

REPORT OF THE GULF OF FONSECA HAWKSBILL PROJECT IN PACIFIC HONDURAS

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November 15, 2012



Protective Turtle Ecology Center for Training,
Outreach, and Research, Inc.



SECRETARIA DE AGRICULTURA Y GANADERIA



DIRECCIÓN GENERAL DE PESCA

REPORT OF THE GULF OF FONSECA HAWKSBILL PROJECT IN PACIFIC HONDURAS

***YEAR-END REPORT FROM 2011
NOVEMBER 15, 2012***

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PREFACE

The following report has been prepared by the Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR), and provides an overview of the progress to date of the ProTECTOR Hawksbill Project in the Pacific coast of Honduras, Gulf of Fonseca. We present information collected from community members in the region during 2011 on the presence and distribution of the hawksbill (*Eretmochelys imbricata*) sea turtle along the Pacific region of the country.

ACKNOWLEDGEMENTS

ProTECTOR gratefully acknowledges the assistance of community members throughout the Pacific coast of Honduras. Special thanks to the Municipality of Amapala, and the Association of Fishers at Isla del Tigre. Permits for research were granted by the Department of Fisheries (DIGEPESCA), under the Secretary for Agriculture and Ranching (SAG). Partial funding was provided by the National Fish and Wildlife Service through a collaborative grant with the Eastern Pacific Hawksbill Initiative (ICAPO) through The Ocean Foundation. Thanks to Ernesto Espiga for preparing the maps used in this report. We thank Mr. Larry Bracho and Ms. Noemi Duran for their tireless work in the field, collecting data, talking with community members, collating information – your assistance has been invaluable. We also thank Dustin Baumbach, Lindsey Damazo, Nathan Strub, and Magalie Valere-Rivet for their assistance in analyzing data tables and preparing graphics for this report.

Front Cover: A juvenile hawksbill captured by a fisher in the community of Punta Ratón. Photo credit: Noemi Duran, 2011 ©ProTECTOR 2011.

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1.0 BACKGROUND AND INTRODUCTION

The hawksbill sea turtle (*Eretmochelys imbricata*), is critically endangered in all of its pan-tropical range (Mortimer and Donnelly, 2008). The species has mainly been studied in the Wider Caribbean (Meylan and Frazier, 2001; McClenachan et al., 2006), and the Indo-Pacific (Limpus, 1992; Chaloupka and Limpus, 1997; Balazs et al., 1998), where populations have declined due to exploitation of the species for its carapace used in the production of curios (Mortimer and Donnelly, 2008). Most available information suggests that populations in the Eastern Pacific have steadily declined in recent decades, but that some efforts are now underway to assess habitat usage and population numbers in several countries throughout Central America (Gaos et al., 2010; Gaos et al., 2011).

This species has been considered essentially extirpated in the Eastern Pacific (NMFS and USFWS, 1998), and it is likely that while exploitation for tortoiseshell, egg harvesting, and fisheries bycatch are all contributing factors (Mortimer and Donnelly, 2008), direct take of adults and juveniles is also likely an important factor in declining populations in this region.

Little is known regarding the ecology of this species in the waters of Honduras, aside from a few older studies (Hasbún, 2002), recent in-water studies by Dunbar et al (2008), and investigations of juvenile hawksbill home ranges by Berube et al (2012), all in the Caribbean. However, recent studies elsewhere have provided important evidence for both the presence of hawksbills and their foraging grounds along the Eastern Pacific in the Gulf of Fonseca (GOF), in Guatemala (Brittain et al., 2012), El Salvador (Liles et al., 2011), and Nicaragua (Gaos et al., 2010). Still, even in recent publications of Eastern Pacific hawksbills (Gaos et al., 2010), reports from Honduras are absent, although Gaos et al. (Gaos et al., 2011) did track hawksbills from El Salvador moving into estuarine habitats in three main areas in the Honduran coast of the GOF through satellite telemetry.

The use of mangrove habitat is, to our present knowledge, a novel association for hawksbills (Gaos et al., 2011). This species has been widely known to inhabit and forage in coral reef areas of their pan-tropical distribution (Meylan and Donnelly, 1999; Tröeng et al., 2005) where they are important ecosystem engineers, affecting the diversity, biomass, succession and availability of reef dwelling sponges (Meylan, 1988; Bjorndal, 1997; Bjorndal, 1999; Leon and Bjorndal, 2002), although they have also been reported to inhabit other peripheral habitats, such as sea grass beds (NMFS and USFWS, 1993; Bjorndal, 1997; Bjorndal and Bolten, 2010). The identification and conservation management of such unique habitat use areas for Eastern Pacific hawksbills in the GOF constitutes a high priority for the preservation and potential recovery of the species in this region.

The purpose of this study was to undertake a current collection and assessment of anecdotal information from local community members that live and fish in the Honduras coastal zone of the GOF. By undertaking this assessment and providing this report, we hope to improve the state of knowledge of hawksbills in Honduras and the wider Eastern Pacific region, and to provide a platform for additional studies and conservation efforts to take place in this region.

2.0 METHODS

2.1 Zone Delineation

We delineated zones in which to conduct interviews with fishermen and shellfish harvesters based on five regional areas within the Honduran coast of the Gulf of Fonseca (GOF) (Figure 1). These regions were selected as best representatives of communities in which we were likely to find large numbers of either fishers, or shellfish harvesters, and provided a reasonable number of potential communities in which to conduct interviews.



Figure 1. Map of the Gulf of Fonseca showing the coastal area of Honduras, and the five zones in which communities were visited to conduct interviews with fishers, community members, and shellfish harvesters.

2.2 Community Selection

Within each zone, we selected several communities in which to conduct interviews with fishers, community members, and shellfish harvesters. We first visited communities and gathered a list of potential interviewees, then set a date to return to the communities to conduct the interviews. These return dates ensured that fishers and shellfish harvesters

would be available for in-depth interviews, and also instigated an initial level of cooperation from the fishers with the interviewers. A list of fishers, community members, and/or shellfish harvesters was assembled with cell phone numbers and contact details.

2.3 Interviews

Prior to returning to each community, fishers were contacted by phone to ensure continuing agreement with the interview date and process. On returning to each community, interviewers contacted and assembled with potential interviewees, and conducted interviews with each individual.

2.4 Data Collection

Data were collected directly onto interview sheets, while approximate site locations for in-water data were collected on hard copies of maps.

2.5 Data Compilation and Analyses

We compiled numeric data from survey sheets and undertook basic statistical analyses of these data sets. Some interview questions lacked numeric data, and thus were collated for types of answers provided. These data are more variable and subjective.

3.0 PROGRESS TO DATE

3.1 Community Interviews

Interviews have been conducted in all five zones that were selected to represent the GOF. To date, we have undertaken 181 formal interviews in 28 communities along the Honduran coast of the GOF. Interviews were conducted with local fishers, community members, Tortugueros, and shellfish harvesters. When occupations were compared among communities (Figure 2), we found the majority of interviewees were fishers, and that few interviewees were shellfish harvesters. Thus far, interviews with shellfish harvesters have only been undertaken in El Carretal and Punta Ratón. In contrast to the communities of El Venado, El Carretal, Punta Ratón, and Islitas, fishers in the majority of communities are not involved as Tortugueros in sea turtle conservation (Figure 2).

