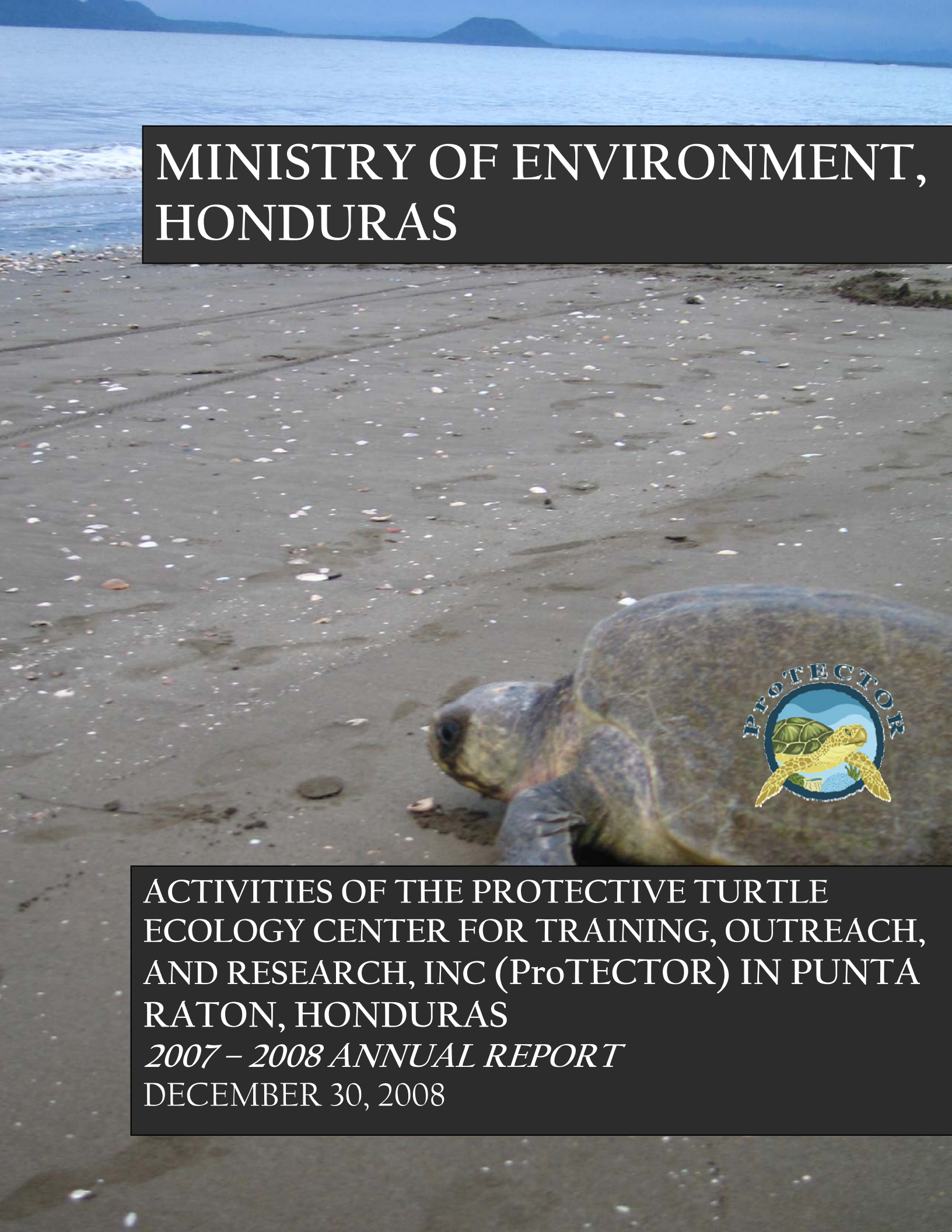

MINISTRY OF ENVIRONMENT, HONDURAS

ACTIVITIES OF THE PROTECTIVE TURTLE ECOLOGY CENTER FOR TRAINING, OUTREACH, AND RESEARCH, INC (ProTECTOR) IN PUNTA RATON, HONDURAS

2007 – 2008 ANNUAL REPORT

DECEMBER 30, 2008

ACTIVITIES OF THE PROTECTIVE TURTLE ECOLOGY CENTER FOR TRAINING, OUTREACH, AND RESEARCH, INC. (ProTECTOR) ON OLIVE RIDLEY (*Lepidochelys olivacea*) IN PUNTA RATON, HONDURAS

ANNUAL REPORT OF THE 2007 – 2008 NESTING SEASONS

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PREFACE

This report summarizes the activities of the Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR) over the 2007 and 2008 nesting seasons for *L. olivacea* at Punta Raton on the south coast of Honduras. This report was compiled by Stephen G. Dunbar and Lidia Salinas of ProTECTOR and ProTECTOR, Honduras, respectively. The results of this ongoing study reported here, will provide information to decision makers for the development of further steps to manage the population of sea turtles along the south coast of Honduras.

