Department of Environmental Protection and Conservation
Bioprospecting Permit VAN-ENV-04022
Preliminary Report on Authorized Activity
January 9, 11, 12, 2023

Post Nesting Migrations of Hawksbill Turtles (*Eretmochelys imbricata*) Nesting at Moso Island, Republic of Vanuatu

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This is a preliminary report on the research activities conducted on Moso Island, Vanuatu during the nights of January 9, 11 and 12, 2023 pursuant to the conditions stipulated in the Bioprospecting Permit VAN-ENV-04022 issued by the Vanuatu Department of Environmental Protection and Conservation. This research was initiated in 2018 and continued in 2019 and 2020. However, due to Covid 19 travel restrictions, research was suspended during 2021 and 2022. We now intend to continue this research from January 2023 to January 31, 2025 under the current three year DEPC permit.

The goal of this work is to deploy GPS satellite tags on post nesting Hawksbill turtles that nest on Moso Island, Vanuatu in order to better understand the post-nesting migratory routes and foraging grounds. Referenced in this preliminary report is the paper published in the journal Micronesica concerning our first three years of similar research (Jim et al., 2022). In this paper the procedures and methods are outlined that were followed during the most recent expedition.

Activities (January 9, 11 & 12, 2023):

On January 9, we surveyed the beach at the western end of Moso as it is also known as a nesting beach (17.569895°, 168.218542°). It was accessible via a walking trail from Tranquility Resort. Unfortunately, there was a group from a mainland village that also came to the beach by boat to harvest crabs while others spearfished at various locations off the beach well into the night. Given the array of underwater lights present around the nesting site, as well as the lights and fire used by the crab hunters, it is likely that potential nesting turtles would have been scared off.

Following a tropical depression, the ocean swells on the north side of Moso Island prohibited field work on the northern nesting beaches until January 11 and 12 when the seas were calmer. The research team motored from Tranquility Dive Resort (our base of operations for the trip) around the western end of Moso Island to the nesting beaches on the north shore. Camp was set up on a small beach in the center of the area from which we conducted beach monitoring. Nesting beaches were monitored from approximately 2000 h to 0300 h on an hourly basis by teams walking along the beaches and connecting bush trails to the east and west of our campsite. Red lights were used so as not to frighten the sea turtles during our walks. During the two nights of monitoring we only observed the tracks of one turtle that we were able to capture and tag on January 12, 2023.

This post-nesting hawksbill was first detected at 2010 h on January 12, 2023 (Table 1) and, after waiting for her to complete nesting, she was safely detained in a plywood box at 2025 h. A Telonics TGW-4*7* Iridium GPS tag (#733014A) was attached to the 2nd central scute using materials and methods outlined in Jim et al. 2022 (Figure 1). Once the attachment polyester resin had solidified and was deemed secure the turtle was released back to the ocean. Release time was 2130 h on January 12, 2023. The 89.5 cm CCL female turtle named “Makala” made her way rapidly and vigorously to the water.

Tag numbers R49268 and R49267 were recorded from Makala’s right and left front flippers respectively (Table 1) and were passed on to SPREP who manages the regional TREDS database. Unfortunately, they only had a record of these tag numbers being sent to the Wan Smol Bag turtle program in January 2012, but no record of when and where they were deployed. We have contacted the Vanua-tai to see if they have any record of these tags but have not heard back from them at the time of this report.

We noted that Makala laid her nest just above the vegetation line and it may be vulnerable to being washed out by storm surges if any cyclones occur in this general area prior to hatching.

Facial images were taken and recorded. These images can be used to identify this turtle should any future images be available (Figures 3 & 4).

Makala remained at Moso Island for one day after tagging and then departed. A preliminary chart of her track from 1/12/23 to 2/6/23 is shown in Figure 2. She has traveled roughly 818 km at an average rate of 1.4 km/h. The average rate of travel in the open ocean has been approximately 1.9 km/h. The lower overall average rate of travel is the result of her spending time in the northern New Caledonia shallow reef area where she likely fed and rested.

Figure 1. Makala inside of the plywood enclosure with the Telonics TGW-4*7* Iridium GPS tag (#733014A) attached to the second central scute.

