

LANDSCAPE CONSERVATION COOPERATIVES



Best Practices Approach to Data Management

"Defining Conservation for the 21st Century"

2012 National Workshop Denver, Colorado

ensuring
maximum efficiency of LCC conservation delivery

data is the currency of science...

Today's Objectives



1. Update on the LCC Network Data, Tools, and Information Management Working Group
2. Partner perspectives on data management

LCC Network Data, Tools, and Information Management Working Group



Charge:

Determine if there is a need for an LCC network scale geospatial data management and sharing system.

Initial Task:

Create a LCC Data Management Best Practices Guide that provides comprehensive guidance for our partners across-LCC, yet is general enough that each LCC can customize as needed.

Target Date:

Final Draft – 1 July 2012

LCC Network Data, Tools, and Information Management Working Group

A horizontal grey arrow with diamond-shaped heads at both ends, pointing from left to right, positioned below the title.

- Sean Finn, GNLCC Science Coordinator
- Josh Bradley, Arctic LCC Data Manager
- Emily Fort, NCCWSC Data & IT Lead
- Jenn Jenkins, Arctic LCC Geospatial Specialist
- Pat Lineback, FWS R8 GIS Coordinator
- Rick Riester, FWS R2 GIS Coordinator
- BJ Richardson, FWS R5 Biologist/GIS Coord.
- Karen Murphy, Arctic LCC Coordinator

'Best Practices' Approach



- LCCs with regional autonomy
- LCC Network, in part through Working Groups, provides guidance on desired cross-LCC standards or *Best Practices*
- The trick is to ensure the guidance is compelling to Steering Committees and linked with a broad range of existing Partner practices

Sources Used Include:

- Federal Geographic Data Standards (FGDC)
- International Organization for Standardization (ISO)
- National Climate Change and Wildlife Science Center (NCCWSC)
 - Data Sharing Policy
 - Guidance on Data Management Plans
- Alaska Data Integration working group (ADIWG)
- National Science Foundation

Topics Planned for Final Draft

Best Practices for:

1. LCC Funded Science
2. Cross-LCC Data Sharing and Integration
3. LCC Interactions with the broader Info Management community

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confidence that products will be delivered in a timely manner in a format most useful to

1

Today's Lineup

Emily Fort, Nat'l Climate Change & Wildlife Science Center

Leslie Honey, NatureServe

Jim Strittholt, Conservation Biology Institute

Whitney Albright, California Dept. of Fish and Game

Tim Kern, USGS Ft. Collins Science Center



WHY?

Why invest in data management?

- Encourages data sharing
- Enables data integration
- Allows for data aggregation
- Saves time
- Simplifies research
- Protects against data loss

HOW?

How are the Climate Science Centers managing their data?

- Formed collaborative working group with representatives from CSCs, LCCs, universities, and data management experts
- Develop common policies and guidance
- Encourage use of open standards and community efforts

WHAT?

What are we doing?

- Developed data sharing policy and data management plan requirements
- Leveraging existing tools and capabilities
- Building a collaboration between many different partners

WHEN?

- All FY 2012 CSC proposals require a data management plan
- Data managers for the CSCs are being funded centrally
- Implementation and the integration of tools and capabilities is occurring during this FY

