CONFLICT ISLANDS CONSERVATION INITIATIVE & THE CORAL ISLANDS LIMITED

2024-2025 TURTLE NESTING SEASON

END OF SEASON REPORT

CICI
CONFLICT ISLANDS CONSERVATION INITIATIVE

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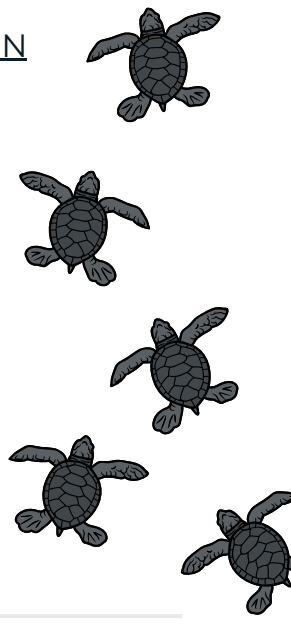


THE CONFLICT ISLANDS

The Conflict Islands Atoll, in the heart of the Coral triangle and part of the Coral Sea in Milne Bay, Papua New Guinea is a bridge between the Solomon Islands, the Great Barrier Reef in Australia and the interconnected waters of the Pacific Ocean.
Within Papua New Guinea, The Conflict Islands are held under a free hold land title, with 100% ownership to Mr. Ian Gowrie Smith and his business, The Coral Islands Ltd. Decisions about how the Conflict Islands can be sustainably used and managed falls under the *Papua New Guinea Land Act 1996* and can be made by the owner. Adjacent communities are consulted and are involved in decision making and awareness and education programs are held with active communities.

GOALS & MISSION

The Conflict Islands Conservation Initiative is dedicated to the preservation and sustainable management of the unique ecosystems within the Conflict Islands and the connected waters of the Great Barrier Reef and Coral Sea. To conduct research and education about the natural environment around the Conflict Islands to further enhance our collective knowledge around its connectedness through migratory marine species to the Great Barrier Reef and Coral Sea
Our mission is to protect biodiversity, promote environmental education, and foster community-driven conservation efforts. We aim to create a sustainable future for the islands by working collaboratively with local communities, researchers, and international partners to ensure that the rich marine and terrestrial life found here can thrive for generations to come. Through education, women's empowerment, community engagement, research, advocacy, and hands-on conservation projects, we strive to make a lasting impact on the health of our planet's ecosystems.

THE CONFLICT ISLANDS

A "HOPESPOT" FOR BIODIVERSITY-

by Sylvia Earl's non-profit Mission Blue

Hope Spots are special places that are critical to the health of the ocean — Earth's blue heart. Hope Spots are about recognizing, empowering and supporting individuals and communities around the world in their efforts to protect the ocean. While about 12 percent of the land around the world is now under some form of protection, less than six percent of the ocean is protected in any way. Hope Spots allow us to plan for the future and look beyond current marine protected areas (MPAs), which are like national parks on land where exploitative uses like fishing and deep sea mining are restricted. Collectively, all of these Hope Spots will create a global wave of community support for ocean conservation that leaders and policy makers can't ignore.

The Conflict Islands Atoll has very diverse coral fauna. A total of 418 Scleractinia corals clearly places it within the area of the highest coral diversity in the world ("Coral Triangle") along with
the Philippines and Indonesia. The highest average number of species of reef fish (220) was recorded for the Conflict Group.
The number of species in the below families is totalled to obtain the Coral Fish Diversity Index (CFDI). The total CFDI for Milne Bay Province is 337 with the following components: Labridae (108), Pomacentridae (100), Chaetodontidae (42), Acanthuridae (34), Scaridae (28) and Pomacanthidae (25). This is the highest total for a restricted location thus far recorded in the Indo-Pacific, surpassing the previous figure of 333 for the Maumere Bay region of Flores, Indonesia. Significant numbers of maori wrasse (Cheilinus undulatus), giant clams, white teat and black teat sea cucumber, all IUCN Red Listed as endangered species, also inhabit the reefs of the Conflict Group. Along with amazing richness of the coral reef and fish biodiversity rivalling that of Indonesia, the Conflict Group has recorded such important mega fauna as whale sharks, reef manta ray (*Mobula alfredi*) giant manta ray (*Mobula birostris*), bowmouth guitar shark (*Rhina ancylostoma*), endemic epaulette shark (*Hemiscyllium michaeli*), bigeye thresher (*Alopias superciliosus*) and marine mammals, such as risso dolphin (*Grampus griseus*), dugongs (*Dugong dugon*), false killer whales (*Pseudorca crassidens*), bottlenose dolphins (*Tursiops sp.*) and reported sightings of orca (*Orcinus orca*) and sperm whales (*Physeter macrocephalus*).

The Conflict Island Group has globally and regionally significant nesting populations of sea turtle, many of which have migrated to the islands from other countries (e.g., Australia) to court and nest. There is also foraging populations that reside in the lagoons of the Conflict Island Atoll.

The critically endangered hawksbill turtle (*Eretmochelys imbricata*) and the endangered green turtle (*Chelonia mydas*) (IUCN Red List) are the two species known to use the islands to nest, breed and feed, however, there have been multiple sightings of the olive ridley turtle (*Lepidochelys olivacea*) foraging in these waters. There are also images of reported nesting and harvest of olive ridley turtles on surrounding islands which indicates a gap of understanding about this vulnerable species to also be utilizing the area of around and beyond the atoll.

The Coral Islands Ltd (TCIL) in partnership with Conflict Islands Conservation Initiative (CICI) has been running a Turtle Conservation Program on 21 of the Conflict Islands since
the 2016-17 nesting season.The program was built around a voluntourism model that relied on income from overseas volunteers, but also assisted the attendance of local Papua New Guinea university students and graduates to attend the program to gain experience and knowledge in the field of turtle conservation and husbandry. Our turtle conservation program has only been able to continue running through the support of our varied and generous sponsors and donors, of which we are forever grateful to for their support in these challenging times.

TURTLE LIFE CYCLE

Turtles take roughly 20 to 30 years to reach sexual maturity in the wild. After hatching out of the sand as 2-3 cm long hatchlings, they head out into oceanic currents for their lost years those years where they are difficult to track. After a period of around 5-15 years, those which survive the lost years at sea, they settle to reside in a coastal reef area where they spend years feeding to reach breeding maturity. Once they are sexually mature, they migrate from their foraging grounds to a courtship area and then the females continue to a nearby location close to where they hatched to lay their own eggs.

CICI monitors both green and hawksbill turtle nesting in The Conflict Island Atoll. Researchers from WWF-Coral Triangle Programme and one of our past directors Dr Christine Madden Hof, has been satellite tracking some hawksbill turtles that nested on the islands in 2017 and 2018. This data showed that most nesting hawksbills are migrating across the Coral Sea, to and from the Great Barrier reef in Australia to feed. Data collected from foraging turtles tagged in the Howick Island Group in the northern Great Barrier Reef also showed that green turtles have long migrations to the Conflicts to return to their nesting grounds. Female turtles do not make this migration annually, but every 5 – 8 years, returning to the nesting grounds to lay between 3 – 5 clutches of eggs. Whilst male turtles are likely to return to breed 2 – 3 times more frequently than their female counterparts.

The nesting season here starts in October, and the last of the hatchlings usually emerging by the end of April. There is no parental care for turtles. After the female deposits her eggs in her nest, she returns to the sea, with no further interaction with the nest or her hatchlings. Nest depth can vary between 30 – 60 cm deep for the different species, as does the number of eggs laid in each clutch. Some females may lay only 50 eggs toward the end of the season, but the total clutch count (number of eggs) can be as high as 220 or more.

The sex of the hatchlings is not determined at fertilization (i.e., by sex chromosomes). Instead, sex is determined by the nest temperature during the middle third of embryonic development. Nest temperatures over ~29°C produce more females, and temperatures below this range produce more male hatchlings. With the warming global temperatures, some sea turtle populations are producing close to 100% female hatchling, such as the northern Great Barrier Reef green turtle population on Raine Island, the largest green turtle nesting site in the world. The consequences of this could be dire for the future of turtle species. Similarly, nest temperatures above 32°C are lethal for developing sea turtle embryos and have huge consequences to the overall health of the hatchling. Along with the low survival rate to maturity, which is less than one in every 1000 hatchlings, the future for the species without expert management and intervention is looking dire.

THREATS TO TURTLES LOCALLY & GLOBALLY

The global trend for many turtle populations is declining due to the many factors that affect them in every stage of their life cycles, from global to local scales. Globally, marine turtles face a multitude of threats that endanger their survival. These threats include habitat loss and degradation, climate change, pollution, fisheries bycatch, **poaching** and **illegal wildlife trade**, and coastal development. Similarly, in Papua New Guinea (PNG), marine turtles encounter both global and local threats that pose significant risks to their populations.

CLIMATE CHANGE

Rising temperatures, sea level rise, and changes in ocean currents and weather patterns associated with climate change can have profound impacts on marine turtle populations. For instance, increases in sand temperatures on nesting beaches can skew sex ratios, with higher temperatures resulting in more female hatchlings. Additionally, rising sea levels can inundate nesting sites and alter beach dynamics, leading to habitat loss.

POLLUTION

Marine debris, including plastics, fishing gear, and other anthropogenic waste, poses a significant threat to marine turtles globally and locally in PNG. Ingestion of plastics and entanglement in marine debris can cause injury, suffocation, and death in marine turtles. Additionally, pollution from oil spills, chemical runoff, and coastal development can degrade water quality and harm marine turtle habitats.

HABITAT LOSS & DEGRADATION

Destruction and alteration of nesting beaches, feeding grounds, and migration routes due to coastal development, land reclamation, and erosion are major threats to marine turtles globally and locally in PNG. Loss of nesting habitat can disrupt nesting behaviors and decrease reproductive success, while degradation of feeding grounds can impact foraging behaviors and food availability.

The carapace of hawksbill turtles (*Eretmochelys imbricata*) is highly sought-after used in the fashion, medicinal and ornamental industry contributing to the illegal wildlife trade.

For turtles in the Conflict Islands, key threats are poaching of turtles for meat and eggs, the illegal wildlife trade for “tortoise shell” (hawksbill turtles), erosion caused by sea level rise leading to a loss of available nesting beach, plastic debris, and marine debris including trees blocking access to the nesting habitats.

Our team of Rangers are without exception, reformed turtle poachers, who openly admit to poaching and harvesting of turtles and was the most common use for the turtles that they harvested. As stated by our rangers, they money they got from selling turtles was often used to buy alcohol, betel nut, and Christmas supplies. Enforcement and effective management have always been an issue in PNG, even though high-level political members condone the sale of turtles.

PROGRAM OVERVIEW

CICI's ongoing Turtle Conservation Program is designed to monitor and protect nesting turtles and their eggs of the Conflict Island Atoll. Over the years we have also been creating a baseline data set that CICI and others will be able to use to determine if the management strategies put in place are successfully contributing to the conservation of green and hawksbill turtles. Supported my nesting population survey some of the species management strategies used are poaching deterrence, egg protection, translocation, nest cooling, "head-start" hatchlings, environment clean ups and community education and awareness. The program is continually evolving and adapting the methods and techniques to keep up with worlds best practice and to ensure laws, ethics and regulations are adhered to. This also involves partnering with government, students, PhD candidates, universities, scientific advisors, and other conservation organizations, ensuring data sharing and collaborations where possible.The project area consists of the atoll's 21 islands with the furthest being Auroroa Island, ~ 22 kms away from the base and hatchery at Panasesa Island. This makes the logistics and costs to effectively monitor all the islands difficult and expensive to run.

CICI's Turtle Conservation Project aims to monitor the marine turtle populations at the Conflict Islands Atoll via a long-term tagging program to allow population trends and trajectories to be calculated (i.e., is the population increasing, stable or declining). Beach patrols occur at night when the female turtles come up to lay. At this time, the rangers are able to tag green and hawksbill turtles, take genetic samples where necessary, collect facial ID photos, and other morphological data collection such as carapace length (CCL) and nest depth. These patrols also protect the turtles and their eggs from poaching and enables education and awareness to be conducted when poachers are encountered. This project conducts emergence and hatchling success studies by collecting eggs and translocating them to the Conflict Islands Turtle Hatchery. The nests are incubated, and temperature regulated using shade and irrigation to produce healthy hatchlings and not all females. Some hatchlings are raised in the on-site nursery until they are healthy and strong enough (3 – 12 months) to be released into the wild as part of our 'head-start' program.