ACKNOWLEDGEMENTS

We wish to thank the following members of the Punta Raton Community for their assistance to ProTECTOR in data collection and conservation efforts: Ely Hernandez, Herminio Carmona, and Teo Ordoñez. We extend our thanks to Secretary of State (SERNA) Tomas Vaquero, SERNA personnel Fernando Sotelo and Nixon Rivas for assistance in transportation and data collection, as well as DiBio Personnel David Jaén for arranging transportation and Claudia Cortez for assisting with data collection. Thanks to Municipality of Marcovia Vice Mayor, Ronnie Umanzor, and PROGOLFO Technical Director, Luis Turcios for providing technical reports and for supporting requests to meet with community leaders. We gratefully acknowledge Cesar Duron from UNAH, who spent the month of September (2008) at Punta Raton collecting data. Thanks to Jeff Seminoff at NOAA Southwest Marine Fisheries, La Jolla, CA who supplied the flipper tags for this project. The Department of Earth and Biological sciences at Loma Linda University continue to support the research activities of SGD in Honduras, for which we are grateful. This report has been delivered to the Ministry of Environment (SERNA), the Department of Fisheries (DIGEPESCA), the Division of Biodiversity (DiBio), and the Municipality of Marcovia December 30, 2008.

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INTRODUCTION AND BACKGROUND

The South Coast of Honduras is comprised of the Golf of Fonseca and shares national boundaries with El Salvador to the north and Nicaragua to the south. In the central region of the Golf is a 27 km stretch of west-facing beach running from Punta Raton in the North to Punta Condega in the south (Figure 1). The beach at Punta Raton is approximately 4.62 km long.

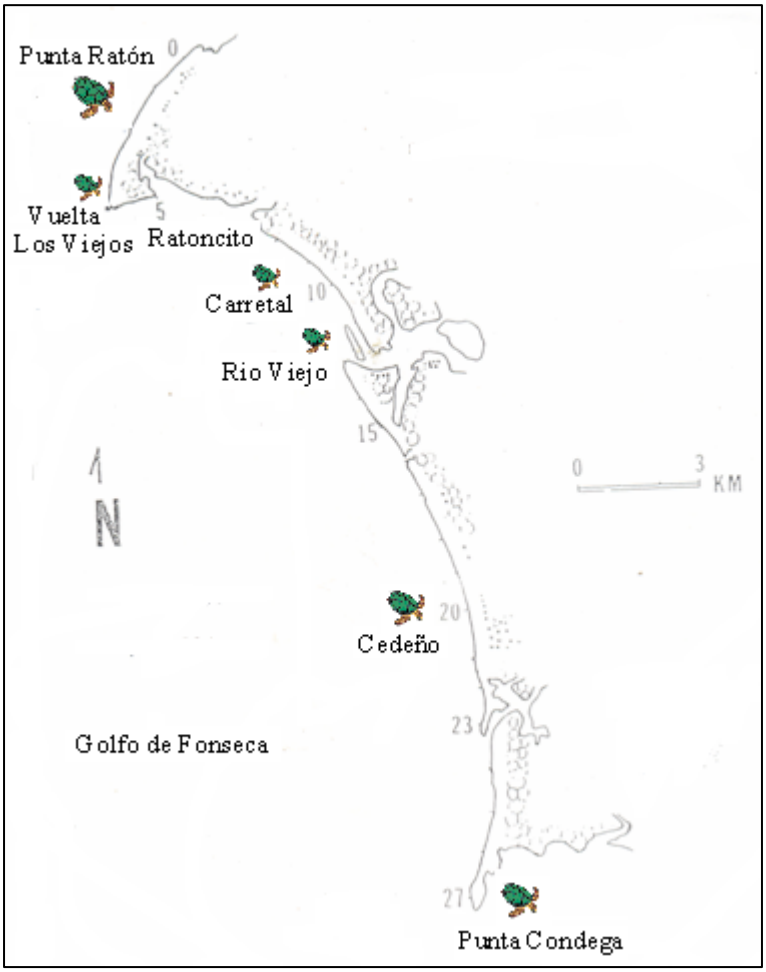

Figure 1. Map of the central coastal area of the Golf of Fonseca. The area of concentration for this report is the area from Punta Raton to Vuelta Los Viejos.

Throughout this region, local citizens of the Punta Raton community have been engaged in an harvesting program for Olive Ridley (*Lepidochelys olivacea*) eggs for almost three and a half decades (Morales *et al.*, 2003; Dunbar, unpublished data).

The program began in 1975 when the Honduran Fish Law of 1967 was put into practice with the first "off-season" from egg harvesting, first established along the south coast of the country (Minarik, 1985). The "off-season" at Punta Raton represents the 25 day period from September 1 – 25 each year. This may be the most appropriate time to have a limited off-season, since other studies of *L. olivacea* suggest that nesting activity is concentrated between May and October, and peaks in August and September (Hasbún & Vásquez, 1991, 1999).

The egg harvesting program is organized to allow community members to harvest all eggs from every nest found during the nesting season, except for what is referred to as the "off season." During the off season, community members harvest the eggs to be traded for staple food supplies. The trade is directed by the Ministry of Environment (SERNA), the Municipality of Marcovia and the CVC. Throughout this period, military personnel are brought into the area to limit direct poaching of eggs. Eggs are moved to a protected hatchery where they are counted and recorded.

Although records of the number of eggs collected, the number of live and dead hatchlings and the number of turtles released have been kept since 1975 (Morales *et al.*, 2003), virtually no data has been kept on the number of females nesting, the number of nests laid through the season, the number of eggs harvested outside of the off season, or the number of remigrant turtles within or between seasons. Thus, virtually nothing is known about the population dynamics of the species along this section of its range.

In 2003, funds were provided to SERNA and the Municipality of Marcovia from the Government of Denmark to invest in the development of the "Centro de Visitantes, Capacitacion Y Interpretacion Ambiental Para la Proteccion Y Conservacion de la Tortuga Golfina (*Lepidochely olivacea*)" at Punta Raton. The center was established in December, 2003.

