MINISTRY OF ENVIRONMENT, DIGEPESCA, HONDURAS

ACTIVITIES OF THE PROTECTIVE TURTLE ECOLOGY CENTER FOR TRAINING, OUTREACH, AND RESEARCH, INC. (ProTECTOR) IN THE GOLF OF FONSECA, HONDURAS

2009 - 2010 ANNUAL REPORT

July 15, 2011

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ANNUAL REPORT OF THE 2009 - 2010 SEASON

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PREFACE

This report represents the ongoing work of the Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR) in the Golf of Fonseca, Honduras. The report covers activities of ProTECTOR during the 2010 calendar year, and is provided in partial fulfillment of the permit agreement provided to ProTECTOR for 2010 by DIGEPESCA.

ACKNOWLEDGEMENTS

ProTECTOR recognizes that without the financial assistance of the Department of Earth and Biological sciences (Loma Linda University), this project could not have taken place. We are grateful to students from UNAH that were involved in the collection of the data provided in this report as part of their practical requirements for graduation. We also acknowledge the assistance of the following volunteers who helped with data collection: Ken Lindsay, Marta Llorca, Oliver and Anna Nash, Alejandro Lopez, and Christina Martin. This project was facilitated, in large part, by the communities of Punta Ratón and the Municipality of Marcovia. We are grateful to Snr. Henrique Vihil and the community of El Venado for their partnership with ProTECTOR to increase opportunities for continued investigations in El Venado in the coming nesting seasons. We are indebted to both the communities of Punta Ratón and El venado for their participation in these sea turtle conservation efforts. We thank Noemi Duran Royo for assistance in organizing and tabulating data collected from this and past years.
For Submission to: The Secretariat for Agriculture and Ranching (SAG), the Ministry of Environment (SERNA), Fisheries (DIGEPESCA), and the Department of Biodiversity (DiBio).

July 15, 2011

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INTRODUCTION AND BACKGROUND

A comprehensive background regarding the previous status of the Olive Ridley (*Lepidochelys olivacea*) sea turtle, and the need for continuing research on their status and plight in Honduran waters, has been provided in a previous report to SAG, SERNA, DIGEPESCA, and DiBio (Dunbar and Salinas, 2008). That report provided details on methods carried out by ProTECTOR under SAG permits **# #DGPA/5428/2007,** and provided study results obtained up to November, 2008. The subsequent report by Dunbar et al (2010), provides details on findings up to the year ending 2009.

The following is an annual report on the activities of ProTECTOR carried out between January, 2010 and November, 2010. These studies continue with the aim of tagging and tracking nesting Olive Ridley sea turtles, as well as assessing the health, population dynamics, and population genetics of turtles nesting on the beaches of the Golf of Fonseca. This year, in addition to Punta Ratón, the community of El Venado was added to the program. The new study site is located to the south of Punta Ratón approximately 17.7 km (N13° 8'4.43", W87°25'34.40") (Figure 1). Unlike Punta Ratón, El Venado sits on the shore of a protected inlet, separated from the nesting beaches, which the community patrols, by very shallow (<2 m at high tide, and almost dry in many areas during low tide) tidally dominated seawater flows (Figure 2).

This report provides details on data collected during "*la veda*" (from September 1 – 25, 2010), and after "*la veda*" (from September 26 – November 1, 2010). Detailed methods, results and discussions for the project are provided in the following report. At the conclusion of the report, a series of recommendations is provided for consideration by decision-makers in the various Ministries of the Government of Honduras to which the report has been provided.

This report has been furnished to all appropriate Secretariats, Ministries, and Departments of the Honduran Government, including SAG, DIGEPESCA, SERNA, and DiBio, in both Spanish and English languages. Data from this report may be included in the annual report of Honduras to the Inter- American Convention for the Protection and Conservation of Sea Turtles (IAC).

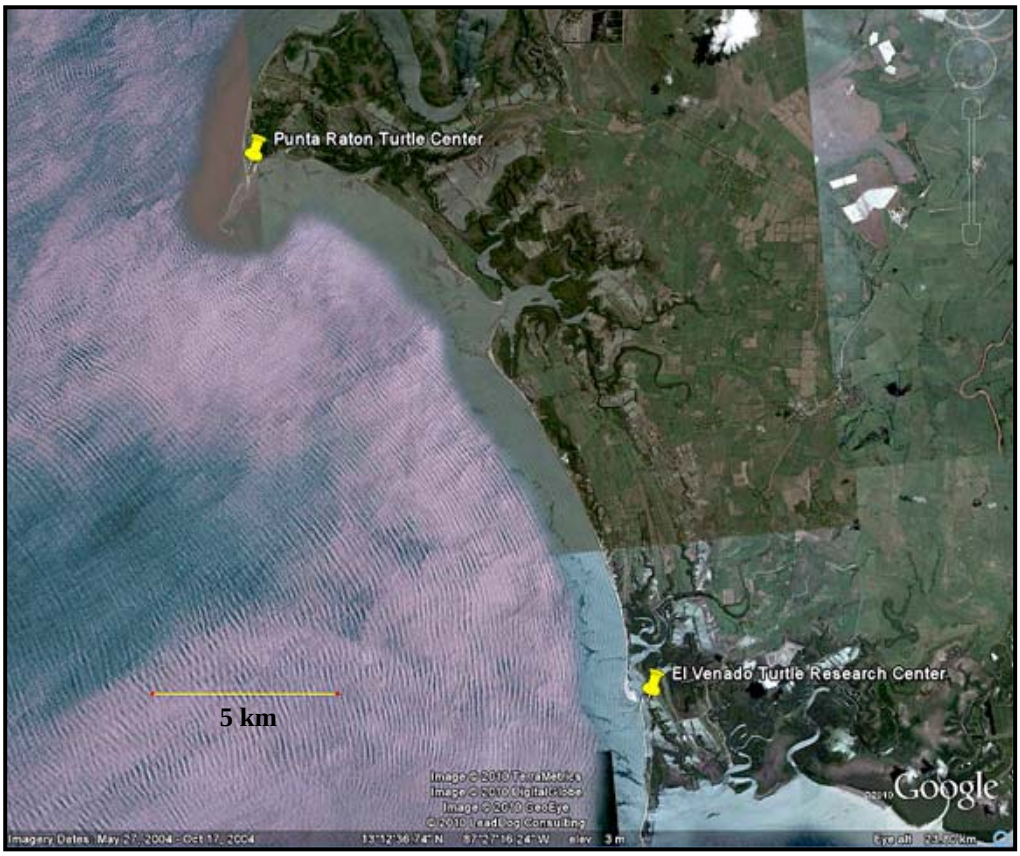

Figure 1. The geographical relation between the communities of Punta Ratón and El Venado along the south coast of Honduras.

Figure 2. The area between the Turtle Research Center and the nesting beaches is a shallow, tidally-dominated inlet.

Volunteer Research Assistants Program

Volunteer research programs are of great potential value for communities in which conservation of local natural resources is emphasized. The communities of Punta Ratón and El Venado are relatively isolated and can be extremely difficult to reach by local public transportation. However, isolated communities around the world have benefitted, both in terms of economic stimulus and conservation, from the introduction of structured research volunteer programs.

ProTECTOR is in the process of developing a volunteer program that will provide volunteer experiences to people interested in being involved with ProTECTOR projects, both in the North and South coasts of Honduras. These opportunities will provide income to the turtle research centers, as well as income and markets for ProTECTOR partner communities.

Local Community Attitude to Tagging

Positive community attitudes toward sea turtle research have increasingly been recognized as essential for the success of conservation efforts (Kalamandeen, M. 2011; Muurmans, M. 2011; Urteaga, J. et al., 2011). While positive attitudes toward research may not initially be forthcoming in many rural communities with minimal opportunities for formal education, such attitudes can be developed with time and the intentional inclusion of community members in the research process. Numerous sea turtle conservation projects around the world provide systematic environmental and research education to the communities in which they work helping to convert antagonists and poachers into conservation assistants and leaders in their respective communities (Kalamandeen, 2011; Muurmans, 2011; Urteaga et al., 2011). Attitude changes amongst community members can signal strong shifts in community support for both research and conservation efforts, and can extend to other communities in the region when community members disseminate reports and updates of continuing success.

One of the goals of ProTECTOR is to initiate a positive shift in attitude of local communities toward sea turtle research and conservation, and increase the number of community members who both participate, and benefit from research efforts in local areas. These benefits may include guide training, research assistantships, development of micro-enterprises, development

of sustainable eco-tourism, and facilitating an increased role of local communities in the management of local natural resources.

The current report provides evidence of local attitudinal changes in the communities of Punta Ratón and El Venado. We suggest that these shifts are, in part, due to continuing efforts by ProTECTOR to partner with these communities in environmental education, research, and community development.

Tagging, Measuring, Nest Relocations, and Hatching Success

Standard data collection procedures have been provided in previous ProTECTOR annual reports (Dunbar and Salinas, 2008; Dunbar et al., 2010). We followed previous data collection protocols, while introducing new protocols for additional data collection.

Environmental Education and Outreach

Environmental education and outreach are critical components of the research and conservation efforts of ProTECTOR. We have previously provided environmental education regarding sea turtle ecology in general, and our research efforts in the community of Punta Ratón, in particular (Dunbar et al., 2010). Recognizing the importance of not only informing community members, but integrating community knowledge and assistance into our research, we continue to seek new ways to provide education outreach to the community, and to train community members as research assistants for ProTECTOR projects. This can, at times, be a challenge when communication is hindered by a language barrier.

DETAILED METHODS

Volunteer Research Assistants Program

Each year ProTECTOR receives many inquiries from individuals who are willing to volunteer for the organization in one of the sites in which research and conservation efforts are carried out. To facilitate these requests, ProTECTOR is developing the ProTECTOR Volunteer Program in which individuals and groups pay a weekly fee to participate in research activities under the direction of ProTECTOR. These fees incorporate a fee for food and maintenance

services at the Centers, and are intended to encourage community members to be involved with the development of the Center, thus providing a form of income to local community members. Although not fully developed, the program was tested with five volunteers of whom four participated in projects on the South Coast. Potential ProTECTOR Volunteers contacted the ProTECTOR Office in the United States and enquired about opportunities for involvement in the research projects in Honduras. Potential volunteers were informed of the fees associated with the program. Although some volunteers paid the full fee, we waived, or reduced fees for student volunteers this year, since the program was still under development, and some of the logistics involved in the program were not fully developed.

Volunteers who decided to enlist in the program were required to register with the Loma Linda University Global Health Institute (GHI), which provided the volunteers with additional insurance coverage above personal travel insurance, which all volunteers were required to purchase on their own. Once registered with GHI, ProTECTOR Volunteers were assisted in developing their scheduled times of arrival into, and departure out of, Honduras.

On arriving in Honduras, ProTECTOR Volunteers were met at the airport and escorted to their field site and local accommodations. These arrangements varied, depending on which sites volunteers were working in. Volunteers typically stayed with the project for 1 – 2 weeks, and were prepared to undertake data collection, flipper tagging, nest relocations, beach clean-ups, Center clean-ups, and presentations for local community members.

Local Community Attitude to Tagging, Research, Facilities, and Volunteers

El Venado

This year marked the initiation of our projects with the community of El Venado. An intentional effort was made to hold several meetings prior to the start of “la veda” period to discuss the procedures for flipper tagging and data collection with the community and the tortugueros. During “la veda,” we continued to hold meetings among the community members involved with the turtle center, and encouraged as many people as possible to become involved in the research and conservation efforts.

Punta Ratón

No formal interviews or surveys were undertaken to evaluate the attitudes of community members toward tagging and data collection. Instead, we endeavored to inform community members at Punta Ratón of the continuing work of tagging and data collection through informal discussion and dialogue. Discussions with community members focused on the need to improve data collection, especially the connection between nesting females and their individual clutches (including hatching success rates for individual females). Some efforts were made to integrate community members into research efforts by discussing the importance of the research for the community.

Tagging, Measuring, Nest Relocations, and Hatching Success

We followed the same methods for flipper tagging and carapace measurements of nesting turtles as outlined in previous reports (Dunbar and Salinas, 2008; Dunbar et al., 2010). This season, data collection was hampered by torrential rain and unusually frequent lightening storms within close proximity to the nesting beaches. In these cases, we considered it too dangerous to patrol the beaches, especially while carrying metallic calipers and other equipment.

Measuring and tagging were undertaken along the Golf of Fonseca from September 4 – November 1, 2010, with the majority of tagging effort taking place along the beach at Punta Ratón from September 16 – November 1. The primary tagging effort was undertaken at El Venado from September 4 – 12.

Satellite Tagging

We planned to capture a post-nesting female and keep her restrained until a satellite tag could be affixed to the carapace. To fix the satellite tag to the turtle, we first placed the turtle in a small pit surrounded by filled sandbags. These served to keep the turtle in a small, closed area. The carapace was dried and cleaned of sand and sea water, then cleaned with rubbing alcohol to remove any remaining algae on the scutes. Additionally, we prepared the apex of the carapace by lightly sanding it to produce a slightly rough surface into which the Sika Anchorfix-1 epoxy could adhere.

