

Field report to
Belize Marine Program, Wildlife Conservation Society

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Principal Objective

Establish protocol for nesting beach monitoring and in-water monitoring for sea turtles at Glover's Reef Marine Reserve (GRMR), and provide training to caye owners, Fisheries Department staff, and Wildlife Conservation Society (WCS) staff to conduct long-term monitoring program.

Nesting Beach Monitoring

A presentation on sea turtles, their nesting behavior, and identification characteristics was given at the WCS research facility on Middle Cay, Glover's Reef Marine Reserve. The presentation included detailed information on identification of adults, hatchlings, eggs, and tracks of three species of turtles that occur at GRMR. Nesting habitat needs and threats, natural and man-made, were discussed. Participants included six Fisheries Department staff, including the Managers of Bacalar Chico Marine Reserve, South Water Caye Marine Reserve, and GRMR, as well as a biologist and two rangers from the GRMR. In addition, two land owners of GRMR cayes (and two of their children) attended, and three WCS/Belize staff. After the presentation, we visited Long Caye and Northeast Caye and discussed nesting habitat condition and artificial lighting. Handouts on species identification characteristics and artificial beach lighting were provided.

In-water Monitoring

Six Fisheries Department staff and three WCS staff participated in the training of in-water sea turtle surveys and captures. A brief meeting to discuss the purpose and methodology of the in-water surveys was conducted. We discussed that we would first do reconnaissance to check out areas around the atoll based on their recommendations as having experience sighting turtles in the area. We also discussed how the surveys should be conducted, a team snorkeling at a distance of 10-20 meters apart, swimming parallel to one another. Methods for counting and capturing sighted turtles were determined with the team in the field.

We conducted in-water surveys near Long Caye, Middle Caye, Northeast Caye, Rockhead, Southwest Channel, Baking Swash, and Fishermen's Camp 1 & 2. In some cases, we surveyed the reef wall, forereef, shelf and white sands areas. We also surveyed two channels (near Northeast and Southeast Cayes) and a backreef area by boat on the northeast side of the atoll. During the approximately 11.5 hours of in-water surveys conducted we sighted 38 sea turtles, averaging 3.3 turtles sighted per hour surveyed. Of these 38 turtles sighted, 76.3% were juvenile hawksbills, 5.3% were adult loggerheads, and 5.3% were post-pelagic juvenile green turtles, and 13.2% were not identified to species (Table 1). The greatest proportion of turtles was sighted between Fisherman's Camp 1 & 2, with seven sightings in one hour, followed by Rockhead with six sightings in one hour. These two sites are on the northwest and west side of the atoll, respectively.

Of the 38 turtles sighted, 10 turtles were captured. Participants were trained on measuring, weighing, tagging, collecting genetic tissue samples, and recording data on the captured turtles. All turtles were measured and tagged (with the exception of the small juvenile green turtle that was too small to be tagged with the 1005-4 size monel tags). Genetic tissue samples were collected from all turtles except the juvenile green as we did not have sufficient tissue buffer. Tissue samples were given the Fisheries Department to send away for processing. Of the ten captured, eight were juvenile hawksbills, one was an adult male loggerhead, and one was a small juvenile green turtle. The average size of the hawksbills was 39.9 cm straight carapace length (minimum), SCLmin, and ranged from 32.7 cm to 49.6 cm SCLmin. The adult male loggerhead was >80.0 SCLmin (85.0 cm curved carapace length minimum), however, our calipers were too short to obtain a precise straight-line measurement. The green turtle was only 22.2 cm SCLmin, which is within the size range we expect to have recently recruited from feeding in pelagic habitat into the benthic feeding area on the western side of the atoll.

Date	Location	# of snorkelers	Duration (minutes)	Distance covered	Ei sighted	Cc sighted	Cm sighted	Spec Unk	Total Sighted	# Captured
22-Apr	LC-White Sands	5	30		0	0	0	0	0	0
22-Apr	LC-Wall	6	45		1	0	0	0	1	1
22-Apr	MC-Wall	6	10		1	0	0	0	1	1
22-Apr	MC-Wall	6	30		1	1	0	0	2	0
22-Apr	MC-Wall	2	25		0	0	0	0	0	0
23-Apr	Rockhead	5	60		5	0	1	0	6	1
23-Apr	SW-channel (SE)	6	45		3	0	0	0	3	0
23-Apr	SW-channel (W)	6	47		2	0	0	2	4	0
24-Apr	Baking Swash	6	30		2	0	0	0	2	0
24-Apr	Fisherman's Cut (S)	6	24		0	0	0	1	1	0
24-Apr	NE-Channel	6	15		0	0	0	0	0	0
24-Apr	MC-Shelf	5	40		2	0	0	0	2	0
25-Apr	NE-Forereef	5	60		2	0	0	1	3	0
25-Apr	LC-Forereef	5	60		1	0	0	0	1	0
25-Apr	NE-Channel	6	30		0	0	0	0	0	0
25-Apr	LC-White Sands	6	20		1	0	0	0	1	1
26-Apr	Fisherman Camp 1	7	60		3	1	0	0	4	2
26-Apr	Fisherman Camp 1/2	6	60		5	0	1	1	7	4
Total			691		29	2	2	5	38	10

Summary

We were successful at providing initial training in the development of a nesting beach and in-water monitoring program for sea turtles in GRMR. Participants now have a much better sense of sea turtle nesting behavior, habitat needs, and species identification characteristics. Monitoring the nesting beaches to better understand the status of nesting sea turtles and improve nesting beach habitat conditions are needed in GRMR. The success of in-water surveys, captures, and ability to establish a consistent survey/capture protocol during this five day effort suggests that a long-term in-water monitoring program is feasible. A great deal of information on sea turtles in GRMR can be obtained through this in-water monitoring/tagging program, such as, population trends, growth rates, genetic stock assessment, and habitat use. However, field

staff will need additional training/supervision in survey methods and processing captured sea turtles to ensure the safety of field staff and turtles, and consistency in methodology.

