A first report on fish and turtle catch in Trudillé Jaragua National Park, Dominican Republic

National Fish and Wildlife Foundation **Project: 2008-0064-009**
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8 October 2010

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Introduction

Objectives

(see Appendix 1)

- To collect information on fishing activity and turtles caught by fishers in Trudillé, Jaragua National Park, during a 4-month period.
- To conduct one yearly in-water turtle survey in the region of Jaragua National Park.

Methods

One local and temporary inhabitant of Trudillé was hired to observe and document fishing activity. The observer recorded (1) all numbers of turtles captured and the weight of fish landed by fishing methods, (2) the number of fishers at the camp, and (3) the number of areas fished.

Six local and temporary inhabitants of Trudillé (including the above observer with one boat) were hired to conduct an in-water turtle survey (completing the 12th consecutive yearly turtle survey in the region). The in-water survey involves snorkeling at 7 selected sites following the method of León and Diez (1999).

Background

Trudillé is the largest fishing camp in the province of Pedernales, Dominican Republic. It is located near the Haitian border in the southwestern area of Jaragua National Park across from Isla Beata (Fig. 1). In 2004, fishers of Trudillé accounted for 30 % (133/449) of the licensed fishers and ~27 % (61/229) of the registered fishing boats in the province (Pons, 2004). The population of Dominican and Haitian inhabitants of Trudillé is subject to change weekly. Up to a maximum of about 200 individuals can occupy the camp. Trudillé also harbors non-licensed fishers and unregistered boats from both the Dominican Republic and Haiti. All of its inhabitants live in huts or makeshift shelters along the beach. Trudillé is very remote, there are no roads, no electrical and sanitation facilities, and freshwater is largely collected from rain and natural wells when available. Up to half of its inhabitants have no primary education or are illiterate (Y. Arias, personal communication – Grupo Jaragua, Dominican Republic).

Since 1996, in-water surveys of the turtle population in Jaragua National Park have been conducted north of Trudillé at 7 sites from Cabo Rojo to Cabo Falso (Fig. 1). Over time, the surveys have documented one of the highest hawksbill turtle densities in the Caribbean. From 1996 to 2007, the average rate of recaptured turtles was 12 %. In comparison, the average rate of recaptured turtles during surveys at Isla de la Mona (a similar long-standing in-water survey project in Puerto Rico) has been 50-60 % (C. Diez, personal communication - Department of Natural Resources, Puerto Rico). In contrast to Isla de la Mona (where the majority of hawksbills observed are large adults), very few mature individuals have been observed during the surveys conducted at Jaragua National Park. The majority of turtles are small juveniles and an occasional sub-adult is recorded.

The extent that low recapture rates at Jaragua National Park are the result of mortality or from migration away from the region is unknown. Preliminary studies indicate that the accidental bycatch of juvenile turtles may be an important mortality factor in the surveyed areas (Aucoin and Leon, 2008). Information from word of mouth suggests that the direct targeting of turtles occasionally occurs in the region. In recent years, very few hawksbill and green turtle nests have been found on the beaches along the coast of the park, possibly indicating that not many native nesting turtles remain and that adult turtles no longer occur in the region as they have historically.

Participants hired

The fishery observer (C. Gonzalez) has been assisting with in-water turtle surveys since 1996. He has fished in the region most of his life. His father was one of the founders of Trudillé over 40 years ago. During his time at Trudillé, the observer has been an active fisher, kept a basic supplies shop for a period, and also acts as pastor to the camp.

The in-water survey team has had its 4 original members participate in surveys since 1996 (including the above observer). The team usually consists of 7-8 members (Fig. 3), 6 of them fishers from Trudillé. These 6 fishers are skilled free-divers and familiar with the regional marine environment. Local and foreign volunteers also accompanied the hired team to help and learn about the surveys.

Observer results

Fish, lobster, and mollusc landings

Between 17 September 2008 and 23 April 2009, the observer recorded a total of 33 Dominican fishers and 30 Dominican boats at Trudillé. The low number of fishers and boats reflects the particularly strong and long hurricane season in 2008. The 3 most common fishing methods at Trudillé are fish traps, gillnets, and diving. A total of 20 fishing sites (with names) were identified, but the observer failed to take detailed GPS waypoints. The catch landed is as follows:

Fishing method	Fish (kg)	Lobster (kg)	Conch (kg)	Octopus (kg)
fish traps	4885	365	0	36
gillnets	4525	1	0	0
compressor-aided dives	18	3	308	0

Trammel nets

24 adult turtles were recorded captured in trammel nets.

