NT Blue Carbon Workshop **Summary Report**

Charles Darwin University, Darwin November 22, 2023

Hosted by the Northern Institute, Charles Darwin University, and the University of Queensland









Research Institute for the Environment and Livelihoods





Background

Mechanisms are being developed globally to mitigate and abate changes in our climate created by anthropogenic carbon emissions.

Market-based mechanisms aim to financially link those producing carbon (and therefore increasing atmospheric carbon) with those who foster actions to sequester carbon (thus decreasing atmospheric carbon); producers pay to sequester equal or greater amounts than they produce. By achieving this net zero emissions scenario (i.e. a balance between greenhouse gas emissions produced and removed) or better, these market-based mechanisms aim to avoid the catastrophic climate change trajectories predicted under 'business as usual' models.

A wide range of ecosystems can sequester carbon, most utilising plants that remove carbon from the atmosphere and bind it into their ecosystems. Blue carbon refers to the carbon stored in coastal and marine plant ecosystems, such as mangrove, seagrass, saltmarsh and other coastal and marine ecosystems (Howard et al. 2023). Marine carbon sinks have been shown to hold equal or higher concentrations of carbon than terrestrial systems (Lovelock et al., 2019; McCreadie et al., 2021). Coastal and intertidal carbon sinks like mangroves, saltmarshes and seagrass beds provide a range of other ecosystem services that will directly build coastal resilience (e.g. mangroves protect coasts from storm surges that are likely more frequent under climate change) (Hagger et al., 2022a). Australia holds significant potential for blue carbon sequestration with its extensive coastline and diverse ecosystems (Serrano et al. 2019).

Many activities are occurring nationally and internationally to support marketbased solutions to climate change, crediting carbon abatement through carbon markets. Within Australia, the regulated creation and sale of carbon credits (Australian Carbon Credit Units, or ACCU) is administered through the Clean Energy Regulator (CER). Under this regulated market, various vegetation-based methods describe how carbon can be abated and how sequestered carbon abatement can be calculated under different activities.

Methods that utilise marine systems are new and emerging, with only one method currently (April 2024) available – the 'Tidal restoration of blue carbon



Mangroves and seagrass beds provide a range of ecosystem services that will directly build coastal resilience

ecosystems' method. Other methods are in development, such as i) integrated farming management; ii) the feral ungulate management, and iii) seagrass restoration. Concurrent to these carbon-based markets are other natural capital markets that aim to monetise and incentivise the restoration of biodiversity, ecosystem function and the connection between people and Country. These 'core benefits' complement carbon abatement through vegetation-based methods and could be quantified and sold. Markets are being established that may grant the ability to purchase carbon credits with associated co-benefits for an additional cost.

Some national-scale analyses have been conducted that include the Northern Territory coast. A preliminary CSIRO analyses suggest large potential for blue carbon abatement in the Northern Territory (Kelleway et al. CSIRO 2023), though these are concentrated in particular locations. Other locality-focussed analyses for the top end suggest that the mechanisms available within the existing tidal restoration method have limited scope in the NT – not because there is limited potential for abatement and restoration in coastal wetlands, but because the types of coastal modification this method targets are not common in the north (Hagger et al., 2022b). This has stimulated the research and development of other methods that are likely more suitable for a Northern Territory context – primarily a method focused on managing feral ungulates to limit damage to soils and vegetation of the mosaic of floodplain wetlands.

The NT Blue Carbon Workshop (November 22, 2023) brought together experts, government agencies, Aboriginal land council representatives, researchers, policymakers, and non-government organisations to discuss the current state of blue carbon research and conservation efforts in Australia, specifically focusing on the Northern Territory. The Northern Territory's coast plays a crucial role in the country's blue carbon landscape, and the workshop sought to assess the region's contribution to carbon abatement, identify challenges, and provide a forum to consider management strategies.

The resulting workshop report synthesises key insights, recommendations, and the NT Blue Carbon Research Strategy discussed during the event. It serves as a starting point for policymakers, researchers, and stakeholders interested in advancing blue carbon initiatives in Australia, particularly in the ecologically diverse and significant context of the Northern Territory.

This workshop was funded by the INPEX-led Ichthys Joint Venture as part of the Developing a Blue Carbon Economy in the NT research program.

Workshop Purpose

To provide a forum for agencies with key responsibilities across the NT to be briefed on the current state of blue carbon nationally and within the NT and to share recent insights of potential opportunities relevant to the NT.

