



# Hawksbill Turtle *Eretmochelys imbricate* Nesting Environment and Population Study



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## ABSTRACT

This poster outlines my contributions to ProTECTOR's Hawksbill turtle conservation project along the beach at Cuero y Salado Wildlife Refuge of Honduras. Beach surveys were undertaken to create a map of environmental factors relevant to Hawksbill nesting along this beach, and observation-focused beach patrols were conducted to census numbers of turtles presently nesting in this location.

Resulting environmental maps were associated with Hawksbill census numbers in order to assess the suitability of this beach for hawksbill nesting, and thus determine its value for preservation efforts and ongoing funding. It was found that while the beach is under-populated presently (our nightly observations yielded a count of 0 nesting turtles), the environmental conditions of the beach are favorable to function as a Hawksbill nesting site.

My work contributes to the ongoing effort to preserve Hawksbill Turtles in Honduras. First, the data I collect contributes to the national Nesting Beach Network, which will allow future investigators to estimate population trends, and thus both target and increase awareness of the region's Hawksbill conservation efforts. The goal is to facilitate long-term population recovery of hawksbill toward historic numbers. Second, our nightly patrols offered immediate protection for nesting turtles and clutches during the nesting season.

## INTRODUCTION

The Hawksbill Turtle (*Eretmochelys imbricata*) is one of six species of sea turtles distributed in the waters of the Caribbean and tropical western Atlantic, including the Caribbean coast of Honduras. If able to survive the extraordinary odds—a mere 1 in 1,000 hatchlings live to maturity—sea turtles are among the oldest creatures in the sea (able to live more than fifty years) and are late-maturing, first reproducing at ages ranging from 12 to 40 years.

Substantial work has been done to catalogue the specifics of the hawksbills' nesting process and preferences in terms of sea access, slope of beach, elevation of nesting site above underlying water table, sand composition, moisture, and temperature.

Evidenced in longstanding records, Honduras' coastline and bay islands once served as important foraging and nesting grounds for Hawksbills in the Caribbean region, a population estimated to have once reached 11 million. The Honduran Hawksbill is currently experiencing a significant population decline, and in 1996 the Hawksbill was declared as Critically Endangered on the World Conservation Union's (IUCN) Red List of Threatened Animals, which recognizes that the species has suffered adult population declines of at least 80% over their last three generations. Of the entire Caribbean, 20% of historic nesting sites have been lost entirely, 50% of the remaining nesting sites have been reduced to dangerously low populations, and 44% of these beaches now host fewer than 10 nesting female hawksbills.

