DOES RECREATIONAL DIVING IMPACT HAWKSBILL SEA TURTLE SIGHTING RATES? PRELIMINARY ANALYSIS FOR A MARINE PROTECTED AREA, HONDURAS

Christian T. Hayes[1,3], Dustin S. Baumbach[1,3], Marsha K. Wright[1,4], Linda Baeza[1,2], Marta Macpui[6], Lidia A. Salinas[1,5], and Stephen G. Dunbar[1,3,5]

[1]Protective Turtle Ecology Center for Training, Outreach, and Research, Inc. (ProTECTOR). Colton, CA 92324. [2]Department of Biological Sciences, Moorpark College, Moorpark, CA 93021. [3]Marine Research Group, Department of Earth and Biological Sciences, Loma Linda University, Loma Linda, CA 92350.
[4]Department of Biological Sciences, Oakwood University, Huntsville, AL 35896. [5]Protective Turtle Ecology Center for Training, Outreach, and Research, Inc., Honduras (ProTECTOR - H), Tegucigalpa, Honduras. [6]Roatán Marine Park, Roatán, Bay Islands, Honduras

Introduction

- Recreational diving is traditionally viewed as an ecologically sustainable activity.
- Little is known about the effects of recreational diving on sea turtle populations.
- **Goal:** to determine if differences in dive site use and habitat composition can affect the rate of Hawksbill sea turtle (*Eretmochelys imbricata*) sightings in a marine protected area.
- **Hypothesis**: Hawksbill sightings rates will be higher for sites with heavy diving pressure.

Methods

Turtle Sightings and Dive Logs

- We distributed turtle sightings survey forms to 14 dive operations over 4 months.
- Dive logs were collected from 2 dive operations for 3 months.
- Hawksbill sightings rates were mapped against diver density using ArcMap GIS.

Habitat Assessment

- Habitat surveys were conducted of 12 hawksbill foraging sites.
- We photographically surveyed 5 –7 transects at each site using a 30 m transect and 1 m^2 quadrate.
- We analyzed habitat using CPCe 14 software (Fig. 1).

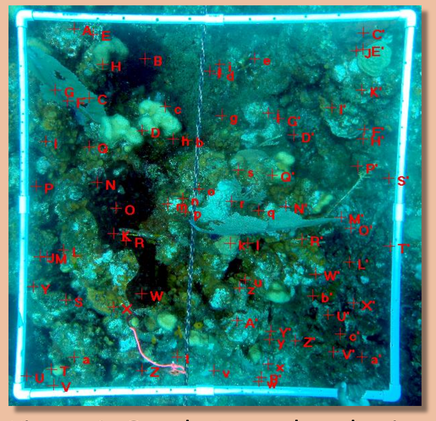

Figure 1. Quadrate analyzed using CPCe 14 software

Results

Turtle Sightings and Dive logs

- 666 hawksbills, 420 greens, 4 loggerheads, and 22 unknown sightings from 701 dives.
- Dive logs at 46 sites for 5342 divers on 1014 dives (Multiple divers on each dive).

Spatial Distribution (Fig. 2)

- No relationship between turtle sightings and number of divers at each site.
- No relationship between turtle sightings and number of divers per dive at each site.

Monthly variability

- Total hawksbill sightings peaked in July and were lowest in September (Fig. 3).
- Sightings survey effort peaked in July and was lowest in September (Fig. 4).

Habitat Assessment

- 5 sites: Algae abundance high (>60%).
- 12 sites: Algae abundance moderate (<60%).
- 3 sites: Coral abundance low (<10%).
- 9 sites: Coral abundance moderate (>10%).
- High coral abundance did not correlate with low algae abundance.

