The EcoTrends Web Portal: An Opportunity for Discovery and Exploration of Long-term Ecological Data by Teachers and Students

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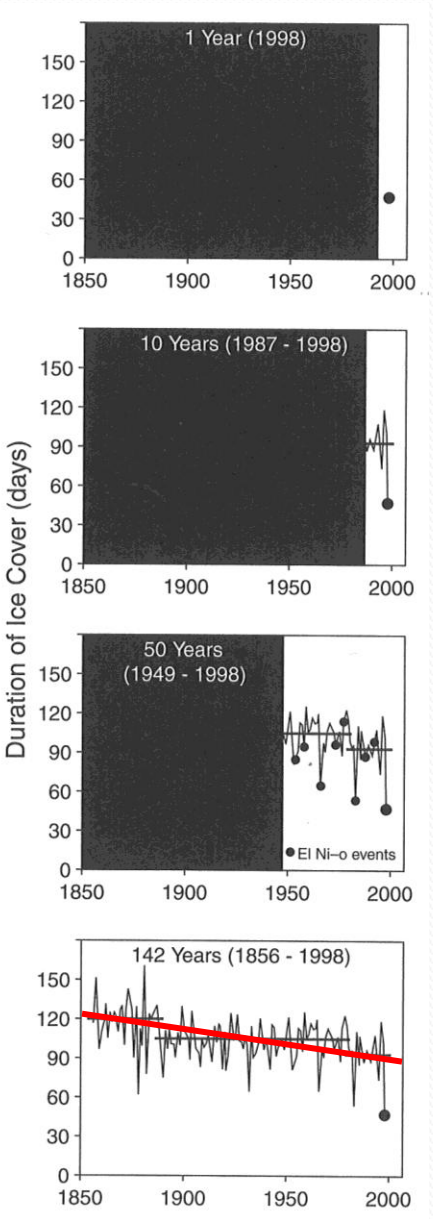
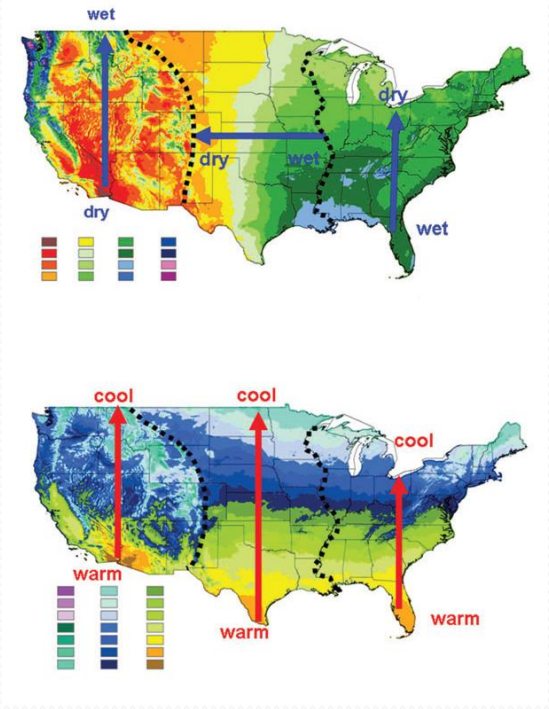
The value of long-term data

"[Using the] wealth of long-term data is the most reliable way to document historical patterns and to disentangle future directional trends from short-term variability and cyclic behavior."

- Peters, DPC. 2008. Ecology in a connected world: a vision for a "network of networks". Frontiers in Ecology 6(5): 227

Long-term data expose variability, trends, and cycles over time and space.

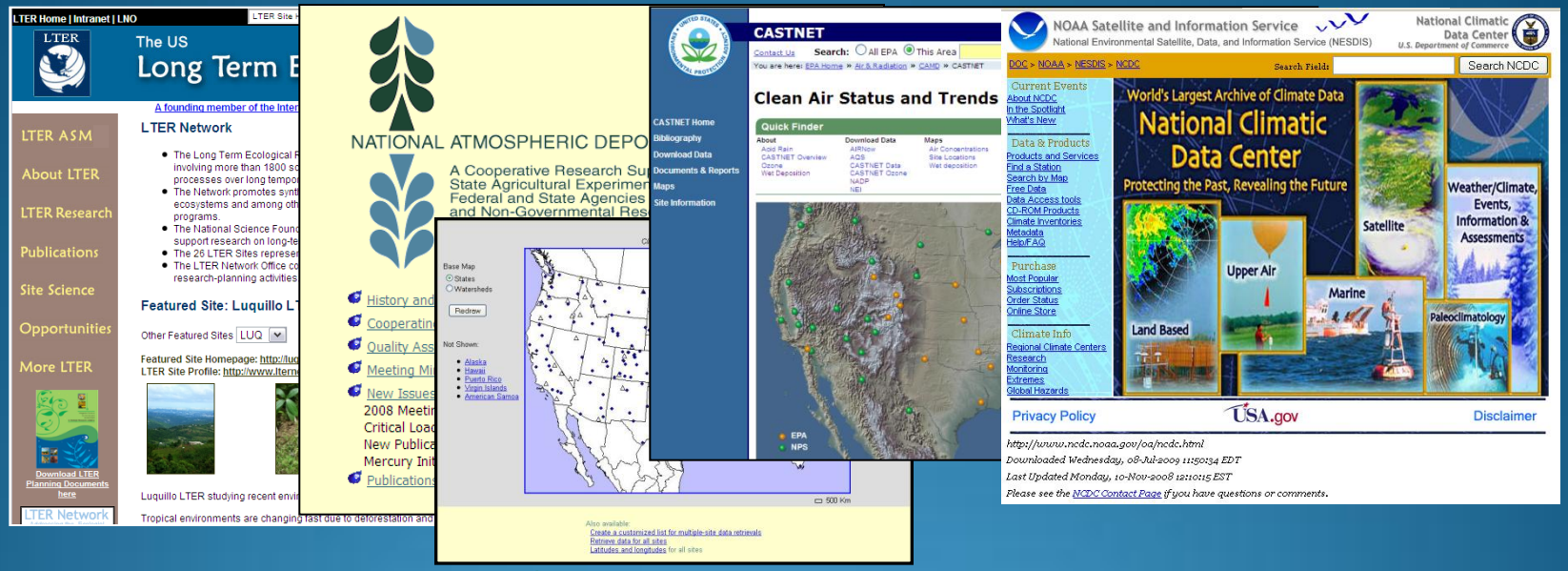




Trends across the US. Peters, DPC et al. 2008

Trends in ice duration over time at Lake Mendota (NTL LTER, Wisconson). Magnuson et al., 2000, 2006

More datasets are online every day…



… are they adequate for supporting synthetic research across time and across the US (or the globe)?

