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Final Report

Flatback turtles of Torres Strait

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Australian Government
Department of the Environment

Reef & Rainforest RESEARCH CENTRE

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Executive Summary

1. The islands of western and southern Torres Strait, plus the adjacent mainland beaches, are important for flatback turtle nesting. It is likely that these rookeries form part of the same genetic population as Crab Island and the Western Cape.

2. Warul Kara (Deliverance Island) is an important flatback turtle rookery and receives around 100 to 200 turtles per year.

3. Female turtles use much of the deeper waters surrounding Warul Kawa for their inter-nesting habitat and two turtles moved up into Papua New Guinea waters during inter-nesting periods.

4. Turtles migrated between 100 and 2,000 km towards distant foraging areas. Nine of the 11 tagged turtles migrated west into the Gulf of Carpentaria, Arafura Sea or the Bonaparte Gulf. Two turtles migrated into Indonesian waters.

5. Foraging areas are typically large (516 to 4,324 km^2), and larger than green and loggerhead turtles in eastern Australia.

6. Most turtles spend part of their migration and/or foraging in regions known to have higher incidence of ghost net entanglement.

7. The policy implications of this research centre around the fact that flatback turtles are a shared resource with Indonesia and Papua New Guinea, and Australian recovery and management documents need to consider overseas threats such as fisheries bycatch and ghost net fishing.

Introduction

Low density nesting by flatback turtles occurs throughout most of the central, southern and western islands of Torres Strait. Unlike green turtles there are no long-term data sets or published information on migration patterns. Warul Kawa, an Indigenous Protected area, is a marine turtle rookery site in the north-western Torres Strait. Flatback turtles (*Natator depressus*) are the predominant turtle that nest on the island, although both the green turtle (*Chelonia mydas*) and hawksbill turtle (*Eretmochelys imbricata*) have also been infrequently observed nesting on the beaches. Flatback turtles are known to nest year round in northern Australia, particularly from July to September as is the case with the nearest rookery of Crab Island. However, fieldwork in September 2012 resulted in the tagging of only two individual nesting turtles. Previous studies of flatback turtles at Warul Kawa have suggested a peak nesting period in the early months of the year with anecdotal evidence from local rangers and traditional owners of the island supporting these results. In August 2010, we began annual nesting turtle research trips to Warul Kawa (Deliverance Island) to collect data on nesting flatback turtles and their migration patterns.

Objectives

1. To calculate To map the inter-nesting and migration pathways of flatback turtles from Torres Strait.
2. To determine the size and importance of the Warul Kawa flatback turtle rookery influencing nesting success of sea turtles.

Methods

We conducted field trips in cooperation with, and permission from TSRA and the Malua Kiai Rangers from Boigu, Mura Badhulgau from Badu and Mabuygiw Rangers from Mabuiag. The island was visited four times throughout the study – September 2012, February 2013, August 2013 and March 2014. Turtle monitoring techniques followed the standard methods used by the Queensland Government turtle project[1] (Figure 1). Genetic and stable isotope samples have been collected from foraging green turtles and nesting flatback turtles. These have been stored for future analysis. Eleven satellite tags were deployed on turtles via a specially designed harness and acrylic plate (five in 2013 and six on 2014), and the harness attachment followed establish techniques (Figure 1).

[1] http://www.ehp.qld.gov.au/water/monitoring/assessment/turtle_monitoring.html

Figure 1. Clockwise from top left – tagging juvenile green turtles caught on the reef crest, attaching a satellite tag to a female flatback turtle, relocating eggs because the turtle was laying them below the high tide line, and releasing a female with a satellite tag.

Results

Nesting turtles 2012

Monitoring was conducted for three nights. Two flatback turtles emerged to nest and both were tagged. No other turtles were seen nesting, and no hatchlings were seen.