In September, 2006, the non-profit, non-governmental organization, the Protective Turtle ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR), established relations with SERNA, DiBio, the Municipality of Marcovia, and the Golf of Fonseca non-governmental organization, PROGOLFO, to assist these entities in the coordination of a conservation program for *L. olivacea* in the Punta Raton region. ProTECTOR's role is in oversight of the collection of scientific data on *L. olivacea* population dynamics, egg collection, egg returns, nesting females, nests laid, egg counts, migration, genetics, as well as scientific investigations involving the biology, ecology and physiology of this and other sea turtle species found in the Golf of Fonseca. ProTECTOR began the collection of data on nesting females from September to October, 2007, and continued data collection again from August to October, 2008.

The following is a report on the findings of the data collected by ProTECTOR, with the inclusion of previous data provided in annual reports from PROGOLFO and SERNA.

METHODS

2007 Season

During the period between September 12 and October 19, 2007, a small team of trained participants monitored the beach at Punta Raton from approximately 9:00pm – 3:30am. Occasionally, a turtle would nest in the mid-morning (9:00 or 10:00am). The teamed walked the beach, seeking assistance to locate turtles from local community egg harvesters and military personnel assigned to the egg harvesting period, referred to as the "off season." We collected data under several categories for each nesting turtle encountered (see Table 1). Several non-invasive morphometrics were recorded using a Haglöf Mantax tree caliper, such as Straight Carapace Length (SCL), Straight Carapace Width (SCW) (Figure 2), while Curved Carapace Length (CCL), and Curved Carapace Width (CCW) were recorded with a soft tape measure (Figure 3).

Table 1. List of parameters for which data were collected for each nesting turtle encountered during the 2007 and 2008 data collection seasons.

Date	Distance from Water	Curved Carapace Width
Beach Name	Nest Habitat	Straight Carapace Length $_{min}$
Latitude and Longitude	Egg Count	Straight Carapace Length $_{max}$
Time of Laying	Eggs Damaged	Straight Carapace width
Turtle ID Number	Mean Egg Diameter (cm)	Comments
Turtle Species	Mean Egg Weight (g)	Data Recorder
Left Flipper Tag Number	Curved Carapace Length $_{min}$	
Nest Depth	Curved Carapace Length $_{max}$	

Inconel (681 style) flipper tags (NOAA Southwest Marine Fisheries, La Jolla, CA., suppliers) were attached to all turtles encountered during the data collection period. Tagging sites consisted of the area of the first large scale on the posterior edge of the front flipper (locking point ventral) (Figures 4 and 5). The site of tagging was wiped with Betadine to reduce the potential for infection subsequent to tagging, while the puncture point of tags themselves were coated with Neosporin to reduce potential infection. Prior to the tagging season, tags were washed with a mild detergent, and sterilized in groups of 10 in autoclaveable bags that remained sealed until requred.

Once tagged, turtles were permitted to return to the water (Figure 6). Latitudes and longitudes were taken for each nesting site with a Garmin 72 GPS, and recorded in degrees, minutes, seconds. The measurement error term was also recorded. Nest depths were measured in centimeters by placing a 1 m ruler vertically in the nest until it rested on the bottom. The horizontal plane of the surface of the nest was extended to the ruler by using a flat, straight object. To record nesting habitat, one option was selected from a series of database pull down options which corresponded to sand, sand/vegetation, intertidal, and supratidal sites.

The number of eggs laid was counted after the turtle had completed nesting, and as eggs were harvested from the nest. At the same time, 10 eggs were randomly selected to be measured in centimeters with a hand-held caliper (± 0.1 cm). Mean

egg weight was calculated from weighing the same 10 eggs as those measured for diameter; the total weight was then divided by 10 (Figure 7).

Distance from the water's edge to the nest was estimated by pacing out steps of approximately 1 m from the nest to the water in a direct line. This was not necessarily the path turtles took in approaching the area where the nest was created, or the return path of the turtle to the water, but represented the most direct path to the tide line.

Unfortunately, students from the Universidad Nacional de Autonoma de la Honduras (UNAH), who were not thoroughly trained in recording data, assisted in collecting data. This led to data recording errors. The elimination of obvious errors has been undertaken in this report.

Figure 2. Stephen Dunbar assisted by Vice Mayor, Ronnie Umanzor, measures straight carapace length with Haglöf Mantax tree calipers. Photo credit: Claudia Cortez.

Figure 3. Measuring curved carapace length with s soft measuring tape. Photo credit: Claudia Cortez.

Figure 4. Flipper tagging of a nesting *L. olivacea* after nesting has been completed. Note the site of Betadine application to prevent infection of the tag site. Photo credit: Claudia Cortez.

Figure 5. Tag location on the left, front flipper. Note the tag identification number; LZ771. Photo credit: S.G. Dunbar.

Figure 6. An Olive Ridley (*Lepidochelys olivacea*) returning to sea after nesting and data collection. Photo credit: S.G. Dunbar.

Figure 7. Weighing eggs to determine the mean weight of eggs laid per nest. Photo credit: Claudia Cortez.

Methods followed in 2008 were the same as those in 2007. Tagging in 2008 took place from September 1 - 25, then again from October 5 – 13 for a total tagging time of 33 days. Despite a shorter tagging term, more turtles were tagged with fewer errors in data collection because data were collected mainly by Mr. Cesar Duron (after an intensive training session with SGD), and Dr. Stephen G. Dunbar. However, during the 2008 season, we again had untrained data collectors and recorders from DiBio and the community of Punta Raton that likewise resulted in recording errors, although there were fewer data errors than in the 2007 season.

