

Developmental trajectories of sedimentation in restored and created coastal wetlands along the Mississippi-Alabama coastline.

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INTRODUCTION

- Coastal wetlands are declining, due to several factors, including decreased sediment loading. (1)
- Net sedimentation impacts the capacity for coastal wetlands to build vertically at a pace equal to or greater than local sea-level rise. (2)
- It is unclear if restored/created wetlands develop naturally equivalent sedimentation dynamics over time (3)

STUDY GOALS

1. Assess sediment dynamics in natural and restored/created tidal marshes
2. Determine recovery of natural sediment dynamics in restored/created tidal marshes
3. Evaluate factors related to recovery of natural sediment dynamics

METHODS

- **Study Area:** 4 natural and 9 restored/created ("restored") marshes along the Mississippi-Alabama coastline (Figure 1)
- **Sedimentation:** 3 petri dishes staked in each marsh, left for 52 days and then dried at 50* C ($\text{g cm}^{-2} \text{ day}^{-1}$)
- **Suspended Sediment:** ~250 mL of water collected at each site, vacuum filtered, dried at 50* C (mg ml^{-1})
- **Organic Matter:** dried sediment (sedimentation and suspended sediment) ashed in muffle oven at 550* C for 6 hours (%)
- Mann-Whitney U (comparisons), Spearman Correlations (correlations)