YES… for many purposes, but not all.

- **Many datasets on drivers; few on biotic responses.**
- **Many datasets online are real-time or short-term**

Barriers to using online datasets in the classroom

In general, different networks have

- Varying web portal designs
- A mixture of short and long-term data
- Different data and metadata formats
- Different data use policies

This makes finding, obtaining, and comparing data difficult and time-consuming.

LTER sites (like other networked sites) share

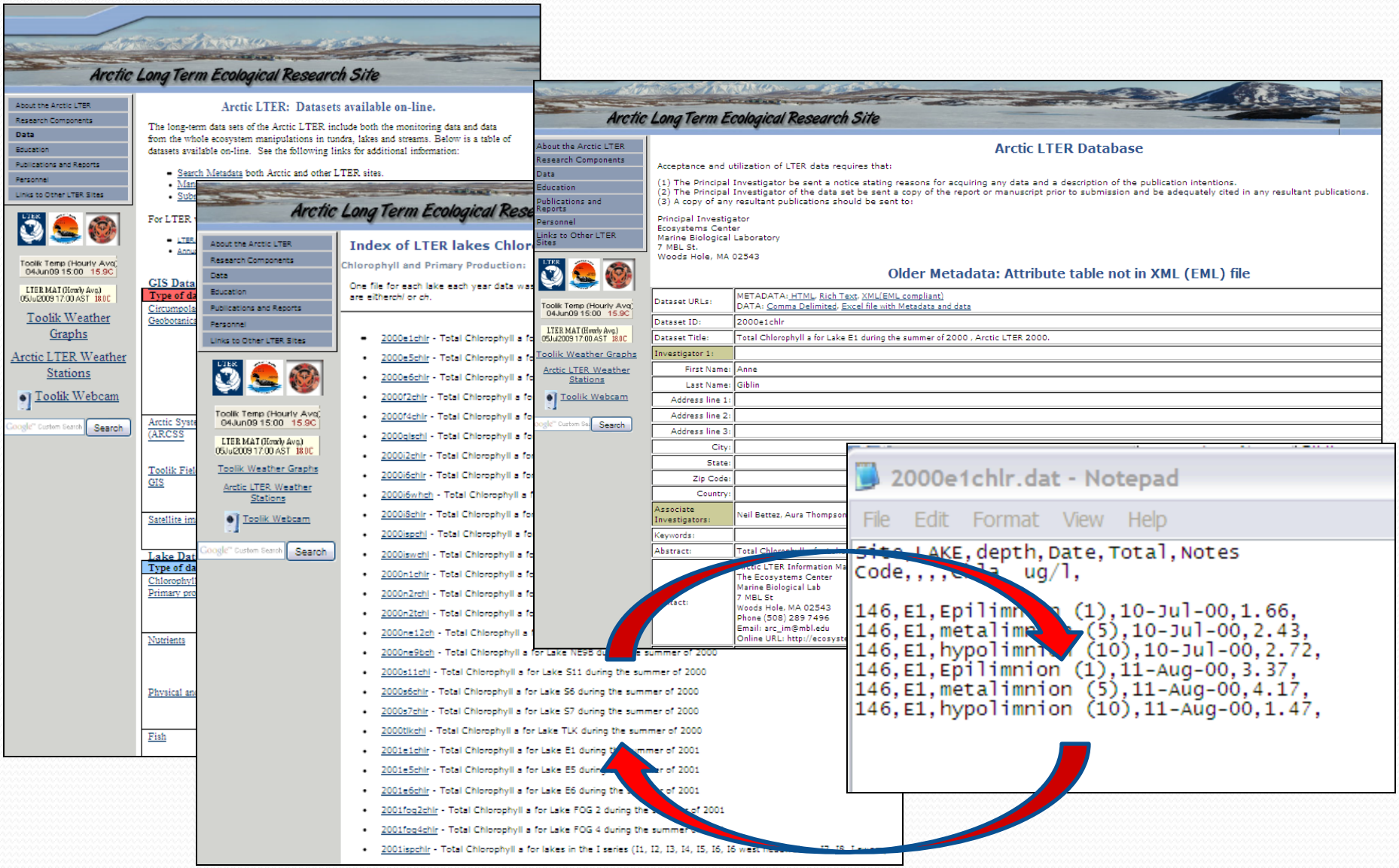
- Common metadata access portal (Metacat) and metadata format (Ecological Metadata Language – EML)
- Common data sharing policies
- Common vision: “The Decade of Synthesis”

