



**2004 PEARL CAYS HAWKSBILL  
CONSERVATION PROJECT, NICARAGUA**

Final Report for  
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## ***Introduction***

The hawksbill turtle, *Eretmochelys imbricata*, is considered to be critically endangered with most populations in serious decline (Nietschmann 1981; King 1982; Groombridge and Luxmoore 1989; Lagueux 1998; Meylan 1999; Meylan and Donnelly 1999). On Nicaragua's Caribbean coast, hawksbill nesting occurs on the Pearl Cays, at El Cocal, and sporadically along the mainland; and all size classes forage in offshore coastal waters (Lagueux et al. 2003; Lagueux and Campbell unpubl. data). The Pearl Cays rookery is believed to be the largest remaining nesting population in the west-central Caribbean (Lagueux et al. 2003) and as such, has been identified as an important index site within the greater Caribbean for long-term population monitoring (see <http://www.cites.org/fra/prog/HBT/dialogue2/E-HT2-8.doc>). The Pearl Cays area also provides important foraging habitat for hawksbill turtles that nest both on the Pearl Cays and across the wider Caribbean, with up to five source populations identified in the Nicaragua foraging aggregation (Lagueux et al. 2001).

The Pearl Cays hawksbill population is severely threatened by decades of uncontrolled harvest of nesting females and their eggs, and by the opportunistic capture of foraging juveniles and adults (Nietschmann 1981; Lagueux et al. 2003). In 1999, we conducted the first systematic surveys of the Pearl Cays rookery and discovered that nearly 100% of the clutches laid were taken by local fishers for personal consumption, and nesting females were killed for their meat and scutes whenever encountered. In 2000, we implemented a local and government approved project to protect nesting females and their eggs. We also implemented a volunteer program that provides an incentive to local fishers and private guards to protect nesting females and donate live turtles to the project to be tagged and released. This volunteer project provides an opportunity to educate locals and engage them in sea turtle conservation activities.

Both the volunteer and Pearl Cays nesting beach projects have been highly successful at reducing hawksbill mortality in the Pearl Cays area. For example, there has been a steady decrease in the number and percent of clutches poached and the number of clutches laid has increased since initiation of the nesting beach project (Lagueux et al. 2003; Campbell and Lagueux 2004). In addition to protecting females and eggs, we have increased our efforts to conduct night patrols and collect data on nesting females to better understand nesting ecology and habitat needs of hawksbills in the Pearl Cays.

## ***Objectives***

To build on the accomplishments attained thus far, our objectives for the 2004 season were to:

1. Quantify nesting activity by date and location on 12 of the Pearl Cays.
2. Increase survival of nesting females and egg clutches.
3. Determine hatching and emergence successes.
4. Initiate efforts to understand the effect of habitat alteration on nesting and hatching success.
5. Collect biometric data on nesting females.

6. Promote hawksbill conservation through local and regional radio, television, and print media, and through education and training of local inhabitants and students assisting with project activities.
7. Improve local participation and collaboration on the project, and increase local, regional, and national government involvement in the conservation of hawksbill turtles.

### ***Methods and Results***

At the onset of the nesting season, the WCS Marine Turtle Conservation Youth Group gave a presentation about sea turtles on the Pearl Lagoon radio station that was broadcast throughout the Pearl Lagoon basin. This presentation was recorded on camera and also presented on the local cable channel. Once the season commenced, the Youth Group gave weekly radio spots to update the communities on the status of the hawksbill project and any problems that were being encountered.

Daily nesting beach surveys were conducted by local, coastal inhabitants (Francisco Escobar, Kenneth Fedrick, Roy Hodgson, Steve Lopez, Dorian McCoy, William McCoy, and Mykell Medrano) and two students from the Bluefields Indian & Caribbean University (BICU) (Yomary Daniels and Lazaro Jarquin), representing seven communities and towns. In addition to conducting daily nesting beach surveys Ms Daniels and Mr. Jarquin conducted research for their senior thesis. Periodic surveys were conducted in May and early June to determine the onset of the nesting season. Daily surveys were initiated on 11 June and continued until 19 October 2004. During each survey, data on the status and location of each new nest was recorded. Nests were relocated as deemed necessary by survey teams. Additional surveys were conducted post-19 October by the nest excavation team. A total of 1,531 surveys were conducted on 12 of the Pearl Cays from 10 May to 29 November.

A total of 176 egg clutches were laid on all 12 cays. Eighty-eight clutches were left *in situ* and 83 clutches were relocated by the survey team, the remaining five clutches were poached prior to encounter by the survey team. The distribution of nesting is shown in Table 1. The majority of clutches were deposited on Wild Cane Cay (31.3%), however, about 14% of clutches were laid on each of three additional cays, Columbilla, Crawl, and Water. Poaching activities were again low in 2004, with only 19 clutches completely poached and 4 clutches partially poached (meaning some eggs were taken but part of the clutch hatched), for a total of 13.1% of the clutches affected by poaching activity.

Hatching and emergence success for all clutches was 69.7% and 67.3%, respectively; regardless if any eggs hatched, and are similar to previous years. We estimated that at least 14,100 hatchlings emerged from nests in the Pearl Cays in 2004. (The exact number of emerged hatchlings cannot be determined since some nests could not be located to excavate and in other cases eggs shells were too fragmented to count.) Of the 153 clutches that were not poached, 142 clutches (92.8%) successfully hatched, 6 clutches (3.9%) were either completely or partially destroyed by rats on Wild Cane Cay, 4

clutches (2.6%) did not hatch (at least 2 of these were associated with water inundation), and 1 clutch (less than 1%) was washed out by high tides.

Table 1. Distribution of hawksbill nesting and poaching activities in the Pearl Cays, Nicaragua in 2004.