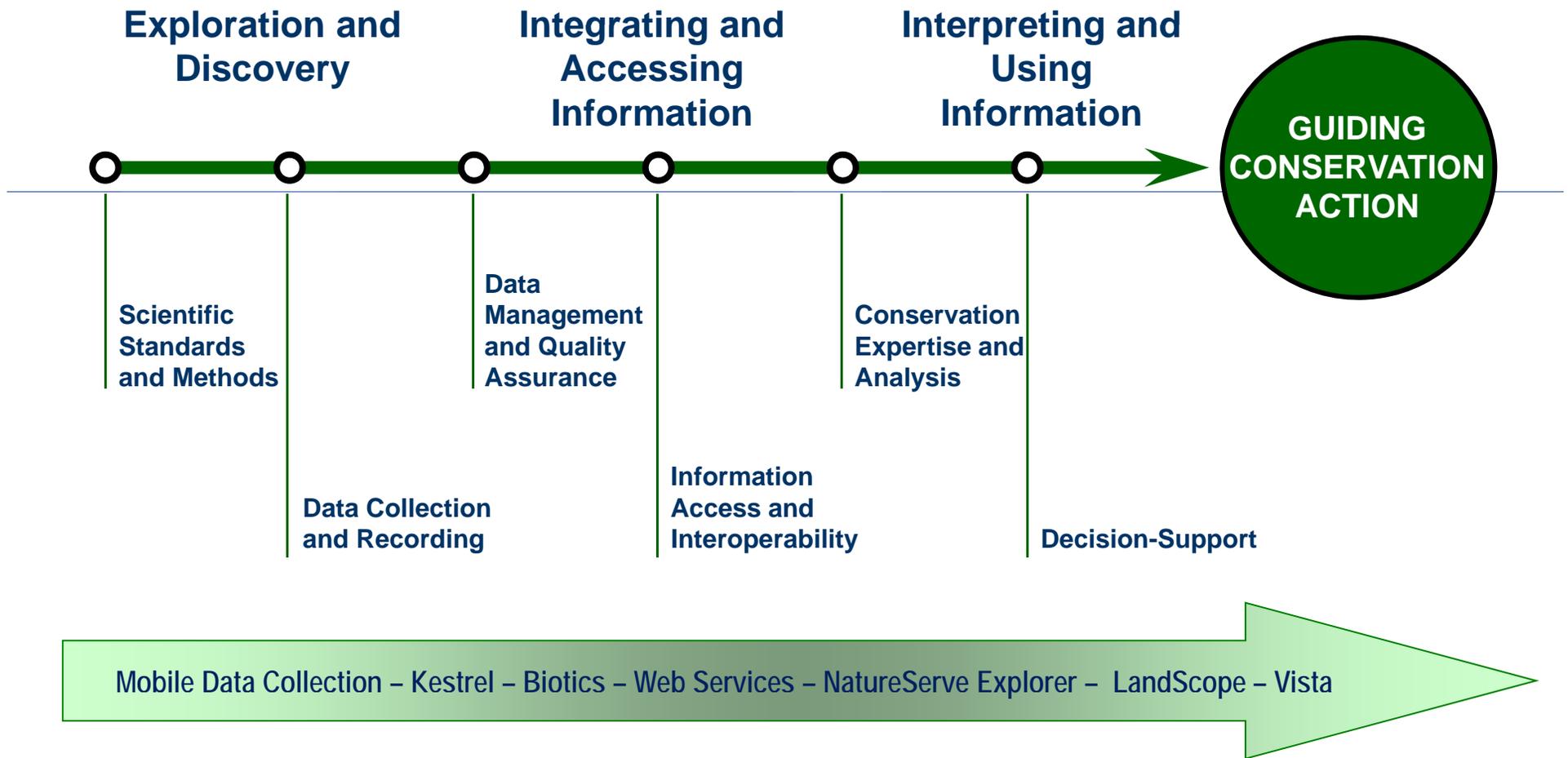
AN APPROACH TO COORDINATED DATA MANAGEMENT AND DELIVERY



NatureServe
A Network Connecting Science With Conservation

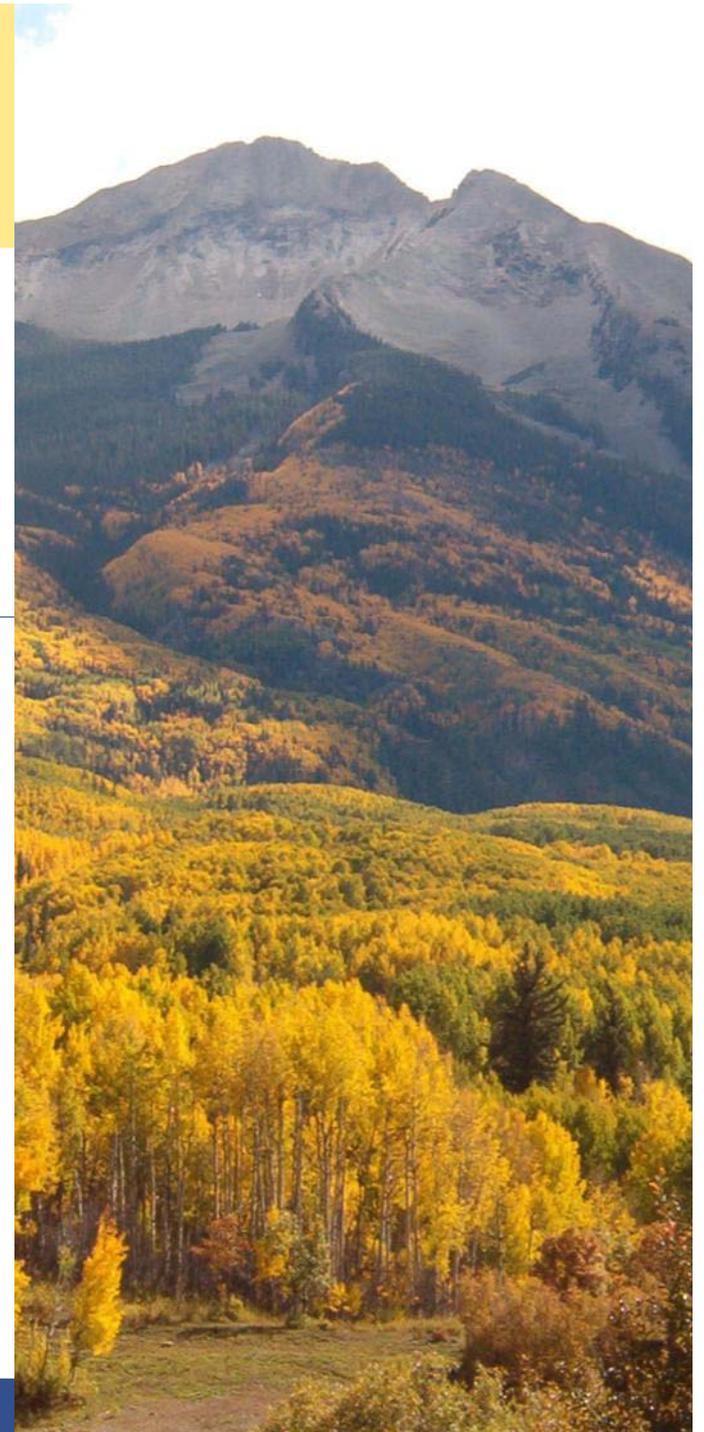
LCC National Workshop
March 28, 2012

System components work together as a fully-supported suite of products



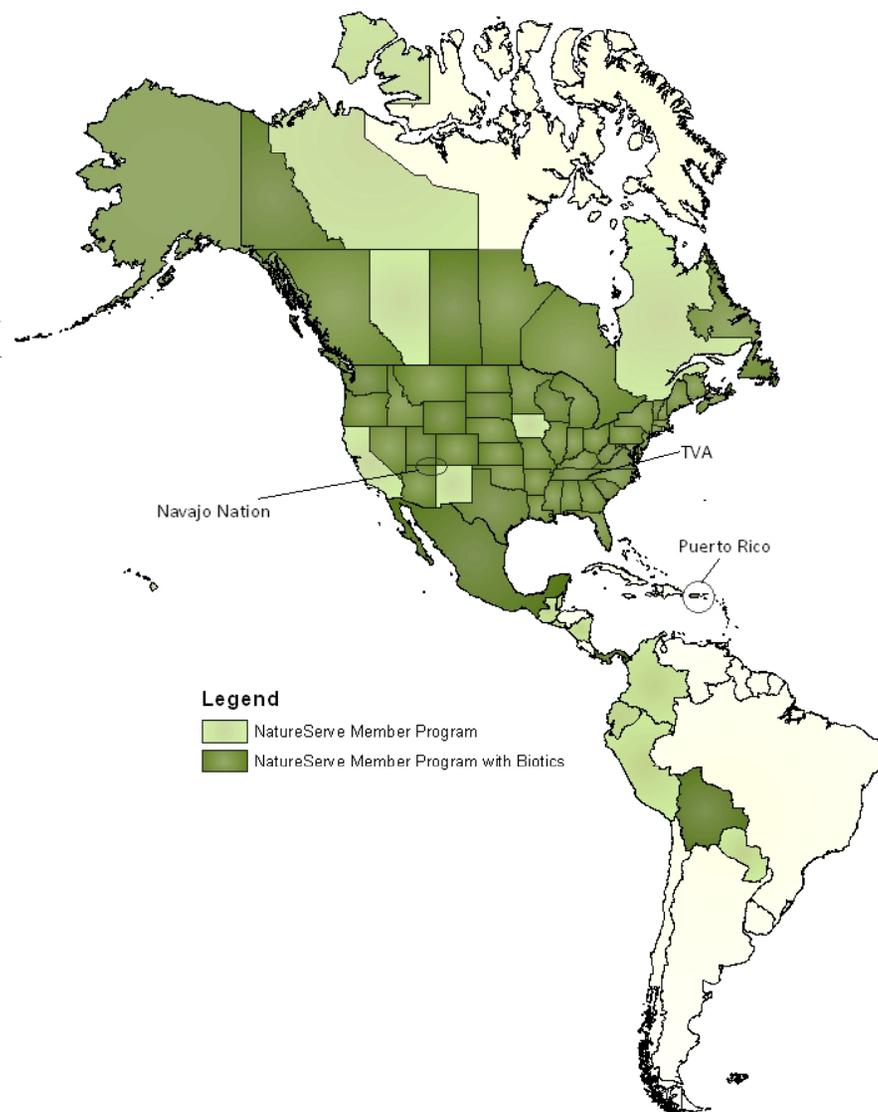
35 Yrs of Lessons Learned: Standards with flexibility