HOWEVER… they do not always share

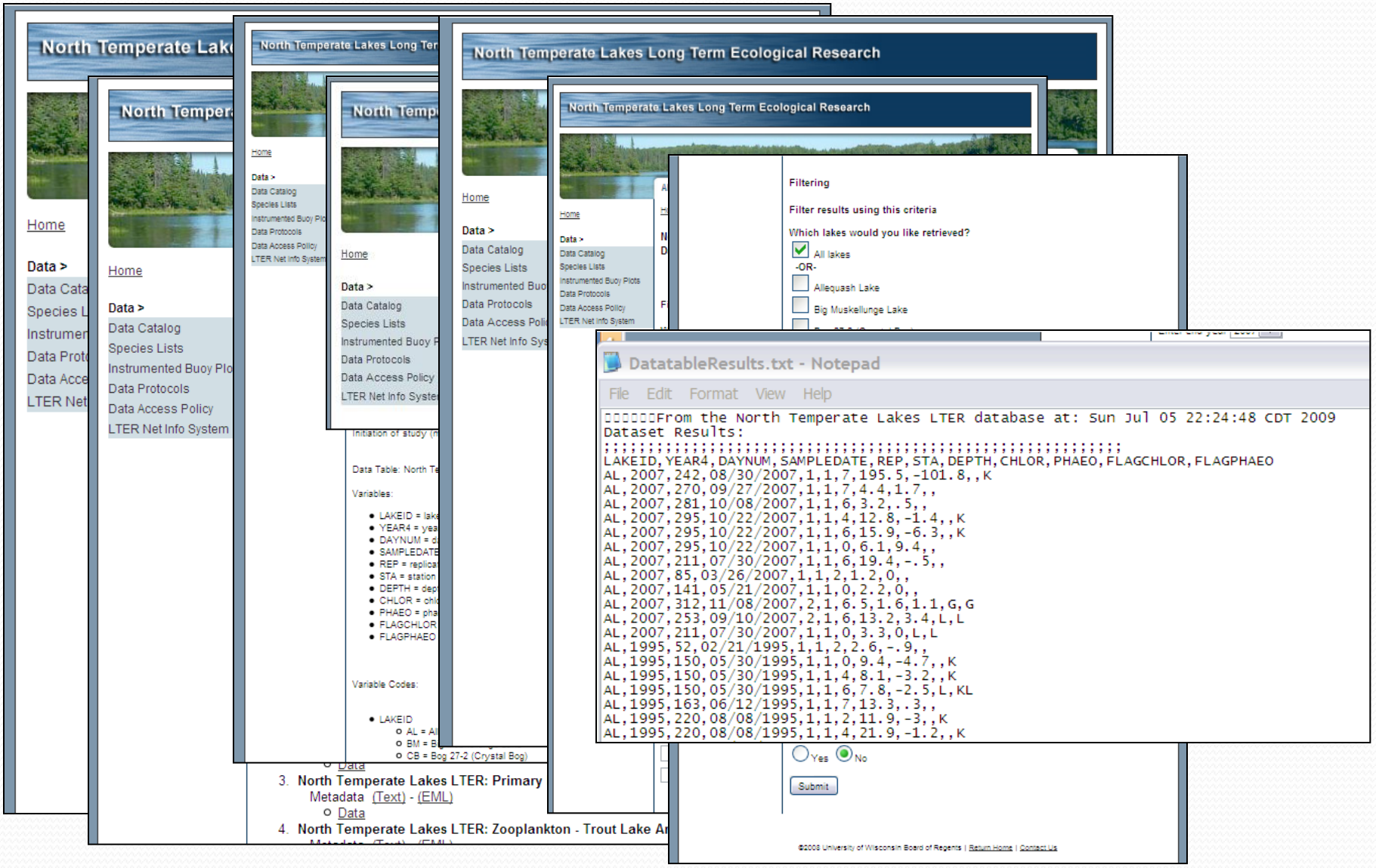
- Common metadata presentation styles
- Common data access portal
- Common data collection methods
- Common data formats

Next… examples of two randomly-chosen, thoughtfully designed LTER data access websites.

