



# Gulf of Mexico Estuarine Blue Carbon Stock, Extent and Flux: Mangroves, Marshes, and Seagrasses: A North American Hotspot

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## Abstract:

The blue carbon habitats are comprised of species of mangroves, seagrass, and marshes in the Gulf of Mexico (GoM), which grow profusely chiefly in estuaries, storing substantial sedimentary organic carbon of 605.5 to 615.4 Tg C. We have integrated new carbon investigations of buried organic carbon in Mexican mangroves, Louisiana marshes and seagrasses throughout the Gulf of Mexico to elucidate a new comparison of GoM carbon stock and portions of a flux estimate with Atlantic coastal carbon and other areas. We note the hydrospheric carbon flows from the watersheds into the GoM estuaries bring enriched carbon dioxide into the GoM basin. The mangroves' new results demonstrate sedimentary storage of the greatest amount of carbon (310.8Tg in first meter) in GoM mangroves, although seagrasses (greater than mangroves in extent) store 184.9Tg in their first meter. There is high variability up to 2100 Mgha<sup>-1</sup> storage. GoM mangroves store carbon up to 6 m in depth, so the conservative amount reported is only a fraction of the storage in the comparative top meter. Marshes show highest carbon salt marsh storage in Louisiana, followed by lesser storage in Florida, Texas, then Mexico and equaling total marsh stock of 109.8-119.7Tg. The southeastern Mexican mangroves, experiencing higher winter temperatures than Florida and fewer extreme storms, especially show high productivity and very deep sediment Corg storage. This deep buried Carbon is not reflected in our estimates of the first meter of sediment. Partial fluxes for present new data are discussed as well as constraints on the carbon cycle of these ecosystems such as widespread anthropogenic destruction of blue carbon. Comparison of stocks with the Atlantic Coastal stock of North American is carried out. These sets of investigations were first assembled at the Botanical Society of America Symposium on Blue Carbon in the Gulf of Mexico.