Between 22 October and 10 December 2008, one fishing crew from Trudillé caught 6 adult hawksbill turtles and 7 adult green turtles with a single trammel net. The hawksbill turtles averaged 87 cm (SD=7 cm) in curved carapace length (CCL) and green turtles averaged 98 cm (SD=19) in CCL. All turtles captured were in waters <8 m in depth. The trammel net gave a catch rate of 0.025 turtles$\cdot h^{-1}$.

The ~80-m trammel net (~4 m in width and ~25 cm in stretched mesh size) was deployed 19 times at 4 sites at depths of 3 to 20 m in a 50-d period (Fig. 2). The net was left to soak an average of 22:30 h (SD=6.25 h) per deployment (excluding one 4-d soak due to weather). The fishers also targeted rays and caught 7. Measurements taken on 5 of the 7 rays captured gave an average weight of 45 kg (SD=11 kg) per ray.

The net was set at Bucane de Tuí ~75 % of the time (Fig. 1) where 6 of the 7 green turtles and 5 of the 6 hawksbills were captured. The other 2 turtles were captured in the nearby area of Pardero de Adolfo. We do not know this specific location at present. One 88-cm hawksbill caught at Bucane de Tuí had Iconel tags WE7830 and WE7827 on its flippers. The tags indicated a female hawksbill tagged on 15 June 2008 at Sandy Beach on the south coast of Barbados (J. Horrocks, personal communication – University of the West Indies, Barbados).

In the early spring of 2009, a similar trammel net was found abandoned in the same general area. Our observer reported that 11 adult turtles were captured and that the net had been lost for at least 2-3 weeks. Iconel tags WH6414 and WH6416 were reported to a park ranger by another fisher

shortly after this occurrence. The tags indicated a female hawksbill tagged on 8 June 2008 at Needham's Point, an IUCN Index beach, in southwest Barbados (J. Horrocks, personal communication – University of the West Indies, Barbados).

Gillnets

No turtles were recorded captured by gillnets.

Between 27 November 2008 and 23 April 2009, 15 fishing crews from Trudillé deployed gillnets measuring ~1500-m (~2 m in width and ~7 cm in stretched mesh size) at 12 sites. The gillnets were deployed 85 times at depths of 3 to 30 m and left to soak an average of 18 h (SD=1.5 h) per deployment in a 148-d period. They were set 11 times at Bucane de Tuí (where the trammel net captured turtles). These gillnets gave a catch rate of 2.7 kg of fish·h^{-1}.

Between 17 October 2008 and 8 December 2009, 5 fishing crews deployed gillnets measuring between 450 to 1300 m (2-3 m in width and ~7 cm in stretched mesh size) at 7 sites. The nets were deployed 8 times at depths of 3 to 37 m and left to soak an average of 15:30 h (SD=8 h) per deployment in a 53-d period. They were only set twice at Bucane de Tuí. These gillnets gave a catch rate of 3.0 kg of fish·h^{-1}.

Fish traps

No turtles were recorded captured by fish traps.

Some fish traps are known to capture small turtles (R.K. Bjorkland, personal communication concerning fish traps in Jamaica – Duke University, USA). Between 27 November 2008 and 23 April 2009, 19 fishing crews deployed fish traps at 15 sites. An average of 58 traps (SD=36) per site were deployed 135 times at depths of 3 to 30 m. Traps were left to soak an average of 148 h (SD=9 h) per deployment in a 148-d period. The catch rate was 0.2 kg of fish·h^{-1}·$trap^{-1}$.

Compressor-aided dives

No turtles were recorded captured by divers.

Between 27 November and 10 December 2008, 2 diving crews went out 5 times at 4 sites. Divers principally sought queen conch at depths of 24 m to 30 m. An average of 63 kg of conch (SD=17 kg) were landed each diving trip.