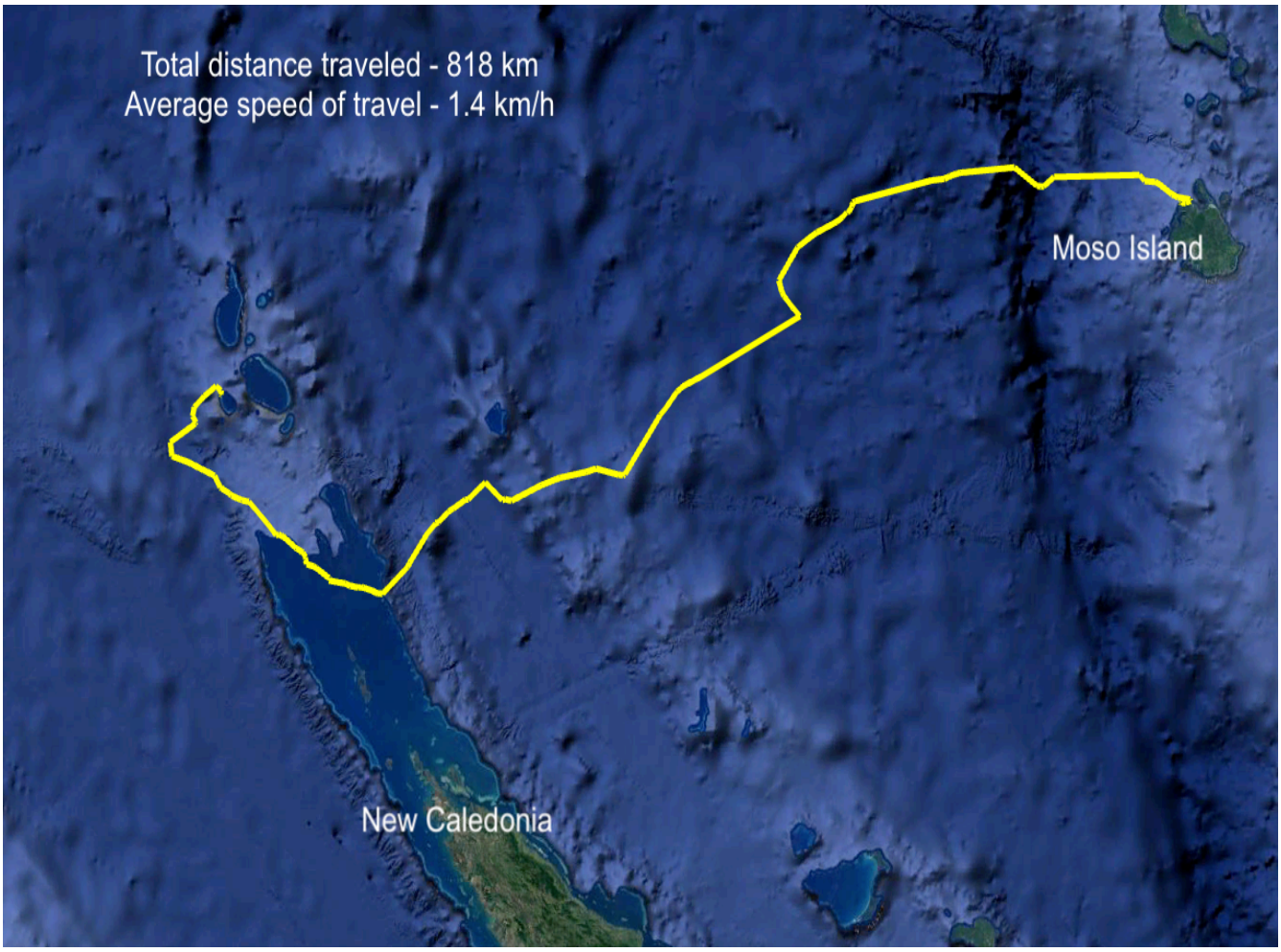


Figure 2. Above is a map of Makala's migration track as of 2/6/2023. After spending a few days in the reef area north of New Caledonia, she move further north to the Ile Portail.

Fig.3 Left side facial image of Makala

Fig.4 Right side facial image of Makala

Table 1. Post-nesting hawksbill turtle captured on January 12, 2023 and outfitted with a Telonics TGW-4*7* Iridium GPS tag (Tag #733014A).

