

LTER – The Next Decade

LTER is at a critical juncture – completed its first 20 years and now planning for the future

- 2001: *Whitepaper* - 20-yr Review Report: Priority Setting in the LTER Network 2001 – *The Decade of Synthesis* coalesces around 4 Grand Challenges
- 2001/2: External Review - Frank Harris and Leonard Krishtalka (co-chairs). Committee recommends enhanced networking and synthesis (moving beyond the sites)
- 2003/4: Planning Grant – Preparing the LTER network for collaborative science, education, and synthesis: a planning proposal – currently funded
- Currently: series of workshops and meetings planning the future development of the LTER network

Review Recommendation: link LTER science with application needs

- Policymakers are increasingly asking science to inform solutions to environmental issues
- The decade of synthesis should lead to a better understanding of complex environmental problems and result in knowledge that serves society.
- LTER needs to develop broader, more network-level experimental frameworks and include other networks and agencies in their design and implementation.
- Turn descriptive and process-based knowledge into ecological forecasting of environmental phenomena.

The Planning Proposal – Objectives

- Develop plan for **network-level** science, technology and training
- Explore alternative governance, planning and evaluation structures for managing **network science**
- Envision and plan for education, training, outreach, and knowledge exchange activities *to link LTER science with application needs*

Steps that could be taken

- develop broader, more network-level experimental frameworks at the regional level – consortiums of LTERs
- Within regions, develop expertise in human socio-economics, in scaling up and in developing predictive, simulation models (scenario evaluation or forecasts)
- Integrate the study of the 4 Grand Challenges within the regional context (they can't be studied in isolation)
- Invite federal agencies to collaborate and become stronger partners in the network of networks.

Collaboratories of LTER sites and agencies working at regional levels would represent interdisciplinary teams capable of addressing complex ecological issues and predicting the effect of human activities and decisions

How?

- We need to build support within NSF that will promote incorporation of human socio-economics and hydrologic and computational sciences into existing LTERs.
- We need to find ways to encourage network level collaboration in order to reveal large-scale ecological phenomena and inform public policy
- We need to build partnerships with federal agencies to facilitate knowledge transfer and inform public policy

one possible scenario -

- Regionalization: collaborations between groups of LTERs within regions (e.g., SE, New England or coastal)
- Address the 4 Grand Challenges (biodiversity, climate change, human dimensions and biogeochemistry), in combination in each region
 - New England collaboratory integrated via the watershed approach (terrestrial system plus Long Island Sound and Gulf of Maine)
 - The effects of climate change on species/human/biogeo
 - Loss of key species, such as hemlock or sugar maple, on human systems and biogeochemistry of land, watershed and coast
 - The effects of changes in the regional economy on land demand, land use change, population growth, workforce, use of land, and biodiversity/biogeo feedbacks and ecosystem services
- Linking regions 10 yrs out – assessing nationally the effects of changing economic climates in various regions – movement of retiree population to SE or SW – job outsourcing

Opportunities at regional levels

- Develop collaborations with gov't agencies, e.g., USGS, NOAA, EPA, NASA, FWS, Park Service, USDA
 - How can LTER (s) work with the various agencies in a way to increase their ability to meet their missions?
 - LTERs with their process-based understanding and expertise in predictive modeling could help to develop predictive models of the effects of human activities and decisions – e.g.,
 - land use change effects of N-enrichment and eutrophication of coastal waters
 - The removal of small dams on downstream ecosystems, including an assessment of changes in ecosystem services
 - LTER models could be tested at govt sites – e.g., NERRS, and make use of agencies' extensive spatial databases
 - Consider LTER's as Level 3 sites (vs. level 1 and 2), with long-term databases on status, trends, process-level understanding, modeling expertise

An example: NOAA and LTER

- NOAA's 5-yr research plan includes ecosystem and climate missions focused on coastal and ocean resources
 - LTER could collaborate thru
 - “Scenario development to support specific management actions and decisions”
 - Can small river dams be removed to enhance sediment delivery to sediment starved intertidal wetlands (evaluate all ecosystem services tradeoffs)?
 - “Understand impacts of climate variability and change on marine ecosystems to improve management of these systems”
 - How do changes in the timing of spring melt/runoff affect the productivity of the coastal ocean and the occurrence of harmful algal blooms?



Thank You

- Lter should share this wealth of knowledge with public officials, esp at the national level where environmental policies can have significant impact
- Turn descriptive knowledge into ecological forecasting of environmental phenomena.
- Collaborate with economists, anthropologists, sociologists, historians, demographers to increase understanding of the interrelationships and reciprocal impacts of natural ecosystems and human systems in order to inform environmental policy
- Nsf should provide real incentives – primarily funding to encourage network level collaboration in order to reveal large-scale ecological phenomena and inform public policy
- The power of the network of coordinated research sites
LTER needs to develop broader, more network-level experimental frameworks and include other networks and agencies in their design and implementation.
- Invite agencies to collaborate and become a stronger partner in the network of networks.
- Large-scale ecological synthesis requires cross-domain approaches involving interdisciplinary, collaborative teams within and across sites and institutions.
- The decade of synthesis should lead to a better understanding of complex environmental problems and result in knowledge that serves science and society.
- Policymakers are increasingly asking science to inform solutions to environmental issues and to be more accountable for public investments in research.
- Form partnerships with federal agencies
- Collaboratories of LTER sites and agencies working at regional levels could assemble interdisciplinary teams to addresses complex ecological issues and to make predictions...
- The power of the network of coordinated research sites
- If we want to serve the nation's need to make defensible environmental decisions and policies

Challenges to Meet

- Developing expertise in simulation modeling and scaling up
- Expanding the human dimension into “regular” LTERs
- Developing expertise on linking economic, land-use, species distributions, biogeochemical and hydrologic models
- Linking with other developing NSF programs, such as CUAHSI (consortium of universities for the advancement of hydrologic science, inc)
- Informing environmental solutions and public policy at multiple scales
- Developing partnerships with federal agencies