The satellite tag was then prepared for attachment by covering the attachment surface with a thick layer of epoxy. The tag was immediately placed on the crown of the shell and held in place until firm. This was followed by over-layering the transmitter with more epoxy and smoothing successive layers to streamline the entire structure. The turtle was confined to the holding area during the drying intervals. Once semi-dry, the structure was painted over with anti-fouling paint. The turtle was held for an additional 45 minutes to allow the anti-fouling paint to dry. Conditions were such that continual rain, warm air temperatures, and high air humidity, substantially increased the time required for the assembly to dry, resulting in the constraint of the turtle for approximately 3 hours.

Once the transmitter was attached, the turtle was released at the high tide mark, and guided toward the waterline. The turtle ("Erica") was released from the beach at Punta Ratón at 4:47am on September 24, 2010.

Beach Erosion

Although we did not undertake measurements of the beach area in the vicinity of the Turtle Center at Punta Ratón, it was clear that major beach erosion processes were in operation along the beach stretch in this area. We made efforts to record beach loss by digital photographs that could be qualitatively compared with photographs from previous years.

In addition, we noted the inundation of tide into the area of the Turtle Center, which was further than previously recorded during our research efforts in the Punta Ratón.

Environmental Education and Outreach

El Venado

Education outreach at El Venado took the form of brief workshops both prior to, and during the tagging effort. Workshops were organized to describe the tagging and measuring efforts, the importance of research and data collection at El Venado, the procedures for satellite tagging, and methods for improving the management and success of the hatchery. We requested that as many as possible of the community members involved in the Turtle Center be present during each of the small workshops.

Punta Ratón

We proposed that outreach at Punta Ratón also include brief workshops with community and Turtle Center members both prior to, and during the tagging effort taking place throughout the "veda" period. During the "veda" period, efforts were again made to inform the community of the importance of carrying out the research efforts, and the utility of attaching the satellite tag to turtles from this area. We endeavored to work with Center members in the process of developing better hatchery procedures, as well as the additional procedure of recording the number of eggs laid during the "veda" by each female identified with flipper tags. When a female was encountered (with or without a tag), the new or previous tag number was recorded both on the data collection sheet, as well as on a separate piece of paper. The separate piece of paper was provided to the egg collectors (community members) and they were asked to provide that number to the egg accountant at the Center when they delivered their egg count and prior to the reburial of the eggs in the hatchery. The tag number for the female was to be recorded on the plaque with the egg count, date, and time for each relocated nest. The number of hatchlings from each nest was then to be recorded with the tag number from the female, allowing us to begin tracking the number of both nests and eggs laid by individual females.

RESULTS

Volunteer Research Assistants Program

This year, ProTECTOR launched the first phase of its Volunteer Research Assistants Program in June. One ProTECTOR Volunteer elected to be involved in the research efforts in Roatán, and thus, is not included in the current report. The remainder of the 14 volunteers who worked with ProTECTOR through this season, elected to volunteer at the El Venado and Punta Ratón sites (see: http://www.turtleprotector.org/Volunteers/Volunteer%20Main%20Page.htm).

The value of volunteer assistance to the project in El Venado has the potential to develop into a seasonal source of partial (limited) income for the community members involved in the Turtle Center. The leaders of the Turtle Center understand the prospective economic value of the volunteer program, as well as the need for developing an eco-tourism program.

The first volunteer to assist in the projects for the South Coast was Ms. Leslie Roberson from Yale University, who was to spend the majority of her eight week stay in Punta Ratón to interview community members about the effect of single species conservation efforts on the community. However, heavy rains, ensuing flooding, and the lack of facility preparation all combined to prevent Ms. Roberson from being able to stay in Punta Ratón to undertake her study. Instead, she spent several weeks in Utila and Roatán, before returning to Punta Ratón at the end of July. However, Ms. Roberson was again unable to stay in Punta Raton due to illness.

Mr. Ken Lindsay (Figure 3) joined the group from August 29 – September 5 with the purpose of helping prepare the facilities at Punta Ratón and El Venado for the "veda." This was to include the installation of water systems at both Punta Ratón and El Venado, and the correction of faulty electrical wiring at Punta Ratón. Again, unseasonably high flood conditions in the south prevented timely transportation to the area. When the team was finally able to reach the coast, Mr. Lindsay had only a few days in which to work, and the community at Punta Ratón was unprepared to begin working on the water system or electrical work as needed. We also were unable to stay at Punta Ratón because of the very poor conditions of the facility. At El Venado, we found a much more inhabitable facility despite the lack of running water and electricity. However, the materials for the electrical installation arrived on site too late for Mr. Lindsay to be involved with the installation process. He has, however, expressed a deep interest in returning to both Punta Ratón and El Venado to assist in the further development of the Centers.

On August 31, Ms. Marta Llorca (Figure 4) arrived to spend two weeks assisting ProTECTOR in data collection at El Venado. Ms. Llorca received training in flipper tagging, measuring, and data recording, and went each night to search the beaches for nesting turtles. Ms. Llorca successfully tagged and measured turtles with assistance from local community members, and eventually headed up a team of community members to work independently of Dr. Dunbar. Ms. Llorca left Honduras on September 14.

Figure 3. ProTECTOR Volunteer, Mr. Ken Lindsay, was prepared to assist in installing a water system and upgrading electricity at both El Venado and Punta Ratón. Facilities at both sites were unable to move forward with these upgrades at the time Mr. Lindsay was present.

Figure 4. Mr. Alejandro Lopez helps Ms. Marta Llorca to bury eggs in the hatchery at El Venado after collecting the nest from one of the beaches monitored by the community.

On the night of September 8, Mr. Alejandro Lopez (Figure 4) stayed at the El Venado Turtle Center and assisted in measuring turtles, and egg collections. Although Mr. Lopez was only on site for the one night, he was able to take part in two tagging and egg collection (nest relocation) events.

From August 29 – September 8, Mr. Oliver Nash and Mrs. Anna Nash (Figure 5) assisted in tagging, measuring, egg collection, and data recording of nesting turtles along the three beach areas patrolled by the community of El Venado. The pair was very excited about learning how to tag and measure turtles, and took every opportunity to learn more about sea turtle ecology and nesting. In addition, Oliver conducted English language classes for community members each day, allowing anyone who was interested in learning English to be involved. The community members that became involved in the classes were very appreciative for the time Oliver and Anna spent teaching basic English skills.

On September 9, a group of six UNAH Biology students arrived at the El Venado Turtle Center prepared to volunteer for five days. These students had been organized by Lidia Salinas to arrive at El Venado to assist with tagging and data collection. The students spent one night patrolling and assisting at El Venado (Figure 6), then moved with Dr. Dunbar over to the Turtle Center at Punta Ratón the next day (September 10). Despite assurances by the Municipality of Marcovia that there was now power and water at the site in Punta Ratón, when we arrived at the Center, we found it virtually uninhabitable. Toilet and shower facilities were unusable, the new building had been taken over by the military, and portions of the old building were in a state of disrepair. The UNAH student group instantly became engaged in cleaning the toilet facilities, the kitchen area (including the stove and fridge), and the old outhouse shower for use.

Figure 5. Mr. Oliver and Mrs. Anna Nash were invaluable volunteers that not only were involved with the turtle research and relocation of nests, but also provided English classes to local community members at El Venado. The accommodation fees paid by the Nashes enabled the community to continue the installation of electricity in the Center.

After receiving brief training on data recording, UNAH student volunteers accompanied Dr. Dunbar on beach patrols during the night of September 11 (Figure 6). On the morning of September 12, four of the UNAH students returned to Tegucigalpa, leaving Jose Vindel and Jimmy Valle to continue the data collection until Tuesday, September 14. Vindel and Valle received further detailed instructions and training on tagging and proper data recording, and continued to collect data over the ensuing three nights of their stay at the Punta Ratón Center. This group arrived without funding assistance from UNAH, or any external sources. Thus, their funds for transportation, for supporting accommodation facilities, and for food, were severely restricted, and were supplemented by ProTECTOR funds.

Ms. Christina Martin arrived in Tegucigalpa on September 15 and was met by Dunbar and Salinas, with the plan for Dunbar and Ms. Martin to return Punta Ratón the following day, by transportation supplied by DiBio. Transportation did not materialize on the 16th, necessitating transportation to be arranged with DiBio for the 17th. Dunbar provided training to Ms. Martin,

and the two began data collection and tagging on the night of September 18 (Figure 7). Ms. Martin had received prior training in flipper tagging, measuring, and data recording in previous volunteer experiences and was, of all the volunteers in this season, the most well prepared for the tagging and measuring efforts. Ms. Martin also assisted with the attachment and deployment of the satellite transmitter on “Erica,” (Figure 8) and stayed with the project over the ensuing two weeks until leaving the country on September 28.

Figure 6. Students from the National Autonomous University of Honduras (UNAH), assist in tagging turtles and collecting field data during their brief stay at the Center at El Venado, before moving with Dr. Dunbar over to the Center at Punta Ratón.

Local Community Attitude to Tagging, Research, Facilities, and Volunteers

El Venado

We found the community members involved with the Turtle Center at El Venado to be very receptive to plans and ideas for data collection, nest relocations, and flipper tagging. Headed by Mr. Henrique Vihil, all members involved with the project were, for the most part, eager to learn about flipper tagging techniques, how to measure nesting turtles, how to properly record data, and how to arrange relocated nests in the hatchery (Figure 9). Although other community members involved in the egg collection during the "veda" showed some interest in the research efforts, we found a core group of approximately 12 people, who were most interested in learning about sea turtle research and conservation, and who were, consequently, highly involved in the management of the Center along with Mr. Vihil. Interest on the part of the core group of community partners, resulted in willing assistance in tagging, measuring, and data collection during beach patrols (Figure 10). Community participants were eager to point out where turtles were emerging along the beach area where we patrolled, and also provided information on numbers of turtles being located on the other beach patrolled.

Figure 7. Dunbar training Ms. Christina Martin as the two begin tagging and data collection at Punta Ratón. Ms. Martin then continued on as a ProTECTOR Volunteer for the next two weeks until the end of the “veda” period.

Figure 8. Ms. Martin also assisted with the first satellite tagging application in Honduras. Here, she is seen with Dr. Dunbar (R) and Punta Ratón community member, Edilberto Montufar (L).

Figure 9. Training meeting with the Turtle Center Comite at El Venado. Steve Dunbar facilitates the session with translation help from ProTECTOR Volunteer, Marta Llorca.

Figure 10. Community members and ProTECTOR Volunteers received training for flipper tagging and measuring nesting turtles, while military personnel provided security from potential poaching.

Core community participants were also very positive regarding the assistance and accommodation of volunteers who visited the Turtle Center, either as ProTECTOR Volunteers, or as community visitors. Accommodations at the Center are modest, yet kept clean and appealing (Figure 11). There are three individual rooms, each with louvered windows that have mosquito screens. Each room also has either one or two beds that are fully made up with sheets and blankets for visitor use. The entire facility is swept clean each day. Toilet facilities, although without running water during this past season, were always clean and kept free of trash, with flushing buckets and water storage barrels provided just outside the toilet area. A small group of community women worked in shifts to buy food and prepare meals for visitors who were willing to pay for this service. All volunteers and visitors who stayed at the Center paid for the meal service, since there are no facilities in which to store food, or for individual cooking. The kitchen area, although very modest and without access to electricity or running water, was keep swept, and clean of scraps and garbage materials. Meals were provided at regular times and presented in as appetizing a manner as possible. Food preparers were willing and happy to receive suggestions for making meals more varied and healthful. This was especially appreciated by volunteers who stayed at the Center for more than a few days, with the recognition that food staples are both expensive and not easily accessible in this remote location.

Figure 11. Facilities at the Turtle Center at El Venado are kept clean and maintained by the Center staff. These efforts are rewarded by volunteers and visitors who both appreciate and help support the Center through paying for the Center facilities.

Punta Ratón

In contrast to attitudes in previous years, we found attitudes toward tagging and data collection more positive this year than in any of the previous years of working in this community. We found community members who were harvesting eggs more than willing to share information on where turtles were emerging to nest, or where harvesters were currently excavating nests. We also found no resistance to measuring turtles while they were laying (a shift in attitude from previous seasons), and all members appeared unconcerned with tagging turtles weather or not turtles had laid eggs or had emerged on a false crawl (also a shift in attitudes from previous years). For each nesting female we tagged and/or collected data from, we provided the flipper tag number to the egg harvesters and reminded them to have the egg accountant record the tag number for each nest moved to the hatchery. This was done to estimate the number of eggs laid, and hatching success rates of individual females.

There was initially much resistance to undertaking new research efforts (satellite transmitter attachment methods), and little effort was extended on the part of community Center members to assist in the capture, restraint, and care of the first nesting turtle selected for transmitter attachment. When this effort failed to be successful, another turtle was selected two days later. At this time, there was more interest in assisting with the attachment process, although some community members remained resistant, and unengaged in the process.

