Long Term Ecological Research
Network Office

Network Development, Community Outreach, and Training

William Michener, James Brunt, Jeanine McGann, John Vande Castle, Robert Waide, Marshall White

Network Development, Community Outreach, and Training

- Define the scope
- Successes
- Lessons learned
- Future

Network Development, Community Outreach, and Training

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Define the scope

- "encompass an array of LNO activities that are specifically designed to have positive impacts on both LTER sites and the broader scientific community."
  - Network development (community building activities)
    - Community databases, OBFS web site, technology evaluation, organization of symposia and workshops
  - Community outreach (building partnerships)
    - Partnership for Biodiversity Informatics, SEEK, NPACI, NBII, RCN (e.g., OBFS), NEON, Santa Fe Institute, Center for Microbial Ecology
  - Training
    - OBFS and LTER

Network Development, Community Outreach, and Training

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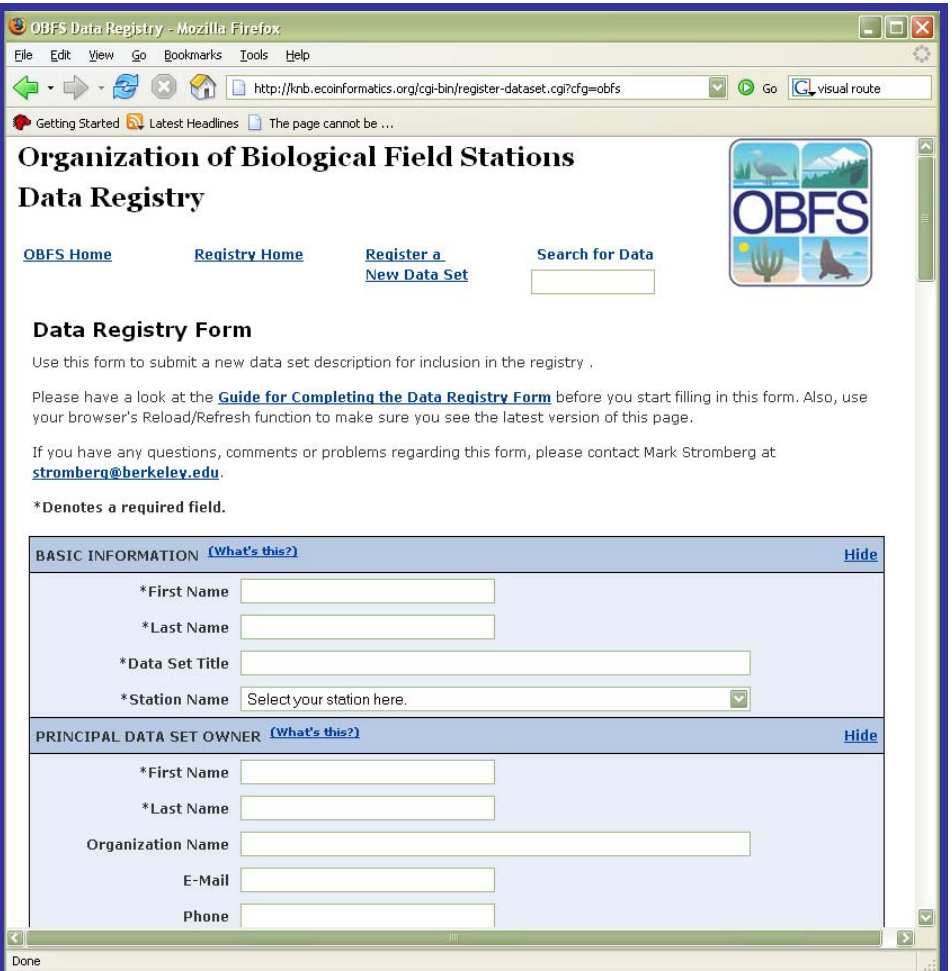
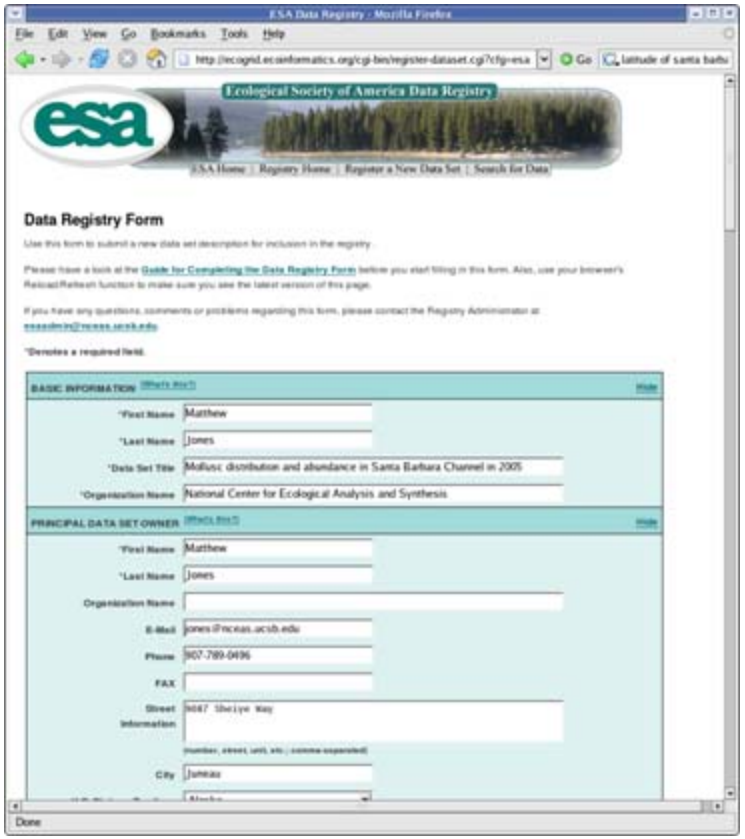
- Lessons learned
- Future