Cay	Total Clutches Laid		Clutches Poached or Partially Poached	
	Number	Percent	Number	Percent
Baboon	7	4.0	1	4.3
Black Mangrove	3	1.7	1	4.3
Bottom Tawira	3	1.7	2	8.7
Buttonwood	2	1.1	1	4.3
Columbilla	26	14.8	2	8.7
Crawl	24	13.6	2	8.7
Grape	12	6.8	4	17.4
Lime	11	6.3	2	8.7
Maroon	2	1.1	0	0
Vincent	6	3.4	3	13.0
Water	25	14.2	3	13.0
Wild Cane	55	31.3	2	8.7
Total	176	100	23	99.8

Night surveys for nesting females were conducted frequently in July, August, and September by field staff and project supervisors. During our night patrols, we had a total of 41 encounters of nesting females, 23 of these encounters represented individual females with the remaining 18 resightings of the 23 individual females. Of the 23 females we encountered in 2004, 14 were tagged for the first time, and 9 were females that remigrated to the Pearl Cays from the 2002 nesting season. Only 17 females were tagged in 2002, thus, more than 50% of the remigrants from 2002 exhibited a two year remigration interval.

On 29 August, we deployed a satellite tracking device on one of our remigrant turtles as part of our collaboration with the National Marine Fishers Service, Office of Protected Species. The turtle migrated north, northeast of the Pearl Cays to an area just northeast of the Miskito Cays, a distance of more than 200 km. The location and movements of the turtle can be found at <http://wcs.org/sw-around-the-globe/marine/marinelacaribbean/nicaraguaseaturtle>. We used this opportunity to educate and build awareness among community members and local authorities about sea turtles and their conservation needs. The event was broadcast on radio stations and cable television in Pearl Lagoon and Bluefields. We also involved the WCS Youth Group in this activity by providing hands on experience with night patrols,

data collection, and assistance with fitting the tracking device on the turtle. As of March 2005, we were still receiving location data.

### ***Discussion and Conclusions***

Nesting activity on the Pearl Cays has increased in the past two years compared to the first three years of the program. In the first three years of the program the total number of clutches laid ranged from 154 to 158 per season, and the number of clutches laid in 2003 and 2004 was 171 and 180 for the same 10 cays. We believe this is a result of increased survival of nesting females. In other words, fewer nesting females are being killed during the reproductive season and thus are able to lay their complete complement of clutches for the season, rather than being killed after laying only one or two clutches. This apparent increase in the survival rate of reproductive females at the nesting site will aid in the recovery of this population more quickly. We are encouraged by this consistent increase in nesting activity.

Local fishers are becoming more cooperative with conservation efforts in the Pearl Cays and making efforts to aid in project activities, such as, informing the survey crew of clutches laid, capturing females after they lay and giving them to the survey team to be tagged and released. We anticipate that these efforts will continue to grow in the future as the project expands and more people become involved.

Local authorities are also more strongly supporting the conservation of hawksbills in the Pearl Cays. For example, the Pearl Lagoon Mayor and board members created an ordinance to incarcerate anyone found killing hawksbills or taking eggs. This is a very important step by local authorities to discourage poaching activities. Enforcement of this ordinance will be crucial to eliminate all poaching of hawksbills in the Pearl Cays. In addition, it will lay the foundation for other municipalities interested in taking stronger steps towards sea turtle conservation on Nicaragua's Caribbean coast.

In recent years, habitat alteration and destruction have been severe on several cays used by hawksbills in the Pearl Cays. We observed changes in nesting behavior during the past four years that were likely the result of changes to the nesting habitat. For example, there has been more wandering by nesting females on the upper beach platform in areas where vegetation has been removed; and an increase in clutches deposited in poorly drained soils and behind dunes, which is inappropriate for incubation of clutches, rather than among dune vegetation, as is typical for hawksbills. Other human activities such as the introduction of domestic animals that alter the beach (e.g., pigs), improper disposal of garbage and human waste that makes the habitat unsuitable, construction of buildings on the nesting beach which damages the beach and eliminates valuable nesting areas, are all negatively impacting hawksbill turtles, as well as other marine resources in the Pearl Cays. Government authorities need to create regulations to discourage destructive activities on or near the Pearl Cays, and enforce those regulations. The declaration of the Pearl Cays as a marine protected area would be a first step in regulating destructive activities and protecting this valuable ecosystem.

Although we are very encouraged by the results from the past five years of conservation activities in the Pearl Cays, there is still work to be done. With more than 13% of the clutches being poached, this represents a loss of as many as 2,000 hatchlings that might have hatched during the 2004 season alone, instead the eggs were never allowed to incubate. This is an unnecessary loss and is contrary to the efforts of many people to recover this population of hawksbill turtles. Enforcement of existing regulations is needed to ensure that hawksbills are protected and are given the opportunity to recover in the Pearl Cays.

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Photos:



2004 Survey Teams: Kenneth Fedrick (front), William McCoy (right front, Field Supervisor), Dorian McCoy (2<sup>nd</sup> row, left), Steve Lopez (2<sup>nd</sup> row center), Roy Hodgson (2<sup>nd</sup> row right), Mykell Medrano (back left), Yomary Daniels (back left, Student), Lazaro Jarquin (back right, Student), Francisco Escobar (back left). Photo: ©WCS/C.J. Lagueux.



WCS Youth Group and WCS staff with adult hawksbill outfitted with satellite transmitter. 1st row: Kendall Martinez, Milda Martinez, Conrad Howard; 2<sup>nd</sup> row: Shonny Thyne, Laura Pondler, Sheila Hooker, Cynthia Lagueux, Cathi Campbell; 3<sup>rd</sup> row: Denis Hansack, Deyvon Ordoñez, and William McCoy. Photo: ©WCS.