

LNO ARRA OPERATIONS PLAN REVERSE SITE VISIT REPORT

LNO ARRA award number: R09

Project title: Operations Plan (2009-2014)

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I. Background

The Long Term Ecological Research (LTER) Network Office (LNO) is responsible for planning, implementing, and supporting activities that advance the goals of the LTER Network. With funds from the National Science Foundation (NSF), the LNO carries out these activities as defined in Cooperative Agreements (CA) with NSF with additional guidance from the Executive Board (EB) of the LTER Network. Specifics of each activity are described in proposals to the NSF that are examined by external reviewers and evaluated by a panel of experts selected by NSF.

One of these Cooperative Agreements with the NSF incorporates funds from the American Recovery and Reinvestment Act (ARRA). As part of cost-accounting measures associated with awards using ARRA funds, the NSF requires specific details on the planned expenditure of funds. In the case of the LNO Cooperative Agreement, the NSF requested the development of a detailed implementation plan describing the ten activities to be carried out with ARRA funding and the costs associated with those activities. The NSF further requested that the LTER Executive Board be closely engaged in the development of this operational plan by the LNO and that external reviewers inform the development of that plan.

The LNO has undertaken to develop an operational plan that provides detailed information on each activity funded by ARRA. With guidance from NSF and the Executive Board, the LNO has prepared standard descriptions of each activity, linking these with effort (Table 1) and cost (Table 2) budgets to provide clear links between activities, personnel, and expenditures. This operational plan has been reviewed by the Executive Board, the relevant LTER committees, and a panel of outside experts chosen for their knowledge of the technical aspects of cyber-infrastructure and information management. The final operational plan will form the basis of future evaluations of the performance of the LNO with regard to work supported by ARRA funds.

II. Statement on LNO ARRA Operations Plan

The operational plan contains the following information for each of 10 activities in four thematic areas: 1) description of activity, 2) outcomes of activity, 3) operational steps to carry out activity, 4) milestones, 5) process for reviewing progress and evaluating

success, 6) benefits to the LTER community, its external partners, and the larger U.S. scientific and education community, and 7) mechanisms to garner feedback from the LTER community and external communities of science and education. The descriptions of each activity are designed to provide sufficient information to understand purpose, outcomes, and impacts.

As part of the development of the plan being reviewed, the Network Office, with advice from the LTER Executive Board employed an ad hoc review committee (committee external review report attached) to comment on an earlier draft of this document. The document reviewed here includes changes as per the ad hoc review committee and Executive Board's suggestions.

III. The Operation Plan Development Process

This plan is based heavily on the LTER Decadal Plan cyber-infrastructure plan which was developed by the entire LTER Network. The proposal was much larger than would typically be submitted but was encouraged by the NSF Program Officers (H. Gholz and D. Childers). Following the proposal submission, an NSF-organized site review was held. The Site Review Team (report in jacket) recommended full funding. NSF subsequently asked the LNO to split the proposal into a standard renewal proposal and a Cyber-Infrastructure Development and Synthesis Activities Project, including a 5-year plan as a first step.

The first proposal was funded as a Cooperative Agreement using FY 2009 moneys. The second proposal was funded as a Cooperative Agreement using FY2009 ARRA funds. As part of the special reporting requirements for ARRA funds, NSF included a list of Special Conditions and Requirements (see diary note in jacket) including the development and review (this reverse site visit) of this Operations Plan.

The key points from this process highlight the need for the continued information exchange and communication between the LNO, NIS and the site-level scientists. To facilitate this, lead PI Waide will develop an additional communication plan.

IV. Key activities and objectives

a. Network Information Management System

The overall mission statement and many of the stated goals come directly from the 2005 NIS Strategic Plan and the Cyber-infrastructure Strategic Plan (2007). The critical elements of managing the Network Information System (NIS) will require communication, managing risk, and evaluation. Toward this end, the Operations Plan provides specific milestones and metrics. NISAC and LTER-EB provided continual oversight in all aspects of the NIS development and communication.

The LNO has proposed a new position to oversee NIS communication. They will also facilitate committee recruitment, staffing and scheduling. The plan

also calls for the use of Tiger Teams to provide feedback from the user community to the LNO.

Major likely risks have been identified and include staffing, software integration, metadata quality, data portal product complexity and M&O transition.