- Inter-operability & Co-Evolution is Essential
- Programs participate in standards and systems development
- Focus on standard core
- Provide ability to add custom tables and spatial data to meet local needs



Biotics User Base (Today)

- US: 46 states, TVA, Navajo Nation
- Canada: 6 provinces/territories, Parks Canada Agency
- LAC: Puerto Rico, Mexico, Bolivia, Panama



Standards Support All Components

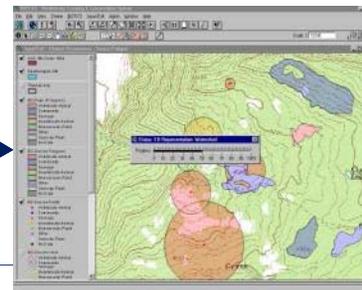
Status Assessment



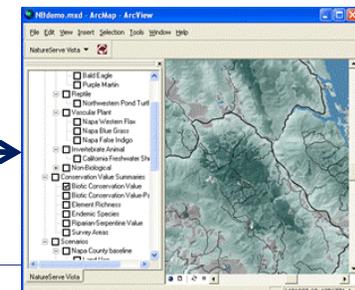
Mobile tools for field data collection



Documenting observations in Kestrel



NatureServe
BIOTICS4



NatureServe
VISTA

Information Publishing



LandScope America

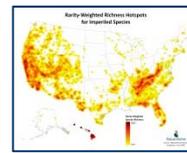


NatureServe
EXPLORER



NatureServe
SURVEYOR

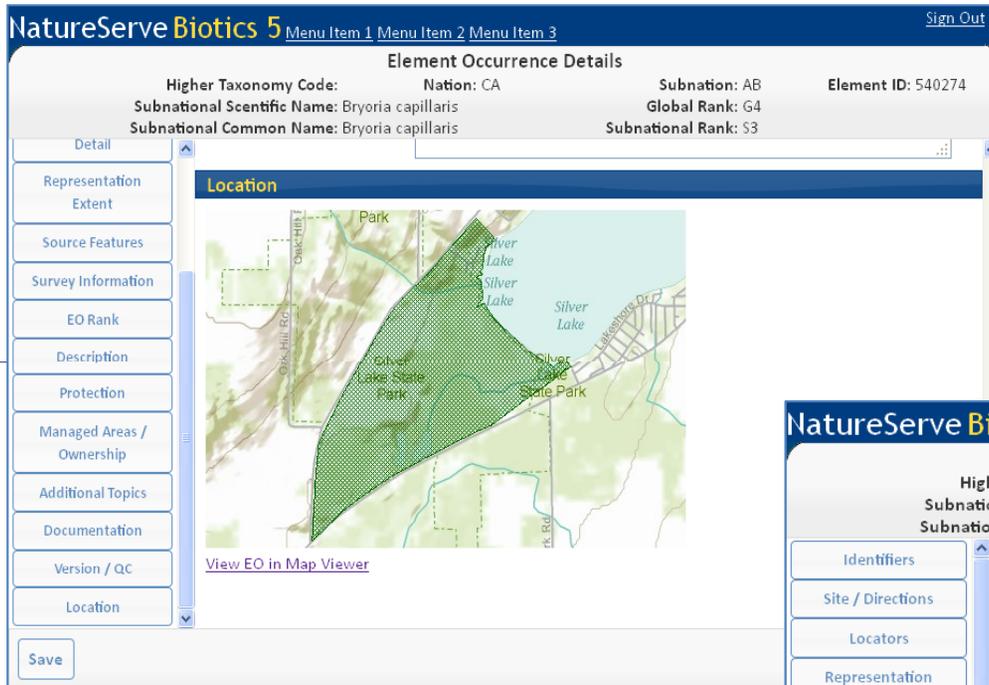
Standard Products



Information Sharing



- Hosted web application
- ArcGIS Server mapping
- Web service architecture



NatureServe Biotics 5 Menu Item 1 Menu Item 2 Menu Item 3 Sign Out

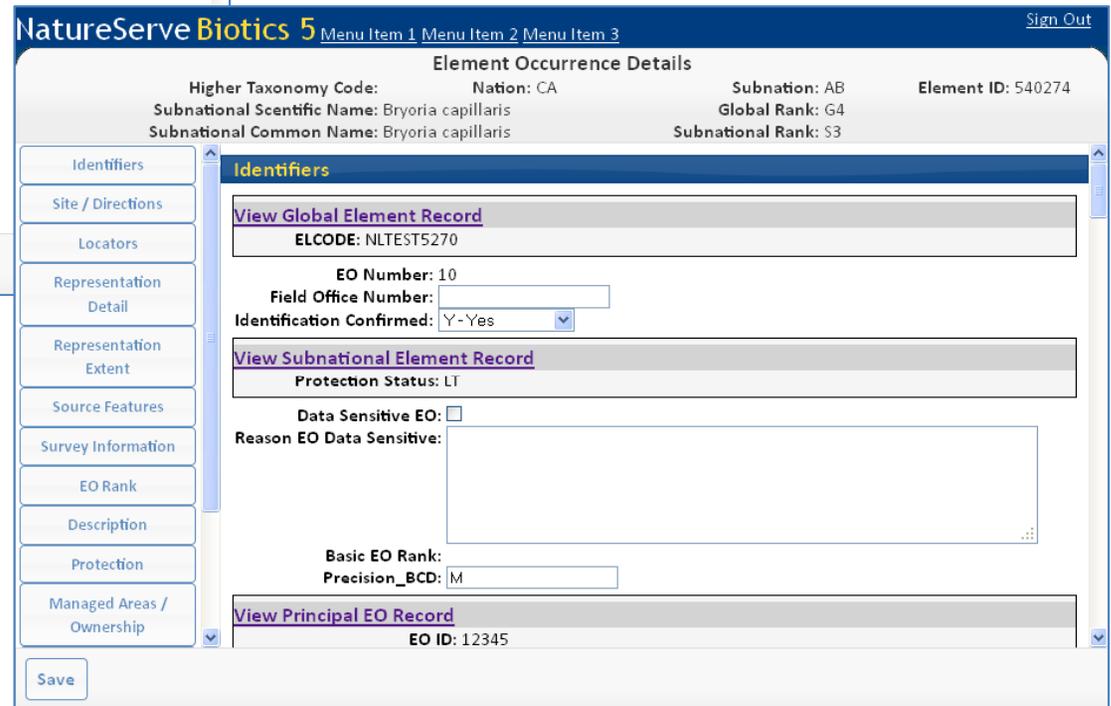
Element Occurrence Details

Higher Taxonomy Code: Nation: CA Subnation: AB Element ID: 540274
 Subnational Scientific Name: Bryoria capillaris Global Rank: G4
 Subnational Common Name: Bryoria capillaris Subnational Rank: S3

Location

View EO in Map Viewer

- Separate databases for each member program
- Streamlines spatial data workflow



NatureServe Biotics 5 Menu Item 1 Menu Item 2 Menu Item 3 Sign Out

Element Occurrence Details

Higher Taxonomy Code: Nation: CA Subnation: AB Element ID: 540274
 Subnational Scientific Name: Bryoria capillaris Global Rank: G4
 Subnational Common Name: Bryoria capillaris Subnational Rank: S3

Identifiers

[View Global Element Record](#)
 ELCODE: NLTEST5270

EO Number: 10
 Field Office Number:
 Identification Confirmed: Y-Yes

[View Subnational Element Record](#)
 Protection Status: LT

Data Sensitive EO:
 Reason EO Data Sensitive:

Basic EO Rank:
 Precision_BCD: M

[View Principal EO Record](#)
 EO ID: 12345



Tools in the Public Arena

- Provide easy access to data and information
- Support current social processes and workflows
- Encourage transparency and sharing



User Specifications

1. **Must be** easy to use
2. **Must be** available anytime, anywhere, to anyone
3. **Must be largely** controlled by the user
4. **Must** allow for customization
5. **Must be** cost-effective

Incentives

1. Credit recognized throughout the system
2. Users control level of access to content
3. Branding permitted throughout the system
4. Users publish their own work

Building Blocks



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Commission for Environmental Cooperation

Terrestrial and Marine Protected Areas for North America. [Read More.](#)



Data Basin Centers

Data Basin Centers provide focused datasets, maps, galleries, people, and working groups on specific topics or geographies that facilitate more effective collaboration.



The Climate Center