Network Development

1. Design, implement and maintain web-accessible databases

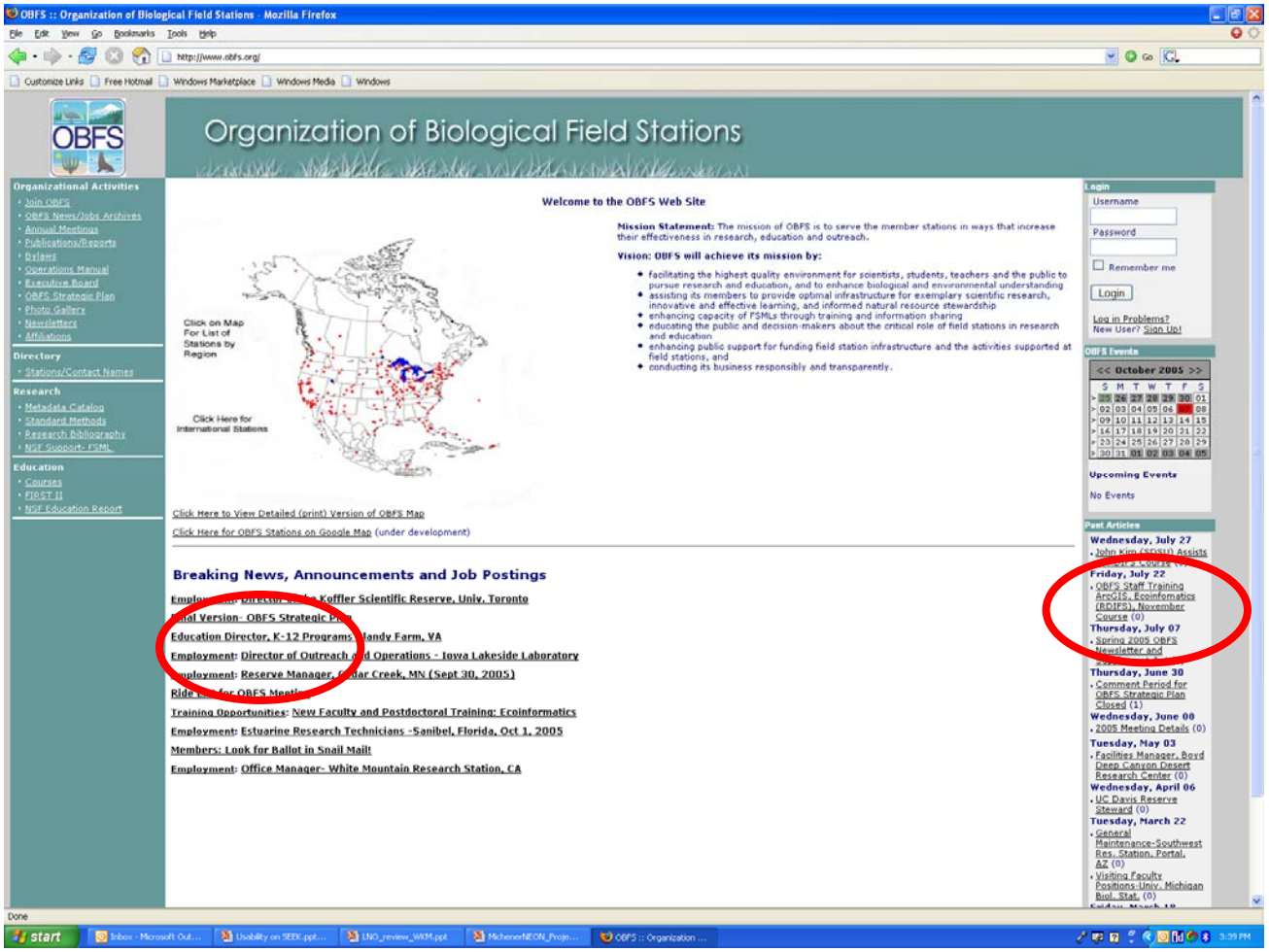




LTER

Network Development

2. Maintain the infrastructure to support the OBFS web site and mailing list



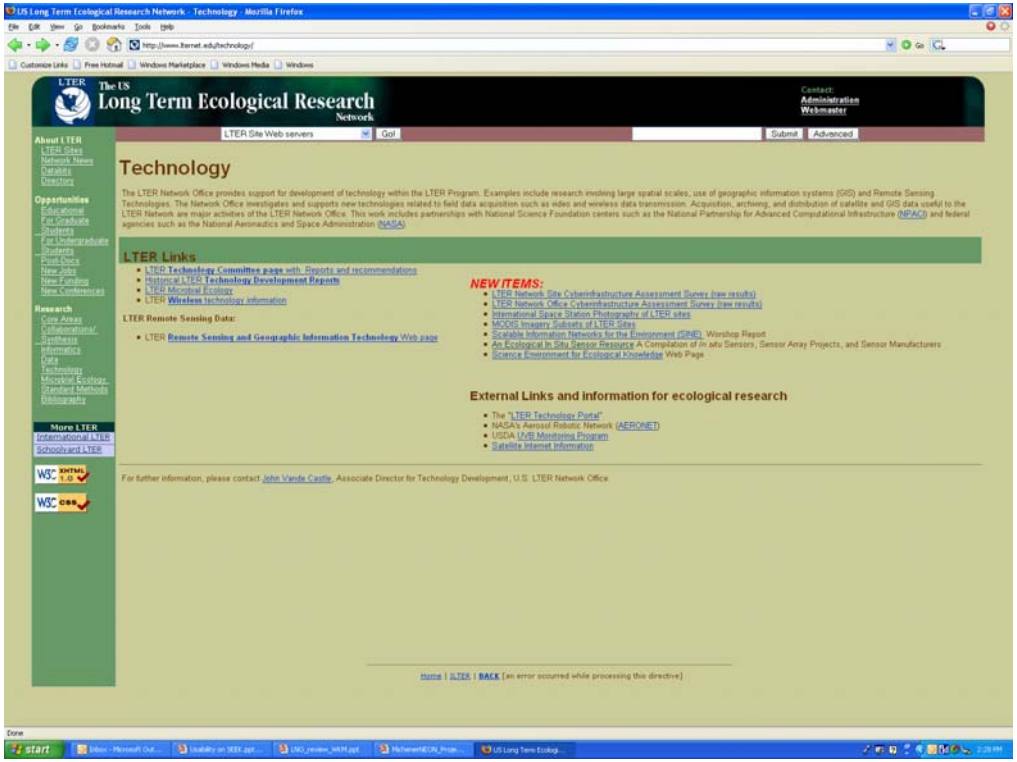
Network Development

3. Evaluate and implement advanced wireless communication and sensor technologies

Wireless testing at Coweeta showed almost the entire site could be reached from an old fire lookout. The site installed large solar panels to power wireless radio and instruments.

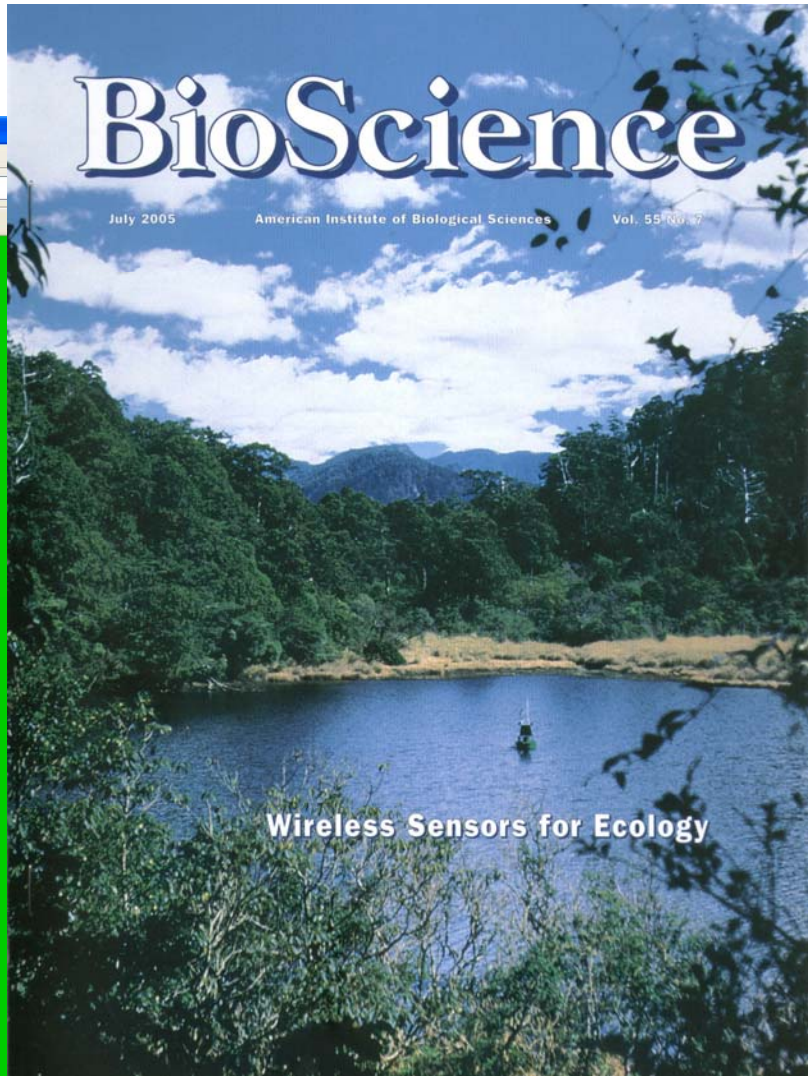
Network Development

4. Develop a web-accessible resource for technology information



Network Development

5. Organize symposia with other disciplines



LTER

Community Outreach

1. SEEK
2. PBI
3. NPACI
4. NBII
5. RCN
6. NEON
7. Center for Microbial Ecology

ecoinformatics.org :: home page - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://ecoinformatics.org/
Go
Customize Links Free Hotmail Windows Marketplace Windows Media Windows

ecoinformatics.org

Online Resource for Managing Ecological Data and Information

Ecoinformatics.org is an open, voluntary collaboration of developers and researchers that aims to produce software, systems, publications, and services that are beneficial to the ecological and environmental sciences.

Sub-projects are created and supported by ecoinformatics.org in order to build an active community that is developing informatics solutions for the ecological and environmental sciences. See our **Charter** for details. Subscribe to mailing list

The **projects** supported by ecoinformatics.org are relevant to ecologists and scientists of other disciplines.

We hope that ecologists who are interested in technologies that facilitate the use of data for purposes including archiving, discovery, analysis and classification will use this site to identify **tools** to augment their activities.

Technologists may use the **resources** provided by ecoinformatics.org to leverage tools being developed in an open-source, collaborative, standards-aware environment.