LTER data website 1



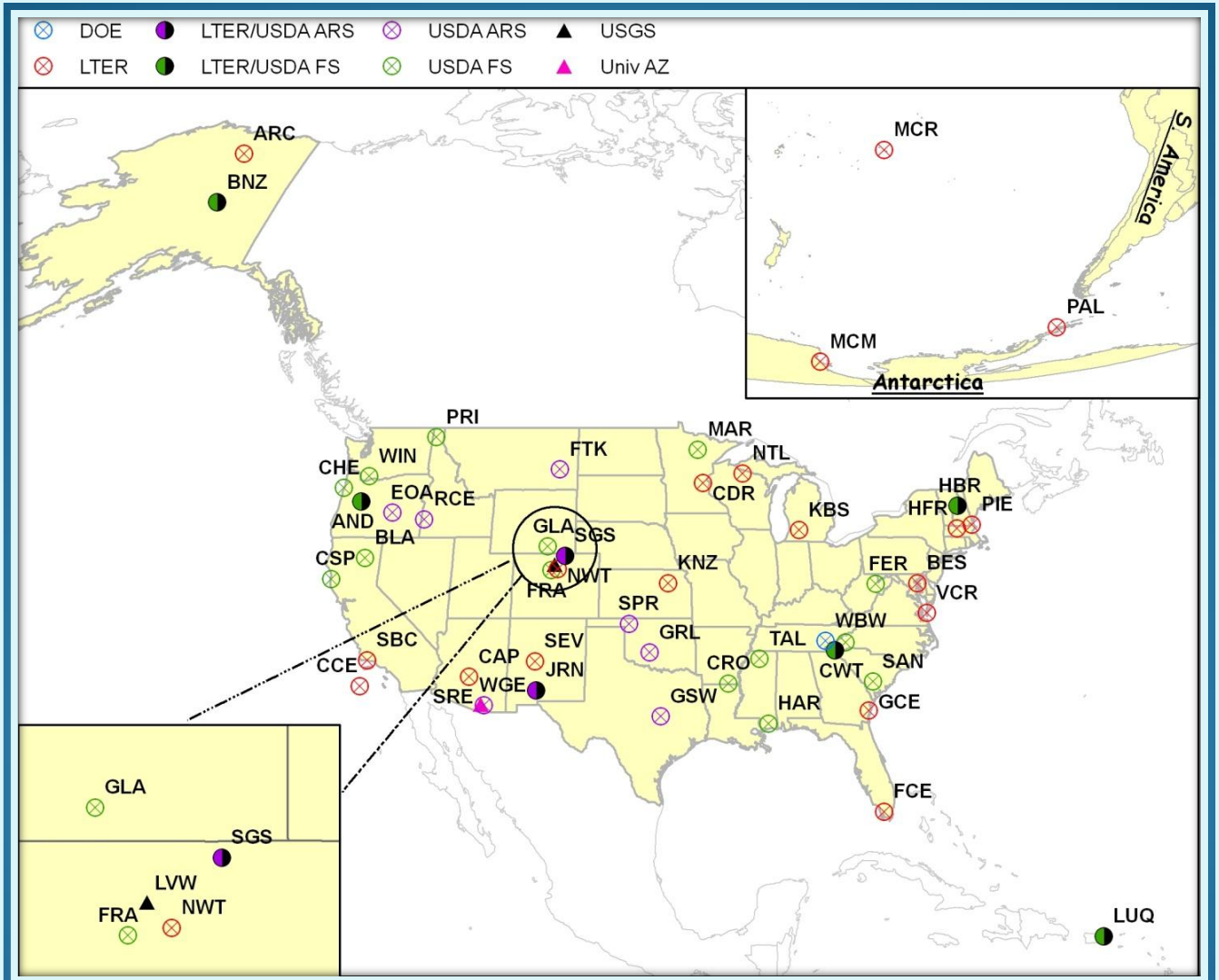
LTER data website 2



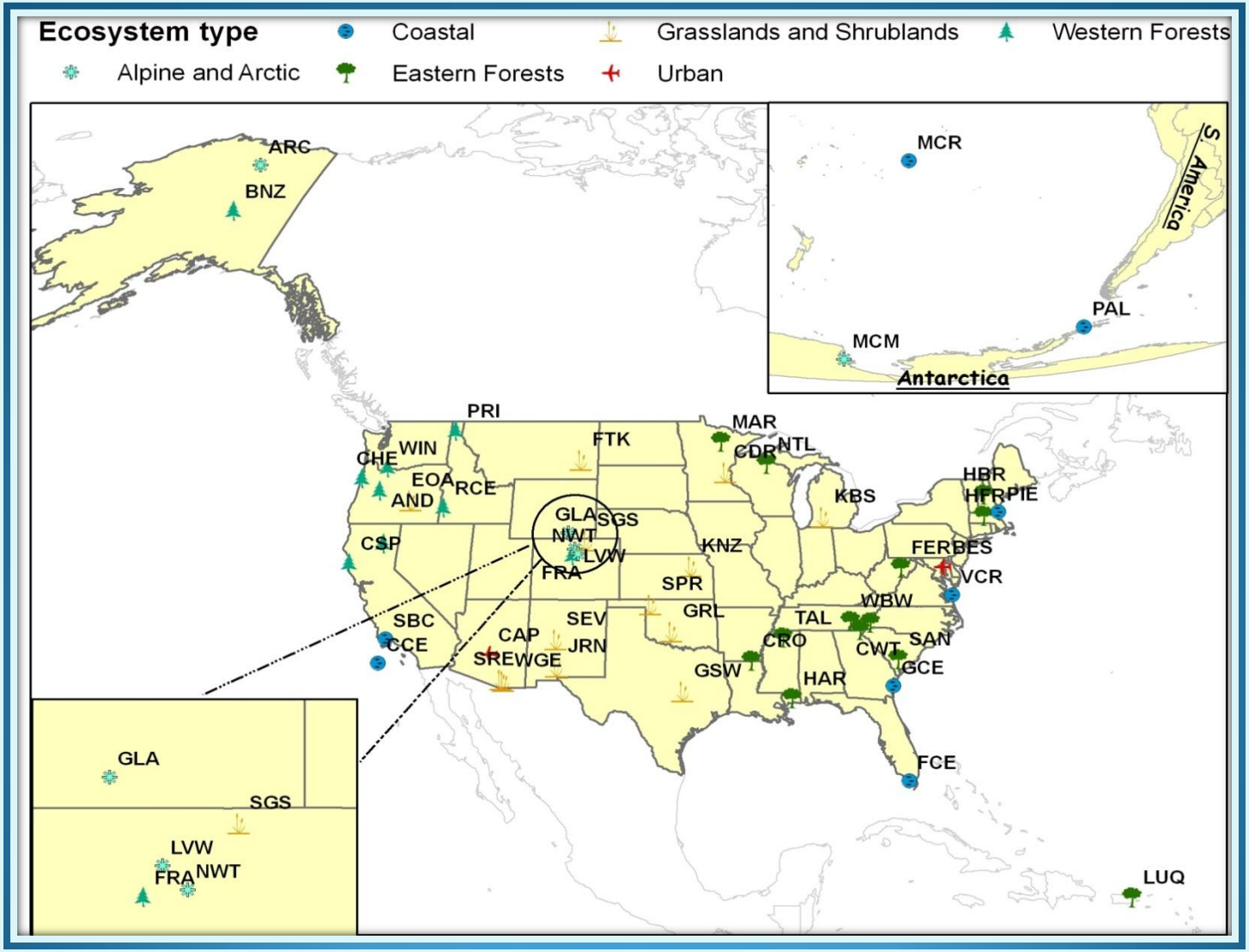
EcoTrends Project Overview

Goal	Promote and enable long-term (>10yr) ecological time-series data, across research networks, for use in synthesis projects by simplifying discovery, access and exploration of standardized data products
Data Partners	• US. LTER (all 26 sites) • USDA Agricultural Research Service &Forest Service (21+ LTER) • USGS, DOE, Univ. Arizona (3) = **50 total**
Other Data Providers	• NOAA/National Climate Data Center (NCDC) • National Atmospheric Deposition Program (NADP)
Timeline	• Web portal release late 2009 • Book published by USDA ARS publications 2010

