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PAPUA NEW GUINEA FIELD RESEARCH

CONFLICT ISLAND NESTING SEASON 2017-2018

Bring Back the Bills

Uplisted to 'Endangered' under Queensland Government State legislation in May 2017, the northeast Australian hawksbill stock continues to decline. Through WWF-Australia's collaborative project on Milman Island (Queensland, Australia), satellite trackers deployed in 2015 and 2016 revealed that hawksbill turtles breeding in north Queensland are not migrating outside Australian waters. However, it is unknown whether these hawksbill turtles used to migrate to neighbouring countries and if they are related (genetically) to our closest neighbour in Papua New Guinea (PNG). Unfortunately, hawksbill turtles are not a protected species in PNG and although their population status remains unknown, anecdotal evidence suggests they are also declining. This information is urgently needed to inform management, policy and community-based approaches to *Bring Back the Bills*.

As an extension to WWF-Australia's (WWF) existing hawksbill tracking work underway on Milman Island, WWF partnered with the University of the Sunshine Coast (USC), local Milne Bay Province community turtle monitors and newly established Conflict Island Conservation Initiative (CICI) in the Conflict Group of Islands, Papua New Guinea (PNG). Representing both WWF and USC, we participated in a two week turtle nest monitoring trip (from 29 December 2017 - 12 January 2018) to help determine the migratory routes, feeding grounds and relationships with other known hawksbill stocks. We also collected morphometrics and other meristic nesting turtle biology measurements for comparison to prior data collected in PNG, northeast Queensland and elsewhere, including genetic samples

and incubation temperatures. Turtle sighting and catch surveys were also undertaken with local community turtle monitors and other CICI staff to help decipher hawksbill distribution and use throughout Milne Bay Province. This information will also inform CICI's turtle awareness program. Where determining the population trend and management options for the recovery of hawksbill turtles is a long-term goal, the short-term aim is to understand whether the northeast Australian and/or PNG populations are *sinks* and *strongholds*, or targeted sources driving critical population declines.

Similar to Australia, PNG hawksbill populations are threatened by unsustainable legal take - targeted in fisheries and caught as bycatch using modern practices, and threatened by the impacts of climate change, including loss of nesting and feeding habitat and population feminisation. Both Australia and PNG are listed in the top three countries for the highest amount of legally taken turtles in the world. Traded domestically for food and money, anecdotal evidence also suggests illegal international trade is also occurring as a black market in PNG.

Conflict Group of Islands

For the first time in Papua New Guinea, the CICI instigated a three month marine turtle nesting beach monitoring survey during 3 November 2017 - 9 February 2018, with the view to continuing the program over successive years. CICI employs six local community turtle monitors ("rangers") to monitor nesting beaches, undertake poaching surveys, remove marine debris and logs blocking nesting beach access, and support a turtle awareness program throughout the Milne Bay Province.

Because of its remoteness, it is thought the Milne Bay Province – primarily made up of the Engineer, Deboyne, Conflict and Jomard Group of Islands – may support one of the highest densities of hawksbill turtles nesting in PNG. Although monitored ad hoc throughout Jomard and only twice in the Conflict Groups historically, there is no published information on population structure, dynamics or trend estimates to date.

The Conflict Group of Islands lies approximately 80 nautical miles south-east of Alotau in Milne Bay Province. This very remote group of islands is owned and managed by Ian Gowrie-Smith (Australian businessman). The islands are unoccupied, except for a small dwelling on Panasesa, visited by cruise ships intermittently. Other islands in the atoll include: Irai, Gabugabutau, Tupit (Tobiki), Panarakuum, Kolavia, Muniara, Aroroa and the Reef Islands. Locals hunt turtles in the region, where turtles are still a delicacy for food (kai kai) and traded.

The specific activities carried out during the Conflict Islands field trips were:

- Support local community turtle monitor and CICI's nesting monitoring project to document peak nesting and population trends.
- Attach and deploy 10 satellite transmitters to help determine previously unknown migration paths and foraging grounds.

- Collect genetic (tissue) samples to determine diversity, composition and relatedness to other known hawksbill populations in the Asia-Pacific region.
- Deploy sand temperature data loggers and assess dead hatchlings gonads to determine sex of hatchlings.
- Identify threats to the Conflict Group of Islands (e.g. take, trade, accessibility and availability of nesting habitat) through undertaking a turtle sighting and catch survey and on-ground nesting beach observation.