In all communities, interviewees tended to be males, although some interviewees in the communities of El Venado, Cedeño, Punta Raton, Caracolito, Punta Honda, Playa El Sapote/Las Pelonas, Los Langués and Playa Blanca were women (Figure 3).

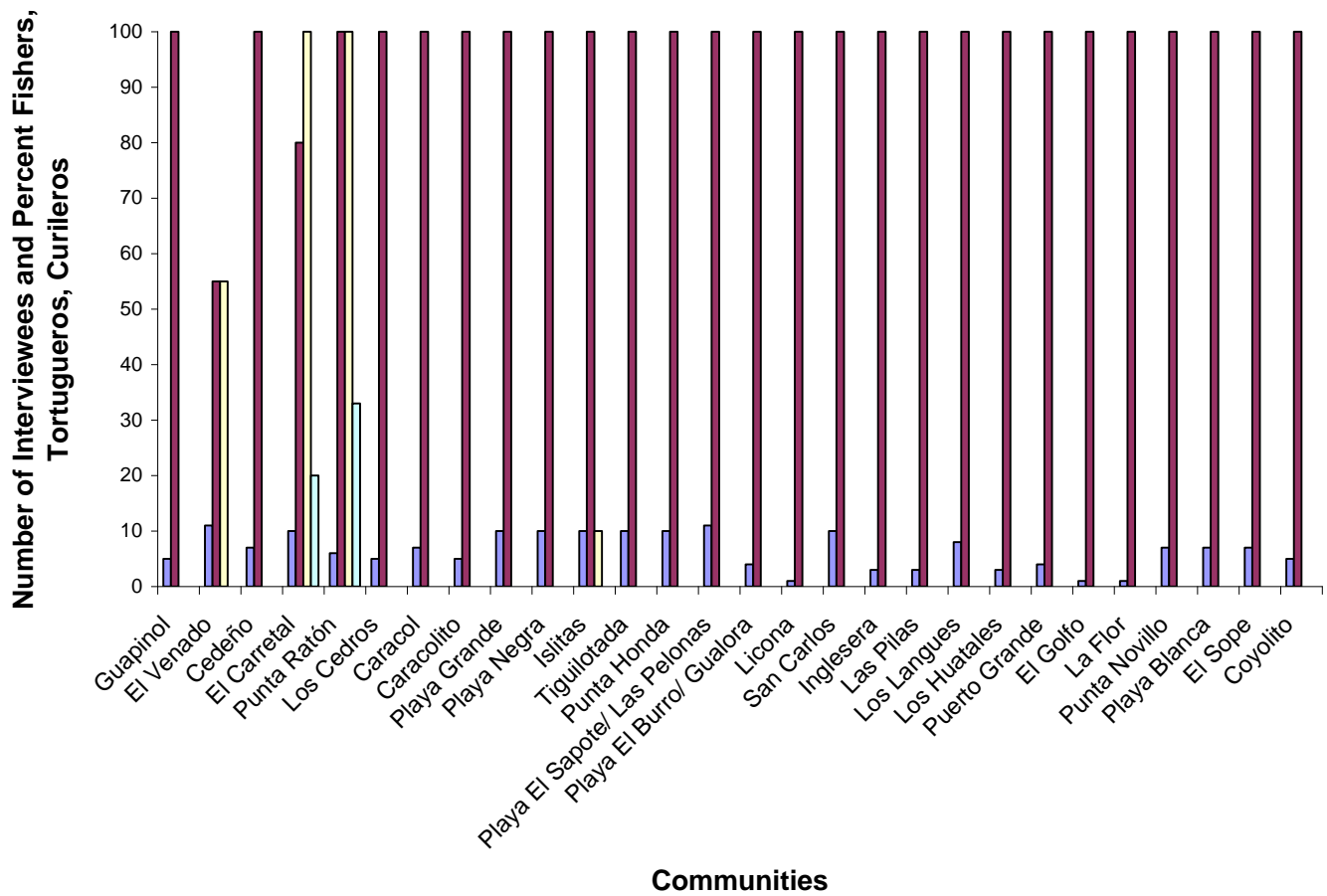


Figure 2. Comparison among communities of the number of interviewees and percentage of interviewees that are fishers, tortugueros, and shellfish harvesters (curileros).

