

## Net uptake of atmospheric CO<sub>2</sub> in human-dominated estuarine and shallow coastal systems: empirical studies and the ecosystem modeling

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Estuarine and shallow coastal systems (ESCS) are recognized as not only significant carbon reservoirs but also net emitters of CO<sub>2</sub> to the atmosphere, posing the dilemma of how ESCS functions relate to climate change mitigation. However, some studies have shown that ESCS take up atmospheric CO<sub>2</sub>. Here we reviewed empirical studies and developed a new ecosystem model to investigate the magnitude and determinants of net uptake atmospheric CO<sub>2</sub> by ESCS. We found that the capability of ESCS to function as CO<sub>2</sub> sinks is enhanced by environmental conditions that are typical of human-dominated systems (e.g., input of high terrestrial nutrients, input of treated wastewater in which labile carbon is highly removed, and presence of hypoxia).

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