To: Kendra McLauchlan, on behalf of the NSF LTER Working Group
From: LTER Network Office Leadership Team (Frank Davis, Marty Downs, Jenn Caselle, Julien Brun)
CC: NSF LTER Working Group
Date: 25 March 2022

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We appreciate the open lines of communication between the LTER Network Office (LNO) and the NSF working group. In general, the content and recommendations of the site visit report align well with our perception of how the LTER Network Office operates. There are, however, a few areas where we may have failed to impart information that could contribute to a full and accurate assessment of the LNO's work.

Specifically:

Recommendation II.a.i.

With respect to site participation in the synthesis process, Figure 1 describes a general trend in which sites that have been funded for longer have more participants in the synthesis process than sites with a shorter funding history. Three of the marine and coastal sites (Beaufort Lagoon Ecosystems, Northern Gulf of Alaska, and Northeast U.S. Shelf LTERs) are all in their first funding cycles and therefore were unlikely to have participated in the 2020 or 2021 synthesis competitions. We anticipate an increase in participation of marine and coastal sites in synthesis activities as their time series grow. There are also a number of other factors that influence participation.

Sites based at soft-money institutions (ARC, PIE, HBR, NES) find it difficult to devote uncompensated time to synthesis activities. Substantial engagement of these sites will be challenging unless we can find a mechanism to compensate investigators for their efforts on synthesis projects.
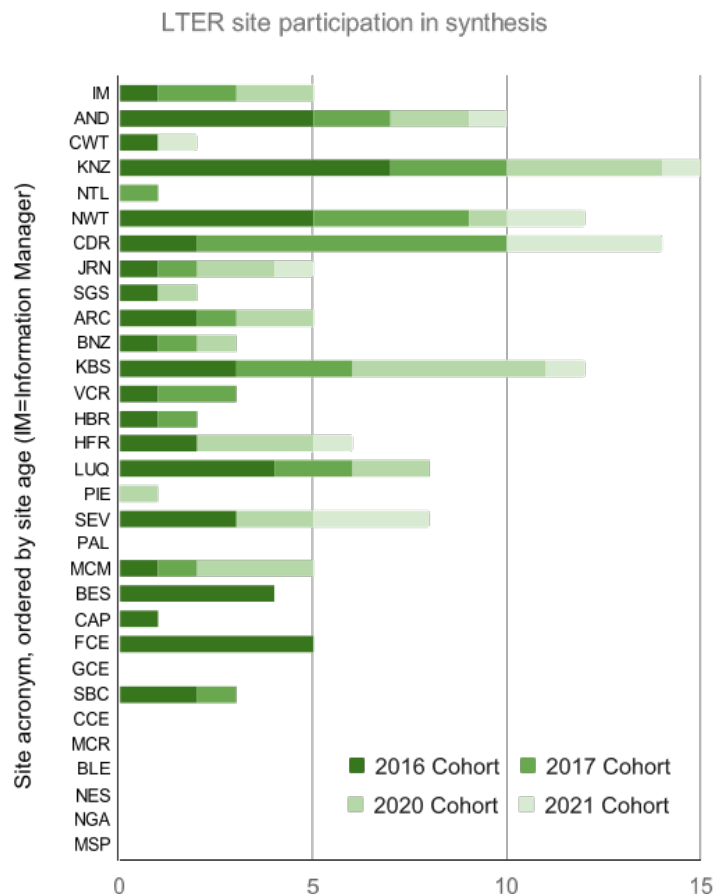

Figure 1. Count of participants in LTER synthesis groups with a primary affiliation to a site. Information managers (IM) are counted separately. Shading represents the year in which the working group was funded. Site order is first to last funded, from top to bottom.

Institutional and partner support for research in general and synthetic research in particular varies widely among sites. Many sites with land-based field stations have funding resources that can support involvement of an independently-funded postdoctoral research associate on synthesis activities. This is one of the reasons we feel so strongly that LNO postdocs and analysts help to level the playing field for sites that do not have local access to funding for synthesis.

Many LTER sites compete successfully in NSF funding programs that support synthetic work. For example, three coastal sites (Virginia Coast Reserve, Georgia Coastal Ecosystems, and Plum Island LTER) received Coastal SEES funding (award #1427282) to support cross-site research on salt marsh persistence in the face of sea-level rise and social adaptations. Similarly, a handful of urban and suburban LTER sites have participated in synthesis on ecological homogenization, funded through the Emerging Frontiers and Macrosystems programs. The third decadal review of the LTER program instructed sites to seek out other sources of funding for synthesis and they have done so – but explicitly tracking non-LTER funding sources is beyond the scope of the LNO.

