

ILTER Workshop Proposal: Future Scenarios of Land Change

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More than ever before, society is in need of fundamental research that transcends the ecological and social sciences. To meet the need for a sustainable future requires basic knowledge of the ways that human activities affect the ecosystems on which we depend, of concomitant effects on the delivery of the services these ecosystems provide, and of how we perceive and respond to alterations in these services. Especially as environmental change approaches tipping points or nonlinear thresholds, the need to anticipate and mitigate future change is acute.

U.S. LTER Network. The Decadal Plan. 2007

This opening paragraph of the LTER Decadal Plan summarizes the network-wide activity we seek to initiate with this proposal to establish a working group and fund an initial workshop on Future Scenarios of Land Change. In short, a large group of LTER sites and their social, ecological, and physical scientists and modelers seek to develop alternative future scenarios for their LTER regions and then, factoring in projected changes in the environment, evaluate the consequences with regard to (1) key ecosystem services (e.g., carbon sequestration and freshwater, agricultural and natural resources) and (2) habitat integrity and connectivity. This proposal arose spontaneously at the Baltimore LTER Science Council mini-workshop when it became apparent that many sites had great experience in this area, others had initiated such studies, and others were keenly interested in pursuing them. Beyond addressing central objectives of the LTER Decadal Plan, this activity offers great potential to: (1) guide future research directions at LTER sites and Network-wide by identifying critical gaps in knowledge and ecosystems poised for imminent change, (2) engage scientists from diverse disciplines and across sites in and beyond the LTER network in collaborative research, (3) address critical problems confronting society, and (4) forge strong alliances with agencies (e.g., USFS, EPA, NASA) and NGOs (e.g., TNC, TPL). The proposed activity includes leading LTER social and ecological scientists and the six Ag Trans sites, which have a track record of collaborative interdisciplinary research and publication (Redman and Foster 2008)¹.

Mechanism. One thing is certain about all inhabited landscapes worldwide: over the next decades each will experience profound changes as a consequence of land use and land cover changes, especially conversion of natural areas to development, land protection, and resource extraction. Despite this certainty, most scientists, conservationists and climate modelers operate without a well developed understanding of how these changes *may* unfold, especially as human decisions and policies change. As a consequence, our science measurements are not necessarily directed towards regions of most rapid change, our conservation planning is not appropriately assessed against future conditions and promise for success, and the development of management decisions and land policies are based on incomplete information. As we seek to develop appropriate strategies to maximize ecosystem services and increase the resilience of natural systems, it is imperative that we operate with an awareness of the plausible future conditions of the land.

The proposed effort, engaging diverse LTER sites and coordinated by an LTER Working Group, will comprise an evaluation of ecological and societal implications of plausible landscape futures. Detailed scenarios, founded on recent trends in conversion, land protection, conservation, harvesting, cropping or other management activity, land-use regulations/zoning, and social preferences for residential development – and grounded in social and ecological science – will be

¹ Redman, C. and D. Foster. (eds). 2008. *Agrarian Landscapes in Transition. Comparisons of Long-term Ecological and Cultural Change.* Oxford University Press.

used to project the likely consequences of contrasting, but plausible policy and management choices in terms of changes in land use and land cover. The resulting analyses, maps, and tools will be valuable to scientists in guiding future sampling and experimental design, to conservationists in developing land protection and management strategies, and to policy-makers in evaluating the future benefits of carbon sequestration, clean water production, and other ecosystem services. This initial effort is intended to establish a working group, to exchange information and expertise across and beyond the Network, to forge a broader collaborative activity and to evaluate opportunities for publications and proposals to synthesize and extend current efforts. Because there are diverse approaches for generating scenarios and forecasting future conditions the initial effort will focus extensively on exchange, synthesis, and forging consensus on future directions and goals.

The organizing group (OG) will task each participant/site in advance to: (1) complete a web-based form providing metadata for the project. Initially developed at the SC workshop in May, this form provides basic but detailed information on the region of focus, participants, objectives, methods, anticipated modeling activities, partner agencies/organizations, and bibliography of resulting papers and products; (2) upload a 1-page overview of the project; and (3) upload pdfs of any initial products. All participants have access to the complete metadata and supporting materials in advance of initial meetings and materials will be freely available. Planning and coordination will be overseen by the OG led by Jonathan Thompson, new post-doc at HFR who is leading the scenarios effort there.

