Working Group Report: Synergies between LTER and NEON
Long Term Ecological Research (LTER) network All Scientists Meeting
Estes Park, CO
September 2, 2015

Attending:

Name		LTER site/affiliation
Jesssica	Corman	NTL
Alan	Covich	LUQ
Todd	Crowl	LUQ/FCE
Walter	Dodds	KNZ
Hilary	Dugan	NTL
Eve	Gasarch	NWT
Kate	Glanville	KBS
Peter	Groffman	BES/HBR
Omar	Gutiérrez del Arroyo	LUQ
Steve	Hamilton	KBS
Paul	Hanson	NTL
Leif	Klemedtsson	SITES
Ola	Langvall	SITES
Russ	Lea	NEON
Noah	Lotting	NTL
Peter	McCartney	NSF
Bill	McDowell	LUQ
Kim	Novick	CWT
Mark	Schildauer	NCEAS
Tim	Schowalter	LUQ
Tim	Seastedt	NWT
Emily	Stanley	NTL
Jeff	Taylor	Aspen Global Change Institute
Will	Wieder	NWT
Mike	Willig	LUQ

Key topics of discussion

- Peter Groffman presented an overview (presentation attached at the end of this email) of the NSF-funded project that provides funds for a synthesis working group to explore synergies between the National Ecological Observatory Network (NEON) and the Long Term Ecological Research (LTER) Network. Through a series of workshops, we will address four topics; 1) using LTER data and insights to provide landscape and regional scale ecological context for NEON sites, 2) using NEON data to inform the five core areas of LTER research, 3) use LTER experience and insight to develop long-term conceptual models for NEON sites and 4) combine data and models from LTER and NEON sites to

improve predictions of future ecological trajectories at regional to continental scales. The effort is led by Groffman, current chair of the LTER Science Council along with co-Chair Julia Jones.

- Follow up workshop timing and procedures:
  - The workshops will take place in spring and summer of 2016.
  - The workshops will be held at the Cary Institute of Ecosystem Studies in Millbrook NY. There will be two workshop "events" with two working groups/themes at each event. Each working group would have 20 – 25 participants, with some overlap and interchange between the two groups meeting at each event. This format will allow us to explore all four themes and involve a large number of participants with an efficient use of funds.
  - It will be important to involve a wide range of participants in these workshops; with both senior and junior scientists from both within and outside of the LTER and NEON networks. The pool of investigators that have been involved in the Macrosystems Biology program is a particularly promising pool of participants for this effort. It will be important to have a representative from each of the LTER/NEON overlap sites.
  - One idea is to issue a request for expressions of interest in participating in the workshops. For the modeling workshops. Perhaps ask applicants to propose a NEON/LTER synergy model or question.
  - While NEON personnel were not involved in the original proposal, we are keen to have them involved:
    - It would be important and useful to involve Gene Kelly.
    - Brian Wee provided input to the proposal and would like to participate.
    - Gene and Brian can help to identify other good participants.

- Data issues:
  - NSF has funded some workshops on using NEON data, we might want to get some of these people involved in our workshop.
  - It might be good to include some "mini-hackathons" to kickstart some data integration.

- International links:
  - Some IKOS (Sweden) people at the meeting, expressed interest in further participation.
  - Europe LTER

- Products:
  - Case studies build around the co-located LTER and NEON sites; HFR, NTL, KNZ, JRN, TLK, etc.
  - Ideas for follow- up workshops on preparing students and postdocts for using NEON data.

LTER and NEON

- LTER:
  - Network (since 1981) of site-based hypothesis-driven research organized around five core areas of ecosystem research.
  - Diverse research approaches; long-term data, experiments, comparative studies, modeling.

- NEON:
  - Continental scale observing network.
  - Produces and provides coordinated, calibrated datasets on ecological structure and function to the community for analysis.

- Why both and important and needed:
  - NEON will make data available for coordinated assessments of if and how ecosystems are changing in time and space.
  - LTER will tell us why they are changing; the mechanistic underpinning of ecosystem response to environmental change.