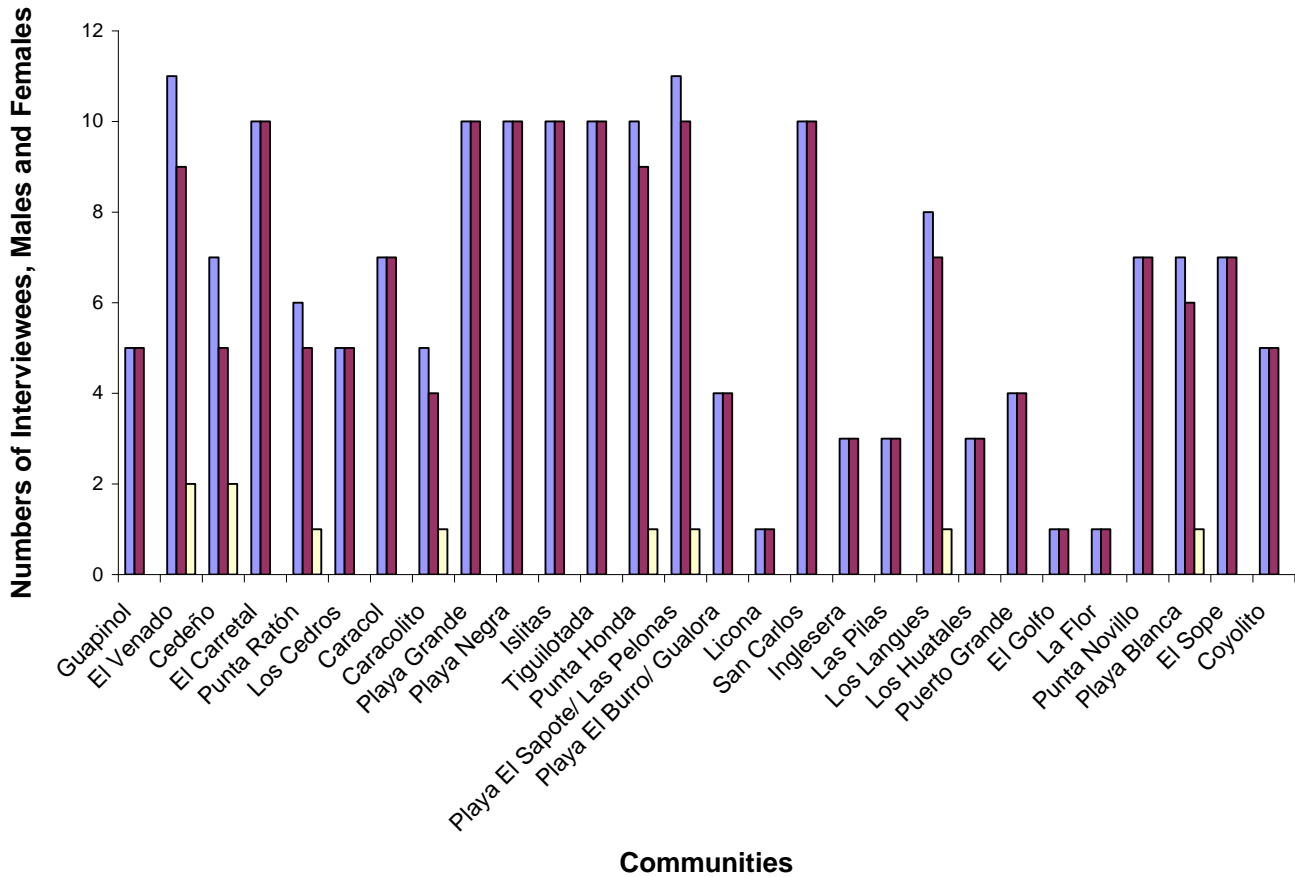


Figure 3. Number of interviewees from each community, and the number of interviewees that are males and females.

3.2 Workshops

Thus far we have conducted 28 workshops in 26 communities along the Honduras GOF. Table 1 provides details about the communities in which workshops or discussion meetings have been held to date. Each workshop was convened to bring fishers, community members, and shellfish harvesters together to provide a platform for both information gathering and dissemination about hawksbills and other turtle species in the GOF (Figures 4 and 5). In August, 2011, ProTECTOR personnel organized a regional meeting held at the community of Amapala on Isla del Tigre for August 12. Local community members met with representatives from ProTECTOR, CODEFAGULF, SERNA/DiBio, the Municipalities of Amapala and Marcovia, and ICAPO representatives from El Salvador and Nicaragua (Figures 6 and 7). This meeting facilitated presentations and interchange among participants regarding the status of hawksbills in the Eastern Pacific, current information on hawksbills in the GOF, and the collaboration of organizations toward conservation of this and other turtle species in the GOF.

Table 1. Details of communities where workshops or group discussions have been held to date.

Community	Date	Number of Participants	Occupation
El Venado	24 June 2011	10	Fishers, Tortugueros, Homemakers
Cedeño	24 June 2011	7	Fishers, Tortugueros.
Punta Raton	24 June 2011	9	Fishers, Tortugueros, Shellfish Harvesters, Homemakers.
Boca del Rio Viejo	24 June 2011	0	x
Playa Grande	31 July 2011	11	Fishers
El Cedro	31 July 2011	0	x
Caracol	31 July 2011	2	Fishers
Tiguilotada	1 August 2011	20	Fishers, Homemakers
Las Pelonas/El Sapote	1 August 2011	10	Fishers, Homemakers
Playa Negra	2 August 2011	12	Fishers
Islitas	2 August 2011	13	Fishers
Punta Honda	2 August 2011	11	Fishers, Homemakers
Puerto Grande	11 August 2011	6	
los langues	15 August 2011	10	
Punta Novillo	18 August 2011	8	
El Venado	24 June 2011	10	Fishers, Tortugueros, Homemakers
Cedeño	24 June 2011	7	Fishers, Tortugueros.
Punta Raton	24 June 2011	9	Fishers, Tortugueros, Shellfish Harvesters, Homemakers.
Boca del Rio Viejo	24 June 2011	No attendants	x
Playa Grande	31 July 2011	11	Fishers
El Cedro	31 July 2011	No attendants	x
Caracol	31 July 2011	2	Fishers
Tiguilotada	1 August 2011	20	Fishers, Homemakers

Table 1 cont.

Las Pelonas/El Sapote	1 August 2011	10	Fishers, Homemakers
Playa Negra	2 August 2011	12	Fishers
Islitas	2 August 2011	13	Fishers



Figure 4. Fishers from the community of Las Islitas on Isla del Tigre, in a small group meeting to discuss fishing practices, sightings of hawksbills during fishing, and areas of known hawksbill nesting.



Figure 5. Individual interview with a fisherman in the community of Playa Grande on Isla del Tigre.



Figure 6. Mike Liles addresses the attendees at the hawksbill meeting on the island of Amapala, in the Honduran region of the Gulf of Fonseca.



Figure 7. Attendees at the Amapala hawksbill meeting are informed about the current status of hawksbills in the Eastern Pacific, and specifically in the Gulf of Fonseca.

3.3 Nesting Beaches

Interviews in the communities provided important anecdotal information regarding nesting sites of hawksbills along the Honduran coast of the GOF. Table 2 shows nesting beaches reported from fishers, Tortugueros, and shellfish harvesters from each zone. Coordinates of each location, as well as relative harvests of eggs are presented on the map provided in Figure 8.

These data demonstrate that nearly 100% of all eggs laid at known nesting beaches along the Honduran coast are reported to be harvested for consumption (Table 2). Despite the fact that interviewees report almost all eggs are harvested, they nevertheless report that the number of hawksbills seen has either increased or greatly increased over the last 20 years (Figure 9). It is somewhat surprising that there were no reports from any communities of a reduction in sightings among nesting beaches (Figure 9).

Table 2. Nesting beaches reported from each community.

Zones	Beach Sites	Peak Nesting Months	% Eggs Removed
Zona 1. Municipio de Marcovia	Punta Condega	May, Jun, Jul, Aug, Sept, Oct	95%
	Las Doradas	May, Jun, Jul, Aug, Sept, Oct	100%
	Cedeño	Aug, Sept, Oct	100%
	Estero Punta Ratón	May, Jun, Jul, Aug, Sept, Oct	75%
	El Carretal	Aug, Sept, Oct	75%
	El Banquito (Boca del Río Viejo)	Aug, Sept, Oct	95%
	Estero El Relleno (El Carretal)	May, Jun, Jul, Aug, Sept, Oct	75%
	Brisas del Gofo (El Carretal)	May, Jun, Jul, Aug, Sept, Oct	75%
Zona 2. Municipio de Amapala	Playa El Diablo	May, Jun, Jul, Aug, Sept, Oct	100%
	Playa Grande	Jun, Jul, Aug, Sept, Oct	100%
	Playa Negra	May, Jun, Jul, Aug, Sept, Oct	100%
	Jocotillo	Aug, Sept	100%
	Playa Brava	Jul, Aug, Sept, Oct	100%
	Islitas	Aug, Sept	100%
	El Sapote	Aug, Sept, Oct	100%
	Playa La Almejera	Aug, Sept, Oct	100%
Zona 3. Archipiélago del Golfo de Fonseca. Municipio de Amapala	La Playona (Exposición)	May, Jun, Jul, Aug, Sept, Oct	75%
	Playa Los Muertos (San Carlos)	May, Jun, Jul, Aug, Sept, Oct	75%
	Playa El Golfo (San Carlos)	May, Jun, Jul, Aug, Sept, Oct	75%
Zona 4. Isla de Zacate Grande. Municipio de Amapala	Los Justillos	Aug, Sept	50%
	Playa Las Almejas	Aug, Sept, Oct	100%
	Playa La Virgen (El Sope)	Aug, Sept	25%
	Playa El Sope	May, Jun, Jul, Aug, Sept	95%

Table 2 cont.