Recommendation II.a.i.

Recommendation II.a.i. focuses on expanding inclusion of "non-LTER" researchers. Identification of researchers as "LTER" or "non-LTER" and assigning them to specific sites can be a challenging exercise, as participation in LTER research is rarely more than a small fraction of a participant's time. Nonetheless, a review of all LTER synthesis participants suggests that at least one-third and possibly as many as one-half of the 230 participants in LTER synthesis groups were *not* affiliated with LTER sites. In follow-up discussions with program officers, that seems to be an appropriate level of non-LTER participation.
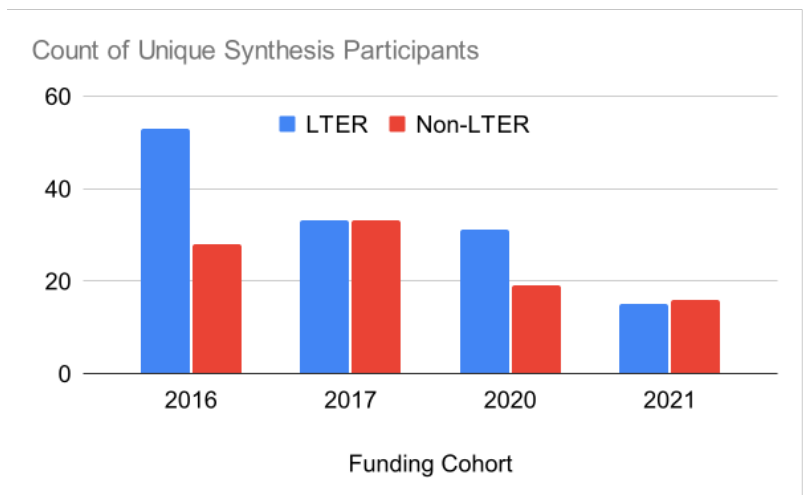

Figure 2. Participation of LTER-affiliated and non-LTER affiliated researchers in LTER Network Office synthesis working groups.

Suggestion I.b.ii

Suggestion I.b.ii recommends "integration of personnel with expertise in data informatics, site IMs, and data repositories co-located with the LNO."

We enthusiastically support this direction. When LTER information managers have had the interest and capacity to participate in synthesis, their contributions have been extremely helpful and the insight they gain also contributes to improvements in the information management

system overall. We anticipate that the recent addition of data analysts to the LNO team (if sustained) will allow site information managers to be involved in synthesis without fear that they will be drawn into a commitment that is more time-consuming than their sites can accommodate.

We would like to clarify that the only repositories co-located with the LNO are the Arctic Data Center (ADC) and the Knowledge Network for Biocomplexity (KNB). The KNB is no longer actively funded and the Arctic Data Center was advised to remove synthesis from its initially proposed activities. The Environmental Data Initiative (which was separated from the LTER Network Office in 2015) is located at the University of Wisconsin and the University of New Mexico and we continue to collaborate closely with them as their staffing capacity and funding mandate allow.

Recommendations III.a.ii and III.a.iii

Recommendation III.a.ii states: "*In cooperation with NSF, develop clear guidance on structured governance as well as a structured decision-making process for the LNO and partners. In particular, the role and responsibilities of the Executive Board chair, in relation to the LNO Director, Executive Board, and Science Council should be further clarified.*"

Recommendation III.a.iii states: **"*Given the numerous demands on the LNO and the many stakeholders*
involved in LTER, the quality of decision making would likely improve with an executive governance committee. Currently a tremendous amount of responsibility rests solely on the shoulders of LNO Director Marty Downs. Downs has done an admirable job with this responsibility, but this is a
heavy burden for one person to carry. We encourage Director Frank Davis to stay as involved as possible and for there to be a more structured decision-making process that involves input from an advisory committee."

The LTER Network Office has a 4-person Leadership Team (Davis, Downs, Caselle, Brun) which meets weekly - either with the whole LNO team or in executive session. LNO Director Marty Downs is the only member of the leadership team with a full time commitment to the LNO and so she is often responsible for communicating decisions, but only the most straightforward operational decisions are made without group discussion. Downs does carry a heavy workload, but adding an advisory body would not serve to decrease it.