Despite previous efforts to prepare the community and Turtle Center members at Punta Ratón for the tagging and growing research efforts during and after the “veda” period, we were somewhat disappointed with the lack of preparation of the Center and hatchery for the start of the season. On our initial visit to the Center on September 1, we found the state of the Center unlivable, with no electricity, no running water, rooms without clean mattresses or sheets (Figure 12), and the entire facility without having had any maintenance or cleaning (Figure 13) over the past several months. The volunteer (Mr. Ken Lindsay) who accompanied us on the initial visit to the Center, has much electrical, plumbing, and building experience, and was brought to Punta Ratón to begin working on upgrading the facility. However, no materials for electrical, plumbing, or maintenance had been purchased, and the site was not ready to be used.

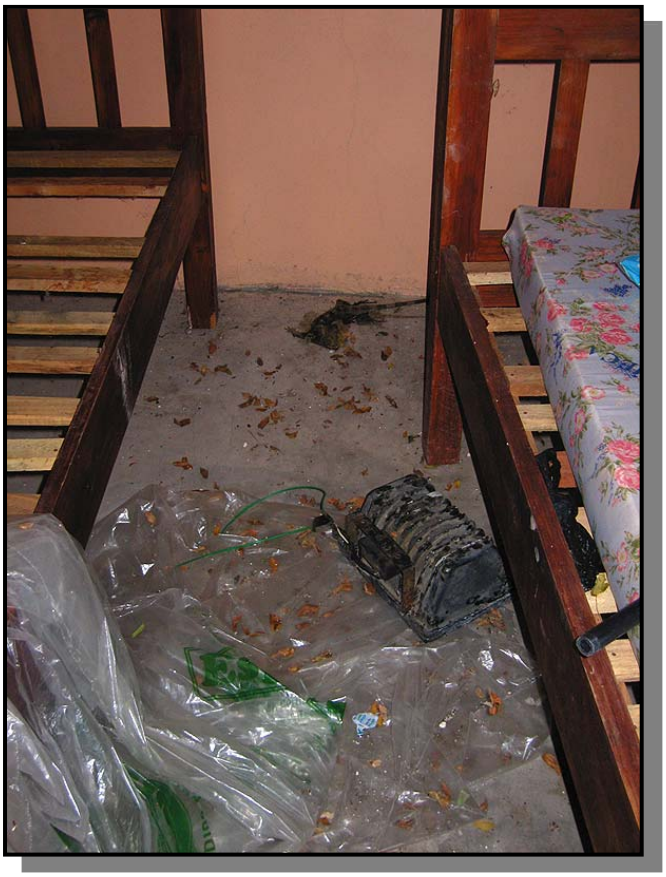

Figure 12. Unkempt condition of rooms in the new building at the Punta Ratón Center. Without regular care and maintenance, the great potential of the facility as an eco-tourism center will remain unrealized.

Figure 13. The bathroom facilities in the new building are modern, but uncared for. These facilities have the potential to offer paying visitors a good standard of living as an eco-tourism center.

During this visit, we provided suggestions to the Center members regarding the hatchery, and ways to improve the detection of water intrusion into the hatchery with the use of a hole and PVC pipe so that water levels could be tracked in case of flooding. During this visit, we also discussed the launching of a satellite transmitter on a nesting turtle from this location. We suggested that the Center members bring the community together and help prepare them for this research effort so that on our return, the community would have some awareness of what we planned to accomplish.

On our return to Punta Ratón on September 10, we found no evidence of any further preparation of the facilities for volunteers or visitors, and the facility was still in a state of disrepair. Community members appeared to be unconcerned about the state of the facility, as did the Municipality of Marcovia. On our arrival, UNAH student volunteers engaged in cleaning the facility, including sweeping the old building, cleaning the toilets and shower areas of the new building, cleaning the outhouse shower, and cleaning the kitchen, appliances, and dishes. We also noted that suggestions for improving the monitoring of the hatchery had not been considered, and there was no mechanism in place to monitor water table levels in relation to nest depths.

Unfortunately, there has not been an interest on the part of community members, to take advantage of the visitors and volunteers that have come through ProTECTOR to the Punta Ratón Turtle Center, and who are willing to pay the Center to support community members who provide cleaning, maintenance, cooking, and guiding services. Although all ProTECTOR Volunteers were prepared to pay a daily fee to stay at Punta Ratón, conditions were such that they did not warrant a fee for services.

Tagging, Measuring, Nest Relocations, and Hatching Success

El Venado

In 2010 we started collecting data on the population of *L.olivacea* that nests at El Venado beaches. During most night patrols over the two weeks we spent working at El Venado, we had only one patrol team prepared to tag and measure nesting turtles. Our efforts resulted in tagging eight turtles at four beach sites. This represented 7.1 % of all turtles tagged and/or

measured during the 2010 season. While this does not represent the total number of turtles nesting during this period, it does represent the relatively low number of nesters along the beaches patrolled by the community at El Venado, when compared with the single stretch of beach at Punta Ratón. None of the turtles we encountered on the beaches under the patrol of El Venado had flipper tags, or evidence of previous flipper tagging (i.e. tag scars).

Measurements of $CCL_{n\text{-}n}$ and SCLn-n for eight turtles measured are shown in Figure14 and Figure 15. The mean value for CCLn-n was 65.2 ± 0.77cm, with a range of 61.0 – 69.1 cm. The mean value for SCLn-n is 60.98 ± 1.00 cm, with a range of 56.8 – 67.4 cm. Distance from the water was measured for nine nests (Figure 16). Mean value for distance from the water was 31.11 ± 8.75 m, with a range of 12 – 100 m. Number of eggs was recorded for seven nests (Figure 17). Mean value for number of eggs was 83.43 ± 12.94, with a range of 18 – 123.

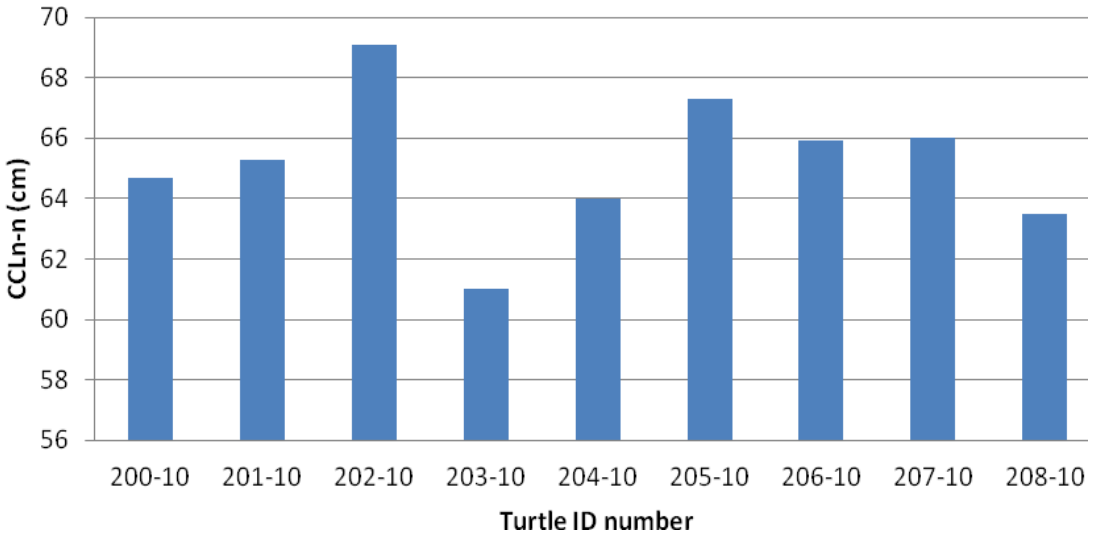

Figure 14. Curved carapace length (notch to notch) for nesting *L. olivacea* measured at El Venado during the 2010 nesting season.

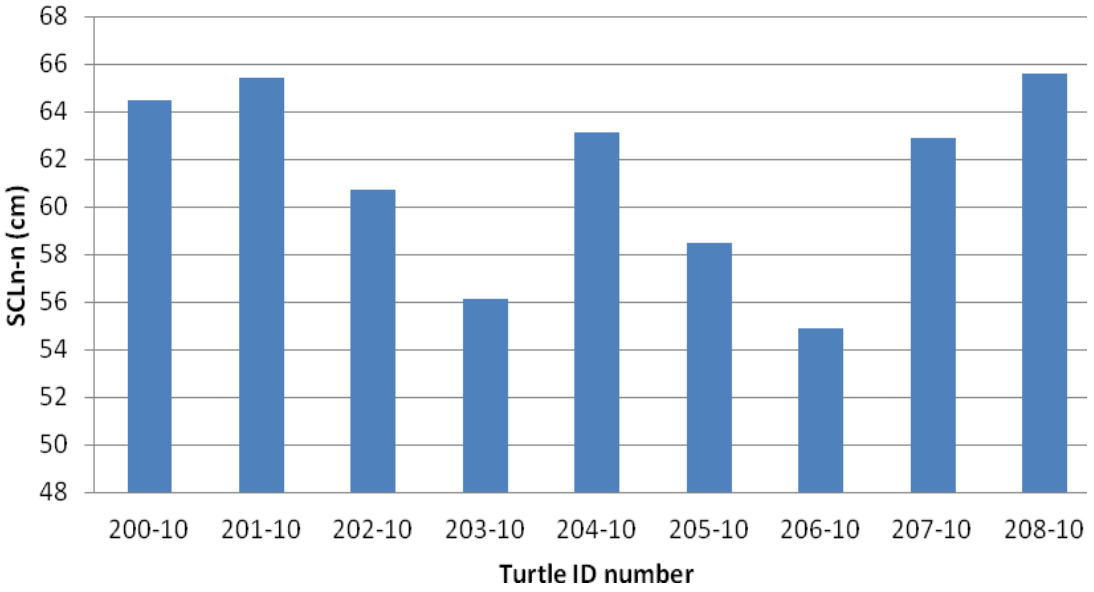

Figure 15. Straight carapace length (notch to notch) for nesting *L. olivacea* measured at El Venado during the 2010 nesting season

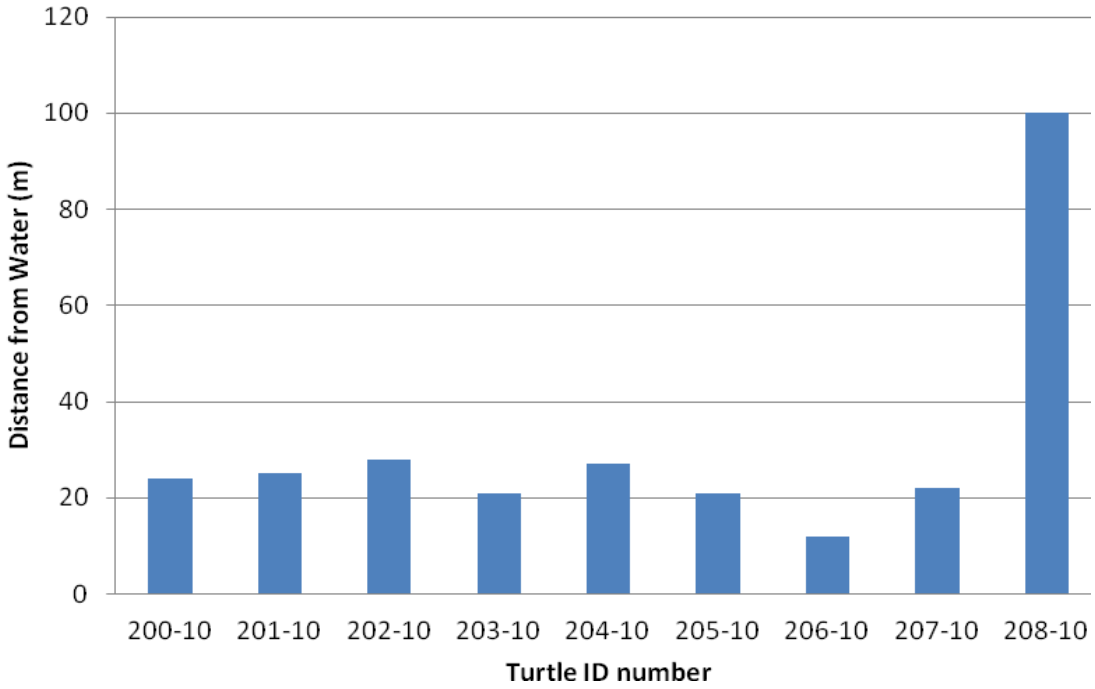

Figure 16. Distance from the water of nests deposited at El Venado during the 2010 nesting season.