Workshop Objectives

To explore the scope and scale of blue carbon opportunities in Australia and the NT

To provide an overview of scientific advancement and blue carbon method development

To share lessons learned on the development of blue carbon projects in other regions

To identify policy barriers and solutions to enable the development of blue carbon projects

To share best practices regarding FPIC, governance, human rights, cultural and social considerations







Workshop Participants

Facilitators: Dr Renee Rossini (UQ) and Dr Rachel Groom (CDU)

| Presenter/Attendee | Affiliation | Presentation Theme |
|--------------------|---|--|
| Jeremy Carruthers | Clean Energy Regulator (CER) | Status of blue carbon methods and scope and relative interest (Presentation Provided) |
| Katherine Mitchell | Department of Climate Change Energy, Environment and Water (DCCEEW) | Commonwealth government priorities and investment (Presentation Provided) |
| Paul Branson | Commonwealth Scientific Industrial Research (CSIRO) | Blue carbon scope and scale of opportunities (Presentation Provided) |
| Rachel Groom | Charles Darwin University (CDU) | Literature review and lay of the land in the NT |
| Justin Perry | Northern Australia Indigenous Land and Sea Management Alliance (NAILSMA) | Feral animal management metrics of success |
| Cath Lovelock | University of Queensland (UQ) | Overview of emerging and established methods (Presentation Provided) |
| Alice Jones | University of Adelaide | Seagrass method |
| Jann Crase | Indigenous Carbon Industry Network (ICIN) | Best practice for First Nations-led and partnered projects (Presentation Provided) |
| Justin Bell-James | University of Queensland (UQ) | Legal permitting processes |

| Presenter/Attendee | Affiliation | Presentation Theme |
|---------------------|--|--|
| Catherine Riordan | Department of Climate Change Energy, Environment and Water (DCCEEW) | The Nature Repair market and possible integrations |
| | | (Presentation Provided) |
| Emilie Ens | Macquarie University | Ungulate exclusion and its relevance for Blue Carbon in the NT |
| Nathan Waltham | James Cook University (JCU) | Marklands: North QLD case study |
| Alice Jones | University of Adelaide | St Vincent Gulf: Seagrass case study |
| Rod Johnson | NT Department of Environment, Parks and Water Security (DEPWS) | Gulf of Carpentaria: Assessment process case study |
| Geoff Lipsett-Moore | The Nature Conservancy (TNC) | Blue Heart, Sunshine Coast |
| | | (Presentation Provided) |
| Ryan Pearson | Greening Australia | Mungalla: Greening Australia case study |
| Melissa Nursey-Bray | University of Adelaide | Socio-cultural values and co-benefits |
| Renne Rossini | University of Queensland (UQ) | Quantifying and considering co- benefits in project design |
| | | (Presentation Provided) |
| Valerie Hagger | University of Queensland (UQ) | Using cost-benefit analyses to prioritise projects |





| Attendees | Affiliation |
|------------------|---|
| Paul Donohoe | Northern Land Council (NLC) |
| Dan Keynes | Anindilyakwa Land Council (ALC) |
| Fiona Keighran | li-Anthawirriyarra Sea Ranger Unit |
| Christine Burke | Dhimurru Aboriginal Corporation |
| Alana Mackay | NT Department of Environment, Parks and Water Security (DEPWS) |
| Mike Welch | NT Department of Environment, Parks and Water Security (DEPWS) |
| Tim Clancy | NT Department of Environment, Parks and Water Security (DEPWS) |
| Felicity Watt | NT Department of Environment, Parks and Water Security (DEPWS) |
| Jonathan Vea | NT Department of Environment, Parks and Water Security (DEPWS) |
| David Rhind | NT Department of Environment, Parks and Water Security (DEPWS) |
| Jake Maynard | NT Fisheries |
| Felicity Beswick | South Australia Department of Environment and Water |
| Joe Taylor | Representative for Federal Electorate of Lingiari |
| Kamaljit Sanga | Charles Darwin University (CDU) |
| Lynise Wearne | Greening Australia |
| Dayna Will | Greening Australia |
| Ben Davis | INPEX Australia |
| Polly Grace | Polly Grace Legal and Consulting |
| Jarrad Holmes | People, Environment, Carbon Consultants (PEC Consultants) |

| Apologies | |
|-----------------------|---|
| Lisa Bradley | NT Department of Environment, Parks and Water Security (DEPWS) |
| Karen Avery | NT Department of Environment, Parks and Water Security (DEPWS) |
| Murray Knyvett | Tiwi Land Council (TLC) |
| Sarah Ryan | Tiwi Land Council (TLC) |
| Christine Burke | Dhimurru Aboriginal Corporation |
| Luke Einoder | Kakadu National Park |
| Diane Brodie | Northern Land Council (NLC) |
| Keith Ferdinands | Northern Land Council (NLC) |
| Bridie Velik-Lord | Northern Land Council (NLC) |
| Lachlan Sutherland | Laynhapuy Aboriginal Corporation – Yirralka Rangers |
| Tom Nagle | Bawinanga Aboriginal Corporation – Djelk Rangers |
| Linda Ford | Charles Darwin University (CDU) |
| Lindsay Hutley | Charles Darwin University (CDU) |
| Kamaljit Sanga | Charles Darwin University (CDU) |
| Lynise Wearne | Greening Australia |
| Dayna Will | Greening Australia |
| Ben Davis | INPEX Australia |
| Polly Grace | Polly Grace Legal and Consulting |
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Discussion summary

Scope and scale of blue carbon opportunities

Australia

At the time of this workshop, a single method was available for calculating and selling ACCU through the CER – the tidal restoration method (see DCEEW presentation by Katherine Mitchell). In brief, this method outlines how the return of natural tidal flows by the hydrological modification of impoundments can result in the abatement of carbon through both the growth of intertidal vegetation communities AND the avoidant emissions that would have occurred when the impounded freshwater system eventually received saltwater incursion. Various international programs and attempts to establish markets for blue carbon methods exist. However, these are mostly within voluntary markets.

