Collaborations on Sea Country

Dr Rachel Groom

Acknowledgment

I acknowledge the Larrakia people on whose land I present today. I pay my respects to Elders past, present and emerging.

I extend this acknowledgement to all First Nations peoples across the lands and seas on which I live and work.

Brief Introduction

Recently completed a 3-yr fellowship with CDU-AIMS.

I will present on the project work that I have been involved with during this time and what is currently underway.

I finished my marine science degree 20 years ago, since that time I've worked mostly in northern Australia and the Pacific on marine threatened species and environmental impact assessment and engaging with Indigenous peoples in various capacities.

There's an inseparable link with the traditional custodians of place and many of the plants and animals I works with. Strong and respectful relationships are critical to enable this work.

Checklist for working in northern Australian sea spaces

Item	Action!?
Does the project lead to (structural) empowerment for First Nations partners	Y/N
Does it support self-determination • Prioritise culture • Support healing • Address racism and promote cultural safety • Transfer power and resources to communities	Y/N
Can it be applied	Y/N
Who has interpretative authority or the ‘final word’ in giving effect to	Y/N

Indigenous led projects

Mapping values and habitats in Marra and Yanyuwa sea country and the Southeast Arnhem Indigenous Protected Area (IPA). li-Anthawirriyarra Sea Ranger Unit, Yanyuwa families, Mabunji ARIC, NLC, Numbulwar-Numburindi Rangers, NTG, Commonwealth Marine Parks, Commonwealth Migratory Species Section, NESP.

Applying Indigenous and western science knowledges to inform the sustainable management of a dugong and seagrass hotspot in the Girringun TUMRA. Girringun Aboriginal Corporation, Alex Carter and Chris Cleguer (JCU)

Investigating the distribution and population ecology of the green and olive ridley turtles in the NT. Anindilyakwa land and sea rangers, Tiwi Land Council and sea rangers, Crocodile Island Rangers, and AIMS (Michele Thums, Vinay Udyawer and Philippa Wilson)

National Environmental Science Program 2023-2025/26

A National Approach to Indigenous Engagement in Australia's Blue Carbon and Environmental Markets. Project partners: Linda Ford, ICIN, NAILSMA

A partnership approach to filling key knowledge gaps on dugongs in northern Australia using novel technologies. Christophe Cleguer (Lead, JCU) and Holly Raudino (WA gov); First Nations groups from the Torres Strait, Gulf of Carpentaria, Tiwi, Larrakia, FNQ)

Addressing Kakadu's strategic marine research needs. KNP, Bininj/Mungguy

Supporting regional planning in northern Australia: Building knowledge, skills, and partnerships for understanding seagrass distribution. Co-leaders Alex carter & Catherine Collier (JCU), Kathryn McMahon (ECU), First Nations from QLD southern Gulf, Tiwi, Kimberley, Pilbara. Four survey regions

Industry Partnership

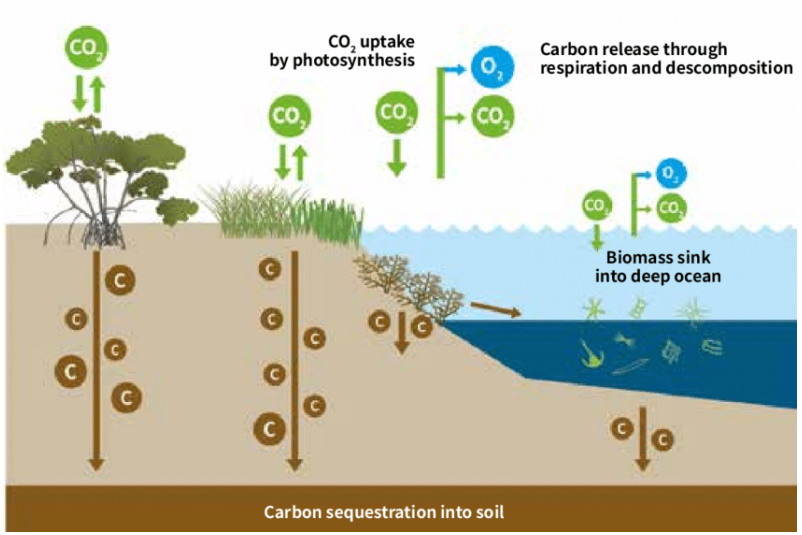
Incorporating Aboriginal perspectives into fishery management review processes, using the NT Barramundi Fishery as a case study. Jackie Gould (CDU), Northern Land Council, NT Fisheries, Regional Aboriginal communities (Gulf, NE Arnhem, Maningrida and Daly). Fisheries Research and Development Corporation funded.

Developing a Conservation Agreement Area under the EPBC Act. Jackie Gould, Sam Williams (CDU), (INPEX on behalf of the INPEX joint venture partnership)

Investigating Blue Carbon Opportunities in the NT: Literature Review, Detailed Assessment, NT Strategy, and a Research Strategy. Lindsay Hutley, Miguel Tovar, Cath Lovelock (UQ), Justin Perry (NAILSMA), Ben Brown, Ros Vickers . (INPEX on behalf of the INPEX joint venture partnership)

Investigating Blue Carbon Opportunities in the NT

Coastal and marine ecosystems such as mangroves, seagrass and salt marshes can store, on average, more carbon per acre than terrestrial forests



Why Blue Carbon (BC):

- To meet the goals of the Paris Climate Agreement and limit global warming to 1.5 °C or achieve the UN's Sustainable Development Goals, blue carbon cannot be ignored.

- ~50% of the global extent of blue carbon ecosystems has disappeared, which limits the role of these ecosystems in carbon sequestration.

- Only about 1.5% of the global extent of blue carbon ecosystems is found in marine protected areas.

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Background - Blue carbon Emissions Reduction Fund method

- Tidal restoration where a barrier (e.g. built structure) has cut off natural tidal flows and wetlands have been converted to other land uses (e.g. sugarcane, grazing, salt ponds, aquaculture etc.)
- Focus is on restoring coastal wetlands: mangrove, saltmarsh and samphire, melaleuca, casuarina
- Avoided emissions and carbon sequestration in soils and biomass

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Investigating Blue Carbon Opportunities in the NT

What is the project about?

- Literature review
- Detailed assessment of BC site/s
- Strategy for the NT
- Research Strategy

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Method for submission
Cth Clean Energy Regulator

Method:

- Avoiding disturbance of soils and vegetation and their rehabilitation in coastal wetlands influenced by non-native ungulates

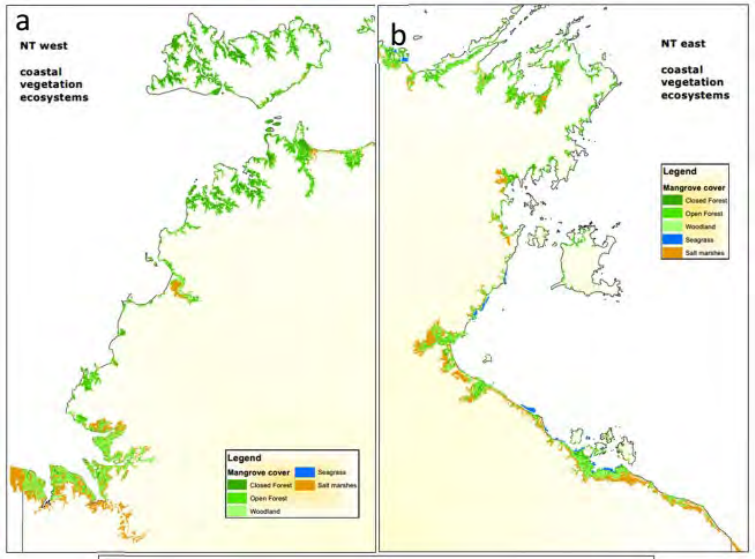
- Builds on components of the abatement model developed in the “Tidal Introduction Blue Carbon Method.”