Nesting turtles 2013

A total of 20 nesting flatback turtles were recorded on Warul Kawa between 26 – 28 February 2013 (Table 1). Turtles ranged in size from 78.5 to 98.8 cm, with a mean curved carapace length (CCL) of 86.5 cm. Seventeen turtles (85%) successfully nested on the first attempt. Of the three turtles that were not successful, two were successful on a subsequent second attempt in a nearby location. The third turtle was successful on the next night, however, the nest position chosen was only 1 m above the previous high tide mark. These eggs were carefully taken from the nest as each was laid and relocated to an alternative nest site dug by hand higher on the sand dune. Total egg count for this nest was 54. All observed turtle nesting activity occurred at the northern sand spit and the north-western section of beach (Figure 1), however, an island track count showed evidence of turtle nesting around the entire island. A total of 164 recent turtle arrivals were counted, although the nesting success of these visits was unclear. During our time on the island counts of fresh tracks were conducted each morning and afternoon with six turtles missed on the second morning, including two turtles in

the act of nesting. These turtles were both successful on the first attempt and one was a green turtle.

An additional trip of three nights in February 2013 was conducted with the aim to assess the situation with black rats.

Nesting turtles 2014

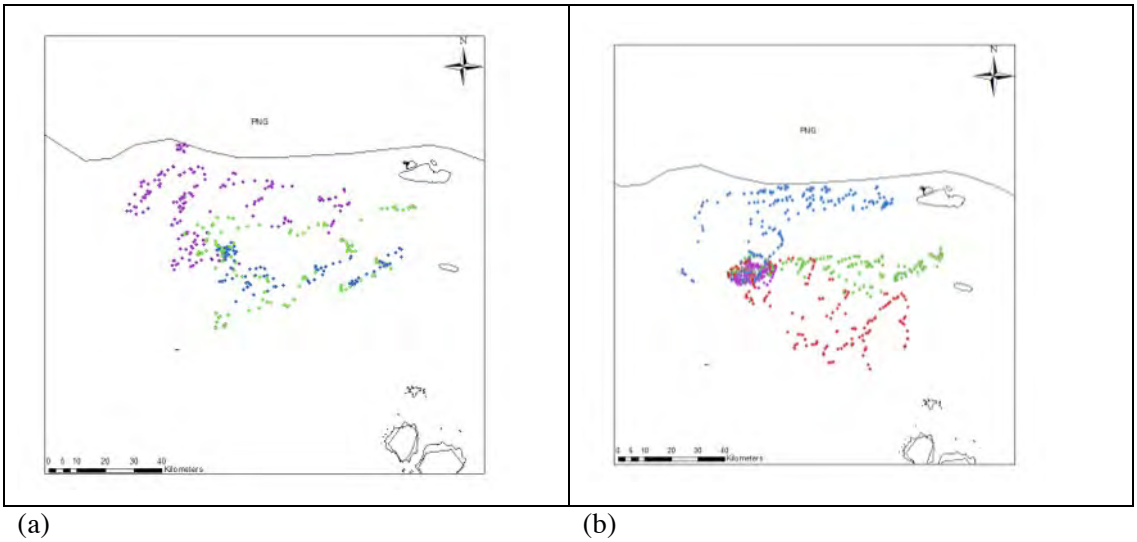
A total of 31 nesting flatback turtles were recorded on Warul Kawa from 3–5 March 2014. Turtles ranged in size from 80.8 to 91.5 cm. Five of the 31 turtles were not successful at laying a clutch of eggs on their first attempt and were not seen again on the island. One turtle had a healed injury consistent with a harpoon scar and a second turtle had injuries consistent with being caught in a net.

Satellite telemetry

Upon release, five turtles had completed their nesting season and moved away from the island while six turtles initially remained in the area, returning to nest again around 14 days after being released.

Inter-nesting

Each of the turtles spent their interesting period within 25 km of the nesting beach. One turtle in each year used habitat along the coast of Papua New Guinea (Figure 2).



(a) (b)

Figure 2. Inter-nesting locations of three female flatback turtles nesting at Warul Kawa in (a) 2013, and (b) 2014.

Migration and foraging

Upon release, five turtles had completed their nesting season and moved away from the island while six turtles initially remained in the area, returning to nest again around 14 days after being released.

