

**TO: Frank Davis, Marty Downs, and Jennifer Caselle at the LTER Network Office**  
**FROM: Kendra McLaughlan on behalf of the NSF LTER Working Group**  
**CC: NSF LTER Working Group**  
**RE: Report from NSF to the LTER-Network Office on the Mid-term site visit**  
**11 March 2022**

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The mid-term review of the LTER Network Office (LNO) was held on Wednesday February 23<sup>rd</sup>, 2022. The LNO is award #1929393 to PI Frank Davis at the University of California- Santa Barbara. It was a successful and informative review attended by almost all members of the LTER NSF Working Group and eight LNO staff members (see Appendix 1). Overall, the LNO has successfully achieved many of the objectives described in the proposal, despite the challenges of the ongoing COVID-19 pandemic. The NSF LTER Working Group identified several areas for improvement around synthesis activities, governance, and coordination which we will describe in this report. We have phrased these as suggestions and recommendations in the text below. The LNO is welcome to respond in writing to this report, although no response is required. A copy of this report and any response from you will be placed in the LNO proposal jacket as part of the review history of this project. The annual reporting and rebudgeting process will provide a formal opportunity for LNO and NSF to discuss any adjustments needed for upcoming activities.

The goals of the site review were: (1) to evaluate progress of the LNO within the first 3 years of the award and (2) identify future directions of focus for the LNO, especially considering changing conditions due to the pandemic. The LNO award is a Cooperative Agreement that requires regular communication between the LNO and the managing PO for the award (Kendra McLaughlan) along with NSF representatives from OCE (Daniel Thornhill) and OPP (Karla Heidelberg). With regular monthly meetings between the LNO and NSF, as well as an extensive annual reporting and rebudgeting process, there was no need for an exhaustive mid-term site review. However, the mid-term site review provided an important opportunity to take a comprehensive view of the LNO activities with an eye toward future directions. The format of the review—virtual format in Zoom, shortened to three hours total—worked well.

The site visit was organized into four sessions: Overview, Synthesis, Network Coordination and LNO Project Management, and Education/Outreach/Engagement. There was time for discussion after each session as well as a longer discussion session to conclude the site visit. A brief summary of the content in each section, as well as recommendations and suggestions from NSF, are presented below.

- I. **Overview.** The LNO presented an overview of the LTER program, describing the key role of the LNO in synthesis, coordination, partnerships, and education/engagement. The LNO plays a key role in coordinating among the 28 diverse sites. One strength of the LNO is that its connective role shapes the individual sites into a cohesive network. The current LNO award began 1 September 2019, and has been highly impacted by the pandemic and the loss of the previous managing Program Officer, John Schade. The location of the current LNO at the University of California-Santa Barbara has many advantages, primarily

co-location with the National Center for Ecological Analysis and Synthesis. Synthesis is at the heart of the LNO. The budget structure of the LNO supports synthesis as a priority, with most of the budget comprising participant support costs and salary.

a. **Recommendation:**

- i. There are \$194,000 in unspent funds from the previous LNCO grant (1545288). These must be spent as soon as possible. These funds will expire 9/30/2022 and cannot be extended.

**II. Synthesis.** The goal of the LNO in this area is to enable participants of the Synthesis Working Groups (SWGs) to do science differently, more collaboratively, and reproducibly. The LNO approach of providing open calls for synthesis proposals has yielded strong, motivated grassroots groups. During the pandemic, the LNO increased analytical and facilitation support for SWGs. Five synthesis groups are in progress and have received training in remote work and reproducible research practices. Two new postdocs (Ingrid Slette and Joan Dudney) and two new data analysts (Angel Chen and Nick Lyon) have been recently hired to assist with upcoming synthesis activities at the LNO, which will provide much needed support for this central activity. There have been 11 Synthesis Working Groups since January of 2016. There will be a new call for Synthesis Working Group proposals in Spring 2022 with a long open period of several months. The process for selecting and supporting the SWGs is working well, although redoubled efforts to solicit SWG proposals on a broader range of topics are needed (see below). SWG activities have led to some important high-profile papers as well as additional impacts and products (such as connections, datasets, R packages, and webinars). Surveys of SWG participants have yielded some insight into motivation and barriers to participation, as well as outcomes from participation. The All-Scientists Meeting is an upcoming activity in September 2022 where ideas and plans for future synthesis activities could develop further.

a. **Recommendations:**

- i. The topics of the SWGs seem to be strongly focused on a few areas. The breadth of LTER science covered by these synthesis groups needs to be expanded, as marine and polar ecosystems are not represented in the current groups. This issue was identified in the mid-term review of the previous LNO award but has not been addressed. Further, participation in SWGs seems to be highly uneven across sites—some sites are involved in multiple SWGs and some sites do not seem to be involved at all through personnel or data. The LNO needs to find ways to attract and support synthesis for the full breadth of LTER science and scientists. In the LNO proposal, a stated goal was to “encourage greater incorporation of coastal and marine ecosystems (which now make up nearly half of the LTER sites).” We strongly support achievement of this goal.
- ii. The goal of including non-LTER researchers in the SWGs should be pursued. It was unclear how many participants in the SWGs are from outside the LTER. Even if the definition of network affiliation is broad, there is room to improve the inclusion of researchers.

