LTER in the Next Decade

LTER

What is LTER?

- 24 Sites, >1200 scientists
- Network
- Network Office

Why LTER?

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

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

Understanding: Gaining understanding of long-term 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: Creating well designed, documented databases that are accessible to the broader scientific community

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

Legacies: Creating a legacy of well-designed and documented long-term observations, and experiments and archives of samples and specimens

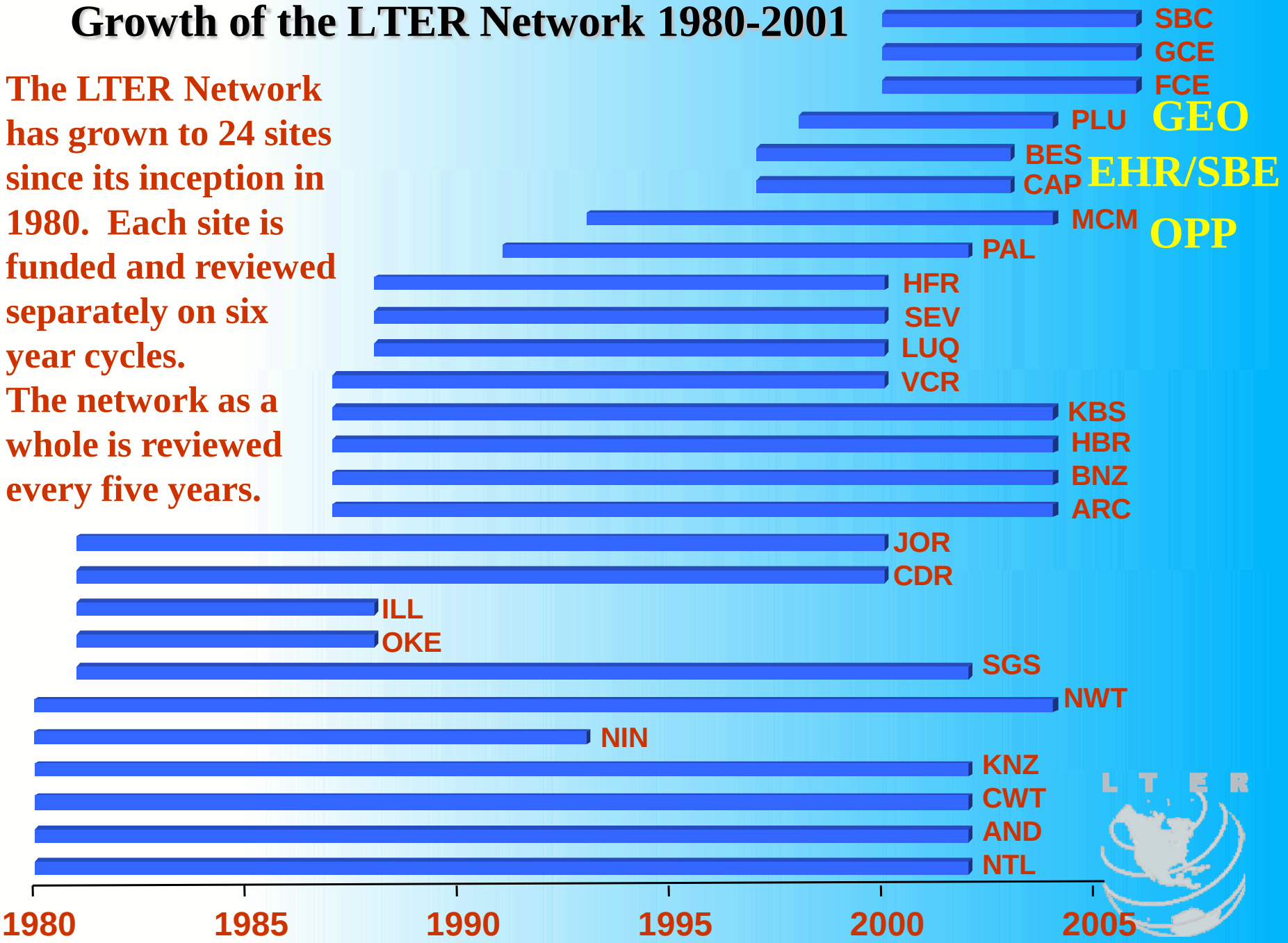
Training: Developing a cadre of scientists who are equipped to conduct long-term, collaborative research to address complex ecological problems

Outreach: Providing knowledge to the broader ecological community, general public, resource managers, and policy makers to address complex environmental challenges

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

Growth of the LTER Network 1980-2001

The LTER Network has grown to 24 sites since its inception in 1980. Each site is funded and reviewed separately on six year cycles.
The network as a whole is reviewed every five years.



