

1 **LIST OF TABLES:**

2 **Table S1.** Responses of soil organic carbon fractions and carbon pool management index to *Spartina alterniflora* control in salt marshes.

Control strategies	Carbon density		Carbon fractions				Microbial	
	Vegetation	Soil	SOC	EOC	DOC	MBC	quotient	CPMI
	(Mg C ha ⁻¹)	(Mg C ha ⁻¹)	(g kg ⁻¹)	(g kg ⁻¹)	(mg kg ⁻¹)	(mg kg ⁻¹)	(%)	
Unmanaged <i>S. alterniflora</i>	15.50 ± 1.10 a	56.06 ± 10.76 a	24.89 ± 6.44 a	4.51 ± 0.04 a	54.01 ± 12.94 b	86.04 ± 6.97 a	0.38 ± 0.06 b	100.00 a
Chemical control	13.07 ± 1.79 a	42.77 ± 6.62 b	9.95 ± 0.82 b	1.96 ± 0.01 b	49.34 ± 32.55 b	68.86 ± 7.13 b	0.74 ± 0.23 a	44.64 ± 1.06 b
Physical control	–	53.62 ± 16.68 ab	9.09 ± 2.61 b	1.46 ± 0.02 b	172.62 ± 62.11 a	27.83 ± 3.67 c	0.29 ± 0.10 b	35.76 ± 1.41 b

3 Note. Values in the table are shown as means ± SD (n = 9). Different lowercase letters indicate significant differences under the above
 4 controls within the same carbon budgets at $P < 0.05$.

1 **Table S2.** Responses of key plant biological traits and soil properties to invasive *Spartina alterniflora* control in salt marshes (0–10 cm).

Phenology Phase	Control strategies	AGB (kg m ⁻²)	Chl	NDVI	T (°C)	SWC (%)	SAL (ppt)	pH
Greenup	Unmanaged	0.6 ± 0.5 a	27.9 ± 4.2 a	0.4 ± 0.2 a	18.9 ± 4.6 a	28.9 ± 8.0c	10.0 ± 3.4 a	7.6 ± 0.4 a
	Chemical	0.3 ± 0.2 b	20.1 ± 7.9 b	0.2 ± 0.1 b	21.4 ± 2.4 a	68.4 ± 10.6 a	7.3 ± 4.5 ab	8.0 ± 0.3 a
	Physical	–	–	–	21.0 ± 5.0 a	45.0 ± 6.1 b	4.6 ± 0.4 b	7.6 ± 0.3 a
Maturity	Unmanaged	2.3 ± 0.4 a	35.3 ± 4.2 a	0.8 ± 0.1 a	25.7 ± 3.2a	43.5 ± 7.9 b	2.3 ± 0.8 b	7.5 ± 0.4 a
	Chemical	1.1 ± 0.7 b	37.8 ± 8.4 a	0.5 ± 0.1 b	27.0 ± 1.2a	76.3 ± 8.4 a	2.4 ± 0.4 b	7.5 ± 0.2 a
	Physical	–	–	–	26.8 ± 2.6a	44.6 ± 5.7 b	3.9 ± 0.7 a	7.8 ± 0.2 a
Senescence	Unmanaged	1.8 ± 0.04 a	32.3± 6.2 a	0.7 ± 0.05 a	13.3 ± 3.6a	55.0 ± 9.8 b	4.1 ± 0.02 a	7.2 ± 0.1 a
	Chemical	0.7 ± 0.2 b	16 ± 4.4 b	0.4 ± 0.1 b	14.5 ± 2.8a	78.8 ± 10.0 a	4.3 ± 1.9a	7.7 ± 0.1 a
	Physical	–	–	–	8.9 ± 3.3b	47.2 ± 4.6 b	3.3 ± 0.3 a	7.4 ± 0.1 a
Dormancy	Unmanaged	1.5 ± 0.3 a	17.8 ± 5.1 a	0.3 ± 0.2 a	8.6 ± 3.0a	58.1 ± 9.8 b	8.0 ± 5.3 a	7.8 ± 0.2 a
	Chemical	0.5 ± 0.1 b	16.3 ± 3.9 a	0.2 ± 0.1 b	9.5 ± 6.5a	67.7 ± 13.9 a	10.7 ± 3.3 a	7.9 ± 0.2 a
	Physical	–	–	–	10.2 ± 2.5a	49.8 ± 8.2 b	3.4 ± 0.1 b	7.5 ± 0.1 a

2 Note. Values in the table are shown as means ± SD (n = 9). Different lowercase letters indicate significant differences under the above
3 controls within phenological phases at $P < 0.05$.

4 Phenology phases: Greenup, April–June; Maturity, July–September; Senescence, October–November; Dormancy, December–next March.

5 Abbreviations: T, temperature; SWC, soil water content; SAL, salinity; carbon/nitrogen: C/N; Chl, leaf chlorophyll concentration; AGB,
6 aboveground biomass; NDVI, normalized difference vegetation index.