

3 April 2007

TO: Dr. John Magnuson, Chair, LTER Science Committee and Executive Board
RE: LTER National Advisory Board Report
Meeting of 8-9 March 2007
CC: Dr. Robert Waide, Executive Director, LTER Network Office
Professor Scott Collins, PI, NSF LTER Planning Grant
Dr. Phil Robertson, Chair elect, LTER Science Committee and Executive Board

Dear John,

Attached please find a copy of the LTER National Advisory Board report from our meeting in Arlington Virginia on 8-9 March 2007. We were very pleased to have participated in the Mini-Symposium, and we thought the venue of meeting with the LTER Executive Board and at National Science Foundation was very beneficial for us this time.

Overall, we are very excited by the potential of the Integrative Science for Society and Environment (ISSE) as a direction for the LTER community. We look forward to providing input into the rest of the LTER Strategic Planning Process. The report of the National Advisory Board, attached, provides some other recommendations for your consideration.

We wanted to thank you, Bob Waide, and Scott Collins for making the meeting stimulating and easy to participate in. In the future, we might consider other locations, such as LTER Sites, for our meetings. This would allow us to learn more about the LTER network at the site level.

We very much appreciated meeting Phil Robertson, and look forward to working with him. We are willing to help in anyway reasonable in the transition of leadership.

Finally, it has been a pleasure working with you. On behalf of the NAB, I would like to acknowledge your efforts to help guide the LTER network during this time of transition.

In conclusion, we hope that the comments in the report are helpful, and we look forward to working with you and in the near future Phil over this very exciting time. As always, we stand ready to help in any way and are eager to hear more about your plans as they develop.

Sincerely,

Peter Arzberger on behalf of the National Advisory Board:

Peter Arzberger, University of California San Diego
Roger Bales, University of California Merced
Barbara Bedford, Cornell University
Alan Blatecky, Renaissance Computing Institute
Carol Brewer, University of Montana
Terry Chapin, University of Alaska and Bonanza Creek

Robert Dickinson, Georgia Institute of Technology
Michael Goodchild, University of California Santa Barbara
James Levitt, Harvard Forest and Harvard's Kennedy School of Government
Elinor Ostrom, Indiana University
Margaret Palmer, University of Maryland Center for Environmental Science
Paul Risser, University of Oklahoma
Jack Stanford, Flathead Lake Biological Station, Montana State University
Sander van der Leeuw, Arizona State University

Attached: Report of the LTER National Advisory Board, Meeting 8-9 March 2007

Final
3 April 2007

Report of the National Advisory Board
National Advisory Board Meeting
8 – 9 March 2007
National Science Building
Held in conjunction with the LTER Mini-Symposium and the LTER Executive Board Meeting

Summary:

The NAB strongly endorses the direction set out in the “Integrative Science for Society and Environment (ISSE): A Strategic Research Plan” as a direction for the LTER community to embrace, promote and pursue. We understand that the ISSE plan is a “background” document that will complement other documents, including the Research Plan, that are being prepared under the Planning Grant. We believe that the entire suite of Planning Grant documents would benefit from a concise and clearly presented “foreground” or “Overview” document. The “Overview” document should make evident the unique and distinctive vision, mission, and role of the LTER program. As such, it should have the potential to stand as a milestone reference document for years to come. We also believe that the LTER community needs to vigorously pursue partnerships with different research communities to realize the vision of the ISSE.

Background to the 2007 National Advisory Board Meeting:

This year the LTER National Advisory Board Meeting (NAB) held its meeting at the National Science Foundation, in conjunction with the Fifth Annual LTER Mini-Symposium and the LTER Executive Board meeting. The LTER Planning Grant activity was started in October 2004 and engaged more than 200 LTER and non-LTER scientists. One product of that activity, the “Integrative Science for Society and Environment (ISSE): A Strategic Research Plan,” recently had been completed and submitted to NSF. The ISSE is one component of the larger LTER Strategic Planning process, which will comprise:

- ISSE
- LTER Research Plan
- LTER Cyberinfrastructure (CI) Plan
- LTER Education Plan
- LTER Governance
- Trends Publication

The goals for this NAB meeting were to gain an understanding of the ISSE, review and comment on the CI Plan, and obtain an update on the other components of the LTER Strategic Plan. The entire LTER Strategic Plan will be completed and submitted to NSF by 1 October 2007.

By holding the NAB meeting in conjunction with the Executive Board (EB) of LTER, at NSF, at the time of the LTER Mini-Symposium, NAB was able to have a much broader dialog with EB, to engage key members of NSF leadership in a dialog about LTER and LTER’s strategic direction, and to gain a very exciting view of LTER research.

