Seagrass avoided loss and restoration

Seagrasses provide shoreline protection, critical habitat, and sequester 80 million metric tons of carbon per year.2 Of the three types of coastal wetlands, only seagrasses have meaningful rates of ongoing avoidable conversion in the continental U.S. Due to their protected status, the relatively small losses of mangroves and tidal marsh are due to sea level rise and sedimentation and cannot be avoided by improved management in the near term.3 The seagrass opportunity also offers optimal economic and ecological opportunities. Avoided seagrass loss: Avoided CO2 emissions from avoiding seagrass loss. An estimated 1.5% of seagrass extent is lost every year.4 We assumed that half of the carbon contained in seagrasses and sediment from disappearing seagrass beds is lost to the atmosphere.5 The maximum mitigation potential was found to be 6.5 Tg CO2e yr⁻¹.

Seagrass restoration: In increased sequestration from restoring the estimated 29 to 52% of historic seagrass extent that has been lost and could be restored. We estimated the average carbon sequestration rate in the sediment of seagrass restorations based on data from six seagrass restoration sites in the United States.6 The maximum potential mitigation was found to be 5.9 Tg CO2e yr⁻¹.

Tidal wetland restoration

While the contribution of coastal wetlands compared to other NCS strategies is limited by comparison, tidal wetland restoration (including salt marshes and mangroves), is one of the top 10 NCS opportunities in the United States, which combined account for 90% of the maximum NCS mitigation potential of all the coastal wetland pathways.

In the United States, 27% of tidal wetlands have limited tidal connection with the sea, causing their salinity to decline when freshwater is introduced to the point where methane emissions increase.8 Both drainage and impoundment are typical anthropogenic interventions in marsh systems causing degradation.9 The fate of soil C in wetlands, and emissions of CH4 and CO2, largely depend on water salinity and water table elevation relative to the soil surface.

Blockage or restriction of tidal flows through installation of dikes or tide gates is a common method to protect coastal infrastructure. Tidal wetlands have also been drained for farming, mosquito control, and development; raising water tables to reduce salinity for aquaculture, rice production, and wetland management. Reconnecting salt marshes to the sea re-establishing the natural hydrology can reduce emissions from methane and turn these systems into powerful sinks again. This can be done through the removal or opening of dikes, culverts, and tide gates.

References