Ecoinformatics.org has a low-volume **mailing list**, which is for public discussion of issues relevant to ecological informatics. You can subscribe by providing your email address:

email address: subscribe

You may also **browse the online archive** of previous mailing list discussions

Transferring data from ecoinformatics.org...
start Inbox - Microsoft Ou... LNO_review_WKM.ppt Document11 - Micros... ecoinformatics.org :: ... 3:51 PM

ROADNet

realtime revelle

Online realtime data from the Research Vessel Roger Revelle

file:/C:/ny/incoming/Kepler/kepler/workflows/orb/OrbImageViewer.xml

File View Edit Graph Debug Help

Actors Data

Quick Search

Go

- nmiworkflow
  - GlobusProxy
  - GlobusJob
  - GridFTP
- resurgence
- ROADnet
  - ObjectToRecord
  - OrbPacketObjectSou
  - OrbImageSource
  - OrbWaveformSink
  - OrbWaveformSourc
- skidlkit
  - FileLocator
  - TextFileReader
  - Trainer

executing

SDF Director

Streaming demo: images from SIO rese
accessed via "bohemia.splorg.org:6580

OrbImageSource → output → input → ImageDisplay

Tobin T. Fricke
University of California
July 2004

ORB

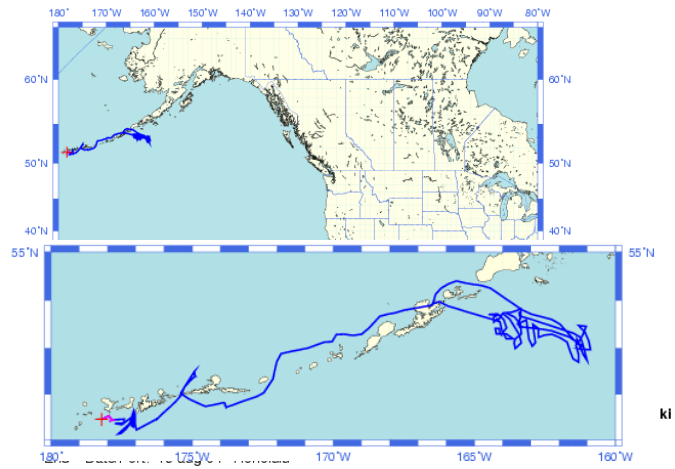
Revelle's Current Location - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://shipsked.ucsd.edu/general/rev_loc.html

Mozilla Firebird Help | Mozilla Firebird Discu... | Plug-in FAQ | Ian Taylor - Publishe...

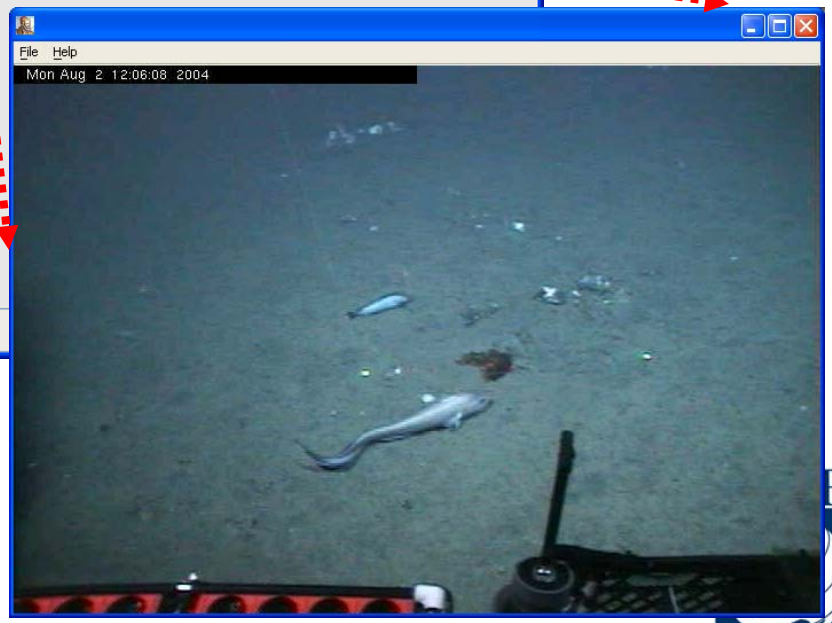
R/V Revelle position as of 2-Aug-04



Last Position: 2-Aug-04 / 2300Z 51-26N 178-12W course: 243 speed: 12.9 knots

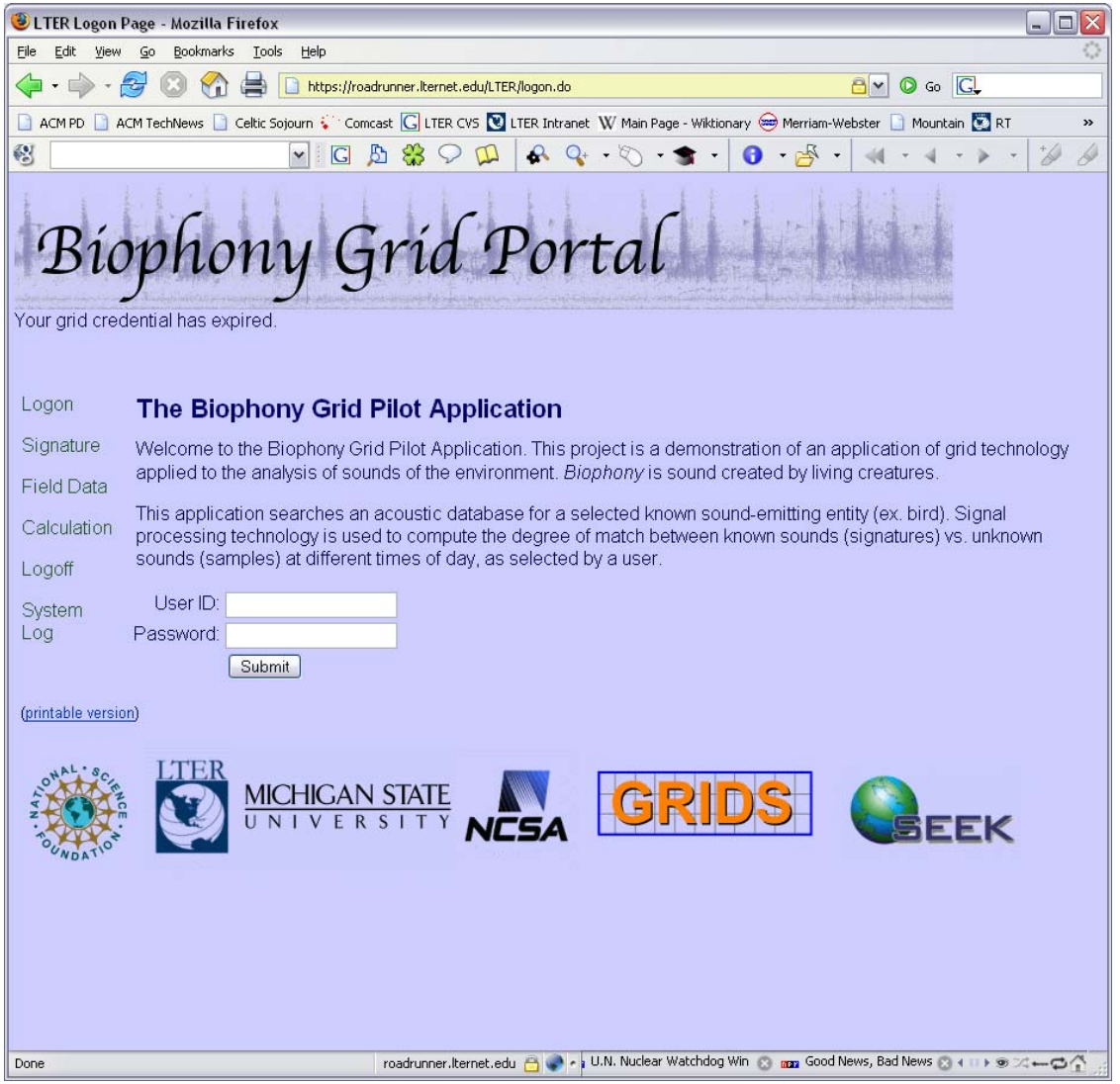
Provided by Shipboard Computer Group

Done



Community Outreach

3. ~~NPACI~~
- NCSA
- UCSD
- NLADR



Community Outreach

4. NBII

BDP
To
Eml
crosswalk

EML2BDP crosswalk

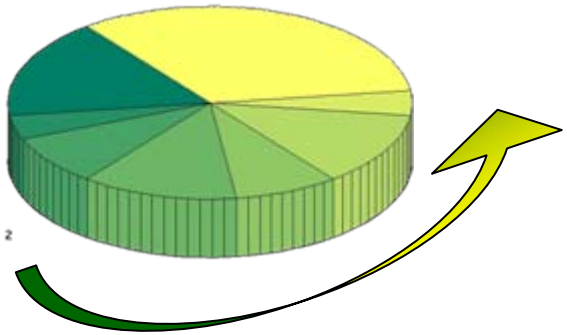
EML implementation
- Standard crosswalks

