

The LTER Program:

**Issues and Strategies
at the Network Level**

Network Organization Activities

semiannual Coordinating Comm. Mtgs.

spring - business

fall - science theme/business

quarterly Executive Comm. Mtgs.

All Scientist Meeting

Network Office Coordination

Coordinating Committee Agenda

Tuesday Evening Dinner Meeting

EC Election

Questions on Committee Reports

Fall Science Meeting at PIE

SLTER Report

Revisit hosts for subsequent spring/fall CC mtgs.

Science Themes for subsequent mtgs.

**-involvement of Data Task to develop
appropriate data/protocols for themes**

**-identify/adopt appropriate standards for
comparative research**

Wednesday

**8:00 unfinished discussion from evening
NSF Report (Gholz)
Annual LTER presentations to NSF
National Advisory Board Report Discussion
20 year Review Process/Update
Priority Setting Criteria Discussion**

10:30 Break

**11:00 Breakout groups to discuss implementation of
LTER goals for the next decade**

Noon: Lunch

Wednesday afternoon

1:00 Plenary to discuss breakout group reports

3:00 Break

3:30 Breakout Groups report writing time

4:30 Departures

**Committee Reports (approval of recommendations)
(authorization for EC to prioritize/implement)**

Publications

Social Science

Graduate Students

Climate

Data Management

Technology

Schoolyard LTER Program Report

Monica Elser

**Upcoming Coordinating Comm. Meetings
(Science Themes in fall meetings)**

Spring 2002

Sevilleta

Fall 2002

Niwot

Spring 2003

Kellogg Biological Station

Fall 2003

Bonanza Creek

Spring 2004

Florida site

Fall 2004

Virginia Coast Reserve

Past Science Themes:

Biodiversity (1995)

Regionalization (1996)

Climate Variability (1997)

Social Science (1998)

Productivity (1999)

All Scientists Meeting (2000)

**Fall Coordinating Committee Meeting
and Science Theme**

Plum Island Ecosystem LTER

**“The Linkage between Land and Water –
From the Atmosphere to the Coastal Zone”**

September 20, 21, 2001

Chuck Hopkinson

Science Themes:

(including database development, standards)

Niwot (2002):

Causes and consequences of species additions and extinctions in ecosystems

Bonanza Crk (2003):

Synthesizing trophic relationships across sites

Virginia Coast Reserve (2004):

Extreme Events and Ecosystem Dynamics

NSF Science Series on LTER Research

**NSF would like a series of
research and synthesis presentations**

**These could be done in conjunction with the
annual Exec. Comm. Meeting at NSF in Jan./Feb.
(or at multiple times during the year)**

Format? Order of Sites/Synthesis topics? Length?

Synthesis workshop topics?

BioScience Articles?

Real-time connections with LTER site, cams, etc.

e.g., A LTER series focusing on cross-site syntheses, national issues in terms of long-term dynamics, complex phenomena...

Preparing for the 20 yr review

- review mission and goals**

- evolution of the LTER program**

- current status**

- future directions**

The LTER program has evolved over the past 2 decades starting from the initial goal of understanding long-term patterns in ecosystems based on 5 core science areas

FIVE CORE RESEARCH AREAS AT ALL LTER SITES

- Pattern and control of primary production**
- Spatial and temporal distribution of populations selected to represent trophic structures**
- Pattern and control of organic matter accumulation and decomposition in surface layers and sediments**
- Patterns of inorganic inputs and movements of nutrients through soils, groundwater and surface waters**
- Patterns and frequency of disturbances**

Long-term Research Decade (1980's):

- **recognition of long-term frequencies (i.e. 60 yr periodicities) that affect system dynamics, system resets**
- **extended temporal analyses retrospectively (e.g. tree rings, paleo-studies) to understand and forecast behaviors.**
- **broader view of ecological systems thinking (not just an ecosystem program!)**
- **networking/Network Office functions**
- **importance of data management/information management at sites**
- **“Magnet” role of LTER sites in attracting broad array of other scientific activities addressing behaviors/interactions in ecological systems expansion to 17 sites and Network Office**

Large-scale Research Decade (1990's):