Some analyses have been conducted for Australia at a national scale to map where opportunities for this method occur. Work has also been completed on presenting case studies for how core benefits of blue carbon restoration could be conceptualised, modelled, and quantified (see UQ presentation by Valerie Hagger). Australia holds about 12% of global blue carbon stocks in three different resources (seagrass, saltmarsh and mangrove) to different extents across climate and geopolitical zones (Kelley et al., 2019). Blue carbon stored within Australia's supratidal forests is currently being characterised (see Adame et al. 2023 and Conroy et al. 2022).

Case studies at a more granular scale show that the emerging opportunities relate to the region's unique attributes. For example, in tropical central Queensland, opportunities primarily exist in the removal of tidal impoundments that create ponded pasture intended to support grazing of beef cattle (Hagger et al., 2022b), whilst in the wet tropics bioregion it is through the transition of degraded sugarcane fields (Rowland et al. 2023) to coastal wetlands (Hagger et al., 2022a). The interaction between opportunity cost (i.e. money that will no longer be earned if a blue carbon project is opted for) and the value of the blue carbon project creates a cost-benefit tipping point unique to the primary industry, the co-benefits available, and the regional priorities for financially incentivising those co-benefits. Irrespective of current land use, the ACCU price is variable and, in most cases, is not enough to incentivise a cost-neutral or

cost-positive land use change. Therefore, under the current Australian carbon market, the feasibility of increasing blue carbon stocks by incentivising privately managed land-use change will perhaps rely heavily on co-benefit payments 'sweetening the deal' for creating land-use shifts from agricultural land-uses to blue carbon abatement.

Northern Territory

A literature review for the NT exists (Groom et al. 2022). CSIRO is working through a spatial modelling process to identify places that are likely available for the tidal restoration method – this is complex, and the information available is not high resolution, so it has high levels of uncertainty (see CSIRO presentation by Paul Branson and refer to seamapaustralia.org/map/for CO abatement as modelled by CSIRO.). In a previous analysis by UQ (Hagger et al., 2022b), a limited potential for tidal restoration was noted because the NT is mostly mapped as having 'remnant' ecosystems, that is ecosystems in their natural state, and thus with limited potential for restoration, and there are few impoundments that could be reversed under the current method. This is not to say that the coastal wetlands of the NT are not degraded and are experiencing land-use practices or impacts that reduce standing carbon stocks and the propensity for coastal ecosystems to sequester carbon. Because of this, alternative methods are being investigated. For example, the NT has significant potential for a method where control of ungulates and their impacts can abate greenhouse gas emissions from damage to soils and vegetation. Research is showing potential to abate carbon emissions by controlling the damage caused by feral ungulates on coastal and floodplain wetlands. There is a strong incentive to have a method that applies to the NT as the core benefit potential is substantial:

- High number of threatened species
- Many diverse and threatened ecosystems
- Large areas of Aboriginal-owned and managed land where direct cultural co-benefits can accompany carbon abatement and the growth of biodiversity co-benefits.

Whilst not unique to the NT, Aboriginal rangers and Traditional Owners are the landowners and custodians of Country where much blue carbon sequestration can potentially occur. As land managers and custodians, Aboriginal people and Traditional Owners have the potential to benefit directly, culturally and economically from the management of blue carbon projects. Supporting Aboriginal landowners in making informed decisions about the management of their Country is a priority. Internationally, risks have been identified that include unethical behaviour by carbon providers, poor project planning in considering and monetising co-benefit, and inappropriate community consultation and negotiation which will detriment these communities' potential to interact and benefit from the blue carbon market (Dencer-Brown et al. 2022). Projects focusing on restoring Aboriginal land for carbon credits must present a fully informed trade-off to the landowners because projects are complex. Therefore, accessible forms of communication are needed to progress this understanding. Some existing stakeholder groups are positioned to provide advice and guidance in this area (e.g. ICIN) (see presentation by Jann Crase). However, there is a role for regulators (e.g. NT government) in being aware of project prospecting by non-Indigenous groups and assisting as a 'watchdog' in the early days of potential Blue Carbon partnerships. The adoption and implementation of standards (e.g., best practice blue carbon principles and guidance) could reduce risks to Indigenous groups wanting to participate in carbon markets.