The Data Basin Climate Center centralizes critical climate change datasets and findings about impacts, trends or predicted future scenarios at local and regional scales. [Visit the Climate Center.](#)



Boreal Information Centre

The Boreal Information Centre contains high-quality geospatial datasets and information to aid management of the North American boreal forest biome. [Visit the Boreal Centre.](#)



Aquatic Conservation Center

The Aquatic Conservation Center contains data, tools, and experts working to increase the resilience of freshwater and marine biodiversity. [Visit the Aquatic Center.](#)



Protected Areas Center

The Data Basin Protected Areas Center centralizes

About Data Basin

Building Blocks

Tell Your Story

Participate

Bridging Conservation Science and Practice

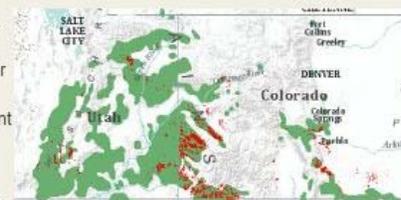
Data Basin is an online system that connects users with spatial datasets, tools, and a network of scientists and practitioners.

You can explore and download a vast library of datasets, connect to external data sources, upload and publish your own datasets, connect to experts, create working groups, and produce customized maps that can be easily shared. Click on [Join Now](#) to set up your free Data Basin user account.



Spotlight: Massive Die-off of Pinyon Pine

Regional aerial surveys conducted by the U.S. Forest Service confirm that there has been widespread mortality of Pinyon pine (in the four corners area (CO, NM, AZ, UT). Compared to the drought of the 1950s that caused significant ponderosa and pinyon pines mortality, the recent drought (1999-2009) in the southwest US was even warmer (Breshears et al. 2005).



Data Basin Centers

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The Protected Areas Center



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Spotlight

New Release of PAD-US 1.1 (CBI Edition)

PAD-US 1.1 (CBI Edition) provides a rich picture of protected area coverage useful at a variety of scales. This version of PAD-US should substantially improve our national inventory of protected lands. [Read More.](#)



→ Click here to read more about PAD-US 1.1 (CBI Edition)

Recent Blog Posts

Why is a Protected Areas Database Important?

Protected areas are important to each person in their own way. It is a special spot, a rare habitat or unique ecosystem, we all have our reasons for caring. While I care deeply about the intrinsic value of protected areas, I also care about the data that helps us catalog these places...

[Read More](#)

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The Boreal Information Centre



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Spotlight

The Last Great Intact Forests of Canada

The Boreal Information Centre is hosting Global Forest Watch Canada's Atlas of Alberta: The Last Great Intact Forests of Canada. The Atlas shows Alberta's last intact forest landscapes and looks at some of their key conservation values, as well as key indicators of threats to their future conservation. [Read more.](#)



→ Read more.

