

# 2019 Cooperative Summer Field Training Program

● <b>Project Title:</b>	Understanding the impacts of climate and global change on habitat dynamics and linking with species responses from a management perspective
● <b>Project Scientists:</b>	Mitchell Eaton
● <b>USGS Center:</b>	Southeast Climate Adaptation Science Center
● <b>Location:</b>	Raleigh, NC and possible field locations (Gulf Coast or Brevard City, FL)

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## Project Description:

### **Background Information:**

The Southeast Climate Adaptation Science Center (SE CASC) staff and funded projects are studying how external drivers such as sea-level rise, increased storm frequency and changes in precipitation directly affect habitats and indirectly affect species of conservation concern that depend on these habitats. Because there are several different avenues that could be pursued based on a student's interests and skills, this proposal has been written generally. Modeling species-habitat interactions using data on past observations of conditions and species abundance or occurrence relies on assumptions that these dynamics are in equilibrium. With climate change, this assumption is unlikely to hold as environmental conditions change directionally (i.e., not just fluctuating randomly around a central tendency). Therefore, to build predictive models that will enable decision makers to select the best management actions today and in the future, we must understand these relationships, how decisions made today will affect future populations, and how conditions are expected to change over time. Decisions made today that don't consider dynamic processes and the future are likely to be suboptimal.

### **Objectives:**

Our objectives pertain to several species-habitat and management problems, including scrub management to advance endangered Florida scrub-jay recovery and conservation of coastal dune and wetland habitat on the Gulf coast to support small mammals, shorebirds and nesting turtles. Research objectives include:

- Work with decision makers and managers to formulate decision problems of interest, identify relevant uncertainties, elicit experiential knowledge with which to build models, and better understand what science output will be most useful for decision making.
- Characterization of climate variables relevant to particular species dynamics
- Development of species dynamic models with input parameters including important climate variables, other environmental variables, and management intervention options. Model output will be at an appropriate temporal and spatial scale to match with decision maker objectives.
- Develop field methods to gather new observations if existing data do not meet the needs identified by co-developing the research problem with decision makers.

- Build optimization or other quantified decision models to produce inference on management dynamics and support the decision-making process.

**Intern Tasks:**

Depending on the interest and skills of the intern, possible task could include:

- Work directly with decision makers and managers to formulate and clarify management problems and the underlying need for scientific input
- Help to develop and implement field or monitoring methods to collect data as needed
- Work with climate experts within the DOI-CASC network, or elsewhere, to obtain and format relevant climate data
- Work with decision scientists at the CASCs and/or USGS to formulate and implement decision analytic methods
- Help to build ecological and decision models for problem solving
- Communicate findings with decision makers and stakeholders

**Expected Outcomes:**

The intern would benefit by being engaged directly at the interface of science and management, interacting with decision makers, natural resource managers and scientists to help address some of the most pressing resource problems faced by DOI land-management agencies such as the USFWS and NPS. The student will be exposed to interdisciplinary field of science including state-of-the-art physical climate science, ecological sciences and decision theory. Expertise in these subjects are contained in-house at the SE CASC. The intern will gain experience in working with climate and/or ecological data, including developing customized models, and be introduced to the principles of decision theory for applied natural resource management. Additionally, the SE CASC is co-located at North Carolina State University in Raleigh, NC so the student would have the opportunity to interact with NCSU faculty and the SE CASC Global Change Fellows.

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**Details for Matching:**

**Type of Project:** Office Work

**Project Discipline:** Ecology, Modeling, Wildlife Biology, Climate Science, Decision Sciences

**Project Start Date:** Wed May 01 2019 00:00:00 GMT-0400 (EDT)

**Project Duration:** 3-4 years

**Level of Physical Demand:** Level 8-1: The work is sedentary. Typically, the employee may sit comfortably to do the work. However, there may be some walking; standing; bending; carrying of light items such as papers, books, or small parts; or driving an automobile. No special physical demands are required to perform the work.

**GIS Training:** ESA

**Special Skills and Interests:** • Statistical/mathematical/engineering

- Interest in ecology, ecological processes, and quantitative analysis
- o Familiarity with R, Matlab or other computational software
- Interest in science as applied to support policy and decision making; interested in learning about formal decision theory
- Interested in developing survey methods and willing to participate in field data collection as needed. Fieldwork is not likely to be a primary component of this internship.