Our primary rangers of the team this season consisted of Steven Amos as Project Manager Patrick Lemeki as Head Rangers, and Toby Losane as our Community Liaison Officer. Henry John has continued with the project in his home community at Tewatewa island to our east sponsored by Steamships community grant program and SEE_Turtles Sea Turtle Inclusivity Fund. We have also been able to kickstart a new pilot project on Epokom-Kimuta Island in the Renard group of islands led by Kimuta Island community member and team leader Nina Wadilei.
Promoted in their roles from last season were head ranger Steven Amos
being responsible for data entry and Ranger Patrick Lemeki for equipment inventories. Badi Seko, Michael Moten, Rodney Taliya, Norman Panta and Eddie Allen remained as trainee rangers as they have room to improve their skills and knowledge from their performances from last year.

Figure 9: Conflict Island Map with Island names and locations of ranger deployments.

Youth engagement is a priority as we aim to meaningfully employ, educate, teach new skills and conservation principles to the trainees regardless of past opportunities, education or experience levels. All the trainees in the past had either eaten, harvested, or killed turtles and their eggs. After spending the last six months at home in their villages all of the rangers reported changes in their communities' attitudes towards turtles and even their own positions in the community. They also reported they had carried out awareness about the work they were doing and the effects it has had on the community.

METHODS

TAGGING & PATROLS

The tagging method was adapted from standard SPREP tagging instructions (Geermans, 1993) sections 2 (2.2) and 3 (3.1, 3.2 and 3.3). Female turtles were tagged on nightly patrols during the months of November 2022 – February 2023 across the entire atoll. The patrols started at nightfall through to the lowest point of the tide every night. The turtles were tagged with standard self-locking titanium tags. The tags belong to the Conflict Islands Conservation Initiative; tag series IGS0001-IGS3000.

Recorded data included when a turtle is encountered includes:

- Species
- Tag ID Number (new or recapture
- Carapace length and width (CCL and CCW)
- Injuries, diseases or scars on the nesting female
- 3x facial identification photos (top, left and right)
- Date and time of laying event
- Nesting island
- GPS location of nest
- Nest Habitat (e.g., bare sand, grass)
- Number of eggs laid (total clutch count)
- Number of nesting attempts
- Reasons for nest failures (e.g., tree roots, erosion)
- Nest Relocation information

So as not to disrupt her during the egg laying phase, the female turtle is not handled/touched until she is near completion of laying. She is then flipper tagged on the trailing edge of her front left or right flipper on pad L3 (closest to the body), otherwise subsequent pads, L2 or L1 will be tagged. The turtle is only tagged after laying is finished and only once on the left flipper (a primary tag), and then on the right flipper on the second time the turtle is encountered (recapture). The tag number will be recorded as well as any injuries or previous tags. Where possible we also record a facial identification photograph, that is later uploaded to an online database (www.wildme.org) where facial mapping occurs through artificial intelligence (AI) software. Turtles have a unique scale print on their faces that in the future we hope will be able to be used effectively to identify individual, and to replace the flipper tags.

EGG COLLECTION & RELOCATION

Eggs are only relocated if they are at high-risk of mortality. This may include) poachers, predators or if the female has dug her egg-chamber below the hightide line as they are at risk to drowning and erosion. Unfortunately, most clutches of eggs laid have to be relocated to a hatchery due to the high levels of threats.

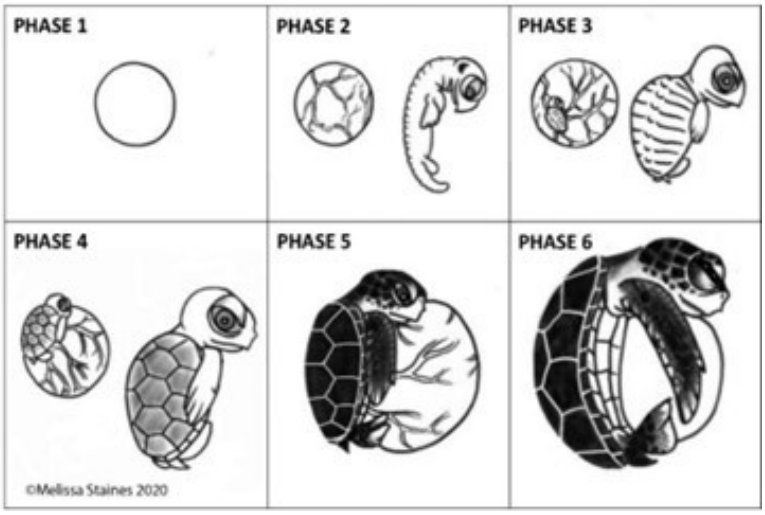


Figure 14: Embryonic development stages used in the field for assessing development stage at death (©Melissa Staines).

As the female starts laying her eggs into her egg-chamber, she is no longer susceptible to disturbance. This allows our Conservation Rangers to easily place a ziplock bag under her cloaca to catch the eggs and the mucous she excretes whilst laying (Figure 10). Once laying has finished, the air is removed from the Ziplock bag minimize exposure to oxygen during relocation, which pauses the development of the pin head-sized embryos until they are placed into their new nest site (Williamson et al 2017, Kam 1993, Kennett et al 1993). The eggs are then carefully transported back to the hatchery on Panasesa Island via boat. This process is done as quickly as possible from the time of collection, to minimize the risk of mortality caused by rotations of the egg.

A replicate nest is dug in the hatchery, to the same depth and width as the natural nest and is covered with the same sand the was removed to excavate the nest. The species, number of eggs and estimated hatching date, female's tag number and hatchery position are all recorded on the data sheet. We also collect data on the maximum and minimum diameter and weight of each egg from a random sample (n=10) pre clutch laid. The nest is then covered by a nest protector to exclude any crabs or other predators. The eggs are then left for approximately 60 days to develop and allow the hatchlings to emerge naturally.

HATCHLINGS

The nests are observed approximately a week prior to the estimated hatch date for the first signs of emergence of the hatchlings. The clutch is allowed to emerge naturally with some or very little assistance from the rangers. Hatchlings with no morphological mutations are released the same evening they hatch. The release location depends a lot on weather and conditions, and we try to release the hatchlings from high up on the originating beach where the eggs were originally collected from which may be important for their natal returning imprinting. If we cannot take them back to their natal beach, they are released at the closest beach to the nursery under the cover of darkness to reduce the number of predators. Other hatchlings that show distinct genetic deformities or weakness are brought to the nursery onsite for further husbandry and observation. The nest is then excavated to determine the hatchling and emergence success, and to identify if any eggs that did not develop, at what stage their development ceased. This entails opening any unhatched eggs to look for different stages of development. This helps us to improve our relocation and incubation techniques. If there are any unhatched eggs that look healthy, we use a candling technique to check if the embryo is still viable inside the shell. If it is, these are what we have termed 'live eggs' and we take these back to the nursery to our sand incubation tanks where they are left to emerge naturally. Once emerged they will be released with another clutch of hatchlings the same night if they are healthy.

HATCHERY CONSTRUCTION

To create our hatchery, we excavated an extended area from 18m x 12m to a depth of 80 cm and lined the perimeter with builder's plastic (50 cm down in the sand) to stop root invasion and aid in predator exclusion, leaving the base open for natural water drainage. Roots alone can cause severe dehydration and death of the developing embryos. Encompassed by a 30cm fence, this area is then refilled with beach sand from the ideal location for natural nesting. A roof to provide shade is then constructed over the top of the whole area, made from PVC pipes and volleyball nets and woven coconut leaves for the shading.

NURSERY

We have limited use for the nursery and do not keep many hatchlings in there for extended periods. We utilize the facilities for any clearly deformed or week hatchlings and the incubation of any live eggs that require extended incubation after the rest of their clutch has emerged. We feed the hatchlings on a gelatine mix with calcium fresh fish pellets and Aibika a local spinach whilst we keep them if for extended periods. We do not feed them if we release them within 72 hours of hatching.

RESULTS

NESTING POPULATION SURVEYS

Table 1. Summary of combined tagging data for Conflict Islands 2024-25 season

Species	New tagged Individuals	Re-migrant Individuals	QLD tagged Individuals	Total tagged Individuals	In-Season Recapture	One off captures	Missed events
Green	246	18	2	266	163	103	62
Hawksbill	71	5	1	77	32	45	12
Total	**317**	**23**	**3**	**343**	**195**	**148**	**74**

Table 2. Summary of green turtle tagging data for Conflict Islands 2024-25 season

GREEN					
Season	**New Turtles**	**Re-migrant Individuals**	**SPREP Tags**	**QLD Tags**	**Total**
2017-2018	234	0	5	1	240
2018-2019	52	0	2	0	54
2019-2020	342	0	1	0	343
2020-2021	78	5	0	0	83
2021-2022	655	10	3	0	669
2022-2023	98	7	0	1	106
2023-2024	310	18	0	1	329
2024-2025	246	18	1	2	266
Total	**2015**	**58**	**12**	**5**	**2090**

Table 3. Summary of hawksbill turtle tagging data for Conflict Islands 2024-25 season

HAWKSBILL					
Season	**New Turtles**	**Re-migrant Individuals**	**SPREP Tags**	**QLD Tags**	**Total**
2017-2018	30	0	2	0	32
2018-2019	40	0	2	1	43
2019-2020	25	0	0	0	25
2020-2021	35	0	0	1	36
2021-2022	35	1	1	0	37
2022-2023	25	2	0	0	27
2023-2024	29	3	1	0	33
2024-2025	71	5	1	1	77
Total	**290**	**12**	**7**	**3**	**310**

Table 4. Summary of combined turtle tagging data for Conflict Islands 2024-25 season

Species	New Turtles	Re-migrant Individuals	SPREP Tags	QLD Tags	Total
2017-2018	264	0	7	1	272
2018-2019	92	0	4	1	97
2019-2020	367	0	1	0	368
2020-2021	113	5	0	1	119
2021-2022	690	11	4	0	706
2022-2023	123	9	0	1	133
2023-2024	339	21	1	1	362
2024-2025	312	28	2	3	343
Total	**2,300**	**74**	**19**	**8**	**2,400**

Green turtle **'T93546'** was originally **tagged in the 1990s** as a juvenile in north Queensland, Australia by Qld Turtle Research Program (QTR)