Metadata tools training
- NBII nodes collaboration

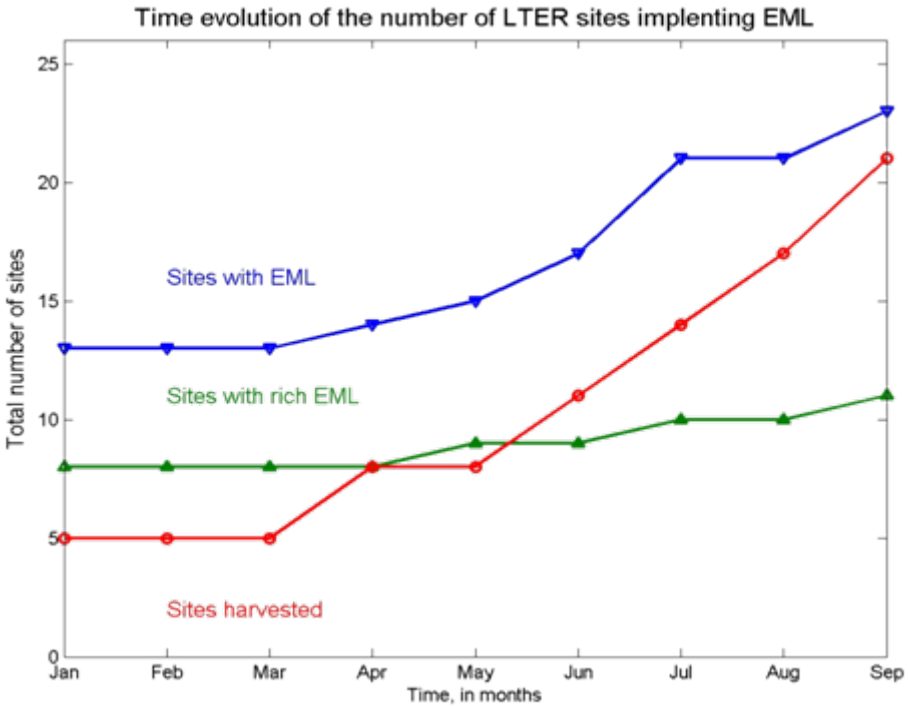
Stakeholders workshop organization
- NBII all nodes meeting

Web services (metadata crosswalk, ontologies)

Sites EML metadata richness, Aug 05

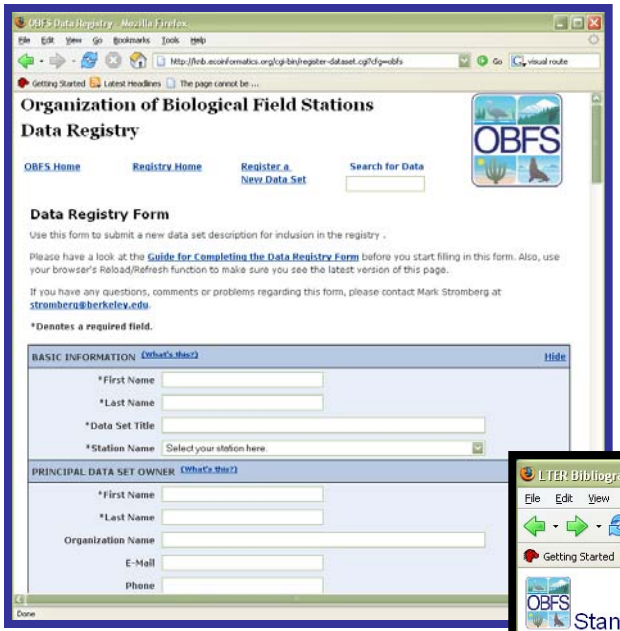


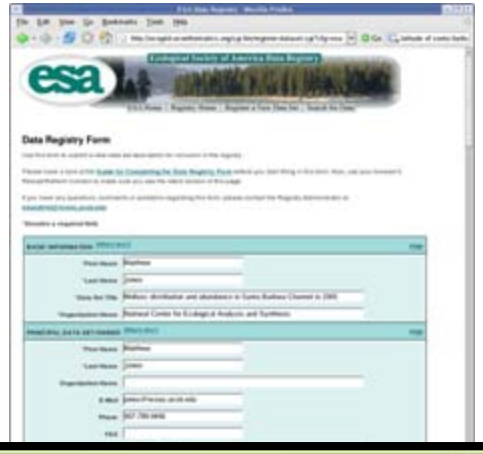
TIER levels: **0 - 5**

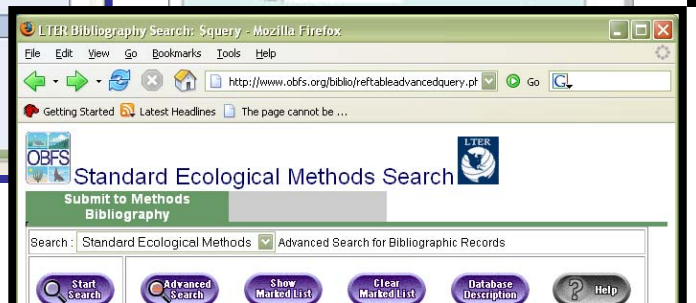


Community Outreach

5. RCN (Resource Discovery Initiative for Field Stations)
   - Data Registry and Repository (4,205 entries)
   - Database of Field Station QA/QC and Standard Methods (1,328)
   - EOT— Trainings and Workshops





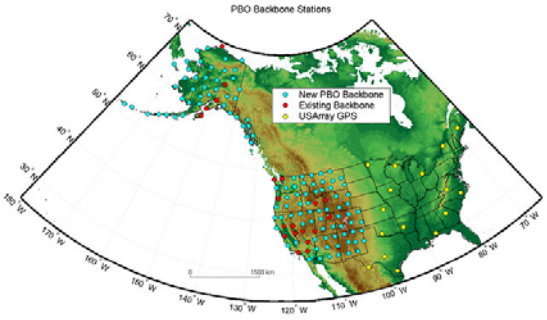


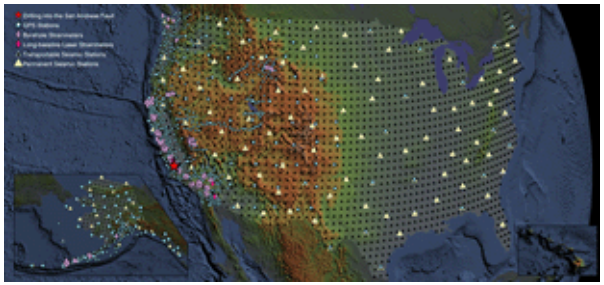
Community Outreach

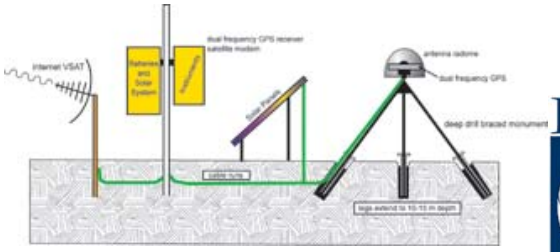
6. NEON

Big Science & MREFC

scientific research that requires a massive capital investment, that involves large teams of scientists, and that is expected to yield very significant results—i.e., transform the science