Long-term Research Decade (1980's):

- Recognition of long-term frequencies that affect system dynamics, system resets
- Distinguish short-term from long-term controls, interactions of processes on different timescales
- Extended temporal analyses retrospectively to understand and forecast behaviors.
- Broader view of ecological systems thinking (not just an ecosystem program!)

Long-term Research Decade (1980's):

- **Networking/Network Office functions**
- **Implementation of data and information management systems at all sites**
- **"Magnet" role of LTER sites**
- **Expansion to 17 sites and Network Office**

Large-scale Research Decade (1990's):

- Increased focus on spatial scaling and spatial-temporal interactions
- Cross-site comparisons testing generalizations
- Role of natural and human "legacies"
- Role of of landuse and other anthropogenic influences
- Broader representation of ecosystem types, focused groups of sites
- Synthesis (often for science themes not directly addressed by core areas)

Large-scale Research Decade (1990's):

- Network Data System
- Interaction/collaboration with non-LTER sites and programs
- Development of international interactions (ILTER)
- LTER as an experiment to evaluate initiatives (augmentation, urban ecosystems, social science collaborations, Schoolyard LTER)
- Expansion to 24 sites; ~1200 scientists/students

LTER Site Profiles (1995-1998)

	Averages per site		
	1995	1998	2000
Number of PIs	15	18	18
Ave. $/PI (x1000)	27	31	30
No. of Institutions	6.1	6.5	6.5
Effective Overhead Rate (%)	20	22	20
% spent on Infrastructure	21	21	20
% spent on Local Economy	56	65	63
Graduate Students	17	17	19
Undergraduate Students	15	17	23
LTER leveraged resources	2.1	2.4	2.9
Non-PI scientists at the site	25	35	30

Network management:

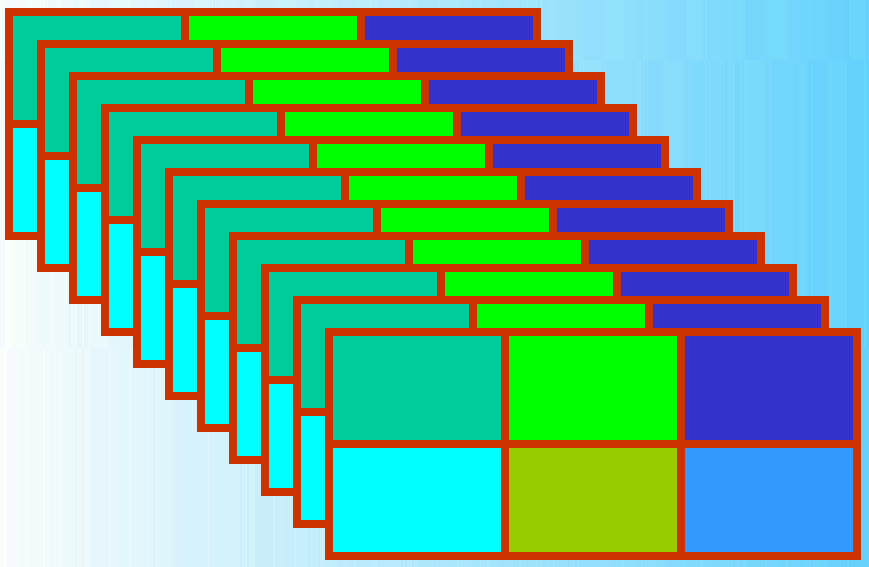
The design of the LTER program pre-adapts it to address an ever-changing array of questions important to the scientific community and society.