RESULTS

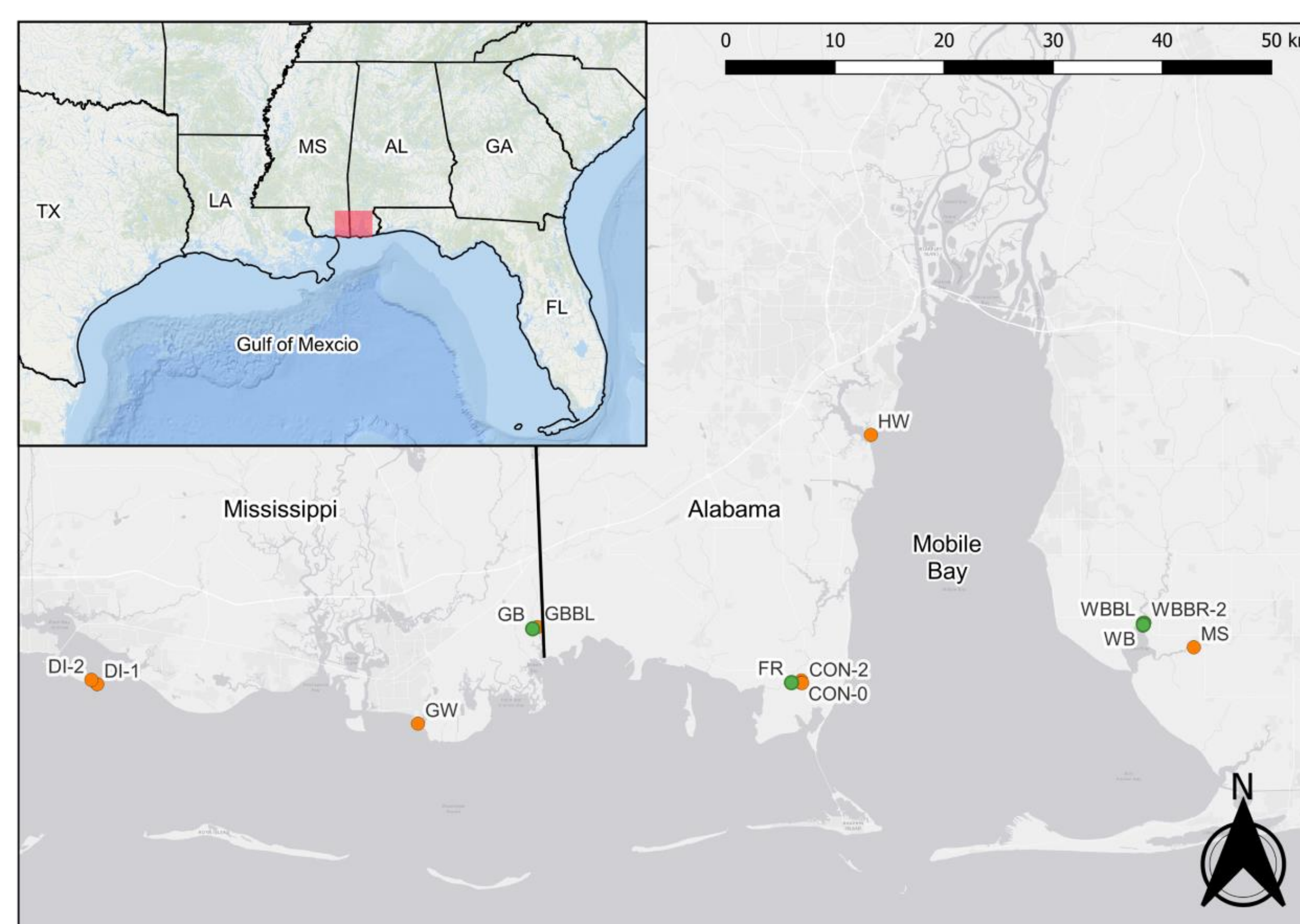


Figure 1. Location of sites along Mississippi-Alabama coastline

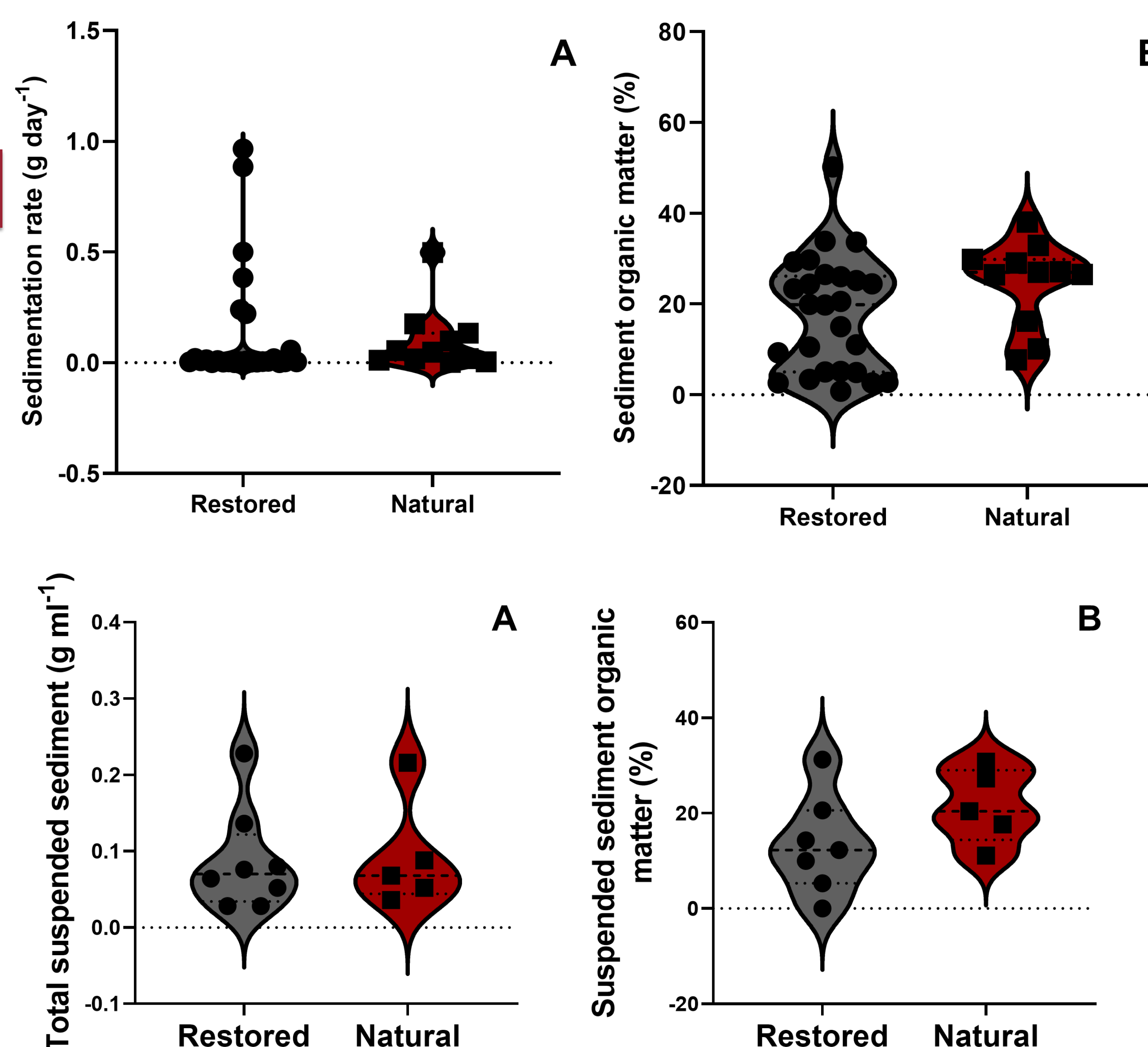


Figure 4. Relationship between (A) suspended sediments and sedimentation, and (B) organic matter of suspended sediments and deposited sediments