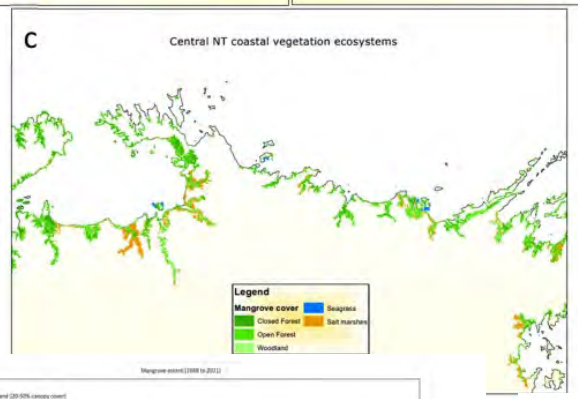
Main activity includes:

- Removal or exclusion of non-native water buffalo, pigs, and potentially feral cattle to repair coastal wetlands.

- Avoided disturbance from these feral ungulates would result in reduction of various greenhouse gas emissions.

What have we learnt so far?





- Available spatial data is generally course which means our carbon estimates are course (National Ocean Accounting, ABS).
- There is BC market opportunity in the NT, it's important but not significant
- Proposed new method approval would see greater opportunity on Aboriginal Land through managing ungulates (pigs/buffalo)
- Local-level data and costings needed: opportunity (loss), transaction (negotiation), and implementation (intervention)

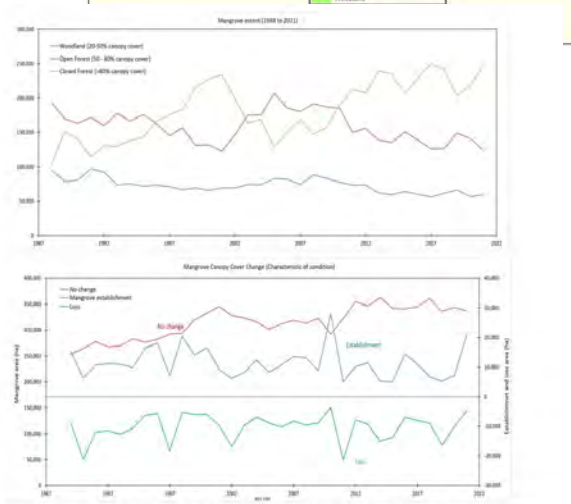


Figure 4. a) Mangrove extent through time partitioned by fractional green canopy cover classes, after Lymburner et al. (2020) that has been incorporated into the ABS database. Panel b) shows the mangrove area that showed no change in cover year to year (LH axis), plus the area of new mangrove establishment and loss (RH axis). The net change was +39,000 ha, ~12% of the estate area in 2021.

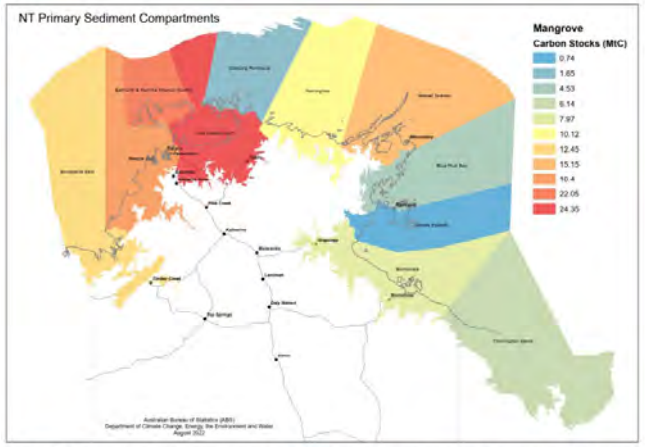


Figure 3. Modelled output of estimated mangrove carbon stocks based on biophysical attributes (e.g., primary sediment components, local geomorphology riverine catchment, aspect). Data derived from the ABS (2022) https://www.abs.gov.au/methodologies/national-ocean-account-experimental-estimates-methodology/aug-2022.

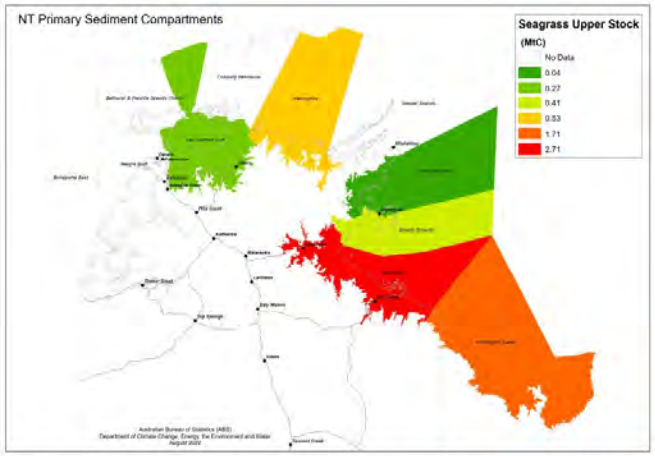


Figure 6. Modelled output of estimated seagrass carbon stocks based on validated seagrass data for the NT. Data derived from the ABS (2022) https://www.abs.gov.au/methodologies/national-ocean-account-experimental-estimates-methodology/aug-2022.ABS (2022)

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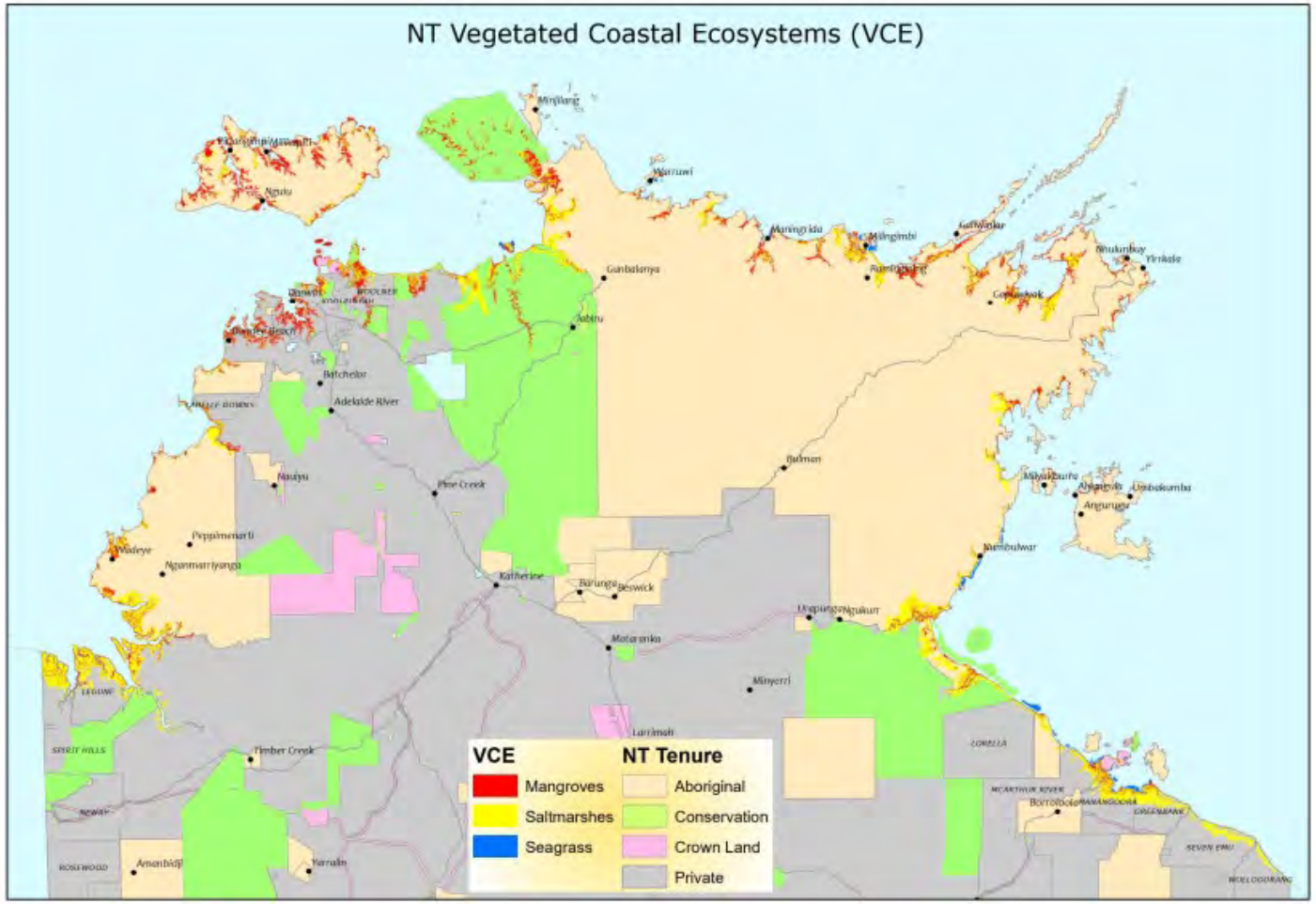
NT land and sea tenure and governance