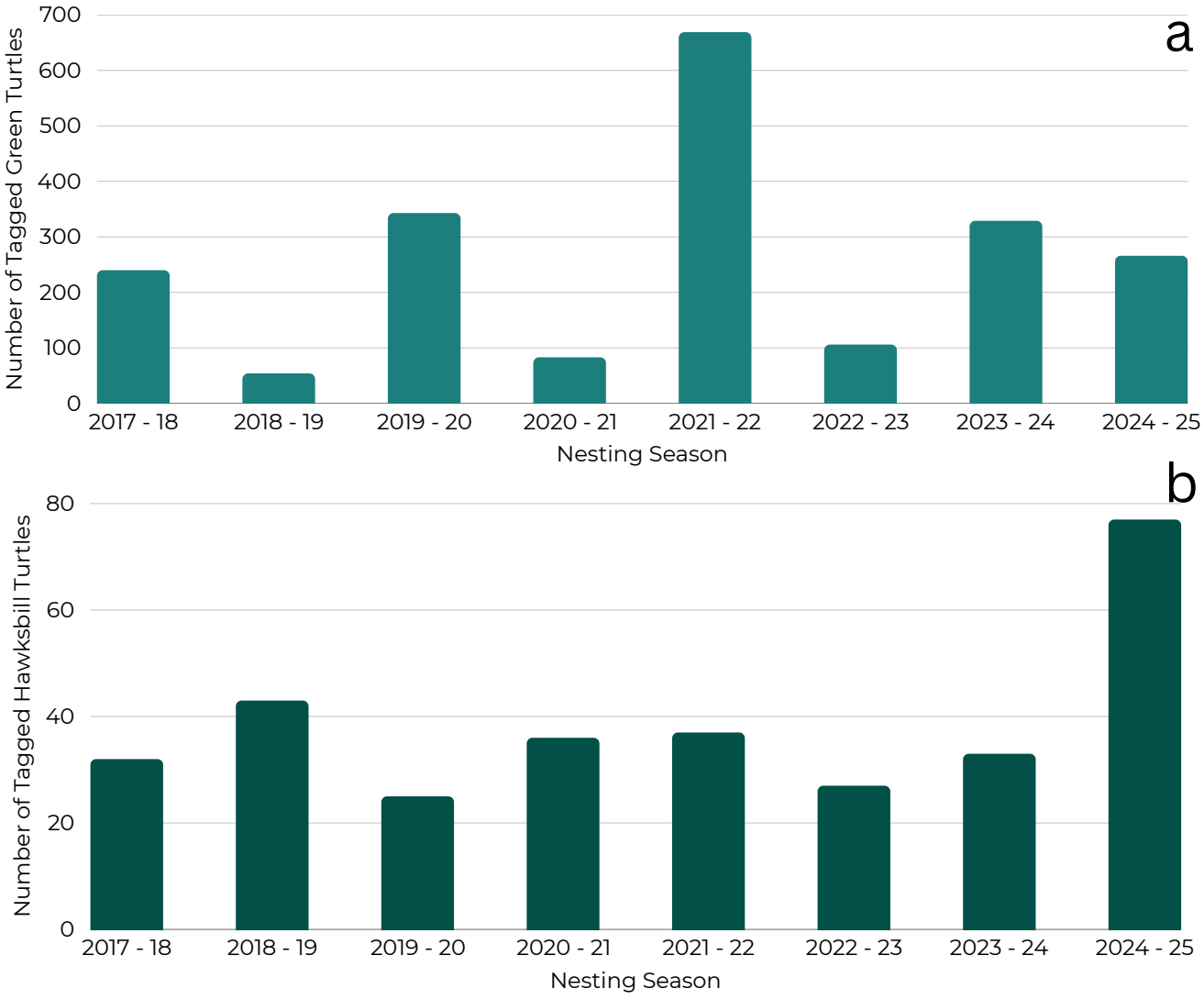


Figure 16. Number of tagged **(a)** green and **(b)** hawksbill turtles encountered in Conflict Islands from 2017 through to 2024 nesting seasons.

ADULT TURTLE MORPHOMETRICS

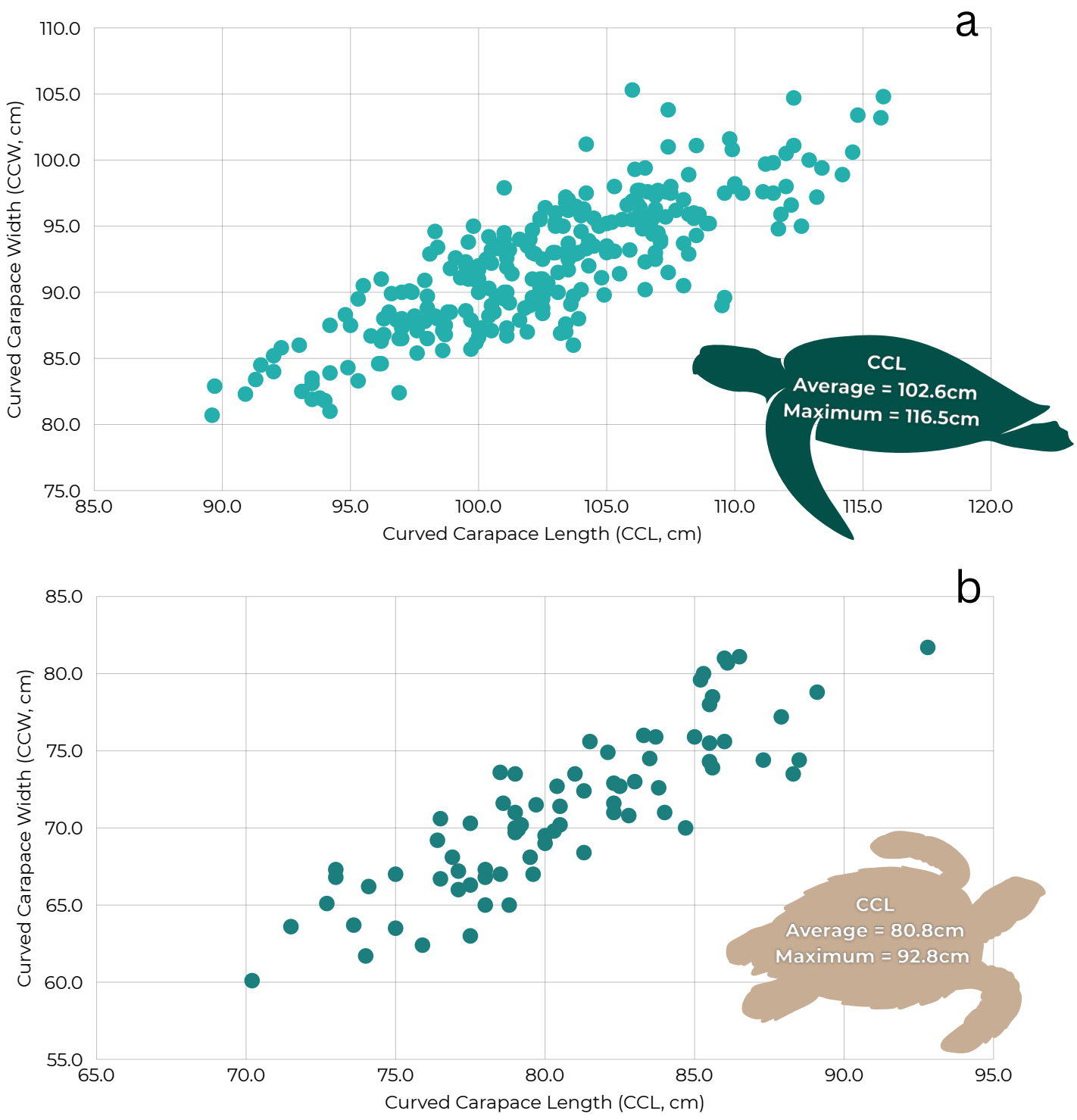


Figure 17. Curved carapace length (CCL) and curved carapace width (CCW) of **(a)** green and **(b)** hawksbill turtles encountered in Conflict Islands in the 2024-25 nesting season.

REMIGRANT TURTLES

Table 5. Remigrant "BINGO" green turtles nesting in 2024-25. CCL = curved carapace length.

Tag ID	First Tag Date	Attempts recorded in first season	First clutch date in current Season	Attempts recorded in current season	Remigration Period (years)	CCL (cm)
IGS0510	6-01-2018	1	3-01-2025	2	7	101.1
IGS0654	31-01-2018	1	12-12-2014	3	7	98.6
R56601	2-11-2018	1	22-11-2024	6	6	102.1
IGS0161	19-12-2018	1	30-11-2024	5	6	106.9
IGS0177	29-10-2018	2	20-11-2024	1	6	99.5
IGS0716	31-01-2019	1	2-01-2025	2	6	109.0
IGS1319	11-12-2019	1	14-01-2025	1	5	108.2
IGS0662	4-12-2019	1	19-11-2024	3	5	106.6
IGS1396	23-11-2019	1	25-01-2025	2	5	103.4
IGS1628	27-12-2019	1	8-02-2025	2	5	106.5
IGS1997	6-12-2019	1	22-11-2024	1	5	107.5
IGS1657	12-12-2019	1	4-01-2025	3	5	103.9
IGS1928	23-11-2019	1	9-11-2024	1	5	100.6
IGS1097	30-12-2020	1	12-11-2024	4	4	104.0
IGS2157	29-12-2021	1	12-11-2024	1	3	100.8
IGS2445	1-12-2021	4	26-11-2024	1	3	99.3
IGS2516	9-02-2022	2	21-12-2024	6	3	104.3
IGS2632	21-01-2022	2	11-12-2024	3	3	100.4

Table 6. Remigrant "BINGO" hawksbill turtles nesting in 2024-25. CCL = curved carapace length.

Tag ID	First Tag Date	Attempts recorded in first season	First clutch date current Season	Attempts recorded in current season	Remigration Period (years)	CCL (cm)
IGS0427	14-11-2017	1	14-11-2024	2	7	81.3
IGS0793	15-12-2017	1	18-12-2024	3	7	79.7
IGS0193	13-12-2018	1	20-11-2024	2	6	76.9
R56573	6-11-2018	1	1-01-2025	1	6	85.5
IGS1074	2-01-2021	1	13-01-2025	1	3	78.5

RESULTS

NESTING PHENOLOGY & SUCCESS

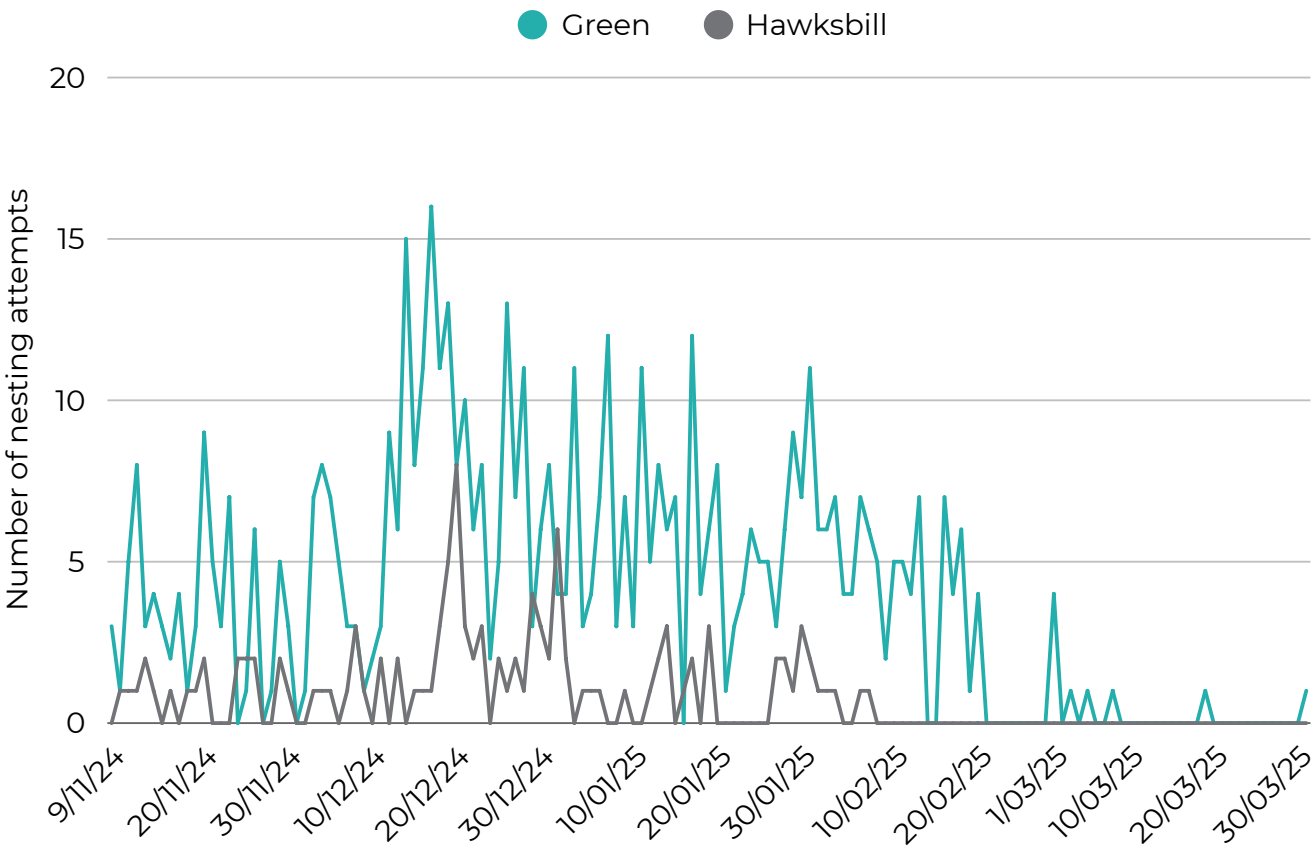


Figure 18. Number of nesting attempts by green and hawksbill turtles in the Conflict Islands 2024 - 25 nesting season.