RESULTS

2007 Season

During the 2007 season, Dr. Stephen G. Dunbar trained SERNA personnel Fernando Sotelo; Marcovia Vice Mayor, Ronnie Umanzor; PROGOLFO Director, Luis Turcios; and ProTECTOR Honduras Country Director, Lidia Salinas, in methods for tagging turtles, measuring eggs andturtles. During and after training, 31 turtles were measured and tagged along the 2.31 km of beach we regularly monitored during the off-season.

Table 2 provides measurements of basic parameters regarding the nest and eggs of sea turtles nesting at La Playa and La Punta beaches. For nests measured, mean depth was 40.4 ± 0.9 cm (range: 33.0 – 52.0 cm; n=23). Approximate distance from the water's edge was estimated to average 19.0 ± 1.7 m (range: 5 – 40 m; n=31). Most turtles nested in the combined substrate of sand and vegetation (n=9). The main vegetation on the beach at La Playa and La Punta is the Goat's foot convolvulus (*Ipomea pes-caprae*), a prostrate, creeping vine common to beaches throughout the Atlantic, Pacific, and Indian oceans. The mean number of eggs laid by turtles we tagged was 80.2 ± 3.5 (range: 52 - 113; n=23). One turtle in 2007 (TID# 008-07) laid only a single egg. However, this nest appears to be an outlier and was excluded from analyses. No eggs we examined were damaged during deposition or

collection. Mean egg diameter was 3.7 ± .03 cm (range: 3.5 – 4.0 cm; n=15), while the average egg weight was 30.1 ± 0.6 g (range: 28.3 – 31.3; n=4).

In Table 3, we present morphometrics of individual nesting turtles. Mean CCLn-t was 65.9 ± 0.5 cm, while the mean CCW was 70.3 ± 0.4 cm (range CCL: 61.4 – 70.5 cm; n=30; range CCW: 66.0 – 75.0 cm; n=30). As recorded in Carr (1986), we noted that curved carapace measures for *L. olivacea* are greater in width than length. This is an artifact of measuring curved length, since the carapace of this species is highly arched. When the straight distance of the carapace was measured, the mean SCLn-t was 60.1 ± 1.0 (range: 45.0 – 69.0 cm; n=22; Table 3, Figure 8), and the SCW was 52.6 ± 0.5 cm (range: 46.0 – 56.0 cm; n=21).

The number of turtles tagged and those that remigrated back to the tagging beaches are provided in Table 4. We tagged 31 turtles and had zero remigrant turtles in 2007, either from other tagging efforts, or from turtles tagged within the 2007 season.

Local Community Attitude and Involvement

There was some resistance to tagging turtles with the Inconel flipper tags during the 2007 tagging season. Some members of the local community opposed the tagging, believing that if turtles were tagged, they would not return to the beach to nest. Their belief was that tagging would result in the loss of eggs and income to both individual egg collectors, and the community, as a whole. Resistant members of the community numbered approximately nine individuals out of some 60 people who are involved in the annual egg harvesting program at Punta Raton. Despite this sentiment on the part of some community members, others cooperated fully and were actively involved with the collection of data during the egg harvest (Figure 9).

Table 2. Means and description of nest and egg characteristics.

	Nest depth (cm) ± S.E.	Distance from water (m)	Nest habitat	Egg count ± S.E.	Eggs damaged at laying	Egg diameter (cm) ± S.E.	Egg weight (g) ± S.E.
2007	40.4 ± 0.9	19.0 ± 1.7	Sand/vegetation	80.2 ± 3.5	0	3.7 ± 0.03	30.1 ± 0.6
2008	34.6 ± 1.3	27.2 ± 2.3	Sand/vegetation	88.7 ± 2.3	0	3.7 ± 0.05	29.7 ± 2.2

Table 3. Means of nesting turtle measurements.

		CCLn-n	CCLn-t	CCW	SCLn-n	SCLn-t	SCW
2007	**Range**	60.8 – 70.0	61.4 - 70.5	66.0 – 75.0	44.5 – 64.0	45.0 – 69.0	46.0 – 56.0
	Mean	65.3 ± 0.4	65.9 ± 0.5	70.3 ± 0.4	59.0 ± 1.0	60.1 ± 1.0	52.6 ± 0.5
2008	**Range**	60.2 – 74.0	60.4 – 74.5	60.0 – 77.3	56.2 – 68.5	56.1 – 69.0	48.2 – 64.6
	Mean	66.0 ± 0.3	66.7 ± 0.3	70.4 ± 0.3	61.3 ± 0.3	60.1 ± 1.0	52.6 ± 0.5

Table 4. Number of nesting turtles tagged, and remigrants in the 2007 and 2008 data collection seasons.