- **expansion to understanding spatial scales and interactions with temporal scales**
- **cross-site comparisons testing generalizations**
- **importance of accessibility of data/information**
- **broader representation of ecosystem types**
- **role of landuse and natural and anthropogenic legacies**
- **role of anthropogenic influences**
- **collaboration with physical, social and economic sciences**
- **interaction/collaboration with non-LTER sites and programs**
- **development of international interactions (ILTER)**
- **increased use of LTER as an experiment to evaluate initiatives (augmentation, urban ecosystems, social science collaborations, Schoolyard LTER)**
- **synthesis (often for science themes not directly addressed by core areas)**
- **expansion to 24 sites; ~1200 scientists/students**
- **National Advisory Board Review**
- **prioritization of efforts**

LTER White Paper: Priority Setting in the LTER Network

The US LTER network has grown rapidly over the past 20 years, both in size and in the scope of its activities. This growth is generally welcomed and is viewed overall as a mark of the success of the network and its individual sites and investigators. This networking of sites, researchers and projects is unique in the ecological community. It is not only a large group but also diverse in its personnel, diverse in the science performed and long term. Through networking, it is cooperative and yields conclusions that have a breadth and detail unmatched by other sources. Growth and success have led to an ever-increasing number of demands on the network and network office. These demands are many and varied and, although all are individually easy to justify, clearly not all can be met simultaneously. There is, therefore, a clear need for the LTER network and its network office to develop a well-defined set of priorities designed to maximize its effectiveness and scientific impact over the next 10 years.

BOX 1. STAGES IN DEVELOPMENT OF THIS DOCUMENT

- August 2000** LTER Coordinating Committee,
LTER All Scientists Meeting,
Snowbird, Utah
- November 2000** LTER Executive Committee
Scientific Initiatives Committee
Fort Collins, Colorado
- December 2000** Survey of Site and Network Priorities
- January 2001** LTER Executive Committee
LTER Site Lead Principal Investigators
Sevilleta NWR, New Mexico
- February 2001** LTER Executive Committee
LTER National Advisory Board
NSF, Arlington, VA
- April, 2001** LTER Executive Committee
LTER Coordinating Committee
Tempe, AZ

The central, organizing intellectual aim of the LTER program is to understand long-term patterns and processes of ecological systems at multiple spatial scales.

Synthesis Decade (2000's):

Questions and issues have evolved over the past two decades.

The design of the LTER program pre-adapts it to address an ever-changing array of questions important to the scientific community and society.

(That may or may not be directly related to the 5 core areas!)

The Mission of the LTER Network is implemented in six interrelated ways.

- **Understanding**: Gaining understanding of ecological processes and patterns at multiple spatial and temporal scales for a diverse array of ecosystems
- **Synthesis**: Using the network of sites to create general ecological knowledge through the synthesis of information gained from long-term research and development of theory
- **Information Dissemination**: Creating well designed, documented databases that are accessible to the broader scientific community
- **Legacies**: Creating a legacy of well-designed and documented long-term observations and experiments, and archives of samples and specimens
- **Training**: Developing a cadre of scientists who are equipped to conduct long-term, collaborative research to address complex ecological problems
- **Outreach**: Providing knowledge to the broader ecological community, general public, resource managers, and policy makers to address complex environmental challenges

Goals for the next 10 years:

- A. Maintain the quality of science and integrity of core measurements at sites**
- B. Increase the pace of synthesis through activities such as site volumes, network-wide synthesis projects, multi-site synthesis projects, and database development**
- C. Increase experimental and comparative cross-site research**
- D. Facilitate/increase multidisciplinary/interdisciplinary research and synthesis efforts with other disciplines (e.g., physical, social, economic, computer sciences)**
- E. Extend use of LTER knowledge in education, policy-making, management and public understanding**

Goals for the next 10 years:

B. Increase the pace of synthesis

- **Synthesis volumes (ca. 2 per year; Oxford Press)**
 - Site volumes (e.g., Konza, Niwot Ridge)**
 - Topic volumes (e.g., soil methods, biodiversity, productivity)**
- **Network-wide synthesis projects (papers and databases; ca. 1/year)**
- **Multi-site synthesis projects (ca. 4/year)**

Recent Synthesis Activities/Products:

- **Global Ice Cover Analysis**
- **Net Primary Productivity across LTER Network**
- **Stream Nitrogen Comparison (LINX)**
- **Net Productivity/Biodiversity Relationship**
- **Long-term Intersite Decomposition (LIDET)**
- **Detritus Input and Removal (DIRT)**
- **Soil Methods Book**
- **Data Sharing Protocols**
- **Site Synthesis Volumes**