## STUDY SITE



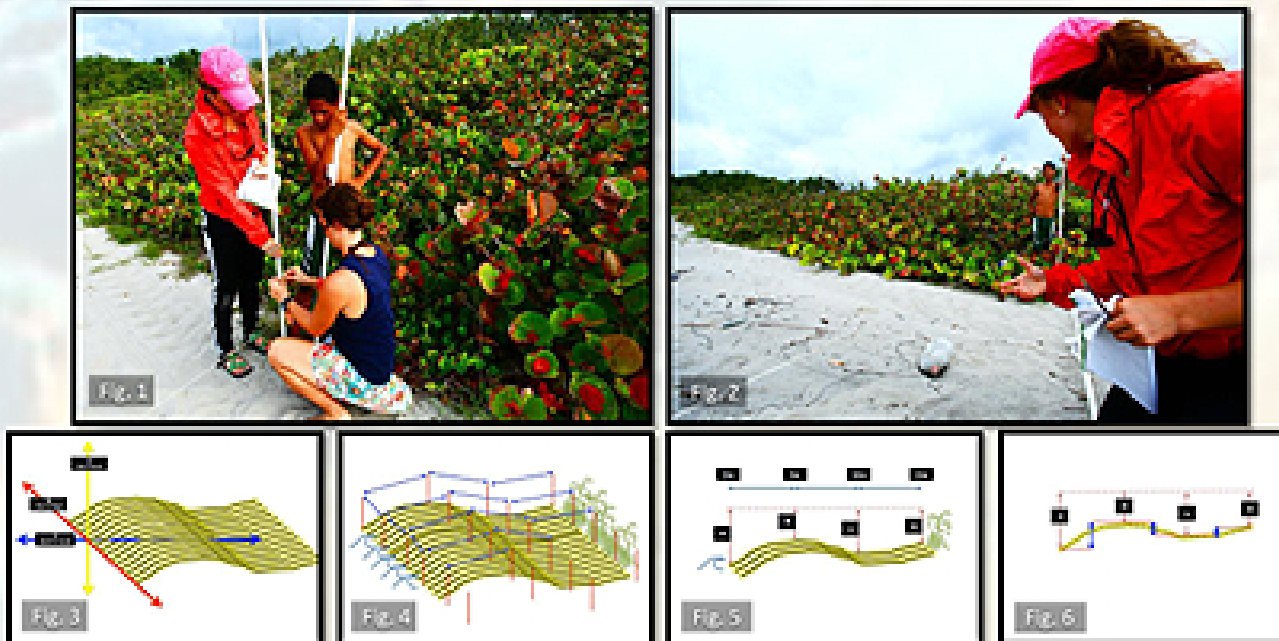
## METHODOLOGY

### BEACH SECTOR PATROL, TURTLE TAGGING, & CLUTCH DESCRIPTION:

- Purpose: to observe and record any turtle and/or nesting activity.
- Beach divided into roughly 5km sectors by natural landmarks.
- Nightly beach patrols along sectors with varied longevity of 3, 4, 6 and 7 hours depending on weather conditions.

### BIPOLAR LINE TRANSECT BEACH PROFILING:

- Purpose: to construct a relative slope and elevation profile map, by use of arcGIS software.

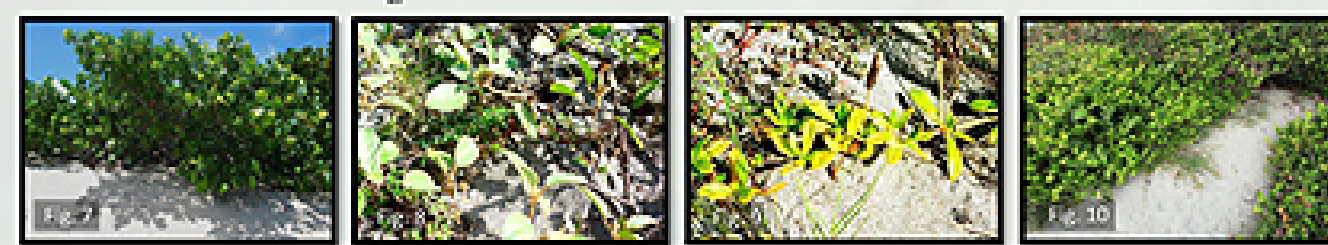


Figures 1-5: (1-2) Myself and fellow researcher conducting the Bipolar Line Level method survey of beach section. (3) Axis used in measurement are displayed, their intersection being the 0 m mark in the X (east to west, parallel to the water and vegetation line), Y (north to south, vertical to the water and vegetation line), and Z (up to down, aka altitude) respect being considered the central point. (4) The orange poles rising vertically from the ground are placed at 5m distances. The maintenance of the constant 218 compass bearing ensures that the lines between X0, X1, X2...etc. and Y0, Y1, Y2...etc. are respectively parallel. (5) The height of the string between the two poles, having been leveled, is measured at each 5 m point. (6) The differences between two adjacent line level heights is found so as to determine slope, comparative heights will then used to determine actual beach elevation at each point.

- From beach entrance, measuring slope of beach in 5 m segments in both the North/South and East/West tangents.
- Each height recording is paired with a Global Positioning System (GPS) reading.

### VEGETATION PERCENTAGE BEACH PROFILING:

- Purpose: to construct a vegetation percentage map by use of arcGIS software so as to characterize beach segments.



Figures 7-9: Various vegetation types found along the beach-front: (7) Sea Grape; (8,9) mixed vegetation and grass; (10) Hicaco.

- Classifying type, and measuring amount of, vegetation types occurring along a line 15m above the waterline.
- Percentages calculated in 20m transects.
- Each vegetation percentage transect recording is paired with a GPS reading.

### DESCRIPTIVE BEACH PROFILING:

- Purpose: to construct a map displaying each environmental variable relevant for turtle nesting and locate regions of the beach where favorable attributes co-occur and unfavorable attributes are minimized.
- General trends in beachfront changes are noted by Rapid Beach profiling method (regarding elevation, slope grade, width, vegetative coverage, beach-back environment, and degree of refuse pollution). Landmarks and water inlets are also considered in dividing the beach into sections of homogeneity.
- Points characteristically significant for accuracy of sectors' locational boundaries are described and paired with a GPS reading.

## RESULTS

### BEACH SECTOR PATROL & TURTLE TAGGING AND CLUTCH DESCRIPTION:

- We observed no turtles during our beach patrols during July and August.
- BIPOLAR LINE TRANSECT BEACH PROFILING, VEGETATION PERCENTAGE BEACH PROFILING & DESCRIPTIVE BEACH PROFILING:**