Table 7. Summary of nesting attempts for Conflict Islands 2024-25 season

Species	Successful Nests	Failed Nests	Total Nesting Attempts	Nesting Success (%)	Average number of clutches (range)	Average number of eggs per clutch
Green	461	243	704	65.5	2.4 (1 - 8)	90.6
Hawksbill	103	29	132	78.0	1.6 (1 - 4)	132.9
Total	**564**	**272**	**836**	**67.5**	**2.2**	**98.6**

NESTING DISTRIBUTION

Table 8. Summary of nesting attempts (successful and failed) for Conflict Islands 2024-25 season

Island	Green	Hawksbill	Total Events (n)
Irai	212	6	218
Auroroa	136	16	152
Panarakumm	70	55	125
Tabanagoal	63	3	66
Tupit	54	12	66
Muniara	58	5	64
Panasesa	28	13	41
Gabugabutau	19	5	24
Panaboal	14	4	18
Ginara	13	3	16
Koliva	9	5	14
Lachlan	13	1	14
Baden	6	3	9
Skye	6	1	7
Total	**701**	**132**	**833**

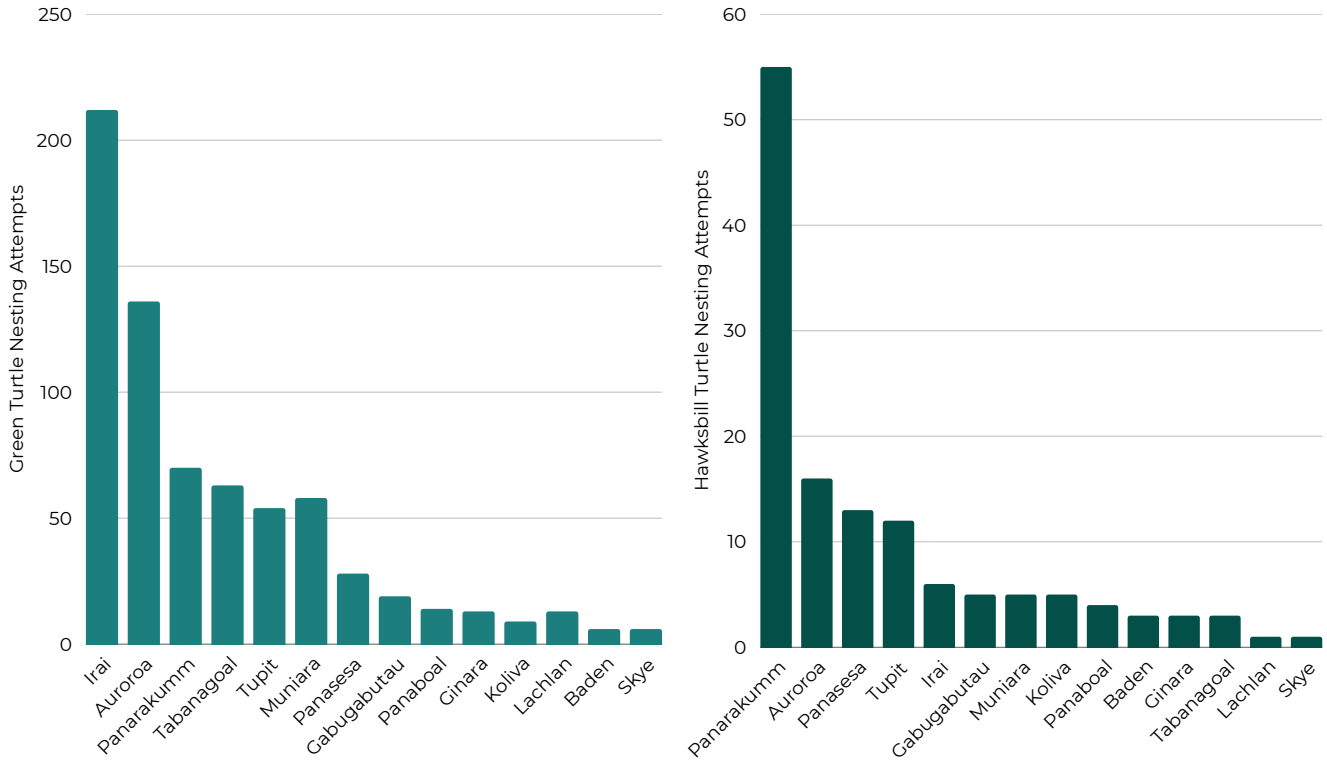


Figure 19. Number of nests events for green (light) and hawksbill (dark) turtles across the islands of the Atoll in 2024-2025 season.

NESTING DISTRIBUTION

Figure 20. Distribution of green turtle (green) and hawksbill turtle (pink) nesting attempts (failed and successful) across the Conflict Islands in 2024-25.

NESTING DISTRIBUTION

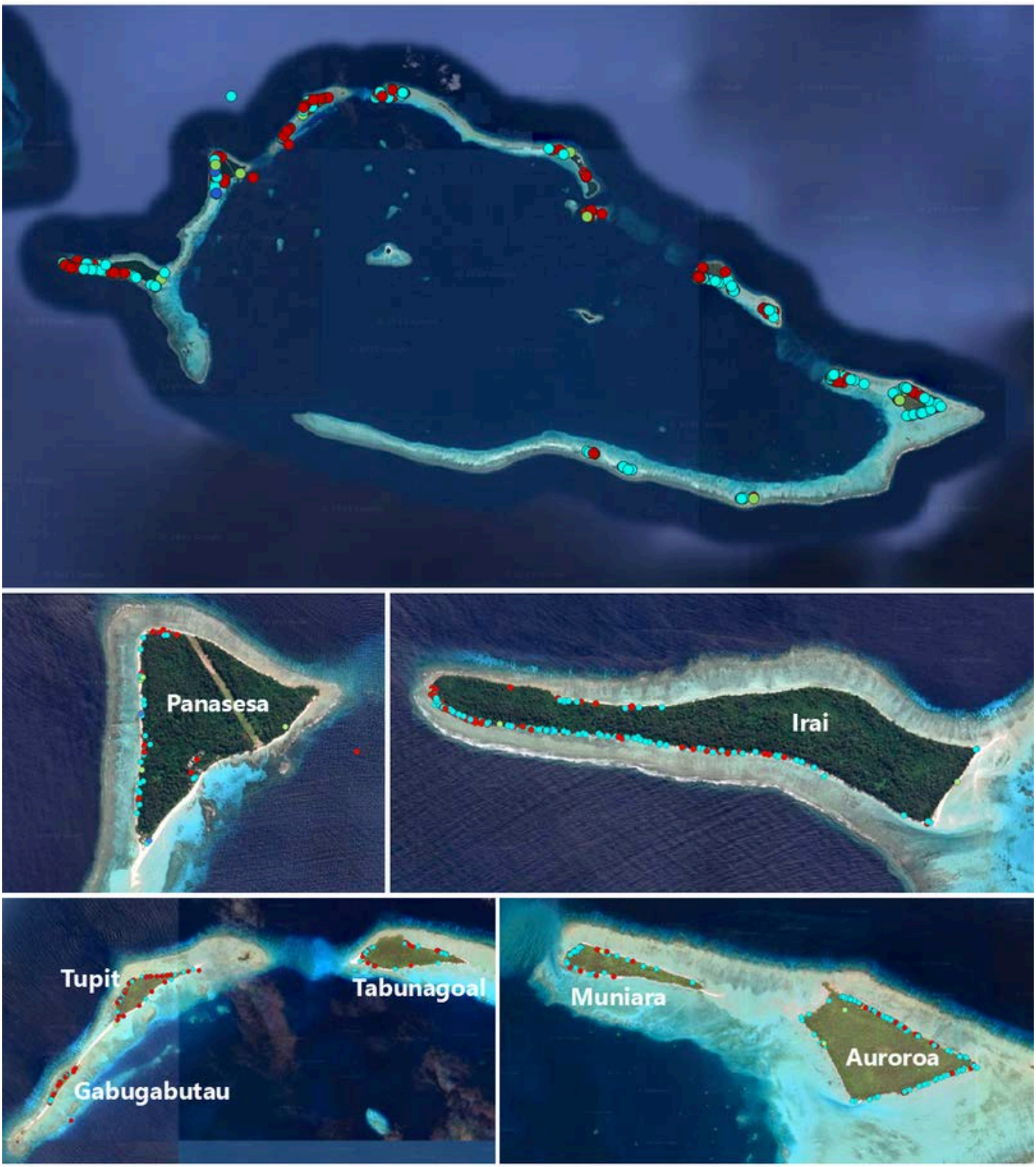


Figure 21. Distribution of failed (red), natural (green) and relocated nests (blue) across the Conflict Islands in 2024-25.

Table 9. Top nesting green and hawksbill turtles during the 2024-25 season. Bolded tags are remigrants.

Primary Tag No	Species	Successful Nests	Failed Nests	Nesting Success (%)	Average number of eggs	CCL (cm)
IGS3471	Green	7	0	100	131	103.5
IGS3540	Green	7	1	87.5	69.4	105.4
IGS3450	Green	6	0	100	92.4	102.4
IGS3528	Green	6	2	75	120.25	105.0
R56601	Green	6	1	85.7	88.7	102.1
IGS0161	Green	5	1	83.3	106	106.9
IGS3069	Green	5	1	83.3	97.5	107.12
IGS3171	Green	5	1	83.3	81.5	101.1
IGS3174	Green	5	1	83.3	93.3	106.2
IGS3414	Green	5	3	62.5	89.6	101.9
IGS3472	Green	5	1	83.3	107.3	106.9
IGS3475	Green	5	0	100	99.6	108.6
IGS3217	Hawksbill	4	0	100	125	74.13
IGS0427	Hawksbill	3	0	100	97	81.3
IGS3225	Hawksbill	3	0	100	128	76.4
IGS3371	Hawksbill	3	0	100	164.5	83.3
IGS3521	Hawksbill	3	0	100	149	77.1
IGS3583	Hawksbill	3	0	100	136.5	80.5
IGS3660	Hawksbill	3	0	100	139.7	83.7
IGS3675	Hawksbill	3	0	100	145.3	82.1

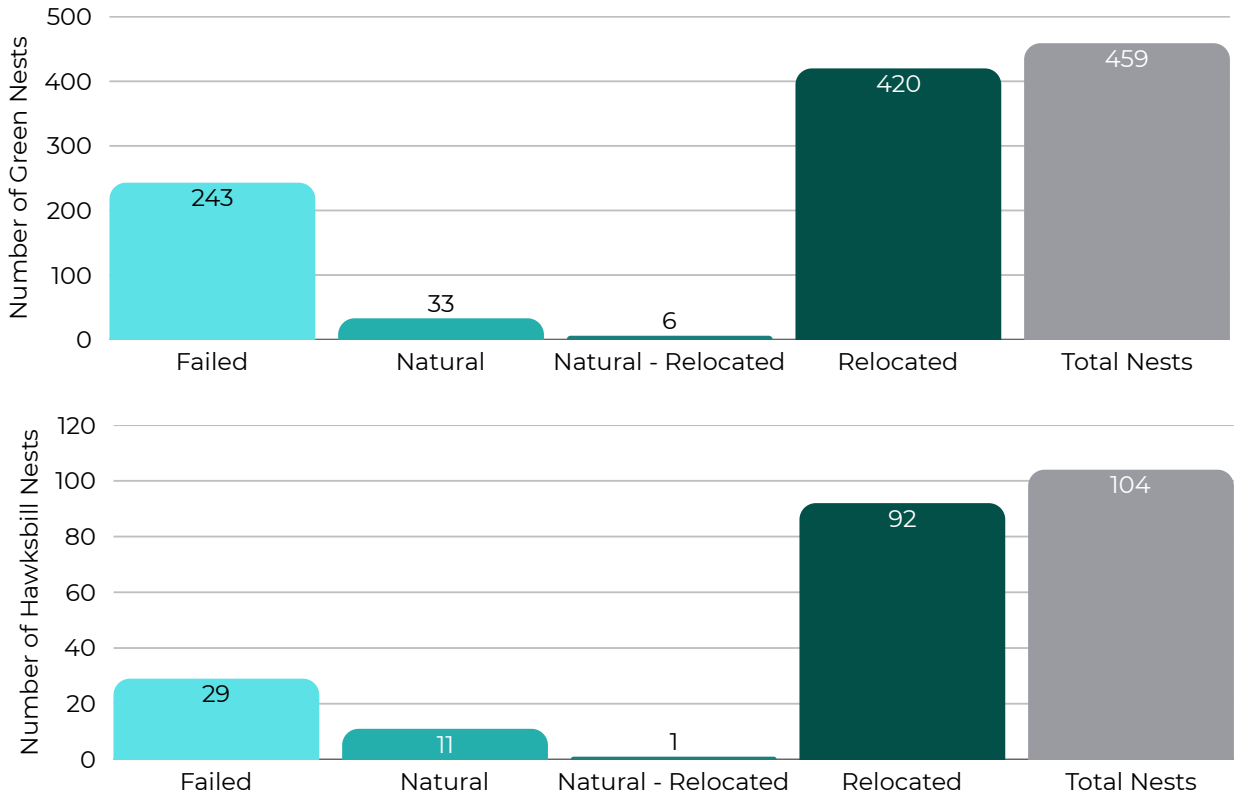


Figure 22. Number of nests that were failed, successful and kept natural, relocated to a natural site or relocated to a hatchery. **(a)** green and **(b)** hawksbill turtle nest types in the Conflict Islands 2024 - 25 nesting season.