Season	Tagged	Remigrants
2007	31	0
2008	110	34

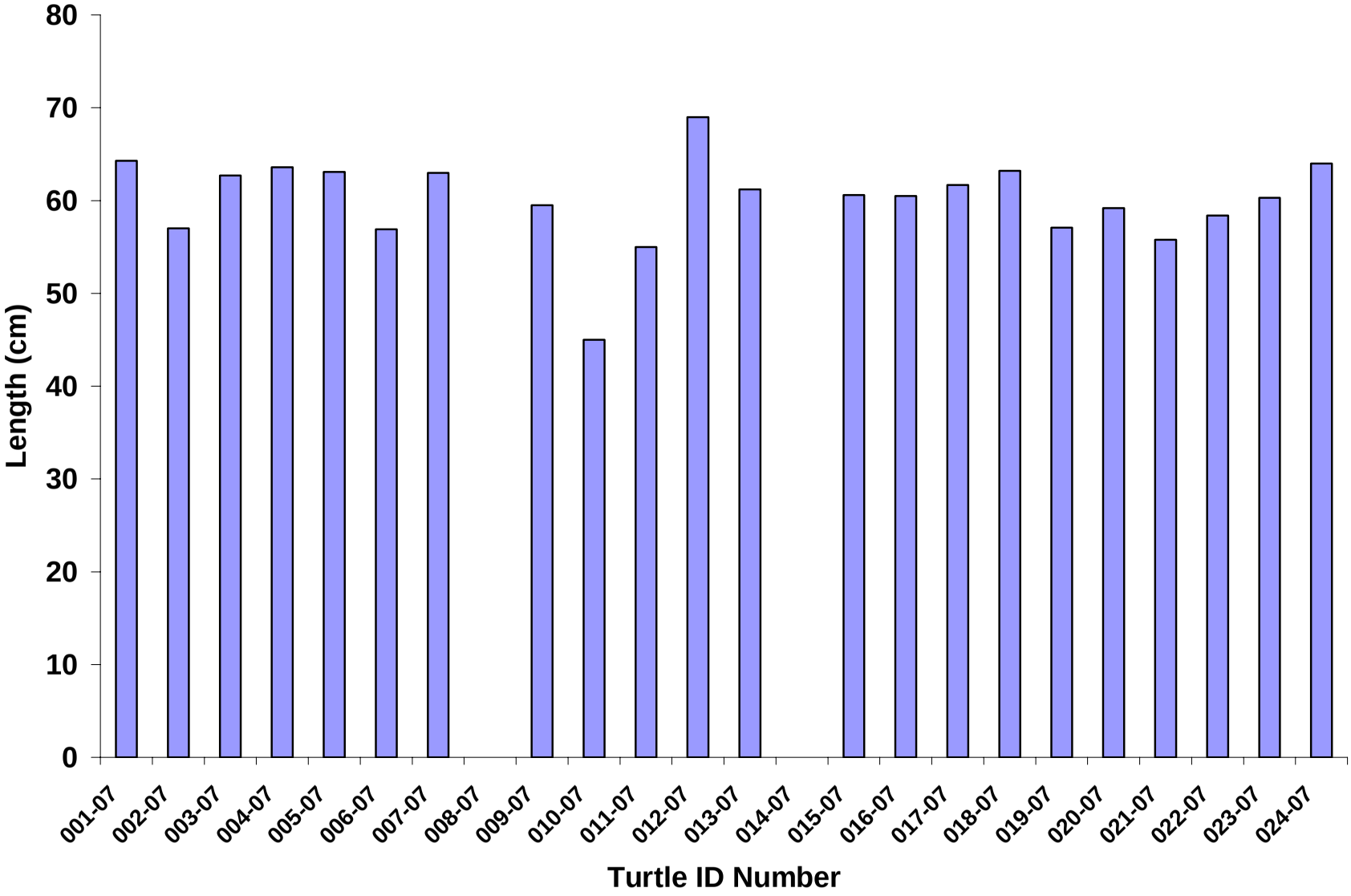

Figure 8. Straight carapace lengths (notch to tip) of nesting females measured during the 2007 data collection season.

Figure 9. ProTECTOR Country Director, Lidia Salinas, works with Teo Ordoñez to tag and record data on a nesting *L. olivacea* on La Playa at Punta Raton during the 2007 nesting season. Photo credit: Claudia Cortez.

2008 Season

During the 2008 season, Dr. Stephen G. Dunbar trained Mr. Cesar Duron, a senior Biology student at the National University of Honduras (UNAH), in tagging and data collection methodology. During the pre-season training sessions, we were aided by Mr. Ely Hernandez, a local member of the community at Punta Raton. Data was collected mainly by Mr. Duron, Mr. Hernandez, and Dr. Stephen G. Dunbar. During one week of the season, data was also collected by members of DiBio.

We were able to tag and measure turtles throughout the "off season" (September 1 – 25), but were also able to continue data collection from October 5 – 13.

Table 2 provides details from the 2008 season on parameters of the nest and eggs. Mean nest depth during 2008 was 34.6 ± 1.3 cm (range: 27.0 – 42.0 cm; n=10), while the average distance of nests from the water's edge was 27.2 ± 2.3 m (range: 15 - 38 m; n=11). Most turtles nested on the upper intertidal, or supratidal areas, where the sand was covered by the beach plant Goat's foot convolvulus (*Ipomea pes-caprae*).

Mean number of eggs laid per nest was 88.7 ± 2.3 (range: 30 - 130; n=88). One turtle in 2008 (TID#072-08) laid only two eggs. We considered this nest to be an outlier and excluded it from analyses. We saw evidence of only one egg damaged during the laying process (n=88). Mean egg diameter and egg weight were 3.7 ± .05 (range: 3.5 – 3.9; n=7), and 29.7 ± 2.2 (range: 23.2 – 32.6; n=4), respectively.

When nest and egg parameters were compared between years, we found nest depth in 2007 significantly deeper than in 2008 (ANOVA $F_{(1,32)} = 11.64$, P = 0.002), and distance of the nest from the water's edge significantly greater in 2008 than in 2007 (ANOVA $F_{(1,41)} = 6.49$, P = 0.015). There was no difference in the number of eggs laid, diameter of eggs, or egg weight between years.