- Free, Prior and Informed Consent processes (without coercion, well in advance, information throughout the engagement, consensus)
- S19 Activity under the ALRA
- Permission will be required from the Pastoral Board (non-pastoral use permit)
- Perceived conflict of land use can be managed with better data
- More data and a trade-off analysis is needed to provide landowners with the tools to make informed decisions about land management/use

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Synthesise knowledges as evidence for feral animal removal as a carbon and biodiversity enhancement strategy

- Synthesis will support method development for environmental markets
- Method development requires all relevant information and evidence to be drawn together and standardised

NESP Large Feral Animal Management Cluster

3.9 Indigenous led management of large feral animals

2.5 Defining metrics of success

- Conceptualise regional coordination of feral animals on Indigenous land.
- Test the conceptual model with Indigenous organisations conducting feral animal control

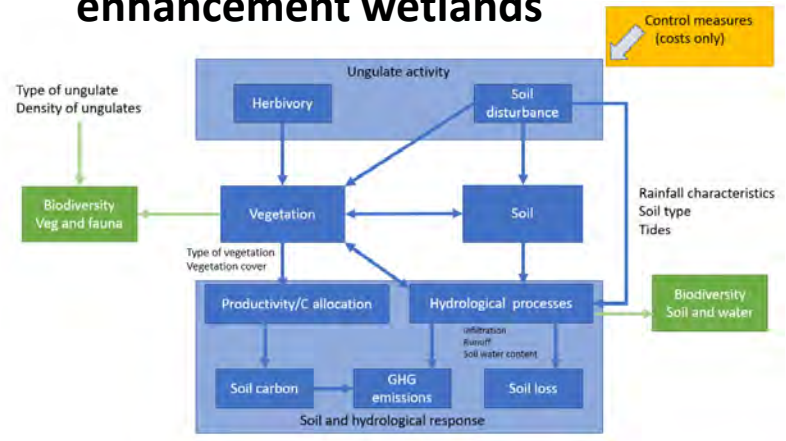
Guiding principles for effective Indigenous led regional coordination of feral animal control

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

3.7 Overcoming barriers to marine restoration

- Consultation
- Agreements
- Guiding principles for carbon projects

3.8 Carbon and biodiversity enhancement wetlands

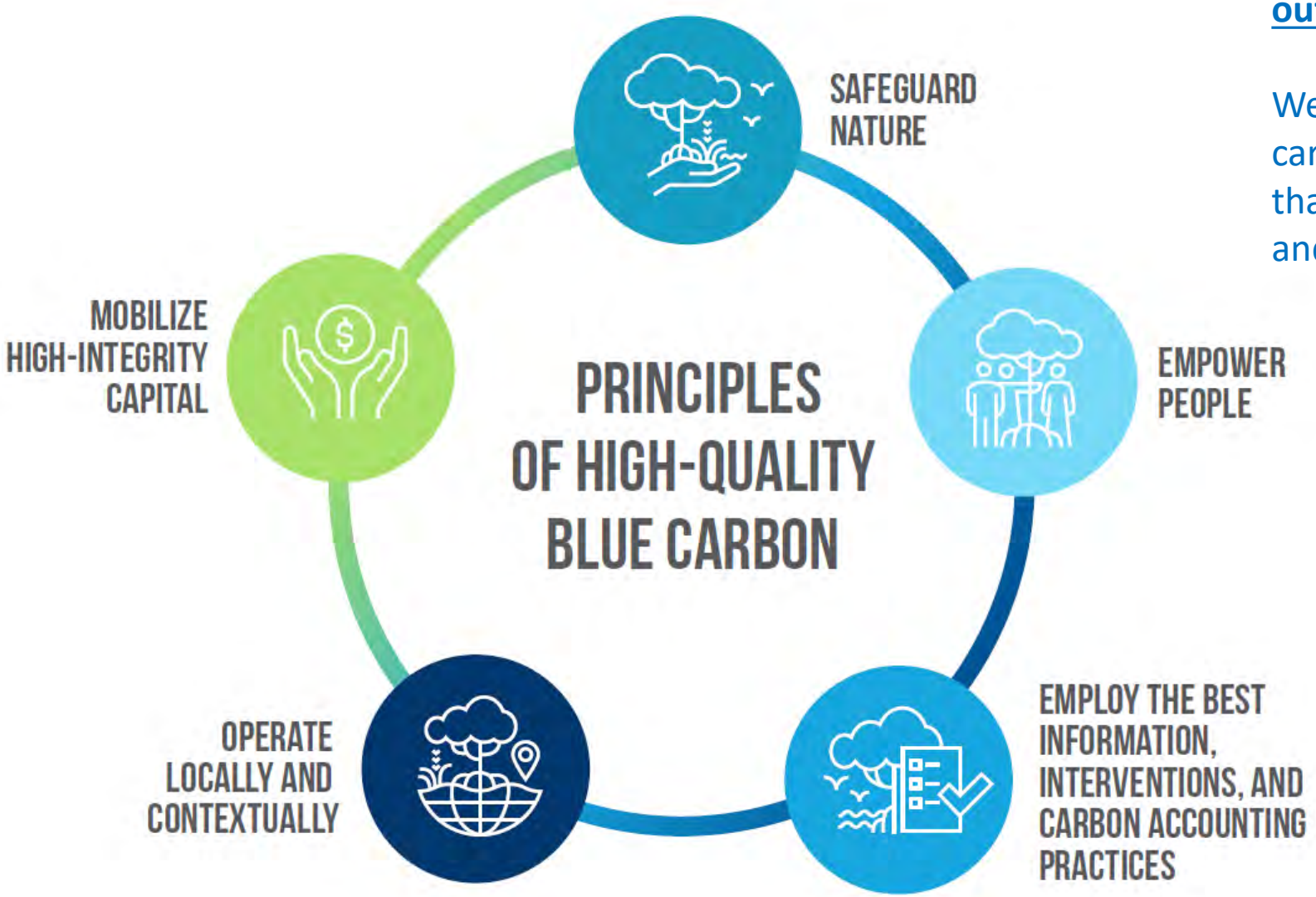


Landholders

Industry

Government

Stakeholders



Source: COP27, Principles for Blue Carbon

Demand for blue carbon credits currently far outweighs supply

We must ensure that the growth of blue carbon is driven by principles and guidance that optimise outcomes for people, biodiversity and the climate.

"41% of all CO_2 emissions since the beginning of the industrial era (1750) were emitted in 30 years, when we knew most. "The world listened but we did not hear".

Turtles and Sea Country

IMOS
Integrated Marine Observing System

TIWI LAND COUNCIL

Anindilyakwa Land & Sea Rangers

CROCODILE ISLANDS RANGERS
Maringa Ocean Patrol

AUSTRALIAN INSTITUTE OF MARINE SCIENCE

CHARLES DARWIN UNIVERSITY AUSTRALIA

Background

Green Turtle *Chelonia mydas*

Flatback Turtle *Natator depressus*

Olive Ridley Turtle *Lepidochelys olivacea*

Hawksbill Turtle *Eretmochelys imbricata*

Leatherback Turtle *Dermochelys coriacea*

Loggerhead Turtle *Caretta caretta*

- Turtles are listed threatened and listed migratory species under the Commonwealth EPBC Act 1999
- Olive Ridley and Green turtles are prioritised under the Threatened Species Action Plan (based on risk of extinction and benefits to other species and other criteria)
- They have cultural and biodiversity significance
- Aboriginal and Torres Strait Islander peoples have a long history of collaborating on turtle science and data collection
- NT has some of the most important nesting populations left in Australia
- There are multiple pressures impacting them

Key Turtles Questions

- Are the turtles doing ok?
- Where do they go?
- How many are there?
- What's affecting them?
- What can we do to support the population?