In-water turtle survey results

65 hawksbill turtles and 12 green turtles were recorded.

The in-water turtle surveys (sites 1-7; Fig. 1) were conducted from 21 to 25 July 2008. The survey team (Fig. 3) recorded 65 hawksbill turtles and 12 green turtles. The turtles were measured and tagged when necessary. There were 4 hawksbill turtles and 1 green turtle recaptured from previous years. The hawksbill turtles averaged 29.3 cm (SD=10.3) in straight carapace length (SCL) and green turtles averaged 35.6 cm (SD=7.7) in SCL.

The survey team also brought 10+ local volunteers of non-governmental organizations Grupo Jaragua (the local biodiversity conservation authority) and AGUINAPE (Asociación de Guías de Pedernales – a local nature guide organization; Fig. 4) to give them a hands-on opportunity to learn about turtles and their habitat.

Discussion

Given the few hawksbill and green turtle nests recorded over the years in Jaragua National Park, and the predominance of juvenile turtles observed during in-water surveys, we did not expect a considerable number of large mature turtles to be found in the fishing region of Trudillé (indicated by the 24 large adult turtles captured in trammel nets at Bucan de Tuí). Fortunately, few trammel nets were recorded during our study. However, catch observations were only recorded from Dominican fishers at Trudillé. Haitian fishers in these coastal waters are known to often use nets, including trammel nets (Pesekas, 2008). We also have no information from smaller fishing embarkation points strewn along the coast from Cabo Rojo to Petit Cabo, where fishers may also camp and land their catch.

Given our past observations of juvenile turtles captured in gillnets in the area of the in-water survey sites (Aucoin and León, 2008), it is perhaps surprising that no turtles were captured in the gillnets reported at Trudillé. However, as the majority of the gillnets reported were set around Isla Beata (41 % of all deployments among the 12 sites where gillnets were deployed), and that fishers from Trudillé frequently stop at Isla Beata when fishing nearby, we cannot rule out that captured turtles could have been brought to the island (the second largest fishing camp in the province).

From an ongoing World Wildlife Foundation study[1] (WWF), 7 of 9 hawksbill turtles with recent satellite transmitters attached at Isla Saona (eastern Dominican Republic) have passed through the fishing grounds of Trudillé and Isla Beata on their migrations to Central America. Further, one recent study from Turks and Caicos (Richardson *et al*., 2010) and another from Isla de la Mona, Puerto Rico (Van Dam *et al*., 2007), both showed hawksbill turtles passing through this same area during their migrations. From our study, two adult hawksbill turtles tagged in Barbados were also present in the area (and unfortunately captured in trammel nets). The number of potentially transitory adult turtles observed in this study, and the migratory trajectories of turtles in the aforementioned studies (which appear to 'bottle-neck' in the area of Trudillé and Isla Beata) suggest that the coast of Jaragua National Park may provide an important migration pathway or corridor for a number of mature turtles from different parts of the Caribbean. In-water surveys over 12 years at sites 1 through 7 (Fig. 1) already strongly suggest that the coast of Jaragua National Park provides important feeding grounds for juvenile hawksbills of the Caribbean (León and Diez, 1999; Y. León, unpublished data).

Our study at Trudillé has indicated that a notable number of adult hawksbill and green turtles occur in Jaragua National Park between Cabo Falso and Petit Cabo. This had not been revealed during yearly in-water surveys, and now suggests the importance of increasing the survey range to this area. This study has also revealed that the majority of fishers at Trudillé use fishing methods that currently do not appear to capture turtles. Further information should be collected on fishing activity and potential turtles caught by fishers in the fishing camp at Isla Beata, the largest fishing camp after Trudillé. In 2004, Isla Beata accounted for ~13 % (59/449) of the licensed fishers and ~15 % (34/229) of the registered fishing vessels in the province (Pons, 2004).

We recommend expanding the survey range to include Bucan de Tuí, and increasing the frequency of in-water surveys per year. This would involve more fishers in turtle conservation. The single fishing crew that captured turtles shows how even only one boat targeting turtles can pose a significant problem to turtle conservation in the Dominican Republic and to other Caribbean countries as far away as Barbados. This also highlights the susceptibility of turtles vis-à-vis much smaller permanent and often temporary fishing camps along the coast in the area. The fisher responsible for capturing turtles (based at Trudillé) was eventually reported to the local authorities and thus fled. Fewer fishers inhabiting smaller and more intimate fishing camps (or more remote ones such as Isla Beata) may be able to target turtles with less fear of legal repercussions.