Key is achieving appropriate balance of opportunities/requirements

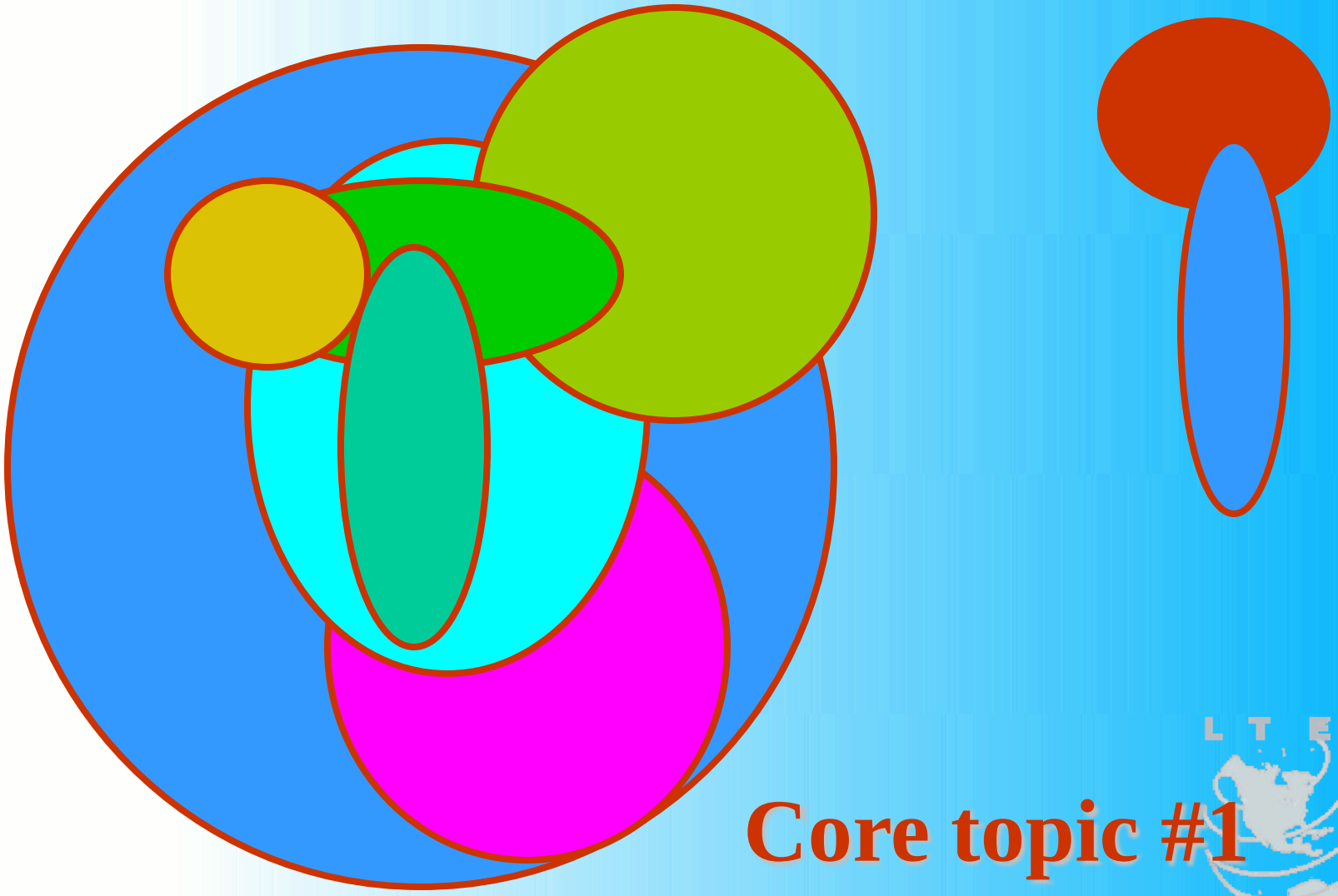
Site based activities

- Synoptic research on local and regional ecology and environment
- Focused, long-term theme unique to site
- Five core LTER topics
- Site data base
- Education programs
- Cross-site research and synthesis

LTER is not a traditional network (all sites more or less identical)