Metrics for success identified to date include iterative software process milestones, software release milestones, and trailing metrics of success, user satisfaction and descriptive statistics on use.

b. Cyber-infrastructure development and deliverables

NIS mission statement and characteristics set the stage for PASTA development and the NIS architecture. First, the ecological metadata language (EML) is central to allowing these activities succeed. Because the scientists, sites and network have adopted EML, there is a common structure that allows the data harvesting activities to succeed. The 'controlled vocabulary' group has completed their tasks.

c. Development and Outreach

To fully integrate the community, the LNO will provide an additional Communications Plan that details the feedback pathways and mechanisms between the LNO , the individual LTER sites and user community.

V. Feedback regarding the submitted 5-year operations plan

a. Summary statement

The panel is truly impressed by the level of thought and effort that went into the Operations Plan. The proposed activities and potential achievements are based on the considerable skill and management that the LNO has assembled. It is clear that the LNO through the activities presented here are helping to the lead the LTER sites toward a better integrated, more functional true network through data accessibility and availability and most importantly, by allowing LTER and other scientist answer large scale questions heretofore, inaccessible.

b. Specific observations and recommendations

1. PASTA is described in the proposal as "a conceptual model for transforming LTER data in to network ready Products". This sounds much more experimental than it is, or at least that description does not help the general science user appreciate what parts of this are more mature than others.

2. Risks are all discussed in very high-level units (workflow system, data portal, system integration) that are difficult to assign any mitigation strategies to. A little more break down here would help address the problem stated above.
3. Milestones are defined in terms of CI development, not data products or science impacts. There is a need for early releases, but those should be measure ultimately by the science they enable and not just by the progress they represent in the iterative development path to PASTA 1.0.
4. The proposal, the OP and the external reviews don't really address the science rationale for the NIS in general and for the new infrastructure proposed here in particular. Given the similarities with the general goal of this system with many other data management systems (KNB, SEEK, OOI, NEON, GEON, GLEON, etc), it would be helpful to keep stating what seems patently obvious as a mechanism for ensuring that there is a science driver defining the functional design.
5. Many parts of the scope of work are for fundamental middleware components that do not pose any specific ecoinformatics challenges and are universal elements of most cyber-infrastructures. Even EML has virtually no tags unique to ecological data. Are there some components that could in fact be supplied with commercial products and licensing? Is there a strategy for decision-making and modular design that leaves flexibility in replacing components should an external one become available competitive?
6. Is there a strategy for de-scoping that enables LNO to drop certain functionality in the face of components that fail, or prove too risky or costly to develop? Can the impact of that de-scoping be accounted for in terms of science functionality? what kinds of datasets or what kinds of capabilities are lost or preserved in the event of some part (say, the metadata generator) either failing or falling short of expectations?
7. Transitional risk - the current LNO will end in 5 years and will be re-competed. What will happen to all of the efforts and products outlined here if this group is not awarded the contract? We must insure that these products are readily transferable. The LNO should identify the parts of the CI and IM that are completed along the way and easily transferable. The data portal complexity issue can be largely avoided if the deliverables are phrased in simpler data products than the overall completion of the PASTA project like CLIMDB, HYDRODB and Ecotrends.

Overall, the seven specific points above suggest that the LNO They would benefit from aligning their design, work plan, budget, risk register and schedule around a tiered set of data-product deliverables that:

1. Trace to meaningful science impacts that clearly reflect LTER program goals,
2. Start appearing early on, and
3. Lets them incrementally grow the system by layering in new functionality.

c. More minor observations and considerations

1. Be sure to engage graduate students and post-docs in this process; they are likely to be the most engaged and have the time and inclination to use this information and any new advances developed.
2. The Metrics should also include non-LTER users. What about the overall effect on ecosystems science?
3. It would be helpful if the various emerging networks and information systems (e.g. NEON) could adopt common naming conventions. NEON uses 1-5 for their data levels and the LNO uses 0-4; is there a community standard?
4. The way this is designed, the burden is on the sites is for EML compliance and quality. How can feedback be provided to the sites so that the individual node heterogeneity is minimized. Right now, there are no best practices, but there seemed to be the suggestion that the LNO will identify which sites have the easiest flow and then hope the other sites will follow.

Overall, the panel found the five-year operational plan to be well thought out, delivered and consistent with the intent of the ARRA award. We offer these suggestions for your consideration as you move forward and as a guide for our evaluation of your progress as you move into the development and delivery of the various aspects of this project.