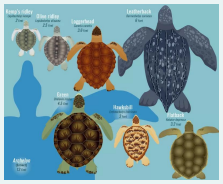
Date of Capture/ Release	Time of Capture [1]	Capture Location	Release Location	Time of Release	Curved Carapace Length	Curved Carapace Width	Flipper Tags
01/12/23	2010 h	-17,522167, 168.240805	-17,522167, 168.240805	2130 h, 01/12/23	89.5 cm	77.0 cm	RFL=R49268 LFL=R49267

We also distributed copies of a summary information sheet that reports the results of the satellite tagging activities done over the three prior years from 2018-2020 (see below). The results were explained in both English (for the school) and in Bislama (for community members). Copies were distributed to the school, to the chiefs and to the community members who participated in the fieldwork.

The posters and other general information on turtles were also shared with the staff at Tranquility Resort, as they have been operating a head-start program for many years. They were very interested in general information regarding the turtles known to inhabit and visit Vanuatu, including where the Moso post-nesters migrate. They intend to integrate the results of this research into the information provided to the public that visit their facility.

[1] The timing of this nester coming ashore is on a rising tide, as the Port Vila tide tables indicate a high tide of 1.26m was at 2043h. There is some debate whether turtles primarily nest at high tides, so we include this data here.

Post-Nesting Migrations of Hawksbill Turtles from Moso Island, Republic of Vanuatu



About Sea Turtles

- There are 7 species of sea turtles worldwide (green, leatherback, loggerhead, hawksbills, flatback, olive ridley, and Kemp's ridley). Vanuatu has 5 species of sea turtle; leatherback, hawksbill, green, with small numbers of loggerhead and olive ridley.
- Hawksbill turtles are listed as critically endangered by the IUCN (International Union on the Conservation of Nature) signifying the species is "facing extreme risk of extinction worldwide".
- Sea turtles migrate long distances to nesting beaches in order to successfully continue the species allowing for genetic diversity. The rest of the time they spend in home "foraging" grounds.

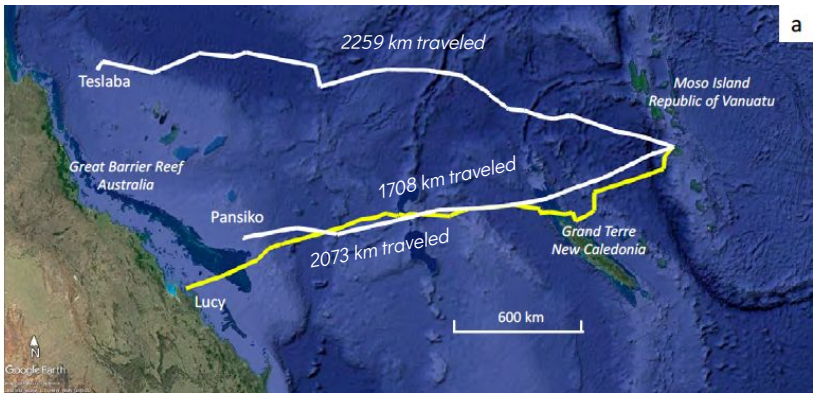
The Project

Marc Rice and Laura Jim with Hawai'i Preparatory Academy and Francis Hickey with the Traditional Resources Management Program at Vanuatu Cultural Centre have placed satellite tags on seven post-nesting hawksbill turtles from Moso Island between 2018 to 2020 in order to learn more about where turtles nesting on Moso Island live and forage. We hope to place additional tags over the next 3 years.

All work done while in the Republic of Vanuatu was covered by Marine Resource Scientific Research Permit number VAN 001-RES-18 provided by the Vanuatu Fisheries Department and Bioprospecting Permit VAN-ENV-03419 issued by the Department of Environmental Protection and Conservation.

Post-nesting hawskbill turtles - Tassiriki (left) and Launmakala (right) with satellite tags returning to the ocean.

Where do Moso Island nesting hawksbill turtles live and forage?