BioScience Article(s) (John Hobbie)

**The recent NSF cross-site competition
has funded 17 proposals**

**All Scientists Meeting has led to
*17 New Synthesis Activities***

Synthesis Meetings Funded

Debra Peters

Scaling from Plots to Landscapes and Regions: Relevance of Landscapes to current issues in Ecology

Mark Harmon

LIDET: Decomposition and Nitrogen Dynamics of Fine Litter and Fine Roots

Laura Huenneke

LTER/GCTE Workshop on Removal Experiments on the Role of Biodiversity in Ecosystem Functioning

Dave Coleman

A Cross-Site Synthesis of Biotic and Abiotic Agents of Decomposition and SOM Dynamics in LTER Sites

Kate Lajtha

Effects of Decomposing Woods on Soil Carbon Accumulation and Chemistry, Fungal Diversity and Microbial Enzyme Systems

Phil Robertson

Integrating LTER Research into Ecosystem Management

Alan Yearkley

Process Controls on Nitrogen Flux in Riparian Zones

Tim Seastedt

Causes and Consequences of Invasive Species: Past and Future Contributions of the LTER Network

Bob Christian

Ecological Network Analysis for Cross-Site Comparisons: Developing the Network of Users

David Turner

Scaling Carbon Flux to the Site Level in the Context of Validating Products from Earth Observing Satellites

Larry Baker

Integration of Research on Biogeochemical Cycles at LTER Sites

Richard Lathrop

Sense-of-Place Attitudes in the World's Temperate Lake Districts

Barbara Benson

**Advancing the Sharing and Synthesis of Ecological Data:
Guidelines for Data Sharing and Integration**

Rich Boone

**Defining the Schoolyard LTER Program: Priorities,
Infrastructure, and Communications**

Jim Morris

**Regulation of Organic Matter Preservation in Soils and
Sediments**

Dan Childers

**LTER Based Tropical Coastal Research Across the
Caribbean Basin**

Hen Biau-King

East-Asia Pacific Decomposition Experiment

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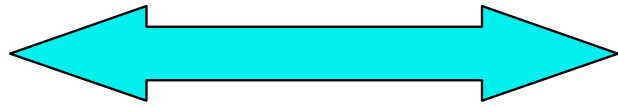
Site

- Research
- Education
- Training

Network

- Coordination
- Outreach
- Informatics Research

- **INTELLECTUAL AIMS**
- **Resources**
- **Activities**



Scientific Capital
- Scientists
- Money
- data

*Experimentation and
Information management*
LEGACIES

**Multiple Site and
Regional-scale
data**

*Site-based research
and support;
Working with
undergraduates,
graduates and
post-docs*
(Site-level data)

**INFORMATION
DISSEMINATION**

*Internal and external multi-site
Research and experiments, network-level
synthesis and support*