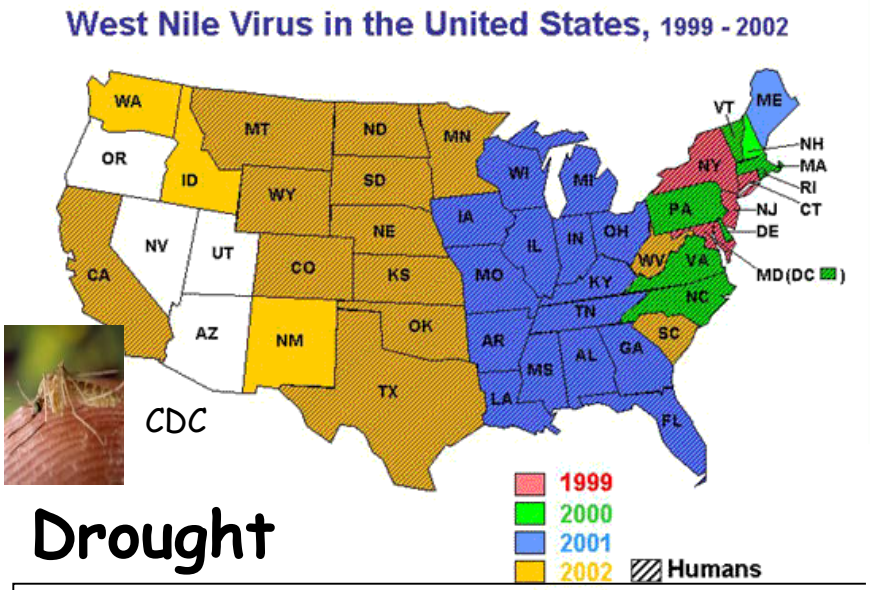




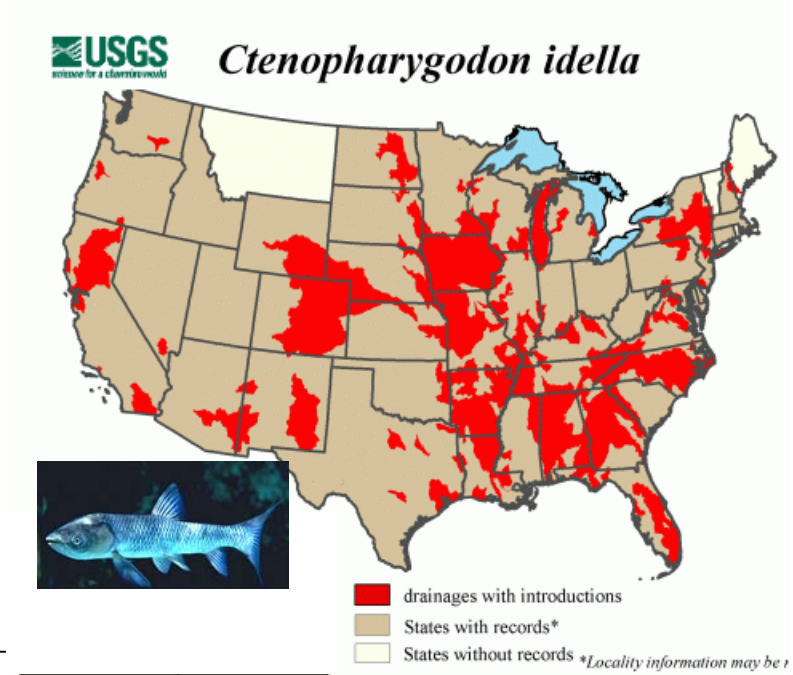


Many important ecological questions that confront society are national in scope

National Ecological Observatory Network (NEON)

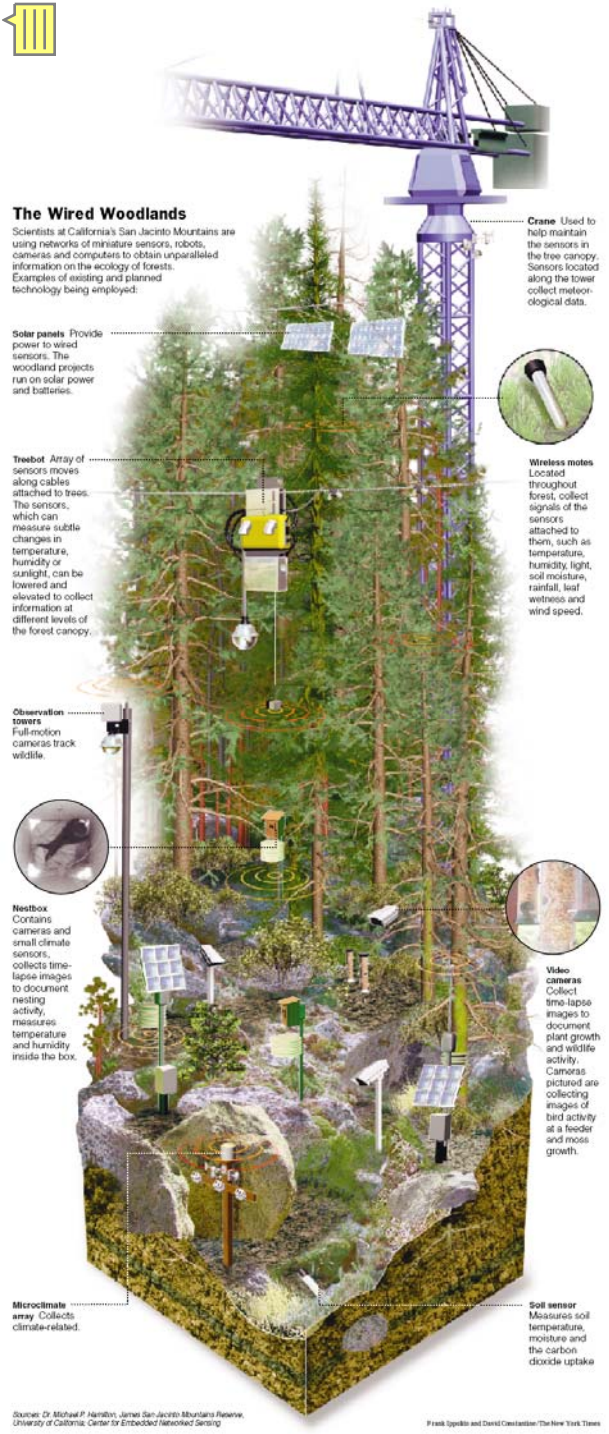


CDC



Drought

Source: Drought Monitor



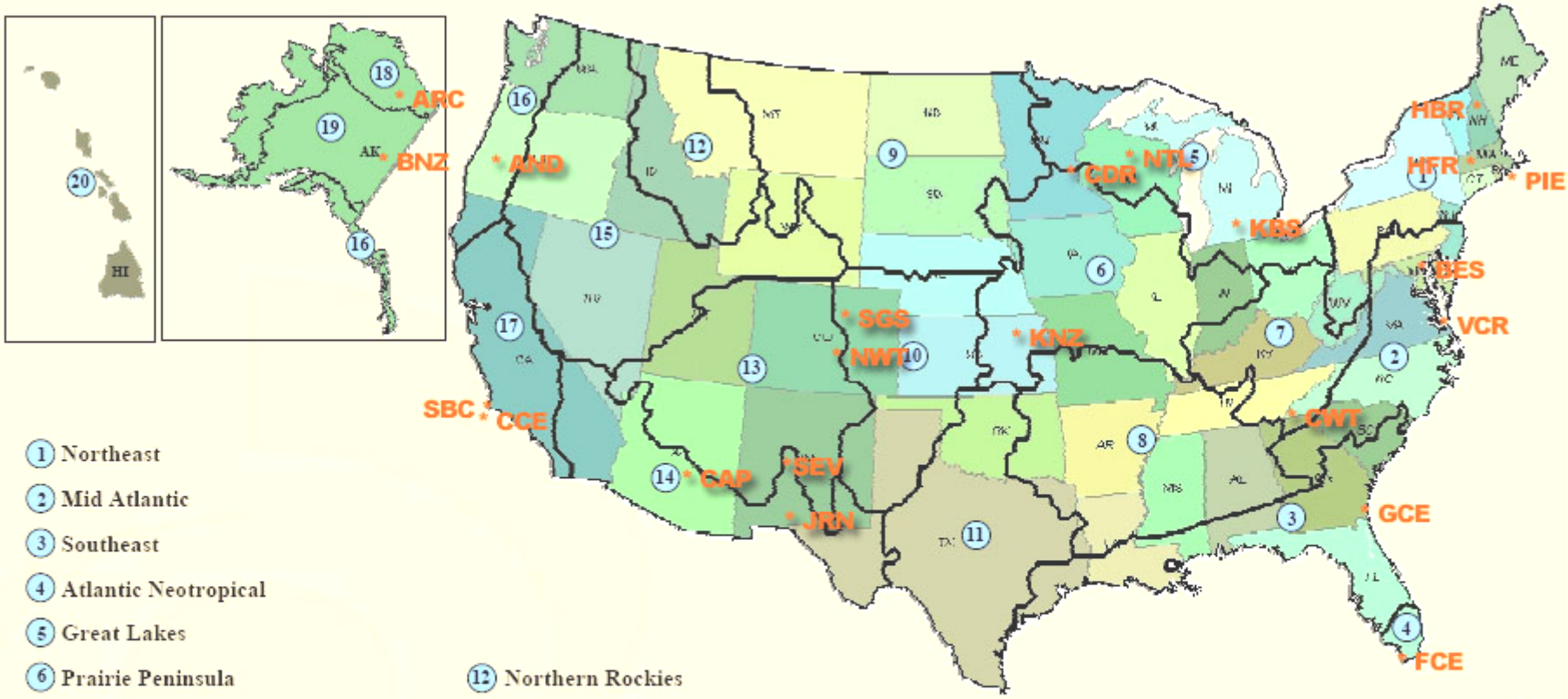
A continental research platform to provide the capacity to forecast future states of ecological systems for the advancement of science and the benefit of society