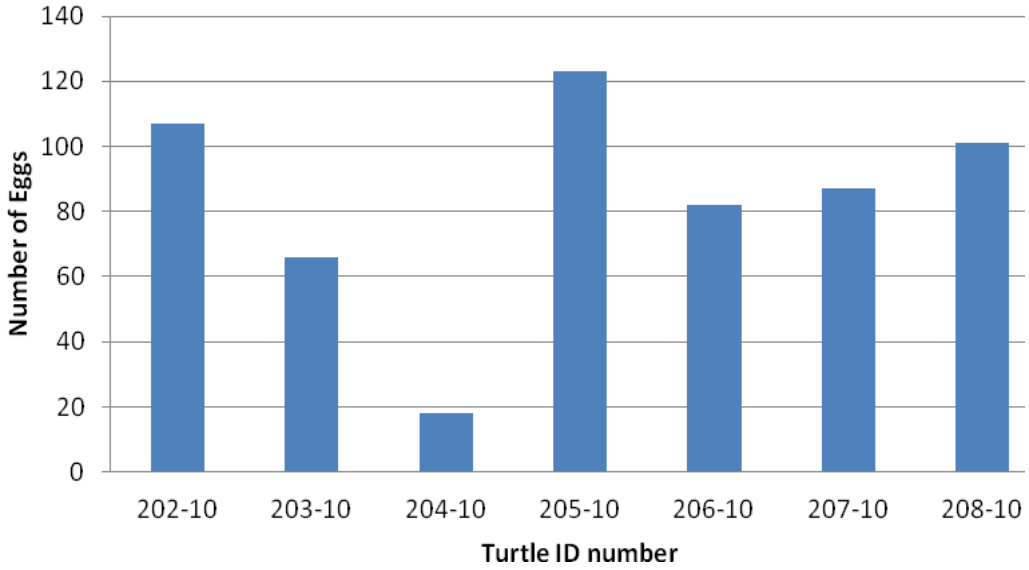

Figure 17. Number of eggs of nests deposited at El Venado during the 2010 nesting season.

Over the "veda" season, 8,453 eggs were relocated from the beaches to the hatchery alongside the Turtle Center. Some 6,691 additional eggs were bought by the Turtle Center managers and relocated to the hatchery after the "veda" period, bringing the total number of eggs brought into the hatchery to 15,144. Eggs incubated in the hatchery for approximately 45 - 50 days, after which, nests erupted. The reported number of hatchlings at El Venado was 13,499, giving a hatching success rate of 89.1%

Punta Ratón

Over the 14 days of data collection during the "veda" period, we tagged and/or measured 43 turtles over 3 km of the 4 km stretch of beach at Punta Ratón. This represents 38.4 % of all turtles tagged and or measured during research work throughout the 2010 season. Several of the turtles in this group either had tags from previous seasons (as evidenced by tag numbers matching the tag database), or had evidence of having been previously tagged (i.e. tag scars).

In addition to the "veda" period, we continued to tag and collect data on nesting turtles on the beach at Punta Ratón from October 1 - November 1. During this time, Samaria Castellanos carried on tagging and data collection on nesting turtles, and tagged and/or measured an

additional 61 turtles, representing 54.5 % of all turtles on which data were recorded over the 2010 season.

Over the “veda” season, 19,779 eggs were relocated from the beaches to the hatchery alongside the Turtle Center at Punta Ratón. Eggs hatched after a 45 - 50-day incubation period. There were 2,131 infertile eggs and 1,984 dead hatchlings, leaving 15,664 eggs that successfully hatched, giving a hatching success rate of 79.2 %.

Although we had egg collectors provide flipper tag numbers with each clutch of eggs moved to the hatchery, we received no reports of how many hatchlings coincided with the tag numbers that were provided to the egg accountant. It is likely that during the hatching, this information was forgotten by the Center managers and may not have been recorded.

Measurements of CCLn-n and SCLn-n for all turtles measured at Punta Raton over the 2010 season are shown in Figure 18 and Figure 19. The number of measured females was 100 for both CCL and SCL. The mean CCL was 65.75 ± 0.18 cm, with a range of 47.9 – 86.0 cm. The mean SCL was 61.16 ± 0.18, with a range of 44.4 – 69.5. We found significant differences in CCLn-n among years of measurements (2007 – 2010: $F_{(3,305)} = 3.113$, P = 0.027; Figure 20, Table 1), with 2010 CCLn-n being smaller than 2009 and 2008 values. There was also a difference in SCLn-n among years, with 2007 measurements being significantly less than measurements from 2008 to 2010 (2007 – 2010: $F_{(3,292)} = 4.881$, P = ,0.003; Figure 10), but no difference among 2008 to 2010 (Figure 21, Table 1).

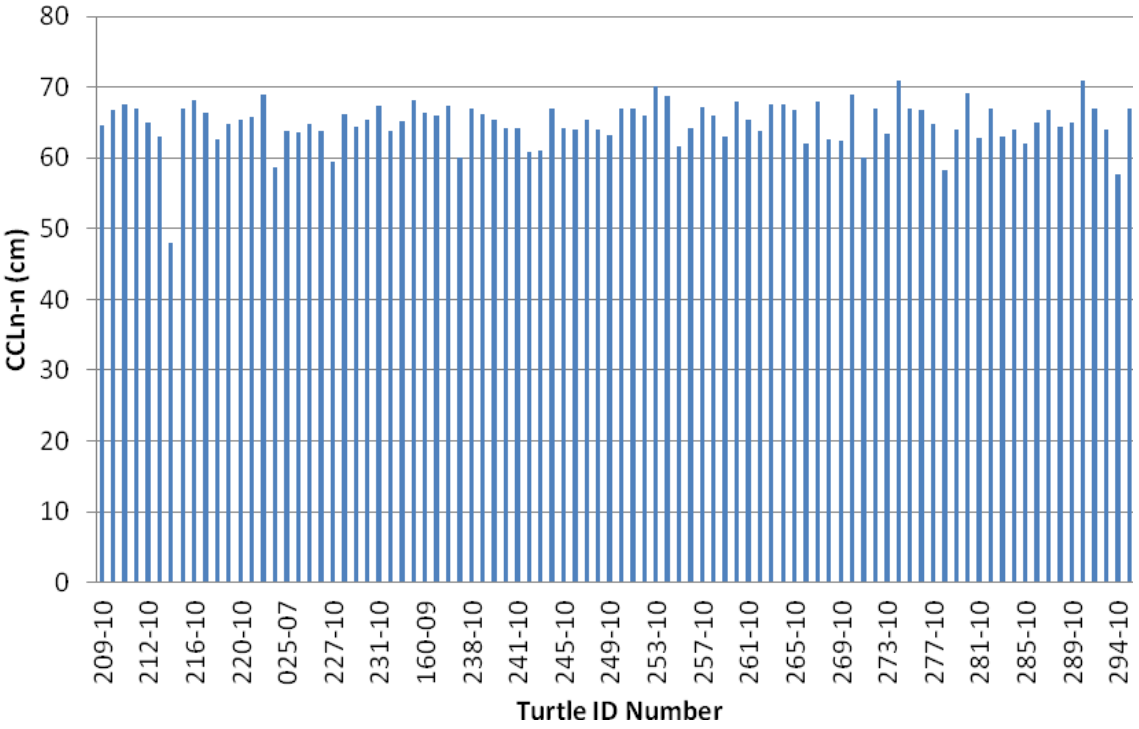

Figure 18. Curved carapace length (notch to notch) for nesting *L. olivacea* measured during the 2010 nesting season

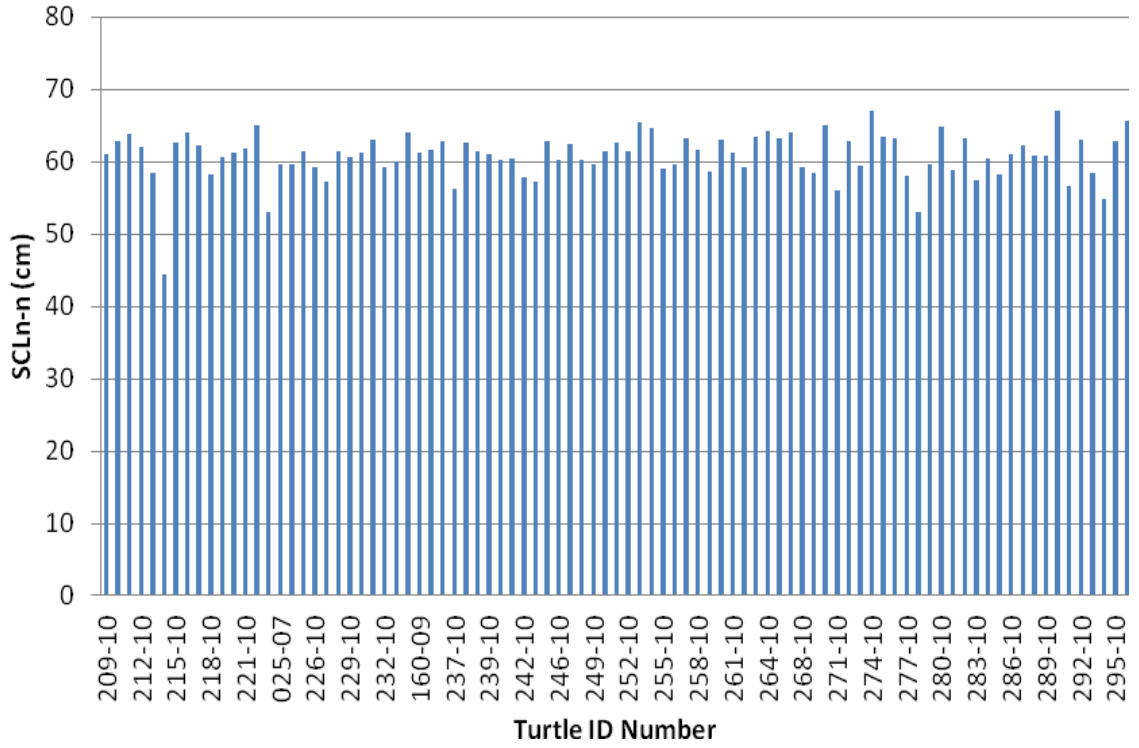

Figure 19. Straight carapace length (notch to notch) for nesting *L. olivacea* measured during the 2010 nesting season

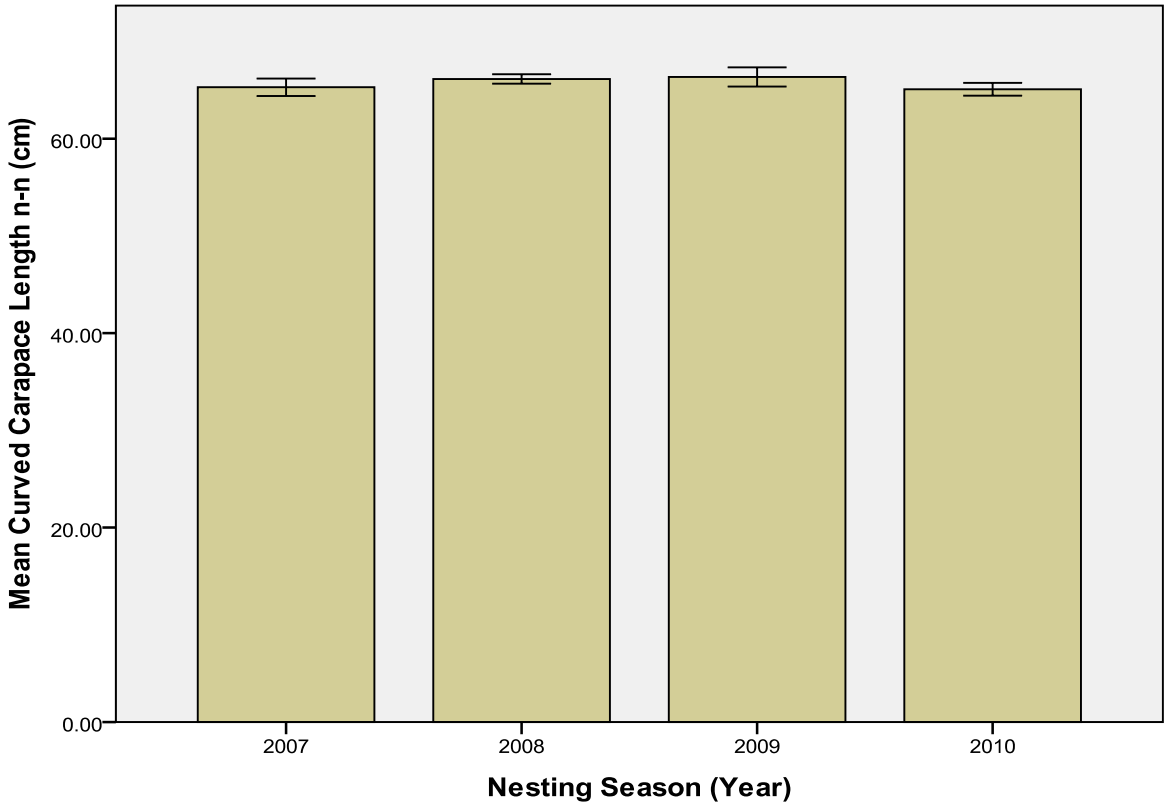

Figure 20. Comparison of Curved Carapace Length (CCL_{n-n}) of turtles measured during the 2007, 2008, 2009 and 2010 nesting seasons.