Threats to Turtles

- Climate change: feminisation, habitat loss, increased mortality
- Ghost nets and marine debris
- Pig and dog predation (native species too)
- Unsustainable use
- Coastal development
- Lighting

Collaborative Turtle projects in the NT

Quantify:

- Nest predation and inundation
- Nesting peaks
- Nesting and hatching success to assess recruitment
- Sex ratios
- Migration pathways, interesting and core foraging habitat

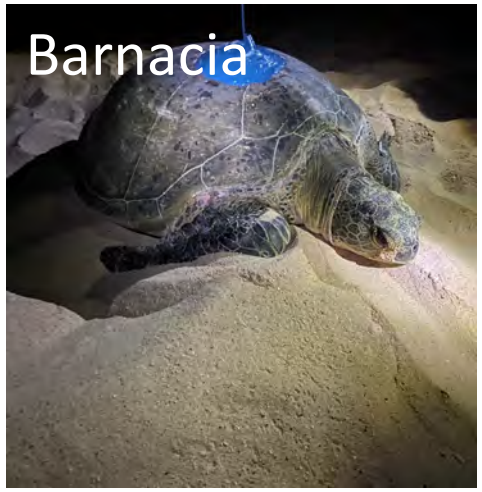
Methods:

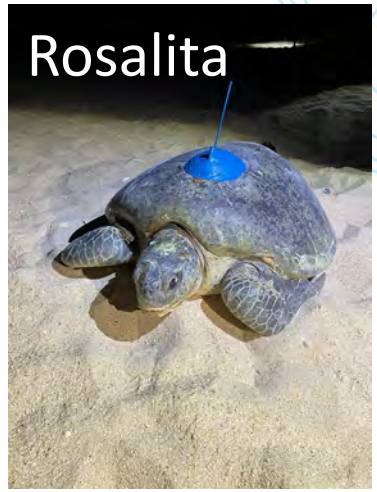
- Deploying motion sensor cameras to monitor predation
- Remote cameras to detect nesting density to ID peak
- Deploy temperature loggers
- Nest excavations
- Satellite telemetry

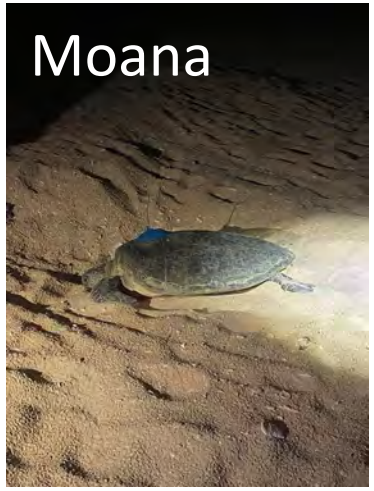
Report on nest success, hatchling recruitment and the causes of mortality and their relative impacts, ID predator species responsible. Mitigate and manage.