Recent Blog Posts

Sharing, Interpreting and Visualizing

One of the most pervasive barriers to conservation effectiveness has always been the lack of capacity in our community for easily sharing, interpreting, and visualizing complex ecological information, and our stories have suffered for it. In...

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The Climate Center



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Watershed Resilience

What can we learn from a case study in Washington State? [Read More.](#)



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Spotlight

Participatory Forest Modeling

The forests of northern Minnesota contain many species that are at the southern most range of the boreal forest, making them vulnerable to changes in climate. Data Basin is being used to facilitate the formulation and delivery of climate science to managers and practitioners. [Read more.](#)



→ Spotlight

Recent Blog Posts

Welcome to the Data Basin Climate Center

In this era of highly politicized debate about climate change, where the scientific exchange of ideas has become so polarized, it has become critical to make observations and simulations of climate-related information available. To quote A. Conan Doyle Sr., "It is a capital mistake to theorize..."

[Read More](#)

About the Climate Center

The Data Basin Climate Center centralizes critical climate change-related datasets and findings. Tools are provided to visualize, analyze, and communicate about vulnerabilities, trends or predicted future scenarios at local and regional scales. The Climate Center is working to increase the resistance and resilience of biodiversity in a climate-altered future by building collective understanding of the potential biological, physical, and cultural impacts. [Read more.](#)

The Data Basin Climate Center was built in collaboration with the Climate Adaptation Knowledge Exchange (CAKE). CAKE supports individuals interested in developing the discipline of adaptation to climate change. CAKE is an online destination built by EcoAdapt and Island Press that provide the best information and tools to those working on the ground. To help users take action, CAKE provides detailed case studies, a directory of experts, exchange forums, and links to community building tools. [Read more.](#)



Climate Content in Data Basin

Datasets

→ View More

- Simulated potential PNW vegetation map under MIROC 3.2 medres general circulation model run with the A2 SRES emission scenario (2070-1099 mode) using the MC1 dynamic global vegetation model

Maps

→ View More

- Yosemite Vegetation Shifts from the 1930s to 1997
- Vegetation type shifts in PNW under 3 climate change scenarios
- Potential Vegetation Shifts over GPNF restoration priority areas

Data Basin Gateways



FSC-US CONTROLLED WOOD RESOURCE GATEWAY

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Inter-American Biodiversity Information Network

DATA INTEGRATION & ANALYSIS GATEWAY

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Yale Mapping Framework

INTEGRATING CLIMATE ADAPTATION AND LANDSCAPE CONSERVATION PLANNING

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FSC-US Gateway



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IABIN Gateway



- About the DIAG
- Content Types
- How to Use the DIAG

IABIN DIAG

Data Integration & Analysis Gateway

Resource Center

FSC Controlled Wood Criteria

Legality

Traditional & Civil Rights

High Conservation Values

Forest Conversion

GMO

FSC-US Documents

FSC-US Controlled Wood

Standard (Company Evaluation of Controlled Wood)

FSC Principles & Criteria

FSC-US Forest Management Standard

FSC-US Fact Sheet

Thematic Networks

Ecosystems

Invasive Species

Pollinators

Protected Areas

Species & Specimens

IABIN DIAG

IABIN was created in 1996 as an initiative of gaining momentum, there are now 34 countries endorsed by governments, NGOs, universities, and IABIN.

IABIN will provide the networking information content required by the countries of the Americas for human development and biodiversity conservation. IABIN is a scientifically credible biodiversity information network that provides government organizations, museums, botanic gardens, and other organizations with the information process, coordinate catalogues and directories, electronic mailing, lists and Web sites, coordinate organizations, and support the efforts of IABIN.

All content developed by IADIN is open and available.

Coordinating Institutions:

The Coordinating Institution for the Ecosystems members of the consortium are:

- Centro Internacional para el Desarrollo Sostenible
- Instituto de Investigación de Recursos Biológicos Alexander von Humboldt
- Museo Argentino de Ciencias Naturales "Bernabé Uribe Cura"
- NatureServe (USA)
- Smithsonian Tropical Research Institute
- The Nature Conservancy - TNC (USA)

Framework Overview

Using the Framework

Pilot Projects

Adaptation Objectives

Approaches and Tools

Supporting Data

About the Framework

Glossary

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Overview

The Challenge

Debates about anthropogenic origins aside, scientific evidence demonstrates that the Earth's climate is changing. Many species are responding to this changing climate by shifting their geographic ranges. The differential rates at which species will shift their ranges will also result in a reshuffling of species relationships, ecological processes, and related ecosystem services.

As a result, conservation planners are now faced with the challenge of developing and implementing strategies that will support wildlife to adapt to climate change. The large number and diversity of models and data that can be applied to climate-impact analyses and adaptation strategies can often be confusing.

The Framework

Recognizing a need for clarity within this field, the Yale School of Forestry & Environmental Studies convened a working group of the nation's leading conservation biologists, modelers, and policymakers to develop guidance for integrating climate-change adaptation strategies into the context of natural-resource planning and policymaking.

...assists in selecting the assessment and modeling strategies that are most relevant to specific needs...

The product of this working group—the Yale Framework—assists conservation planners in selecting the assessment and modeling strategies that are most relevant to their specific needs. Rather than supplanting existing techniques, the Yale Framework provides simplified and flexible advice on models and data, and presents a list of commonly used datasets that can be helpful to planners. The Framework also provides a structured menu of options that assist resource managers in determining the best possible approach to conservation, as opposed to offering a prescriptive approach to natural resource management.

Data Basin and the Framework

The Yale Mapping Framework has been built using the Data Basin platform. Data Basin makes it simple to find reliable data and make compelling visualizations. Planners can locate datasets, combine multiple layers together in a visualization session, and then share maps with their colleagues. With the Data Basin data and tools, planners have everything they need to make their assessments.