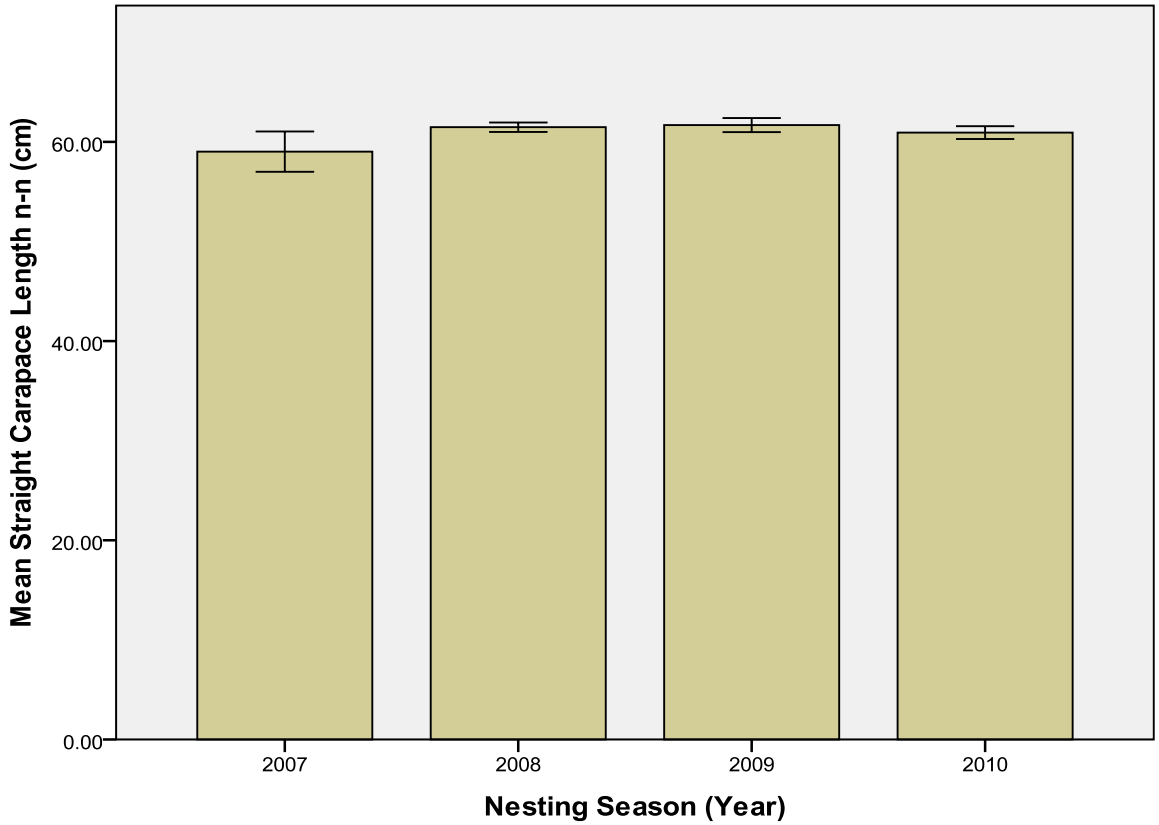

Figure 21. Comparison of Curved Carapace Length (CCL_{n-n}) of turtles measured during the 2007, 2008, 2009 and 2010 nesting seasons.

Table 1. Mean values for CCLn-n and SCLn-n for *L.olivacea* female turtles nesting at Punta Ratón during 2007, 2008, 2009 and 2010 nesting seasons.

Nesting Season	2007	2008	2009	2010
Mean CCLn-n (cm)	65.29 ± 0.45	66.14 ± 0.25	66.35 ± 0.50	65.08 ± 0.33
Mean SCLn-n (cm)	59.02 ± 1.01	61.47 ± 0.24	61.69 ± 0.35	60.94 ± 0.32

Measurements for nest depth and distance from the water for each nest are shown in Figures 22 and 23, respectively. The mean for nest depth for 84 nests measured during the 2010 nesting season was 34.48 ± 0.60 cm, with a range of 21.5 – 69 cm. The mean for distance from the water for 91 nests measured was 29.54 ± 1.62 m, with a range of 5 – 80 m. We found significant differences in nest depth when compared with data from 2007 to 2009 nesting seasons (2007 – 2010: $F_{(3,185)} = 10.883$, $P < 0.001$; Figure 24, Table 2). Nests in 2007 were significantly deeper than in 2008, 2009 and 2010. We found as well that 2010 nest depth was significantly shallower than 2009, but the difference was not as profound as in the former case. No differences were found among nest depth between 2008 and 2009 or between 2008 and 2010. There was also a difference among years regarding distance of nests from the water (2007 – 2010: $F_{(3,200)} = 5.681$, $P = 0.01$; Figure 25, Table 2), with 2010 measurements being significantly higher than 2007 and 2009, but with no difference between 2007 and 2008; 2007 and 2009; 2008 and 2009; or between 2008 and 2010.

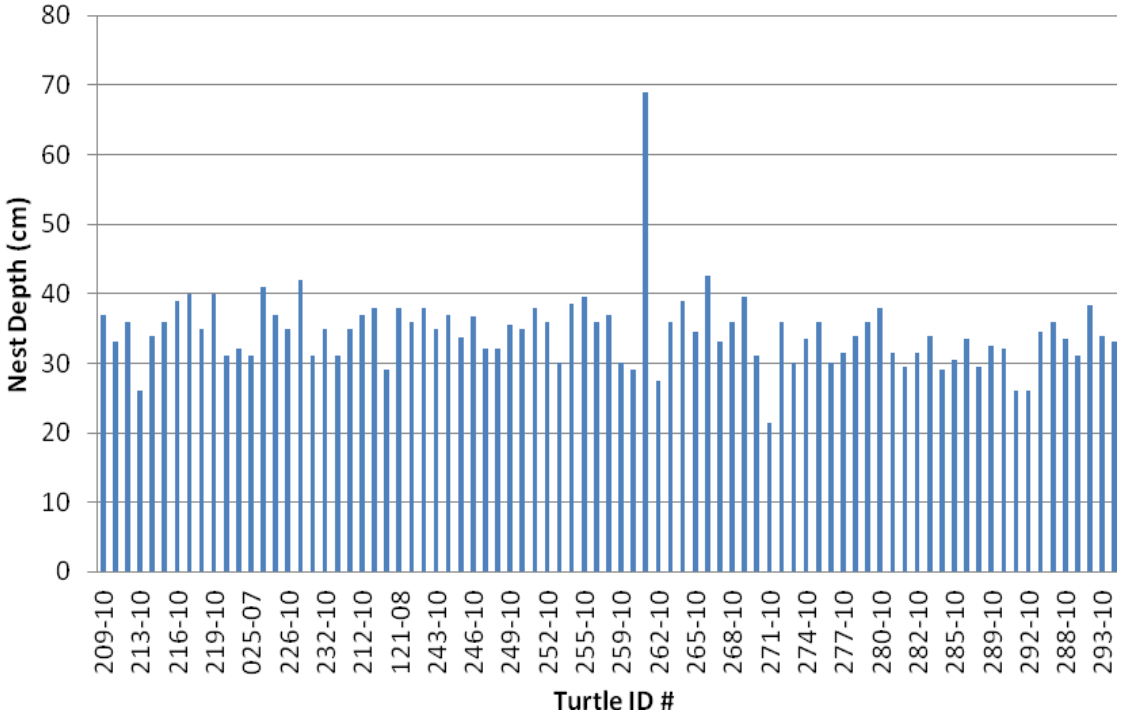

Figure 22. Nest depth of nests deposited at Punta Ratón during the 2010 nesting season.

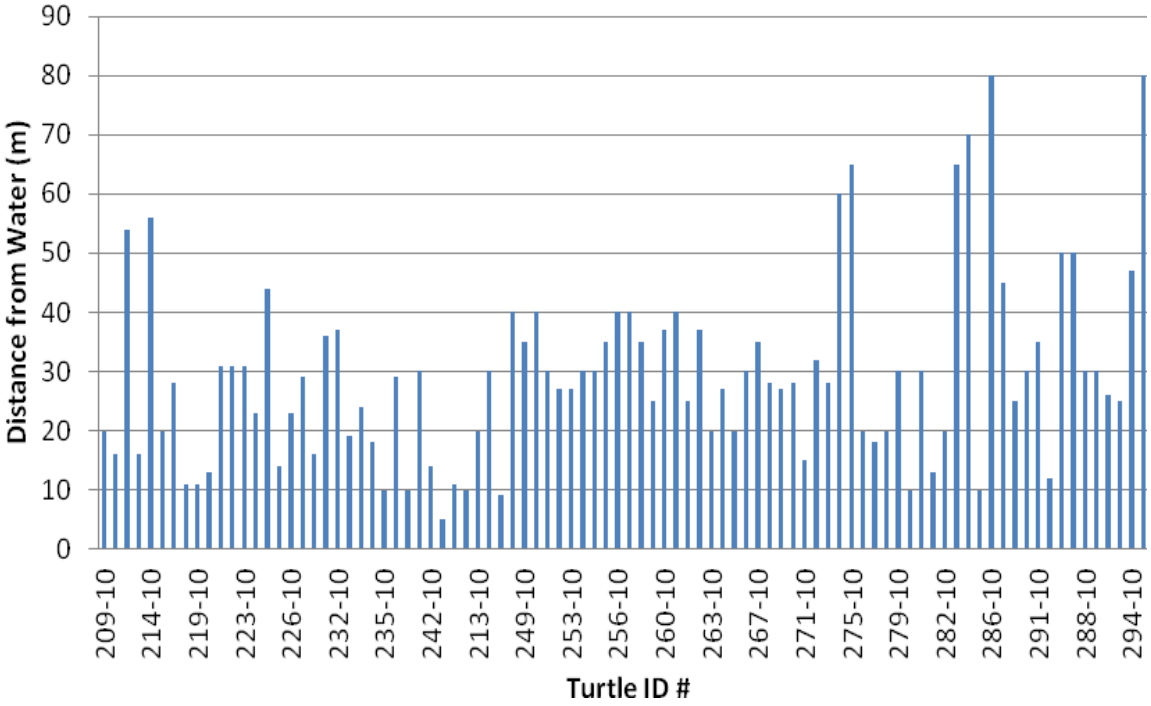

Figure 23. Distance from the water of nests deposited at Punta Ratón during the 2010 nesting season.

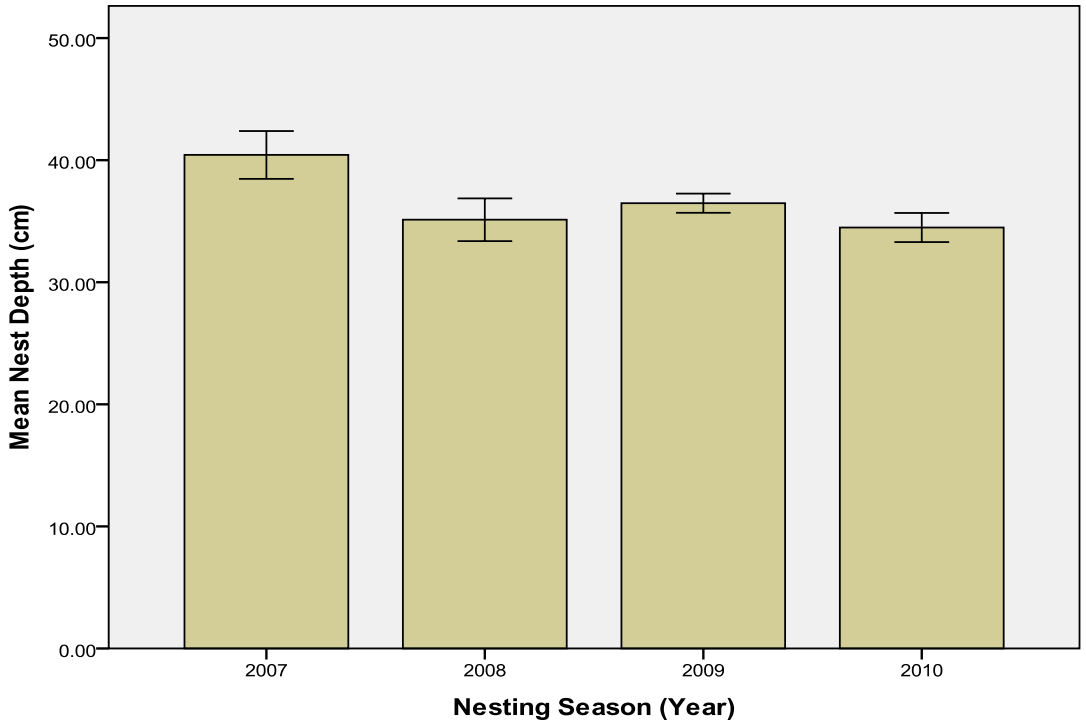

Figure 24. Comparison of nest depth of nests deposited at Punta Ratón during the 2007, 2008, 2009 and 2010 nesting seasons.

Table 2. Mean values for nest depth, distance from the water and number of eggs of nests deposited at Punta Ratón during the 2010 nesting season.