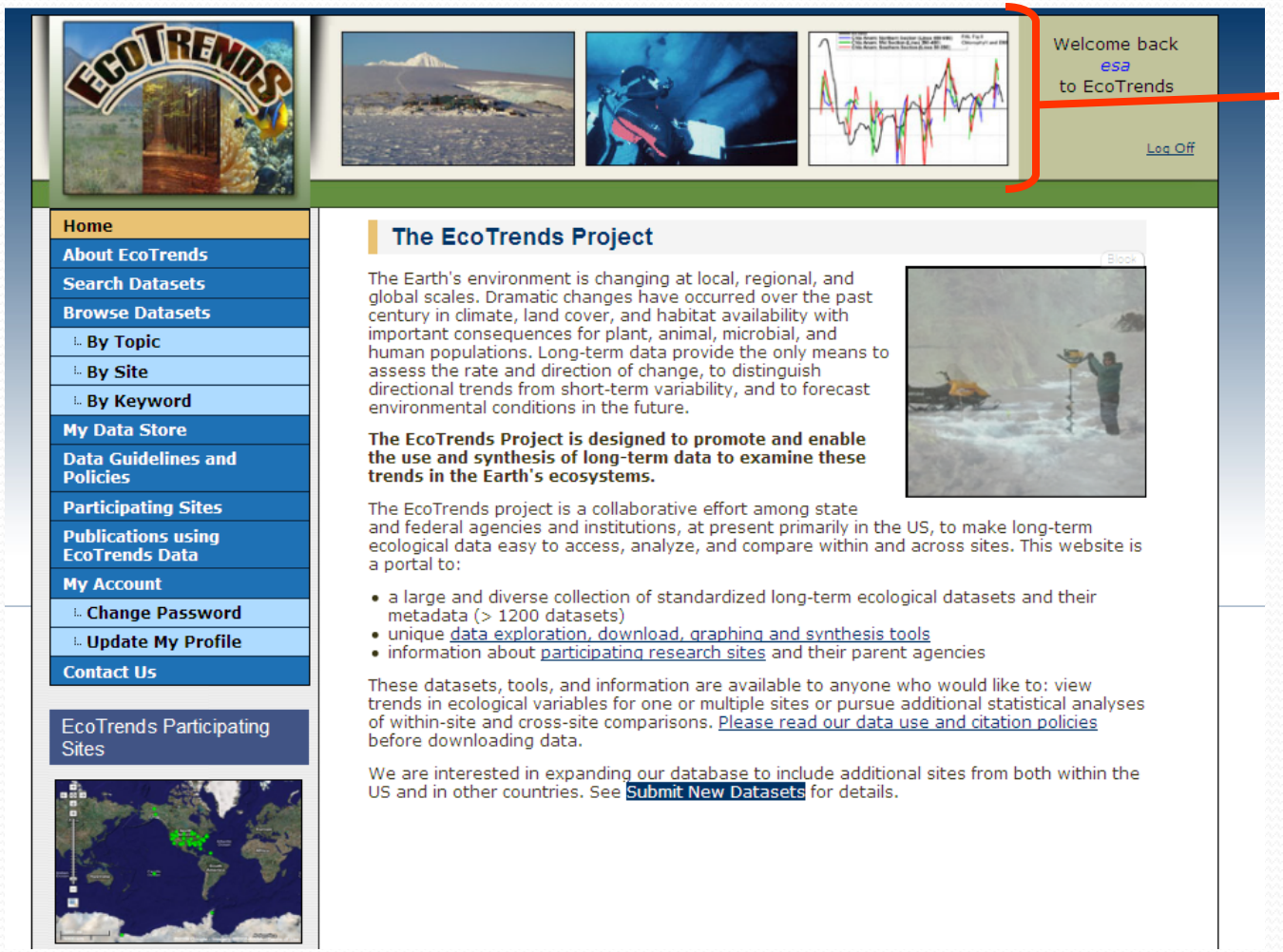
EcoTrends Sites by Agency



EcoTrends Sites by Ecosystem Type

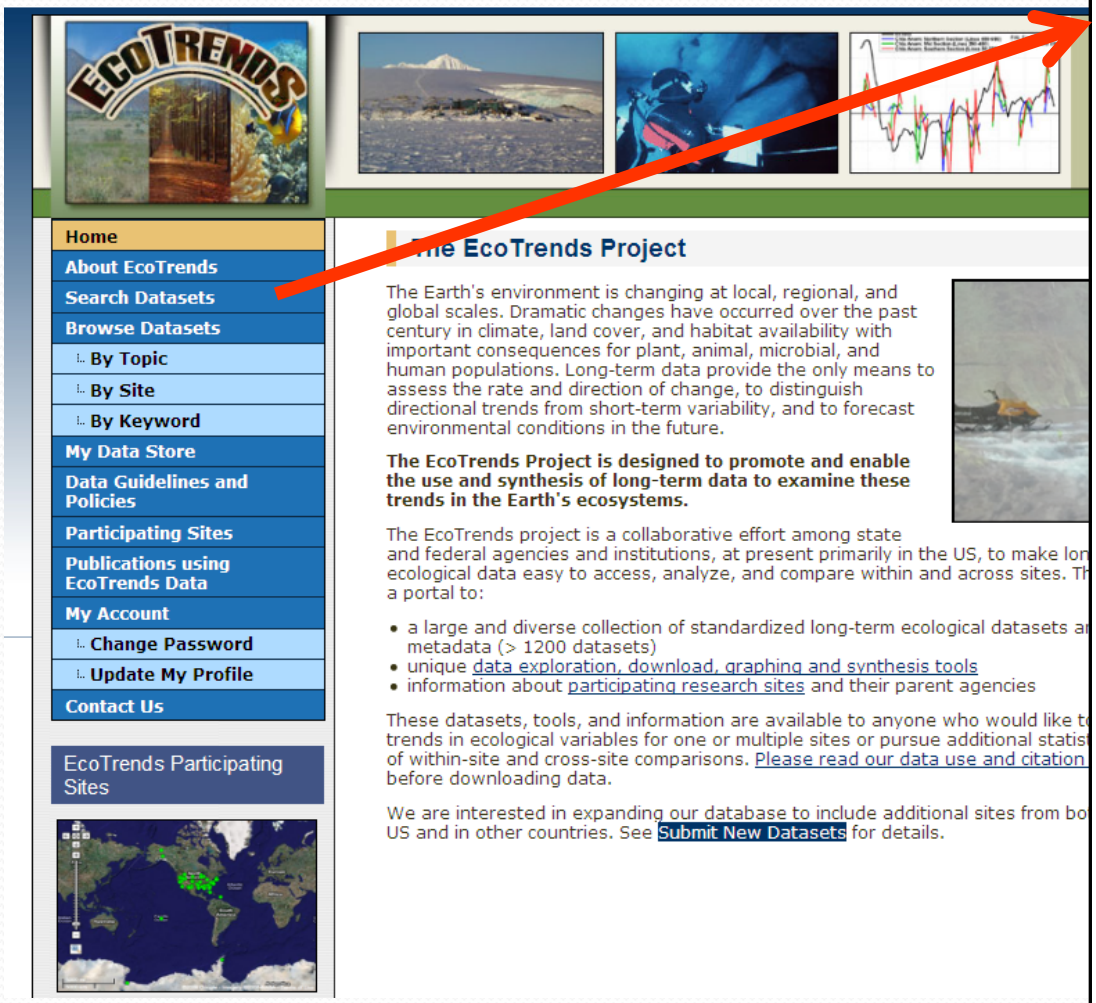


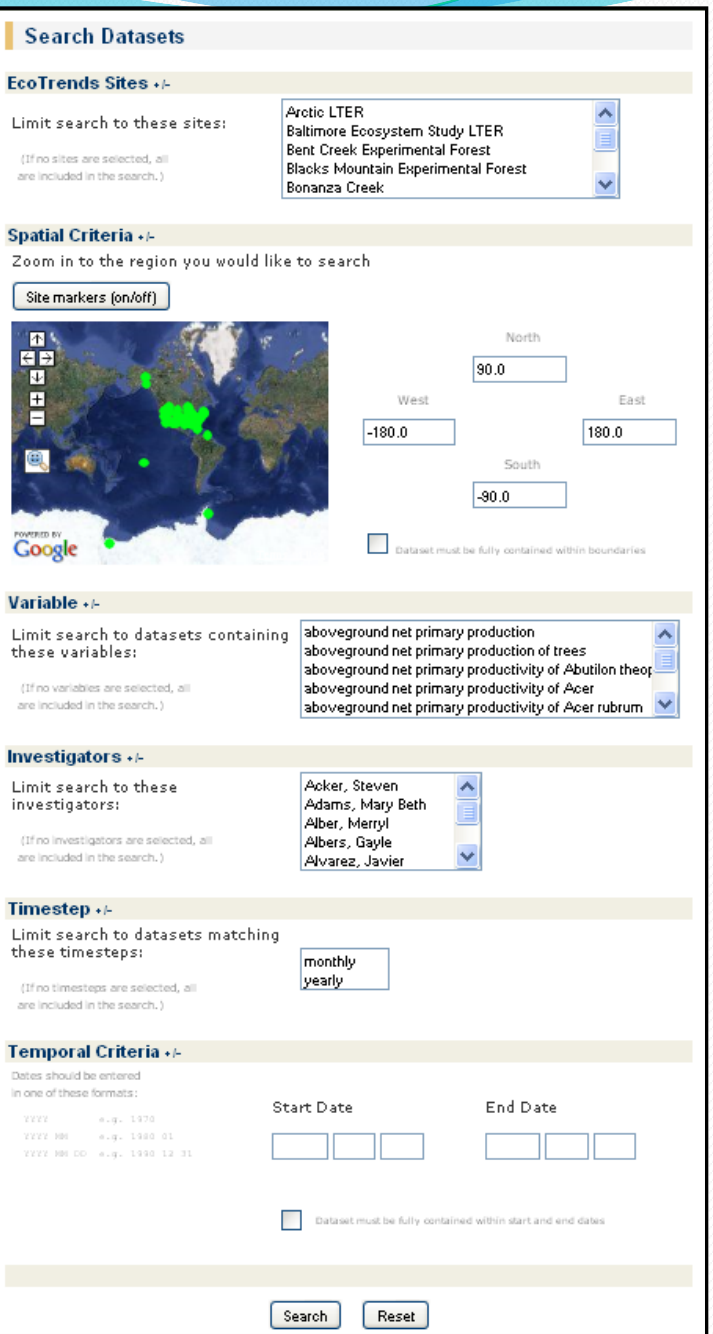
http://www.ecotrends.info/



Learning about ecosystems is a long-term process that requires data to be collected across space and over time and carefully analyzed.