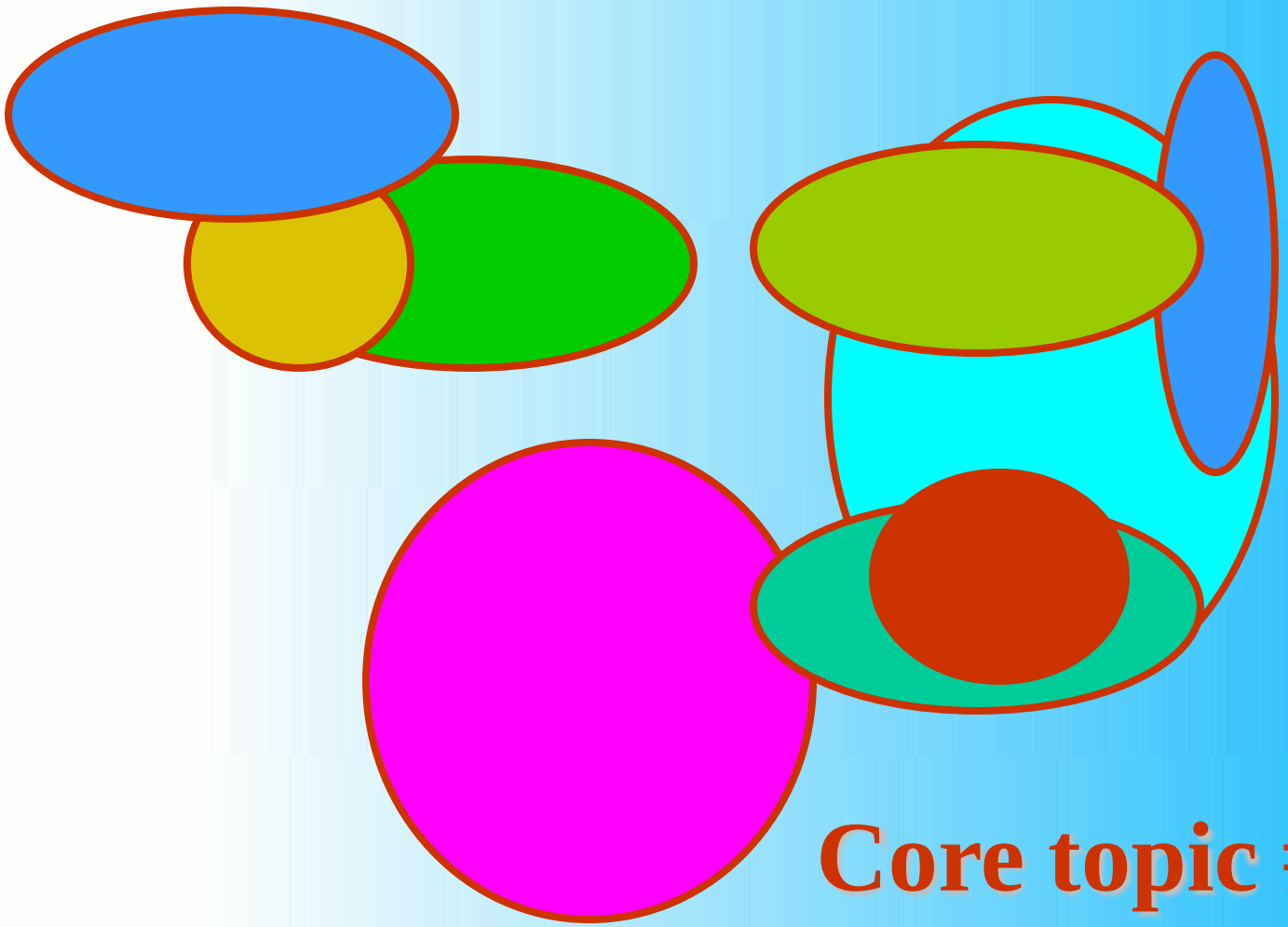


The LTER “Network”



Core topic #1

The LTER “Network”



Core topic #2

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

Five core research areas at all LTER sites

- Patterns of inorganic inputs and movements of nutrients through soils, groundwater, and surface waters
- Patterns and frequency of disturbances

Multisite and Network activities

- Meetings and committees
- Synthesis activities
- Cross-site research
- Focus areas (urban, coastal)
- Data /communications

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 Coast**
Fall 2004	**Virginia Coast Reserve**

Past Science Themes:

- Biodiversity (1995)
- Regionalization (1996)
- Climate Variability (1997)
- Social Science (1998)
- Productivity (1999)
- All Scientists Meeting (2000)

Future themes:

- Land-Water Interactions (2002)
- Species Changes and Ecosystems (2002)

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**

NEXT: BioScience special issue

Cross-site publications and multiple-site authorships

Oxford - LTER Synthsis Series

Published:

- **Konza/Tallgrass Prairie**
- **Soil Methods**
- **Alpine Ecosystems/Niwot Ridge**

Under Contract:

- **Short Grass Steppe**
- **Jornada**

In Preparation:

- **Drylands Biodiversity**
- **North Temperate Lakes**
- **Virginia Coast**
- **Kellogg Biological Station**
- **Sevilleta**
- **Harvard Forest**
- **Toolik Lake**
- **Luquillo**

Other Site Volumes:

- **Hubbard Brook**
- **McMurdo**
- **Palmer**

THE THIRD DECADE OF LTER:

A DECADE OF SYNTHESIS

Goals for the next 10 years:

A. Maintain the quality of science and integrity of core measurements at all LTER 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)

