ProTECTOR, Inc. NATIONAL REPORT OF ACTIVITIES FOR THE 2023 RESEARCH SEASON

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This report has been provided to the Honduran Department of Forest Conservation (ICF), and the Department of Fisheries (DIGEPESCA) in fulfillment of the requirements for the 2024 Honduras ICF research permit # ICF-121-2023. The permit was secured through the efforts of ProTECTOR, Inc. Country Director, Lidia Salinas.

This report has been authored by Stephen G. Dunbar, Cara Dunbar, and Lidia Salinas.

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INTRODUCTION

The following report is a brief overview of the activities of the Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR, Inc.) over the 2024 research season from June 6 to July 31, 2024. We briefly present methods and results of individual projects. We undertook all research under a national pre-permit issued by the Honduras Government through the Department of of Forestry Conservation (ICF). Lack of efficiency, and the unnecessary involvement of lawyers in processing of permits applications again delayed the issuing of the research permit. In the interim, we were requested to take (and provide funding for) an ICF officer to come to our field site to receive training. In return for this training, we received a notice of continuance of research activities from ICF. However, the research permit was not issued during or after the research season in 2024.

During the 2024 research season we focused again on Caribbean Honduras, with an emphasis on Guanaja and Barbareta Islands (Fig. 1). Research efforts during this season were focused entirely on the nesting beaches of both Guanaja and Barbareta. Although Roatán is the largest of the three Bay Islands sitting approximately 48 km north of mainland Honduras, there is essentially no regular nesting of any species of sea turtles on beaches of this main island. In contrast, consistent nesting (although in small numbers) has been recorded on both Barbareta and Guanaja over the past 5 – 6 years. Barbareta sits approximately 2.6 km to the east of the community of St. Helene, and is approximately 5.1 km long and 1.9 km wide at its widest point. Guanaja is the eastern-most island in the group, laying approximately 25.9 km from the eastern point of St. Helene, and is a mere 16 km long and 6 km wide.

We carried out research efforts on Barbarat with direct assistance from the staff at CFB, and Loma Linda University graduate student, Stephanie Molina. On Guanaja the staff of the Green Island Challenge initiative, directed by Mr. Anuar Romero, assisted our investigations by leading out in nightly patrols at different beaches around the island. Mr. Romero was assisted by the Berkshire High School. Our ProTECTOR, Inc. team was supported and assisted by the owner and manager of Hotel Guanaja.

The work carried out on Barbarat continued prior, although undirected, information gathering on sea turtle nesting on the island. Since 2015, ProTECTOR, Inc. has been involved with tagging juvenile

turtles temporarily held at Barbarat before being released to the wild.

Work on Guanaja continued the monitoring of beaches around the island for nesting hawksbill (*Eretmochelys imbricata*), green (*Chelonia mydas*), and loggerhead (*Caretta caretta*) sea turtles, as well as the flipper tagging and tissue sampling of captive turtles held at a tourist resort on one of the local cays.

Fig. 1. A map of the regional view of Barbareta (A) and Guanaja (B) in the Bay Islands of Honduras .

As in prior years, ProTECTOR, Inc. Interns assisted in collecting data for various projects during the 2024 research season. The number of ProTECTOR, Inc. Interns was lower in 2024 owing to the delay in planning for the field season. We delayed in planning due to health needs of PI Dunbar that constrained the team to only work on nesting beach areas through this season. We had a single Intern this past season; Mr. Kye Stephens, who assisted in beach monitoring and hatchling work-ups on Barbarat, as well as beach monitoring for nesting turtles around Guanaja. This opportunity provided Kye with one-on-one field training and hands-on experiences working in the area of sea turtle biology and conservation. He was also involved with a community meeting in St. Helene that allowed him to experience interactions in the context of community conservation planning on a local level.

M E T H O D S

CFB Work

During the current season, we collaborated with staff at CFB, and provided training to key personnel on beach monitoring, safe sea turtle handling, sample collection, and satellite transmitter attachment protocols. Included in the training was the CFB veterinarian and several environmental managing staff of the island.

