

ECURE

EXPANDING COURSE-BASED
UNDERGRADUATE RESEARCH
EXPERIENCES PROJECT

Instructor Name: Corinne Myers

Department: Earth and Planetary Sciences

Course: ENVS 322L, Life in the Earth System

ECURE Engagement Level: FULL

Description of FULL implementation: Students in this course participate in a scaffolded research experience where they 1st collect raw data and apply analytical techniques in a made-up setting (where the answer doesn't matter) and then apply these skills to do an independent research project using the same methods. The overarching hypotheses for both parts of the project are what/where are suitable habitats found for XYZ creature; in the 1st part, the creature are "shadow lobos," metal statues of wolves hidden around campus. In groups, students go on a scavenger hunt to find and gps each shadow lobo and collect environmental data where they are found AND where they are not. The environmental data is used to create GIS environmental coverages that become the "layers" for correlating their "occurrence" data in an ecological niche modeling (ENM) framework. The output of this model and subsequent interpretation steps is a map of what habitat on campus is "good" vs. "not good" for the shadow lobo species. Once they have learned how these data are collected (from scratch) and practiced using the modeling analysis technique, students are asked to pick and research a terrestrial animal existing today. In this iteration, students collect the environmental and occurrence data for their species from large international online data aggregators, which adds the step of downloading and processing large datasets in GIS and xls. Students not only use the ENM technique to map current predicted suitable habitat for their species, but also project their models to projected future climate conditions in order to test the additional hypothesis of how their species will do under potential climate change conditions. The results of their project are then put together in an oral powerpoint presentation given to the full class; all students participate in evaluating the work of each other and providing constructive comments.

Assessment: Each part of this project had an evaluation step. The shadow lobo exercise was evaluated over two lab assignments and the independent project was evaluated over another two lab assignments. These acted as formative assessments. The summative assessment was their final oral presentation of independent project results.

Engagement with Academic Literature: One of the lab assignments required students to use primary literature to learn about their species of choice and use this information to make an informed hypothesis of their species' response to climate change. Cited literature was also required in their final project presentations, where they connected their researched hypothesis to their results and how they might engage in conservation biology and/or policy decisions to mitigate the effects of climate change on their species.

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