Details of measurements of nesting turtles are provided in Table 3. We found the mean CCLn-t in 2008 was 66.7 ± 0.3 (range: 60.4 – 74.5; n=96), mean CCW was 70.4

± 0.3 (range: 60.0 – 77.3; n=96), mean SCLn-t was 61.9 ± 0.3 (range: 56.1 – 69.0; n=91; Figure 10), and SCW averaged 54.7 ± 0.3 (range: 48.2 – 64.6; n=92). Note that some individuals did not have SCL measured. This was because multiple teams were collecting data, but only one straight caliper was available at the time. When we compared the SCLn-t of nesting females between years, we found turtles in 2008 were significantly longer than those in 2007 (ANOVA $F_{(1,112)} = 6.23$, P = 0.14).

In Table 4, we compare the number of turtles tagged and remigrancy between 2007 and 2008. Both the number of turtles tagged and the number of remigrants were significantly greater (Continuity corrected $\chi^2_{(1)} = 7.64$, P = 0.006) in 2008 than in 2007. The mean inter-annual period we recorded was 346.3 ± 3.5 days (n = 3) (Table 5). This period represents the time between when the turtle was initially tagged in 2007, and when we recorded its re-appearance at the nesting beach in 2008. In addition, we encountered six turtles tagged in 2007 for which tagging records were missing. Because of limited access to nesting turtles during the off-season, this should not be taken to mean that this is the first time the turtle appeared on the nesting beach in 2008. In contrast, it is the first appearance that we recorded during the 2008 season.

Table 6 provides information on the inter-nesting period for turtles tagged in the 2008 season. These dates represent times between nesting (or nesting attempts) of individual turtles within the 2008. Mean inter-nesting period within the period of the season we recorded, was 13.0 ± 1.1. During the majority of the nesting season at Punta Raton, it was not possible to monitor the area of La Playa for nesting turtles, due to both the activities of the egg harvesting program by local residents, and the lack of research personnel. These two factors resulted in only a short period of 25 days (during the off-season) in which the majority of tagging was done. A small team was able to return to the site to continue tagging from October 5 – 13. During this time we tagged 11 turtles in addition to those tagged during the off-season.

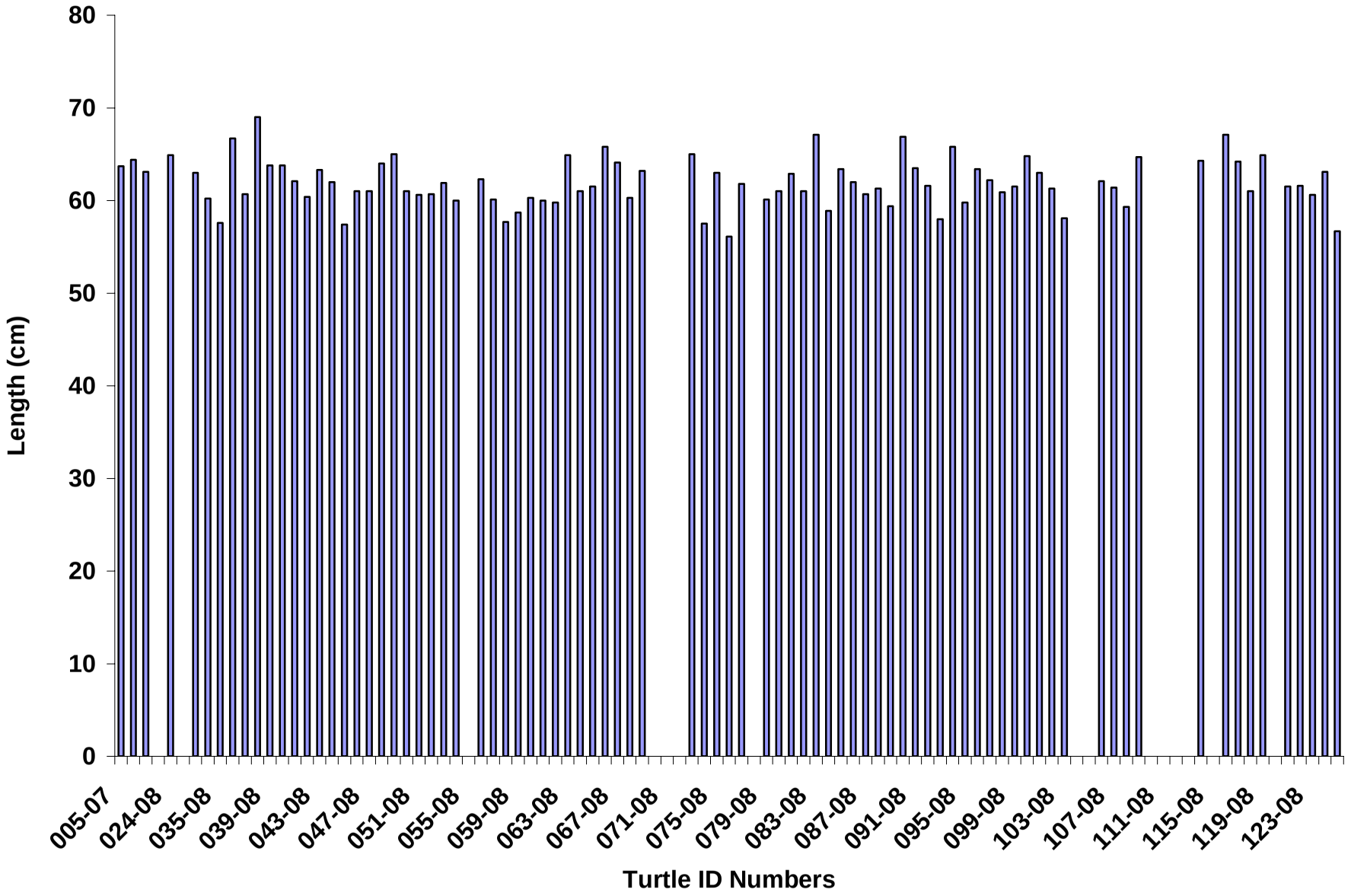

Figure 10. Straight carapace lengths (notch to tip) of nesting females measured during the 2008 data collection season.

