Proposal Status | MAIN

Organization: University of Florida

Review #4

Proposal Number:	1754741
NSF Program:	POP & COMMUNITY ECOL PROG
Principal Investigator:	Bruna, Emilio M
Proposal Title:	SG: Are there synergistic effects of habitat fragmentation and drought on tropical plant demography?
Rating:	Very Good

REVIEW:

In the context of the five review elements, please
evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

Land use change, particularly forest fragmentation, has been a focus of decades of work in the tropics, particularly in the Amazon. This research has covered plant, animal, and, more recently, microbial communities. During the past few decades, population and community dynamics have also been studied in the context of climate change. This proposal would bring one aspect of climate changeùdrought frequency and severityùtogether with fragmentation using the understory plant, Heliconia, as a model system. I am not an expert in this research area, but the PI claims it will be the first study of its kind. More generally, it is important to understand how changes in land use interact with variability in environmental conditions, such as those related to a changing climate.

The research plan builds on 20 years of demographic data on Heliconia in plots located in continuous forest and in large and small forest fragments. This dataset forms the basis for the research. It will be supplemented by the assembling complementary historical data on climatic and environmental conditions on the plots. Whether these historic data are of sufficient resolution to match the plant demographic data is not explicitly explained; the assumption is that it will be. Some additional, detailed data (canopy cover, understory light level, relative humidity, soil and plant surface temperature) are being gathered on the plot to provide finer temporal resolution (e.g., dirurnal and seasonal). It was not clear how this contemporary data will be extrapolated backwards 20 years for use with the historical data. The data analysis presented to answer the three questions seemed logical and likely to succeed.

PI Bruna is an expert in this subject area and has worked in Brazil for 20 years. He developed the Heliconia study system and has spent many years doing research on it, as shown by an impressive set of results from prior NSF funding. Bruna has worked very closely on this with Uriarte, an unfunded collaborator, who is also an expert on this system. Zartman is a new, unfunded collaborator who works in the same BDFFP and who focuses on drought effects.

There are no resource limitations.

In the context of the five review elements, please
evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

The results will add to our existing understanding of the effects of habitat fragmentation and shifting climate

in the Amazon, a topic of general interest. Making the datasets publically available will be of benefit to the scientific community.

Efforts will be made to strengthen linkages between scientists in the US and Brazil, although how this is to be done is not explicitly described. A more definitive plan is given to place the project data in the Dryad repository (the PI is an advisor to Dryad). There is a good plan for updating an exhibit at the Harn Museum at the University of Florida. No explicit assessment mechanism is provided, although some would seem obvious (download numbers for the data, change in museum visitors).

The PI is well qualified and the activities build upon previous outreach activities.

There are no limitations.

Please evaluate the strengths and
weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

It fits within the SG guidelines. Although the cover page mentions 48 months for the duration, the budget is for 24 months, which should be adequate to complete the research.

Summary Statement

Gaining a better understanding of how climate variability interacts with land use change is a worthwhile goal. The long-term dataset on Heliconia is a valuable resource that can be used to address questions about the impact of drought/fragmentation interactions. The PI and collaborators have been instrumental in collecting this dataset and clearly have the expertise to supervise the data analysis and modeling that have been proposed. One potential weakness is whether the additional data to be collected can be used with the historical data because it would seem to vary with time in a way that may not be easily predictable. A reasonable plan for activities that builds upon past efforts was presented. Other scientists are likely to use the open source data that will be made available.

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