Modeling
**SYNTHESIS
SPATIAL EXTRAPOLATION
LONG-TERM PREDICTIONS**

New Scientists

TRAINING

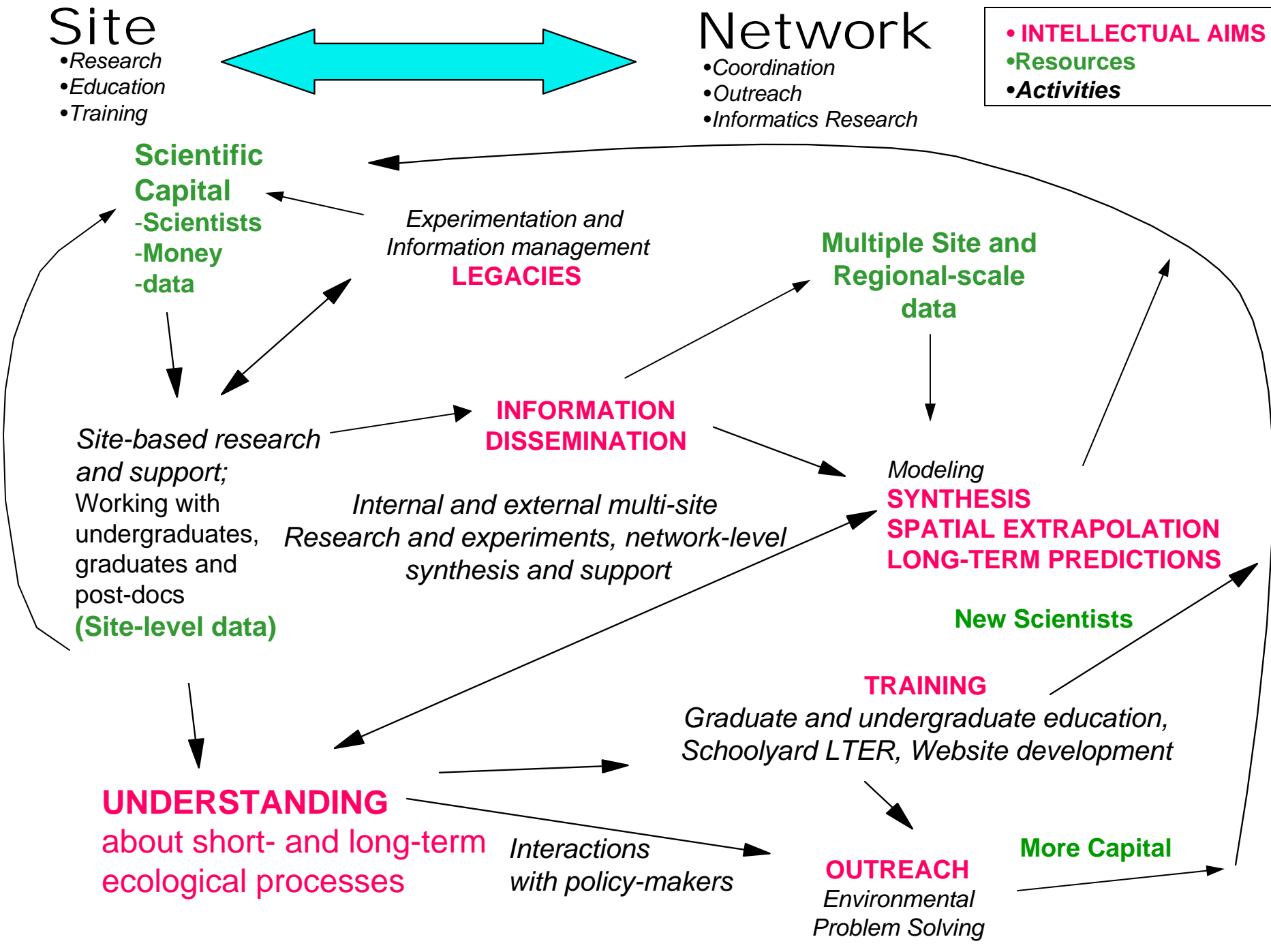
*Graduate and undergraduate education,
Schoolyard LTER, Website development*

**UNDERSTANDING
about short- and long-term
ecological processes**

*Interactions
with policy-makers*

OUTREACH
*Environmental
Problem Solving*

More Capital



Network Management by NSF

6 year awards

3 cohorts of LTER sites:

1 cohort renewed every 2 years

1 cohort has site visit every 2 years (in the 3rd yr of award)