Turtle Camp with the Mamarika clan and the rangers

Yimenda satellite tracking

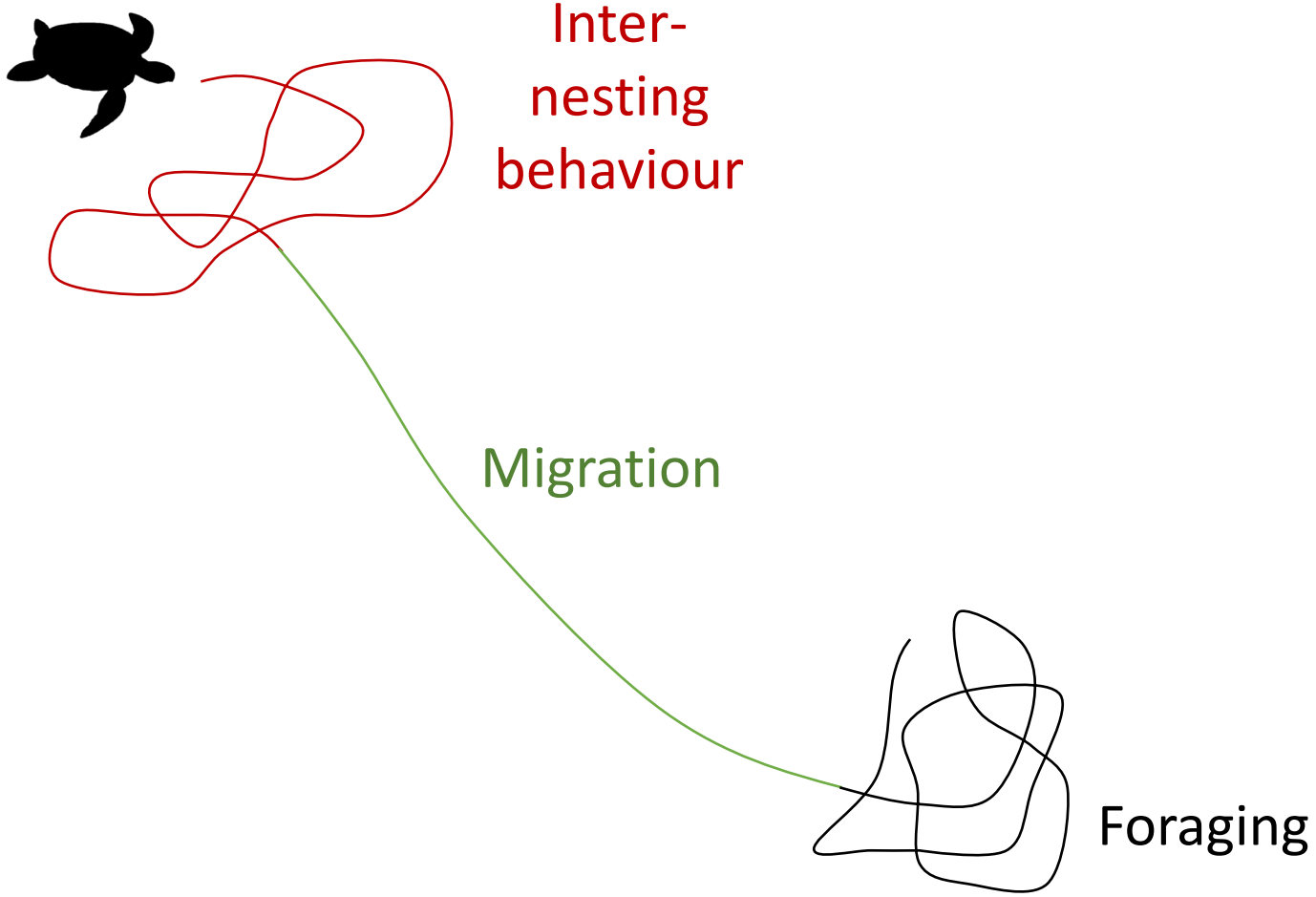


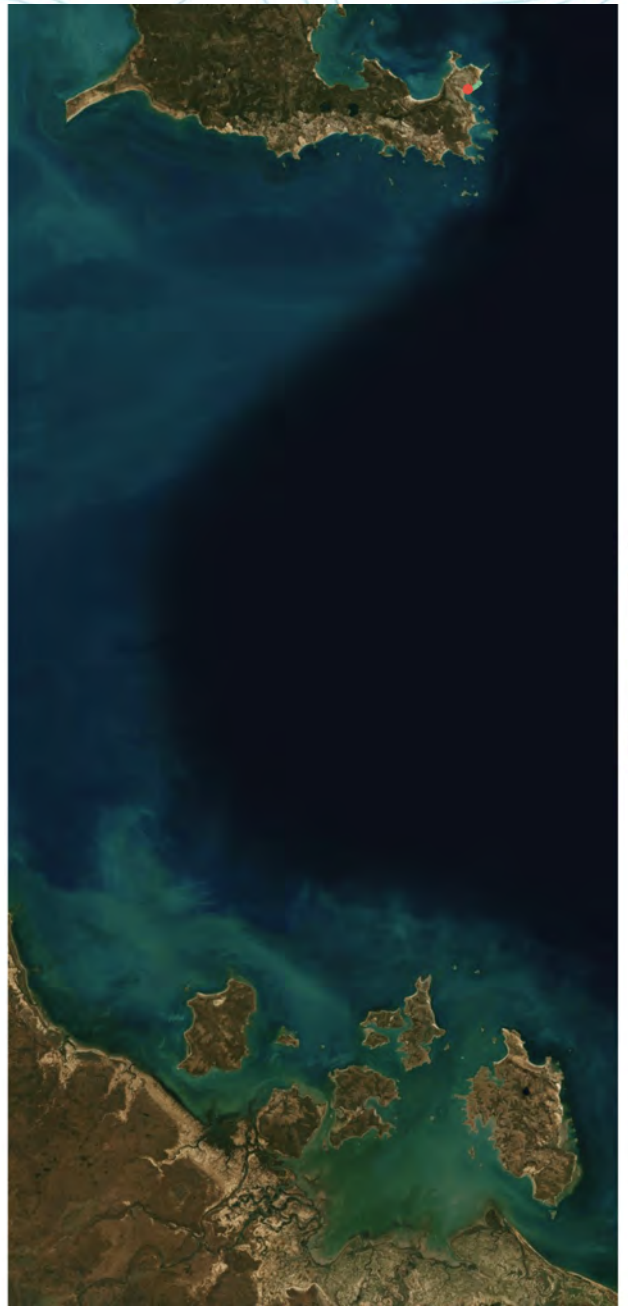


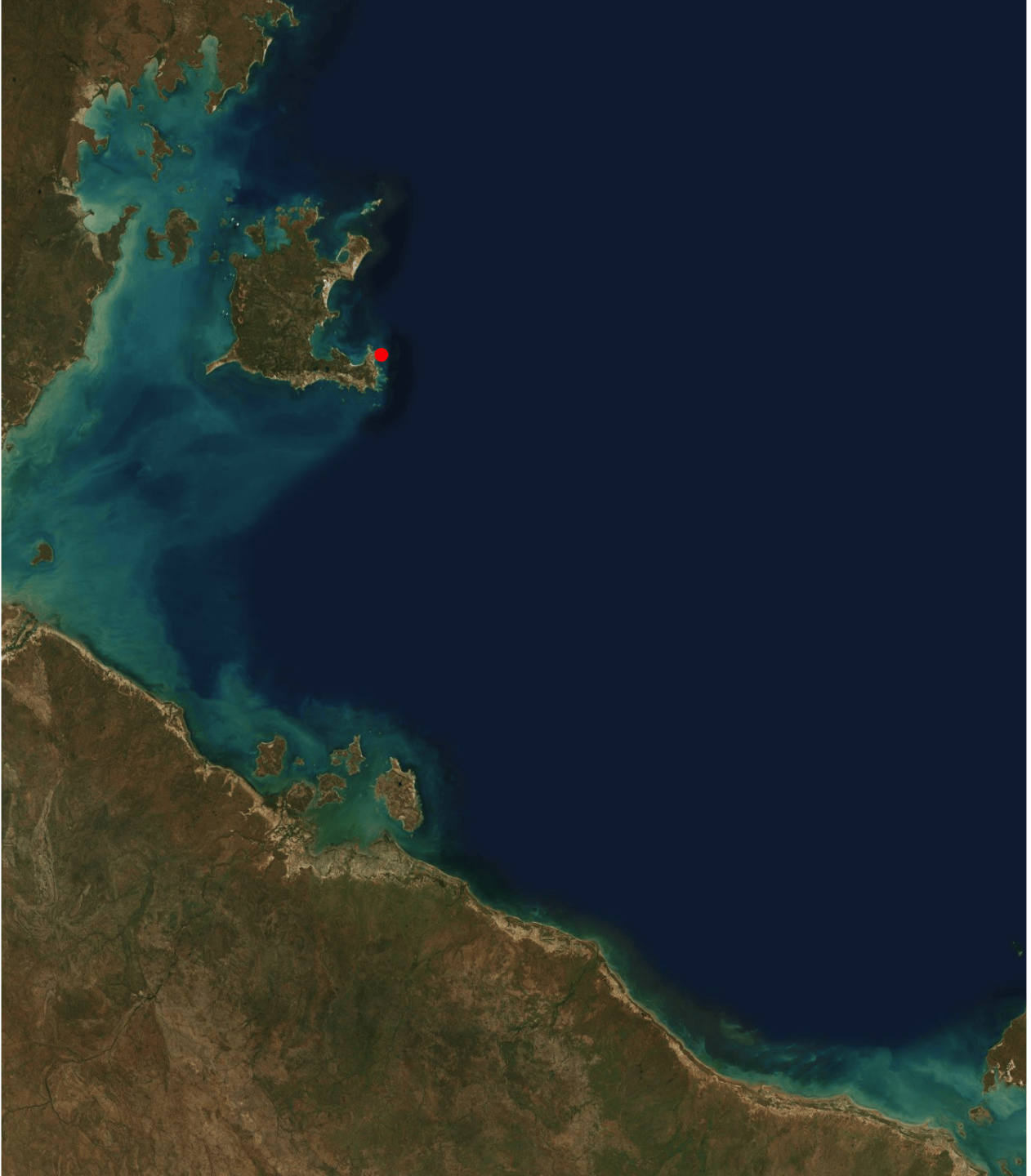


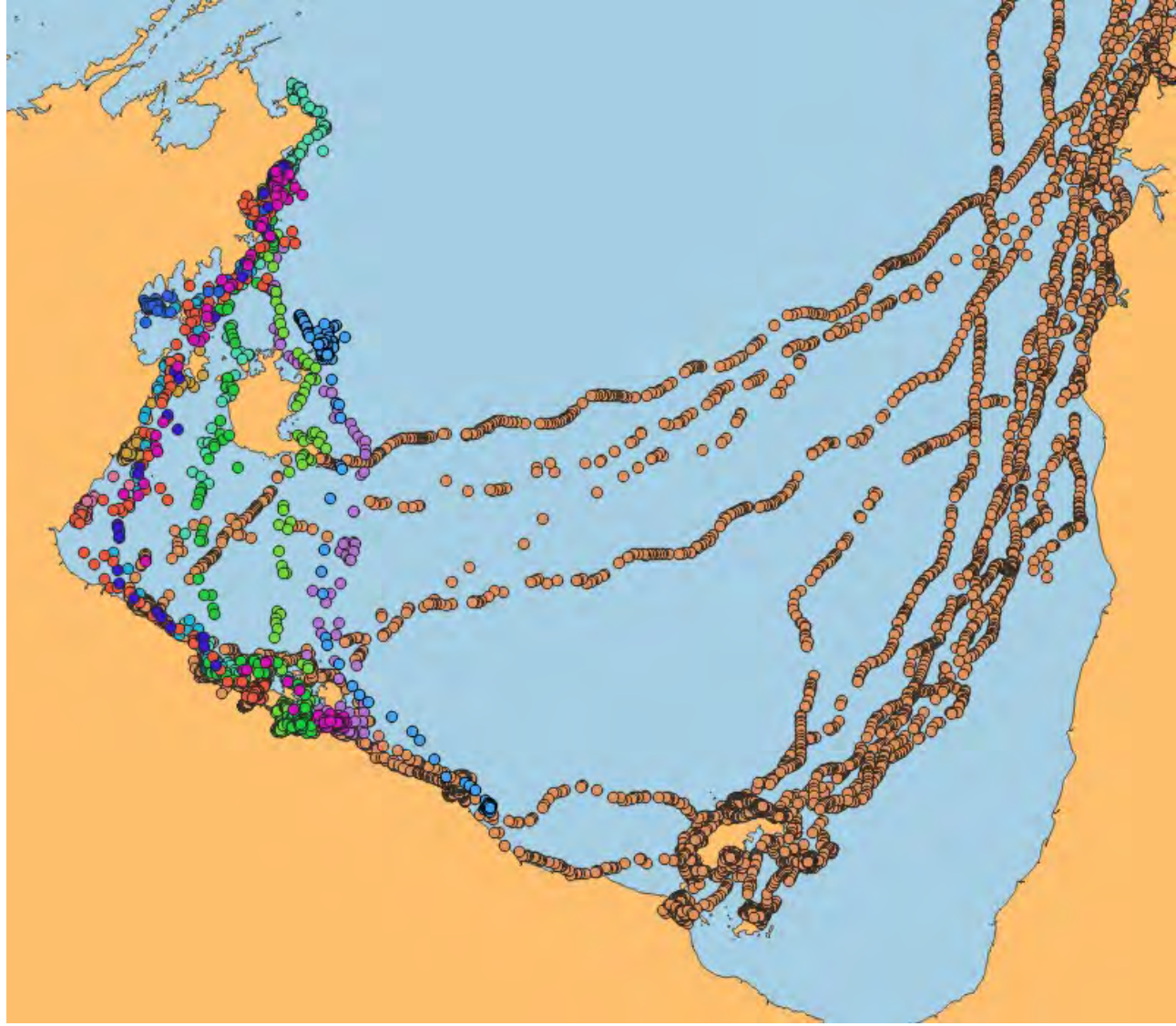
Yimenda satellite tracking

Speed and amount of turning helps to classify behaviour along the tracks









The southern Gulf of Carpentaria is a highly significant foraging site for nGBR (in decline) and Gulf of Carpentaria Green turtles (status unknown)


