

## Supplementary Materials

### Supplementary Tables

Table S1. Sampling date, latitude and longitude of the cores taken by this study.

Marsh	Core ID	Sampling Date	Latitude	Longitude
Aldboro Point	AP23/1	04/08/2023	51.834533	0.987312
	AP23/2		51.833077	0.986191
	AP23/3		51.834021	0.987137
	AP23/4		51.833562	0.986089
	AP23/5		51.833293	0.986758
	AP23/6		51.832377	0.986017
	AP23/7		51.831541	0.985929
	AP23/8		51.830220	0.985362
Freiston Shore	FS23/1	15/06/2023	52.970278	0.095722
	FS23/2		52.964833	0.095111
	FS23/3		52.969361	0.096861
	FS23/4		52.970361	0.094361
	FS23/5		52.967194	0.092111
	FS23/6		52.965056	0.093944
	FS23/7		52.963917	0.090500
	FS23/8		52.961944	0.090278
Brancaster West	BW23/1	03/08/2023	52.971754	0.633353
	BW23/2		52.971694	0.630778
	BW23/3	05/06/2023	52.972167	0.631694
	BW23/4		52.971795	0.630168
	BW23/5		52.972306	0.633139
	BW23/6		52.971722	0.631611
	BW23/7		52.971583	0.630083
	BW23/8		52.972000	0.632889
Fingringhoe Wick	FW23/1	20/06/2023	51.839889	0.977083
	FW23/2		51.842139	0.972972
	FW23/3		51.839056	0.976953
	FW23/4		51.838556	0.976417
	FW23/5		51.839472	0.973806
	FW23/6		51.843167	0.972750
	FW23/7		51.843833	0.972278
	FW23/8		51.845389	0.973417

Table S2. Percentage cover of the plant species within the 1 m<sup>2</sup> areas surrounding our coring locations. AP - *Atriplex portulacoides*; AT - *Aster tripolium*; LV - *Limonium vulgare*; S - *Salicornia* spp.; SA - *Spartina anglica*; PM - *Puccinellia maritima*; TM - *Triglochin maritima*; BM – bare mud.

Core ID	AP (%)	AT (%)	LV (%)	S (%)	SA (%)	PM (%)	TM (%)	BM (%)
AP23/1	40	0	10	0	0	50	0	0
AP23/2	0	0	0	0	30	70	0	0
AP23/3	0	0	20	0	0	70	0	10
AP23/4	98	0	0	0	0	2	0	0
AP23/5	0	0	2	0	45	45	0	0
AP23/6	90	0	0	0	0	10	0	0
AP23/7	1	0	20	0	0	79	0	0
AP23/8	0	0	5	0	5	80	0	10
FS23/1	90	2	0	0	0	0	0	8
FS23/2	90	0	1	0	5	0	0	4
FS23/3	10	0	10	0	0	80	0	0
FS23/4	80	0	0	0	5	0	0	15
FS23/5	0	0	10	0	5	80	5	0
FS23/6	90	0	5	0	0	0	0	5
FS23/7	15	0	10	70	0	0	0	5
FS23/8	10	0	0	0	60	10	0	20
BW23/1	0	0	0	0	80	0	0	20
BW23/2	0	0	0	0	80	0	0	20
BW23/3	90	5	0	0	0	0	0	5
BW23/4	90	0	5	0	0	0	0	5
BW23/5	80	0	10	5	0	0	0	5
BW23/6	0	0	5	0	40	0	0	55
BW23/7	10	0	0	30	20	0	0	40
BW23/8	10	0	25	0	20	15	10	20
FW23/1	0	0	0	0	90	0	0	10
FW23/2	0	0	0	0	70	0	0	30
FW23/3	0	0	0	0	90	0	0	10
FW23/4	0	0	0	40	40	0	0	20
FW23/5	60	0	0	20	0	0	0	20
FW23/6	0	0	0	30	0	0	0	70
FW23/7	0	0	0	20	5	0	0	75
FW23/8	0	0	0	0	25	0	0	75

Table S3. Summary of the variables identified that differ between restored and natural saltmarshes that could be useful as indicators of restoration.

