Abstract

Tidal freshwater wetlands (TFWs) are regulated by many of the same factors that operate in saline tidal wetlands, yet the interplay among element cycles in TFWs is unique. TFW sediment deposition is rapid, particularly when located near the estuarine turbidity maximum, which drives high rates of soil C, N and P sequestration. TFWs export dissolved organic and inorganic carbon, thereby contributing to estuarine alkalinity. Primary production is not consistently limited by nitrogen or phosphorus, and plant nutrient demand is met primarily through internal recycling. TFWs emit methane at high rates due to low sulfate concentrations. The impact of sea level rise on the radiative balance of TFWs is unclear due to complex interactions between increasing salinity and sulfate concentrations on primary production, sediment carbon deposition, decomposition rates, methanogenesis, and methane oxidation. It is assumed that TFW processes adhere to generalizations drawn from salt marshes, but more biogeochemical research focused on low-salinity tidal wetlands is needed.

Keywords

coastal wetland, tidal freshwater wetland, methane emissions, carbon sequestration, sediment deposition, internal nitrogen cycling, carbon budget, nitrogen budget, hydrologic export, dissolved inorganic carbon, dissolved organic carbon, phosphorus, sea level rise, sulfate reduction, iron reduction