Participants² Partial list of participating sites and individuals based on the SC mini-Workshop: HFR
 – David Foster, Dave Kittredge, Jonathan Thompson, Liz Almgren; **AND** – Tom Spies, Sherri Johnson, Stan

² Note: We will solicit the full LTER Network for interest and participants. This initial list, drawn from the Baltimore mini-workshop and Ag Trans groups just confirms that there is strong interest across diverse sites and disciplines. We anticipate interest from many sites not yet contacted. After submitting this proposal to NET we will distribute it to all LTER PIs and will also pursue collaborations with other agencies, organizations, and research groups.

LTER Workshop Proposal: Future Scenarios of Land Change Budget and Explanation

We anticipate that this workshop will involve participants from nearly all of the 20 LTER sites (we have 14 based on the Baltimore workshop and Ag Trans group but have not yet contacted some of the obvious groups that should be interested including NTL and Florida; all sites contacted to-date have signed on enthusiastically). We also plan to invite a few outside groups – Dave Mladenoff and others from Wisconsin, Jerry Melillo and a group from MIT, the modeling group from UNH and Harvard (Scott Ollinger and Paul Moorcroft), and individuals from USFS and TNC who have expressed interest in participating and possibly partnering. Therefore we budget for a total of 20 participants in addition to local individuals.

The budget is based on two recent workshops held at HFR: a UMass four-day event for 25 people and the NSF-funded NEON Social Science workshop for 16 participants.

			20 Participants @
Travel		\$ 26,500	
Airfare - West	\$ 10,000		\$ 1,000 10 from West
Airfare - East	\$ 7,500		\$ 750 10 from East
Ground transportation	\$ 8,000		\$ 400 Less if participants car pool.
Travel Meals	\$ 1,000		\$ 50 for 2 days
Meeting		\$ 9,500	

Gregory; **BNZ** – Teresa Hollingworth, Terry Chapin; **PIE** – Colin Polsky, Gil Pontius, Chuck Hopkinson; **CAP** – Nancy Grimm, Chuck Redman; **HBR** – Peter Groffman, Tim Fahey; **CWT** – Ted Gragson; **BES** – Morgan Grove, Steward Pickett; **CDR** – Sarah Hobbie; **NWT** – Patrick Bourgeron ; **KNZ** – John Harrington; **KBS** – Craig Harris; **SGS** – Myron Gutmann, Ken Sylvester; **LUQ** – Nick Brokaw

Timing We will poll participants in Fall 2008 for metadata, overview information, and initial products from their respective sites and host the working group meeting in Spring 2009.

Expected products of the planned activity The workshop will be hosted at the Harvard Forest to minimize housing and meal costs, in collaboration with Clark University, which is leading a related Coupled Natural-Human systems project at PIE. Over 2-3 days the schedule will allow participants to share and compare approaches, objectives and initial findings; synthesize information into a draft outline for a paper; and identify collaborative activities that may lead to future research proposals.

To provide exposure to different examples of mature scenario projects operating at different scales and in different landscapes we propose including evening presentations by three investigators: Dave Mladenoff, (Wisconsin) who heads a large regional project across the Upper Midwest; Jerry Melillo and MIT collaborators who are developing global scenarios based on land use and climate change; and Stan Gregory (OSU and AND), who has been working for 20 years on ecological, historical, and modeling projects in the Willamette River basin as well as the Andrews Experimental Forest in Oregon.

Workshop Meals	\$ 3,000	\$ 150	for 2 days
Workshop Lodging	\$ 3,300	\$ 165	for 3 nights
Meeting Space	\$ 2,200	\$ 110	for 2 days
Meeting Materials	\$ 1,000	\$ 50	for 2 days
Total	\$ 36,000		

Travel – The budget is based on a recommendation from Bob Waide of \$1000 for flights, reduced for the east coast and midwestern participants. Ground transportation will clearly be less than budgeted as individuals will car pool in rentals, but the \$400 figure is based on existing bus/limo rates from Bradley to Petersham/return.

Meals – Based on real numbers from our Amherst caterer, including two coffee breaks daily.

Lodging – The typical inexpensive Harvard Forest rate.

Meeting Space – Covers university-mandated costs for prep, housekeeping, and utilities.

Meeting Materials – Includes xeroxing, postage, binders and supplies.