Cecilia
Lulu
Diana
Sophie
Peta
Carol
Sunshine
Tian
Shanti
Asha
Anna
Kristy-lee
Jacinta

Key Findings

Green turtles

- Lots of green turtles (373 tracks), but very few nests (64 nests, ~4 nests per night)
- Females were large, which is important for the local population but may indicate low recruitment
- Remote cameras were deployed for 12 months to identify the nesting peak, late Oct-Dec
- The green turtles of Groote Eylandt travel to other sea countries and mostly stay inside the Gulf, and mostly go to the southern Gulf to forage (for many years before coming back to nest)
- Some greens nested multiple times in the same season on different beaches – which means monitoring can be challenging

Olive Ridley turtles

- They travel deep (>80 m) and have extensive migrations to West Papua and west Cape York Qld
- The waters they transit have multiple threats including International fishing fleets and Ghost nets – a challenge to conserve their foraging habitat
- Nest predation (pigs) and inundation is apparent but unquantified, work is underway!

Management considerations

Turtle management (esp. greens) needs a regional approach (with other sea groups in the Gulf)

A large number of adult females are needed to keep a population healthy and the green population size is undetermined but smaller than expected.

We collected a baseline for the greens, now need to see how populations change over time (regular monitoring – but this is difficult, it takes many years)

More information to collect on both species:

- Hatching success
- Density of predators and nest predation
- Impact of sand and water temperature on hatchling survival and sex ratios
- Effect of removing lots of large females from the beach
- Effective and culturally appropriate mitigation options

