

BELIZE - COASTAL ECOLOGY AND ENVIRONMENTAL SCIENCE

January 5-19, 2020

Instructors

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Course description

This course explores tropical coastal ecosystems in Belize and the conservation challenges of anthropogenic stressors on ecosystems. Students will use the scientific method to answer questions in marine ecology and environmental science. Explored ecosystems include coral reefs in the Mesoamerican Barrier Reef System, seagrass and algae beds, and mangrove forests. We will survey manatees, fishes, corals, and vegetated coastal habitats. In these ecosystems, students will study community structure, biodiversity, water quality, and effects of human activities and impacts on ecosystem health.

Course objectives

- Students expand and reinforce their understanding of tropical coastal ecology
- Students learn to measure tropical ecological processes in the field
- Students learn to think critically about the interpretation of ecological data, and how to use these data for hypothesis testing in the Scientific Method.
- Students practice their scientific communication skills
- Students expand their appreciation on Belizean cultural and natural heritage.

Journaling

Students are immersed in the environment making observations on habitats and organisms present in Belize. They also make observations on societal, and other factors that are pertinent to their research. To assist learning through these observations, students keep an observation journal. One Rite-in-the-rain notebook will be used for Front Line Journaling and data entry, and one Rite-in-the-Rain notebook will be used for Reflective Writing. A journal guideline is provided on Blackboard.

Readings discussion

Students read scientific papers relevant to the ecological research we will be doing ourselves, and online news items about current environmental issues in Belize, which are provided on Blackboard. Each student leads group discussions to explore these issues, and completes the question form regarding the scientific papers.

Study proposal presentation

Ecological patterns are investigated by using the scientific method. Students propose hypotheses on community structure, biodiversity, water quality, and effects of human activities and impacts on ecosystem health. These hypotheses that are tested by analyzing field observations. Students summarize the hypothesis, its relevance on understanding anthropogenic stressors on ecosystems, and proposed hypothesis test in a study proposal presentation.

Data analysis and presentation

Data collected for the purpose of hypothesis testing is analyzed using appropriate methods. Conclusions – rejecting or failing to reject the null hypothesis – are placed in context of the conservation challenges of anthropogenic stressors on coastal ecosystems. Students present an overview of the entire hypothesis testing process to the class in a 15-min oral presentation.

Final report – graduate students only

Graduate students produce a group report that includes an overview of all investigated efforts and the class findings. This report is due two weeks after the return

<u>Grading Rubric</u>	<u>Undergrad</u>	<u>Grad</u>
TOTAL	100 points	100 points
Journaling	20	15
Readings discussion	20	15
Study proposal presentation	20	15
Final project presentation	20	15
Participation	20	15
Final report	-	25

100-97% A+; 96-93% A; 92-90% A-; 89-87% B+; 86-83% B; 82-80% B-; etc.

Required books and writing materials

(note that online most of these can be found used for a few dollars)

1. Paul Humann. Reef Fish in a Pocket Identification Book.
2. Paul Humann. Reef Creatures in a Pocket Identification Book.
3. Two “Rite in the rain” spiral notebooks (4 5/8” X 7”) for journaling and field notes (nr 393).

Suggested textbooks

1. P. Humann. 2002. Reef Fish Identification: Florida, Caribbean, Bahamas. New World Publications: Jacksonville, FL.
2. P. Humann. 2002. Reef Creature Identification: Florida, Caribbean, Bahamas. New World Publications: Jacksonville, FL.
3. P. Humann. 2002. Reef Coral Identification. New World Publications: Jacksonville, FL.
4. Belize & Northern Guatemala (Travelers' Wildlife Guides) http://www.amazon.com/Belize-Northern-Guatemala-Travellers-Wildlife/dp/1566565685/ref=sr_1_14?ie=UTF8&qid=1317852438&sr=8-14

Course itineraryDay 1-5

Students arrive in Belize and travel by water taxi to San Pedro on Ambergris Caye. This city has a strong tourist industry and is built on the southern end of a peninsula. This site represents the urbanized site. Students reside at the Belize Tropical Research and Education Center (Belize TREC) during our stay on Ambergris Caye. During their stay, students study ecosystem characteristics of mangroves (day 2), seagrass beds (day 3), and coral reefs (day 4). These characteristics include biotic community composition and measurements of ecosystem processes. The coral reef ecosystem also includes comparing these characteristics inside and outside Marine Protected Areas.