- How are ecological systems affected by changes in land use and climate across a range of spatiotemporal scales?
- How do changes in the availability and distribution of the Nation's water affect ecological systems?
- How do the patterns and movement of genes and organisms across the continent affect biodiversity and the spread of infectious diseases and invasive species?

www.neoninc.org

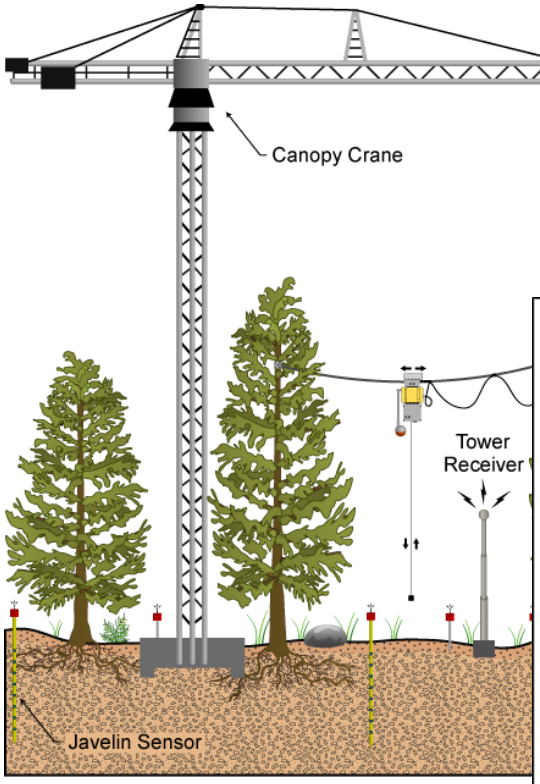
LTER

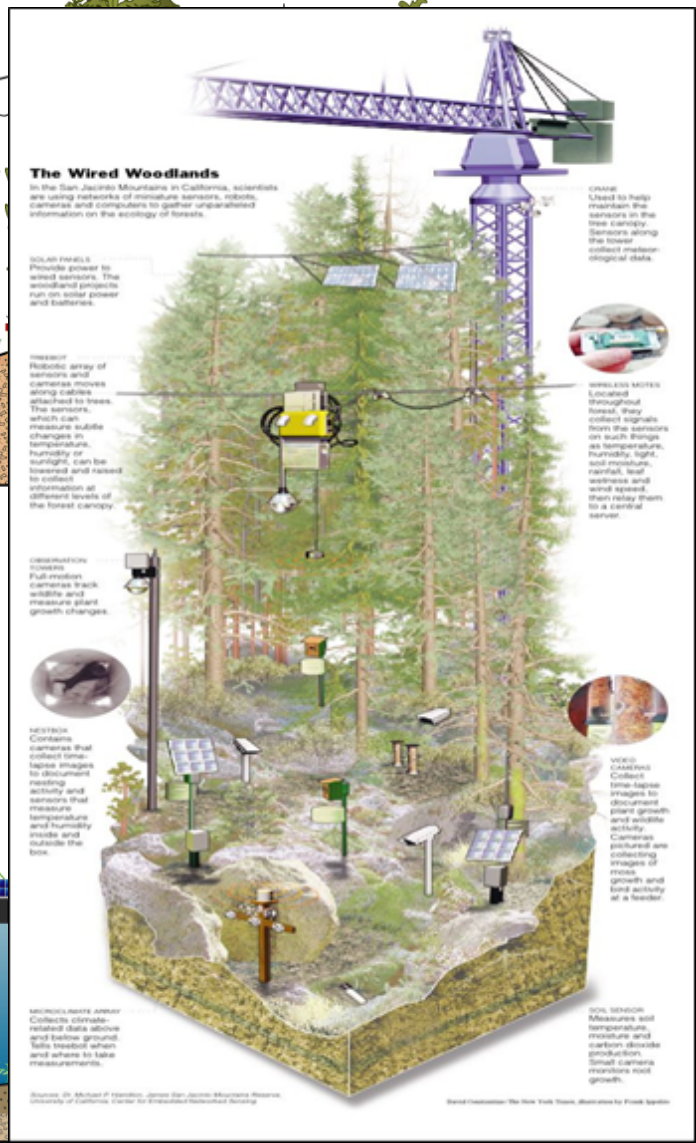
Urban to Natural Gradient

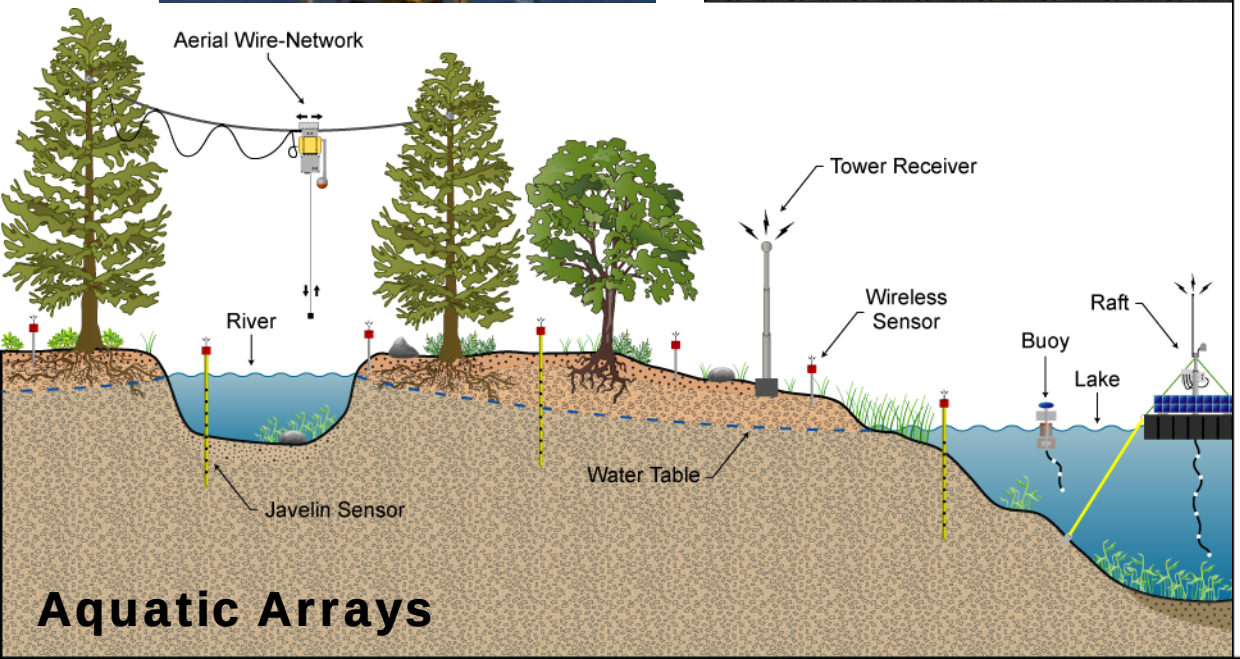


1. Northeast
2. Mid Atlantic
3. Southeast
4. Atlantic Neotropical
5. Great Lakes
6. Prairie Peninsula
7. Appalachians / Cumberland Plateau
8. Ozarks Complex
9. Northern Plains
10. Central Plains
11. Southern Plains
12. Northern Rockies
13. Southern Rockies / Colorado Plateau
14. Desert Southwest
15. Great Basin
16. Pacific Northwest
17. Pacific Southwest
18. Tundra
19. Taiga
20. Pacific Neotropical