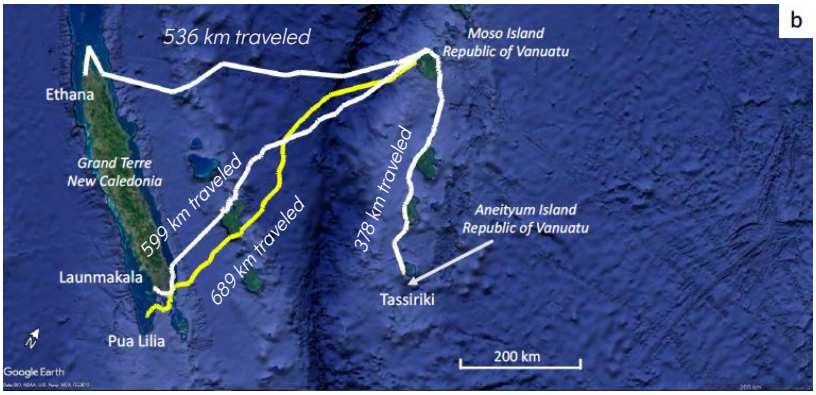


Figure 1. a. Post-nesting migration of Lucy (yellow line), Teslaba and Pansiko from Moso Island, Vanuatu to the Great Barrier Reef region, Queensland, Australia. b. Post-nesting migration of Ethana, Launmakala, Pua Lilia and Tassiriki from Moso Island, Vanuatu to New Caledonia and Aneityum Island. So turtles nesting on Moso travel thousands of kilometers to return to their foraging grounds, and face many threats like fisheries bycatch, entanglement in plastic debris and being hit by ships.

Mahalo to Donna Kalfatak, Director at the Republic of Vanuatu's Department of Environmental Protection and Conservation, William Naviti, Director of Fisheries, Owen Drew, Nolan Kalmelu, Evan David, Derrick Peter, James Tamata, Chief Marimelu, Chief Alikau, Donald James Aromalo of the Vanua–tai Network, and Marama.

Ol wokabot blong ol Hawksbill totel afta oli bin kam so blong putem ol ek long Moso Aelan, Vanuatu

About Sea Turtles

- I gat 7 difren spisis blong si totel long world, be Vanuatu i gat 5 nomo i stap. Yumi gat grin totel, hawksbill mo leatherback totel, mo i gat smol numba blong loggerhead mo olive ridley totel (tufala i smol saes, olsem haf meter nomo.)
- Hawksbil totel (nasiveru maut) hem i stap long danger frum numba blong ol totel ia i stap ko doan. I gat tingting se hem i save lus evriwan sipos yumi no lukaotem gud.
- Ol totel oli mekem longfala wokabot taem oli finis nesting blong ko long street ples blong olgeta blong kakae. Taem oli kakae gud long 2-3 yia, afta ol tas kam bak bakegen blong nesting long stret sanbis blong olgeta long Moso bakegen.

The Project

Marc Rice witem Laura Jim blong Hawai'i Preparatory Academy witem Francis Hickey blong Vanuatu Kaljoral Senta oli bin putem ol satellite tag long 7 hawksbill totel taem oli finis blong nesting long Moso. Hemi long January 2018, 2019 mo 2020.

Riserj ia hem i blong faenem aot se ol totel wia oli nesting long Moso oli go wia ples stret blong kakae. Plan hem i stap blong putem mo tags i ko long ol totel evri yia kasem 2025.

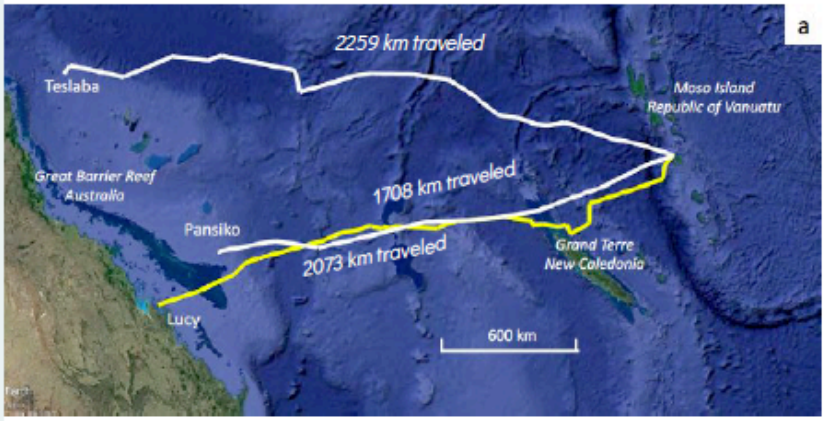
Ol wok ia hemi unda ol Reserj Permit wia Department blong Fiseris mo Department blong Environmen oli givem.