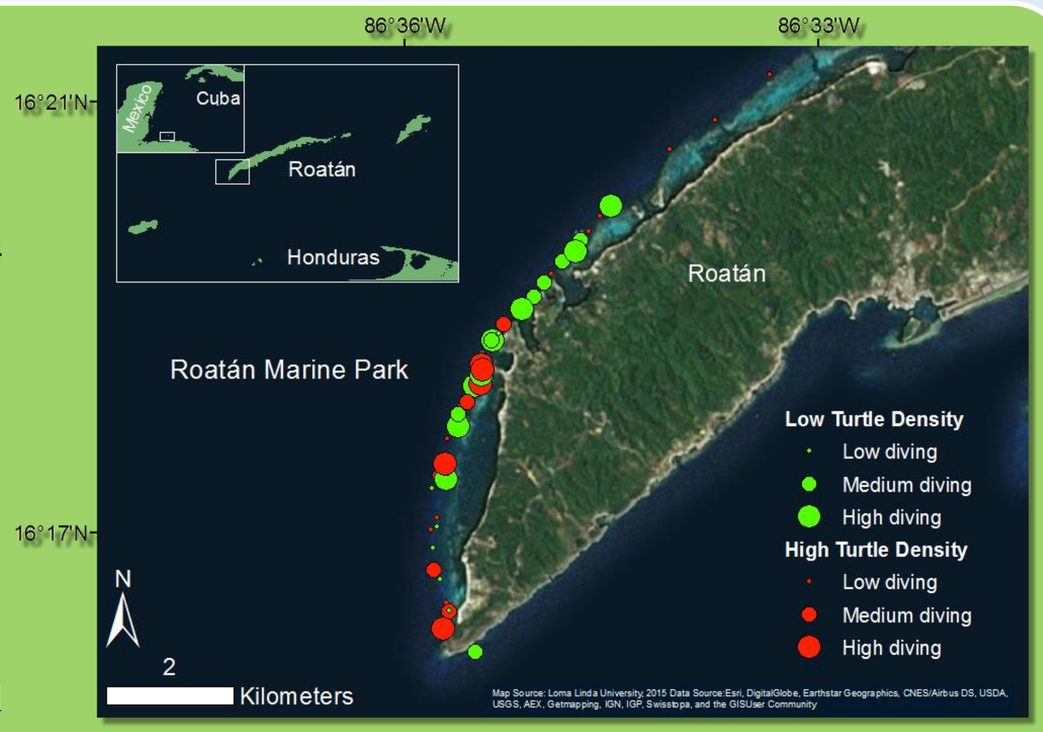

Figure 2. Hawksbill sighting rates and diver density, Roatán Marine Park, Bay Islands, Honduras

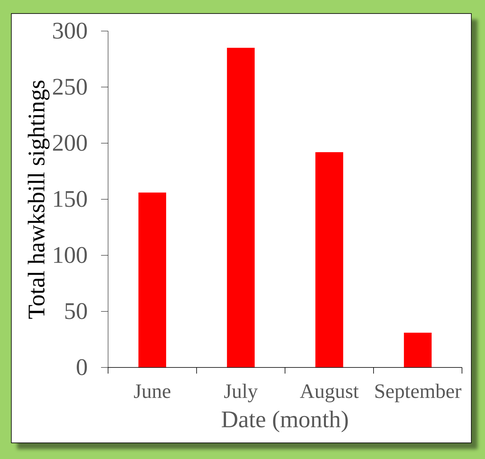

Figure 3. Total hawksbill sightings per month

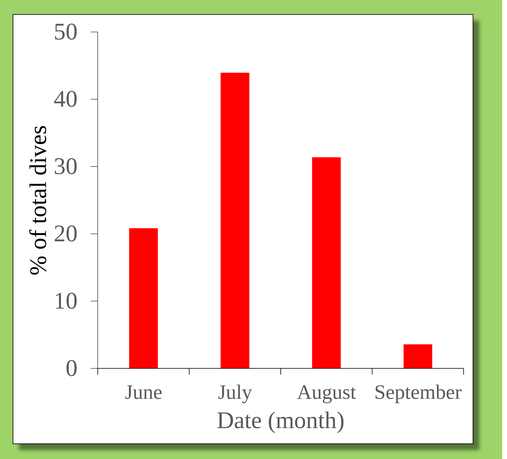

Figure 4. Sightings survey effort per month

Conclusions

Habitat

- Heavily dived sites did not significantly differ in habitat composition from sites that were not heavily dived.

Turtle Sightings and Dive Logs

- Recreational diving did not impact hawksbill sightings rates over a 4 month period, suggesting that hawksbill abundance is independent of diver presence.

- Additional sightings and habitat studies should be conducted to determine if recreational diving effects hawksbill sightings rates over multiple seasons.

References

Bell, C. D., J. M. Blumenthal, T. J. Austin, G. Ebanks-Petrie, A. C. Broderick, B. L. Godley. (2009). Harnessing recreational divers for the collection of sea turtle data around the Cayman Islands. Tourism in Marine Environments 5: 245-247.

Dunbar, S. G. and V. Perumal. (2006). Standard 2.2.1: Rapid Inventory of Queen Conch (Strombus Gigas) in Roatan, Mesoamerican Reef. Integrated Watershed Resources, USAID Honduras.

Kohler, K. E. and S. M. Gill. (2006). Coral Point Count with Excel extensions (CPCe): A Visual Basic program for the determination of coral and substrate coverage using random point count methodology. Computers & Geosciences 32: 1259-1269.

Acknowledgements

This research was funded by ProTECTOR and Loma Linda University. We would like to thank Giacomo Palavincini, Nic Bach and the Roatán Marine Park for providing us with equipment and transportation, ISTS, Kelly Stewart, and all the travel grant sponsors for their support, Lidia Salinas for help with logistics, DIGEPESCA and SAG for research permits, Ed Santos and Lance PompevMeerdervoort for ArcGIS™ support, West End Divers, Coconut Tree Divers, and Splash Inn for providing us with dives, Jimmy Miller for transportation, and the many volunteers who helped us with data collection.