Flatback turtle tracking from Warul Kawa 2013 and 2014

Tracking of flatback turtles tagged on Warul Kawa in 2013 and 2014 found:

- mean migration distance 733 km (+/-503 km; range 56 to 1,652 km),
- mean 95% home range 11,724 km^2 (+/-9,756 km^2; range 2,046 to 27,645 km^2),
- mean 50% home range 2,334 km^2 (+/-1,410 km^2; range 516 to 4,324 km^2), and
- mean distance travelled while foraging 4,595 km (+/-1,095 km; range 2,539 to 5,731 km).

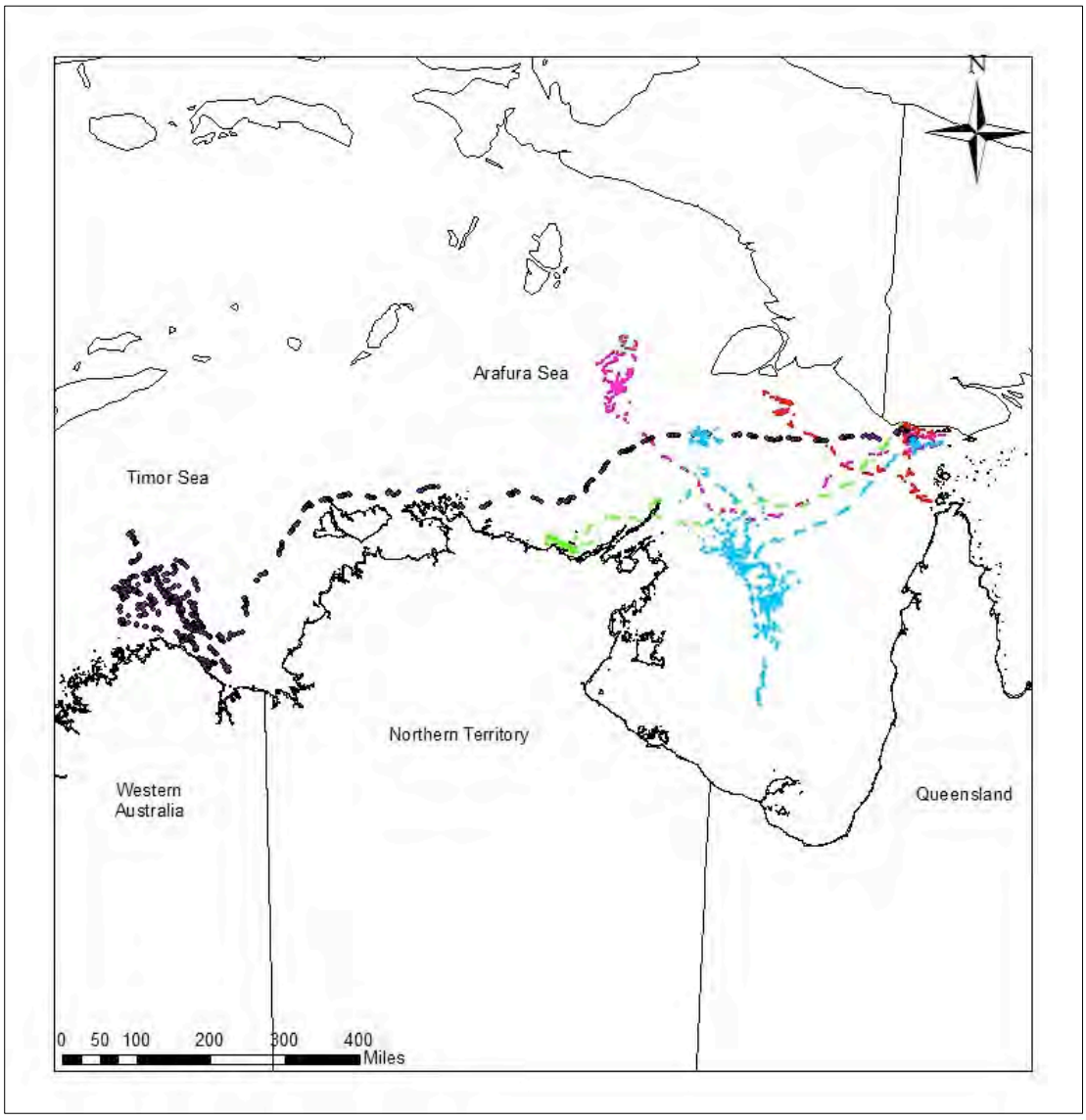


Figure 3. Migration routes and foraging areas for five female flatback turtles after nesting at Warul Kawa in 2013.

