

Northeast NEON Meeting

Harvard Forest, 25 April 2006

Compiled by E. Boose from notes by A. Barker Plotkin, E. Boose, J. O'Keefe

1. Purpose. The meeting had the following objectives:

- Exchange information on the current status of the NEON program.
- Discuss preparation of a prospectus for the Northeast NEON in response to an RFP from NSF anticipated on June 1, 2006.
- Identify one or more possible districts for the Northeast NEON.
- Identify next steps in preparation for the RFP.

BACKGROUND INFORMATION

2. NEON Design. The current design of NEON is specified in three design documents available on the NEON web page (<http://www.neoninc.org>). Additional information is contained in a Power Point by Bill Michener presented at the meeting. Here are some key points:

- NEON is a national ecological observatory. The driving questions are continental in scale. For the most part NEON will not capture variation at the domain scale.
- The NEON mission is to forecast future states of ecological systems.
- The overarching questions are: how are ecosystems & organisms affected by changes in climate & land use?
- The NEON program has a highly structured, top-down design. Protocols for field measurements and data processing are explicit and rigid.
- The Northeast domain is one of 20 domains across the country. The domains are of approximately equal size and were chosen to represent the continental climatic gradient.
- Each domain contains one district. Each district contains three sites chose to represent three land use types (urbanizing, managed, & wild). The sites represent the land use gradient at the domain scale.
- Districts should be no larger than 200 km to minimize logistical problems and variations in climate and geology.
- Each site should be a 1st (or low) order watershed. Each site should be 1-100 km² in size.
- Some of the proposed measurements will require research & development of new technologies. (utilize expertise in Boston area?)

3. NEON Funding.

- NSF has \$6M for NEON planning. The initial setup will cost about \$300M. Operation will cost about \$100M per year. NEON planners are worried about possible cost overruns.

- The initial funding would come from the MREFC (major research equipment & facilities construction) program at NSF. NEON is in the current MREFC budget and has passed the major science hurdles.
- The plan is to fund and deploy all 20 domains at the same time.
- MREFC would primarily fund equipment for automated measurements. NSF intends to generate comparable (new) funding for biodiversity measurements and research at NEON sites.
- NSF would prefer one prospectus per domain and would like to encourage ecologists to work together.
- Some evaluation criteria have been articulated, including housing for 30 scientists, electricity, road access, and proximity to universities. Legacy data are valued.

4. Education & Public Policy.

- Education is a key component of NEON but the current design documents do not specify how national and regional efforts will be coordinated.
- Current focus is on K-12 and informal education.
- Some educational infrastructure might be funded through MREFC. NEON may build on existing educational programs through partnerships with universities, NGOs, the National Park Service, and other organizations.
- Public policy will be impacted by NEON research and education and through partner institutions (but not directly through NSF).

5. Important Points.

- Sites must commit to 30 or more years.
- The ultimate goal of NEON is prediction, which will require synthesis & modeling. A second dialogue at NSF will be needed to address synthesis & modeling.
- Site technicians will be hired & trained by NEON, Inc, though details are not yet clear.
- Many logistical details are unclear, including the need for housing, computer facilities, and administrative offices at the site and domain level.
- Methodological recommendations are still welcome.
- The Field Sentinel Unit component (remote sensing, field observations, organism tracking) is less well developed and will require separate funding.
- Remote sensing will be critical to model development and validation.
- Domain-specific themes (such as greenhouse gas emissions and suburbanization) are not NEON themes. Value-added considerations in site selection are great but are not critical to NEON.
- Museums are encouraged to participate.
- How the NEON program will interface with legacy data and existing measurements is not yet clear.

- Several earlier components have been dropped, including lake studies, regional sampling, soil megatrons, canopy cranes, mobile platforms, large experiments, explicit social science, and coastal science.
- There has been little follow up on the human component, infectious diseases, or invasive species. The role of genomics is unclear.

DISCUSSION

6. Key Questions. Several key questions were identified on the issue of site placement:

- Should NEON build on existing research sites (e.g., LTER sites)? Selecting new sites would provide better spatial coverage and wider distribution of resources. However the consensus was that existing sites may provide critical legacy data, demonstrated researcher commitment, existing partnerships with other organizations, and a greater likelihood of immediate results.
- Should sites be located in a single larger watershed (e.g., Connecticut or Merrimac Rivers)? Though advantageous, inclusion in a larger watershed is not critical. Scaling up from 1st order watersheds to a large watershed would require considerably more data than NEON will collect.
- Should sites be representative of the domain? Not necessarily, but sites should not be completely atypical.
- Should sites extend across multiple states? Inclusion of two or more states might have some political advantage.
- Which management type is most appropriate for the Northeast: agriculture or forest management? Probably the latter.
- How can we guarantee the management type and level of activity for 30 years? For agricultural sites, use state agricultural extensions or lands with agricultural easements.
- How engaged do we want to be in the prospectus and deployment of NEON?

7. Strategies. Different strategies were proposed for identifying the Northeast NEON district:

- Create an inventory and map of existing resources across the domain, including Ameriflux towers, NADP sites, USGS stream gages, and field stations.
- Identify the urbanizing site first (since it is hardest to identify).
- Identify areas that may be excluded from consideration. For example, areas that drain to other domains (rather than the ocean) might be excluded.
- Consider the placement of sites relative to important regional gradients, such as acid and N deposition.

8. Districts. Three possible districts emerged from the discussions:

- **Central New England:** Urbanizing = Metro Boston / Plum Island. Managed = Harvard Forest (or Bartlett Forest). Wild = Hubbard Brook (or Harvard Forest).

- **Eastern New York:** Urbanizing = Metro New York (or Poughkeepsie, Kingston). Managed = managed forests in Catskills (or Black Rock Forest). Wild = Biscuit Brook or Frost Valley in Catskills.
- **Coastal New England:** Urbanizing = Metro Boston / Plum Island (or Portsmouth, Portland). Managed = Bear Brook ME (or Massabesic Forest ME, coastal NH). Wild = Acadia National Park.
- Other possible sites include: Urbanizing = Central Park, Arnold Arboretum, Manchester NH, Worcester, Albany. Managed = UMass forests, state agricultural extensions, Quabbin Reservoir. Wild = Howland Forest, Adirondacks. Educational = Sargent Center, Schoodic Program.

9. Pros & Cons. Some advantages and disadvantages of hosting a NEON site were identified:

- The NEON program will provide a wealth of new data for the local site.
- Local researchers may have more time to analyze data.
- NSF is promising matching research funds. There is no guarantee, but NEON will not achieve its goal without this funding.
- Hosting a site will be a large administrative burden, with the need to provide housing, meals, vehicles, and network connectivity for 30-50 visitors.
- Most NEON researchers will come from outside the local area.
- Some NEON measurements may overlap existing measurements.
- There will be no local control or ownership of the data collected.
- Extensive efforts may be required to secure the necessary land use permits.

10. Next Steps. The following steps may help position us to respond to the RFP. Note that NEON, Inc. is planning a national dissemination of information shortly after the RFP is announced (probably via the web).

- Identify 3-4 possible districts for the Northeast NEON and representatives for each district.
- For each possible site, collect information on critical features such as watershed boundaries, available infrastructure, institutional support, and long-term site commitment.
- Identify potential educational collaborators and initiate work on an educational plan.

11. List of Participants.

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| • Taber Allison | Massachusetts Audubon Society |
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