The CFB staff and Loma Linda university/ProTECTOR, Inc. graduate student monitored the beaches around the island with assistance from security staff positioned on beach areas around the island. When nesting turtles were sighted, messages were sent to the monitoring team through radio communications. Once at the site of the nesting activity, team members secured the turtle through gentle hand restraint, then applied an Inconel (681-style) flipper tag with a unique identification number to the front right flipper of the nesting turtle. Tags were applied to the scale proximal to the body.

In addition to flipper tagging, personnel received training on sampling turtles for blood, scute, and skin tissue, all of which were then preserved in appropriate preservation solutions or solutes. These samples were taken for various genetic, metal, health, and parasite analyses that will be accomplished when samples have been transported back to Loma Linda University at a later date.

Satellite transmitters were attached to nesting hawksbill turtles after turtles successfully laid eggs. Attachment followed a standard platform terminal transmitter (PTT) protocol in which the nesting turtle was constrained within a wooden box made of four plywood pieces that fit together to make a box of four sides. There was no bottom to the box so that the floor of the box was the natural substrate of the beach location. Once constrained, the apex of the turtle carapace was washed several times with clean, freshwater, then cleaned with 70% Ethanol. The second vertebral scute was then lightly sanded with course sandpaper, then cleaned again with Ethanol. The same surface was then scratched with a knife or screwdriver, causing some surface etching in the scute. This was done to provide a rough, uneven surface to which the adhesive epoxy could infiltrate into the scute. Once the surface of the scute was prepared in this manner, the scute was covered with a thin layer of 2-part marine epoxy, as was the base of the PTT. The PTT was then placed on the thin layer of epoxy on the prepared vertebral scute, and the PTT pushed down slightly so the two layers of epoxy integrated together.

METHODS

The satellite tag was allowed to dry on the carapace surface of the turtle for up to 2 hours (Fig. 2) before the turtle was then released at the top of the beach, to crawl down the beach to return to the sea.

Fig. 2. Satellite attachment on one of the two hawksbill turtles on which PTTs were fixed.

Fig. 3. As part of the systematic work-up on captured turtles, we cleaned, measured, weighed, and flipper tagged (if new capture) turtles. Additionally, we collected blood and scute cuttings for additional genetic, heavy metal, parasite, and health analyses. CFB Staff learned the process of handling and collecting samples from turtles.

M E T H O D S

Guanaja Nesting Recovery Project

In 2024, we continued the Guanaja Nesting Recovery Project (GNRP) with field direction and assistance from Mr. Anuar Romero and the Green Island Challenge initiative. This ProTECTOR, Inc. - Green Island Challenge partnership team continued their nightly monitoring of the beaches around Guanaja for nesting hawksbill, green, and loggerhead turtles during the entire nesting season of 2024, from May to September.

When turtles were sighted emerging from the water to nest, the team carefully followed the turtle at a distance to observe the turtle digging the nest, laying the eggs, burying the clutch, and returning to the ocean. As in prior years, the nest location was then marked and triangulated with a handheld GPS so that the nest could be relocated at the time of approximate hatching. The latitude and longitude of the nest was recorded, as was the species of turtle nesting. Monitors searched the turtle for any identifying markings and the presence of flipper tags. If the turtle was carrying a flipper tag, the tag number was recorded in the database. Monitors also noted if no flipper tags were present.

Within two days prior to the expected time of hatching, the monitoring team checked the nest for signs of hatching during the day and at night to ensure they could secure a count of the number of hatchlings that emerged from the nest. Once the clutch hatched, the team continued to monitor the nest for the following 24 hrs, after which nests were excavated, and any remaining live hatchlings were released to the water’s edge. Dead hatchlings and unhatched eggs were counted and recorded, then reburied into the nest and fully covered over again with sand from the excavated nest area.