LTER Strategic Plan

Integrative Science for Society (ISSE)

We were uniformly impressed and excited by what we saw at the LTER Mini-Symposium, “Social-Ecological Change: Insights from LTER.”¹ This symposium highlighted some research activities in the LTER Network relevant to concepts articulated in the recently produced document, Integrative Science for Society and Environment (ISSE): A Strategic Research Plan. Each talk illustrated how the conceptual framework (Figure 7, page 11, ISSE, also known as the loop diagram) captured research at five LTER sites, and in turn applied that research to problems faced by society and addressed at local and regional levels. Several talks indicated the flexibility of the paradigm, for example one talk (Harvard Forest) illustrated a historical perspective being adopted in this framework. Finally, we sensed the enthusiasm for this framework and the future of LTER by its participants; this is an enthusiasm we share.

Within this framework, we see a huge opportunity to engage many NSF programs. The SBE AD attended a portion of the NAB meeting and expressed his support for efforts like this one. Also, a representative from OCI attended part of our meeting. Finally the external chair of the Advisory Committee of Environmental Research and Education attend the EB and portions of the NAB meeting.

Additionally, given the growing awareness in Congress and the public about the impact of humans on the environment, we see an opportunity for NSF to create a flagship activity in research, education, and applications at the socio-ecological interface, and to lead other agencies in such a cross-agency initiative.

LTER Research Plan

The NAB strongly endorses the direction set out in this document (ISSE) as a direction for the LTER community to embrace, promote, and pursue. We think it is **imperative** that the LTER Research Plan reflect the directions of the ISSE. This is the LTER future – seize it!

In addition, the LTER Research Plan should articulate clearly what “**network-level**” research is, e.g. integrate data, analyze issues, develop and apply predictive models, and synthesize insights across sites, and how this will be implemented as part of the plan. In addition, the LTER Research Plan should make a strong scientific case for the value of network-level research. The plan should state clearly how the LTER network is uniquely positioned to address those research questions and what those questions are.

Finally, we envision a time, in the future, where the long labors of the LTER program, coupled with the social and behavioral sciences as well as other partners, will lead to

¹ See <http://www.lternet.edu/news/Article128.html> for presentations and audio downloads

many more **practical applications** in areas such as risk analysis and policy, and a more **predictive science** including ecological and scenario forecasting.

Process for Completing Research Plan: During discussions with the EB we heard both the status of the LTER Research Planning process as well as a plan to complete it. The plan reflects a broad, bottom-up, iterative approach, with integration of input from sites, synthesis, and further engagement of all sites. In particular, sites have responded to the conceptual framework (figure 7 of the ISSE), and tentative common overarching themes have been identified (e.g., loss of cryosphere) and will be refined. A writing team will integrate the input and create the final synthesis.

Uniqueness of the LTER Network – An Asset for ISSE: Based on discussion at NSF, with various NSF staff and leadership, and based on the future LTER research reflected in the ISSE, we feel that the research plan needs to articulate clearly the unique role LTER can play in an ISSE framework. The overall notation of coupled social-ecological systems is not new (see paragraph 2 of the NAB report from July 2006). However, LTER brings unique capabilities to the ISSE vision. The following points should be considered for the LTER Research Plan:

- Describe the conceptual ideas (e.g., resilience) and research (e.g., predictive modeling, scenario forecasting, and incorporation of evolution in prediction capabilities) that distinguishes LTER from other efforts, especially monitoring efforts. The talk from the Baltimore LTER illustrates how new understanding led to regional adaptation of new policies.
- Express the challenges in terms of both ecology as well as the social sciences, e.g., adaptation, mitigation, role of institutions, risk assessment, and “tipping points”.
- Highlight the richness of long-term data sets and the products of long-term research of LTER.
- Articulate the unique LTER perspective (not solely ecology, not solely social science, but a unique blend of these and other perspectives) of the network.
- Identify how LTER will leverage other investments such as NEON and distinguish the goals of LTER from those of the leveraged activities. NSF should be your partner in this effort, especially with NEON.

Marketing the LTER Strategic Plan

It is important that LTER describe and promote its plan, at NSF and within the scientific community. As was stated several times at our meeting, leaving a document on the doorstep of NSF, without adequate briefing of the NSF staff, will likely result in the plan being ignored (without bias).

Recommendation for next meeting: Please present a plan for marketing of the LTER Strategic plan, both to NSF and the broader community.

Comment on NSF: The briefing plan at NSF should reflect a two pronged approach: Work with the Assistant Directors for information, strategy, policy, and NSF-wide initiative; work with program officers for implementation perspectives. Program Officers

also have possibility of helping fund projects and establishing programs for a faster start, and note that program officers have funds from their own programs.

ILTER Network Cyberinfrastructure Strategic Plan – version 3

The presentation of CI very nicely summarized the thinking of the CI group and the CI Strategic Planning document.