Table 5. Inter-annual periods for three nesting females between tagging date in 2007 and first recorded reappearance in 2008.

Turtle ID #	Tag Date	1st Reappearance (days between)
005-07	9/14/ 07	9/02/08 (353)
008-07	9/22/07	9/02/08 (345)
012-07	9/22/07	8/28/08 (341)
Mean ± 1 S.E.		346.3 ± 3.5
Range		341 - 353

Table 6. Inter-nesting periods for 20 turtles between original tagging date, first reappearance and second reappearance during the 2008 nesting season.

Turtle ID #	Tag Date	1st Reappearance (days between)	2nd Reappearance (days between)
033-08	8/26/08	9/08/08 (13)	
034-08	8/26/08	9/08/08 (13)	
037-08	9/02/08	9/17/08 (15)	
040-08	9/03/08	9/19/08 (15)	
043-08	9/03/08	9/20/08 (17)	
047-08	9/03/08	9/19/08 (16)	
048-08	9/03/08	9/23/08 (20)	
049-08	9/04/08	9/07/08 (3)	
053-08	9/04/08	9/05/08 (1)	9/06/08 (1)
054-08	9/04/08	9/20/08 (16)	
068-08	9/10/08	9/24/08 (14)	
069-08	9/10/08	9/23/08 (13)	
070-08	9/10/08	9/24/08 (14)	10/08/08 (14)
075-08	9/12/08	9/24/08 (12)	10/10/08 (16)
076-08	9/12/08	9/24/08 (12)	
090-08	9/18/08	9/20/08 (2)	10/06/08 (16)
106-08	9/21/08	10/08/08 (17)	
116-08	9/22/08	10/06/08 (14)	
117-08	9/22/08	10/09/08 (17)	
124-08	9/24/08	10/09/08 (15)	
Mean ± 1 S.E.		13.0 ± 1.1	11.8 ± 3.6
Range		1 - 20	1 - 16

Local Community Attitude and Involvement

Once again in 2008, there was some initial resistance to flipper tagging. The belief that tagging discouraged turtles from remigrancy again surfaced as the reason for resistance. Unlike the previous year, only approximately four individuals initially displayed this attitude. However, as the season progressed and several tagged turtles returned to nest from both the 2007 and 2008 seasons, negative attitudes toward tagging decreased and tagging activity continued without interference.

DISCUSSION

This report is a summary of tagging activities of ProTECTOR over the course of the 2007 and 2008 nesting seasons for *L. olivacea* in the area of Punta Raton, Honduras. Since each recovery of a turtle increases the value of that individual to a research program (Balazs, 1982b), it is critical that each individual be identifiable. Tags, therefore, facilitate the identification of individual turtles wherever they are seen or captured, and assist in understanding movements, reproductive patterns, strandings, residency and growth rates (Balazs, 1999). There have previously been few efforts to investigate the activities of *L. olivacea* along the south coast of Honduras. These were mainly conducted in the 1970's and early 1980's (Burgos & Perez, 1975; Donovan & Minarik, 1981; DIGERENARE, 1982; Minarik, 1984). However, previous reports provide no evidence of any tagging efforts and thus far, exist only as brief reports held by the government of Honduras. Aside from the tagging efforts carried out by ProTECTOR, only one other effort at tagging has been undertaken at Punta Raton. This was during the 1970's and early 1980's under the direction of Dr. Gustavo Cruz. These data have not been published and, to our knowledge, have not been provided to the Honduras government in the form of a written report. Thus, there is need for long-term studies on *L. olivacea* along the south coast of Honduras. Long-term records of tagging would provide vital informaion on the population dynamics of nesting *L. olivacea* in the Punta Raton area. In addition, genetic studies are needed to determine relationships between the Punta Raton population and other populations along the Eastern Pacific.

Initial tagging of the Punta Raton population of *L. olivacea* began in September, 2007 for 38 days. Unfortunately, very little pre-tagging training was accomplished, and data collection was inconsistent throughout the tagging period. In addition, some data sheets were left incomplete and errors in records were later found in the data sheets. During the 33-day tagging period in 2008, tagging and data collection efficiency were much improved over the 2007 period, mainly due to intensive training of Mr. Cesar Duron, an UNAH student who stayed at Punta Raton for the off-season to tag and collect data. Throughout a short visit during the 2008 season,

personnel from SERNA and DiBio assisted with tagging turtles and collecting data without additional training. However, data collection errors increased during the period when personnel from DiBio participated in the project at Punta Raton.

While there was a significant difference in both the depth of nests (deeper in 2007), and the distance fo the nest from the water's edge (higher in 2008), we found no differences in the number of eggs laid, egg diameter, or egg weight between years. One reason for nesting higher on the shore is the apparent higher tides during the 2008 season, than in the 2007 season. We did not collect data on tide levels during either season, but anecdotes and observations suggest that tidal levels were higher in the later season.