	Playa El Tamarindo	Sep, Oct	100%
	Las Gaviotas	Aug, Sept	100%
	La Guayaba Dorada	Aug, Sept	100%
	El Carey	Aug, Sept, Oct, Nov	100%
	Playa Alta	xxxxxxxxxxxx	???
	El Esteron	Sep, Oct, Nov	75%
	Manzanilla	Sep, Oct	75%
	Isla Gueguense	Sep	95%
Zona 5. Chismuyo	La Cutu	May, Jun, Jul, Aug, Sept, Oct	75%
	Capulín	May, Jun, Jul, Aug, Sept, Oct	75%
	Jiotillo	May, Jun, Jul, Aug, Sept, Oct	75%



Figure 8. Map of the Pacific coast of Honduras showing the locations of beaches where eggs are harvested. The percentage of eggs collected are represented by the colors provided in the figure key.

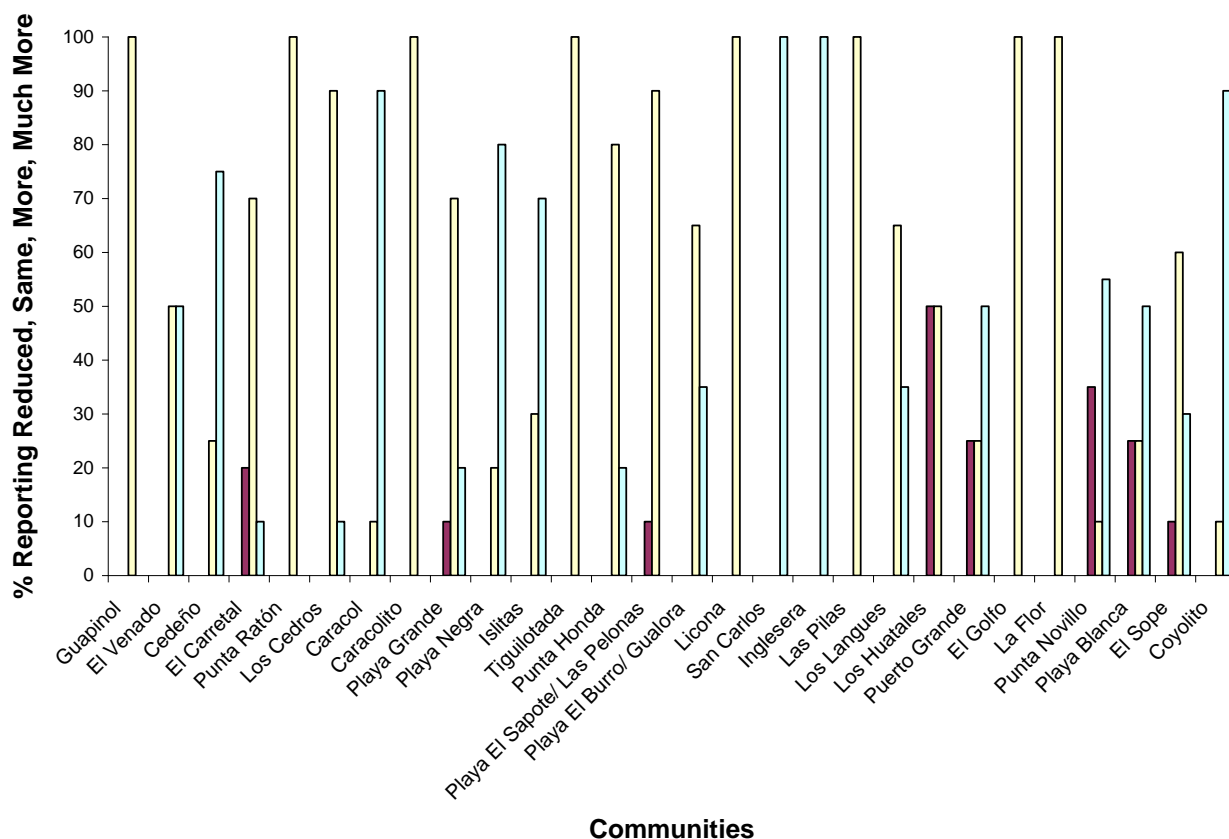


Figure 9. The percentage of interviewees from each community that reported a reduction ■, no change ■, more ■, or many more hawksbills ■ currently sighted compared with the past 20 years.

Peak nesting months appear to differ slightly among nesting beaches in the five zones and among communities (Table 2). However, the main months reported for nesting hawksbills are May through October (Table 2).

3.3.1 Nesting Conservation

Thus far, we know of only four projects along the entire coast that are involved in any form of sea turtle conservation, and these are mainly focused on the olive ridley (*L. olivacea*) during the 25 day “veda” period, in which eggs are removed from the nesting beaches to small hatcheries (Dunbar and Salinas, 2008; Dunbar *et al.*, 2010). We found that the majority of fishers did not consider themselves to be Tortugueros, except for those in the communities of El Venado, El Carretal, and Punta Ratón. Only shellfish harvesters in El Carretal considered themselves as having a role as Tortugueros.

3.4 In Water

Community interviews also gathered data on in-water observations of hawksbills by fishers and shellfish harvesters, as well as fisheries gear types and direct interactions (captures). Although some fishing areas were roughly pointed out on hard copy maps, most fishers or shellfish harvesters related fishing or harvesting areas to known beaches. Figure 10 shows the locations that fishers and shellfish harvesters stated were areas in which they had seen hawksbills while carrying out their daily fishing or shellfish harvesting activities.