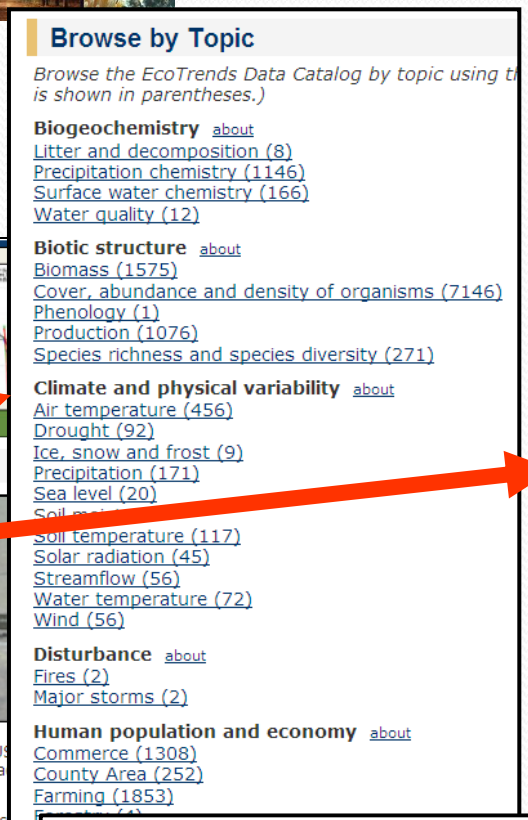
Searching

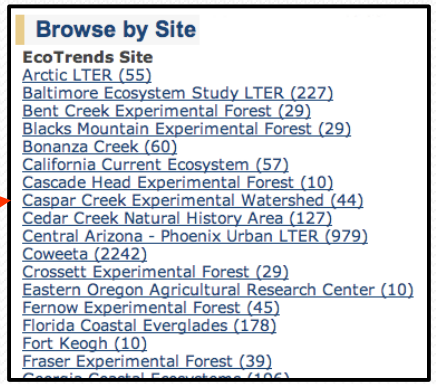

Home
About EcoTrends
Search Datasets
Browse Datasets
By Topic
By Site
By Keyword
My Data Store
Data Guidelines and Policies
Participating Sites
Publications using EcoTrends Data
My Account
Change Password
Update My Profile
Contact Us
EcoTrends Participating Sites
The EcoTrends Project
The Earth's environment is changing at local, regional, and global scales. Dramatic changes have occurred over the past century in climate, land cover, and habitat availability with important consequences for plant, animal, microbial, and human populations. Long-term data provide the only means to assess the rate and direction of change, to distinguish directional trends from short-term variability, and to forecast environmental conditions in the future.
The EcoTrends Project is designed to promote and enable the use and synthesis of long-term data to examine these trends in the Earth's ecosystems.
The EcoTrends project is a collaborative effort among state and federal agencies and institutions, at present primarily in the US, to make lon ecological data easy to access, analyze, and compare within and across sites. Th a portal to:
a large and diverse collection of standardized long-term ecological datasets ar metadata (> 1200 datasets)
unique data exploration, download, graphing and synthesis tools
information about participating research sites and their parent agencies
These datasets, tools, and information are available to anyone who would like t trends in ecological variables for one or multiple sites or pursue additional statist of within-site and cross-site comparisons. Please read our data use and citation before downloading data.
We are interested in expanding our database to include additional sites from bo US and in other countries. See Submit New Datasets for details.

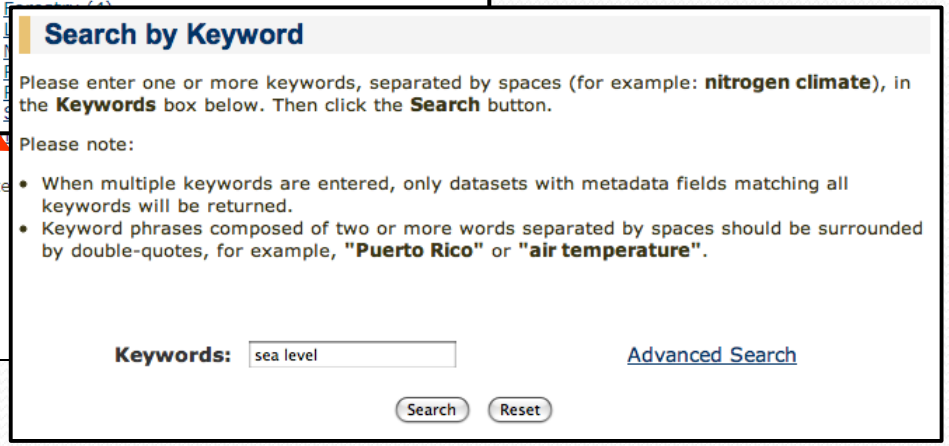

Search Datasets
EcoTrends Sites
Limit search to these sites:
(If no sites are selected, all are included in the search.)
Arctic LTER
Baltimore Ecosystem Study LTER
Bent Creek Experimental Forest
Blacks Mountain Experimental Forest
Bonanza Creek
Spatial Criteria
Zoom in to the region you would like to search
Site markers (on/off)
Google
North
90.0
West
-180.0
East
180.0
South
-90.0
Dataset must be fully contained within boundaries
Variable
Limit search to datasets containing these variables:
(If no variables are selected, all are included in the search.)
aboveground net primary production
aboveground net primary production of trees
aboveground net primary productivity of Abutilon theop
aboveground net primary productivity of Acer
aboveground net primary productivity of Acer rubrum
Investigators
Limit search to these investigators:
(If no investigators are selected, all are included in the search.)
Acker, Steven
Adams, Mary Beth
Alber, Merryl
Albers, Gayle
Alvarez, Javier
Timestep
Limit search to datasets matching these timesteps:
(If no timesteps are selected, all are included in the search.)
monthly
yearly
Temporal Criteria
Dates should be entered in one of these formats:
YYYY e.g. 1970
YYYY MM e.g. 1980 01
YYYY MM DD e.g. 1990 12 31
Start Date
End Date
Dataset must be fully contained within start and end dates
Search
Reset

Browsing


Home
About EcoTrends
Search Datasets
Browse Datasets
By Topic
By Site
By Keyword
My Data Store
Data Guidelines and Policies
Participating Sites
Publications using EcoTrends Data
My Account
Change Password
Update My Profile
Contact Us
EcoTrends Participating Sites
The EcoTrends Project

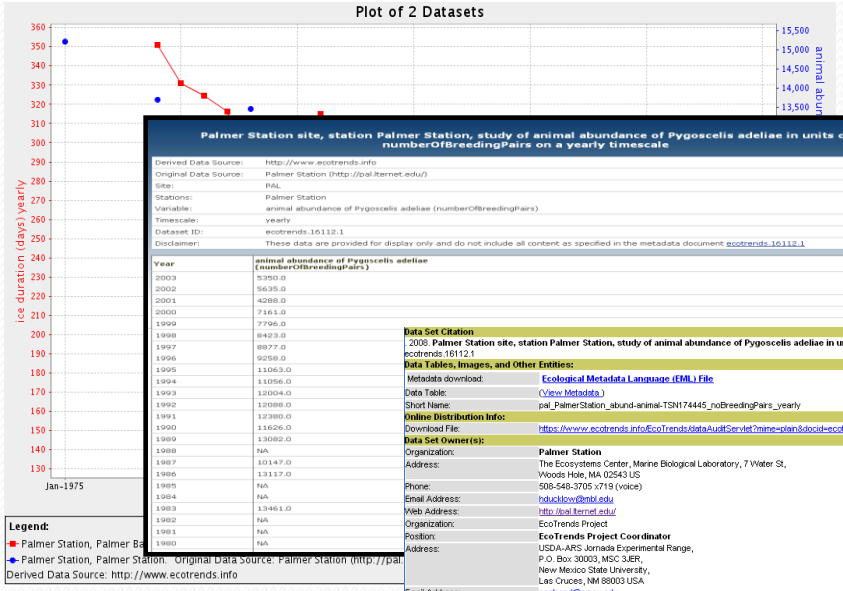

Browse by Topic
Biogeochemistry about
Litter and decomposition (8)
Precipitation chemistry (1146)
Surface water chemistry (166)
Water quality (12)
Biotic structure about
Biomass (1575)
Cover, abundance and density of organisms (7146)
Phenology (1)
Production (1076)
Species richness and species diversity (271)
Climate and physical variability about
Air temperature (456)
Drought (92)
Ice, snow and frost (9)
Precipitation (171)
Sea level (20)
Soil temperature (117)
Solar radiation (45)
Streamflow (56)
Water temperature (72)
Wind (56)
Disturbance about
Fires (2)
Major storms (2)
Human population and economy about
Commerce (1308)
County Area (252)
Farming (1853)