Blue carbon methods development

A strong focus of the workshop was on the progress of other blue carbon method development. As the potential for application of the tidal restoration method in the Northern Territory is low, other methods are of high interest for the NT context. Several presentations discussed the role of feral ungulate control in caring for coastal wetlands (see UQ presentation by Cath Lovelock and NAILSMA presentation by Justin Perry). Early modelling and data collection is underway to quantify the amount of carbon abated when these animals are removed and excluded (see Macquarie Uni presentation by Emilie Ens). Some general information regarding the co-benefits accompanying feral ungulate removal is also being quantified. In the future, this method may potentially co-evolve with the and land management method or <u>enteric method</u>.

Seagrass methods are currently under development but primarily focus on temperate climates in South Australia (see Uni Adelaide presentation by Alice Jones). This work involves the quantification of current stocks, the identification of suitable restorable areas, and the trialling of methods for where they have been lost due to poor water quality. There is a high potential for co-benefit provision with seagrass restoration, which existing literature supports, and some research efforts are starting to address.

Methods for conceptualising and marketing co-benefits were discussed in two formats. The first was from the applied perspective used in case studies by the UQ team (see UQ presentation by Renee Rossini). These align to some extent with the draft guide being developed by DCEEW. In short, this framework proposes a heuristic (standard approach) where co-benefits are spatially guantified in four classes - biodiversity, fisheries, coastal protection, and water guality. A national system for guantifying and marketing all co-benefits was presented by DCEEW - the Nature Repair market (see DCEEW presentation by Catherine Riordan). Under this system, biodiversity credits will be bought and sold in a regulated market, much like carbon as an ACCU. Workshop discussions regarded the potential methodology and role of guantifying and marketing cultural co-benefits. A case study from the Queensland wet tropics showed how non-Indigenous and Indigenous stakeholders can work together to capture, conceptualise and quantify shifts in cultural values accompanying ecosystem restoration (presentation by Melissa Nursey-Bray). This case study was placed in the context of the international framework under the United Nations System of Environmental Economic Accounts, and rich discussions on this topic exemplified how this standard international approach (which may form the foundations of Nature Repair) may not reflect the best approach for capturing cultural values.



Lessons from pilot blue carbon projects

All projects so far use the tidal restoration method, although seagrass pilot studies are underway as part of research for the seagrass method. Examples discussed at the workshop were:

- Blue Heart a coastal wetland project in south-east Queensland (Kabi Kabi Country, Sunshine Coast) (refer to PowerPoint presentation in the Appendix),
- Mungala Station a coastal wetland project in north Queensland (Nwaigi Country, north of Townsville),
- Several seagrass restoration projects in South Australia (<u>https://www.environment.sa.gov.au/topics/coasts/explore-and-learn/seagrass-restoration-in-sa</u>). There is also a trial restoration site in Mourilyan Harbour, Cairns.

For all these projects, it is still early days, but key learnings are:

- Robust knowledge of coastal hydrological context is needed before any re-introduction of flow occurs. Therefore, there needs to be several stages of assessment in identifying sites:
 - » Broad-scale regional identification of eligible areas
 - » Site-specific investigations of hydrological modifications, how they impact current tidal flow and models of how their removal will impact the inundation of tidal water and establishment of coastal wetland vegetation.
- Co-benefits like the reduction of aquatic weeds and return of threatened migratory coastal wetland dependant birds are already being observed in project areas where tidal flows have been reinstated.
- Policy barriers and solutions

The permitting and approval processes across most jurisdictions in Australia are generally not designed to facilitate restoration activities. This creates an impediment to the workflow and stalls implementation of blue carbon projects. Policies need to be developed concurrently with new methods to ensure efficient implementation. In the NT, the Aboriginal Land Councils will be essential in facilitating landowners' understanding of blue carbon projects. To ensure best-practice ethical engagement with First Nations land managers, a set of standards, including standards for obtaining consent. is required to be developed and regulated.

At a national scale, legal and policy constraints must be overcome to begin a blue carbon project. Legal complexities exist around land ownership of areas within the intertidal zone, although in the NT, it is more straight forward as most of the coast is Aboriginal-owned land.. The reintroduction of tidal water to an impounded area has the potential to have impacts beyond the tenure for which a project is registered. Many coastal modifications were constructed without government approval. Although removing these will create blue carbon benefits, there are challenges in demonstrating the additionality needed within the ACCU Scheme. Finally, cautions are raised in this emerging market to ensure the 'siloing' of different aspects of blue carbon is avoided (e.g. silos "isolate", so isolating the crediting of ACCU from the crediting of co-benefit) (refer to UQ research by Justine Bell-James).

Best practice

Blue carbon projects have a high potential for carbon abatement and potential income from the formalised sale of co-benefits. Because of this, it attracts attention from project developers seeking to ride the early rollout wave. However, most blue carbon project potential and opportunities are on private land, where landholders and managers may lack information and understanding about their rights and obligations or the financial opportunities available to them. Under the tidal introduction method, landholders need to be informed about how they can engage and what the opportunities and consequences of a project are. If a carbon project developer or partner is involved, landowners and custodians need to be aware of their rights and obligations as well as the rights and obligations of the partner organisation.