**b. Suggestions:**

- i. Keep the focus on synthesis by maintaining the same number of SWGs as what was proposed, or increasing if possible with the funds available. Identify opportunities to continue to innovate on ways to support a better mix of in-person and remote work for the SWGs.
- ii. Maintain data support for SWGs through integration of personnel with expertise in data informatics, site IMs, and data repositories co-located with the LNO.
- iii. Plans for the ASM (currently planned to be in-person only in Asilomar, CA in September 2022) should remain flexible, considering the ongoing pandemic conditions and the diverse array of needs and preferences within the LTER stakeholder community.

**III. Network Coordination and LNO Project Management.** LNO plays a catalytic role within several levels of organization, focusing on unique network-wide roles. The approach of facilitating peer learning and engagement within the network has been effective within specific communities of practice, connecting people across the network in structured roles such as Information Managers or Education Coordinators. These communities of practice are important for network functioning, and it is good that LNO can coordinate them. The LNO regularly interacts with the Science Council (1 PI per site), Executive Board, and Executive Board chair. Some key accomplishments have been the establishment of a new DEIJ Committee, publication of a new IM manual, organization of regular PI meetings, and launching a searchable updateable directory of LTER personnel called LTERHub. The LNO also helped collect data on network activities for the 40-year Decadal Review through a separate NSF workshop award. A site climate survey is planned for next year, to follow the demographic survey.

**a. Recommendations:**

- i. Care must be taken to ensure that communication among site PIs is not about the NSF review process. Interactions between NSF staff and site staff about site reviews, proposal renewal, or other NSF award-related matters are outside the purview of the LNO.
- ii. 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.
- iii. 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. This structure could be similar to how the NSF LTER Working Group makes decisions for management of the program; we have found this to be an effective approach.

**b. Suggestions:**

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

**IV. Education/Outreach/Engagement.** The education activities are among the strongest parts of LTER sites, and this strength is based on the deep relationship between sites and their communities. The LNO has focused on a set of activities that are synergistic with what the sites are doing. The LNO maintains a website that is the main public face of the LTER, as well as a monthly internal newsletter, and expected media channels such as Twitter, Instagram, YouTube, LinkedIn and Slack (for internal use). The LNO has also coordinated cross-site RET and REU opportunities, accelerated partnerships with other networks, helped develop an R package (lter datasampler), and mentored seven Graduate Writing Fellows. Two additional examples include developing a data reuse tool (EcoComDP) and a video on demystifying field experiences with the Organization of Biological Field Stations and the Undergraduate-Field Experiences Research Network. There are many graduate and undergraduate students in the network across sites, and the LNO provides professional development resources and convenes the Graduate Student Committee. Overall, the NSF LTER Working Group identified many strengths in this area of coordination.

**a. Suggestions:**

- 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.
- ii. The LTER Network Education Committee may want to consider developing materials to assist sites with best practices for collecting data on participants in education activities.
- 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.

In summary, we thank the LNO for hosting a well-organized, informative, and successful mid-term review. We know that the online format was limiting in several ways. However, the LNO did a good job of preparing an interesting and informative presentation that conveyed the history, scope, and accomplishments of the LNO. In considering our comments, please be

assured that NSF is mindful that: 1) LNO has been operating under pandemic conditions, which is a difficult environment for all; 2) expansion of activities cannot be expected based on existing funds alone; and 3) several of the recommendations and suggestions may be different than guidance the LNO has received in the past, or are in areas where the LNO is already investing. We look forward to working with the LNO as we move toward the next phase of the project.

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### **Appendix 1: Attendees**

There were many attendees from both the LNO and NSF.

*Eight attendees from the LNO were:*

- Julien Brun (Scientific Programmer, LTER Network Office; Senior Data Scientist, National Center for Ecological Analysis and Synthesis)
- Jennifer Caselle (Synthesis Coordinator, LTER Network Office, Professional Researcher, UCSB)
- Angel Chen (LTER Data Analyst, LTER Network Office)
- Gabriel de la Rosa (Digital Communications Coordinator, LTER Network Office)
- Frank Davis (Executive Director, LTER Network Office; Professor, UC Santa Barbara; Director, La Kretz Research Center)
- Marty Downs (Director, LTER Network Office)
- Nick Lyon (LTER Data Analyst, LTER Network Office)
- Ingrid Slette (LTER Postdoctoral Associate, LTER Network Office)

*Eleven attendees from the LTER Working Group at the National Science Foundation were:*

- Hana Busse (Science Assistant, GEO/OCE)
- Roberto Delgado (Program Director, Arctic Observing Network, GEO/OPP)
- Cheryl L. Dybas (Science Writer, OD/OLPA)
- Karla Heidelberg (Program Director, Antarctic Organisms and Ecosystems, GEO/OPP)
- Doug Levey (Program Director, BIO/DEB)
- Peter McCartney (Program Director, BIO/DBI)
- Kendra McLauchlan (Program Director, BIO/DEB)
- Francisco “Paco” Moore (Program Director, BIO/DEB)
- Jennifer Rhemann (Science Assistant, GEO/OPP)
- Cynthia Suchman (Program Director, GEO/OCE)
- Daniel Thornhill (Program Director, GEO/OCE)

*Additional NSF observers were:*

- Lauren Howe-Kerr (Knauss Marine Policy Fellow, GEO/OCE)
- Doug Kowalewski (Section Head, Antarctic Sciences, GEO/OPP)