How the Framework Helps Planners



A view from the field: How an LCC might integrate with ongoing data delivery processes

Tom Lupo and Whitney Albright
California Department of Fish and Game
National LCC Workshop
March 28, 2012



Data Management at CA DFG

- ◆ Who: Biogeographic Data Branch
- ◆ How: Open and transparent practices

Biogeographic Information and Observation Systems (BIOS)

- ◆ System for archiving, viewing, and facilitating sharing of biogeographic information

California Department of Fish & Game, Biogeographic Information and Observation System (BIOS) - Windows Internet Explorer

http://bios.dfg.ca.gov/

DEPARTMENT OF FISH AND GAME

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Data Portal | Document Library | BIOS | Biogeographic Data

DFG GIS LINKS

- BIOS Home
- Biogeographic Data Branch
- IMAPS Map Viewers
- DFG's Data Portal

Other GIS Links

- Cal-Atlas Geospatial Clearinghouse
- California Environmental Resources Evaluation System (CERES)

Other Links

- CalFish

Home → BDB → BIOS Home

BIOS

BIOGEOGRAPHIC INFORMATION & OBSERVATION SYSTEM

BIOS is a system designed to enable the management, visualization, and analysis of biogeographic data collected by the Department of Fish and Game and its [Partner Organizations](#). In addition, BIOS facilitates the sharing of those data within the BIOS community. BIOS integrates GIS, relational database management, and ESRI's ArcIMS and ArcGIS Server technologies to create a statewide, integrated information management tool that can be used on any computer with access to the Internet.

Public BIOS Data Viewer - BETA Updated on 01/20/2012: Try our latest BIOS product. It's Beta, so not all functionality is there yet, but it's coming. Send comments to [BIOS](#).

Public BIOS Data Viewer Open to the public - only non-sensitive data are included.

Secure BIOS Data Viewer Password required - for DFG Personnel and Authorized Partners only.

CNDDB & Spotted Owl Data Viewer Password required - for DFG Personnel and [CNDDB Subscribers](#); for current CNDDB password, please call (916) 324-3812.

Password Management:

If you're getting warnings about your password expiring, and need to change it, go to [NRM Password Management](#) for changes.

Non-DFG user accounts expire every year, and need to be manually refreshed. If you think your account has expired, please contact the [DFG Staff](#).

BIOS <http://bios.dfg.ca.gov/>

CalFish.org

Link to
BIOS Viewer

CALFISH A CALIFORNIA COOPERATIVE ANADROMOUS FISH AND HABITAT DATA PROGRAM

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Friday, October 24, 2008 ...: Home ... [Register](#) [Login](#)

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Welcome to CalFish

CalFish is a multi-agency cooperative program designed to gather, maintain, and disseminate fish and aquatic habitat data and data standards.

Two-Fold Mission:

To create, maintain, and enhance high quality, consistent data that are directly applicable to policy, planning, management, research, and recovery of anadromous fish and related aquatic resources in California; and

To provide data and information services in a timely manner in formats that meet the needs of users.

Site Designed by CDFG NCNR-15B [Terms Of Use](#) [Privacy Statement](#)

Data Interpretation



Areas of Conservation Emphasis (ACE)

The screenshot shows a Mozilla Firefox browser window displaying the Department of Fish and Game's ACE-II website. The browser's address bar shows the URL www.dfg.ca.gov/biogeodata/ace/. The website header features the "CA.GOV FISH AND GAME" logo and a navigation menu with links for Home, Recreation, Resource Management, Enforcement, Marine, Spills, Education, Publications, and Data & Maps. A search bar is located in the top right corner.

The main content area is titled "Areas of Conservation Emphasis (ACE-II)" and includes the following text:

Areas of Conservation Emphasis (ACE-II) is a Department of Fish and Game project that was begun in 2009 to provide data to help guide and inform conservation priorities in California.

The purpose of ACE-II was to:

- Compile and analyze the best available statewide, spatial information on California's biological richness, including species diversity, rarity, and sensitive habitats,
- Collect information on recreational needs and opportunities throughout the state, including fishing, hunting and wildlife-viewing,
- Develop a set of tools and produce maps that summarize and display this information for use in conservation decision-making, and
- Integrate these data into a spatial model that can be used to identify areas of biological or conservation interest throughout the state.

ACE-II provides an easily-accessible and standardized way to view the best available statewide data on California's biological richness and biodiversity. These [datasets](#) have many uses ranging from ecological research and modeling to local land-use planning and conservation decision making. The ACE-II data are dynamic and will be updated periodically as new data warrant.

Products

ACE-II Viewer **DFG Map Viewers are best viewed using Firefox, Chrome, Safari, or Internet Explorer 9.** The ACE-II Viewer is an on-line, interactive map interface for displaying and manipulating the ACE-II maps, data, and model results. The viewer includes additional spatial data such as stressors, protected status of lands, and connectivity and corridors that can be overlaid on the ACE-II data layers. The viewer tool allows the user to display and contrast the arrangement and relative value of California's unique biological resources, providing a first step toward setting conservation priorities statewide.

