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TITLE: Future seagrass beds: Can increased productivity lead to increased carbon storage?

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ABSTRACT:

While carbon capture and storage (CCS) is increasingly recognised as technologically possible, recent evidence from deep-sea CCS activities suggests that leakage from reservoirs may result in highly CO₂ impacted biological communities. In contrast, shallow marine waters have higher primary productivity which may partially mitigate this leakage. We used natural CO₂ seeps in shallow marine waters to assess if increased benthic primary productivity could capture and store CO₂ leakage in areas targeted for CCS. We found that the productivity of seagrass communities (in situ, using natural CO₂ seeps) and two individual species (ex situ, *Cymodocea serrulata* and *Halophila ovalis*) increased with CO₂ concentration, but only species with dense belowground biomass increased in abundance (e.g. *C. serrulata*). Importantly, the ratio of below:above ground biomass of seagrass communities increased fivefold, making seagrass good candidates to partially mitigate CO₂ leakage from sub-seabed reservoirs, since they form carbon sinks that can be buried for millennia.

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