



National Environmental
Research Program

NORTHERN AUSTRALIA HUB

Improving biodiversity
conservation in
northern Australia

Marine turtle and dugong monitoring case study

Project context and aims

Marine turtles are species of cultural and conservation significance to both Indigenous and non-Indigenous people in Australia. Northern Australia has some of the healthiest populations of these species in the world, but there are significant data gaps and few data sets identifying long-term trends in populations. Identified conservation and management actions for marine turtles are included in a variety of planning frameworks, at local, regional and national levels.

Recent decades have seen a rapid expansion of locally-based Indigenous land management agencies, including ranger programs. The growth of these programs and their associated capabilities and infrastructure provides a significant opportunity to establish community-based research in remote areas of northern Australia.

An important aim of this project was to come up with a way for Indigenous communities to monitor local populations of marine turtles and dugongs, and the condition of their habitats. The project utilised scientific and local and traditional knowledge to come up with the most effective locations and methods to do this in areas managed by Indigenous people. Turtles and dugongs are migratory species, so impacts from other areas can affect local populations, making it important for local people to hold good baseline data.

Who is involved?

The project took a case study approach and was primarily a partnership between the Wunambal Gaambera Aboriginal Corporation (WGAC) and its Unguu Rangers, the North Australian Indigenous Land and Sea Management Alliance Limited (NAILSMA), and CSIRO. The partnership aimed to provide the Unguu Rangers with technical, scientific, research and logistics support to implement effective long-term monitoring on their country. It also aimed to share project tools and methods with other communities. The partnership approach was adopted to provide the Unguu Rangers with technical, scientific, research and logistical support to look after their turtles and dugongs on their country.



Approximate study area on Wunambal Gaambera country, WA

Turtle and dugong surveys

The Unguu Rangers work to the Wunambal Gaambera Healthy Country Plan 2010-2020, which was developed by local Traditional Owners and sets out priorities for sustaining a healthy country. One of the targets in the plan is about turtles and dugongs, and states:

We need to know more about where [turtles and dugongs] travel, their habitats in our country and how to look after them. Working together...using our traditional knowledge, doing surveys...will help us keep these animals healthy in our country as well as keeping our saltwater traditions strong.

To support this aim, a new boat-based survey method was designed so that rangers can monitor local feeding populations. For turtle populations to stay healthy, both the local feeding habitats and the separate nesting habitats need to be in good condition. In addition, nesting surveys can be expensive and logistically challenging, especially for remote communities, and the dominant local nesting species may not be the dominant species found in local feeding grounds. Therefore, while other surveys are also needed to get the whole picture, monitoring local feeding grounds and habitats is a good way for communities to obtain fine scale information on local populations and to get early detection of any changes in populations.

The boat-based turtle and dugong survey use two observers positioned on either side of the boat who call out all sightings to a third person who records data using a mobile device loaded with the survey application. The boat travels slowly at approximately 5-6 knots along fixed transects approximately 1-2.5 km long and systematically spaced. Turtles are recorded individually with a GPS location saved after each sighting. The information captured about each animal includes distance class from the boat, species, reproductive size class and behaviour.



Turtle survey boat transects established at Mary Island shown as yellow lines

Dugongs were not regularly sighted during the surveys. When sighted dugongs are recorded as a group, with the total number seen in each distance class. Environmental conditions are also recorded for all transects.

Using local knowledge of the geography and feeding sites of Green Turtles, Mary Island was selected as the primary site for the case study because it is regularly accessible to the Unguu Rangers and has consistently high numbers of turtles (on a good day a few turtles are seen every minute). Eight survey transects were established at Mary Island for regular surveys, so that the community can regularly monitor this local feeding population and detect trends over time.

Surveys were completed at Mary Island in: May 2012, June 2012, August 2012, March 2013, August 2013 and August 2014. Green Turtles were by far the most abundant species (84-100% of turtles recorded across all surveys). Relative density (average number of turtles seen per kilometre of survey effort) ranged from 1.4 turtles counted per kilometre (June 2012) to 15.4 Green Turtles counted per kilometre (August 2012).



Green turtle



Uunguu Rangers use a GoPro video camera and quadrat to monitor seagrass at Wobinbeyi



Uunguu Rangers using I-Tracker tools to record turtles

Seagrass monitoring

Seagrass is an important food for many turtles and an essential food for dugongs. While extensive surveys didn't identify seagrass areas in the intertidal zone, a seagrass meadow was found in a deeper area where the community have regularly sighted dugongs. As seagrass is an important resource for dugongs, the project team and rangers decided to monitor this seagrass meadow.

Because the seagrass meadow is located in relatively deep water (>1 m at the lowest tide), the water is regularly turbid, and crocodiles make it unsafe to undertake any diving activities, new methods were developed to monitor this seagrass meadow. Monitoring points were established where surveys for species and extent of seagrass are regularly completed. The surveys use a combination of combination of GoPro video camera mounted on a quadrat that can be dropped underwater to film the seagrass, and a grab sampler that picks up small scoops of sediment so that the specific seagrass species can be identified and measured. This provides a simple, cost-effective way for the rangers to monitor this seagrass meadow over time.

Interestingly, no seagrass was found around Mary Island, indicating that turtles on this feeding ground are eating algae, not seagrass.

I-Tracker tools

I-Tracker is a program coordinated by NAILSMA that supports Indigenous land and sea managers across northern Australia (WA, NT and Queensland) to collect, manage, map and report on information about their activities. The I-Tracker program uses world renowned CyberTracker software to make data collection applications that can be loaded onto mobile devices (for example PDAs, tablets, even mobile phones). These applications make it easy to collect information and follow maps in the field, as well as produce reports and sophisticated maps in the office.

This project used I-Tracker tools to collect scientific information about turtles, dugongs and seagrass from the boat-based surveys. The information is stored and managed locally by ranger groups and analysed with the assistance of NAILSMA and CSIRO. These tools have worked well because they are:

- Community-friendly – the applications include help screens, icons and use straightforward language
- Robust – the hardware used is tough, waterproof and easy to use in the field both for data entry and for live mapping to follow pre-planned transects
- Accurate – input error is reduced because results are automatically georeferenced, the user cannot skip fields, and there is instant and automatic data upload after surveys
- Local – data are housed and stored by rangers
- Empowering – rangers and the local community are empowered to interact with data because it has an easy-to-use mapping interface and reporting capabilities.



Sharing the approach

The methods and tools developed through this project have already been shared and taken up by other Indigenous ranger groups, including the Dambimangari Rangers in WA and the Gumurr Marthakal Rangers in the NT. The monitoring methods were developed to suit the needs and resources of rangers programs, and it is expected that the community will be able to continue with this monitoring independently into the future. Similarly designed surveys in other coastal communities across the north would greatly value-add to regional and national conservation and management objectives.

For further information contact the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) on 08 8946 7673 or the Unguu Rangers on 08 9161 4205.

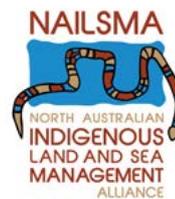
You can also visit <http://www.nerpnorthern.edu.au/research/projects/51> and see a video about the project at <http://vimeo.com/77464220>.



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