THE ROLE OF SITE OWNERS AND HOSTS IN NEON IMPLEMENTATION

Report of an NSF-supported Workshop
Smithsonian Mason School of Conservation, Front Royal, VA
28-30 March 2016

Background

The National Ecological Observatory Network (NEON) is the largest biological component in the National Science Foundation's (NSF) Major Research Equipment and Facility Construction portfolio. The NEON concept and design was the result of extensive consultation with and planning by the biological research community. The selection of NEON sites and instruments evolved over many years, during which community consultation was an important activity. NEON encountered many challenges during its construction phase; delays and cost overruns led NSF to reconsider both the project's scope and management. In August 2015 NSF announced its plan to 'descope' NEON by reducing the construction footprint, and in March 2016 announced the reassignment of management responsibilities from NEON, Inc. to Battelle Memorial Institute.

The announcement of NSF's plans prompted the Smithsonian Institution and the U.S. Department of Agriculture (USDA), two important owners/hosts of NEON sites, to organize a conference call of other site owners and hosts to discuss the current status. This call produced the consensus that it was an opportune time to convene a workshop to discuss the working relationships between NEON's managers and site owners and hosts, and to provide advice to Battelle as the new entity responsible for NEON's management.

Workshop Participants, Goals and Format

NSF provided support for a two-day workshop to be held on the campus of the Smithsonian Mason School of Conservation. The proposed workshop was designed to bring together the following NEON stakeholders:

- Representatives of NEON site owners or hosts;
- NSF officials responsible for funding decisions and operational oversight;
- Members of Battelle's team for NEON management;
- Researchers who have been involved in designing and planning NEON at the programmatic or site levels;
- Stakeholders in NEON deliverables and outcomes; and
- Resource people such as specialists on biological collections and workforce diversity.

The goals of the workshop were to:

- Provide stakeholders with current information on NSF's plans for NEON's management;
- Introduce stakeholders to Battelle's team for NEON management;
- Enable NEON site owners and hosts to discuss their experiences with NEON, Inc.'s management practices and the mechanisms for communication used during the construction phase;
- Facilitate discussion leading to the formulation of recommendations and action items for consideration by Battelle;
- Discuss ways to energize the community's engagement in NEON, especially through early-phase activities that will generate tangible outputs of value to diverse users;
- Reinforce the need for a diverse NEON workforce and user community, and discuss strategies and plans to attract more women and minorities; and
- Develop new, efficient and effective mechanisms for communication among hosts and owners of NEON sites and between them and the new Battelle management team.

The NSF awarded funds for the workshop on 15 March 2016 and the workshop organizers distributed invitations to approximately 100 potential participants. Of this number, 40 agreed to attend in person, and approximately ten individuals participated remotely by videoconferencing. Ten NSF officials attended part or all of the workshop, including Dr. France Cordova (NSF's Director), Dr. James Olds (Assistant Director for Biological Sciences) and Dr. Muriel Poston (Division Director for Biological Infrastructure). Appendix 1 provides the list of workshop participants.

Appendix 2 presents an annotated workshop agenda that includes hyperlinks to presentations and supporting documents. The workshop's agenda used the following sequence of formats to promote discussion and consensus-building:

- Informational presentations by NSF officials;
- Panel discussions that included brief presentations to stimulate discussion among all workshop participants;
- Breakout group discussions to generate findings and recommendations for consideration by all workshop participants. These discussion groups focused on:
    - Infrastructure,
    - Programmatic activities,
    - Data products,
    - Scientific collections, and
    - Workforce diversity; and
- Presentation of breakout group findings followed by moderated discussion by all participants to produce general findings and recommendations.

Findings, Recommendations and Action Items

Discussions within the breakout groups and plenary sessions generated lists of many specific concerns and potential action items. These lists and meeting notes were taken throughout the sessions and posted on a website where workshop participants can make corrections and add suggestions. These documents were also provided to Battelle. The plenary discussions that followed the breakout groups highlighted the following findings. Participants agreed that these issues require the attention of Battelle and NSF as the new NEON management system is established:

1. The operations of each NEON site and other activities underway at each site have the potential to be mutually beneficial and synergistic, as well as the risk of coming into conflict, especially where long-term research is underway. Good communications and collaborative relationships will be needed to stimulate the former and avoid the latter.
2. The research community has not been kept up-to-date with NEON's development. This could reduce user uptake of NEON's data products. In addition, lack of information about new capabilities at NEON sites could decrease community interest in proposing value-added projects that take advantage of them. Outward-facing information resources need to be expanded and improved.
3. Good working relationships between NEON Domain managers and Points-of-contact at each site are critical. For the most part, these relationships are working well and need to be maintained and leveraged into effective relationships with NEON users in each domain/region.
4. Biocollections made over time will be parallel in importance with the Big Data generated by instruments on NEON towers. The specimens and samples in these collections will be of great value to a significant portion of the research community. The protocols for collecting and managing these collections and managing their associated data were developed years ago and have been de-scoped over time. As a result, they do not take advantage of some recent advances such as Next Generation DNA analysis of environmental samples and our increased understanding of microbial communities. A re-examination of protocols for sampling, analysis and archiving seems in order and could be the subject of a NEON Working Group.