The LTER Network is governed by a [set of bylaws](#) that have been regularly updated since 2003. In the current configuration, the LTER Executive Board meets monthly. This basic framework was established in 2012, following an in-depth strategic planning process and the 30-year review. The Executive Board is composed of 9 site PIs who serve 3-year rotations, plus representatives from each of the major committees. The chair of the Executive Board also serves as the Chair of the Science Council and is elected by the Site PIs.

Article VI. Section 1 lays out the duties of the chair:

> *The Chair shall preside at all meetings of the Science Council and the Executive Board and, along with the Executive Board, generally oversee and supervise the governance of the LTER Network. The Chair shall facilitate communication to Network Sites regarding decisions of the Executive Board; provide a receptive ear for any Network member who wishes to raise an issue of concern; and serve as or appoint liaisons to NSF, other agencies, associations, networks, the public, and to Network committees.*

Article VI. Section 3 describes how any compensation for the chair should be negotiated:

> *The Chair-Elect receives no compensation other than reasonable expenses. The position of Chair requires a substantial level of effort. In recognition of the time and effort required, the Chair shall negotiate with NSF the amount and the mechanism for compensation appropriate to the situation.*

We believe that the current structure – in which the LNO is primarily responsible for network operation and the Executive Board is primarily responsible for scientific leadership – has been effective and has helped to avoid some of the tensions between PIs and the Network Office that the network has experienced in the past.

Suggestion III.b.i: *The development of LTERHub seems cumbersome and costly, requiring expensive specialized software (Salesforce) and upkeep. Are there other options to accomplish the goal?*

The UC system, and UCSB in particular, interprets CFR 200 as requiring that contracts include specific conditions that are not part of the standard terms and conditions of any of the major platform vendors we contacted at the time we contracted the platform (Higher Logic, ZoHo, HiveBrite, and NEON CRM). Nor were those vendors willing to engage in legal negotiations for the rather modest contract we were proposing. We do not see an obvious path to a different vendor while adhering to university policy.
Building an in-house custom platform is initially appealing, but also requires significant effort and maintenance (at least a part-time programmer). In addition, custom applications are more challenging to migrate to new institutions, should the LNO eventually move elsewhere. The majority of the effort to stand up the platform in SalesForce has already been spent, so we do not think it makes sense to backtrack at this point.

Maintaining an actively engaged community of nearly 2000 researchers from hundreds of institutions will certainly require a continuous input of effort. (See the Community Participation Model from the Center for Scientific Collaboration and Community Engagement.) However, we expect to see a return on the investment in two main areas: 1) peer-to-peer collaboration across the Network will foster a new generation of scientific leaders in cross-site synthesis by making it easier to identify and engage with potential collaborators; 2) the type of information often requested by NSF (LTER v. non-LTER participation in synthesis; site and network demographic

information) requires a fairly sophisticated way of tracking participants and their affiliations. Both NSF and home institutions request such information from participants, but do not make it available at the program level. If this information is not a priority, the platform could potentially be simplified.

Suggestion IV.a.i.

The LNO and NSF should discuss the purpose of the Graduate Writing Fellows as we could not find mention of this activity in the original proposal. We also need to clarify the distinction between communication activities and network coordination for this activity.

The Graduate Writing Fellows replace the communications interns, which were in the original proposal and who were mainly recruited from the UCSB Bren School of Environmental management. Fellows are recruited from among LTER-affiliated PhD students and receive modest compensation ($300 per story) to write for the network newsletter and the website. They receive extensive editing and writing advice while gaining familiarity with the research conducted at their own and other LTER sites. We view the activity as valuable for professional development of LTER students and for improving network coordination.

Suggestion IV.a.iii.

The LTER Network Education Committee may want to consider developing materials to assist sites with making education activities accessible the same way research activities are made accessible. Sites may need help learning how to include education data and approaches as part of their data management activities and dissemination.

As time allows, we are developing a framework similar to the LTER information manager's manual for more organized sharing of processes and materials among education and outreach managers. (An extensive shared google drive already exists.) Many site education and outreach coordinators are already strong proponents of open educational resources (OER). It is possible that many existing OER materials are not included in proposal descriptions of data management activities because the PIs and information managers (who typically write those sections) are not aware that they should include educational materials in that section.

In conclusion, we appreciate the opportunity to clarify and expand on the material presented in the review.