LTER and NEON

LTER:
- Evolving conceptual models to test hypotheses
- Experiments
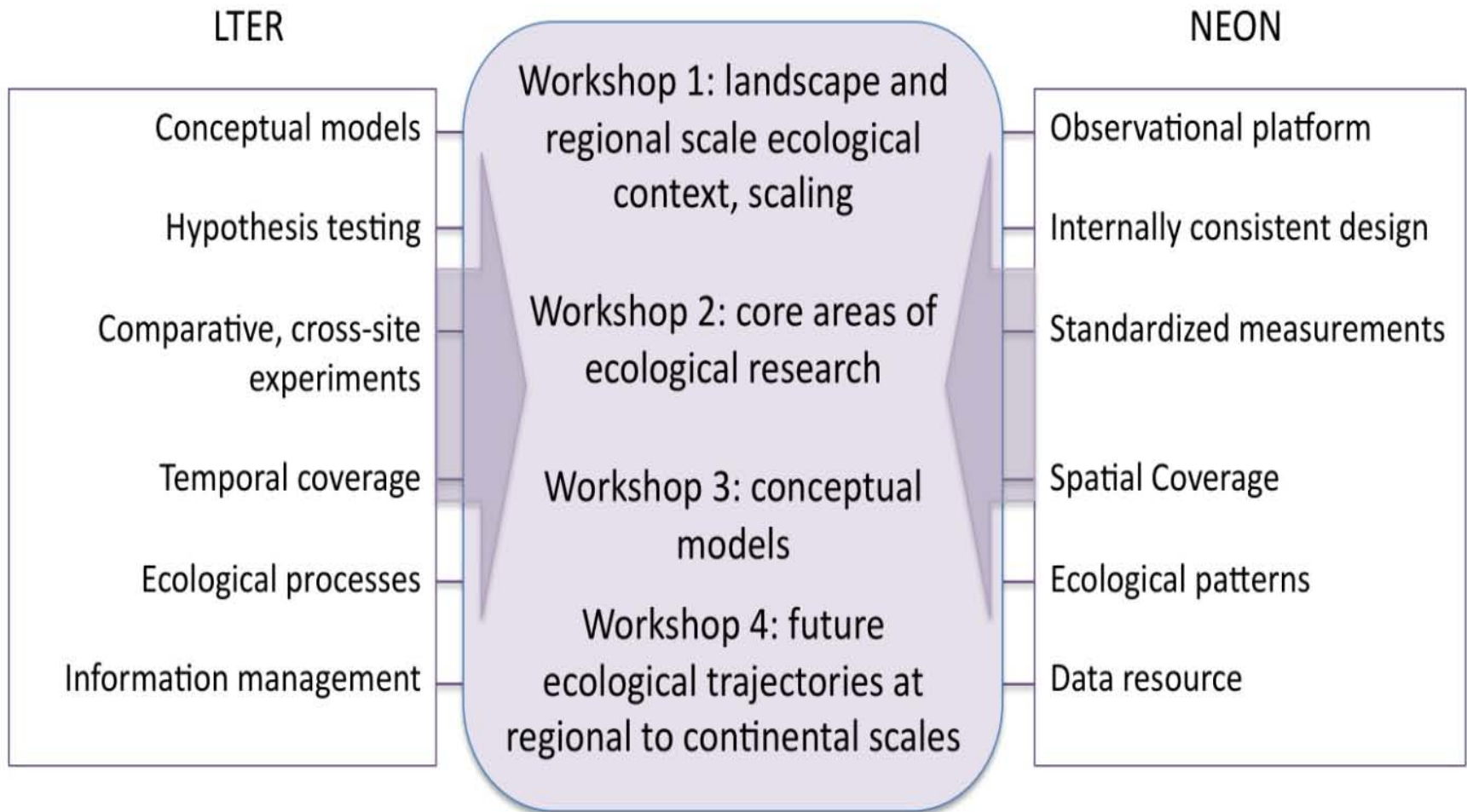- Extensive temporal coverage
- Ecological processes

NEON:
- Enabling data-driven observational hypothesis testing
- Largely observational
- Broad spatial coverage
- Slower evolving design for understanding broad patterns

- **Why both are important and needed:**
  - NEON will enable make data available for coordinated assessments of if and how ecosystems are changing in time and space.
  - LTER will tell us why they are changing; the mechanistic underpinning of ecosystem response to environmental change:

LTER-NEON Synergies Workshops

LTER

- Conceptual models
- Hypothesis testing
- Comparative, cross-site experiments
- Temporal coverage
- Ecological processes
- Information management

Workshop 1: landscape and regional scale ecological context, scaling

Workshop 2: core areas of ecological research

Workshop 3: conceptual models

Workshop 4: future ecological trajectories at regional to continental scales

NEON

- Observational platform
- Internally consistent design
- Standardized measurements
- Spatial Coverage
- Ecological patterns
- Data resource

Characteristics of the LTER and NEON networks showing their multiple, complementary aspects. Proposed workshops will develop synergies between these programs.

Steering Committee

Peter Groffman	Cary Institute	LTER Chair, BES, HBR
John Blair	Kansas State	KNZ, soils, grassland
Eugenie Euskirchen	U. Alaska	BNZ, modeling, micromet
Serita Frey	U. New Hampshire	HFR, NEON Microbial
Julia Jones	Oregon State	AND, LTER Climate
Kimberly Novick	Indiana University	CWT, Ameriflxu
Emily Stanley	U. Wisconsin	NTL, aquatic
Will Wieder	NCAR	Modeling
Mark Williams	U. Colorado	NWT, CZO, NEON

Workshops:

- Using LTER data and insights to provide local, landscape and regional ecological context for NEON sites. Leaders – Mark Williams, Kim Novick

- Using NEON data to inform the five core areas of LTER research. Leaders – Eugenie Euskirchen, Serita Frey

- Use LTER experience and insight to develop long-term conceptual models for NEON sites. Leaders – John Blair, Emily Stanley

- Combine data and models from LTER and NEON sites to make predictions of future ecological trajectories for NEON sites. Leaders - Will Wieder, Julia Jones

Procedures:

- Initial workshop at LTER ASM to develop the four themes described above and to develop plans for the full series of workshops.

- Followup workshops at Cary Institute, Millbrook NY:
  - Two workshop "events" at the Cary Institute with two working groups/themes at each event.
  - Each working group would have 20 – 25 participants, with some overlap and interchange between the two groups meeting at each event.

- Participants:
  - Senior and junior
  - Within and outside of the LTER and NEON networks
  - Macrosystems Biology program investigators
  - Representative from each of the LTER/NEON overlap sites

Products:

- Regional context: A listing of key LTER papers, datasets and model results relevant to each NEON site.

- Core areas: (1) a set of illustrative case studies in which NEON and LTER data relevant to a particular core area are integrated and analyzed and (2) potential information management approaches to access both NEON and LTER data on a given topic.

- Conceptual models: (1) a collection of conceptual models from LTER sites, (2) a critical examination of how these diverse models apply to NEON sites, and (3) development of a set of conceptual models for NEON and LTER sites in a continental scale framework.

- Predictions: A series of proposed joint LTER/NEON modeling efforts focused on predictions of ecological change, e.g., "ecological ensemble modeling" of climate forcing using scenarios based on climate data from LTER and NEON sites.