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Understanding Blue Carbon Storage and Dynamics in the Fraser River Estuary, Canada

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Salt marshes are significant carbon sinks that can help mitigate anthropogenic climate change and protect coasts, but they are increasingly lost due to erosion, land reclamation, and changes in intertidal zones. The scale of carbon loss from salt marsh erosion remains uncertain, as it is unclear whether eroded carbon is remineralized, buried on tidal flats, or exported offshore. To address this knowledge gap, we combined historical and recent mapping of salt-marsh boundaries with sediment coring across different marsh zones and adjacent tidal flats in the Fraser River estuary, comparing sites at various stages of erosion and accretion. By applying standard inventory-based measurements alongside a combination of ^{210}Pb and portable optically-stimulated luminescence dating, we quantify carbon cycling in these dynamic environments. This integrated approach provides a new understanding of salt-marsh carbon mobilization and retention, clarifies the roles of salt marshes and tidal flats in coastal carbon cycling, and supports blue carbon assessments at a broader scale.