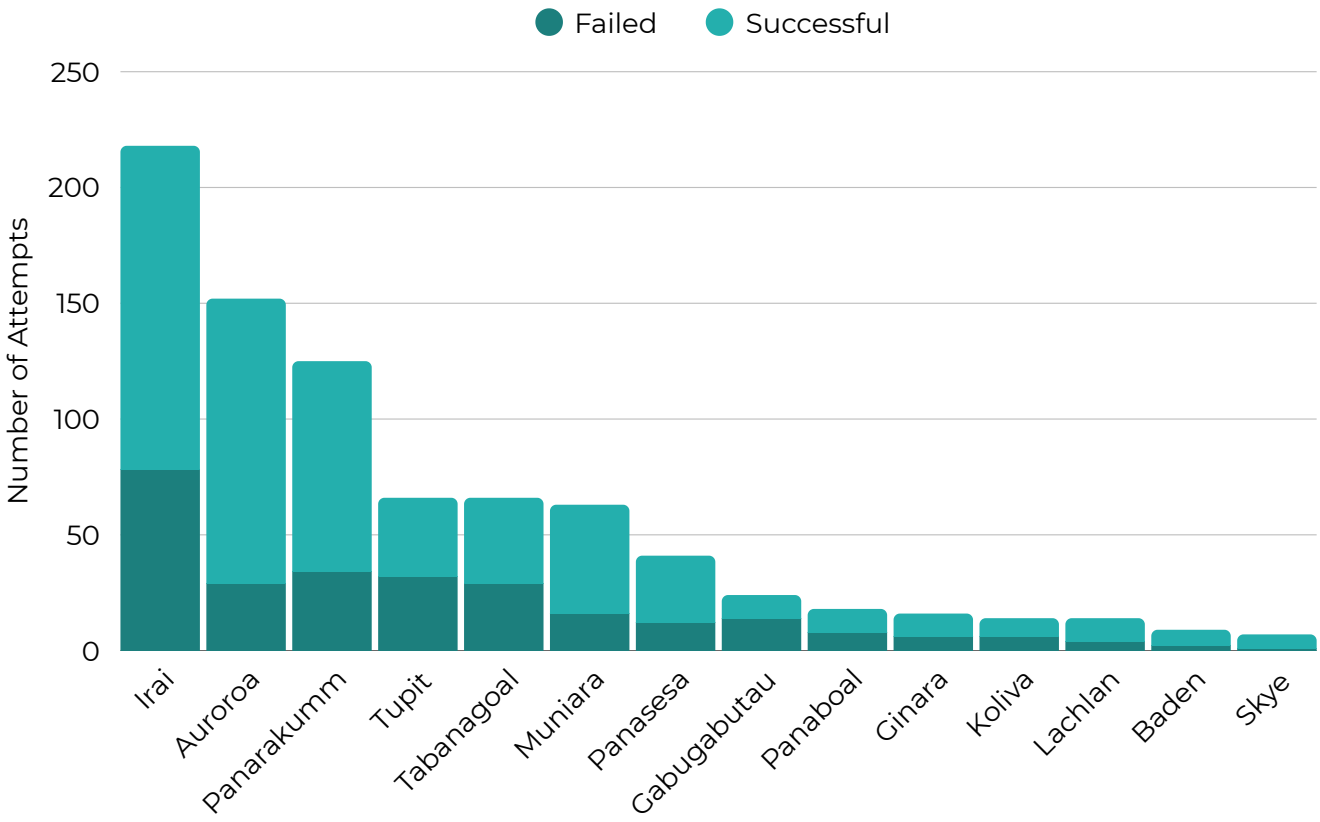


Figure 23. Number of successful and failed nesting attempts for green and hawksbill turtles combined throughout 2024 – 2025 season.

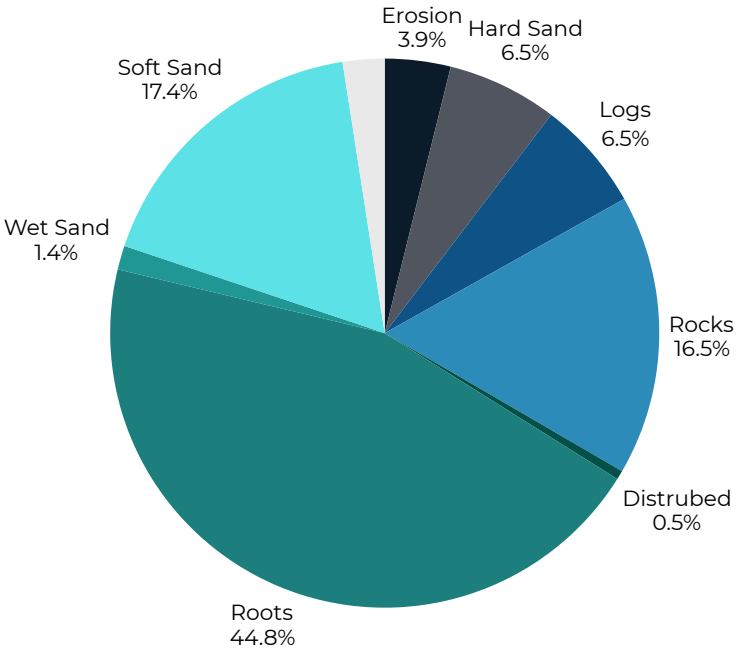


Figure 24. Pie chart showing the percentage of nesting attempts that had failed by different causes.

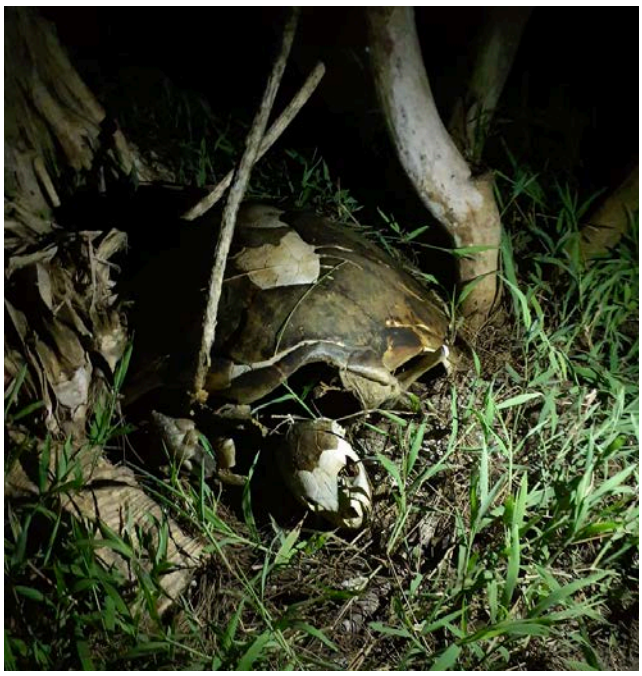


Figure 25. Deceased green turtle that died due after it was trapped in tree roots.

RESULTS

HATCHERY SUCCESS

Table 10. Number of hatchlings released from translocated nests in hatchery during the 2024-25 season to date.

Species	Nest Relocated	Number of Eggs	Number of Hatchlings	Hatchling Success (%)	Emergence Success (%)
Green	417	38,316	33,645	87.1	86.0
Hawksbill	90	12,176	10,628	88.6	86.8
Total	**507**	**50,492**	**44,273**	-	-

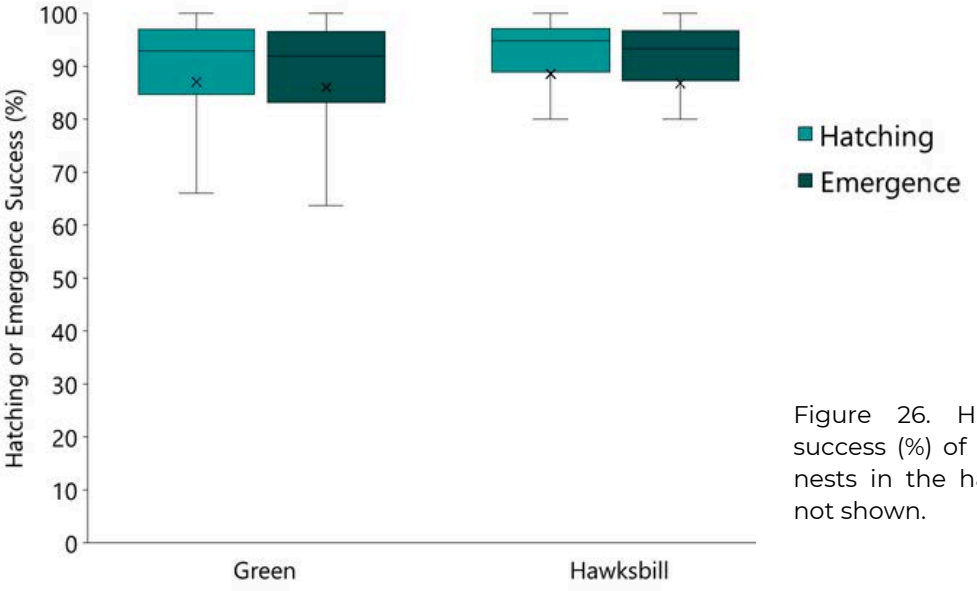


Figure 26. Hatching and emergence success (%) of green and hawksbill turtle nests in the hatchery. Outlier points are not shown.

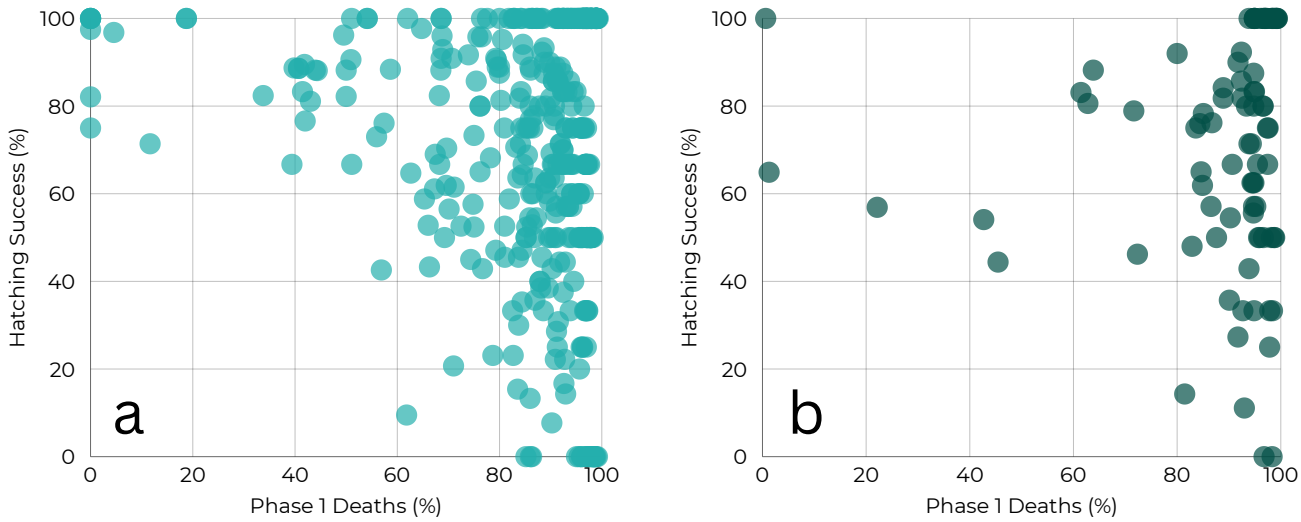


Figure 27. Relationship between hatching success (%) and the percentage of unhatched eggs that died in phase 1 of development for **(a)** green and **(b)** hawksbill turtle hatchery nests.