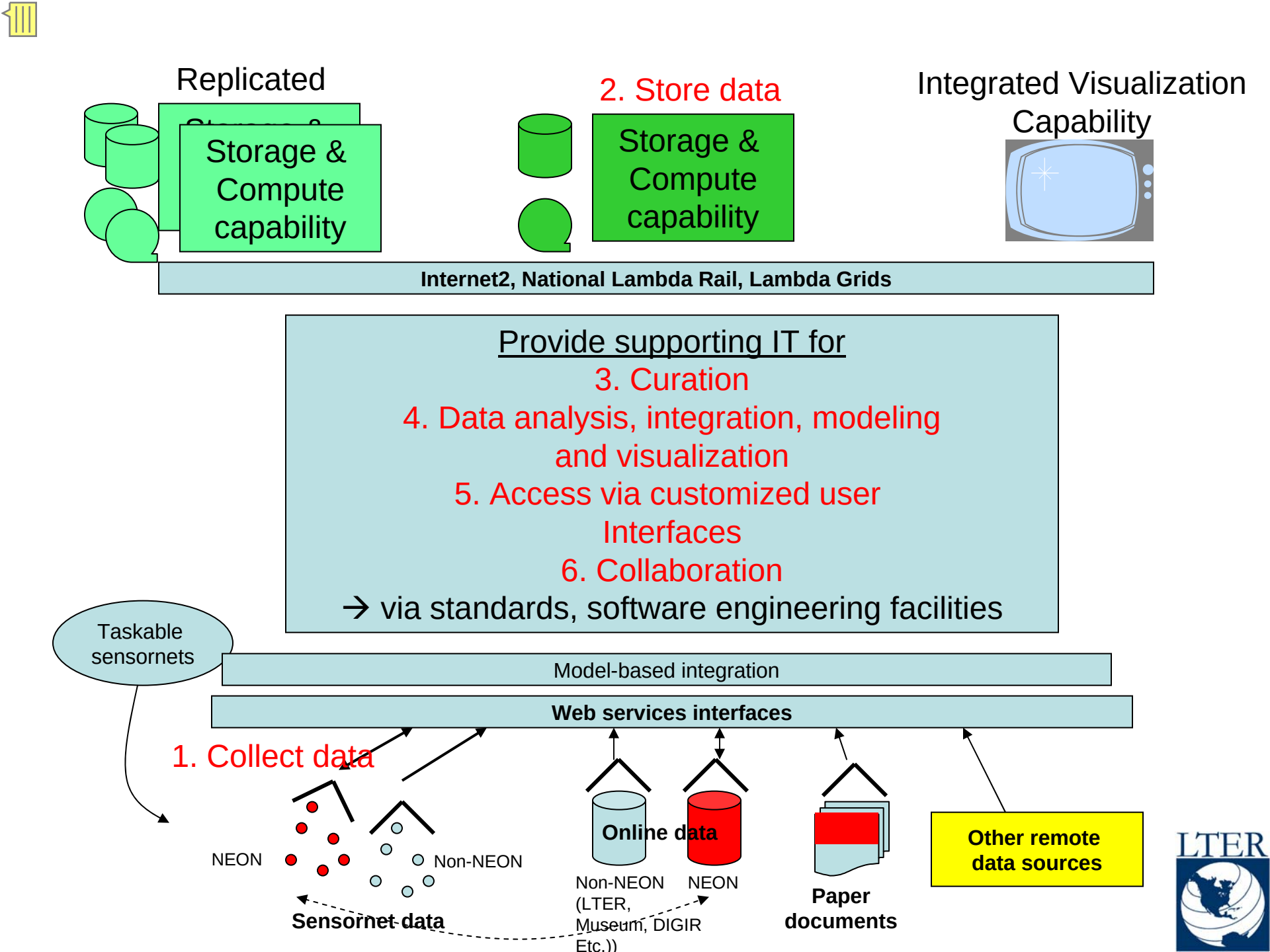
Terrestrial Arrays







Aquatic Arrays


Replicated
Storage & Compute capability
2. Store data
Storage & Compute capability
Integrated Visualization Capability
Internet2, National Lambda Rail, Lambda Grids
Provide supporting IT for
3. Curation
4. Data analysis, integration, modeling and visualization
5. Access via customized user Interfaces
6. Collaboration
→ via standards, software engineering facilities
Taskable sensornets
Model-based integration
Web services interfaces
1. Collect data
NEON
Non-NEON
Sensornet data
Online data
Non-NEON (LTER, Museum, DIGIR Etc.))
NEON
Paper documents
Other remote data sources
LTER

An essential component: *the scientist*
interactive data access and visualization in the field

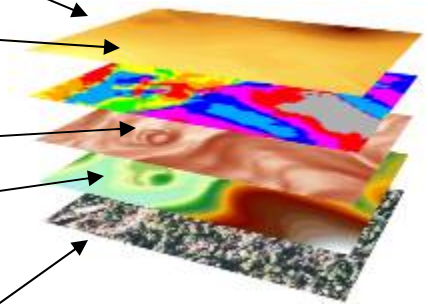
Daily Average Temperature
(Geostatistical Analyst)

Aspect
(Spatial Analyst)

Slope
(Spatial Analyst)

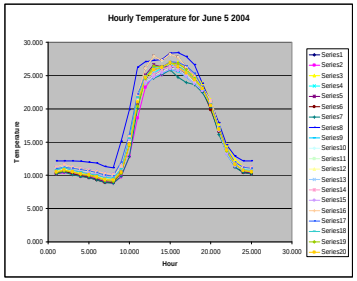
Elevation
(Calculated from Contour)

Aerial Photograph
(10.16cm/pixels)



3D Images

Graphs



- Real time access to archived data and models
- Combine system filtering with manual identification, verification, context, sample collection
- Guide node placement, data collection, system debugging

transform physical observations from batch to interactive process

LTER

Why multi-scale distributed sensor-networking will transform ecology

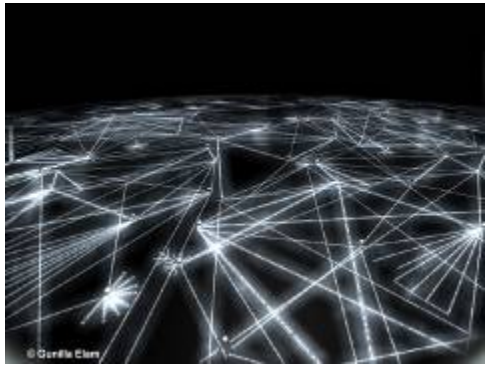
Radioastronomy
Single Telescopes

Computing
Supercomputers

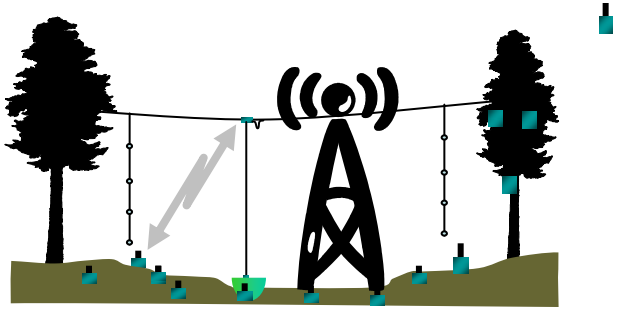
Field ecology
Individual observations

… because it has done so over and over again

Very Large Array

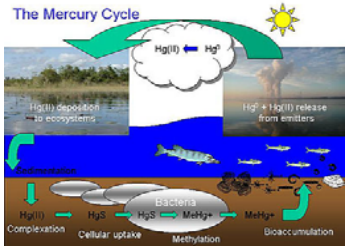


Internet



NEON

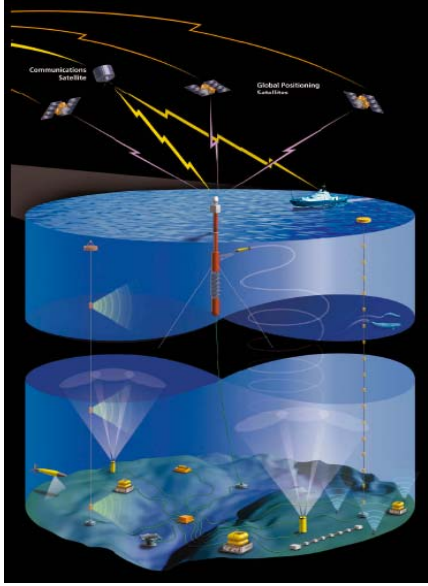
CLEANER
Collaborative Large-scale Engineering Analysis Network for Environmental Research



CUAHSI
Consortium of Universities for the Advancement of Hydrologic Science, Inc.

neon
NATIONAL ECOLOGICAL OBSERVATORY NETWORK

ORION
Ocean Research Interactive Observatory Networks



Transformative in understanding complexity of natural and human environments

Geographically distributed infrastructure connected via cyberinfrastructure into national observatory network

Apply emerging technologies (sensor, analytical, communication, and information) to investigate the structure, dynamics, and evolution of systems in the United States and forecast change.