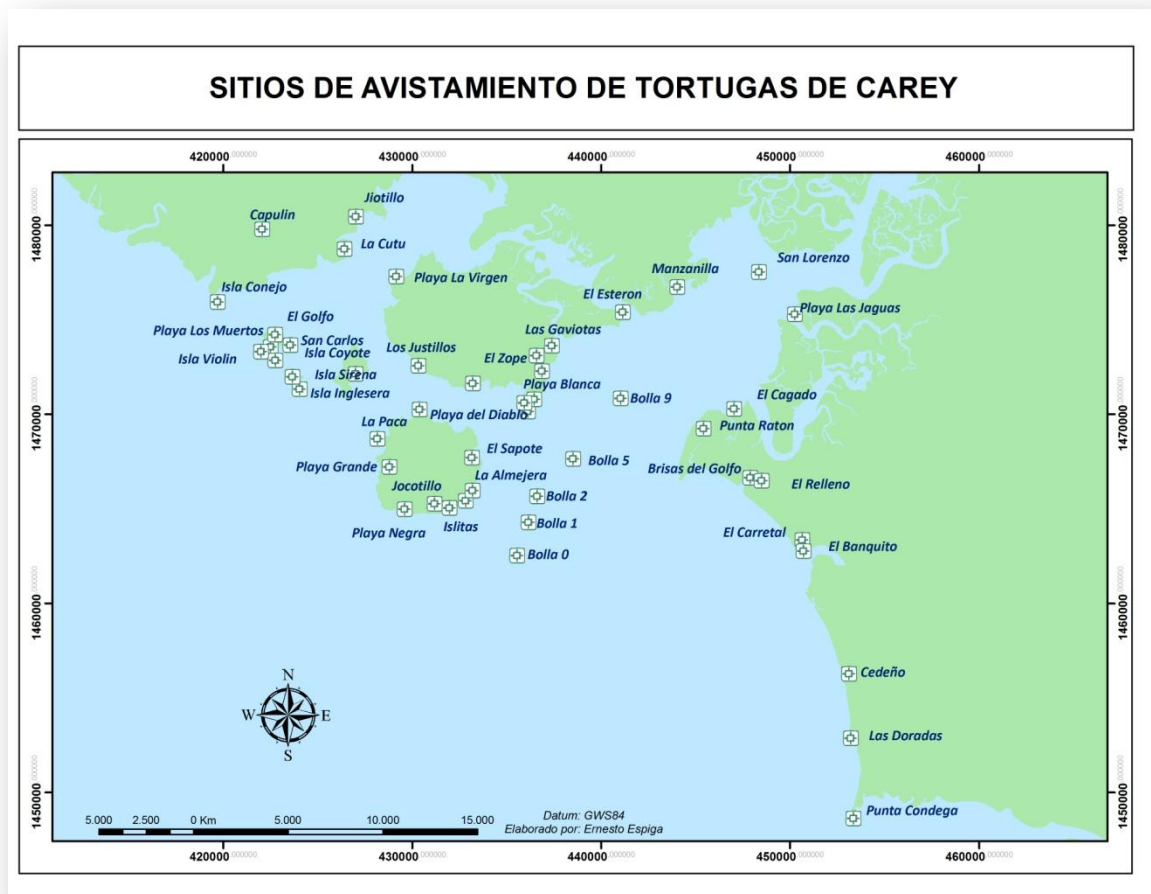


Figure 10. Map of sites throughout the Pacific region of Honduras where fishers and shellfish harvesters report seeing hawksbill turtles either at sea, or from the beaches.

Table 3 lists fishing areas (related to known beaches) provided by interviewees, as well as depths of sites, main months of observations of hawksbills, and fate of turtles caught. Analysis of data for fishing gear types is currently being done.

Table 3. Fishing areas by zone with depths at sites, main months when hawksbills are sighted, and fate of turtles caught.

Zones	Fishing Area	Depth at Site	Main Months of Observations	Fate of hawksbills Caught
Zone 1. Municipality of Marcovia	Punta Condega	5-10 m	All year	Freed
	Las Doradas	10-30 m	Jun, Jul, Aug, Sep, Oct, Nov	Freed
	Cedeño	3-10 m	Jun, Jul, Aug, Sep, Oct, Nov	Freed
	Estero Punta Ratón	3-6 m	Jun, Jul, Aug, Sep, Oct, Nov	Freed
	El Carretal	5-25 m	All year	Freed
	El Banquito (Boca del Río Viejo)	3-10 m	All year	Freed
	Estero El Relleno (El Carretal)	3-6 m	All year	Freed
	Brisas del Gofo (El Carretal)	6-8 m	All year	Freed
Zone 2. Municipality of Amapala	Playa El Diablo	5-10 m	All year	Freed
	Playa Grande	10-30 m	All year	Freed
	Playa Negra	10-30 m	All year	Freed
	Jocotillo	10-30 m	All year	Freed
	Playa Brava	10-30 m	All year	Freed
	Islitas	10-20m	All year	Freed
	Punta Honda	30-40 m	All year	Freed
	El Sapote	30-40 m	All year	Freed
	Playa La Almejera	5-10 m	All year	Freed
Zone 3. Archipiél Aug del Gulfo de Fonseca. Municipality of Amapala	La Playona (Exposición)	5-10 m	All year	Freed
	Playa Los Muertos (San Carlos)	10-20 m	All year	Freed
	Playa El Gulfo (San Carlos)	5-10 m	All year	Consumed
Zona 4. Isla de Zacate Grande. Municipality of Amapala	Los Justillos	5-10 m	All year	Consumed
	Playa Las Almejas	5-10 m	All year	Freed

Table 3 cont.

	Playa La Virgen (El Sope)	5-10 m	All year	Freed
	Playa El Sope	5-10 m	All year	Freed
	Playa El Tamarindo	5-10 m	All year	Freed
	Las Gaviotas	10-20 m	All year	Freed
	La Guayaba Dorada	10-20 m	All year	Freed
	El Carey	10-20 m	All year	Freed
	Playa Alta	5-10 m	All year	Freed
	El Esteron	5-10 m	All year	Freed
	Manzanilla	5-10 m	All year	Freed
	Estero de Las jaguas	3-11 m	All year	Freed
	Isla Gueguense	5-10 m	All year	Freed
Zone 5. Chismuyo	La Cutu	3-11 m	All year	Freed
	Capulín	5-10 m	All year	Freed
	Jiotillo	10-15 m	All year	Freed
	Estero de Las Doradas	10-15 m	All year	Freed
	Estero de El Cagado	6-8 m	All year	Freed
	El Paca	3-6 m	All year	Freed
	Islotes de Islitas (comedero)	3-6 m	All year	Freed
	Isla Sirena	5- 15m	All year	Freed
	Isla Inglesera	3-15 m	All year	Freed
	Isla Violin	3-15 m	All year	Freed
	Isla Conejo	3-15 m	All year	Freed
	Isla Coyote	3-15 m	All year	Freed
	Isla Matate	3-15 m	All year	Freed
	Los Gallos	3-15 m	All year	Freed
	Isla de los Pajaros	5-15 m	All year	Freed
	Isla de Las Almejas	5-15 m	All year	Freed
	Isla del Padre	5-15 m	All year	Freed
	Bolla 0	10-20 m	All year	Freed
	Bolla 1	10-15m	All year	Freed
	Bolla 2	10-15m	All year	Freed
	Bolla 5	10-15m	All year	Freed
	Bolla 9	10-15m	All year	Freed
	Farallones	20-30m	All year	Freed
	San Lorenzo	3-11 m	All year	Freed

It is apparent, from responses of interviewees to date, that many of hawksbills incidentally captured by fishers are reported to be released (Table 3). However, interviewees from the communities of Playa El Gulfo (San Carlos), El Venado, and Los

Justillos, in the Municipality of Amapala, reported that hawksbills caught by fishers were often consumed. Observations reported by fishers suggest, overall, that fishers see hawksbills throughout the entire year. However, the communities of Las Doradas, Cedeño, and Estero Punta Raton mainly sight hawksbills in the months from June to November.

3.4.1 Fishing Practices

The main types of fishing gear used throughout the Honduras portion of the GOF are the 8 cm and 7.5 cm mesh-size nets. These net types are used in sites reported by fishers in all five of the zones in which information on gear type was collected. In the Gulf of Fonseca Archipelago region of the Municipality of Amapala, 7.5 cm and 8 cm mesh-size nets are the only gear reported to be in use by artisanal fishers at all fishing sites in this zone (Figure 11).