Recommendation: We recommend that the CI group make the arguments for CI based on network science and LTER Research needs. Namely, link specific research goals to the needs for CI. We do understand that the research plan is still being worked on, and we understand that there will need to be a dialog among all of the players.

In general, we feel that LTER research should be moving towards prediction and scenario forecasting. Ensuring that is possible will be an important part of the CI plan.

ILTER Education Plan

A plan has been constructed. Final input on a survey has been collected but not yet incorporated into the Education Plan. We also would like to learn how the education plan will link to and be synergistic with the Research and CI plans.

Recommendation: We request a copy of the Education Plan when it is completed.

Comments on Packaging the final product:

The suite of Planning Grant documents should include a summary “Overview” document, somewhat more directed and crisply worded than a typical executive summary on an analytical document, that lays out the high level vision, mission and objectives of the LTER program going forward. That vision should include an affirmative statement, in line with the ISSE document, which states that at least a portion of the program should be for work which integrates the natural and social sciences, as this is essential to serving the national interest and our environmental security. In addition, more of the science should span the entire network -- that is, be "network-level" science.

This summary “Overview” should offer any intelligent lay reader a sense of the significance and thrust of the LTER program, in just the same way that the presentations we heard at the mini-symposium do. Don't waffle -- state your case clearly, and it should be heard and appreciated.

Recommendations:

- There should be an executive summary for the entire set of products of the Planning Process. That executive summary should address points raised in the previous paragraph.

- In addition, we think that this summary should accompany all products of the planning grant.
- We strongly recommend a shorter time frame to complete this process.
- The NAB would like to provide strategic advice on the LTER Strategic Plan before it goes to NSF. We also recommend a face to face meeting for this dialog. If the intent is to stay with the original timeline of delivering the documents to NSF by 1 October 2007, we suggest a meeting in late August or early September (at the latest) for that dialog.

Partnerships:

As was stated in the NAB report from the July 2006 meeting:

“Partnerships will be essential to succeed in this initiative, and LTER has formed strong partnerships in the past. In addition to the partnership with the social science community, we feel a clear role for geosciences is important and needs to be better articulated in the planning documents. To succeed in this initiative the cyberinfrastructure plans will be critical. We urge the planners of this initiative (as defined in the Initiative document) to continue to engage computer science and cyberinfrastructure (CI) experts to complement the expertise gained in the LTER network, and to engage these experts as equal partners in the further development of the Initiative. This partnership will provide the best possible insight into technology trends in CI, and will ensure the plans are compatible with trends in the broader CI community.”

Social and Behavioral Sciences:

We were delighted to see the support from David Lightfoot, AD, SBE, for the concepts of the ISSE. It is clear that the ISSE success will depend on strong engagement of that community.

We understand that community-wide partnerships take time to grow, to learn a new language, to understand each others' concepts, and to build trust. This will take repeated commitment by all parties to work together.

The Mini-Symposium demonstrated the LTER community articulating their science in the ISSE Framework. We do not know whether the SBE community is fully aware of this initiative and in turn supportive of the current articulation of the ISSE.

Suggestion: One idea is to open a dialog with a broader range of researchers in the SBE community by holding a workshop in which select members of that community would articulate their research ideas around the conceptual framework of the ISSE. This would be a first, small step to building a dialog that would need to be continued after articulation of joint research, and the acquisition of funds for conducting research and training students.

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We wondered if having a workshop / symposium that was presented predominately by members of the SBE community – working on “similar” problems - might be an early step to engage broader and deeper participation with LTER scientists.

Geosciences:

This interaction is still under-developed within the ISSE. We encourage efforts targeted to engage GEO. We see opportunities to complement involvement by Ocean Sciences in areas such as Earth Science division, which includes hydrology, biogeochemistry, and the lithosphere.

Cyberinfrastructure:

We note that a member of OCI was attending part of the meeting. This should be encouraged. We want to continue to encourage engagement as full partners the members of the CI community. This group at NSF should be targeted as a partner in developing initiatives for the ISSE and the LTER of the future. Moreover, we encourage interaction with the NEON CI planning and implementation process to learn where leveraging is possible and desirable.

Other NSF Directorates or Divisions:

Other NSF administrative components to consider for partnering are Education and Human Resources (EHR) Directorate for the Education activities based on the novel developments at the socio-ecological interface; and Engineering, as the home of the new WATERS initiative.

Evolution of the NAB

Four members of the NAB rotated off the NAB at this meeting: Barbara Bedford, Robert Dickinson, Elinor Ostrom, and Paul Risser. We wish to acknowledge and thank them for their service to LTER.

Over the course of Spring 2007, we will be identifying individuals who can and would be willing to serve on the National Advisory Board for a three year renewable term. In general, we will be seeking individuals who can assist LTER in looking towards the future. While the strategic plan will have been completed within the year, its implementation will require discussion with the NAB. One area of emphasis will be in the area of the social, behavioral, and economic sciences, which will align with a key direction of the LTER strategic plan.