As noted above, free, prior, and informed consent is needed before any projects proceed where Aboriginal peoples' rights and interests are present. National guidelines on Indigenous engagement in the blue carbon and other environmental markets are being developed as part of a collaboration with CDU, ICIN and NAILSMA and of work in this emerging market, there is an urgency to develop and implement FPIC standards..

There are advantages of considering ACCUs and other benefits simultaneously. The savannah burning ACCUs sell high because of perceived value. Similar would be expected from a well-managed and supported carbon market in the coastal environment.

Conclusions and Next Steps

Participants discussed the latest scientific findings, management practices, and policy implications related to blue carbon.

The workshop also highlighted the economic and ecological benefits of preserving and restoring these coastal ecosystems. Additionally, participants explored potential collaboration opportunities between various sectors to enhance blue carbon conservation and restoration efforts.

The main conclusions and future steps from the workshop were:

- 1. The NT is unique and has large blue carbon resources, but the tidal restoration blue carbon method may not have much scope for implementation. However, opportunities may grow when there are more methods available that are suitable for implementation in the NT. Government, research, and landholders need access to information about these methods and where opportunities exist.
 - a. Whose role is this?
 - b. How can industry, research, governance, and policy work together to make this seamless?

- 2. A strategic approach to monitoring and monetising carbon abatement, co-benefit provision, and potential cultural co-benefits is needed. This needs to occur at project inception, which requires information and support.
 - a. How do potential project proponents understand the whole gamut of their co-benefit potential? How do they strategise their project delivery considering this information?
 - b. What is the role of the Nature Repair Market?
- 3. What is the role of research and governance in achieving the best for blue carbon projects? This is very open-ended right now. What are the other states doing? What can the NT do?
 - a. Who will do what?
 - b. Who are the major players that can provide this information and support?

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Appendix 1

Workshop presentations by:

TNC DCCEEW ICIN CSIRO







Geoff Lipsett-Moore – TNC NCS Specialist



Blue Heart

• The Place:

- > 5,000 ha coastal floodplain of the Maroochy River
- ~ 1,400 hectares of public land
- Remainder (private land, rural and agricultural, solar farm and open space).
- Kabi Kabi traditional owners

• The Project:

- Floodplain area is already being impacted by tidal inundation and expected to transition from land to estuarine ecosystems with increasing sea level rise.
- The project seeks to manage the transition from land to water to provide positive outcomes for the environment, community and economy.

• Objectives:

- Protect the most critical areas of the floodplain under public ownership.
- Establish a regionally-significant complex of wetland and floodplain ecosystems.
- Enhance water quality in the Maroochy River through nutrient management and sediment reduction works.
- Provide community and recreation opportunities through regional parkland, open space and trails.
- Establish new uses for existing rural and agricultural lands, including new economic opportunities for landowners and Traditional Owners (TNC is supporting this).



Blue Heart

- The Partnership
 - Sunshine Coast Council, Unitywater, the Queensland Government's Department of Environment and Science (LRF)
 - To date the project has received \$5.3M
 - TNC collaborated on the development of a \$2M Blue Carbon Ecosystem Restoration Grant funding proposal (TNC – supporting partner)

• TNC's role:

- Feasibility assessments for Blue Carbon pilot projects
- Registration of the BC pilot project with Restore Blue
- Feasibility for the whole of the Blue Heart project area
- Data from all of the above to inform the feasibility and design of the Blue Carbon Investment Fund
- TNC collaboration with SCC and AON to explore whether the expansion of mangroves in the floodplain results in a reduction in flood risk for downstream properties and communities



Figure 1.2: Blue Heart pilot project extent









Figure 2.4: Digital Elevation Model (2014) (source data: Geoscience Australia, 2021)







Figure 3.4: Project start tidal inundation map



ZAZ 2130 -100yr 2A3 permanence period TA Tidal Plane HAT 📶 MHWS 🌉 MHWN 📰 MSL 🔜 MLWN 🔚 MSLW 📒 Ø Blue Heart Project Areas 1 km 0.5 Lots

Figure 3.6: 100-year permanence period tidal extent map (2130; 107 years from present day)

Figure 3.5: 25-year crediting period (2055) tidal inundation map



Blue Heart Pilot Project Areas





Figure 5.2: Standard Tidal Position Index (STPI) mapping - 25-year crediting period tidal inundation

Figure 5.1: Present day baseline land vegetation type



Nambour Sugar Mill Shut Down in late 2003







Figure 4: STPI Ranges for the BH under predicted sea level rise scenarios.

Estimated ACCU's over the first 25yrs if all eligible areas in the Blue Heart project area were under blue carbon projects >700,000 tCO2e (less the costs of developing and maintaining the projects – TBD) . In addition, blue carbon projects should attract a greater premium given the multiple co-benefits they provide.



Figure 5: Carbon abatement values for the BH (2 scenarios) generated from BlueCAM modelling.





Australian Government

Department of Climate Change, Energy, the Environment and Water

Blue Carbon Conservation, Restoration and Accounting Program

Katherine Mitchell Blue Carbon and International Partnerships 22 November 2023





Acknowledgement of Country

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters, and culture. We pay our respects to Elders past and present.