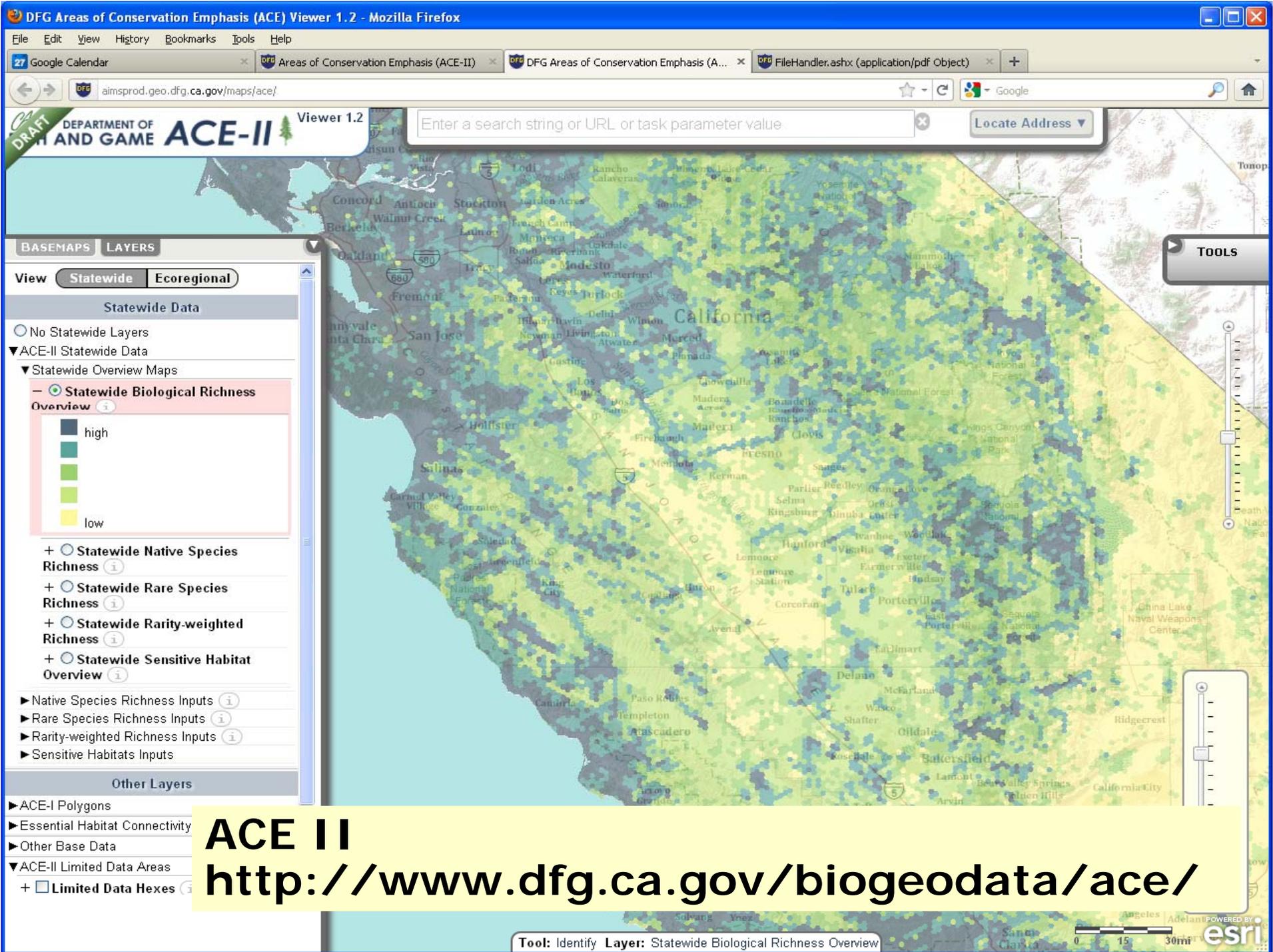
ACE-II Viewer - DFG Only

- **Weighted-additive model interface:** A component of the ACE-II Interactive Viewer that allows the user to adjust the weights of the various layers and display a customized model result.
- **GIS Data:** All spatial data layers can be displayed in the viewer or are available upon request.
- **Ecoregional Model:** Model results depicting relative biological richness within each USDA Ecoregion Section can be displayed in the viewer or are available upon request.

Reports and Further Information

- [PDF] [ACE-II Project Report](#): detailed summary of the process and datasets developed
- [PDF] [Frequently Asked Questions \(FAQ\)](#)
- [PDF] [ACE-II Uses and Limitations](#)
- [PDF] [Biological Index Model Flow Chart](#)
- [PDF] [ACE-II Interactive Viewer User Guide](#)

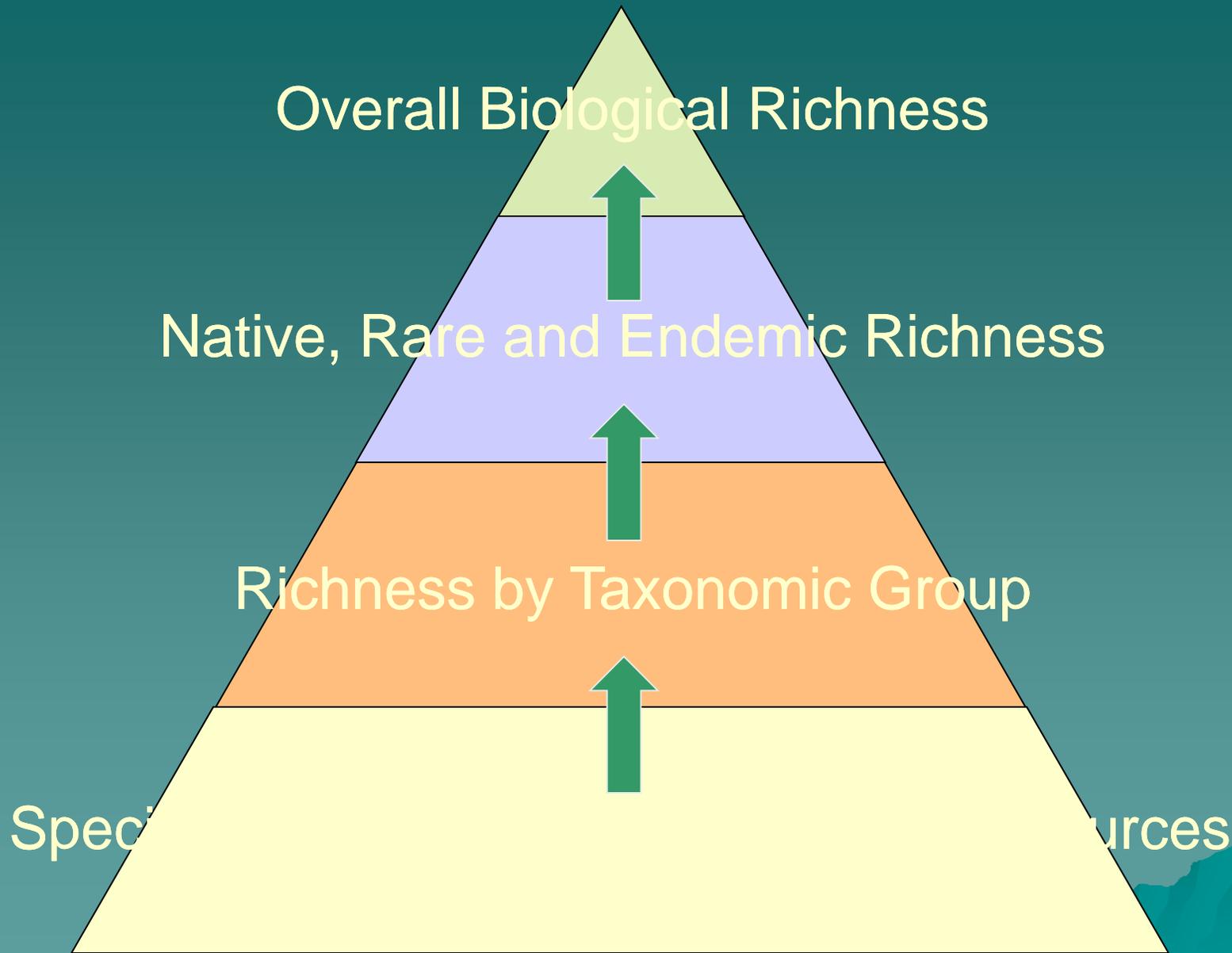
On the left side of the page, there is a "BDB PROGRAMS" sidebar with a list of links: ACE-II, BIOS, Vegetation Classification and Mapping Program, CNDDDB, CWHR, GIS Services, Data Products, Support, About BDB, Staff, and Partners. Below this sidebar is an Adobe Reader logo and contact information for the Department of Fish & Game Biogeographic Data Branch: 1807 13th Street, Suite 202, Sacramento, CA 95811, (916) 322-2493 • Email BDB.