Request: We request the EB to provide some names to the Chair for selection to the NAB. We would hope to have those names by 1 June. This would allow us to engage new members at a potential meeting to review the strategic plan. In general we seek a balance

of expertise on the NAB, including individuals not directly involved in LTER activities, to provide an independent view of LTER activities.

Future Meetings

The NAB endorses the idea of holding its meeting in conjunction with the LTER Mini-Symposium and the LTER Executive Board meeting, at or near the National Science Foundation building, when it makes sense. We saw the potential for engaging more members of NSF (Program Directors, Division Directors, and Assistant Directors) in our discussions.

Based on the turnout at the Mini-Symposium, we would suggest seeking a larger room, either at NSF or in a neighboring building.

A final note, while the location of NSF is very good for engaging NSF in dialog, it does entail more time at the meeting. We found that our time for discussion was compressed. However, the overview of LTER activities and the dialog with the EB was very rich. In the future, the agenda for the meeting should be considered carefully to ensure the topics will be covered thoroughly.

Special Recognition

Paul Risser has been extremely involved with the LTER community for many years, helping with the concept while an NSF program officer and chairing the first 10 year review of the LTER network. During the meeting we recognized his contributions to the LTER community. He very early on recognized the opportunity of performing network science, and continued stressing this position in his role as Chair and member of the National Advisory Board. We all feel fortunate in having the opportunity to work with him.

NAB Interaction with NSF Staff

By holding the meeting at NSF, we (NAB) were able to meet with or have attended our meeting the following staff and leaders of NSF:

- Jim Collins, Assistant Director, BIO
- David Lightfoot, Assistant Director, SBE
- Joanne Roskoski, Deputy Assistant Director, BIO
- Alan Tessier, Acting Division Director, Division of Environmental Biology
- Henry Gholz, Program Officer, LTER Program
- Phil Taylor, Program Officer, Biological Oceanography
- Kevin Thompson, Program Officer, Office of Cyberinfrastructure

Present at the Meeting

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- Peter Arzberger, UCSD, Chair NAB
- Roger Bales, UC Merced
- Barbara Bedford, Cornell
- Alan Blatecky, Renaissance Computing Institute
- Carol Brewer, U Montana
- Terry Chapin, U Alaska Fairbanks; Bonanza Creek
- Robert Dickinson, Georgia Tech
- James Levitt, Harvard Forest and Harvard's Kennedy School of Government
- Margaret Palmer, University of Maryland Center for Environmental Science
- Paul Risser, University of Oklahoma
- Jack Stanford, Flathead Lake Biological Station, The University of Montana
- Sander Van der Leeuw, Arizona State University

Agenda for the NAB Meeting

LTER National Advisory Board
8-9 March 2007
Arlington, VA

Thursday 8 March 2007

0830 – 1200 Mini-Symposium in Room 110 main floor of NSF before security (see attached agenda)

1330 – 1800 LTER NAB Meeting

1. Welcome, Introductions, Overview of Meeting and Context within LTER Strategic Planning [Magnuson, Arzberger]
2. Minutes of last meeting.
3. Response to recommendations from NAB
 - a. Report on the Integrated Science for Society and Environment (ISSE) [Scott Collins]
 - b. Melillo STF Advisory Committee Recommendations [Collins]
 - c. Report on the Planning Grant and feedback loops [Robertson]
4. Cyberinfrastructure for the Planning Grant [Benson via video conference]
5. Governance structure for the Planning Grant
 - a. Review possible alternative structures [Magnuson]
 - b. Thoughts of the NAB
6. Status and Plans for Proposal Effort as follow-up on ISSE [all]
7. LTER in 2020. To what heights should LTER aspire? In this discussion we should hear about roll out of new initiatives such as NEON and Plant [all] Cyberinfrastructure, and the role of LTER.

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- a. This would be an opportunity to hear strategic thinking from NSF about the role of LTER in its future, from BIO (NEON, PlantCI, LTER), from SBE, from OCI. Others?
8. Executive Session [To reflect on materials presented, to prepare for meeting other NSF staff.]

NOTE: At points during this meeting, Dr. Henry Gholz, Program Officer, LTER, and Dr Alan Tessier, Deputy Division Director (Acting), Division of Environmental Biology, will be present.

1830 – 2100 Dinner

Friday 9 March 2007

0830 – 1200 LTER NAB Meeting

1. Business of the NAB
 - a. Rotation schedule and membership
 - b. Annual Meetings: Is holding the NAB annually appropriate?
 - c. Writing the Report
 - d. Next Meeting date
2. Meet with James Collins (9:30 am to 10:30 am) [We will be working on Issues to raise with Jim]
3. Feedback to EB (11:00 am)
4. Other visits at NSF