Nesting Season	2007	2008	2009	2010
Mean Nest Depth (cm)	40.43 ± 0.98	35.12 ± 0.88	36.47 ± 0.39	34.48 ± 0.60
Mean Distance from the Water (m)	19.00 ± 1.72	26.59 ± 1.80	24.43 ± 1.40	29.54 ± 1.62
Mean Number of Eggs	76 92 ± 4.72	87.25 ± 2.25	89.28 ± 2.96	93.42 ± 2.32

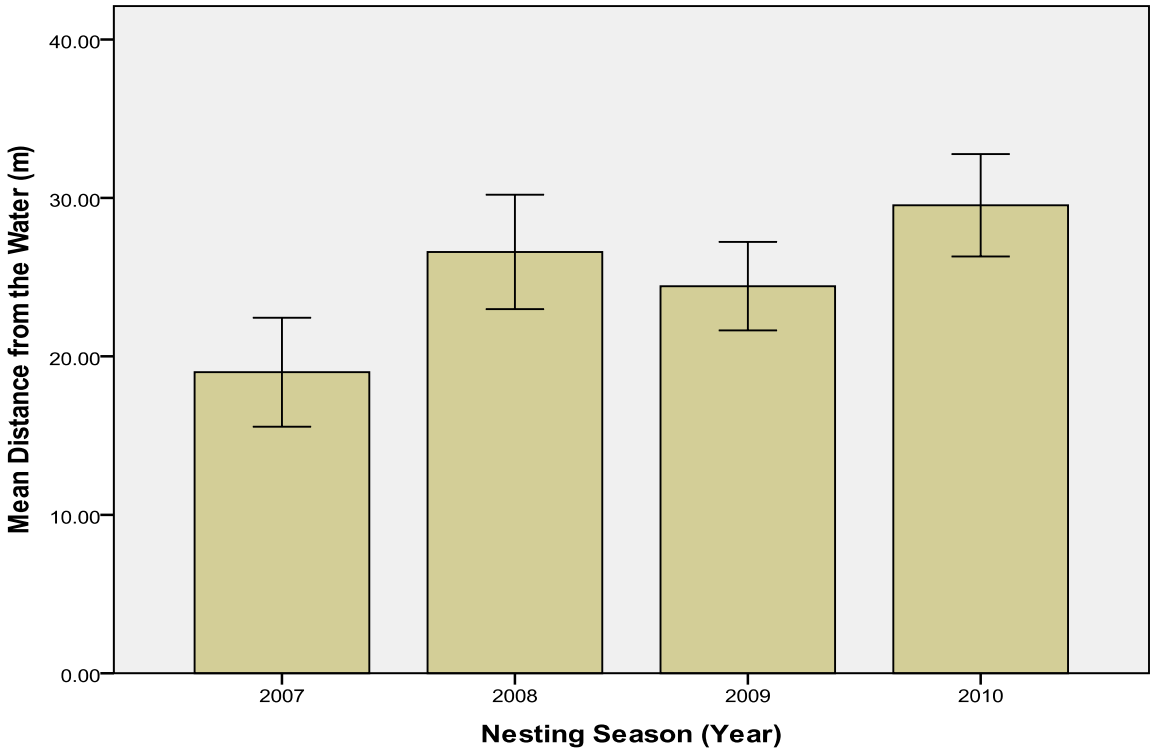

Figure 25. Comparison of distance from the water of nests deposited at Punta Ratón during the 2007, 2008, 2009 and 2010 nesting seasons.

We counted the number of eggs of 89 nests deposited during the 2010 nesting season (Figure 26). The mean number of eggs was 93.42 ± 2.32, with a range of 24 – 132. We found that the number of eggs per nest deposited in 2007 was significantly lower than in 2010 (2007 – 2010: $F_{(3,288)} = 3.454$, P = 0.017; Figure 27, Table 2).

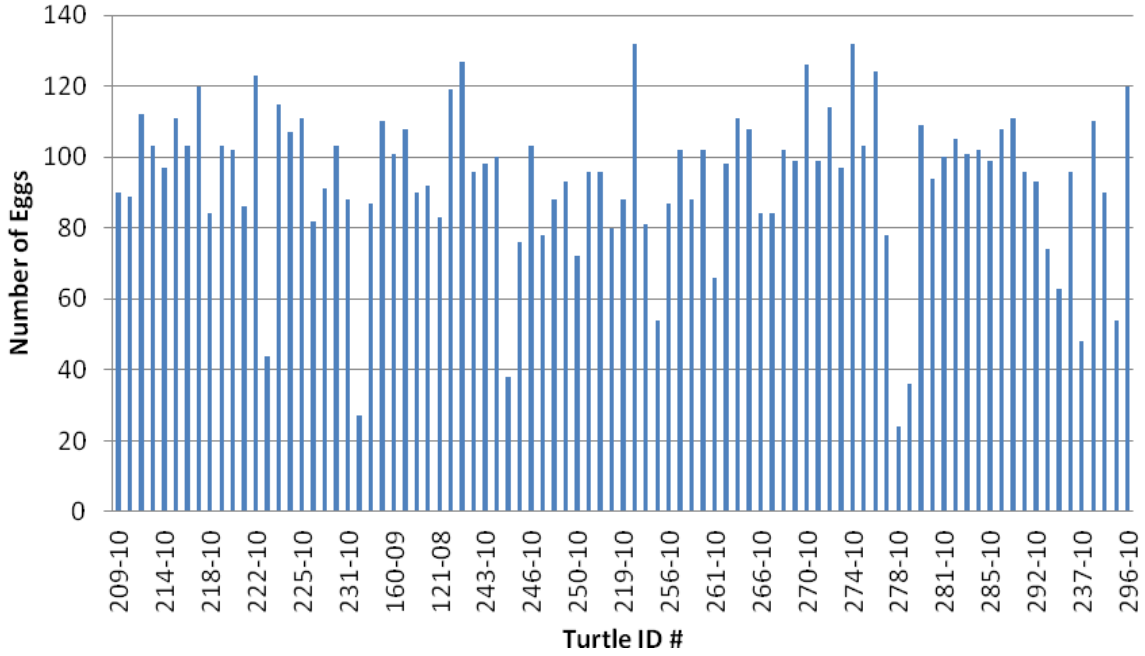

Figure 26. Number of eggs of nests deposited at Punta Ratón during the 2010 nesting season.

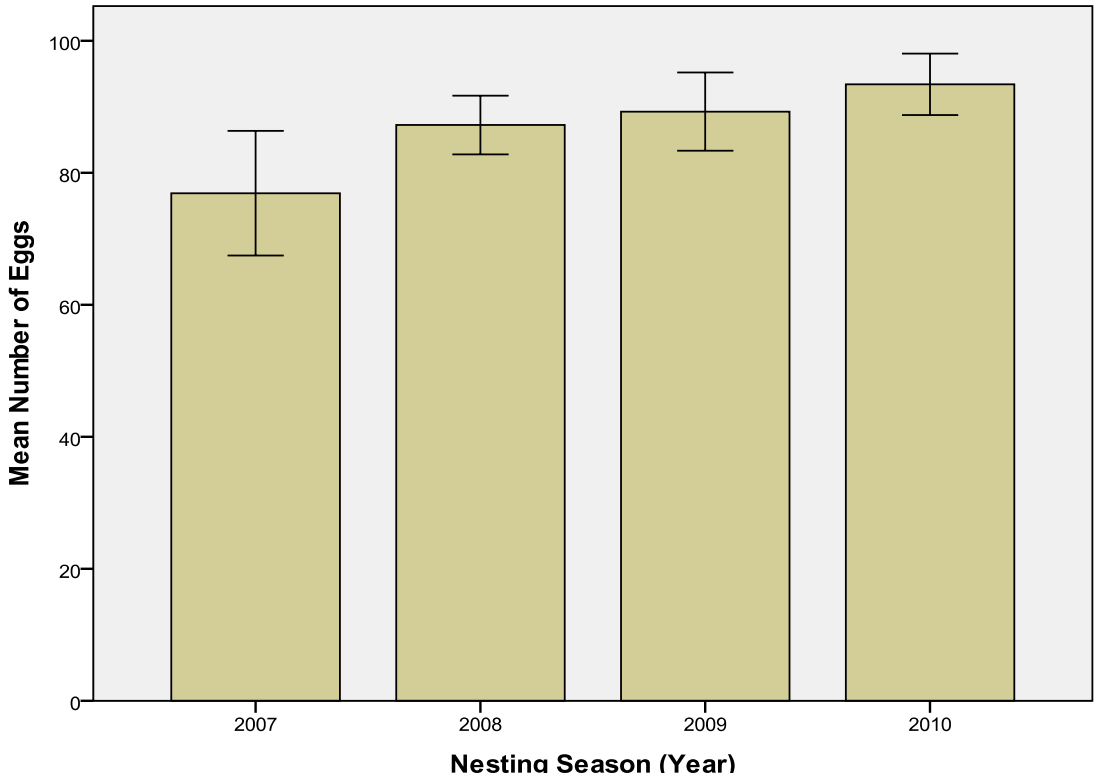

Figure 27. Comparison of number of eggs of nests deposited at Punta Ratón during the 2007, 2008, 2009 and 2010 nesting seasons.

Remigrant Data

During the 2010 nesting season, 13 turtles were confirmed as intra-seasonal remigrants because they had two different emergences in different days. Eight of these 13 turtles nested successfully twice with a mean inter-nesting interval of 16.57 days. Tables 3 and 4 and Figures 28 to 32 show detailed information about these remigrant females.

Table 3. CCLn-n and SCLn-n measurements for 2010 intra-seasonal remigrants.

Turtle ID number	CCLn-n (cm) First Emergence	CCLn-n (cm) Second Emergence	Mean CCL n-n (cm)	SCLn-n (cm) First Emergence	SCLn-n (cm) Second Emergence	Mean SCLn-n (cm)
211-10	67.5	67	67.25	64	63.7	63.85
212-10	Not measured	64.9	64.9	62	62	62
213-10	63	63	63	58	58.8	58.4
219-10	64.4	65.3	64.85	60.7	60.5	60.6
234-10	68.2	Not measured	68.2	64.1	Not measured	64.1
236-10	67.8	67	67.4	62.7	62.8	62.75
237-10	60.2	59.8	60	56.3	56.1	56.2
239-10	65.7	65	65.35	60.8	61.3	61.05
240-10	Not measured	64.3	64.3	Not measured	60.3	60.3
253-10	69.9	70.2	70.05	65.5	65.4	65.45
254-10	68.5	68.9	68.7	64.6	64.5	64.55
257-10	67	67.5	67.25	63.4	63.1	63.25
288-10	64.7	64	64.35	61.1	60.7	60.9

Table 4. Dates of successive emergences and internesting intervals for the 2010 intraseason remigrants. *In calculating the mean internesting interval we considered all turtles that ovoposited in both emergences but turtle 237-10. For this female the interval between nests is too high (29 days) and therefore, it is probable that the turtle ovoposited one more time between the two recorded emergences that was not detected.

Turtle ID number	Date first emergence (mm/dd)	Date second emergence (mm/dd)	Interval between emergences (days)	2 succesful ovopositions	Internesting intervalo (days)
211-10	09/20	10/04	14	YES	14
212-10	09/16	09/19	3	NO	-
213-10	09/16	10/01	15	YES	15
219-10	09/19	10/03	14	YES	14
234-10	09/16	09/17	1	NO	-
236-10	09/24	09/26	2	NO	-
237-10	09/24	10/23	29*	YES	29*

239-10	09/24	10/13	19	YES	19
240-10	09/24	10/06	12	NO	-
253-10	10/03	10/22	19	YES	19
254-10	10/04	10/22	18	YES	18
257-10	10/06	10/23	17	YES	17
288-10	10/16	10/23	7	NO	-
Mean inter-nesting interval (for the 8 turtles)					18.125 days
Mean inter-nesting interval (without turtle 237-10) *					**16.57 days**

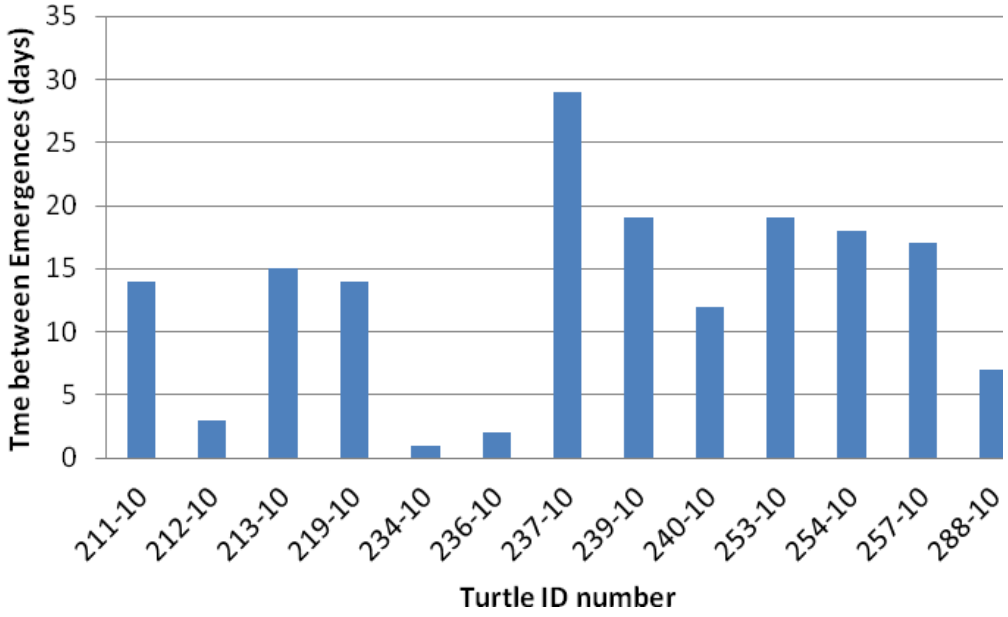

Figure 28. Time between emergences for the 13 intra-seasonal remigrants in 2010.