<b>Factor</b>	<b>Natural marsh conditions</b>	<b>Restored marsh conditions</b>
OC and N content	Values are lowest at the bottom of the core and increase at higher depths, peaking at the surface – this is due to OM decomposition.	A peak in values is seen during or soon above the restoration horizon and after this OC and N content fall to levels like those seen pre-restoration.
Ratio of recalcitrant OM	Labile OM content increases up the cores because a high level initially enters the sediment, but this is quickly broken down.	Soon after the restoration horizon, there is sometimes an influx of labile OM. The ratio remains very stable up the core, suggesting stabilisation happens through mineral association as in uplands.
Ratio of OC to N	Average across all natural marsh samples is $14.30 \pm 1.75$ .	Average across all restored marsh samples is $10.52 \pm 2.65$ .

## Supplementary Figures

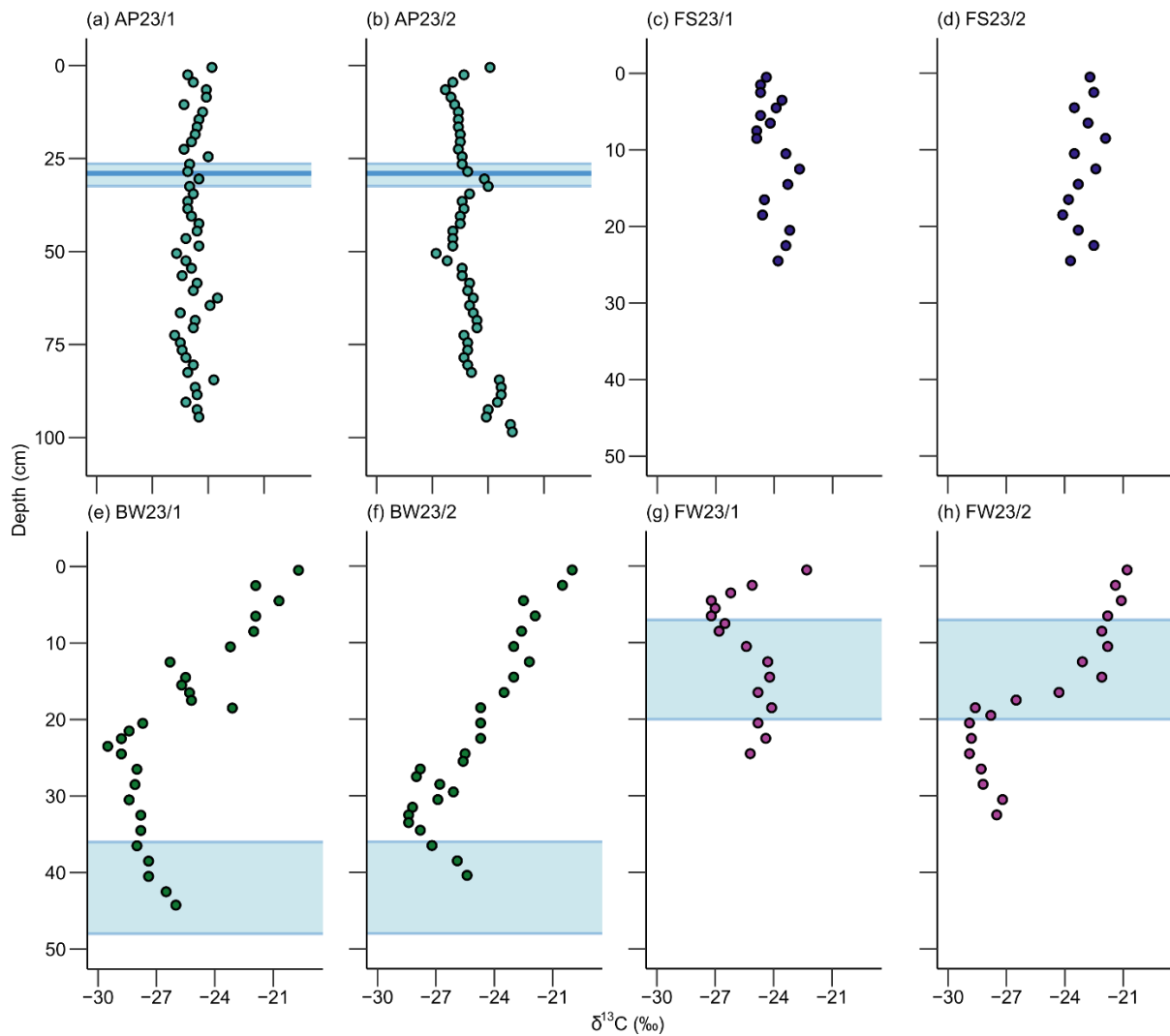


Figure S1.  $\delta^{13}\text{C}$  content of the wide diameter cores taken from (a & b) Aldboro Point, (c & d) Freiston Shore, (e & f) Brancaster West and (g & h) Fingringhoe Wick. The shaded blue areas denote the depth range at which the breaches may have occurred.