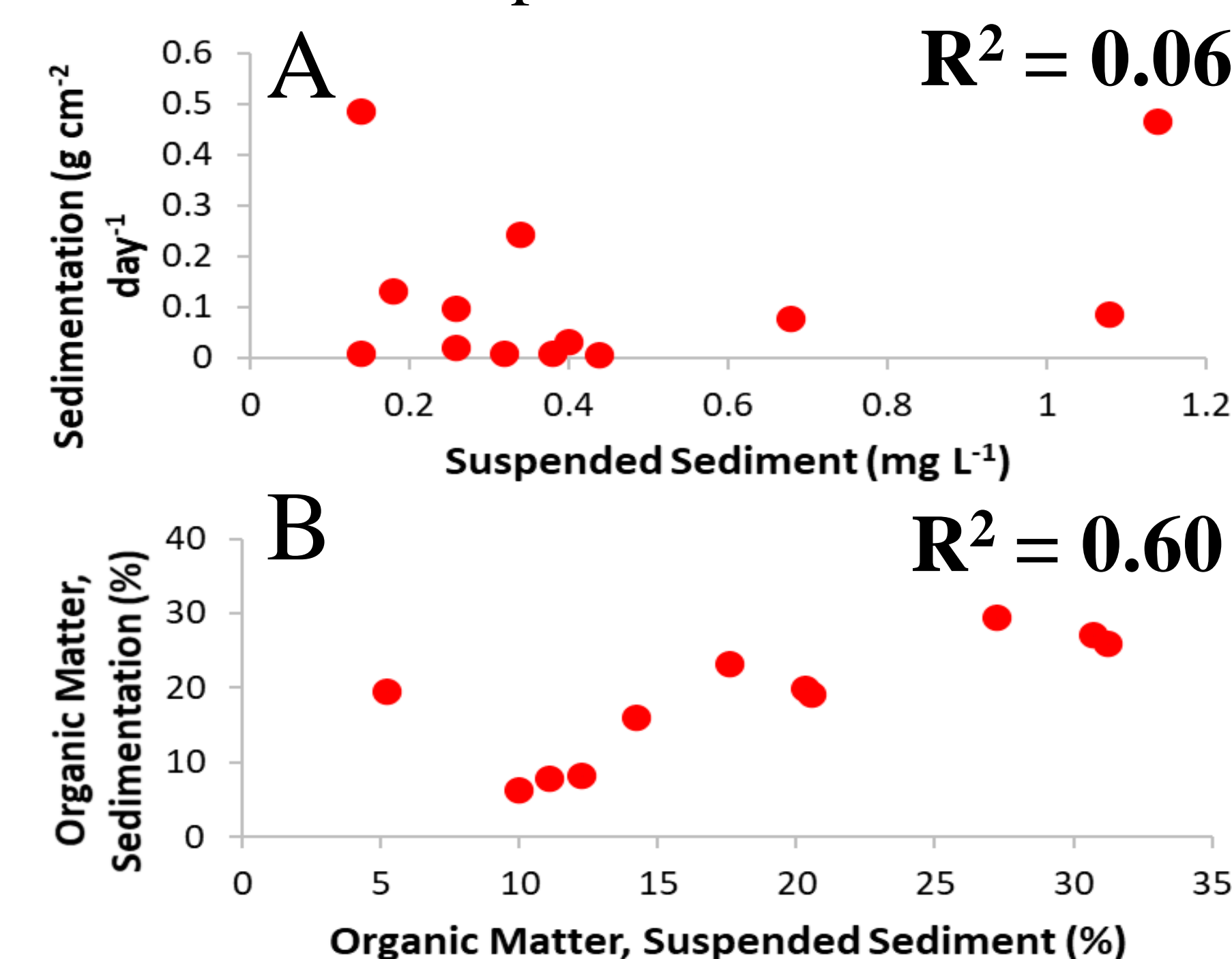


Figure 2. Comparison of sedimentation rates (A) and organic matter of deposited sediment (B) between restored and natural marshes. No significant difference in sedimentation ($U = 106, p = 0.23$), significant difference in organic matter ($U = 82, p = 0.04$)

Figure 3. Comparison of total suspended sediments (A) and organic matter of suspended sediment (B) between restored and natural marshes. No significant difference in sedimentation ($U = 18.5, p = 0.857$) or in organic matter ($U = 10, p = 0.269$)

RESULTS (cont.)

- Sedimentation was consistent between restored and natural marshes (Figure 2A, but organic matter was significantly higher in natural marshes (Figure 2B))
- Suspended sediments were similar to (3A), and organic matter double (3B) in the natural marshes
- Suspended sediment was not strongly correlated with sedimentation (Figure 4A), but organic matter content of suspended sediments was strongly positively correlated with organic matter of deposited sediments (Figure 4B)

CONCLUSIONS

- Restored and natural marshes receive similar total amounts of sediment, suggesting they both have similar capacities to respond to sea-level rise
- However, differences in organic matter accumulation may negatively impact vertical accretion overtime
- While suspended sediment loads did not correspond to sedimentation, they may provide insight into the quality of deposited sediments in restored tidal wetlands.

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