M E T H O D S

Interns

During the 2024 research season, we had one ProTECTOR, Inc. Interns involved with projects. Kye Stephens received training both in sea turtle handling and research. Kye was an integral member of the beach monitoring team throughout Guanaja over three weeks. Additionally, he helped monitor and process juvenile turtles at CFB, photographing each sea turtle as a record of face and head scutes of very young juvenile hawksbills. Kye then assembled a table of all three head angle photographs that will be used to compare to those individuals at a later stage of life to investigate the permanence of head scale patterns in juvenile hawksbills. At the completion of the month of beach monitoring at both Guanaja and CFB, Kye assisted in organizing and holding a meeting with the community of St. Helene regarding their interest in establishing a community-run MPA in their area of the island of Roatan. This was a very helpful part of the conservation process for Kye to witness and be involved with. As a ProTECTOR, Inc. Intern, Kye was exposed to the many angles of wildlife conservation research, as well as conservation education outreach, and the need to develop partnerships with local community members and local non-governmental organizations (NGOs).

Another important aspect of the Internship was the weekly opportunity to read, discuss, and critique published sea turtle research articles. This was done in discussion with PI Dunbar, in which the two discussed and dissected current research articles to understand the rationale for the published studies, to assess the methods used to collect data for the study, to review the results, and to critically evaluate the discussion and applications of the final conclusions of each paper. The Intern was then challenged to suggest ways the study could be improved, or other aspects of the study that should be carried out in the future. In this way, the Intern was encouraged to assess his own understanding of the published literature and received training on how to evaluate the literature he would read in the future.

R E S U L T S

CFB Juvenile Turtle Tagging

During the 2024 season, we weighed, measured, photographed, and sampled 16 head-started juvenile hawksbill turtles (Fig. 4). These turtles hatched on beaches of the island and were kept in a large ocean pool with an area of approximately 40m (L) × 40m (W) × 2m (D) for approximately 4 – 6 months before we sampled and photographed them. None of these turtles were flipper tagged because their mean CCLmax was <15 cm. Turtles were all in good external physical condition, with no turtles appearing to have injuries or abnormal growths. At the conclusion of each work-up, each turtle was returned to the large holding pool. When we left the island, these turtles were scheduled to be released within the following 4 – 6 months.

CFB Nesting Activity

Nesting activity appears to be increasing on CFB (although we do not yet have enough data to analyze trends). This season we had 21 nesting attempts, with 28% (n=6) comprised of *Caretta caretta,* 28% (n=6) comprised of unidentified individuals; and 44% (n=9) comprised of *Eretmochelys imbricata*.

There were 14 nests laid of which 29% (n=4) were *C. caretta*; 14% (n=2) were inundated by tidal waters and lost; and 57% (n=8) were *E. imbricata.* In the 2 *C. caretta* nests laid that were not washed away by tidal inundation, there was a total of 245 *C. caretta* eggs laid. In the *E. imbricata* nests laid, a total of 1,179 eggs were present. Hatching success for turtle nests at CFB was relatively low, with only 17% (n=42) of *C. caretta* eggs hatching successfully, and 51% of *E. imbricata* eggs surviving to hatching stage (Table 1).

Table 1. Percent hatching success rates for *Caretta caretta* and *Eretmochelys imbricata* eggs laid at CFB during the 2024 nesting season.

% Hatching *Caretta caretta*	(42*100) / 245	17.14%
% Hatching *Eretmochelys imbricata*	(604*100) / 1179	51.23%
% Total Hatching	**(646*100) / 1424**	**45.36%**

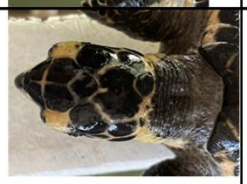
ID-Date	Dorsal	Left	Right	Carapace
HB001-6/23/2024				
HB002-6/23/2024				
HB003-6/23/2024				
HB004-6/23/2024				
HB005-6/23/2024				
HB006-6/23/2024				

Fig. 4. Examples of images taken by ProTECTOR, Inc. Intern Kye Stephens showing the head scutes of very young (4 – 6 months old) juvenile hawksbill turtles for future comparisons of these individuals at a later stage of their life cycle.

