

Faculty: Felicia Nutter, Assistant Professor, Cummings

Project Locations: Oracabessa, Jamaica

Dates: Late May/early June -Mid August. The exact schedule is in development. The peak nesting season at Gibraltar Beach is July-August, so the international component should be planned for this time.

Project Title: Evaluation of long-term nesting beach protection in Oracabessa, Jamaica, for recovery of critically endangered hawksbill turtles, *Eretmochelys imbricata* and endangered green turtles (*Chelonia mydas*)

Project Details: Four species of sea turtles – hawksbill, green, leatherback, and loggerhead – historically nested on Jamaican beaches. Of these, only critically endangered hawksbill turtles (*Eretmochelys imbricata*) and endangered green turtles (*Chelonia mydas*) continue to nest in appreciable numbers, predominantly on Gibraltar Beach within the Oracabessa Bay Fish Sanctuary (OBFS) on the North Shore of Jamaica. Threats to these populations include poaching for meat and eggs, degradation and loss of nesting habitat, accidental capture in fishing gear, ingestion of marine debris, and loss of critical feeding habitat due to development and climate change. Increasing global temperatures further threaten sea turtles because the incubation temperature of the nest directly impacts the sex of the developing embryos, with warmer incubation temperatures producing more females. There is significant concern that higher temperatures will cause such a female bias in sex ratios that populations will face extinction due to lack of reproduction.

The Oracabessa Sea Turtle Project (OSTP) is a continuous, ongoing beach protection and turtle monitoring program that was established by resident Melvyn Tennant in 2005. Data collected include individual identification of nesting females, dates and times of nesting crawls, nest locations, incubation times, number of eggs per nest, hatching success, and an associated suite of environmental data. Gibraltar Beach is part of the larger Oracabessa Bay Fish Sanctuary (OBFS), which conserves critical sea turtle feeding habitats as part of its mission to protect the marine environment and increase biodiversity for the health of the ecosystem and the benefit for the Oracabessa community.

The Sea Turtle Recovery Action Plan (STRAP) for Jamaica was completed in 2011 with a major goal to create a national network of long-term nest monitoring and protection sites. The OSTP is one of the longest-running programs and is a model scalable to other sites. While some of the Gibraltar Beach data have been summarized, a more thorough analysis, including scientific presentations and publications, will be useful for the Jamaican STRAP and for sea turtle conservation efforts globally. In addition, while there is published health information on some Wider Caribbean populations of green sea turtles, information is generally lacking for hawksbill turtles, with no information available on the Jamaica-nesting populations of either species. There are also no facilities in Jamaica that can care for ill or injured sea turtles, and no veterinarians trained to work with them.

The collaboration among Tufts, OSTP, and OBFS started in 2022 with a focus on establishing relationships. This year the goals include 1) expanding the collaboration to include New England Aquarium and the Jamaica Veterinary Medical Association (JVMA), 2) providing basic sea turtle first aid training and medical supplies for interested JVMA members, 3) establishing normal hematology and biochemistry values for nesting female hawksbill turtles, 4) measuring nest temperatures and humidity during incubation, and 5) digitizing and analyzing OSTP data from 2005 to present.

The proposed research experience involves office, field, and possibly laboratory components, working with historical turtle nesting records and supporting the collection and analyses of biological samples from nesting turtles and environmental data from turtle nests. The student is expected to spend 3-4 weeks in the field and the remaining time on office and laboratory work. Data analysis will be supported by Dr. Felicia Nutter.

Tasks and Responsibilities of Research Assistant:

Students will participate in office work (at Tufts or remote), field research at Gibraltar Beach, Jamaica, and potentially laboratory analyses in Jamaica and/or in the US. There is also potential for collaborative work on other project, such as coral restoration, with OBFS.

Office and computer-based work includes the following activities:

- Use of PC and Mac computers and common associated software (MS Office Suite)
- Digitizing historical turtle nesting records – this will include translating both hand-written notes and digital files into spreadsheets and/or databases.
- Data cleaning and coding; reproducible statistical analyses (using R or other statistical software package); written and oral summary of results.
- Report, presentation, and publication writing
- Website and online media contributions

Field work in Jamaica includes the following activities:

- Night-time nesting beach patrols and assistance with turtle identification and nest protection activities, biological sample collection, and data collection
- Assistance with the deployment and recovery of temperature/humidity data loggers in nests
- Assistance with the delivery of a sea turtle first aid course for Jamaican veterinarians
- Depending upon experience, may assist the automated analyses of sea turtle biological (e.g. blood) samples

Because of the amount of historical data that needs to be converted into electronic spreadsheets and/or databases, the student's contribution is a major contribution to project success. Other students and faculty members will also be entering, coding, and cleaning data, but this will be the primary work for the GRAP student. Conversion of the historical records to digital format is essential before biostatistical analyses can be done. Analyses and publication of the existing data are crucial to demonstrate the impact of the Gibraltar Beach nest protection program, and to support any programs to scale up the approach beyond Gibraltar Beach. Analysis of prospectively collected data from this summer's projects (including hematology, biochemistry, and nest temperature and humidity during incubation), will be the first conservation medicine outputs of this collaboration, and will contribute to filling critical information gaps for hawksbill and green turtles. All of these data will be used to seek future funding to support ongoing research.

Description of Field Site:

The research assistant needs to be prepared to work in warm to hot weather (30-35 C/86-95 F, with high humidity). Student must plan to dress appropriately for the weather and remain hydrated. Summer hats and sunscreen are recommended during the daytime to avoid heat/sun stroke. Aside from the orientation training for the nesting beach protocols, which may be conducted during the daytime, the fieldwork component will be undertaken mainly at nighttime, when sea turtles are coming ashore to nest. Nighttime temperatures are typically between 75-80F (24-27C) during July and August, and daytime temperatures typically between 85-92F (29.5-33C).

The primary field site is Gibraltar Beach, one of only two naturally occurring beaches within OBFS. It is recognized by the Jamaican National Environment and Planning Agency for its significance as a turtle nesting beach. At the south end of the beach Jacks River empties into Oracabessa Bay and separates Gibraltar Beach from Fisherman's Beach, which is the other natural beach.



Qualifications:

Requirements:

- Willing and able to travel to foreign country
- Comfortable with shared housing, in a small island town, and working in a foreign country
- Willing and able to work at night (nesting beach patrols)
- Able to lift and carry supplies and equipment on sand (<50lbs)
- Able to sit for several hours at a time for computer work
- Previous experience with biostatistical analyses using R or other common software package (JMP, SPSS, Stata)

Additional considerations (not required, but highly encouraged):

- Previous field and laboratory work experience
- Previous animal-handling experience
- GIS experience
- Able to swim and snorkel (not required for the project but would definitely add to enjoyment of the field experience!)
- SCUBA certification (also not required but would also add to enjoyment!)

Housing in Jamaica: To facilitate access to the field site, students will be housed in Oracabessa during the field research component in shared apartment-style accommodations owned by OSTP founder Mel Tennant. The housing on Gibraltar Beach provides direct access to the turtle nesting beach. Apartments may have single or shared bedrooms, shared bathrooms, shared kitchens, and laundry facilities. Security guards are present 24/7.