Mapping Marra sea country: from above, below and the spaces between

Emma Barrett, Jodie Evans and Rachel Groom

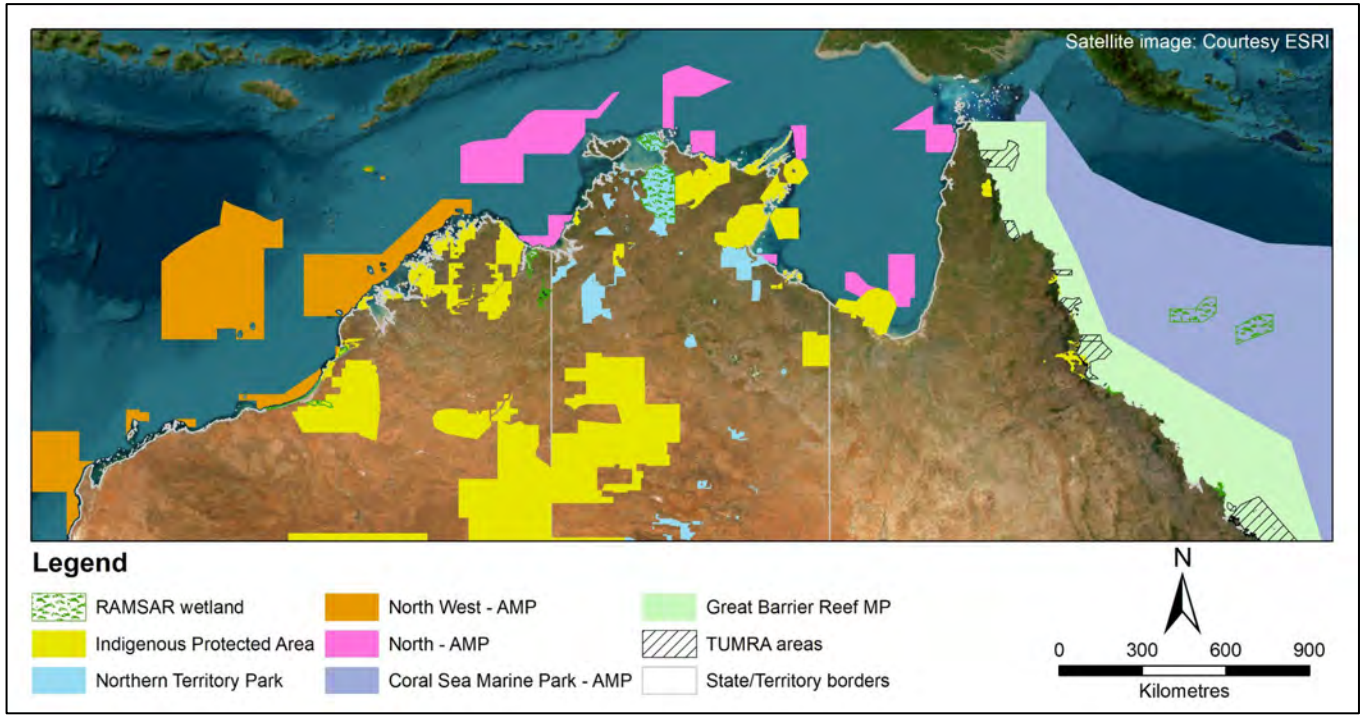
Charles Darwin University Australia

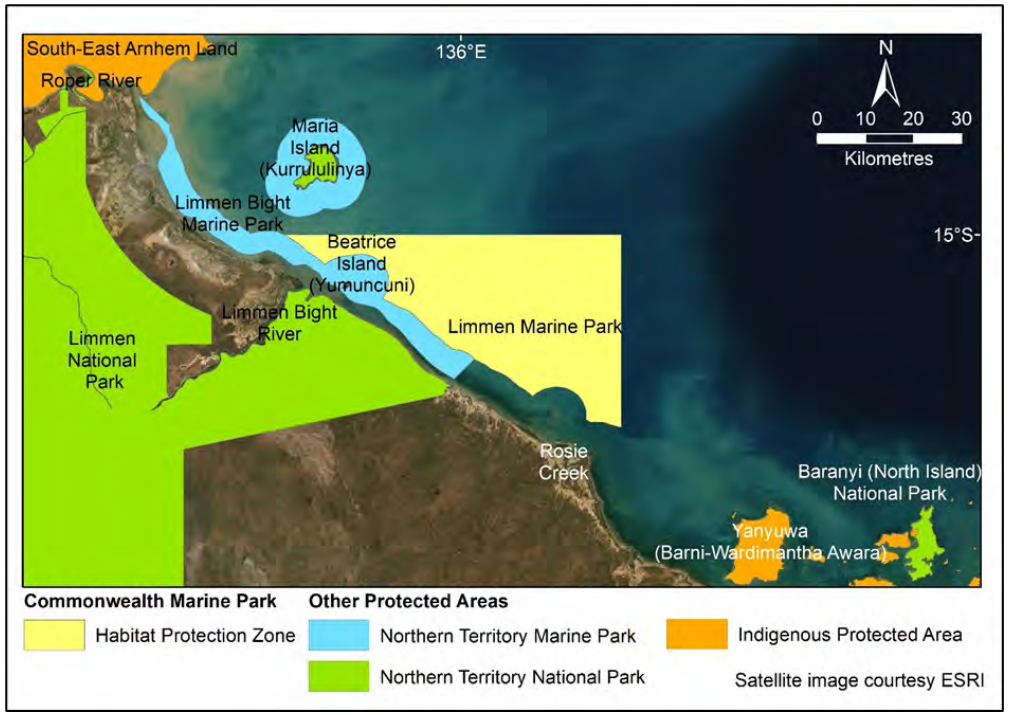
James Cook University Australia

Northern Territory Government

Australian Marine Parks

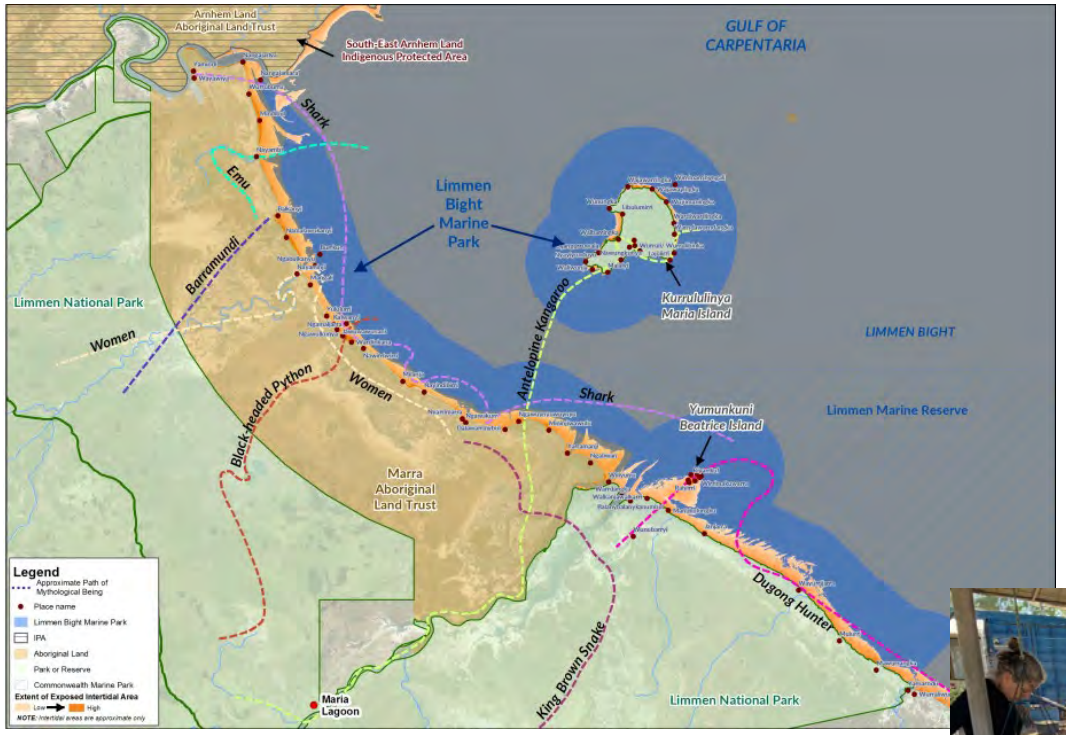
Marine protected areas across the North Network





- Newly established - limited ecological data
- Early stages of developing co-management with Traditional Owner groups
- Adjacent and connected to other protected areas

Co-design: listening & incorporating what exists



- Cultural knowledge, sacred sites
- Aerial survey data (40 years): dugong, turtle, dolphins

Things that worry Marra people:

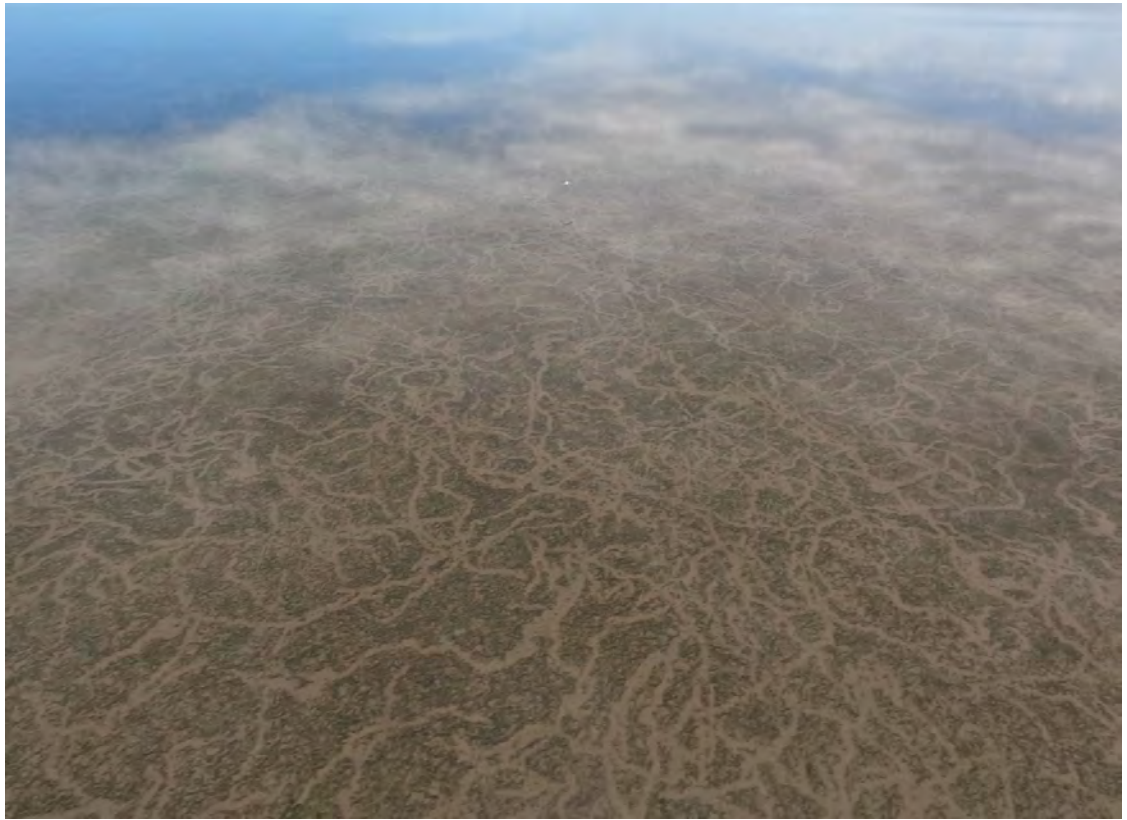
- Crabbing
- Fishing in the wrong places
- Mining
- Gillnets

Threats to Marra sea country

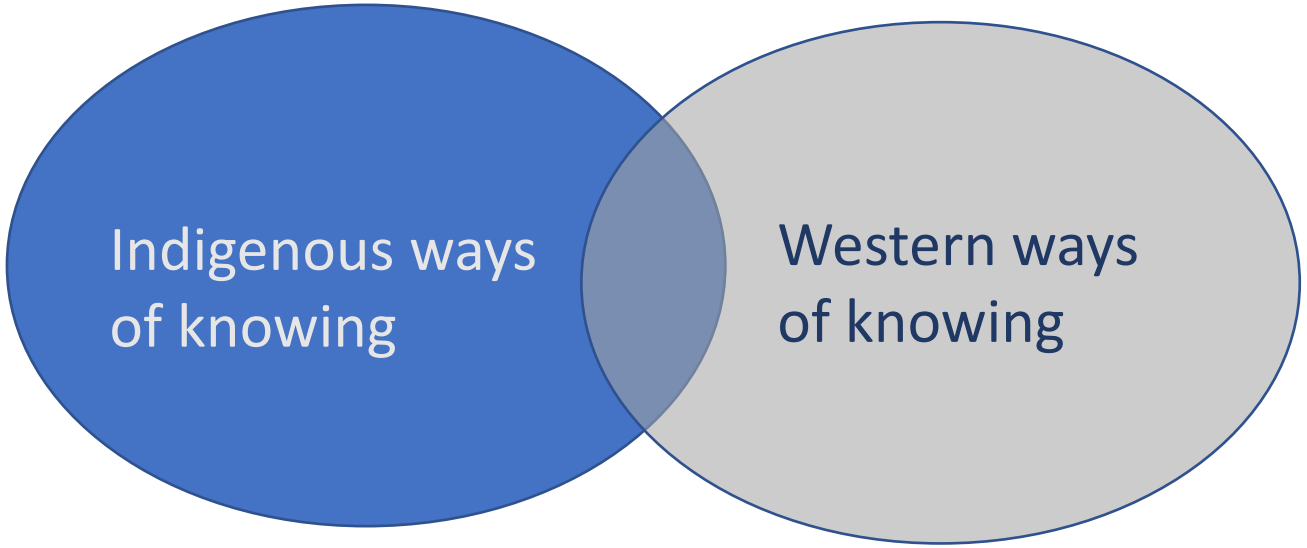
- Climate change, frequency and intensity: bleaching, seagrass burning, cyclones, mangrove dieback
- Increased sedimentation
- Upstream mining and water extraction, dredging
- Over-fishing, gillnets
- Sacred sites being desecrated/not being respected

Why seagrass?