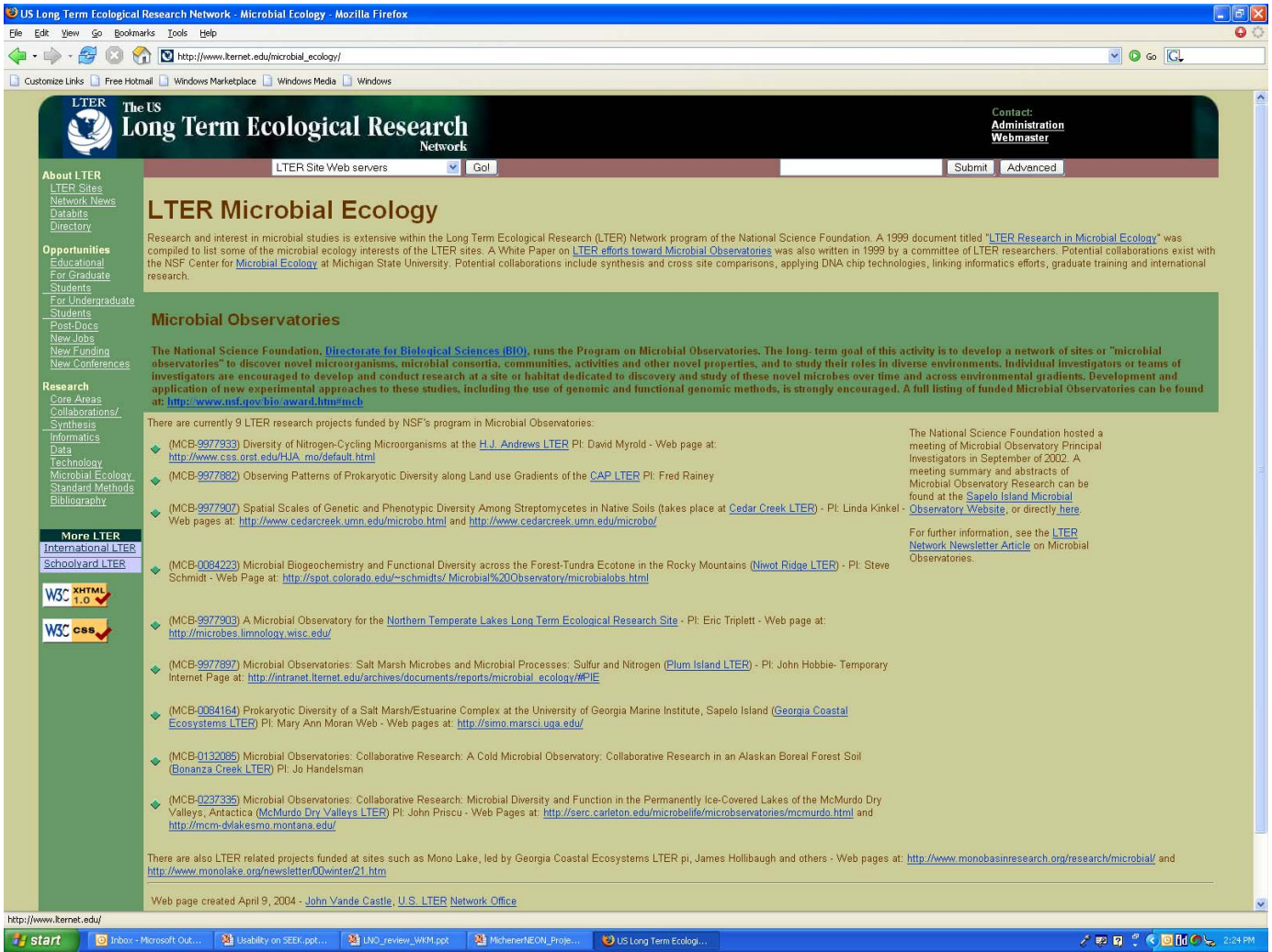
New collaborative environments (simulation, computation, visualization, and knowledge systems) are needed to facilitate the integration of research, education, and dialog across a wide range of biological, geophysical, and social sciences.

Data repositories and facilities for synthesis

NSF EOS

Community Outreach

7. Center for Microbial Ecology



Training

- OBFS & LTER
  - May 2003 – 2 sensor and wireless workshops
  - October 20 – November 2, 2002– Sevilleta
  - October 27 – November 7, 2003 – Sevilleta
  - October 17 - 30, 2004 – UNM
  - October 31 – November 11, 2005 – UNM
  - October 16-27, 2006 – La Selva Biological Station, CR
- Nov. 2003, Feb. 2004 – LTER Information Managers
- SEEK Post-Docs
  - January 2004
  - January 2005
  - January 2006
  - May 2006
- ESA Ecoinformatics
  - August 2004

Network Development, Community Outreach, and Training

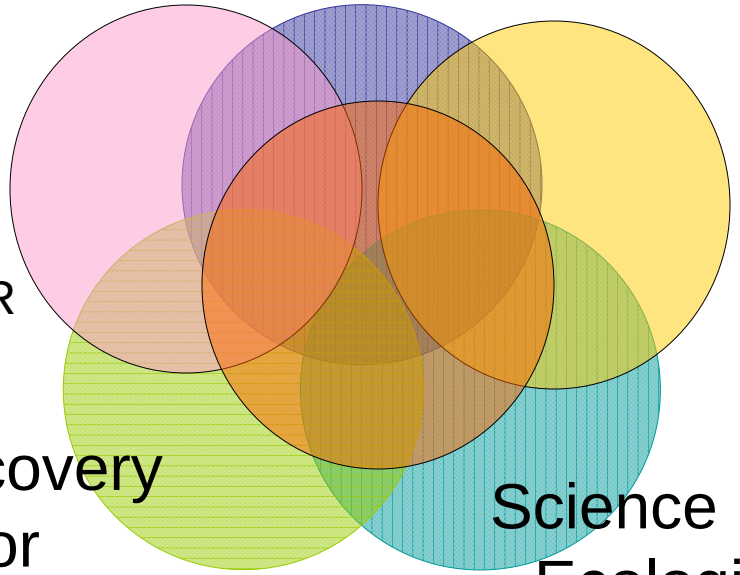
- Define the scope
- Successes
- Lessons learned
- Future

Community building and network development do not happen overnight.

- Time
- Trust
- Relationships

Be responsive,
be proactive,
be focused,
be flexible,
be deliberative,
be nimble.

Leverage, leverage, leverage



NEON, CLEANER, CUAHSI, OOI

Network Development, Community Outreach, and Training

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- ☑ Community outreach (building partnerships)
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- ☑ Training
  - OBFS and LTER

- **NSF Grant Proposal Guide 04-23**
  - ☑ **What is the intellectual merit of the proposed activity?**
  - ☑ **What are the broader impacts of the proposed activity?**
    - How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

LTER

Network Development, Community Outreach, and Training: Future Activities

- Network development (community building activities)
  - Building cyberinfrastructure for ecological community
    - OBFS
    - International Society for Ecological Informatics
    - NBII
    - Planning grant
- Community outreach
  - Partnership for Biodiversity Informatics
  - NEON, CLEANER, CUAHSI, OOI (IOOS)
  - Internet2/NLR
  - Earth & Sky, SACNAS
- Training
  - OBFS ?
  - IGERT ? (U. Mass Boston)
  - LTER
    - Enhancing informatics and synthesis expertise

COMPU-GLOBAL-HYPER-MEGA-NET*

*Name of Homer Simpson's home internet business which was "bought out" by Bill Gates