

Article published entitled “Seasonal variation in bay-marsh sediment exchange through a back-barrier salt marsh tidal creek”

USACE CW and USGS partners published a paper highlighting the seasonal factors influencing sediment exchange in tidal creeks. The increased understanding of sediment exchange in tidal creeks will better inform the Beneficial Use of Dredged Material (BUDM) and Engineering with Nature (EWN) efforts to reduce dredging costs and supplement mineral sediment to coastal wetlands.

The USACE aims to expand the Beneficial Use of Dredged Material (BUDM), particularly for fine-grained sediments, to reduce dredging costs and to benefit coastal communities and ecosystems. To keep pace with current and projected rates of sea-level change, coastal salt marshes often require increased inputs of mineral sediment. This situation provides a significant opportunity for the USACE to reduce dredged material transport distances and costs while supplementing the mineral sediment budget of coastal salt marshes. The recently published article “Seasonal variation in bay-marsh sediment exchange through a back-barrier salt marsh tidal creek” in the *Journal of Limnology and Oceanography* examines a 13-month time series of sediment discharge and sediment concentration throughout a New Jersey salt marsh tidal creek to better understand drivers of bay-marsh sediment exchange. Prior studies have typically examined much shorter datasets – up to several weeks – precluding their ability to resolve seasonal variations in sediment balance.



Figure 17. Data collection at the mouth of Southeast Creek, Gull Island, New Jersey.

Key Contributions:

- Sediment transport in the tidal creek was strongly seasonal, such that 90% of the sediment export occurred during overbank tides that flooded the marsh combined with water temperatures exceeded 14 °C, conditions met in only 30% of the observed tidal cycles.
- The 530 tons of net sediment export observed during the 13-month instrument deployment was small (3–4%) relative to the mass of dredge material placed on Gull Island, suggesting that in the project context, regular application of thin-layer placement appears to be a viable approach in terms of providing a sediment subsidy to this back barrier salt marsh.
- The data collected from this study will be applied to validate predictive models of beneficial use practices over a wide range of coastal saltmarsh settings in an upcoming Dredging Operations and Environmental Research (DOER) study.

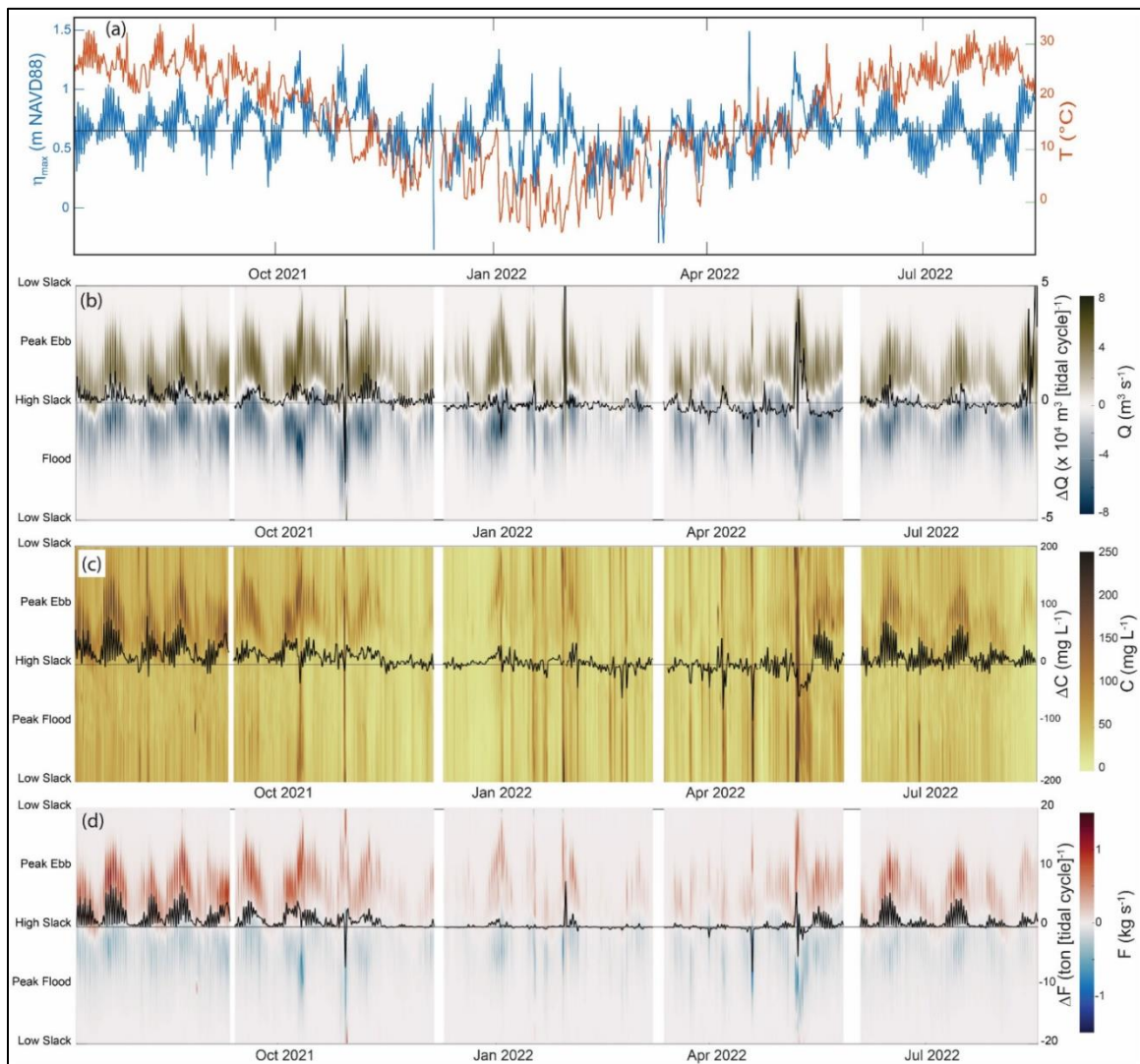


Figure 18. Timeseries signals of (a) temperature and peak tidal water level, (b) water discharge, (c) suspended sediment concentration, and (d) suspended sediment flux at Southeast Creek, Gull Island, New Jersey.

Link: <https://doi.org/10.1002/lno.70193>

Reference: Snedden, Gregg A. and S. Jarrell Smith. 2025. Seasonal variation in bay-marsh sediment exchange through a back-barrier salt marsh tidal creek. *Limnology and Oceanography*. <https://doi.org/10.1002/lno.70193>

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