These and other issues were discussed during workshop's final plenary session, resulting in the following recommendations and proposed action items:

A. Battelle should generate a Communications Management Plan for NEON that:
    - Serves the needs of NEON sites, Domain managers, the Battelle management team in Boulder, NSF, and the research community,
    - Has an improved online presence, and
    - Includes Domain-level conference calls;
B. Battelle should re-establish the Science, Technology and Education Advisory Committee (STEAC) with an updated charter;
C. NEON's Technical Working Groups should be re-launched on topics of shared interest and concern across NEON sites;
D. Organize back-to-back meetings for Fall 2016:
    - A scientific meeting similar to Gordon Conferences, and
    - A General Assembly of site owners and hosts that would include Working Group meetings;
E. An Inter-agency Working Group on NEON to the NSTC Committee on Environment, Natural Resources, and Sustainability should be proposed, with USDA and NSF as co-chairs; and
F. Additional conference calls should be organized to discuss the results of the workshop with NEON site owners and hosts that were not represented at the workshop.

Appendix 1. NEON Workshop Participants

Name	Organization
Adele Crane	SciColl
Alan Knapp	Colorado State University
Ali Andalibi	GMU
Ann Bartuska	USDA
Ann Hitchcock	National Park Service
Anne Maglia	NSF
Brad Reed	USGS
David Schindel	Smithsonian Institution
Eileen Graham	SciColl
Eric Nagy	University of Virginia
Eric Woodard	Smithsonian Institution
France Cordova	NSF
Gene Kelly	NEON
General Abrahamson	NSF
Hank Loescher	NEON
Jay Jones	University of Alaska Fairbanks
Jess Parker	SERC
Jim Olds	NSF
Jim Renfro	NPS
Joe Cook	University of New Mexico
John G. Dennis	National Park Service
John M. Briggs	Kansas State University
Jonathan Thompson	Harvard Forest, Harvard University
Justin Cooper	SCBI Front Royal
Justin D. Derner	USDA Agricultural Research Service
Karl Newyear	Barrow Arctic Research Center
Kris Krishtalka	University of Kansas
Kristina Anderson-Teixeira	Smithsonian - ForestGEO
Larry Rockwood	GMU
Lindsay Boring	J.W. Jones Ecological Research

Name	Organization
	Center at Ichauway
Mariko Yamasaki	USDA Forest Service
Matt A. Sanderson	USDA Agricultural Research Service
Michael Cramer	University of Notre Dame Environmental Research Center
Mike Kuhlman	Battelle
Montona Futrell-Griggs	NSF
Muriel Poston	NSF
R. Scott Taylor	J.W. Jones Ecological Research Center at Ichauway
Rick Farnsworth	Battelle
Roland Roberts	NSF
Ross Hinkle	University of Central Florida
Sally Schneider	USDA
Scott Johnson	University of Wisconsin - Stevens Point
Scott Miller	Smithsonian Institution
Serenity Montaño	Smithsonian Institution
Stephanie Hampton	Washington State University
Steve Ellis	NSF
Stuart Davies	Smithsonian - ForestGEO
Syndonia Bret-Harte	University of Alaska Fairbanks
Teresa Mourad	ESA
Tim Kratz	NSF
Todd Wilson	USDA Forest Service
Toral Patel-Weynand	USDA Forest Service
Ty Lindberg	NEON
W. Clint Hoffmann	USDA
Wendy Gram	NEON
Will Pitt	SCBI Front Royal

Appendix 2. NSF/NEON Workshop Annotated Agenda
Smithsonian-Mason School of Conservation, Front Royal, VA

Meeting Documents: all meeting documents were compiled in a [Google Drive folder](). Presentations and notes are linked to individually throughout this annotated agenda.

Remote Access: off-site participants were able to access all session remotely via GoToWebinar, teleconference lines, and live Google docs.