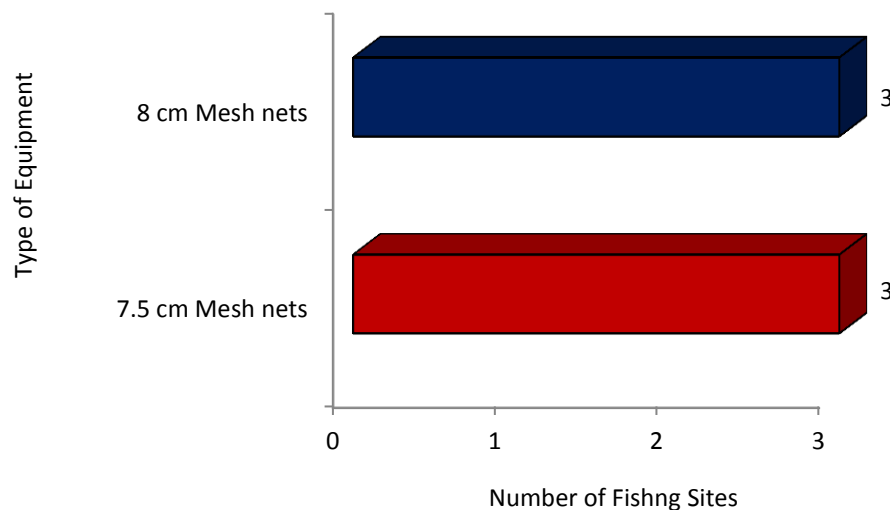


Figure 11. The number of fishing sites at which respondents stated that 7.5 and 8 cm mesh-size nets were used in the Municipality of Amapala, Gulf of Fonseca Archipelago.

Sites within the Municipality of Marcovia and the Bahia Chismuyo reported the greatest number of fishing gear types, which included 7.5 and 8 c, mesh-size nets, shrimp nets, mangas (bag net used in estuaries), “cimbras” (longlines), and fixed nets in Marcovia (Figure 12), and 6, 7, 7.5, and 8 cm, mesh-size nets, cimbras, and blast fishing in Chismuyo (Figure 13). “Roleros” are strong nets for large fish and although infrequently mentioned (Figures 12, 13, and 14), are especially hazardous to turtles, because they are unable to break these nets as they do with the finer trammel nets.

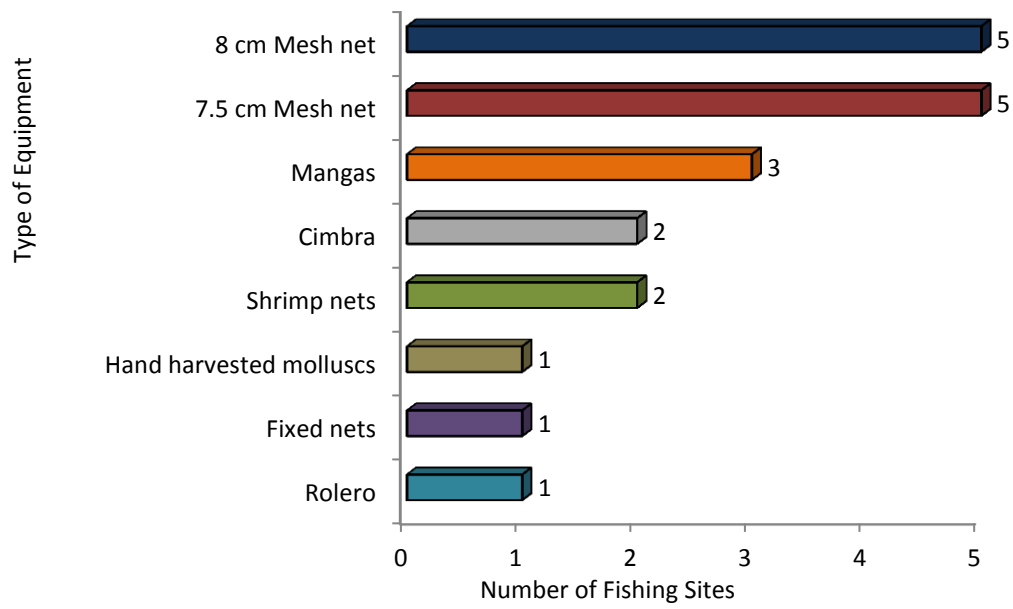


Figure 12. The numbers of sites in which different types of fishing gear are reported from respondents within the Municipality of Marcovia.

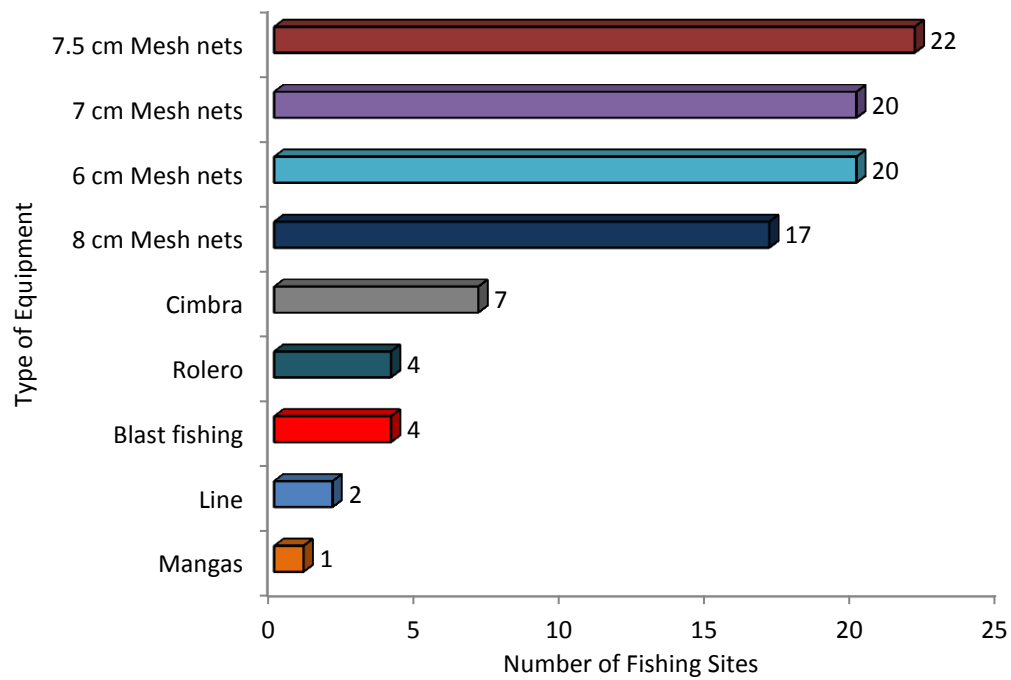


Figure 13. The numbers of sites in which different types of fishing gear are reported from respondents within the Bahia de Chismuyo.

When responses were combined from all locations (Figure 14), it appeared that fixed nets were only used at one site in the municipality of Marcovia. In contrast, sites within all five zones used 8 cm and 7.5 cm mesh-size nest. Two zones (Isla de Zacate Grande and Bahia de Chismuyo) had the most sites in which 6 cm and 7 cm mesh-size nets were used.