- Ecological importance
- Cultural importance
- Economic importance
- Underpins management of place and many species



Knowledge systems and management



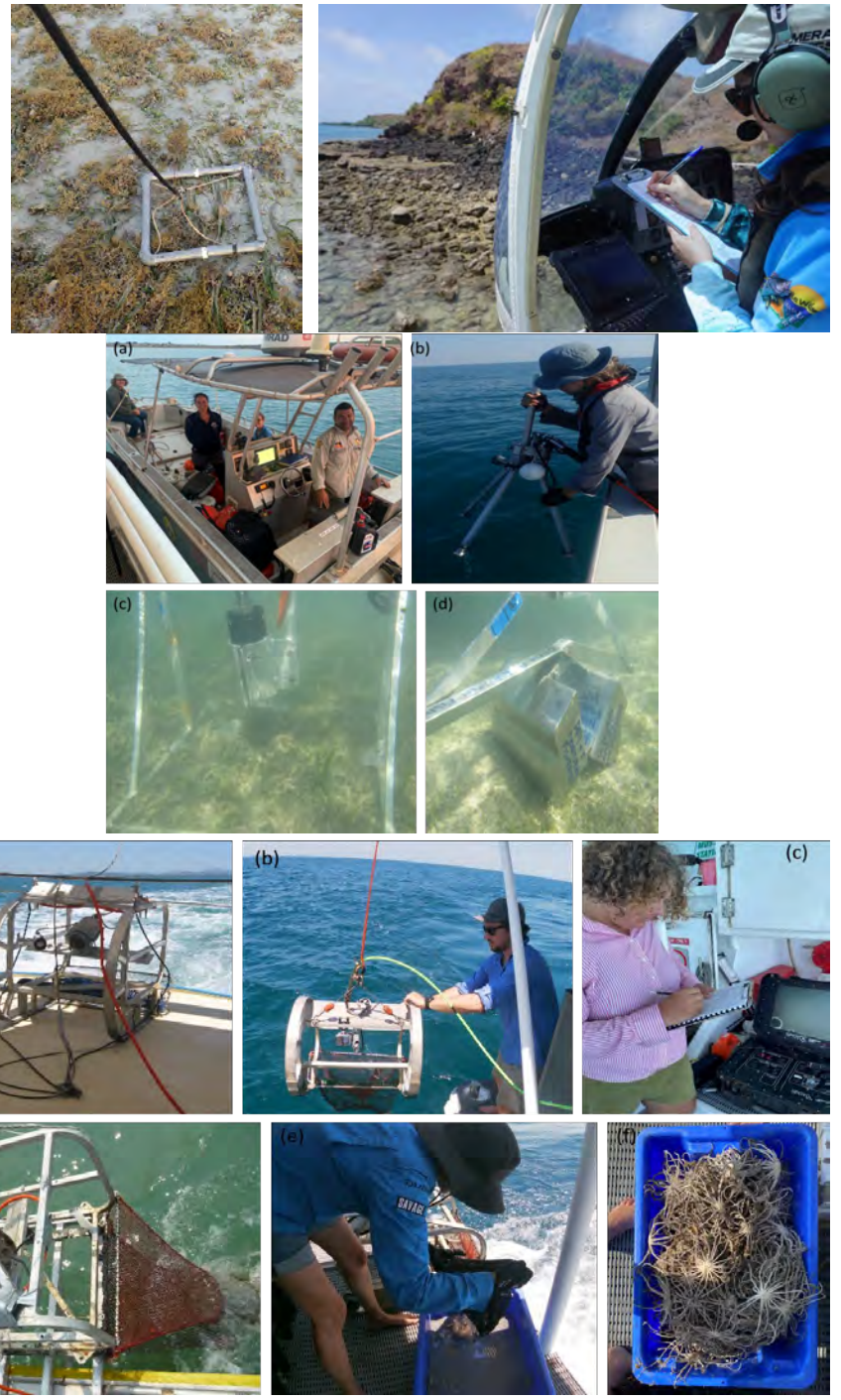
- Interconnected
- Holistic
- Non-hierarchical
- Traditional, experiential and revealed

- Individualistic
- Compartmentalised
- Hierarchical
- Objective and scientific

- Centering Indigenous knowledge systems
- Human Research Ethics
- Co-designing surveys, monitoring to incorporate Indigenous values
- Plan for cultural sustainability

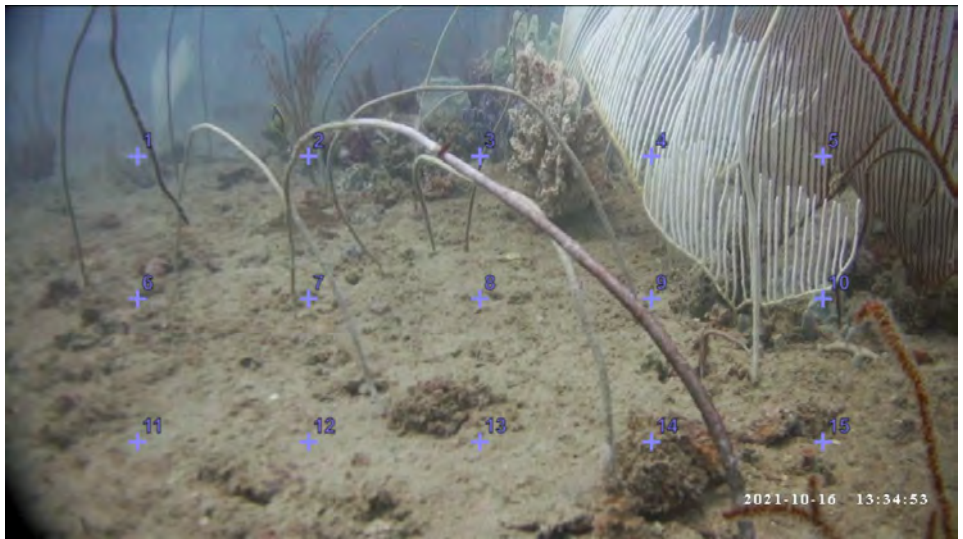
Survey methods

- Community consultation and co-design
  - Research Ethics
- Inter-tidal helicopter survey
- Subtidal boat-based survey (liveaboard)
  - Grab samples
  - Towed video
  - Drop camera



Survey results

- 20% of survey area had seagrass
- Seagrass found at 20 m
- Longest meadow was more than 65 km long
- Bleaching in coral communities
- 80 species of invertebrates e.g. feather stars, sea whips
- Neptune’s cup, a sponge not seen since the late 1800s
- Turtles, dugongs and dolphins on survey



Legend

Seagrass Biomass ($gDWm^{-2}$)

- 0 - 0.01
- 0.01 - 1
- 1 - 5
- 5 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 60
- 60>

- Survey Boundary
- Limmen Bight Marine Park
- Limmen Marine Park

0 10 20
Kilometres

N

Satellite image: courtesy ESRI

Next steps…..

- Using information layers e.g. seagrass, cultural values, threats; co-design zoning scheme for coastal NT Park for better protection (6- 12 months)
- Co-design a ranger two-way knowledge monitoring program across both Parks – a regional approach
- Support and implement Marra cultural governance
- Co-manage Marra sea country with partners and stakeholders

Final words from Marra people (Jodie and Emma)

- Marra people want to be back on country to look after the country
- It’s important for healing, teaching and empowering people
- We want to manage country with two-way knowledge and learn together
- We respect the old Marra people and want to look after country the way our ancestors did
- Project partnerships done the right way change lives

Opportunities to achieve better outcomes

Protect 30% x 2030 – Commonwealth government commitment… How do we steer the conversation?

The expanded protected areas should include seagrass habitats from northern Australia as they:

- Provide valuable ecosystem and commercial services (Blue Carbon, coastal stabilisation, fish and prawn nursery)
- Connect with other habitat corridors to improve resilience to climate change
- Enable improved Indigenous and participation in decision-making (Samuel EPBC review) and would protect culturally significant places
- Protect habitat of priority-listed and culturally significant species

First Nations Peoples are leading protection and management discussions in sea country, they should be included in **this** discussion.


Thanks