Opportunity

- Increase (investment in) coastal blue carbon restoration and conservation
- Carbon credits low supply, large upfront project costs, long lead time
- Measure, value and promote multiple benefits to support management decisions and increased private sector investment

SA Seagrass Restoration Project Site

Blue Carbon Conservation, Restoration and Accounting Program

\$30.6 million (2021 to 2025) for Blue Carbon Conservation, Restoration and Accounting Program - international and domestic

Program components

- Funding on-ground restoration and conservation
- Demonstrate how conservation and restoration activities lead to positive economic, environmental and social outcomes
- Capacity building and collaborations

Blue Heart Restoration Project Site

Coastal restoration, measuring benefits & accounting

1. Blue Carbon Ecosystem Restoration Grants

 On-ground demonstration restoration projects (2021 – 25)

2. Demonstrating outcomes, measuring the benefits of restoration, and accounting

- 5 Project-level EEA case studies (2023-25)
- 'A Guide to Measuring and Accounting for the Benefits of restoring Coastal Blue Carbon Ecosystems' (the "Guide", in development)

Tasmanian Saltmarsh Restoration Project Site

Blue Carbon Ecosystem Restoration Project Map

South Australian Blue Carbon Ecosystem Restoration project

Adelaide International Bird Sanctuary National Park **The Nature Conservancy**

1. Blue Carbon Ecosystem Restoration Grants

Mungalla Blue Carbon Ecosystem Restoration project

Ingham Greening Australia

Blue Heart Blue Carbon Ecosystem Restoration project

Sunshine Coast, Maroochy River floodplain

Sunshine Coast Council

Temperate Saltmarsh Restoration project

Southeast Tasmania NRM South

Gulf St Vincent Seagrass Restoration project

Nepean Bay University of Adelaide

Mungalla Blue Carbon Ecosystem Restoration project

Restoration site:

• Tidal restoration of former cattle grazing property

Expected Benefits:

- Benefits for First Nations people (to be co-designed with the Nywaigi Traditional Owners)
- Biodiversity
Blue Heart Blue Carbon Ecosystem Restoration project

Restoration site:

• Tidal restoration of former farming land to coastal wetlands.

- Carbon sequestration + Emissions reduction
- Habitat services
- Biodiversity (including the water mouse, birds and fish)
- Cultural (recreation)
- Water quality



South Australian Blue Carbon **Ecosystem Restoration project**

Restoration site:

• Tidal restoration of former salt pan property

- Habitat services
- Biodiversity
- Water quality Cultural
- •



Gulf St Vincent Seagrass Restoration project

Restoration site:

• Substrate provision for natural recruitment of seagrass

- Carbon sequestration,
- Marine biodiversity
- Habitat services
- Water quality
- Coastal protection
- Cultural (commercial fishing and community benefits)



Temperate Saltmarsh Restoration project

Restoration site:

• Tidal restoration to cool climate salt marsh

- Carbon sequestration
- Coastal protection
- Habitat services
- Biodiversity
- Water quality
- Cultural (eg recreational fisheries)



Coastal restoration, measuring benefits & accounting

- **1. Blue Carbon Ecosystem Restoration Grants**
 - 5 on-ground demonstration restoration projects
- 2. Demonstrating outcomes, measuring the benefits of restoration, and accounting
 - 5 project-level EEA case studies
 - Apply UN SEEA EA framework
 - National level vs. project level
 - Good baseline data at a project level

Blue Carbon Ecosystem Restoration Project Map

South Australian Blue Carbon Ecosystem Restoration project

Flinders University

2. Demonstrating outcomes, measuring the benefits of restoration, and accounting

Mungalla Blue Carbon Ecosystem Restoration project

Greening Australia

Blue Heart Blue Carbon Ecosystem Restoration project

Griffith University

Gulf St Vincent Seagrass Restoration project

University of Adelaide

Temperate Saltmarsh Restoration project

Blue Carbon Services

KEY FINDINGS: AUSTRALIA'S FIRST NATIONAL OCEAN ECOSYSTEM ACCOUNT BLUE CARBON ECOSYSTEMS - MANGROVES, SEAGRASS & SALTMARSH

MANGROVES

Over 1 million hectares of mangroves in Australia, which is over 500,000 Melbourne Cricket Grounds

Australia's mangroves store over 240 million tonnes of carbon

Provide storm surge protection to over 16,000 kilometres of coastline

Protects over 85,000 homes and 175,000 people in Australia

It would cost about \$196 billion to replace this coastal protection service with a seawall

SEAGRASS

There's 2-3 million hectares of seagrass in Australia

Australia's seagrass sequestered about 5 million tonnes of CO2 in 2021

32% of Australia's seagrass meadows are located outside state boundaries (in Commonwealth waters), mainly in the Torres Strait

About 60% of the country's seagrass is found across Western Australia, South Australia and Queensland

SALTMARSH

There are over 1 million hectares of saltmarsh in Australia

Australia's saltmarsh stores over 275 million tonnes of carbon

Saltmarsh protects about 3,600 kilometres of coastline from storm surge

Protects Over 150,000 people and 88,000 homes in Australia

It would cost over \$41 billion to replace this service with a seawall

Australia's mangroves and saltmarsh provide storm surge protection to over 19,000 kilometres of coastline and protect over 149,000 homes and 280,000 people from storm surge in Australia

The cost of replacing this coastal protection with a seawall is over \$225 billion

What can we do with Ecosystem Accounts?

