

NATIONAL SCIENCE FOUNDATION
Review (PI Copy)

Proposal:1637685

PI Name:Lovett , Gary

Title: LTER: Long Term Ecological Research at the Hubbard Brook Experimental Forest

Institution: Institute of Ecosystem Studies

NSF Program: LONG TERM ECOLOGICAL RESEARCH

Principal Investigator: Lovett, Gary M.

Rating: Good

Review:

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

Strengths

The history of science produced at this site is very impressive, and I enjoyed the summary of work to date included at the beginning of the proposal. In addition, the PIs and project participants seem to have been very productive with prior LTER support. The questions in the proposal are well justified in that they seem to follow from previous research. I was really glad to see the authors will begin to explore how changes in element stoichiometry may be altering ecosystem structure and function (Section 2.2.4), but would have liked to see this thread extended to more of the proposal. While little new experimental work is planned, the team will continue to treat/assess long-term effects of several previous experiments (e.g., the calcium addition, N/P fertilization, and harvesting experiments), and that should continue to produce publishable results.

Weaknesses

I question the organization broadly around 'disturbance', with more specific questions focused on the almost equally broad areas of air pollution, climate change, and forest disturbance. To paraphrase one of the PIs from a recent publication, it seemed odd to focus on 'disturbance' in one of the least disturbed sites in the Northern Forest (US) region. In addition, while there is a fair amount of effort going in to identifying mechanisms, I was disappointed that the overall approach in the proposal does not focus on addressing specific hypotheses. For example, more often than not, questions like, "Which plant and soil mechanisms are most important for maintaining N and P co-limitation?" are posed, rather than presenting specific hypothesis that could be tested to explore mechanisms.

I found the 'related research and leveraging of LTER funding' section to be particularly weak, and suggest that as written, it serves to highlight some of my criticism of this proposal. The list of work included in this section may not be exhaustive, but as is, it suggests that very little in the way of new science that is being forced to compete through regular funding channels/core programs is actually being funded.

I feel that some of the comments made by the midterm review committee have not been adequately addressed. In particular, I strongly agree that this site would really benefit from some new perspectives. The PIs state that they have included new investigators, but following from a comment made by the

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previous review committee, the focus on landscape and stream ecology still isn't clear, at least to me. In the end, this still feels mostly like a terrestrial biogeochemistry proposal, and the other pieces come across as afterthoughts more than well-integrated and important components. The overall theme of the proposal is the response of ecosystem structure, composition and function to disturbance. This certainly maintains continuity with the past work, but the work is much more general/conservative than new/bold. Instead of new exciting ideas, the science is framed via a conceptual model that seems to illustrate the effects of everything on everything and their interactio

Given the core data collection areas noted in the RFP, I found the omission of NPP a bit curious, especially given the focus on the effects of disturbance. The authors essentially dismiss NPP by stating, 'net primary production (NPP) is quite stable from year to year at HBRà' To me, there would be value in linking all of the many belowground processes with measurements of NPP, and how responsive NPP is to disturbance in general.

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

The broader impacts will be realized via a combination of education and outreach activities, and are a strength of the proposal.

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

Summary Statement

The very long-term nature of the science conducted at Hubbard Brook (including the long history of work before LTER status) could be viewed as both a strength and a weakness: A strength in that the list of accomplishments is impressive, and the value of continuing the work is clear. However, it is also a weakness in that the list of accomplishments is much more impressive to me than the new science proposed, and the massive body of work conducted to date makes it challenging to compete in an NSF model which increasingly seems to emphasize novel, transformative science. I am not criticizing the PIs as much as sympathizing with the difficulty of generating exciting, new ideas and questions in a site that has had such a long history of research, and via a program in which the (implicit) focus seems to be on monitoring as much as it is on new, exciting research. In reviewing the proposal, I see much value in continuing this work, and the PIs have a proven track record that suggests that they will continue to produce. Nonetheless, I found much of the science presented to be very familiar, and would argue that another round of funding is much more likely to generate incremental rather than transformative advances.

Inasmuch as the proposal hits on many of the overall goals of the LTER program (i.e., it emphasizes the study of ecological phenomena overlong periods of time based on data collected in core areas), I would suspect it is on par with other proposals submitted in response to this call. Overall, it is a quality

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proposal, worthy of support. Assuming it is funded, I hope the group will also pursue opportunities to test some other interesting questions/hypotheses that may emerge along the way.