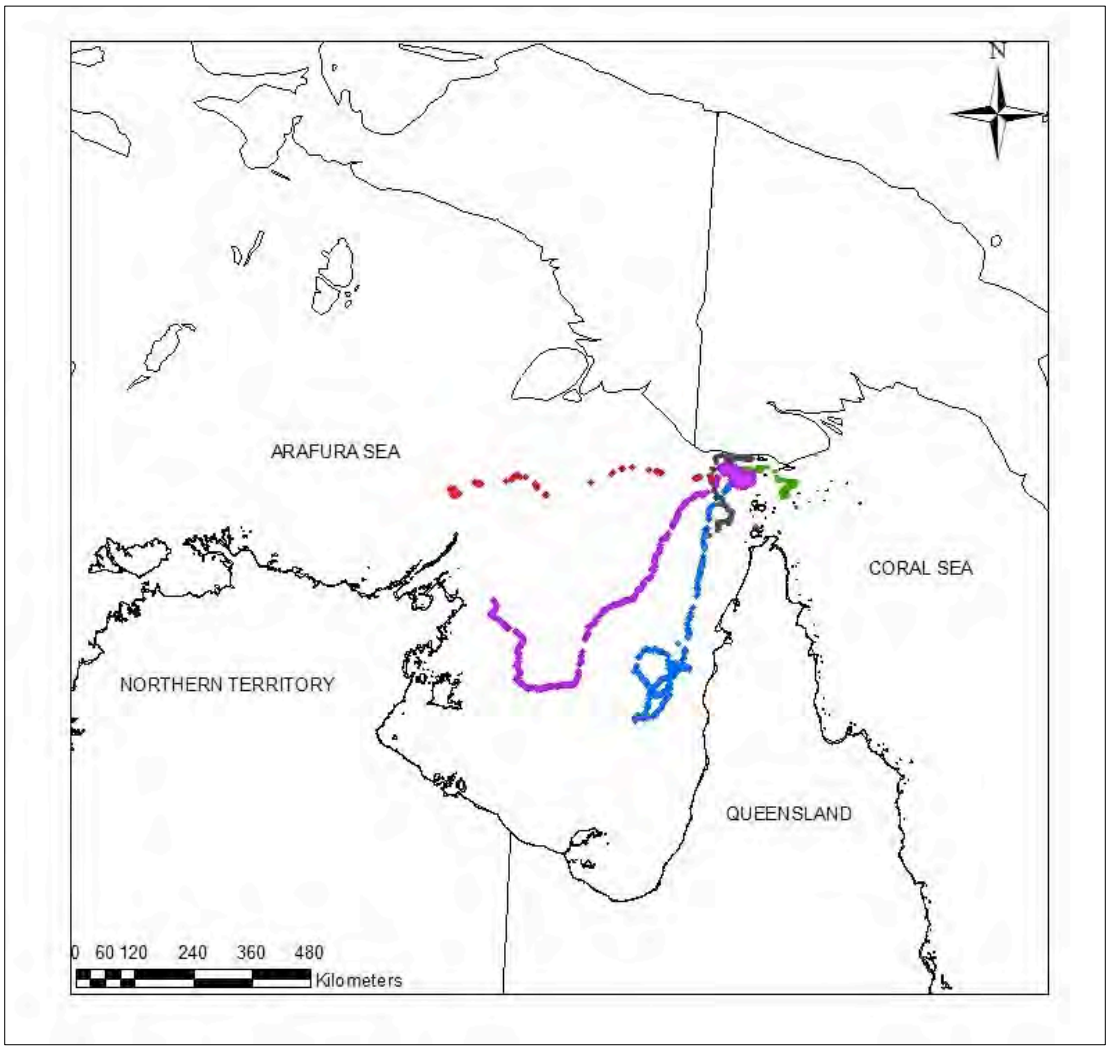


Figure 4. Migration routes and foraging areas for six female flatback turtles after nesting at Warul Kawa in 2014 (3 turtles remain active).