Destructive blast fishing was reported to occur in only 7% (4/57) of fishing sites in the Honduras region of the Gulf. All positive responses came from fishing sites within the Bahia de Chismuyo zone.

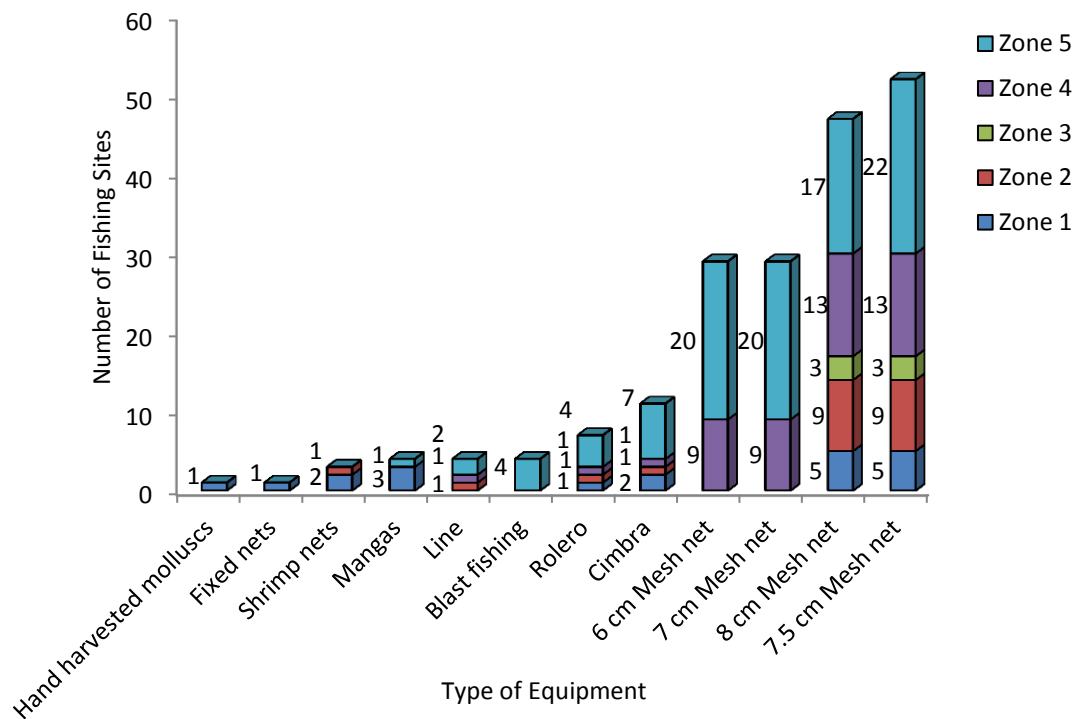


Figure 14. Types of fishing gear used in each zone of the study by number of sites within each zone.

We observed no direct evidence of destructive fishing practices, such as presence of dynamite or other bombing devices, and did not see a prevalence of injured fishers, as is the case in other regions where blast fishing is commonly utilized. In addition, we neither saw, nor heard any blasting activities in all our time in coastal zones or at sea, and fishers we spoke with did not indicate that blast fishing was used in the area, with the exception of four respondents, all from the area of Bahia de Chismuyo. Table 4 shows presence/absence data on use of blast fishing provided by fishermen interviewed in each community.

Table 4. Responses provided by interviewees regarding presence or absence of destructive bomb fishing practices for each community. Zone color refers to the same Zone as in Table 3.

	Fishing Sites	Presence/Absence of Blast Fishing
Zone 1.	Punta Condega	Absent
	Las Doradas	Absent
	Cedeño	Absent
	Estero Punta Ratón	Absent
	El Carretal	Absent
	El Banquito (Boca del Río Viejo)	Absent
	Estero El Relleno (El Carretal)	Absent
	Brisas del Gofo (El Carretal)	Absent
Zone 2.	Playa El Diablo	Absent
	Playa Grande	Absent
	Playa Negra	Absent
	Jocotillo	Absent
	Playa Brava	Absent
	Islitas	Absent
	Punta Honda	Absent
	El Sapote	Absent
	Playa La Almejera	Absent
Zone 3.	La Playona (Exposición)	Absent
	Playa Los Muertos (San Carlos)	Absent
	Playa El Gulfo (San Carlos)	Absent
Zone 4.	Los Justillos	Absent
	Playa Las Almejas	Absent
	Playa La Virgen (El Sope)	Absent
	Playa El Sope	Absent
	Playa El Tamarindo	Absent
	Las Gaviotas	Absent
	La Guayaba Dorada	Absent
	El Carey	Absent
	Playa Alta	Absent
	El Esteron	Absent
	Manzanilla	Absent
	Estero de Las jaguas	Absent
	Isla Gueguense	Absent
Zone 5.	La Cutu	Absent
	Capulín	Absent
	Jiotillo	Present
	Estero de Las Doradas	Present
	Estero de El Cagado	Present
	El Paca	Absent
	Islotes de Islitas (comedero)	Absent

Table 4 cont.

	Isla Sirena	Absent
	Isla Inglesera	Absent
	Isla Violin	Absent
	Isla Conejo	Absent
	Isla Coyote	Absent
	Isla Matate	Absent
	Los Gallos	Absent
	Isla de los Pajaros	Absent
	Isla de Las Almejas	Absent
	Isla del Padre	Absent
	Bolla 0	Absent
	Bolla 1	Absent
	Bolla 2	Absent
	Bolla 5	Absent
	Bolla 9	Absent
	Farallones	Absent
	San Lorenzo	Present

3.4.2 Juvenile hawksbills

Throughout July, 2011 ProTECTOR researchers received two juvenile hawksbill turtles at the Punta Ratón turtle center, brought in by collaborative fishers from the community. The first was brought to the center on July 14. Unfortunately, the turtle was already dead and appeared to have been debilitated for some time. Both hind flippers of this individual were missing (Figure 12). However, these injuries appeared to have taken place well before the turtle was collected, seeing that the injuries to both hind flippers had healed over, despite the seriousness of the trauma sustained. Both the dorsal and ventral surfaces of the animal were almost completely infested with cirripeds and bivalves (Figures 12 and 13), although many of these appeared to have already been dislodged prior to the collection.

The turtle was placed in plastic bags and stored in a freezer until August 15, 2011 when a necropsy of the turtle was performed. There were no obvious indications of internal trauma, or presence of plastic materials lining the respiratory or digestive tracts. We did not have the capacity to preserve tissue for later toxicological or pathological analyses, or to preserve the entire carcass. Once the necropsy had been completed, the remains were stored in plastic and buried. It is fully possible that this turtle may have been drown in discarded net remnants, or entangled in fishing line. However, no such material was present on the turtle when it was brought to the center. Still, there was no external evidence of strangulation, line or net restrictions, or cuts to the areas of soft tissue.



Figure 12. The ventral surface of a juvenile hawksbill collected by a fisher July 14, 2011, and brought to the Punta Ratón turtle center for ProTECTOR researchers to examine. Note the encrustation of both cirripeds and bivalves on the plastron, marginal, and supracaudal scales. Photo: Noemi Duron, 2011.