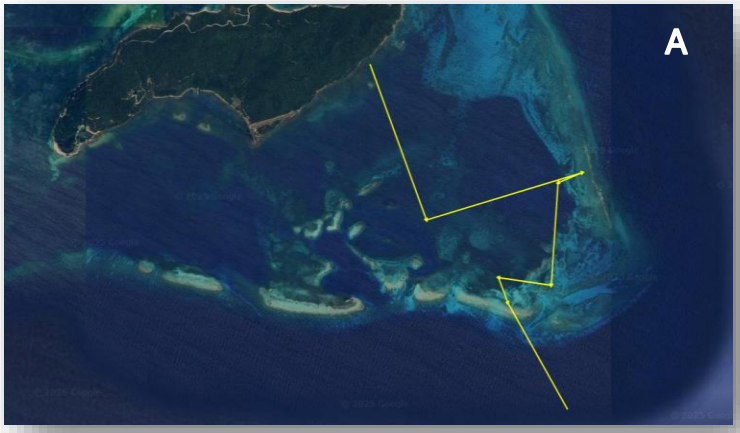
RESULTS

CFB Nesting Hawksbill Satellite Tagging

Another advancement in ProTECTOR, Inc. sea turtle research in the Bay Islands, was the attachment of two satellite transmitters (or PTTs) on nesting hawksbill turtles on CFB island.

The first tag (sat tag #612) was attached to a nesting turtle after completion of nesting activities on September 22. The turtle was constrained in a wooden box designed to keep the turtle from moving wile the tag was applied. The second turtle (sat tag #613) was tagged on September 24 in similar conditions as the first turtle.

The two turtles were tracked through the Lotek website for as long as the tags were transmitting positional data. We were able to track turtle 613 (satellite tag ending in 613) for only one day (Sept. 24) before the tag ceased transmissions. In that time, turtle 612 left the southeast coast of CFB and headed southeast across open water from there. The turtle then moved in an easterly direction before coming to the outer reef area that runs north-south of the east end of CFB. The turtle then reversed course and came back west before turning south, spending some hours navigating through the southern area of the outlying reef, and then into open water again in a southward direction. Transmissions ceased shortly thereafter (Fig. 5A). Turtle 612 was tracked from September 19 – November 24, 2024. This turtled moved in a consistent east-southeastward direction. The turtle crossed open ocean between the Bay Islands and the mainland of Honduras, swimming along the inshore area of the Iriona coast of the country, at times within 350 m of the beach. This turtle then continued along the Rio Platano coastline before heading east into open water where it settled into a feeding area approximately 110 km east of the coast area of Patlaya, Honduras (Fig. 5B)



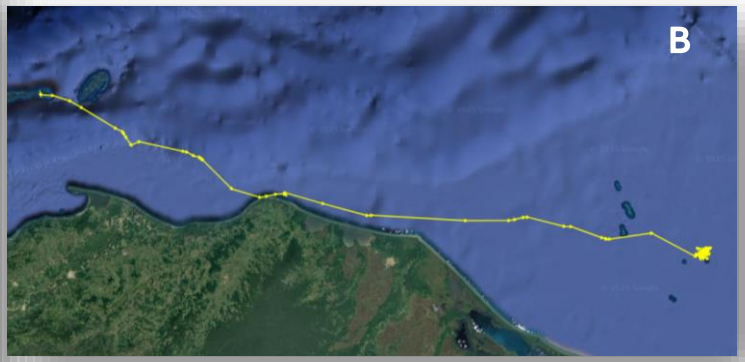


Figure 5. Map showing the satellite-tracked path of two turtles tagged with PTTs on CFB. Turtle 612 (A), and Turtle 613 (B) were tracked on their post-nesting migrations from their release sites on CFB.

R E S U L T S

Guanaja Nesting Recovery Project

Despite nightly monitoring of several beaches around Guanaja during the time from June 6 – July 12, we were unable to observe any nesting activities or nesting females. During this time, we did receive reports from around the island from various beach property owners and security personnel that nesting activity had taken place. We also observed fresh evidence of nesting activity on beaches we patrolled. However, up to July 12, when PI Dunbar, and ProTECTOR, Inc. Intern, Ky Stephens left Guanaja, we had not located any nesting turtles or nests.

Subsequently, the monitoring continued under the direction of Mr. Anuar Romero and his team of volunteers through the Green Island Challenge. Their team continued to monitor for nesting activities, nests, and hatching events until the end of October, 2024. A total of 13 nesting events (activities) were recorded during the season, of which 3 (23%) were from *C. caretta*, 3 (23%) were from *C. mydas,* 1 (8%) was unidentified, and 6 (46%) were from *E. imbricata*.

