Marine and Coastal

National Environmental Science Program

Coastal wetland restoration for blue carbon in northern Australia

Project 1.15

Project Summary

Investment in restoration of coastal wetland ecosystems is increasing due to concerns around habitat loss, water quality, decline in fish catches, coastal inundation and erosion, and climate change. Coastal wetlands, including mangroves, saltmarshes, seagrasses and tidal freshwater forests like Melaleuca have significant capacity to sequester carbon dioxide contributing to blue carbon stocks. They provide habitat for coastal fisheries and a range of biodiversity and are culturally important. This project aims to develop a method, that can be widely used across Australia, to identify coastal wetland restoration sites for blue carbon projects based on a value-based framework that considers biophysical suitability, wetland values (biodiversity, fisheries, nitrogen removal, Indigenous heritage, and flood mitigation), benefits to Traditional Owners, regulation and policy adequacy, and economic feasibility.

Problem

Australia has large blue carbon stocks, many of which have been degraded or converted since European colonisation, and which provide opportunities for restoration for carbon credits that could provide income incentives to landholders and Indigenous land managers. Factors influencing the opportunity for coastal wetland restoration are likely to vary across Australia's coastline, but an analysis of the variation in economic feasibility over different regions with different farming systems, pressures, ecosystem services, and potential carbon abatement, is yet to be done.

How Research Addresses the Probelm

An assessment of opportunities for blue carbon restoration in the Wet Tropics (Hagger et al. in press) has shown that there are large areas of low-lying sugarcane and grazing land that could be restored. This project will build on this assessment to 1) identify the opportunity for coastal wetland restoration for blue carbon in other climatic and land use contexts in northern Australia, 2) incorporate policy and regulatory frameworks into the identification of restoration sites, and 3) refine land suitable for restoration through a value-based framework that considers wetland values and opportunities for Indigenous-led carbon projects.

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General Project Outcomes

We will apply this framework in three case study regions: the southern Great Barrier Reef catchment in QLD (Fitzroy Basin Association NRM), Peel Harvey and South West Catchments Councils in south-west WA, and the Ord River floodplain in east Kimberley WA and north-west NT. Firstly we will identify opportunities for assisted natural regeneration through modification of drains and/or tidal exclusion structures to allow tidal reintroduction, as well as fencing to remove non-native ungulates. We will estimate the climate change mitigation from carbon sequestration in biomass and soils and avoided emissions following the ERF blue carbon tidal restoration method and using Australian specific emission factors and regional carbon data.

To identify sites that are economically feasible, we will undertake a cost-benefit analysis considering financial benefit from climate change mitigation, restoration and maintenance costs, and forgone revenue from ceasing the existing agricultural (or other) land use. We will undertake this for several scenarios to determine sensitivities to varying conditions.

Then we will develop a framework for selecting restoration sites that are economically feasible and valued for biodiversity, fisheries, nitrogen removal, Indigenous heritage, and flood mitigation using a whole of systems approach. Of special interest is the incorporation of regulatory frameworks that aligns within governments priorities, such as ongoing projects in catchments, and the inclusion of Traditional Owners in decision-making to support partnerships in restoration projects, which will involve engagement with government agencies, NRM groups and Indigenous groups.

We will compare the case studies to identify issues with data availability, restoration opportunity under different climatic and land use contexts, and trade-offs between benefits.

Project Leads

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