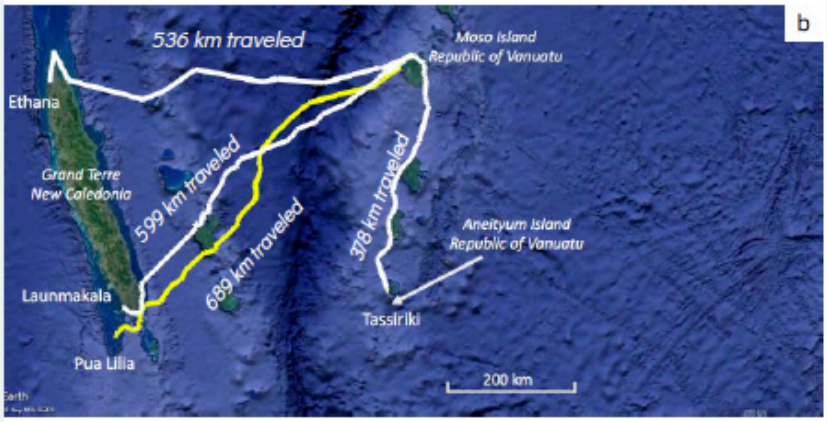
Tango Tumas

Tangio tumas long Mrs. Donna Kalfatak, Direkta blong Depatmen blong Enviromen, Mr. William Naviti, Direkta blong Fisiris, Owen Drew, Nolan Kalmelu, Evan David, Derrick Peter, James Tamata, Chief Marimelu, moChief Alikau, witem Donald James Aromalo blong Vanua-tai Network, mo Marama.

Tufala foto blong tufala totel, Tassiriki (left) witem Launmakala (raet) witem ol satalaet tag taem oli stap ko bak long solwora.

Wia ples nao ol Moso Aelan nesting Hawksbill totel oli stap laev mo kakae taem oli finis blong putem ol ek?





Figa 1. A. Tracking map ia i showem rod blong Lucy (yelo laen) witem Teslaba mo Pansiko i aot long Moso taem oli nesting finis i go long Great Barrier Reef long Kwinslan, Australia. B. Map ia i showem rod blong Ethana, Launmakala, Pua Lilia mo Tassiriki i aot long Moso taem oli finis blong nesting i ko long Nui Kaledonia mo wan i go long Aneityum Aelan. Olsem, yumi tas lukem klia se ol totel wia oli nesting (putem ek) long Moso oli travel 1000's of kms blong ko bak long stret ples blong kakae. Mo oli gat fulap danger long longfala rod ia olsem ol tuna bot oli kasem olgeta, oli fasfas long ol plastik long solwora, mo ol ship i save kilim olgeta.

Acknowledgements:

All work done while in Vanuatu over four nesting seasons was covered by Marine Resource Scientific Research Permit number VAN 001-RES-18 provided by the Vanuatu Fisheries Department for 2018, Bioprospecting Permit's VAN-ENV-03419 issued by the Department of Environmental Protection and Conservation and Bioprospecting for 2019 and 2020 and Permit VAN-ENV-04022 for 2023-2025. We extend our great appreciation to Mrs. Donna Kalfatak and Mrs. Touasi Tiwok, Directors of Vanuatu's Department of Environmental Protection and Conservation in different years and to Mr. William Naviti, Director of Fisheries in 2018. In addition, Owen Drew, owner of Tranquility Resort was very helpful with organizing the logistics surrounding our research work and accommodations. Our research would not have been possible without the cheerful assistance from Moso Islanders Nolan Kalmelu, Evan David, Derrick Peter, James Tamata, Ahpi Peter and Robson Kalma who worked with us in the field. And a special thanks to Chief Marimelu and Chief Alikau who kindly provided us access to the nesting beaches under their traditional tenure along with providing useful advice. Also, many thanks to Donald James Aromalo of the Vanua-tai Network for his assistance.

Reference:

Jim, L.M.R., M.R. Rice, F.R. Hickey & G.H. Balazs. 2022. Destination Revealed: Post-Nesting Migrations of Hawksbill Turtles (*Eretmochelys imbricata*) from Moso Island, Republic of Vanuatu. *Micronesica.* 2022-01: 1-16. *(https://micronesica.org/volumes/2022)*