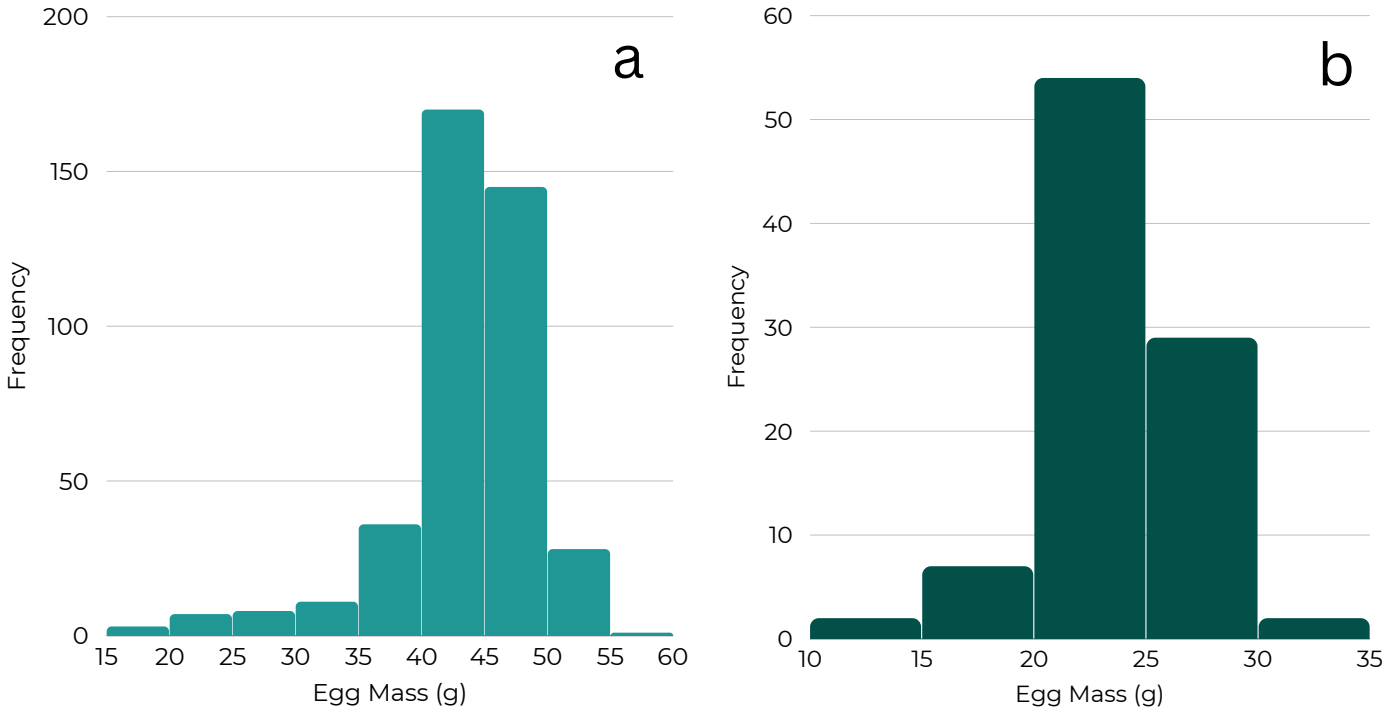


Figure 28. Frequency plot of the average egg mass of the clutch for **(a)** green and **(b)** hawksbill turtle hatchery nests.

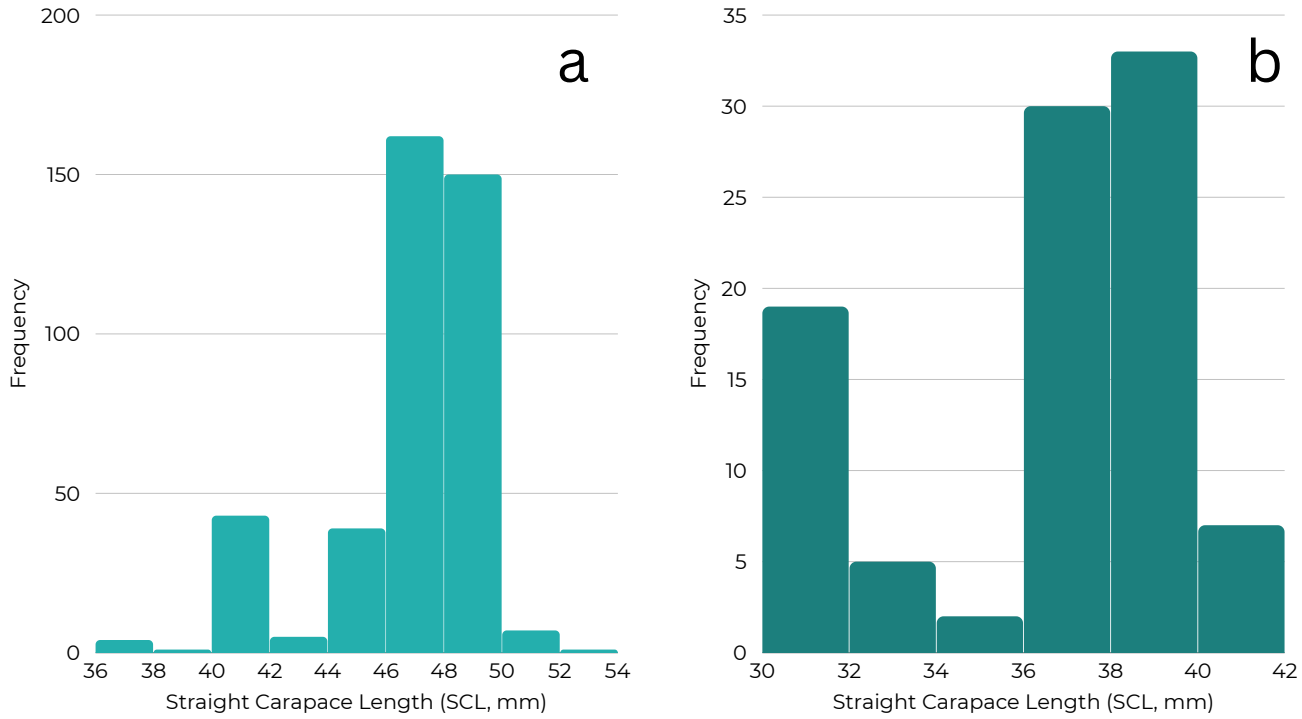


Figure 29. Frequency plot of the average straight carapace length (SCL) of **(a)** green and **(b)** hawksbill turtle hatchlings from hatchery nests.

RESULTS

NATURAL NESTS

Table 11. Number of natural nests and lost nests in the 2024-2025.

Species	Number of Natural Nests	Protection Placed	Predated Nests
Green	40	17	20
Hawksbill	12	8	5
Total	52	25	25

Table 12. Number of natural nests found with hatchlings and the number of emerged hatchlings

Species	Number of excavated natural nests	No. of Eggs	Hatchlings emerged successful
Green	21	1,630	1,224
Hawksbill	10	1,107	986
Total	31	2,737	2,210

Table 13. Average hatching and emergence success of natural nests.

Species	Hatchling Success (%)	Emergence Success (%)
Green	77.5	73.8
Hawksbill	86.3	85.8
Average	**80.4**	**77.7**

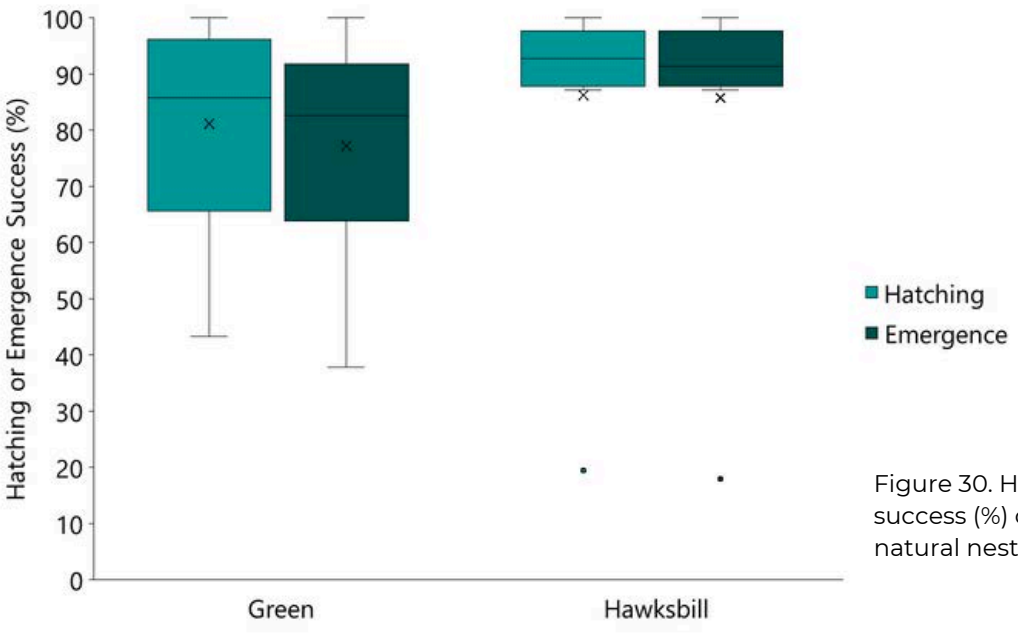


Figure 30. Hatching and emergence success (%) of green and hawksbill natural nests.

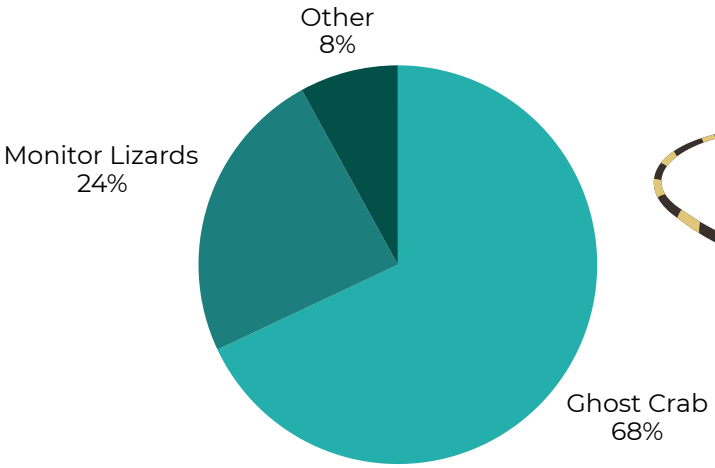


Figure 31. Percentage of natural turtle nests with predation.

Monitor Lizards ate **218** green turtle eggs and **24** hawksbill turtle eggs.

Ghost crabs ate **85** green turtle eggs and **28** hawksbill turtle eggs.