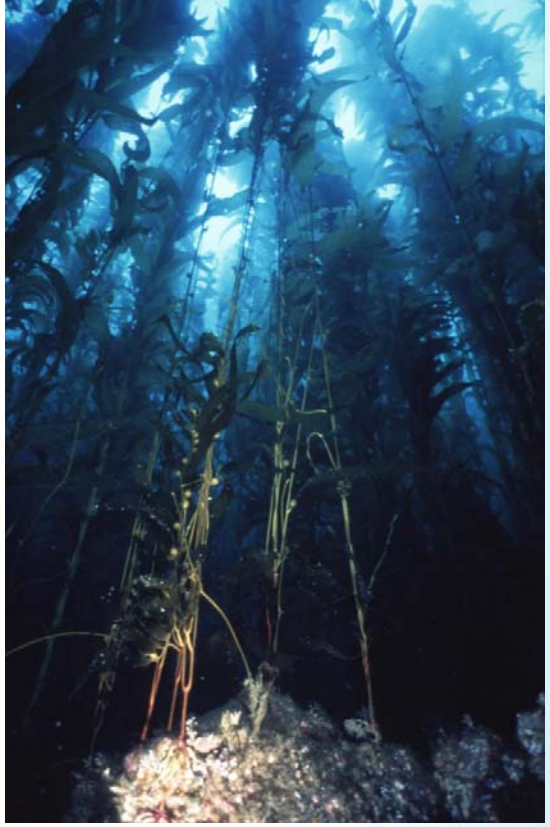
E. Extend use of LTER knowledge in education, policy-making, management and public understanding

Education - Schoolyard LTER

Supplemental funding enhances LTER site k-12 outreach and education programs…

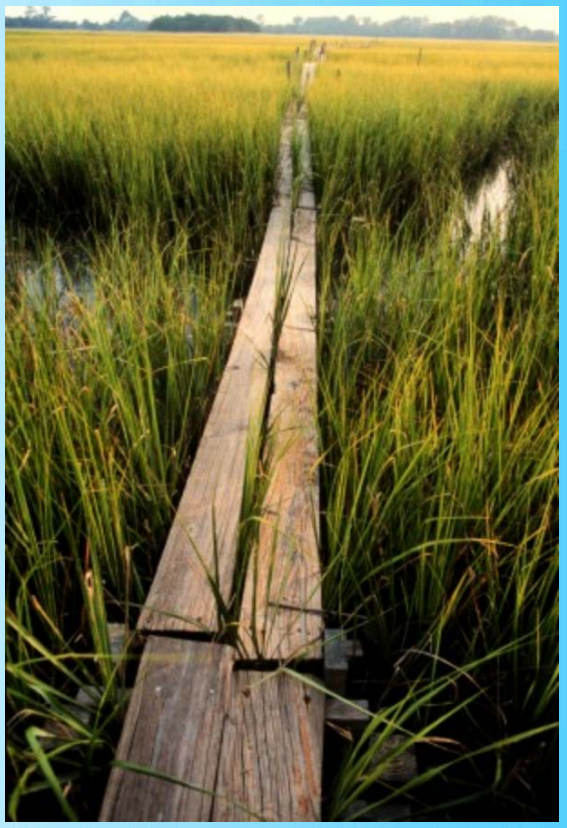
LTER Scientists interact regularly with hundreds of K-12 schoolteachers and thousands of students…

Four estuarine sites recently added broaden scale of cross-site comparisons…



Santa Barbara Coastal Ecosystem LTER

Georgia Coastal Ecosystem LTER



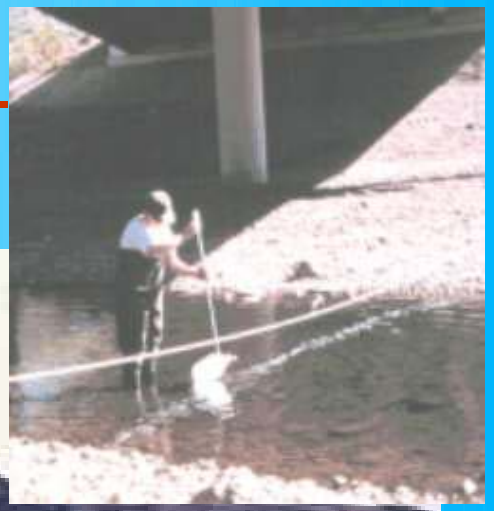
Florida Coastal Ecosystem LTER

Plum Island Ecosystem LTER

Two new sites added in 1998 expand the scope to include multidisciplinary studies of human dominated ecosystems

Baltimore Ecosystem Study

Central Arizona - Phoenix



In the future…..

- Links to other networks, agencies
- New sites, foci,
- New Subgroups?
- New Core topics?
- Constantly shifting balance of opportunities and requirements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