Hatchling production

A small number of turtle hatchling tracks and emerged nests were discovered on each fieldtrip, hence we believe that we have been sampling in the early part of the nesting season.

Monitoring

Four time-lapse cameras were installed at the highest density turtle track locations, which were at the northern sand spit and north-western beach dune. Two cameras were mounted back to back on a 3 m length of 50 mm PVC pipe that was installed over a 2.4 m star picket driven into the sand and secured by rope attached to three further star pickets (Figure 5). This set-up was replicated in a different location for the remaining two cameras, resulting in an approximate total viewing coverage of 400 m of beach. Battery failure in year one prevented any analysis, and cameras are currently deployed to record data until April 2015.

Figure 5. One of the remote cameras deployed on Warul Kawa to record nesting turtles.

Island shape

Sand cays are dynamic systems that change depending upon the weather conditions at different times of the year. In 2013, the island was mapped with RTK GPS to gain an understanding of island height and vulnerability to sea level rise. The majority of the island is less than 4 m above sea level at low tide. Most of the dune area being used by turtles is 1 to 3 m above the low tide sea level (Figure 6). GPS tracks were made of Warul Kawa during prevailing south-easterly winds in September, and again during the north-westerly conditions in February. The large northern and southern sand spits seen in September were no longer in place in February (Figure 7). This change occurred in both 2013 and 2014. Most turtle activity occurs in the more stable areas of the island.

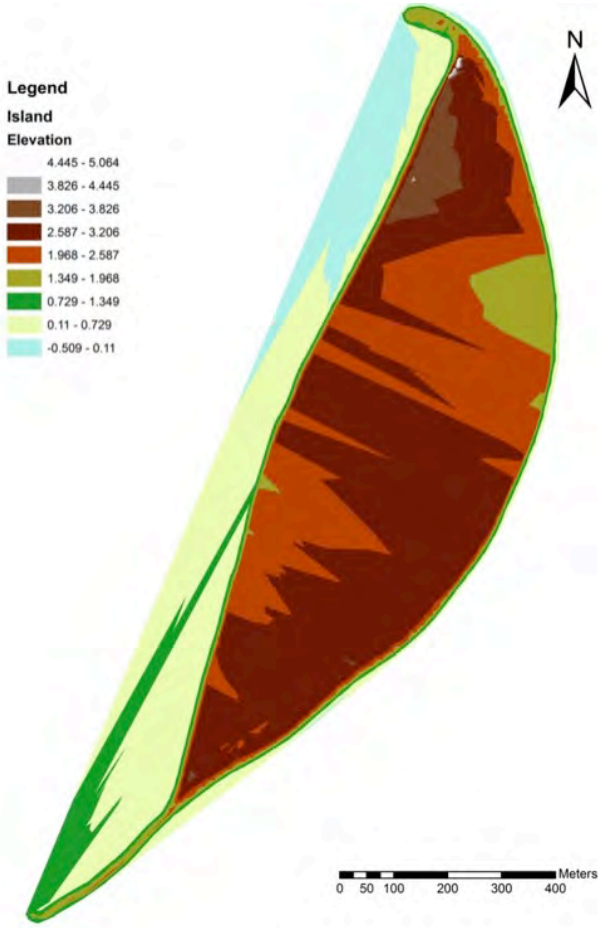


Figure 6. Digital elevation map of Warul Kawa – February 2013.
Shows island height above mean low tide.

Figure 7. GPS monitoring of changing beach morphology at Warul Kawa.
Where: green = September 2012; and black = February 2013.

Acknowledgements

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