Figure 13. Dorsal view of deceased hawksbill collected July 14, 2011. Note the heavy encrustation of cirripeds over the majority of the carapace. Photo: Noemi Duron, 2011

On July 18, 2011, fishers from the community of Punta Ratón presented members of the ProTECTOR research team working in the community, with a live juvenile hawksbill that had been captured at sea. This turtle was infested with large barnacles (unidentified sp.) on both the dorsal (Figure 14) and ventral surfaces. In addition, the carapace and plastron were covered with a layer of unidentified red algae (Figure 15). Aside from the infestation of cirripeds and the layer of algae, the turtle appeared to be in relatively good condition.



Figure 14. A juvenile *E. imbricata*, captured by a fisher from the community of Punta Ratón in the nearshore waters of the community on July 18, 2011. The turtle was released after measurements were recorded and the turtle briefly checked for general health. Photo: Noemi Duran, 2011.

This turtle was also measured for minimum and maximum curved carapace length ($CCL_{min} = 36.2$ cm; $CCL_{max} = 38.5$ cm), falling well within reported size classes for juvenile hawksbills. Although we received numerous anecdotal reports of adult hawksbills during 2011, we were unable to confirm these by direct sightings. However, many of the respondents were able to correctly distinguish hawksbill turtles from other species from photographs or illustrations. We are, therefore, confident that reports of adult hawksbills in the Pacific region of Honduras are correct and confirmation will be forthcoming as the study continues.



Figure 15. The dorsal view of the *E. imbricata* caught July 18, 2011. A layer of red algae was noted on both the carapace and the plastron, possibly indicating that the turtle had been residing in a nearby, shallow area. Photo: Noemi Duran, 2011

4.0 DISCUSSION

4.1 Interviews

Interviews to date have provided new and important information regarding hawksbill nesting grounds, foraging areas, in-water sightings, and interactions with fishers.

While some questions in the interview facilitated numerical analyses, many did not and were relatively subjective in nature. Some weaknesses in the interview were questions related to maps, proportions/percentages, bomb/illegal fishing practices and questions requiring estimates of how many times fishers saw turtles out of 10 times fishing at the same location. These questions presume certain levels of knowledge that fishers in our region are unlikely to have. For instance, it was clear that many fishers and shellfish harvesters could not locate fishing areas or their own communities on maps, having had little or no previous experience reading maps or understanding the overview perspective of a map. Questions regarding percentages and proportions assume a level of education that allows interviewees to make such calculations. In many cases, such levels do not exist among local fishers and harvesters. In addition, questions that require remembering the last 10 fishing trips and encounters with turtles, assume that fishers are making mental notes of interactions with turtles. In most instances, this is not likely to be the

case, since fishers are more likely to be more concerned with their gear and fishing than with turtle interactions. As a final example, we noted that questions regarding illegal fishing practices and bomb fishing caused some agitation. These questions assume interviewees understand and trust their anonymity with the interviewer. If this is not the case, interviewees are likely to avoid these questions, or provide interviewer friendly (false) answers.

4.2 Nesting Beaches

Data obtained through interviews has, for the first time, anecdotally elucidated locations of nesting beaches along the Honduran coast of the GOF. While this information is critically important, there is need to further evaluate the data, monitor the reported beaches for nesting activity and confirm hawksbills are in fact nesting in the reported locations. In any case, whichever species are nesting at these sites, it is clear that nearly all hawksbill eggs are being harvested with little, if any controlled regulatory oversight. To our knowledge, aside from the four communities in which there are hatcheries in use during the “veda” period for *L. olivacea*, there appear to be no monitoring or conservation measures in place for hawksbills along the Pacific coast of Honduras. This is, in some respects not surprising, since the fishers from almost all communities do not consider themselves to be Tortugueros. Only in the communities of El Venado, El Carretal, Punta Raton and Islitas do fishers consider themselves as Tortugueros. The only community in which shellfish harvesters consider themselves as Tortugueros is El Carretal.

4.3 In Water

Fishing areas in which hawksbills are seen in the GOF, are all reported to have depths of 30 m or less with the majority of sites ranging from 5-15 m. The shallow depths of these fishing areas may facilitate the numbers of observations reported.

Although interviewees from the majority of communities reported hawksbill sightings in fishing areas throughout the entire year, it may be most advantageous to concentrate direct observation efforts in the months between June and November, as reported by the communities of Las Doradas, Cedeño and Estero Punta Raton.

Fishers in almost all communities reported that when hawksbills were caught in fishing gear, they were subsequently released. We are uncertain as to the accuracy of these reports, since it is well recognized by local fishers that the taking and consumption of hawksbills from fishing grounds is illegal. The only way to verify these reports will be to accompany fishers in the fishing areas in the following year of the current study. Furthermore, fishers and community members have reported encountering hawksbill turtles in the estuaries that line the Honduran coast. While some interviewees have reported hawksbill nesting activities within the estuaries themselves, others insist that nesting only occurs on the beaches, and that the turtles are living and feeding in the estuaries.

We have confirmed, for the first time, the presence of juvenile hawksbills in the Pacific region of Honduras within the GOF. Fishers from the area collected young turtles during

fishing activities and brought them in to shore to be examined by ProTECTOR researchers at Punta Ratón. Although one turtle was deceased when encountered, necropsy did not provide any evidence of recent internal or external trauma, or of plastic materials blocking either respiratory or digestive tracts.

4.4 In Water Threats

While we are still undertaking analyses of fishing gear types, the information collected during 2011 suggests that fishing activities within the Honduras region of the GOF is of potential concern as a major threat to hawksbills in this region. Of notable concern is the reporting of blast fishing in the area of Bahía de Chismuyo. This area is in close proximity to El Salvador, which has previously been reported to utilize dynamite fishing in its coastal waters (Gaos et al., 2010; Liles et al., 2011), and which has been reported by Liles et al. (2011) as lethally impacting adult hawksbills in that area. In no other areas of the Honduran GOF was blast (or dynamite) fishing reported in the current study. It is unlikely that this form of destructive fishing takes place outside of the Bahía de Chismuyo area, since we have received no reports of such activities from community members or authorities, and have never encountered evidences of such practices in the communities along the coast.

5.0 FUTURE WORK

The data currently reported provide the background for direct observations with fishers in the next year of the study, as well as focused investigations of hawksbills in this portion of the Gulf of Fonseca. Studies will include confirming the presence of adult and juvenile turtles in the estuaries, on-board observations with local fishers, and monitoring of reported nesting beaches for potential development of hawksbill hatcheries in this area. Additional analyses will be undertaken on types of fishing gear used and interactions with hawksbills. These analyses will also relate reports by fishermen of the current number of sightings of hawksbills compared with the past 20 years. We will also be analyzing the reported numbers of adults versus juveniles caught by the different types of fishing gear. We are currently working through additional data on the proportion of sightings by fishers estimated over 10 return trips to the same fishing site.

Additional studies are needed to monitor potential hawksbill nesting beaches, mitigate confirmed hawksbill bycatch in artisanal fisheries, and assess the feasibility of developing a network of hawksbill hatcheries along the Honduran coast of the GOF.

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