The 2017-2018 Nesting Season Field Trips:

29 December 2017 – 12 January 2018

A collaboration of six local community turtle monitors from Milne Bay Province, CICI and its crew, 12 volunteers, USC and WWF made up the research team – working together to deliver the trip's objectives for both CICI and the rest of us.

With CICI having already conducted the first eight weeks of turtle nesting beach monitoring, we hit the ground running. A slight delay for arriving passengers, a 10-hour boat ride from Alotau, training and safety briefs completed on the first two days, and it was straight into nesting beach monitoring at Irai Island on New Year's Eve. Six teams of three, made up of trained monitors and volunteers, walked extensively in the search of nesting turtles. With low tide approaching, we managed to find two hawksbill turtles, one on Irai and one on Panasesa. With a great start to the trip, we finished up early and celebrated New Year's with a bonfire and fireworks.

Days three to eight - resulted in us island hopping around all the Conflict Group, as having a presence at all the islands this nesting season to deter poachers was CICI's initial goal. Between day two and three, we found four hawksbill turtles to attach satellite transmitters to, but then had to wait until day eight to find another.

Days nine to 13 - was a bit more nail-biting as we struggled to catch a glimpse of what was becoming a very elusive hawksbill turtle.

Days 10 to 13 - we managed to find two more hawksbill turtles to attach satellite transmitters, making a total of eight. Time had run out for this trip, leaving two more trackers for CICI to deploy to reach our target of 10. It is this migration track and the place they call home that we need to know more about, to find out if it is a haven or where they may be facing multiple threats. WWF/USC will analyse their movements and publish the results over subsequent years.

Day 14 we made our way to Tube Tube Island, Engineer Group to undertake turtle awareness – this included a play by the volunteers, discussions with the Councillors and local community about the declining numbers of hawksbill turtles, and to leave donations and turtle storyboards for the school.

Throughout the entire two week trip, turtle monitors and other staff at CICI, regularly monitored the islands for poaching. During these trips they burned or removed logs from the nesting beaches. No records of length, diameter or log type are recorded, but like Milman Island, logs block access to nesting beaches on many of the Conflict Group Islands.

The science:

Hawksbill (and green) turtles had been monitored historically on the Conflict Group of Islands in the early 2000s. However, no population status, distribution, dynamics, structure, or trends have been determined. A study in 2003 elucidated however, that the hawksbill population is on a declining trend (Bell et al., 2004). To date, CICI's nesting monitoring program in the Conflicts (2 November 2017 – 10 January 2018) reveals less than 10% of all turtles attempting to nest are hawksbills (n=33 of 352 attempts by all species recorded). There is limited data elsewhere in PNG, except for Jomard, but no data has been published to date.

Along with Purdy Islands in Manus Province, the Conflict Group are considered important nesting aggregations (WWF, 2016). Depending on the outcomes of the Conflict Group nesting beach survey, one or two of its islands may serve as index (or indicator) beaches for PNG hawksbill turtles and a saturation tagging program instigated. This would mean every turtle that has nested, or attempted to nest, is recorded during a common (or peak) nesting period. Currently, the peak for hawksbill nesting is unknown for PNG, but for the north east Australia stock it is reported to run from 15 January – 15 February. In Solomon Islands however, the nesting season runs from May-September (Hamilton et al., 2015).

The genetic makeup of the PNG population will also help decipher the peak and which population it may be related to, but this is also currently unknown (see Vargus et al., 2016), and hence a focus of WWF/USC research.

Limited titanium flipper tagging data suggests northeast Australia nesting hawksbills have been caught or reported by Papa New Guineans and nesting PNG hawksbills caught and reported by Australians within their foraging range – meaning we may in fact share our hawksbill turtles. But, we don't know to what extent, how far they migrate, which feeding grounds they travel to and so on. The satellite tracking program instigated in northeast Australia was extended to PNG during this field trip to help answer some of these questions.