They can help answer questions such as:

- What is the contribution of ecosystems and their services to the economy, social wellbeing, jobs and livelihoods?
- How is the condition, health and integrity of ecosystems and biodiversity changing over time and where are the main areas of degradation and enhancement?
- How can natural resources and ecosystems be best managed to ensure continued services and benefits such as energy, food supply, water supply, flood control, carbon storage and recreational opportunities?
- What are the trade-offs among different land uses (e.g. for agriculture, mining, housing development, habitat conservation, recreation) to achieve long-term sustainability and equity?

Thank you

Contact

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Australian Government

Department of Climate Change, Energy, the Environment and Water

Nature Repair Market

November 2023



Part of the Nature Positive Plan



Objects of the Bill



To promote the enhancement and protection of biodiversity in native species in Australia





Help meet Australia's international obligations in relation to biodiversity, including the Biodiversity Convention



Support & promote the role of First Nations people in enhancing & protecting biodiversity



To contribute to meeting Australia's domestic goal of no new extinctions

Enable the use of First Nations

knowledge, guided by the

knowledge owners



Promote engagement and cooperation of participants



Support better information on biodiversity in Australia

Nature Repair Market 102 | November 2023

Overview: Key elements of the framework



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Carbon and Biodiversity Markets



Co-Benefits

- Co-benefits are the additional positive environmental, socioeconomic and First Nations outcomes delivered by carbon projects (LRF, 2023)
- Queensland's Land Restoration Fund defines how these benefits can be recognised through the Co-Benefits Standard
- Can only claim biodiversity benefit once



Nature Repair Market | November 2023

Next Steps



Contact us

Nature Repair Market team naturerepairmarket@dcceew.gov.au



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Our Work:



September 2022



Mapping the Opportunities for Indigenous Carbon in Australia Identifying opportunities and barriers to Indigenous participation in the Emissions Reduction Fund and an other 20 20

Prepared by the Indianous Carbon Industry National

- Facilitating Indigenous leadership & sharing information.
- Informing Federal and State governments on policy developments.
- Delivering national events.
- Producing best practice guides for land managers - FPIC best practice guide.

A National Approach to Indigenous Engagement in Australia's Blue Carbon & Environmental Markets

2023-2025



National Environmental Science Program (NESP): Project 3.2

A National Approach to Indigenous Engagement in Australia's Blue Carbon & Environmental Markets





Draft 1 - Nov 2023

Indigenous people hold land interests in over 55% of Australia's land area.

In the Northern Territory, approximately 85% of the coastline is Aboriginal land.

Coastal ecosystem market opportunities



Blue Carbon: opportunities & challenges

Complexities **Opportunities** Project rights and coastal strong Indigenous rights along the coastline and Undertaking the activity and intertidal zone - NT Coastal ecosystems crucial to mitigating climate change

Our blue carbon vision:

A thriving co-created blue carbon industry delivering jobs, income, cultural and environmental benefits across the territory founded in Indigenous governance and strengthening Indigenous connection to and management of country.

Key enablers include:

- Collaborative and co-designed projects- seat at the table.
- Recognising Indigenous connection and stewardship of coastal and sea country, the ownership of carbon in sea country is granted to Indigenous people.
- Financial and technical assistance to Indigenous people to help them develop and implement blue carbon projects, particularly for project start-up.
- Collaborative development of cultural and environmental safeguards for blue carbon projects.
- Looking at the operation of non-ACCU scheme carbon projects and providing guidance on the protection of Indigenous rights in relation to these projects.
- Bottom-up design and development of "co-benefits" framework(s).

Thank You

We are grateful to all of the people and organisations who continue to enable the network to operate.

- All of our Directors, Members and supporters
- Warddeken Land Management Ltd
- The Indigenous Land and Sea Corporation
- Australian Government Department of Climate Change, Environment, Energy & Water
- Northern Territory Government Department of the Chief Minister and Bushfires NT
- Queensland Government Department of Environment and Science
- The Nature Conservancy
- Clean Energy Regulator



Contact

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* NOTE: all results in this presentation are preliminary and may change in final version

NT Blue Carbon Workshop

Accelerating Adoption and Implementation of Blue Carbon in Australia



Dr. Paul Branson (on behalf of Dr. Mat Vanderklift and project team)