Hatching success on Guanaja was very high, with 90.4% of *C. caretta* eggs hatching, 89.4% of *E. imbricata* eggs hatching, and 97.4% of *C. mydas* eggs hatching. Numbers of successful hatchlings and percent success for the three species of sea turtles encountered on Guanaja in 2024 are reported in Table 2.

Table 2. Percent hatching success rates for *Caretta caretta,* and *Eretmochelys imbricata,* and *Chelosnia mydas* eggs laid on Guanaja during the 2024 nesting season.

% Hatching *Caretta caretta*	(301*100)/333	90.40%
% Hatching *Eretmochelys imbricata*	(819*100)/916	89.40%
% Hatching *Chelonia mydas*	(458*100)/470	97.40%
% Total Hatching	**(1578*100)/1719**	**91.80%**

ProTECTOR, Inc. Intern Work

The work of ProTECTOR, Inc. Intern, Kye Stephens, resulted in excellent conservation and research experiences for this undergraduate biology student. He was able to be involved with nesting patrols and surveys on both CFB and Guanaja (Fig. 6), assisted in flipper tagging, measuring, and sampling turtles that were held from rescues at Graham's Cay, and was involved with community planning for work on CFB (Fig. 7), as well as a proposed marine protected area on Roatan. A result of data collected and organized by Intern Kye, was a dataset of very young juvenile hawksbill photos that will be used to test hypotheses regarding the stability of hawksbill scute patterns over time (Fig. 4).

Fig. 6. ProTECTOR, Inc. Interns, Kye Stephens (R) undertaking beach monitoring with the rest of the team patrolling for nesting sea turtles on the island of Guanaja.

Fig. 7. As part of his ProTECTOR, Inc. Internship, Kye Stephens (far L) not only took part in beach monitoring for nesting sea turtles on Guanaja and at CFB, and learned sampling and photography techniques for juvenile hawksbills before their release, but was also involved in discussions with community members of St. Helene regarding the establishment of a marine protected area.

GOVERNMENTAL SUPPORT

Once again, our research permit from the Government of Honduras through the Institute for Forestry Conservation (ICF), was severely delayed. This continues to be a problem because ICF does not have a well-developed and efficient research proposal review system. Additionally, the offices that review research proposals do not have technical staff with the experience to understand the research proposals that are submitted to the Institute for approval. This means that proposals are often delayed for approval. We continue to encourage the Honduras government to accept the assistance of experienced researchers to develop a review and approval system for research permits that will increase the numbers of research efforts in the country, as well as provide the Central Government agencies with data on biodiversity that is needed to fulfill their obligations as signatories to several international conventions. Until such a review and approval system is set up that can provide feedback to applicants, Government agencies of Honduras will continue to lag far behind in the ability to affectively manage their natural resources based on data, rather than opinion.

We continue to seek the assistance of the Castro Administration and the applicable Ministries of the Central Government to expand the vital work of ProTECTOR, Inc. through identifying funding support strategies through these government Ministries, and opportunities for government agents, national university faculty, and students to become involved with current and developing projects over the long-term. Without such funding, the development of future research projects and national research talent will continue to fall far short of the potential for such development within the country.

CONCLUSIONS

PI Dunbar has recently written the Marine Turtle Specialist Group (MTSG) Reports for both Caribbean and Pacific Honduras (2024), in which we recognize the lack of information available on the sea turtles of Honduras. The majority of our understanding of sea turtles in Honduran waters has come from the work of ProTECTOR, Inc. over the past 17 years. Still, the bulk of that work has focused on nesting olive ridley (*L. olivacea*) in the Gulf of Fonseca, juvenile hawksbill (*E. imbricata*) and green (*C. mydas*) turtles in the SBWEMR, and nesting hawksbills in Utila and Guanaja. These studies have, in the past, been limited by lack of government and community support, inefficiency of permit issuing processes, lack of funding support, and an unfortunate lack of skilled national personnel who can carefully and correctly manage the ongoing collection of information in the field.