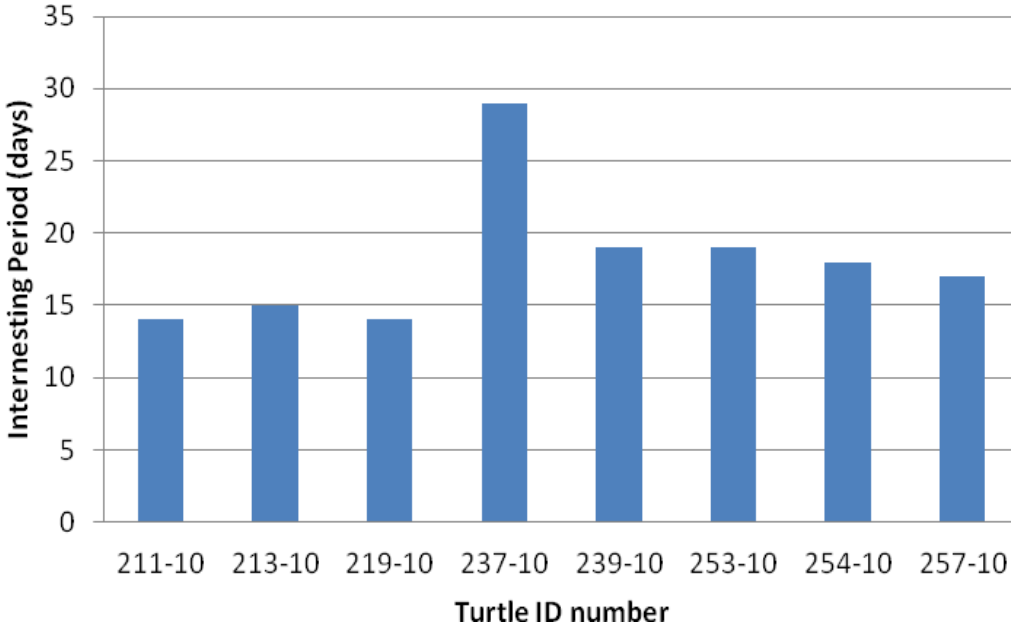

Figure 29. Inter-nesting interval for the 8 intra-seasonal remigrants that ovoposited twice in 2010.

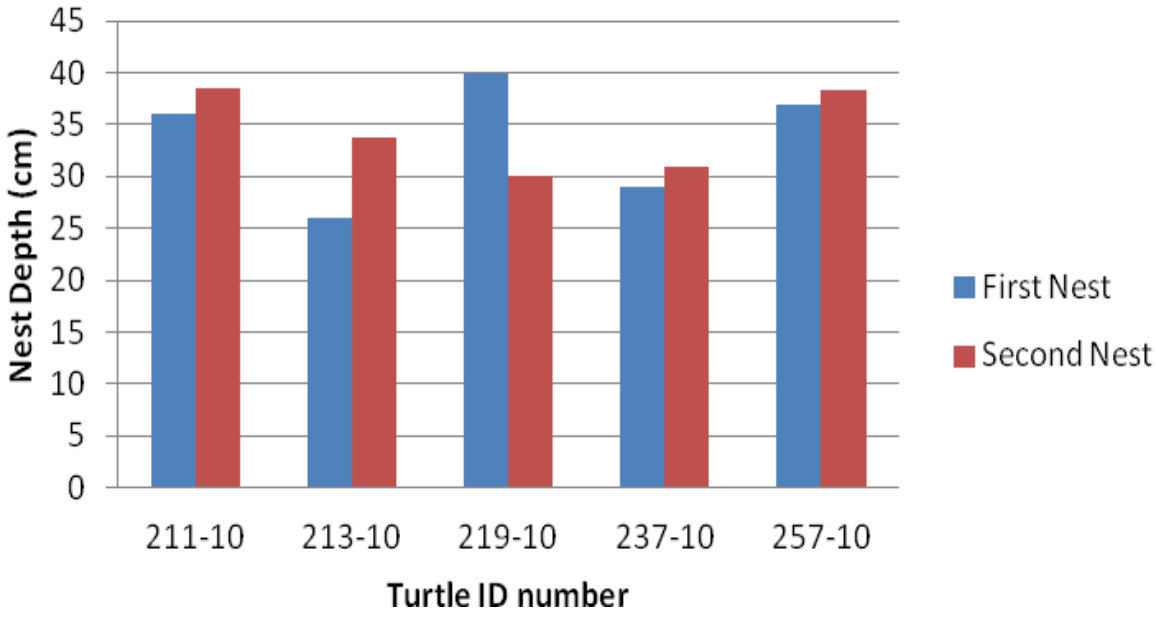

Figure 30. Nest depth for both successful nesting emergences in 2010 intra-seasonal remigrants.

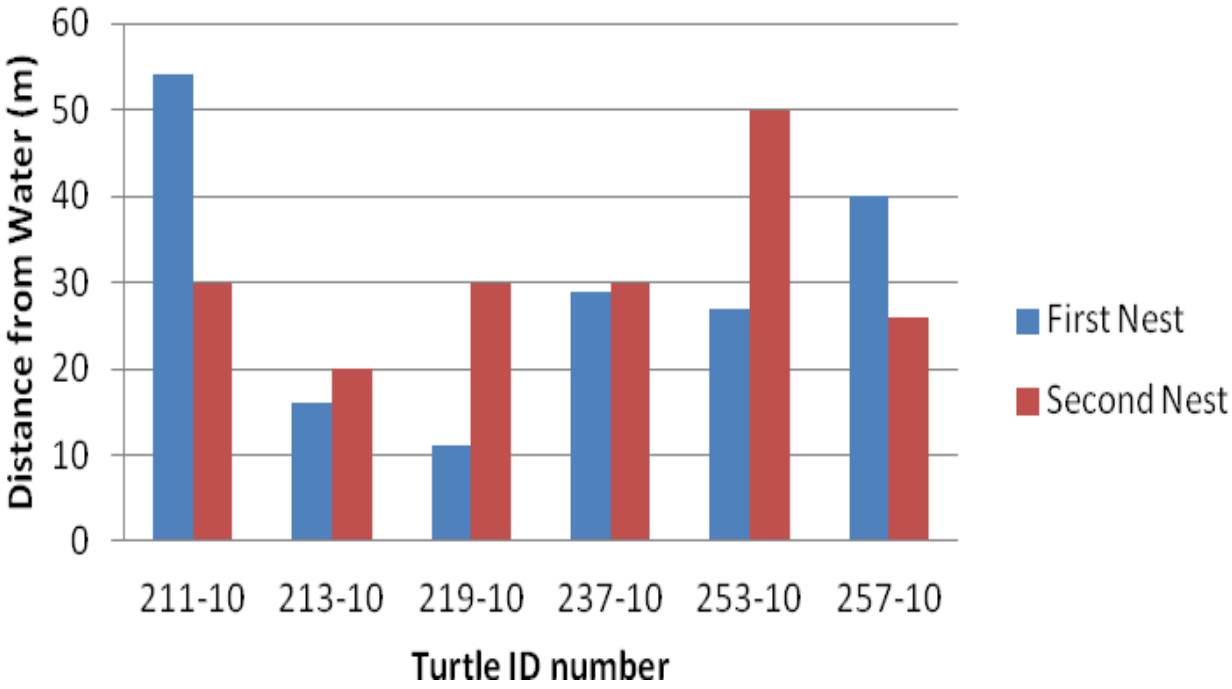

Figure 31. Nest depth for both successful nesting emergences in 2010 intra-seasonal remigrants.

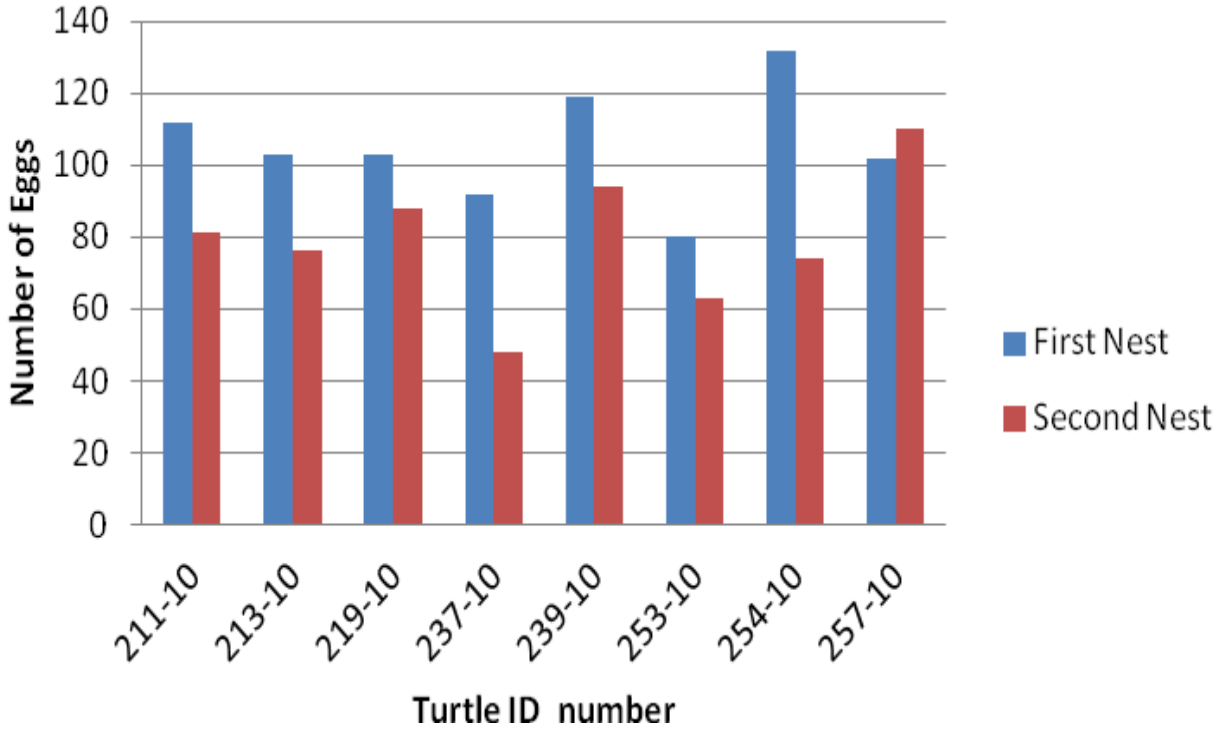

Figure 32. Number of eggs for both successful nesting emergences in 2010 intra-seasonal remigrants.

Satellite Tagging

The satellite-tagged turtle, "Erica," was released from the nesting beach at Punta Ratón on September 24, 2010, but transmitted positional data for only three days. This information suggested that "Erica" travelled northwest from the release site toward Isla del Tigre then returned to the southernmost side of Punta Ratón beach within 24 hours after release. Position transmissions suggest that "Erica" then travelled south toward the mouth of the Golf of Fonseca, but then returned to travel northwest to Isla Meanguera (El Salvador), at which point transmissions ceased (see Figure 33). Insufficient data were collected to analyze. Instead, raw data in transmission classes were used for illustration purposes only (Figure 33).

The cessation of data transmission caused us to speculate that: 1) "Erica" may have been captured and killed at the nesting beach, 2) "Erica" may have lost the transmitter, or 3) the transmitter may have failed while still attached to "Erica."

On October 13, 2010, while patrolling the nesting beach at Punta Ratón, Samaria Castellanos recorded a turtle with “blue paint on the carapace” at 4:25am. At the time, she recognized the turtle as a returning nester, but did not connect the tag numbers recorded to recognize the turtle as “Erica.”

Beach Erosion

We noted that beach erosion had taken place on a large scale, removing much of the beach immediately seaward of the Turtle Center that was previously used as the hatchery area during the 2008 season (Figure 34). Although we did not make formal measurements at the time, we estimate that the site of the turtle hatchery during the 2008 season was approximately 1.5 m higher than the current level of sand (Figure 35). We made no effort to calculate beach loss, but did attempt to photograph the area where the hatchery had previously been located, as well as the tidal inundation into the grounds of the Center (Figures 36 and 37).

Figure 33. Map of "Erica's" movements between September 23 and 26, 2010. This map is used for illustrative purposes only, since the data retrieved was insufficient to filter location classes and to map with any estimation of data accuracy. Last transmission received was on September 26 at 21:44 from Meanguera Island (El Salvador).