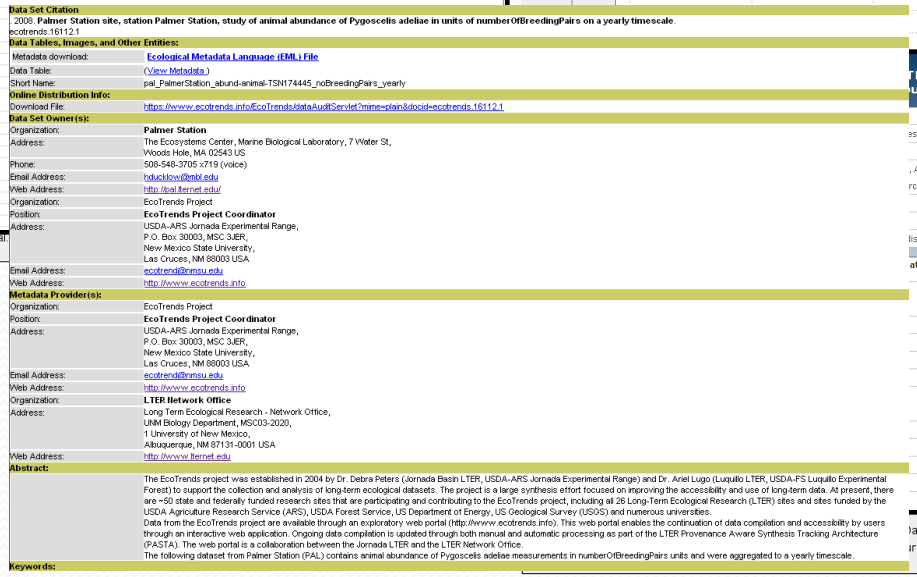

Browse by Site
EcoTrends Site
Arctic LTER (55)
Baltimore Ecosystem Study LTER (227)
Bent Creek Experimental Forest (29)
Blacks Mountain Experimental Forest (29)
Bonanza Creek (60)
California Current Ecosystem (57)
Cascade Head Experimental Forest (10)
Caspar Creek Experimental Watershed (44)
Cedar Creek Natural History Area (127)
Central Arizona - Phoenix Urban LTER (979)
Coweeta (2242)
Crossett Experimental Forest (29)
Eastern Oregon Agricultural Research Center (10)
Fernow Experimental Forest (45)
Florida Coastal Everglades (178)
Fort Keogh (10)
Fraser Experimental Forest (39)


Search by Keyword
Please enter one or more keywords, separated by spaces (for example: nitrogen climate), in the Keywords box below. Then click the Search button.
Please note:
When multiple keywords are entered, only datasets with metadata fields matching all keywords will be returned.
Keyword phrases composed of two or more words separated by spaces should be surrounded by double-quotes, for example, "Puerto Rico" or "air temperature".
Keywords:
sea level
Advanced Search
Search
Reset

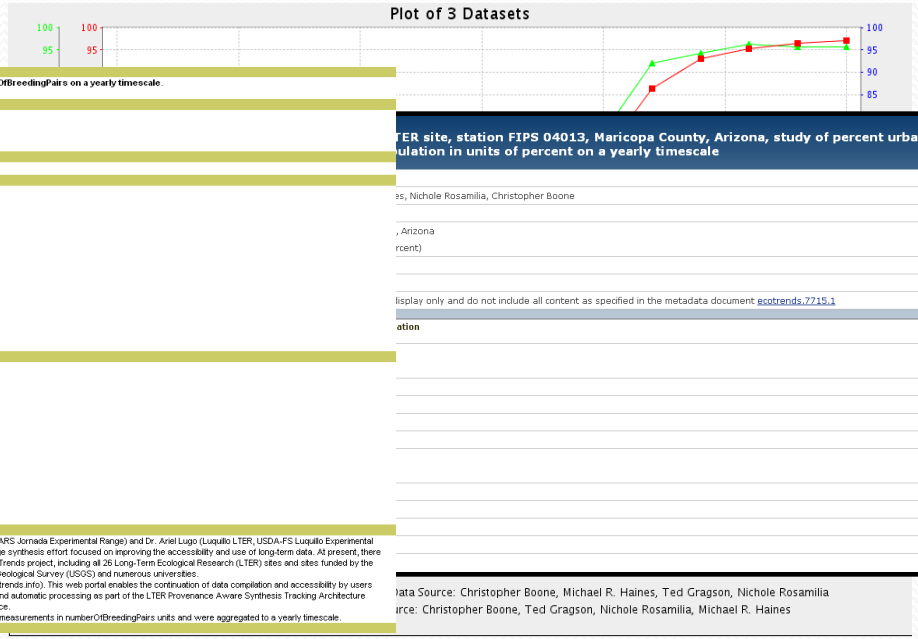
Aggregated data allow for quick comparison

Palmer Station (Antarctica) – Ice duration vs. Adelie penguin population





Percent urban population in 3 southwestern counties



Opportunities for educators

- Find datasets for classroom quickly
- Provide a quick survey of the US across latitude, longitude, and temperature gradients.
- Students have the opportunity to quickly
  - develop hypotheses
  - find and explore data (online and via download)
  - discuss implications of comparing data within and between sites (methodologies, contextual information)
- Discuss the importance of metadata creation and comparison – which datasets should be compared? What are the rights of the data providers?

Next steps

- Finish data-checking with sites, launch website, publish book
- Improve search and view interfaces
- Improve underlying architecture to better represent the original datasets
- Add new sites and data
- Partner with educators to design new curriculum?

Acknowledgements

- Dr. Debra Peters (EcoTrends Project Leader)
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- U.S. National Science Foundation DEB-0080412 and DEB-0236154