DAY 1: Monday, 28 March 2016

12:00pm   **Registration and lunch**

1:00pm   **Session 1A.** Welcome ([Jim Olds, NSF]()) and opening remarks (France Cordova, NSF)
- Welcome from the site host (Will Pitt, SCBI) and the meeting host (Scott Miller, Smithsonian)
- Brief status report on NEON construction and commissioning ([Steve Ellis, NSF]() & [Gene Kelly, NEONINC]())
- Recent developments and decisions concerning NEON management (Anne Maglia, NSF)
- NSF plans for NEON management going forward (Muriel Poston, NSF)

2:00pm   **Session 1B.** Questions and discussion

2:30pm   **Coffee break**

3:00pm   **Session 2.** Panel discussion followed by questions and full discussion: Brief presentations by researchers and stakeholders involved in the design of NEON and its principal products
- [Hank Loescher, NEONINC]()
- [Jay Jones, Caribou Poker Creek]()

4:00pm   **Session 3.** Panel presentations followed by questions and full discussion: Representatives of NEON site owners and hosts will give brief presentations on the relationships between their research programs and deliverables (data and scientific collections) and NEON's
- Toolik: [Syndonia Bret-Harte]()
- Northern Great Plains Research Laboratory: [Matt Sanderson]()
- Central Plains Experimental Range: [Justin Derner]()
- J.W. Jones Ecological Research Center at Ichauway: Lindsay Boring
- Norther Research Station: [Mariko Yamasaki]()

5:30pm   **Day 1 ends**

8:30am   **Session 4.** Charge to breakout groups: Identify five priorities in each group for improving the coordination between NEON and site owners and hosts.

     A. **Infrastructure**. Coordinating the selection, acquisition, commissioning, operation and maintenance of physical structures, IT infrastructure, and scientific instruments. (Notes: Steve Ellis).
        Notes: Session 4A Google Doc
        Room: Multipurpose Room (Residence Hall)

     B. **Programmatic Activities**. Harmonizing activities and capabilities managed by NEON and by NEON site owners and operators. (Chair: Jess Parker, SERC; Notes: Serenity Montaño).
        Notes: Session 4B Google Doc
        Room: 104 Academic Center

     C. **Data Products**. Generating standardized, high-value Big Data through coordinated activities at NEON sites. (Chair: Brad Reed, USGS; Notes: Adele Crane).
        Notes: Session 4C Google Doc
        Room: Auditorium

     D. **Scientific Collections**. Collecting, preserving, digitizing, cataloging and managing samples and specimens that are standardized across NEON sites. (Chair: Kris Krishtalka, KSU; Notes: Justin Cooper).
        Notes: Session 4D Google Doc
        Room: 103 Academic Center

     E. **Workforce Diversity.** Strategies and plans for attracting women and minorities to staff positions and users of NEON sites. (Chair: Eric Woodard, SI)
        Notes: Session 4E Google Doc
        Room: Conference Room 2001 (Residence Center – above multipurpose room)

10:30am   **Coffee break**

11:00am   **Session 5.** Reports of five priorities from each Session 4 rapporteur and discussion of priorities to refine priorities, identify common themes, and formulate recommendations to Battelle and NSF

     A. Infrastructure
     B. Programmatic activities
     C. Data products
     D. Scientific collections
     E. Workforce diversity

12:00pm   **Lunch**

1:00pm   **Session 6.** NSF will present the structures and processes used in the past for communications among NSF, NEONINC and NEON site owners and hosts. This description provides a baseline for discussion about possible improvements. (Montona Futrell-Griggs, NSF)

Panelists representing the following stakeholder groups will present their perspectives on opportunities to improve communications and threats to successful communications based on prior experiences. Panelists will represent:

- Researchers who provided input during NEON's planning phase (Alan Knapp, CSU)
- NEONINC staff (Gene Kelly, NEONINC)
- Universities with NEON sites (Larry Rockwood, GMU; Eric Nagy, UVA; Joe Cook, UNM)
- USG agencies with NEON sites (Toral Patel-Weynand, USFS)

2:30pm   **Coffee break**

3:00pm   **Session 7.** Charge to breakout groups whose members will be self-selected: Each group should develop three-five **(3-5)** recommendations to NSF and Battelle for **MECHANSIMS** for improving communications.

Recommendations can be for new structures (e.g., Working Groups, designated POCs), mechanisms (list-serves, all-hands conferences, online seminar series) and/or protocols (periodic SWOT analyses, annual retreats/reviews).

Notes: Session 7 Google Doc

5:00pm   **Day 2 ends**

DAY 3: Wednesday, 30 March 2016

8:30am   **Session 8.** Report from Battelle and NSF on recommendations and action items identified by the group.

Notes: Session 8 Google Doc

9:30am   **Session 9.** Moderated discussion to refine and prioritize recommendations to Battelle and NSF for improving communications.
Google Doc:

Notes: Session 9 Google Doc

10:30am   **Coffee break**

11:00am   **Summary**

12:00pm   **Workshop ends, lunch and participants depart**