Results from the in-water surveys thus far indicate that waters of GRMR are important habitat for hawksbill, loggerhead, and green turtles, particularly developing hawksbills. Because hawksbills are critically endangered worldwide, the aggregation at GRMR is extremely valuable to the conservation and recovery of hawksbills regionally and globally, and thus should be monitored, and threats to their long-term survival should be assessed and mitigated.

Next Steps

- Data sheets for nesting beach monitoring need to be finalized and distributed to the appropriate individuals on the four cayes within Glover's Reef Marine Reserve. Draft forms are at the end of report.
- A best practices document which provides guidelines that minimize impacts of development to nesting turtles should be developed and implemented. These guidelines will be incorporated into recommendations for voluntary low-impact development of the cayes that are in preparation.
- Efforts should be made to restore important nesting beach areas, especially on Southeast Caye II (particularly the southeast beach at Manta Resort) and Long Caye, including removal of the breakwater wall blocking the nesting area on the northeast side.
- Formalize protocol (a Standard Operating Procedures guide) for conducting in-water surveys and handling captured turtles at Glover's, and possibly other reserves that implement an in-water monitoring/tagging program. Draft data form for turtle captures can be found at the end of report.
- Create databases for nesting beach surveys and nests.
- Create database for sea turtles captured/tagged at GRMR.
- Create database for in-water surveys.
- A select group of sea turtle education videos should be obtained and made available for marine reserve staff to educate staff and visitors about sea turtles and their conservation needs.
- Develop a schedule for in-water surveys, plan next survey, and obtain additional supplies and equipment needed. Preliminary list of equipment needs for future in-water work includes the following:
 - 127 cm caliper
 - tissue buffer and vials for genetic samples
 - 100 flipper tags size 1005-3 and applicator
 - 100 PIT tags and Reader
 - spring scale - 500 lb capacity.

Photographs



Breakwater wall constructed on Long Caye, north and north east side. This location has been an important nesting site for sea turtles in Glover's Reef Marine Reserve. The breakwater wall now prohibits access to the nesting beach by sea turtles. Suitable sea turtle nesting habitat is very limited in GRMR, therefore, obstructions such as breakwater walls should be prohibited. Photo: C.L. Campbell/WCS.



Buildings constructed in valuable sea turtle nesting beach habitat. Construction should be limited to no closer than 20 meters from beach berm, in order to preserve nesting habitat and reduce the need to protect structures placed on these highly dynamic islands. Photo: C.L. Campbell/WCS.



Snorkelers conducting survey on west side of GRMR. Photo: C.L. Campbell/WCS.



Loggerhead capture. Photo: C.L. Campbell/WCS.



Training participants in measurement techniques. Photo: C.L. Campbell/WCS.



Participants with four captured hawksbill turtles. Photo: C.L. Campbell/WCS.

**Beach Survey Data Form
Glover's Atoll**

Caye _____

Survey Date	Observer	Species	Nest	Estimated Hatch Date	False Crawl	Beach Zone*	Comments (continue on back)

* Beach Zone should be either Open (no vegetation), Border (sparse vegetation between no and dense vegetation), or Vegetation (moderate to dense vegetation cover)

**Nesting Activity Form
Glover's Atoll**

Survey Date _____ **Caye** _____ **Time of Survey** _____

Observers _____

Location _____ **Beach Zone** _____

Species (Hawksbill, Green, Loggerhead, Unknown)	Nest	Estimated Hatch Date	Actual Hatch Date	False Crawl	Beach Zone (open, border, vegetation)	Track Width (maximum)	# Eggs

Comments: _____

SEA TURTLE DATA FORM

TAG #'s (R) _____ (L) _____ OTN/OTH or tag (R) _____ (L) _____
(Box around tag # indicates turtle captured with tag)

DATE MEASURED _____ DATE CAPTURED _____ TIME _____
(day/mon/yr) (day/mon/yr)

SPECIES _____ SEX _____ RECAPTURE (Yes/No) _____ CAPTURED BY _____

GPS LOC SIGHTED N _____ W _____ CAPTURE LOC _____

GPS LOC RELEASED N _____ W _____ RELEASE DATE _____ TIME _____

HABITAT TYPE _____ DEPTH (FT) _____ VISIBILITY* _____

WATER TEMP _____ CURRENT _____ TIDE _____

TISSUE SAMPLE Yes _____ No _____ PIT TAG: NEW OR PRESENT# _____

MEASUREMENTS (cm):

WT (kg) _____

STRAIGHT-LINE

CL n-n _____, n-t _____, t-n _____, t-t _____

CW _____, HW _____, BD _____

PL _____ / _____

(PL: to midline/midline inc. sm. scale)

OVER THE CURVE

CL n-n _____, n-t _____, t-n _____, t-t _____

CW _____, PL _____ / _____

(PL: to midline/midline inc. sm. scale)

TAIL LENGTH: TO VENT _____ TO TIP _____

SCARS OR DEFORMITIES (SKETCH)

PAPILLOMAS: NONE _____ YES (How many?) _____

PHOTOS: CAMERA _____ FRAMES _____

MEASURED BY _____ RECORDER _____

COMMENTS:

*Very Poor, Poor, Fair, Good, Very Good

