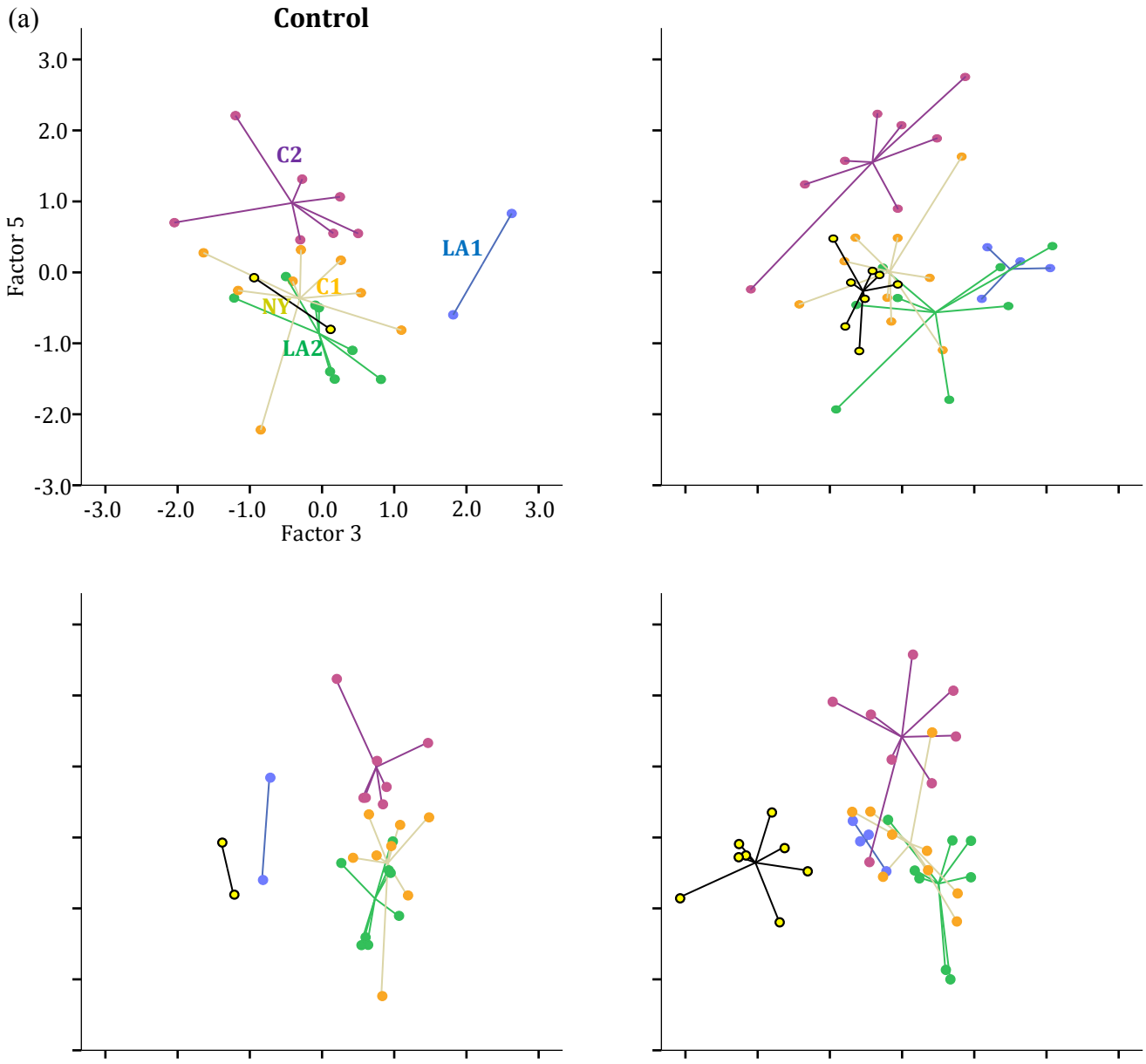

Figure S3. Variation in multivariate components of tissue chemistry and plant growth traits under control and nutrient treatments for plants from different source populations. Eight multivariate factors explain 87.3% of the total variance across all traits (Table 1). Of five factors that significantly differed by provenance, factor 2 (x-axis), factor 3 (z-axis), and factor 5 (y-axis) captured the largest proportion of trait variation based on MANOVA ${}_p\eta^2$ values. Inset depicts the nutrient-response of centroids along each axis.

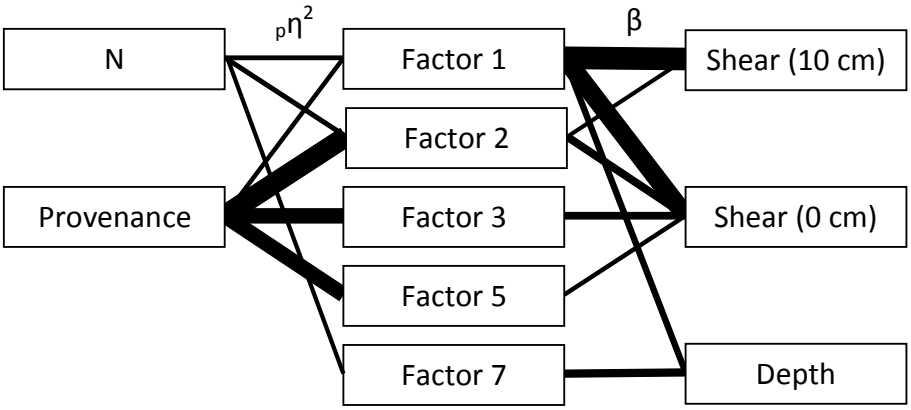

Figure S4. Heuristic illustration of relationships between nutrients (N), provenance, plant trait factors (as listed in Table S2), and soil proxies of erosion resistance. Lines between variables indicate significant effects (running left to right), where line thickness represents the proportion of variation explained (R^2 and $_p\eta^2$). Note that this figure is not a path analysis.