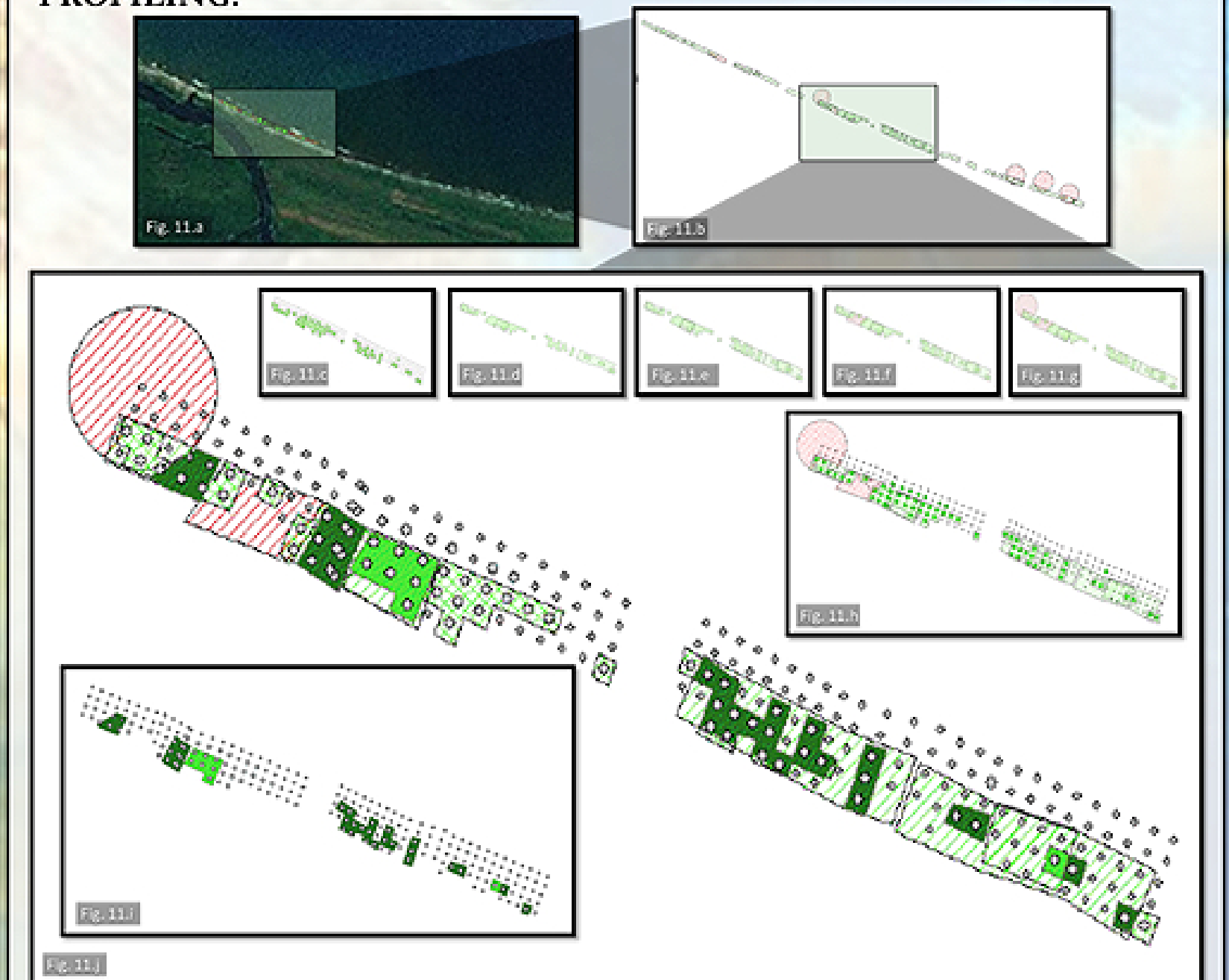


Fig 11: Multilayered display of the Beach Environmental Characterization Map creating using data from Beach Characteristic Surveys. (11a) Map displaying the Cuero y Salado beach front. (11b) 10km of beach front under study. (Figures 11c-11i) 267m of beachfront analyzed with greater specificity using ArcGIS to correlate and overlap both favorable and unfavorable elements in green and red respectively: (11c) areas of favorable elevation between .75 and 1.25m located 10m above sea level indicated by green dots >10m from waterline incorporated in polygons, (11d) with areas of favorable sand percentage cover between 22.5-67%, (11e) with areas of favorable grass percentage cover between 35% and 82%, (11f) with areas of unfavorable Hicaco and Sea Grape vegetation cover above 60%, (11g-h) with areas of pollution classified above level 2, and (11i-j) highlighted in bright green are areas most suitable for nesting, with overlap of three positive environmental attributes and devoid of negative environmental attributes, other areas suitable for nesting with overlap of preferred elevation and at least one other positive environmental element and devoid of negative environmental attributes are highlighted in dark green.

## CONCLUSION

On the wildlife reserve of Cuero Y Salado, the 10km stretch beach currently under study and observation by the ProTECTOR program is a historically noted Hawksbill nesting beach. Various beach characterizations of principal environmental factors (elevation, vegetation, beach width, and pollution) suggest that the beach is still suitable for—though, due to substantial population decrease, not currently being used as—a nesting beach of significant preservative value for the Hawksbill species.

## LITERATURE CITED

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