[1] www.seaturtle.org/tracking/?project_id=291 (L. Hawkes, unpublished data)

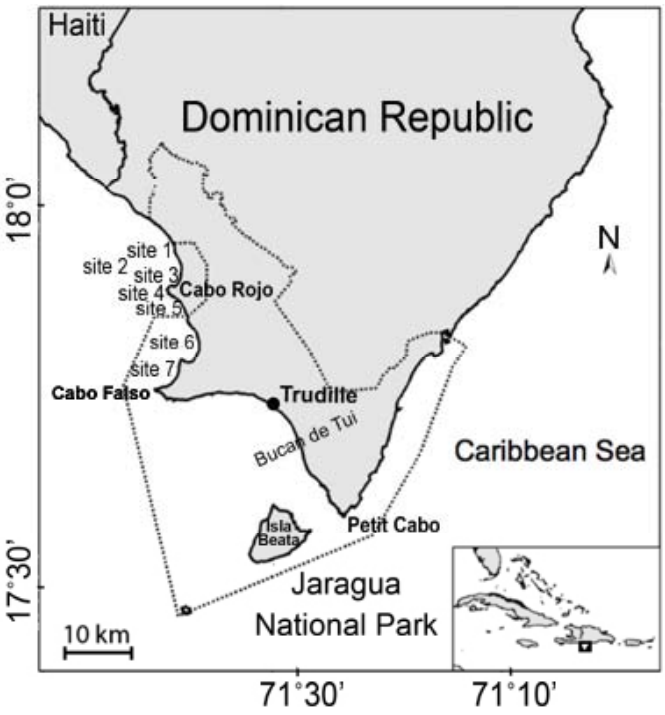

Figure 1. The fishing camps Trudillé and Isla Beata in Jaragua National Park (dotted lines). The fishing site Bucane de Tuí, where turtles where captured, is just below Trudillé. The 7 turtle survey sites are from Cabo Rojo to Cabo Falso.

Figure 2. The trammel net used to capture the 13 turtles at Bucane de Tuí and Pardero de Adolfo (photo by C. Gonzalez).

Figure 3. The observer C. Gonzalez (left) and 7 other members of the turtle survey team. The team leader Y. León is taking the picture.

Figure 4. Local volunteers of non-governmental organizations Grupo Jaragua and AGUINAPE (Asociación de Guías de Pedernales) on a day fieldtrip during in-water fieldwork conducted by the turtle survey team (photo by Y. León).

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Appendix 1.

Project planning/outcome (submitted on 21 April 2008). Revised from original application submission with Tom Barry, Assistant Director of the NWFS Marine Programs.

Schedule	Activities	Project Outputs	Post-Project Outcomes	Indicator	Baseline Value	Predicted Value Project Output	Predicted Post-Project Outcome
1 week	(1) In-water turtle survey at PNJ	Turtle abundance trends and recapture rates are assessed for 2008 (conducted yearly since 1996)	Long-term population estimates and trends	Number of turtles caught over time	n/a	n/a	n/a
4 months	(2) Recruit fisher (Claudio Gonzalez) fishing with nets to collect catch data	Comparative data on catch per 1 to 2 types of nets (including turtles)	Knowledge of rates of catch and turtle mortality by different nets and fishing sites	Number of net fishers collaborating with data collection	0	1 fisher	1 fisher
	(3) Employ Claudio Gonzalez to collect information on number of net fishers and quantities of nets being used at Trudillé (main fishing community at PNJ)	Database on net fisheries in the largest fishing community at PNJ	Understand fishery characteristics and recognize the level of fishing intensity by net fishers at Trudillé	Number of net fishers evaluated	0%	25%	75%
1 month	(4) Collate all data and analyze	Assessment of the net fisheries and their potential impact on turtle populations at Trudillé	Local fishing practices and regional government understand risks to turtles in net fisheries and related issues	Preliminarly turtle risk assessment report	no	yes	yes