Still, our efforts have focused on basic monitoring of small, protected populations, and there has been little work to investigate many aspects of life history stages of these populations of juvenile hawksbill and green turtles within the small area of the Bay Islands. Beyond the ongoing studies, there is need to broaden our research efforts to other coastal areas of the mainland, and remote island territories of Caribbean Honduras. There is need to investigate populations of nesting and foraging leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*) turtles along the north coast and Mosquito region of Honduras and in the non-protected areas of the Bay Islands. There is need to understand the presence, population dynamics, and nesting of species other than *L. olivacea* throughout the Honduras coast of the Gulf of Fonseca. There remains a great need to understand the migratory routes of sea turtles, and the impacts of large-scale and artisanal fisheries on all species of sea turtles in Honduran waters. In addition to these, there is an overarching need to study the impacts of habitat loss, coastal over-development, and global climate change on both sea turtles, and the habitats they require at different ontogenetic stages.

Without such studies, we will be limited in our understanding of how to manage and recover not only sea turtle populations, but also the habitats that sea turtles need and human communities rely on for cultural, social, and economic growth and stability.

Although small, our efforts in 2024 continue to highlight research needs in the SBWEMR, on Guanaja, and on CFB. These included the collection of recapture and growth data throughout the Bay Islands.

CONCLUSIONS

With assistance and field work from Green Island Challenge, we continue to build our understanding of the potential to recover hawksbill, green, and loggerhead turtle nesting on Guanaja.
If nesting in Utila declines due to private development of the main nesting beach there, an understanding of nesting trends in Guanaja and CFB will be crucial to assessing the potential for recovery of all three species in the waters of Caribbean Honduras.

As we have previously emphasized, the research efforts of ProTECTOR, Inc. are of value to Honduras only if the information garnered, analyzed, and reported are used to develop recommendations and plans of action that increase the conservation and management potential of the relative organizations and departments to undertake data-driven, rather than emotion-driven, decision-making. While there are many organizations within the country claiming to undertake conservation projects, there is a need to guide these efforts by simple, standardized, yet effective methods of investigation to understand if such efforts are useful and impactful. Without such insights, efforts toward ‘conservation’ may utilize financial and human resources, yet be unsuccessful in achieving the stated goals, since methods to reach set goals are not objectively evaluated.

As a result of our efforts, we suggest the need are vital for ongoing monitoring of sea turtle status, population dynamics, and the development of programs that increase research efforts, and build a long-term national research strategy of sea turtle conservation.

A C K N O W L E D G M E N T S

We are grateful to all those who have been involved with the research throughout the 2023 research season. Thanks to ProTECTOR, Inc. Country Director, Lidia Salinas, who continues to work tirelessly, to secure the Honduras research permits from the Department of Forestry Conservation (ICF), and who assists with project logistics throughout the Bay Islands. We continue to express our gratitude to the Secretary of State from the Office of the President of Honduras, Snr. Rodolfo Pastor de Maria y Campos and to the Castro Administration for their continuing commitment to the conservation and recovery of biodiversity and the environment of Honduras, and for their support of ProTECTOR, Inc. and encouragement to expand our work throughout the country in the coming years. Without the continuing moral support of Rafael Brioso, Paulo Shikanai, and Kathy Berner (owners) and dive support of the staff of the Splash Inn Dive Resort on Roatán, we would be unable to continue this critical sea turtle conservation research on Roatán.

Additional thanks to Mr. Jimmy Miller of the West End, for logistical support on Roatán.
Former graduate student Dustin Baumbach, continues to provide data analyses and mapping for the writing of these annual reports. We thank the ProTECTOR, Inc. Intern, Kye Stephens, who assisted with all aspects of these projects during the 2024 research season.

Funding and in-kind assistance for projects was provided by the California Turtle and Tortoise Club, the California Turtle and Tortoise Club (Inland Empire Chapter), Splash Inn Dive Resort Roatán, and Loma Linda University Department of Earth and Biological Sciences. We are grateful to Anuar Romero of the Green Island Challenge initiative for his leadership and direction over the Guanaja Nesting Recovery Project.

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N O T E S

NOTES