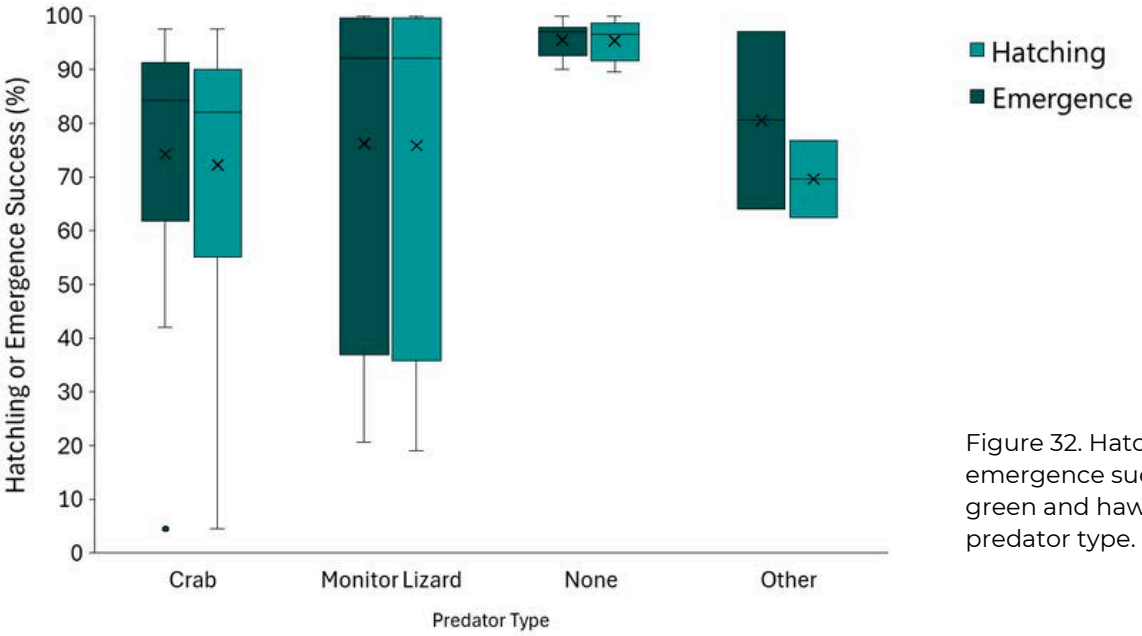


Figure 32. Hatching and emergence success of natural green and hawksbill nests by predator type.

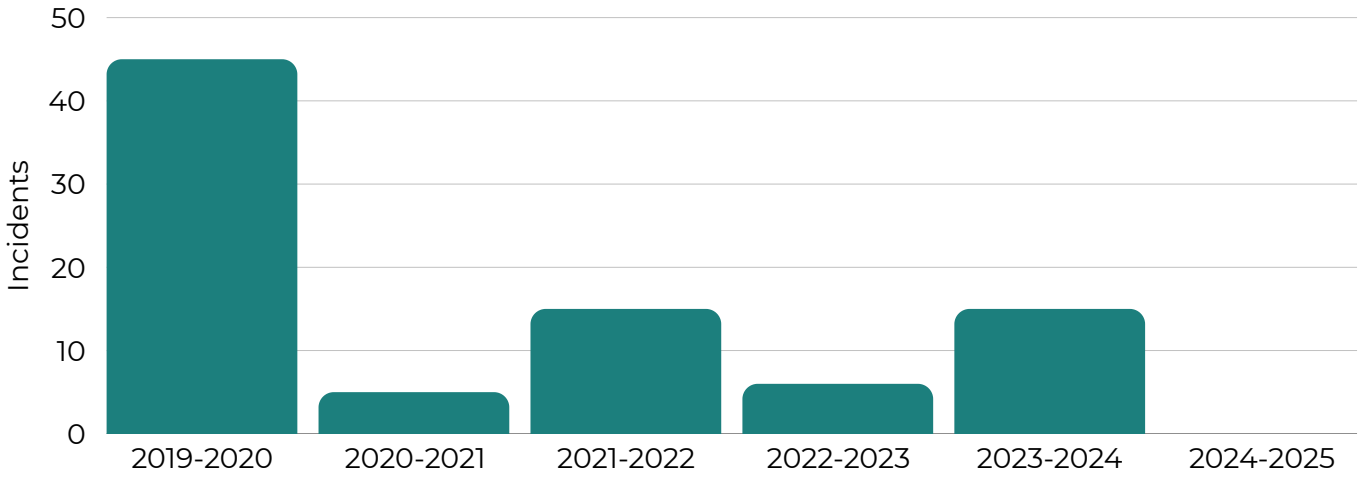


Figure 33. Number of incidences of unlawful take of nesting female turtles that occurred within the Conflict Island Atoll over the past four nesting seasons.

RESULTS

MONITORING LOGISTICS

Table 14. Summary of ranger activities in the Conflict Islands 2024-25 nesting season

Island	Kms patrolled	Hours Patrolling	Number of Rangers
Auroroa	2034.16	1224.12	218
Baden	449.03	119	51
Gabugabutau	210.85	227.99	27
Ginara	182.86	349	35
Irai	1716.41	1082.02	382
Koliva	285	89	24
Lachlan	137.55	59	12
Muniara	1281.2	726.02	118
Panaboal	257.13	119.12	46
Panarakuum	1362.94	589.04	171
Skye	285.38	132	25
Tabanagoal	738.75	280.01	117
Tupit	1213.44	304.12	137
Panasesa	651.18	512.1	94
Total	**10,806**	**5,813**	**1,457**

Table 15. Number of titianium ID Flipper tags issued/replaced in the 2024 - 2025 nesting season and cost on Papua New Guinea Kina.

Species	Tags Applied	Total Costs
Green Turtle	246	3,690
Hawksbill Turtle	71	1,065
Damaged or Lost Tags	41	615
Total	358	5,370

Table 16. Number of hours spent training new rangers (n = 8) for 2023 – 2024 Nesting Season

Position	Training Hours
Marine Biologist	240
Project Manager	960
Head Ranger	7,200
Average	2,800

Table 17. Summary of number of turtles surveyed and tagged in the 2024-25 Nesting Season.

Ranger	Recorded	Tagged
Arthar H	79	17
Badi S	55	8
Banian L	144	28
Bjorn M	12	3
Clinton L	116	18
David B	110	21
Ephraim E	112	21
Genevive P	78	6
Henry J	136	8
Michael M	103	15
Nathaniel S	116	19
Norman P	107	18
Patrick L	133	15
Rodney T	126	19
Roselyn E	10	2
Rowenia M	115	18
Steven A	35	2
Toby L	38	4

CICI FULL TIME RANGERS

TRAINEE CICI RANGERS

Figure 34. (Left) CICI Rangers (top row); Steven , Michael, Henry, Banian, Clinton, Toby, Rodney Solange, (bottom row) Norman, Badi, Patrick, Genevive and Roselyn. (Right) CICI Trainee Rangers; Ephraim, Arthur, David, Rowina, Nathaniel and Albert

RESULTS

MARINE DEBRIS SURVEYS

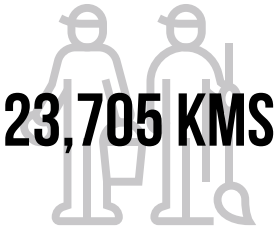
KILOGRAMS OF WASTE REMOVED

NUMBER OF PIECES OF WASTE REMOVED

HOURS SPENT COLLECTING

NUMBER OF ISLANDS CLEANED

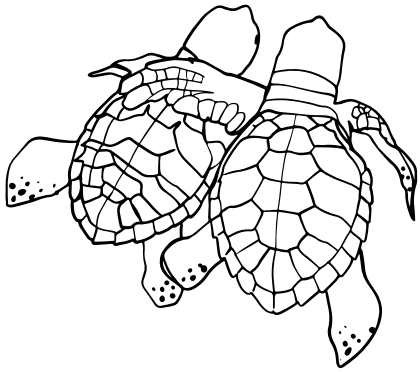
KILOMETERS OF BEACHES CLEANED



HOURS SPENT ON MARINE DEBRIS AUDITS

Table 18. Marine Debris Activity Summary per island for the rangers from Nov 2024 - May 2025.

Island	Km	Hrs Spent Collecting	Number of Rangers	Hrs Spent Sorting	Number of Rangers	Number of items	Kg
Auroroa	216	56.34	65	48.5	24	10091	309.4
Baden	88	23	10	13	7	763	23.7
Gabugabutau	35	29	24	18	12	2794	83.1
Ginara	134.01	55	32	69	25	4850	196.8
Irai	159.12	32	33	32	19	84643	516
Itamarina	5	7	5	4	4	320	18.2
Koliva	47.75	15	15	13	10	1281	53.8
Lachlan	90	8	12	18	11	369	12.8
Muniara	18	20	13	18	14	2325	108.3
Panaboal	58.27	29	25	52	27	2527.94	161.8
Panarakuum	81.94	57	17	17	7	41608	544.4
Quesal	76	11	16	12	7	1494	53.7
Rutipiran	33	21	25	36	6	3982	187
Skye	22237	23	8	1	4	376	6.9
Tabanagoal	73	48	38	37	32	3406	139.1
Tupit	103.97	75	50	158	91	50977	536
Panasesa	224.52	299	69	46	26	89745	605
Total	**23,704.6**	**812.3**	**462**	**592.5**	**326**	**301,551.9**	**3,556**



2024-2025 PROJECT SUMMARY

This season marked our seventh consecutive year of great work and success by the Conflict Islands Conservation Initiatives Rangers and The Coral Islands Ltd company to run this program here in Milne Bay, Papua New Guinea. Thanks to the support of Sandrina Postorino & Chris Ellis, The British High Commission in Port Moresby, Steamships, Carnival and SEE_Turtles, for your financial support to enable this season's work to go ahead.

Our 2024 - 2025 season has been very busy and a record nesting year for hawksbill turtles in the atoll. It was a relatively big season for our "BINGO" re-migrant turtles, with 23 turtles returning to nest after 3 - 7 years since their last nesting season (Table 5 & 6). This long-term data we have collected over the past seven season will contribute towards estimating the population size of green and hawksbill turtles nesting in the Conflict Islands. Although our dataset of tagged turtles is large, there needs to be a larger proportion of remigrants to accurately estimate population size, but we are excited to be approaching this milestone soon. We are confident that our remigrants are very important breeders in the population, as three of the nesting females which had laid 3 or more clutches were tagged remigrants (Table 9).

Across the seven years of data, we have seen a clear pattern in the number of nesting green turtles each year. When there is a peak in nesting numbers (>200 females), the following season is typically a low nesting season (<100 females). This has been similarly observed in green turtle nesting populations in Australia, and has been linked to the ENSO cycle (Limpus 2009). When rainfall is high in the West Pacific, flooding causes seagrasses to die-off and there is knock on effect to nesting green turtles, as they are not able to eat enough to store the energy they need to make egg follicles and migrate back to the breeding grounds (Limpus 2009). Following that theory, we expected that 2024-2025 season would be low, however, we had over 268 green turtle individuals nest in the atoll (Fig. 16a). This is most likely linked to the environmental conditions, but we also had our largest ranger team we have ever had, and they were monitoring every night of the season and so the effort was much higher than 2017 - 2020. One of the most interesting encounters this season was a green turtle that arrived with a titanium flipper tag not issued by CICI. The tag ID number was 'T93546' and addressed to the QLD Government in Australia. After contacting the Department of Environment, Science, Technology and Innovation (DETSI), Dr Col Limpus shared that this individual was first tagged as an immature turtle by QLD Government researchers in the northern Great Barrier Reef in the 1990s. It's uncertain if this was the first nesting season for this turtle, but given the time to sexual maturity is 25 - 35 years, it is likely that it was a neophyte (first-time nester).

Historically in the atoll, the annual number of hawksbill turtles nesting has remained stable with 23 - 43 hawksbill turtles nesting each season. However, in the 2024-2025 season, we had a record breaking 77 tagged individuals nest in the atoll. The reason for this doubling of nesting numbers is currently unknown. Hawksbill turtles are omnivorous, and feed primarily on sponges, soft corals and red coralline algae. So they don't experience the same food availability fluctuations driven by the ENSO cycle as green turtles. Of the tagged turtles, 94% (71 turtles) were first seen this season, and only 6% were remigrant turtles. Potentially the increase in monitoring efforts and greater protection within the atoll has contributed to this staggering increase in the number of nesting hawksbills, which would be a true sign of the success of this conservation work.

Patrols for nesting females begun in November 2024, with first records of the nesting attempts by green and hawksbill turtle occurring on the 9 and 10 of November respectively. The peak in the nesting for green turtles was for 3 weeks from the 12 Dec to 7 Jan, where 38.3% of all nesting attempts for the entire season were made. The peak in the nesting for the hawksbill turtles was for 2 weeks from 19 Dec to 1 Jan, where 37.2% of all nesting attempts for the entire nesting season were made. The end of the nesting season for hawksbill turtles was the 7 Feb, whilst green turtles continued to nest until 20 Feb, with only two more events occurring in March.