Hawksbill Turtle Stats (29 December 2017 – 12 January 2018):

- 71 turtles caught, tagged and measured: 62 green turtles, nine hawksbill turtles
    - Nine primary (first time) hawksbill turtles caught.
    - Two within-season recaptured hawksbill turtles caught (tagged during the season).
    - Of these turtles monitored, five laid and four did not.
- 10 genetic and stable isotope samples were taken for stock and foraging ground identification
- To determine nest temperature changes and sex determination of turtle hatchlings, eight data loggers were deployed east and west, shade and sun, within and outside of the hatchery at Panasesa. Plus, 16 data loggers deployed north, south, east and west, sun and shade at Irai. Two data loggers were also deployed at approximately 200-250 mm depth in two nests.
- Eight satellite transmitters were deployed on hawksbill turtles (refer Table 1) with an additional two deployed at Panarakuum on 16/1/18 and 20/1/18 by CICI.

Table 1. Islands monitored and hawksbill encounters during the two-week nesting sampling period (29 December – 12 January 2018).

Study site (Island)	**Nights surveyed**	**Number of nesting hawksbills encounters**
Irai	31/12/17	1
	4/1/18	0
	9/1/18	0
	10/1/18	0
Panasesa	31/12/17	1
	4/1/18	0
	5/1/18	0
	9/1/18	0
	10/1/18	0
Panarakuum	1/1/18	0
	6/1/18	0
Kolavia	1/1/18	0
	6/1/18	1
Muniara	2/1/18	2
	7/1/18	0
Aroroa	2/1/18	1
	7/1/18	1
Baden	3/1/18	1
	8/1/18	0
Lachlan	3/1/18	0
	8/1/18	0
Skye	3/1/18	0
	8/1/18	0
Tupit	5/1/18	0
	10/1/18	1
Gabugabutau	5/1/18	0
Total	**26 surveys**	**nine encounters (eight satellites tracked)**

Because of poachers and the inability to mark nests, no nests were assessed for hatchling emergence. Season long presence at an index beach (2018-2019) may enable this assessment in the future.

During the two-week survey, 60 poachers (from 6 sailing canoes) were approached by CICI monitors and three green turtles were successfully released.

Next steps

The monitoring data will be stored by CICI and at the end of the monitoring program these data will be analysed to determine the population trend. Migration data will be shared with WWF/USC to support the satellite tracking program. All samples will be analysed by WWF/USC. Given northeast Australian hawksbill turtle's downward trajectory, continuing to monitor hawksbills at Milman Island and the Conflict Group of Islands will be crucial in documenting future population trends and the effectiveness of management actions. Future programs for consideration include saturation tagging at one or two index nesting beaches (e.g. Irai and Aroroa). With constant presence during the nesting season, nests could then also be marked for hatchling emergence assessment. Including measurements and the type of logs washing ashore for comparison to other sites, may be something CICI could also consider in future programs. As a turtle expends a lot of energy to nest, a straight path to a suitable nesting location is key. Given the amount of erosion on each island, continuing to remove logs from the Conflict Group of Islands will be imperative so that that optimal nesting habitat is available to increase nesting success.

Expanding WWF/USC migration and foraging ground identification, to not only help determine critical habitat but also their extent of distribution, will be important to understand what threats they are facing and how to manage and mitigate them.

Highlights from the trip:

- Turtle rodeo and working in the hatchery
- Snorkelling and diving with hawksbill and green turtles, eagle rays, sharks and a healthy reef
- Watching hawksbill turtles lay and release hatchlings

Collaborative project partners of the Bring Back the Bills project include WWF-Australia, USC, local Milne Bay community turtle monitors, CICI, and the volunteers: Dr Ian Bell, Ann More, Tess Lyons, Courtney D'Crus, Madi Rutherford, Jessica Blakeway, Emma Bowen, Nick Henson, David Nehm, Natalie Brown, Sharon Waruta and Nemika Brunton. The field trip and satellite transmitters was supported by WWF-Australia and Isaacson Davis Foundation, USC and Reef HQ Turtle Hospital.

The next step is to secure more funding for Milman Island and Conflict Group of Islands nesting monitoring, log removal (2018-2019), the continuation of turtle monitors in PNG, and to purchase more satellite transmitters for deployment in multiple locations where the northeast Australian hawksbill turtle nests, breeds and feeds.

In continuing to unravel the mystery of where hawksbill turtles migrate and feed, and what threats they are facing in the place they call home, I'm signing off – Chris Hof.

CICI
CONFLICT ISLAND'S CONSERVATION INITIATIVE

USC

reefHQ
Great Barrier Reef
AQUARIUM
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