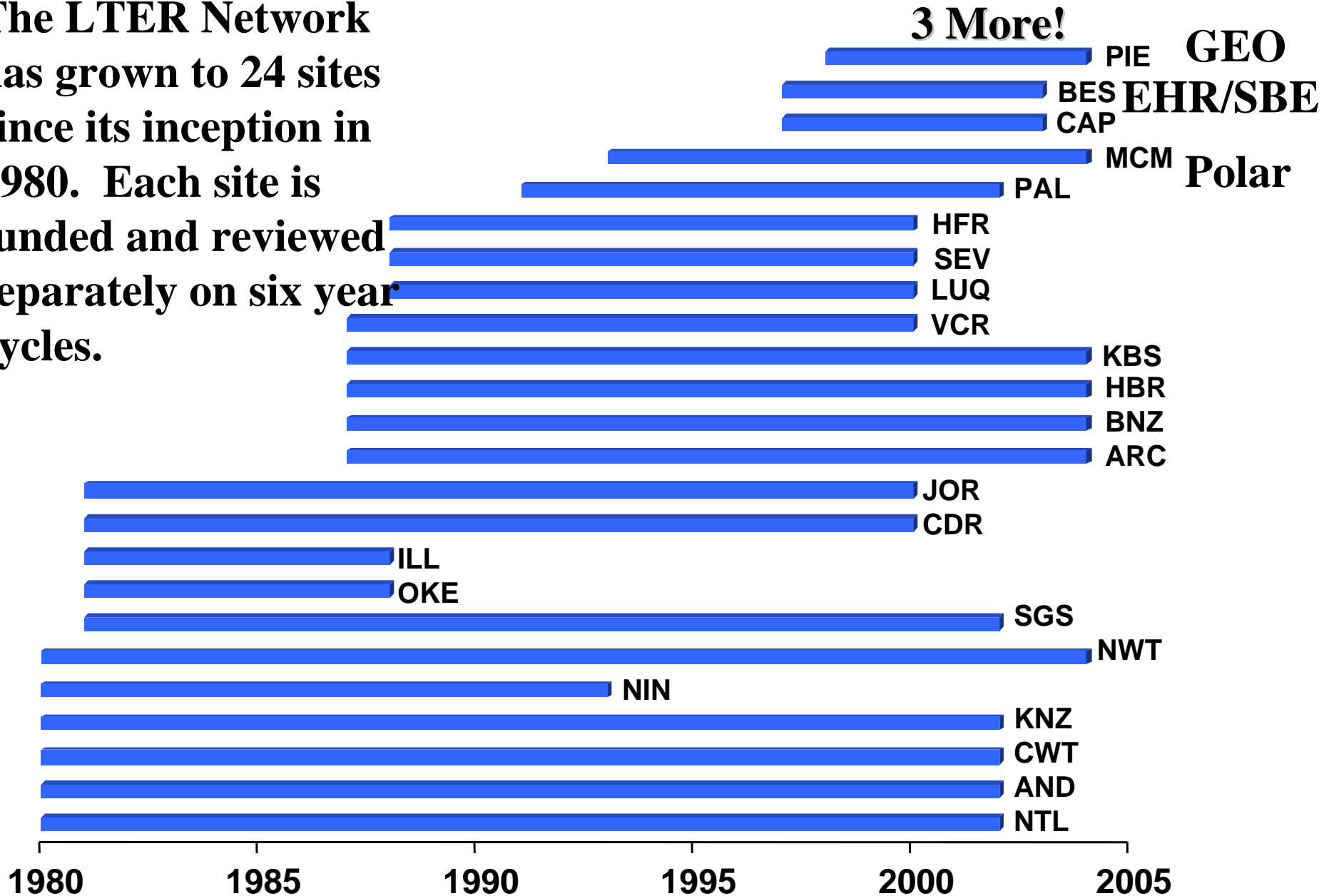
renewal proposals on even-numbered years