This season, there was a change in the preference of nesting islands for hawksbill turtles. Last season, Panasesa was the preferred island (19 attempts), however this season, there was a record-breaking 55 attempts on Panarakum Island. This was followed by Auroroa with 16 nesting attempts. Green turtles however, unwavered from their preferred nesting site from last season. Irai Island had 376 attempts, and this year there were 212 attempts. Similarly to hawksbill turtles, Auroroa was also a preferred site by green turtles, with 136 nesting attempts made. The shift in preference by hawksbills may be due to a loss of sand on Tupit or Panasesa, leaving very little areas suitable for nesting areas available to the turtles.

During the nesting season, we had tropical cyclone Alfred pass through the islands in March, and a result there was a noticeable and significant loss of sand from most of the nesting beaches around the atoll. The average nesting success was 47% and 72% for green and hawksbill turtles respectively. This success rate was similar to last season for hawksbill turtles, but had decreased from 56% success for green turtles in 2023 - 2024 season. The reason for this decrease is not quite known, however rocks reported as being the cause for nest failures had increased from 8% (2023-2024) to 16.5% (2024-2025). This increase in rocks causing nesting attempt failures could be a sign of increased erosion on the island and reduced accessibility to the nesting areas on the island for the turtles. Hawksbills likely have greater nesting successes than the green turtles because they have shallower nests and don't dig deep down to where there are thick and impenetrable tree roots. Roots this season were responsible for 44% of the total nest failures for both species. More and more climate change and loss of nesting habitat is exposing itself as a long-term threat to nesting marine turtles in the Conflict Islands Atoll.

To best protect the nests from predators, unlawful take and erosion, the CICI rangers carefully relocate clutches laid by the females into our protected hatcheries on Panasesa Island. This season, our rangers relocated 420 green turtle clutches and 92 hawksbill turtle clutches into the hatcheries. In total this equated to 50,492 eggs, of which 12,176 were hawksbill turtle eggs and 38,316 were green turtle eggs. From these eggs, 10,628 hawksbill hatchlings and 33,645 green turtle hatchlings were produced, meaning our overall hatchery success was 87.3% and 87.8% for these species respectively. Overall hatching success was high, 87% and 88% for green and hawksbill turtle nests in the hatchery.

As the islands are more and more effected by erosion, sea level rise and sever weather event the impacts on the nesting beaches is very evident. There are significantly less sand and suitable nesting sites available. This season we left at total of 51 in-situ nests around the atoll. These were comprised of 40 green turtle nests and 12 hawksbill nests. Most of these natural nests had been predated despite our best efforts to protect the nests using a wire mesh protector over the top to the nests. Of the natural nests 40 of the green nests, 17 had protectors. Of the 12 natural hawksbill nests, 8 had protectors. Of the 31 nest excavations conducted by the CICI rangers, predators had impacted 20 green turtle nests and 5 hawksbill nests, which equated to 95% and 63% of natural nests predated. The most common predators were ghost crabs (68%) followed by monitor lizards (24%). Although ghost crabs being the more common predator, they predated 113 eggs across all of the nests, compared to 242 eggs predated on by monitor lizards. Despite the high predation rates across the natural nests, the hatching success for green turtles was 77.5% and was 86.3% for hawksbill turtles. There were several natural nests that had to be excluded from the calculation, primarily due to the predation as monitor lizards destroy the nest and make it difficult to find the original locations of the the nests. The natural nests produced 1,224 green turtle hatchlings and 986 hawksbill hatchlings.

A huge milestone for our conservation program was achieved this year. For the first time since 2017 when we started monitoring the Conflict Islands for sea turtles, our Rangers did not encounter any instances of unlawful take of eggs or turtles. Not only did the Rangers have a very large presence across the atoll, but also our outreach programs to the surrounding islands and the monitoring that has begun on the community partner islands may have heavily deterred people from coming to the CI for eggs and turtle.

Every season our rangers collect tonnes of marine debris from the nesting beaches and islands of the atoll and this season was no different. Between Nov 2024 - May 2025, our rangers collected 3.5 tonnes of marine debris across 18 islands. By far the most common item found were hard plastic remnants (23,378 items), plastic drink bottles (17,700 items) followed by lids and bottle caps (17,372 items) and rubber footwear/sandals (9,821 items). Working with Tangaroa Blue foundation this data gets entered into a database to help make informed decisions and recommendations to the International and national Governments for legislative and law making.

RECOMMENDATIONS

We need to develop a sustainable financing model for our program. Currently, we face annual challenges in securing funds for our turtle conservation efforts. Our in-country partner, The Coral Islands Limited, has begun generating income through conservation tours for visiting cruise ships, which helps cover some costs. However, this still leaves us with a funding shortfall, and the uncertainty we face each year creates additional stress, pressure, and doubt regarding the future of this vital program.

Having successfully reduced the threat of poaching, our next steps must focus on building resilience, stabilizing beaches, and safeguarding the islands against the impacts of sea-level rise. This is now the largest threat to the nesting turtles and this rookery. Without significant assistance in this area, the islands may only serve as a sustainable nesting ground for the next 20 years, given the current rate of erosion and loss.

We should explore the possibility of assessing the outer islands for additional hatchery locations. This could help reduce travel fuel costs and enhance safety during adverse weather events. Establishing more permanent base camps could also be beneficial; however, it does increase the risk of unwanted stays or theft of materials if these locations are not consistently occupied and protected by rangers.

ACKNOWLEDGEMENT

On behalf of the management Hayley Versace and Edward Cardwell, we would like to express our sincere gratitude, to you the communities of the Deboyne and Engineer Groups for your co-operation and fulfilment of the restrictions of island stays during the 2023 - 2024 Turtle Nesting Season at the Conflict Islands and no-take of turtles as we work together now and into the future to protect your turtle populations for generations to come. We would also like to express our sincere gratitude to the Tewatewa community, rangers and leaders for your support through the implementation of your pilot project. Our combined efforts will hopefully mean numbers will start to increase on these islands in the future. Again, we thank you, our neighbors very much for your co-operation and for sharing your community with us to help monitor the Conflict islands this season.

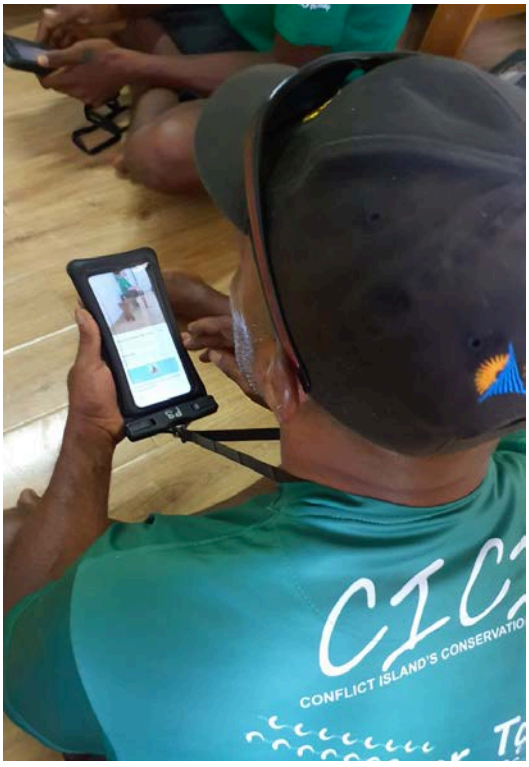
We would also like to express a sincere gratitude to the hard work of our Conversation Rangers who work tirelessly, almost seven days a week for six months of the year to protect the turtles, collect this valuable data and promote a positive conservation message to their communities. Thank you, to our Team Leaders Steven Amos, Patrick Lemeki, Toby Losane, Henry John, and our Conservations Rangers rangers, Banian Leonard, Clinton Luke, Badi Seko, Michael Moten, Rodney Taliya and Norman Poate you have all done an amazing job and your community proud for the hard work and efforts you have tirelessly have put in over this learning and nesting season. Also to our trainee ranger's from this season, Ephraim Ephraim, Rowina Mark, Solange Kambible, Genevive Paul, Arthur Harold, Albert Andrew, David Billy, Nathaniel Sam and Bjoren Marai. Well done and welcome to the CICI family!

We would like to acknowledge the rest of the staff from the Coral Islands Limited, who work to support the Conservation Rangers and help the islands running so we can achieve the conservation work. Thank you for stepping in driving dinghies, security and back up for the ranger team, doing the maintenance and caretaking of the island's infrastructure and redoing the turtle nursery this season. Thank you to our staff cooks, who keeps the Rangers fed and the ladies for keeping the accommodation clean. Thank you to our Melissa Staines for your contribution to the project report and data analysis.

We would also like to acknowledge and thank all those who privately contributed to the program with financial and inkind donations. This season would not have been possible without your help.

PROJECT IMAGES

This season would not have been possible without the efforts of our dedicated rangers. Here are some of the images of the work they have been doing throughout the season

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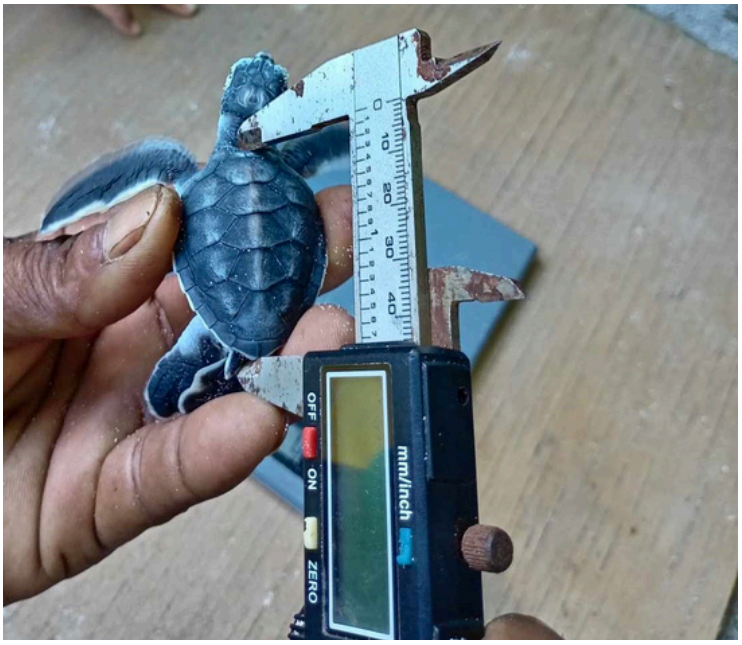
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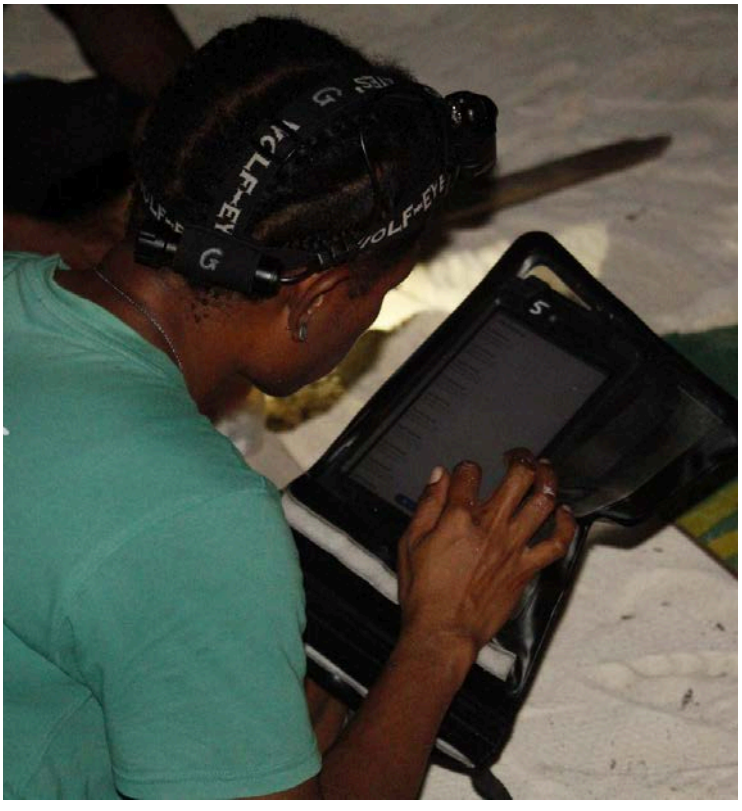


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