Figure 34. Site of the hatchery during the 2008 nesting season at Punta Ratón. During 2008, an area was cleared of Beach Morning Glory (*Ipomaea pes-caprae*) plant to make room for the hatchery surrounded by trees on the landward side, and *I. pes-caprae* on the beach slope.

Figure 35. The view from the 2008 hatchery seaward. Note the height at which the hatchery is above the high tide line, looking down the beach slope toward the water, and the high density of *I. pes-caprae*.

Figure 36. The site of the 2008 hatchery (see Figure 33) during the 2010 nesting season. Note the distance up the shore the high tide reached and that the sediment holding the line of trees has begun to erode awav.

Figure 37. Seawater inundation into the grounds of the Center at Punta Ratón as evidenced by tidal debris. This is the first year that we have witnessed this sort of intrusion.

Environmental Education and Outreach

El Venado

Our education outreach at El Venado was partially successful due to the ability of some of the volunteers to translate intent and methods of the research and data collection undertaken by ProTECTOR. We were able to hold three discussion sessions with Center managers and community members. However, after training sessions were planned, we had little participation on the part of the Center community members. An additional training session was planned, and again was unattended by community members.

Punta Ratón

Outreach in Punta Ratón was not well organized this season, partially due to the condition of the facility prior to, and during the "veda" period. Conditions at the Center were such that no time prior to the "veda" was organized for us to hold community-wide information meetings regarding research and data collection. When we arrived at Punta Ratón at the beginning of the "veda" season, the hatchery was unprepared, and the center was in a state of disrepair, despite confirmation that the Center had been made ready for the season. This resulted in alternative arrangements being made for us to move to El Venado for the first part of the "veda," and did not provide time for us to formally meet with the community to update them on research and data collection plans for the season. As a result, the community was less prepared this season to understand the satellite transmitter attachment method, and was less prepared to assist in this area of research than in the flipper tagging and morphometric data collection methods.

DISCUSSION

Volunteer Research Assistants Program

The ProTECTOR Volunteer Program was designed to bring volunteer researchers and students into the communities in which we work. One goal of the program is to generate incomes for community members who collaborate with ProTECTOR in facilitating volunteers and visitors. To accomplish this, we incorporated a fee for food and facilities into the fee volunteers are charged. These funds are designed to be provided to women who are trained and work as cooks for the Center guests, and also for those employed to maintain the Center facilities for the

visiting public. At El Venado, some of the funds generated from volunteers were used to pay community members who provided meals to the visitors. In addition, funds were provided directly to the Center by visitors who were independent of the ProTECTOR Volunteer Program. Unfortunately, the facilities at Punta Ratón have not received needed maintenance over the past year and are badly deteriorated. In addition, no effort was put forth on the part of community members to assist with preparing meals for visitors. As a result, no funds provided to ProTECTOR were transferred to the managers of the Center at Punta Ratón.

While there is great potential for economic development of the community through the use of the facility for eco-tourism (the facility can be utilized year-round for viewing sea turtles during the nesting and hatching seasons, and for birdlife, mangrove boat tours, sea fishing, and mangrove walks throughout the year), little effort has been made by either the Central government, the Municipal government, or the community at Punta Ratón to outfit the Center and keep it maintained for this use. In addition, although some people from Tegucigalpa visit the center on occasion, there is not structured fee system and most visitors to the Center do not pay to stay on the grounds or to see the turtles. Therefore, the Center has provided little to no benefit for the local community.

Local Community Attitude to Tagging, Research, Facilities, and Volunteers

In past research seasons in the area of Punta Ratón, we have met with negative, and mixed local attitudes toward tagging and research (Dunbar and Salinas, 2008; Dunbar et al., 2010). This has mainly been a result of lack of understanding the research protocols on the part of community members. There is, therefore, the need to more systematically represent protocols and train community members regarding the methodologies involved in research activities undertaken in the community of Punta Ratón. However, we did find that community attitude toward tagging was significantly more positive in this year than in years past. We attribute this to the growing relationship of trust between the communities and ProTECTOR. This is a positive outcome that we wish to continue to foster.

Tagging, Measuring, Nest Relocations, and Hatching Success

El Venado

Lack of equipment, skilled assistants, and communication devices (sufficient radios) hampered efforts to tag more turtles. In addition, transportation to and from the widely separated beach sites, was made particularly difficult by extreme low tides, and severe lightning storms. Despite these setbacks, community members involved with the Center at El Venado were encouraged with the results of the egg relocation process which resulted in some 8,453 eggs brought to the small hatchery facility alongside the Center during the 25-day "veda" period. In addition, Center members purchased a further 6,691 eggs from local harvesters after the "veda" period to relocate to the hatchery, resulting in a total of 15,144 eggs in the hatchery during the 2010 nesting season. Wile data are unclear for the number of turtles hatched, 13,499 turtles were released into the golf in the end. This represents an admirable return of 89% of collected eggs.

We trust that with further education and more equipment that can be left with the Center, the research and conservation program at El Venado could increase, with the potential for population numbers in this are to increase. However, tagging and data collection must be carried out in a systematic fashion throughout the entire nesting season, if we are to understand population dynamics of *L. olivacea* in this area.

Punta Ratón

We tagged and collected data on 104 nesting turtles in Punta Raton this season from September 16 to November 1, despite irregularly inclement weather. We noted trends in distance of nests laid from the water line, and number of eggs per nest, with corresponding increases in both parameters over the past four seasons. Although these trends do not show significant increases for either parameter, this may eventually be the case. Still, we are unsure if this trend is due to more accurate measurements over time, as community members are trained in recording and collecting data, or if these are impacts of tidal level increases.

Satellite Tagging

Despite the short transmission duration of the satellite tag on "Erica," the launching of this first satellite tag provided an impetus for further hypothesis generation, and a platform on which further discussions can take place with SERNA, the municipal government, and local communities regarding the importance of conservation of both this species and the international habitats on which it relies.

There is need for further satellite tracking of sea turtles (both *L. olivacea* and *E. imbricata*) in the Golf of Fonseca. Satellite telemetry can also be used as the basis of a long-term environmental outreach program, and research training program for local community members. The use of satellite tracking will introduce concepts of international collaboration strategies for conservation. This was demonstrated when both government and community members first saw the satellite track map and recognized, for the first time, that sea turtles from Honduras were using islands in the Golf of Fonseca that belong to El Salvador.

Environmental Education and Outreach

Our environmental outreach this past season was hampered by language skill differences. Some volunteers were able to fully communicate with community members, while others could communicate only partially. To ensure the community is fully aware of, and engaged in the research and data collection that are undertaken by ProTECTOR, there is need to more fully develop this area of education outreach. A systematic education outreach program that fully elaborates the intentions and methods of the data collection is needed for each season of research. This will include partnering UNAH students with graduate students who are not fluent in Spanish, so that UNAH students are able to translate and liaise with the community on behalf of the graduate students.

We recognize the importance of communicating and collaborating with the community in the research and conservation of sea turtles in this region. Therefore, it is the intent of ProTECTOR to more fully develop specific steps for community outreach prior to, during, and after undertaking research in the communities in which we work. Thus, we are implementing a long-term plan to establish systematic education outreach among these communities, including

the use of printed material, audio-visual presentations, training workshops, and invited guest speakers.

RECOMMENDATIONS

Volunteer Research Assistants Program

Whereas the volunteer research assistant program was successful in its initial stages, **we recommend** the further development of the ProTECTOR Volunteer Program as a way to introduce students and visitors to the area of Punta Ratón, and as a mechanism by which one level of eco-tourism can be introduced to the area. This will also help to generate some income assistance for community members involved with the Center and its operations, including guiding, cooking, maintaining, and cleaning the Center.

Local Community Attitude to Tagging

Whereas there is a need to continually engage the local community members in the continuing research and conservation efforts, **we recommend** that education outreach be further developed and employed prior to, during, and after deployment of graduate students, UNAH students, researchers, and research volunteers, thus maintaining a collaborative relationship with the communities in which ProTECTOR is working.

Tagging, Measuring, Nest Relocations, and Hatching Success

Whereas there is great value in utilizing many forms of data in education outreach, training of local community members, as awareness outreach tools for volunteers, and for dissertations and manuscripts, **we recommend** that the research efforts that have taken place under ProTECTOR through the previous four years, continue and expand with additional research projects carried out by Dunbar and his graduate students from Loma Linda University. The training of community members and UNAH undergraduate students will further expand capacity building for research and increase the production of results that will be used to direct conservation and education outreach in the country.

Furthermore, these results will be provided to the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC) as part of the international reporting requirement of the Convention for Honduras. The data provided by ProTECTOR is critical to Honduras fulfilling its obligations to the Convention.

Whereas Honduras does not, at this time, have a national strategic plan for assessing, managing, or monitoring any sea turtle species in the country's marine areas, **we recommend** that a national assessment of sea turtle populations be undertaken, and that a national strategic plan be developed, publicized, and initiated, and that continual monitoring of sea turtle populations be carried out. These should be undertaken and directed by ProTECTOR.

Environmental Education and Outreach

Whereas there is great value in utilizing modern technological data collection systems (i.e. satellite telemetry) as the basis of powerful education outreach efforts, **we recommend** that a program of training and environmental education be built on the basis of satellite telemetry data from turtles released from this area. These data can provide powerful lessons in international resources, international cooperation and diplomacy, the migratory routes of sea turtles and potential conflicts with commercial fisheries, and a highly interactive mechanism for involving adults and children, alike, in the behaviors of turtles that most local community members would not experience without such telemetry mechanisms.

We further recommend that funding support be provided by the Ministry of Environment and/or the Ministry of Education of the Honduras Government to ensure a standardized, national program is developed and implemented with respect to sea turtle conservation and environmental outreach among coastal communities throughout the country.

LITERATURE CITED

Dunbar, S. G. and Salinas, L. 2008. Activities of the Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR) on Olive Ridley (*Lepidochelys olivacea*) in Punta Raton, Honduras Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR). Loma Linda. Pp. 30.

Dunbar, S. G., Salinas, L. and Castellanos, S. 2010. Activities of the Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR) in Punta Raton, Honduras; Annual Report of the 2008 - 2009 Season. Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR). Loma Linda. Pp. 43.

Kalamandeen, M. 2011. The case of Shell Beach. SWOT Report VI: 44 - 45.

Muurmans, M. 2011. Community conservation programs built to last. SWOT Report, VI: 22 - 23

Urteaga, J., Torres, P. and Gaos, A. 2011. Egg collection for conservation. SWOT Report, VI: 36 - 39

APPENDIX IA – Data Collection Sheet (Nesting Female)

Nesting Beach Data Collection Sheet (Nesting Female Data)

Date _____ **Time of Laying** _____

Beach Name _____ **Lat/Long (GPS)** _____

Turtle ID # **FN - 10** **Turtle Species** _____

Front Left Tag Number _____ **Rear Left Tag #** _____

Names of Data Recorder and Partner _____

Nest Tag # and Color	
Nest Depth (cm) - Bottom	
Nest Distance from Water (meters)	
Nest Location Habitat (bare sand, grass, in/under vegetation)	
Egg Count (# laid)	
Eggs Damaged (# broken during laying)	
Egg Diameter (cm) (10 normal eggs)	
Egg Weights (g) (same 10 eggs as measured above)	
CCL n-n[1] (cm)	
CCL n-t[2] (cm)	
CCW[3] (cm)	

[1] Curved Carapace Length, notch to notch
[2] Notch to tip
[3] Curved Carapace Width. Measure all animals at the widest position.

SCL n-n (cm)[4]	
SCL n-t (cm)	
SCW (cm)	
Additional Comments, Markings, Health, etc.	

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[4] Straight Carapace Length, notch to notch.

APPENDIX IB - Data Collection Sheet (Nesting Female) (Español)

Hoja de Datos de Playas de Anidamiento (Datos de Hembras Anidando)

Fecha _____ Hora de Postura_____

Nombre de la Playa _____ Lat/Long (GPS)_____

Numero de Tortuga FN_____ - 10_____ Especie de Tortuga_____

Numero de Marca Frontal Izquierda _____

Nombres del Apuntador y Asistente _____

Nido # y Color	
Profundidad del Nido (cm.) – Fondo	
Distancia del Nido de la Línea de Marea (metros)	
Hábitat de Ubicación del Nido (pura arena, grama, en o sobre vegetación)	
Numero de Huevos (# puestos)	
Huevos Dañados (# rotos durante la puesta)	
Diámetro de Huevos (cm.) (10 huevos normales)	
Peso de los Huevos (g) (mismos 10 huevos medidos arriba)	
MCC h-h[5] (cm)	
MCC h-p[6] (cm)	
ACC[7] (cm)	

[5] Medida del Carapacho en Curva, de hendidura a hendidura.
[6] Hendidura a Punta
[7] Ancho del Carapacho en Curva. Medir al espécimen en la posición mas ancha.

SCL n-n (cm)[8]	
SCL n-t (cm)	
SCW (cm)	
Observaciones Adicionales, Marcas, Estado de Salud. etc.	

Director de Proyecto: Dr. Stephen G. Dunbar (ProTECTOR)
Coordinador de Proyecto: Lidia Salinas (ProTECTOR)

[8] Medida Recta del Carapacho., Hendidura frontal a hendidura caudal.