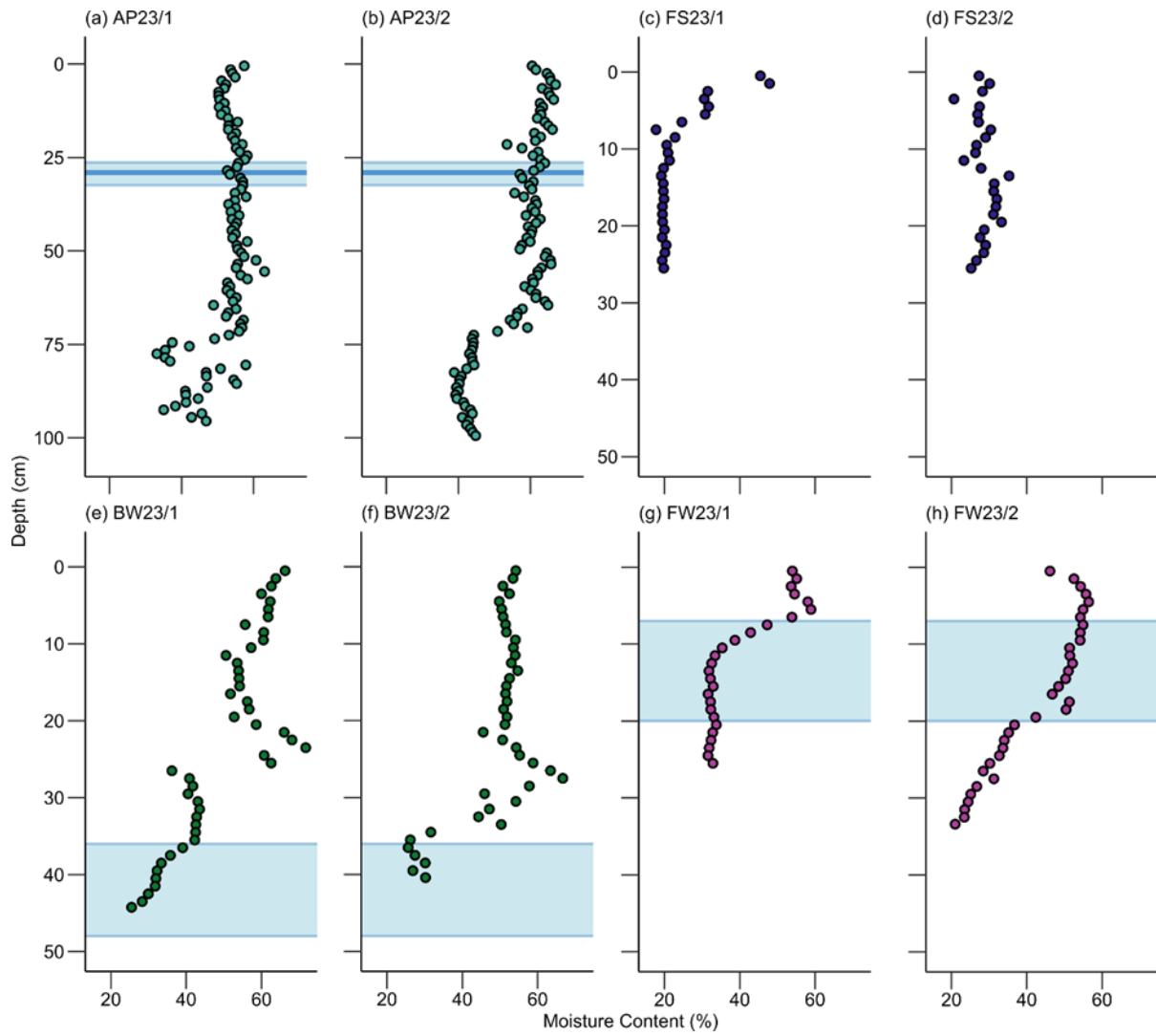


Figure S2. Moisture content of the wide diameter cores taken from (a & b) Aldboro Point, (c & d) Freiston Shore, (e & f) Brancaster West and (g & h) Fingringhoe Wick. The shaded blue areas denote the depth range at which the breaches may have occurred.

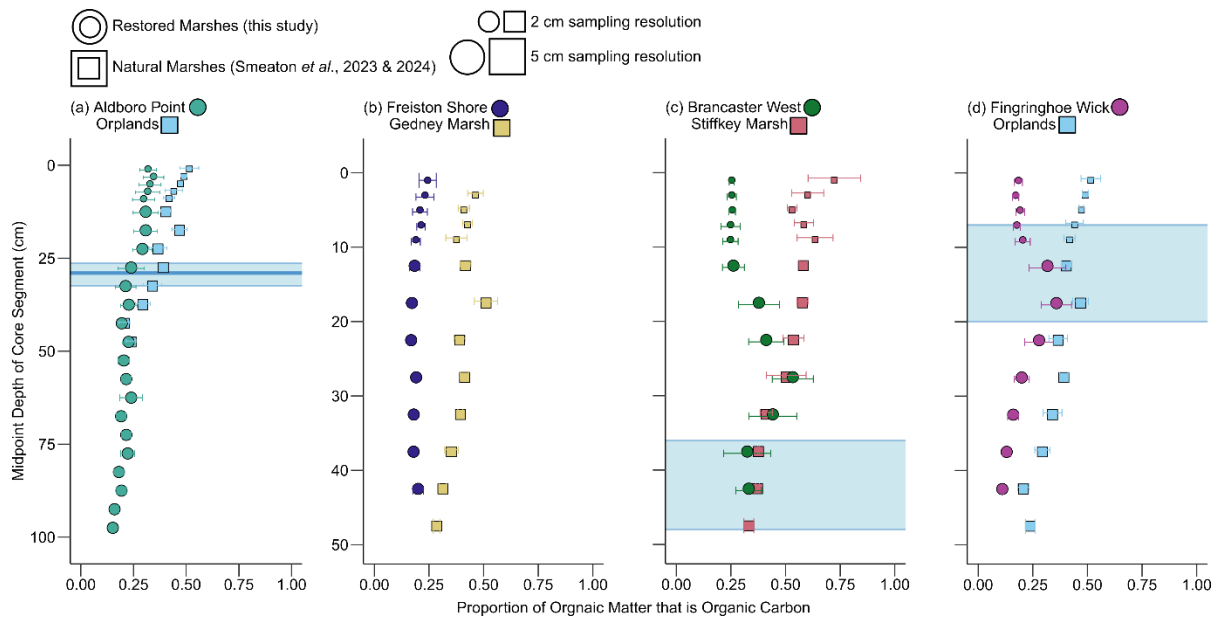


Figure S3. Proportion of total organic matter content that is organic carbon in the narrow cores taken from (a & b) Aldboro Point, (c & d) Freiston Shore, (e & f) Brancaster West and (g & h) Fingringhoe Wick. Restored marsh datapoints are always represented by circles while natural marsh data, collected by Smeaton *et al.* (2023; 2024) are represented by squares. Smaller symbols represent 2 cm samples while larger ones represent 5 cm samples. The shaded blue areas denote the depth range at which the breaches may have occurred and apply only to the restored saltmarshes, not the natural marshes.

## References

Smeaton, C. *et al.* (2023) 'Organic carbon stocks of Great British saltmarshes', *Frontiers in Marine Science*, 10. Available at:

<https://www.frontiersin.org/articles/10.3389/fmars.2023.1229486>.

Smeaton, C. *et al.* (2024) 'Organic carbon accumulation in British saltmarshes', *Science of The Total Environment*, p. 172104. Available at: <https://doi.org/10.1016/j.scitotenv.2024.172104>.