NSF site visit on odd-numbered years

**LTER Network Office has a 6 yr cooperative agreement
(site visit in the 3rd year)**

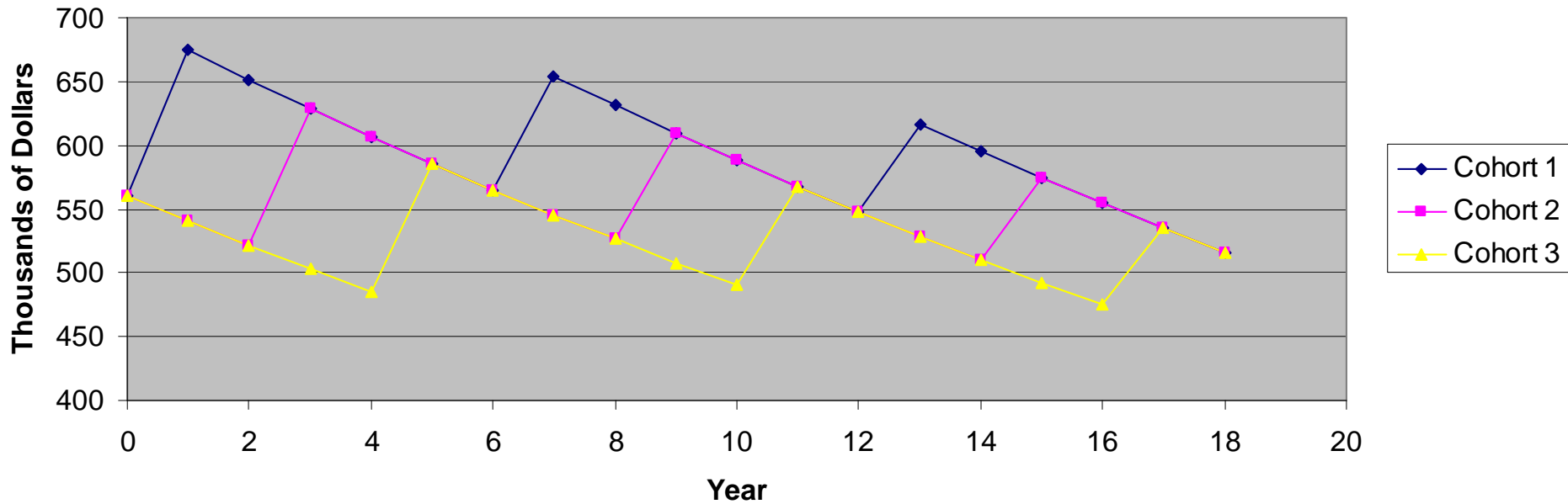
Growth of the LTER

The LTER Network has grown to 24 sites since its inception in 1980. Each site is funded and reviewed separately on six year cycles.

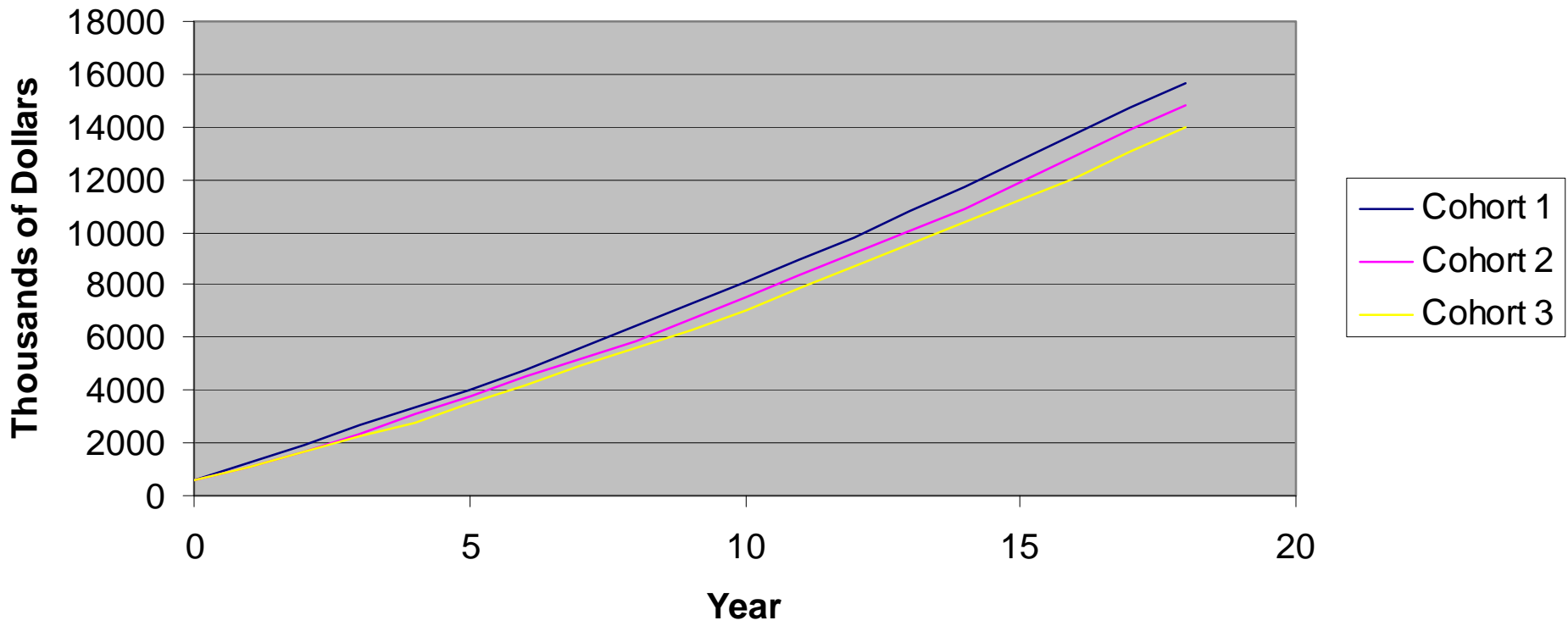


Management influences on Funding

Annual Real Funding (1997 dollars)



Cumulative Funding



Deficit Relative to Cohort 1