Day 5-6

Students travel inland from Ambergris Caye to San Ignacio for the first cultural-environmental excursion. Students reside at a horse farm hostel outside of San Ignacio where they explore the surrounding tropical lowland forests and visit ancient Mayan remains on horseback (day 5). Students also visit the protected archeological site of Xunantunich (day 6)

Day 6-10

Students travel to Gales Point at the Southern Lagoon. This lagoon is a large estuary on the mainland and represent one of the sites with very little urbanization. At this location, students observe the resident

manatee population in their seagrass dominated habitat (day 7-8), and investigate the condition and structure of mangrove ecosystems (day 9).

Day 10-13

Students travel to the Lighthouse Reef, a large coral atoll approximately 40 miles off shore, and reside on Half Moon Caye. Lighthouse reef is an environmentally protected area and represent the second site with little urbanization. At this site, students study ecosystem characteristics of mangroves and coral reefs (day 11-13). These characteristics include biotic community composition and measurements of ecosystem processes. Findings of the entire program are analyzed and compared, and conclusions are discussed.

Day 14-15

Students travel to Tropical Education Center on the mainland and which represents the second cultural-environmental excursion. Here, students visit The Belize Zoo which is focused on conservation of Belizean wildlife and natural heritage, including jaguar and Harpy eagle. Students participate in a night tour of the zoo to observe behavior of the many nocturnal animals in this zoo.

Day 15

Students travel back to the United States.

Board and Lodging

Day 1-5

Belize Tropical Research and Education Center (Belize TREC)

1 Grouper Street, San Pedro, Belize

+501 226-2456

belizemarinetrec.com

Day 5-6

Martz Farm Treehouses and Cabañas Ltd.

8.5 Mls. Mollejon Road Benque Viejo del Carmen

P.O. Box 161 San Ignacio Town Cayo District, Belize,

+501-834 4646 or +501-622-8222

martzfarm.com

Day 6-10

Manatee Lodge

Gales Point Manatee Village

Belize District, Belize

+501 532-2400

manateelodge.com

Day 10-13

Lighthouse Reef Basecamp on Half Moon Caye

islandexpeditions.com

Day 14-15

Tropical Education Center

Mile 29 George Price Highway P.O. Box 178, CA, Belmopan, Belize

+501 633-5378

belizezoo.org/accommodation/accommodations.html

Academic Integrity

Mason is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

Disability Accommodations

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Disability Services (SUB I, Rm. 4205; 993-2474; <http://ds.gmu.edu>) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

George Mason University is committed to providing a learning, living and working environment that is free from discrimination and a campus that is free of sexual misconduct and other acts of interpersonal violence in order to promote community well-being and student success. We encourage students who believe that they have been sexually harassed, assaulted or subjected to sexual misconduct to seek assistance and support. University Policy 1202: Sexual Harassment and Misconduct speaks to the specifics of Mason's process, the resources, and the options available to students.

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible Employee," and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per University Policy 1412. You may seek assistance from Mason's Title IX Coordinator, Jennifer Hammat (703-993-8730) or by email cde@gmu.edu. **If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-993-3686 or Counseling and Psychology Services (CAPS) at 703-993-2380. The 24-hour Sexual and Intimate Partner Violence Crisis Line for Mason is 703-380-1434.**

Privacy

The use of Blackboard is *required* for this class. You can log in using your GMU username and password at <http://mymason.gmu.edu>. I use Blackboard to post lecture slides, grades, homework assignments, etc. Please use your MasonLive email account to receive communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address.