22 November 2023



Accelerating Adoption and Implementation of Blue Carbon in Australia

BHP

Objectives

- Estimate emission abatement potential of a set of plausible blue carbon methods nationally
- Develop metrics to quantify the value of other benefits from Blue carbon Ecosystems:
 - fish production, coastal protection and biodiversity,
- Examine the application of national and international certification and crediting standards
- Explore economic feasibility
- Outputs (maps, etc) online and freely available

Timing:

30 months June 2021 - Dec 2023

The Team:

- CSIRO
- University of Adelaide
- Edith Cowan University
- University of Queensland

Governance:

 Advisory Committee comprising national/state/territory, private and NGO





Tidal introduction: area

| | Qld | NSW | Tas | Vic | SA | WA | NT |
|-----------------|--------|--------|-----|--------|-------|--------|-----------|
| Total area (ha) | | | | | | | |
| Mangrove | 55,378 | 51,576 | 118 | 3,739 | 1,375 | 47,132 | 1,179,905 |
| Saltmarsh | - | 2,825 | 287 | 9,513 | 2,299 | 126 | - |
| Saltflat | 1,569 | | - | - | - | 18,433 | 26,109 |
| Total | 56,947 | 54,401 | 405 | 13,252 | 3,674 | 65,691 | 1,206,014 |

Progress: area estimates

- estimated area that could be inundated under present sea level in the order of >10,000 ha for most jurisdictions
- doesn't incorporate mapping of tidal restrictions
- some obvious errors (e.g. Tasmania mangroves)

Tidal introduction: area





Tidal introduction: abatement



| Net abatement (tCO ₂ -e): 25-y total | Australia |
|--|-------------|
| Flooded ag | 69,708,948 |
| Grazing | 21,851,829 |
| Sugarcane | 12,591,160 |
| Cropping | 434,208 |
| Total | 104,586,145 |

Progress

- abatement calculated over 25 years
- abatement from agricultural land potentially tens of millions of tonnes
- high uncertainty associated with flooded agricultural land
- if we exclude flooded agricultural land, ~34.9 Mt CO_2 -e over 25 y

Tidal introduction: abatement



| | Qld | NSW | Tas | Vic | SA | WA | NT |
|------------|------------|------------|--------|-----------|---------|-----------|------------|
| Flooded ag | 9,268,012 | - | - | - | 205,657 | - | 60,235,279 |
| Sugarcane | 8,333,697 | 4,257,463 | - | - | - | - | - |
| Cropping | 29,223 | 199,698 | 826 | 46,620 | 141,775 | 15,699 | 367 |
| Grazing | 5,239,626 | 5,914,982 | 43,536 | 1,388,355 | 244,906 | 7,332,433 | 1,687,991 |
| Total | 22,870,558 | 10,372,143 | 44,362 | 1,434,975 | 592,338 | 7,348,132 | 61,923,637 |

Progress

- abatement calculated over 25 years
- abatement from agricultural land potentially millions of tonnes
- we are cross-checking model results with other validation data

Tidal introduction: abatement





Tidal introduction: economic feasibility




Tidal introduction: economic feasibility





Location of economically feasible projects for \$80 tCO2_{-e}⁻¹ carbon price, \$1,000 ha⁻¹ establishment cost, 5-yearly costs of \$100 ha⁻¹ and net present value (NPV) of 4%

Co-benefits

Biodiversity

 Comparing reference, restoring and baseline systems

Fisheries

- Commercial catches
- Sources of production
- Age Structure

Coastal risk reduction

- Applying InVEST model at national scale
- Assessing wave attenuation models









Data delivery

- Working with the Seamap Australia platform
- Display and download spatial data
 - Mean Sea Level
 - Tide
 - Elevation
 - Land use
 - Abatement





Communications

https://research.csiro.au/coastal-carbon/



Elevating blue carbon restoration: The power of bathymetry and elevation mapping data

Blue carbon ecosystems (mangrove forests, salt marshes and seagrass meadows) occur in a thin green band between the land and sea. Mangrove and saltmarsh plants occupy the narrow area between the tides. Seagrasses extend further seaward, up to 40 metres deep or more where the water is clear enough for light to penetrate, but apart from a few exceptions are restricted to coastal margins. Their distributions are defined by how far tides can reach landward, with the limits varying among the different species.

To predict where these ecosystems might occur, whether in the context of restoration under contemporary tidal limits or planning for future occurrence as sea level rises, we need to know where tides might reach, or where permanent inundation might occur. To do this, we need information on elevation (height above sea level) and bathymetry (depth below sea level). We combine these to create a Digital Elevation Model (DEM).

Elevation - the height above sea level Bathymetry - the measurement of depth below sea level



Summary

Abatement

Reintroduction of tidal flow

- Full model results complete for all jurisdictions
- Refining digital elevation model
- Online data availability for public access
- NT has significant abatement potential

Co-benefits

- Biodiversity metrics well advanced
- Fishery benefits fieldwork complete (Victoria) or underway (NSW)
- Coastal protection benefits workshop complete and analyses underway

Seagrass method

Stay tuned for 10:45 am Dr Alice Jones





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