We found curved carapace length (CCL) and width (CCW) for nesting turtles tagged in both 2007 and 2008 (n = 126) were no different between years. In addition, minimal staright carapace length (SCL_{n-n}) and straight carapace width (SCW), were also no different between years. However, we found a difference in SCL_{n-t} between years. This difference may be attributed to measurement error due to the lack of training in participants in the 2007 season, and the lack of additional training for some participants in the 2008 season. In any case, our mean measurements of CCL_{n-t} (2007: 65.9 cm; 2008: 66.7 cm), and CCW (2007: 70.3 cm; 2008: 70.6 cm), are consistent with the mean CCL (68.9 cm) and CCW (69.6 cm) reported by Hasbún and Vásquez (1999) for *L. olivacea* along the adjacent coastal area of El Salvador.

***Lepidochelys olivacea* represents the most common sea turtle along the Pacific coast of Honduras. This species is a critical component of the economic system of the Punta Raton community, as well as other communities along this coastal region. Turtles are sometimes consumed (E. Hernandez, pers. comm.), and it is likely that almost no nesting turtle goes undetected, with the result that almost every egg laid, aside from those collected into the hatchery during the off-season, is removed from the population. This has been the case since at least the late 1960's, when Pritchard**

(1969) reported of this area that "every night there were far more egg collectors than turtles on the beach." Because the harvesting of eggs from this species has been so tightly linked to the economics of these communities, there is need for both long-term scientific investigations into this population, as well as long-term education and training of the communities that rely on this natural resource. We encountered resistance by several members of the community at Punta Raton when initiating the tagging program in 2007 to the point of potential violence. However, when community members recognized the intention of ProTECTOR to join with SERNA and the Municipality of Marcovia to assist with sustainable community development, attitudes toward ProTECTOR began to change. This was seen as both Lidia Salinas (LS) and SGD held workshops and met with community and municipality leaders during the remainder of 2007 and early 2008. Due to unforeseen circumstances, LS was unable to continue to meet with the community at Punta Raton from mid-2008 to the end of the year. When we again began the tagging season in 2008, some resistence from community members was witnessed by the ProTECTOR data collection team. However, it was substantially reduced from the previous year. It was appearant that much of the resistance was due to the belief that if turtles were tagged during nesting, they would not return to continue to lay during that season, or any season in the future. Although there was no evidence to support this hypothesis, the belief was strongly held by approximately six to eight people. Throughout the tagging period in 2008, ProTECTOR was able to demonstrate to these community members that tagged turtles from both the 2007 and 2008 seasons were returning to the same beach after being tagged. This evidence immediately reduced the resistance to tagging, from most community members, who then influenced the remaining individuals to stop resisting the tagging effort. It is our belief that consistent training, outreach and research will provide a mechanism by which the population of *L. olivcea* may be increased over time, with the reduction, and eventual elimination of the egg harvest program. It is critical that steps be taken toward this end before this species is reduced beyond sustainable levels and a valuable natural and econiomic resource is lost.

RECOMMENDATIONS

1. Long-term research should be carried out along the south coast of Honduras on all species of sea turtles in this region. Therefore, we recommend that SAG and SERNA provide a long-term permit for research on *Lepidochelys olivacea*, *Eretmochelys imbricate*, and *Chelonia mydas* in order for ProTECTOR to carry out long-term tagging, as well as genetic and population dynamics studies on all species in the region.

In order to construct population estimates and dynamic population models for *L. olivacea* in the Punta Raton area, tagged nesting females should have the tag number transferred to the hatchery nest to connect the number of eggs and hatchlings to the individual female. This important data will provide vital information on the fecundity of individual nesters and allow estimates of nesting success. These data can then be used in population models with predictive value.

2. The precise collection of data is critical to this, and other related studies. Therefore, we recommend a period of intensive training for all participants of the study program. This training period would be conducted for 1 week prior to data collection period, and would provide each participant with a certificate of completion for each year they are trained for the program.

Because such an intensive training program would require time at the Conservation Center at Punta Raton, we further recommend that SERNA provide funding support specifically for the training of UNAH students, local volunteers, community participants and government personnel. This amount should be a regular line item in the SERNA operating budget.

3. Data regarding environmental parameters are critical for linking individual and population scale activities of sea turtles. Therefore, we recommend that data logs be kept on a year-round basis for tidal heights, water and air temps in the Punta Raton area. These data should be recorded daily by one or two people (to reduce recording error).

Because this recording activity represents a minor commitment on the part of the data recorder, we further recommend that a small salary be provided to the data recorder on a bi-annual basis when data is submitted to SERNA, DiBio, or ProTECTOR, and that this salary be incorporated into the annual SERNA budget for this purpose.

4. There is need to increase the efficiency of the data collection, and increase awareness of the local communities to the importance of the population of *L. olivacea*. Therefore, we recommend that a long-term program be initiated of

education outreach and training for the entire community regarding conservation of species and alternative income sources through non-consumptive use of this species. Training should be organized and overseen by ProTECTOR who will invite specialist presenters to provide workshops for the community. In order to remain engaged in the processes of community development, we further recommend that representatives from SERNA and DiBio take part in the workshops.

5. Development of infrastructure to support alternative income sources for the community is critical steps in preserving the natural resources of the area. Therefore, we recommend that steps be taken to provide funding to assist the development and building of infrastructure in the community that will allow the development of income sources that do not rely on the consumptive use of sea turtles and other natural resources in the area.

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