ACE II

<http://www.dfg.ca.gov/biogeodata/ace/>

Tool: Identify Layer: Statewide Biological Richness Overview



Summary: Potential roles of the LCC

- ◆ Support generation of interpretive data layers and tools
- ◆ Support investment in foundational data
- ◆ Work with states and partner agencies to maintain similar data standards and practices



**Landscape Conservation
Management & Analysis Portal**



[LC MAP](#)

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wilsonl@usgs.gov

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Data Integration and Management Option: Landscape Conservation Management and Analysis Portal (LC MAP)

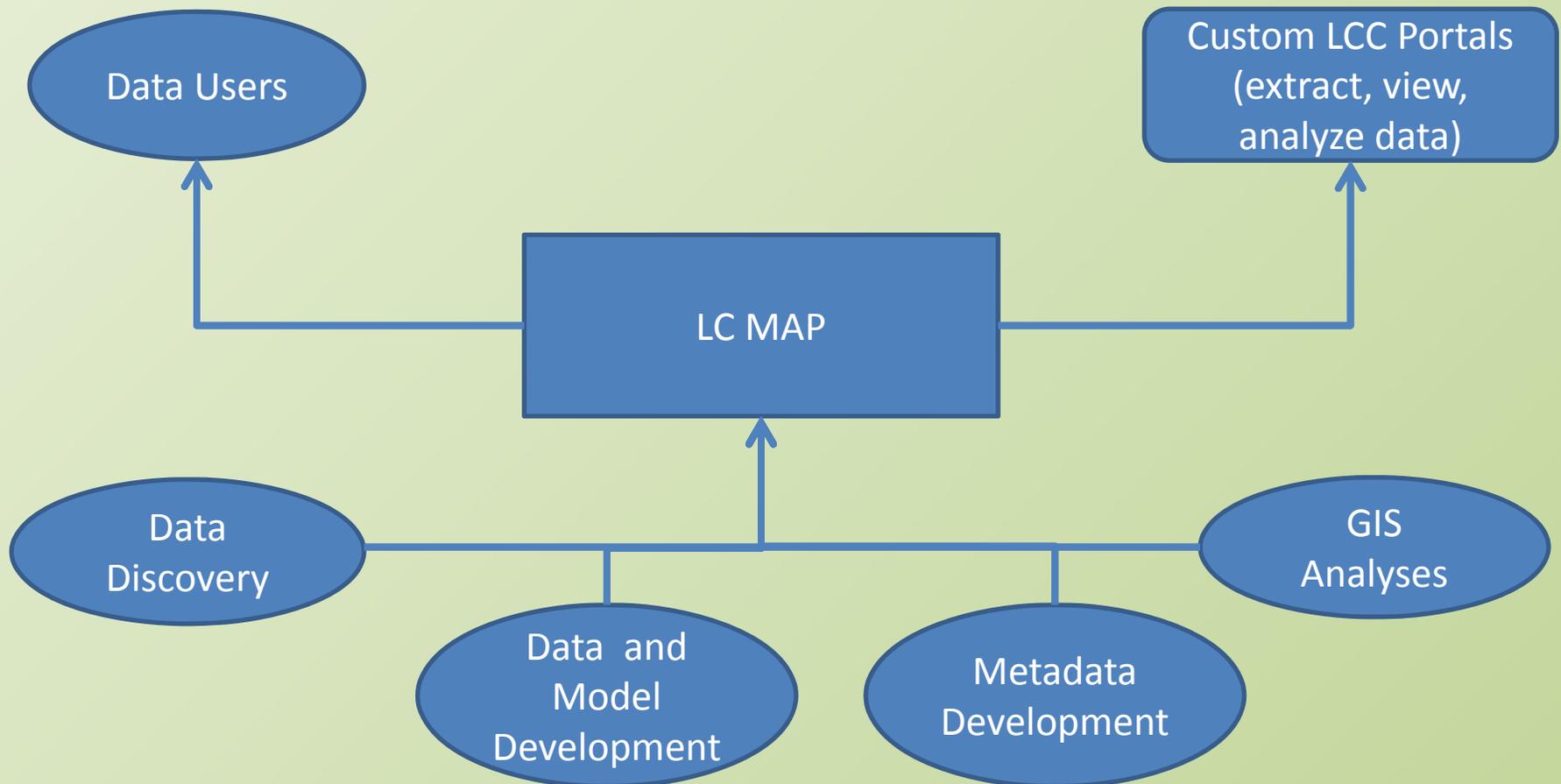
LC MAP Rationale

- In multiple talking sessions, researchers expressed a need for a collaborative scientific data and information management platform for use by scientific communities
- Researchers found few existing projects that focused on the needs of science projects, especially helping projects store and share resources across agency administrative bounds
- Scientists and specialists complained about too many inter-agency hurdles to find and share scientific resources

LC MAP

How Does LC MAP Address These Goals

LCC partners from multiple organizations can collaboratively assess and analyze common data in near real time, significantly speeding the transfer of scientific knowledge to management actions



LC MAP

How Does This Help With Data Management

- Each LCC can use LC MAP to keep track of all data products, either by adding them to the repository or by cataloging what repository houses them; it also lets LCC-based projects build derivative datasets, track versions, and build metadata
- Each LCC controls their own spaces – who can work with data, who can access data, when these data can be distributed
- All LCCs can find data that other LCCs are working on
- The system takes care of all the annoying data protection and policy pieces; scientists can concentrate on project goals.

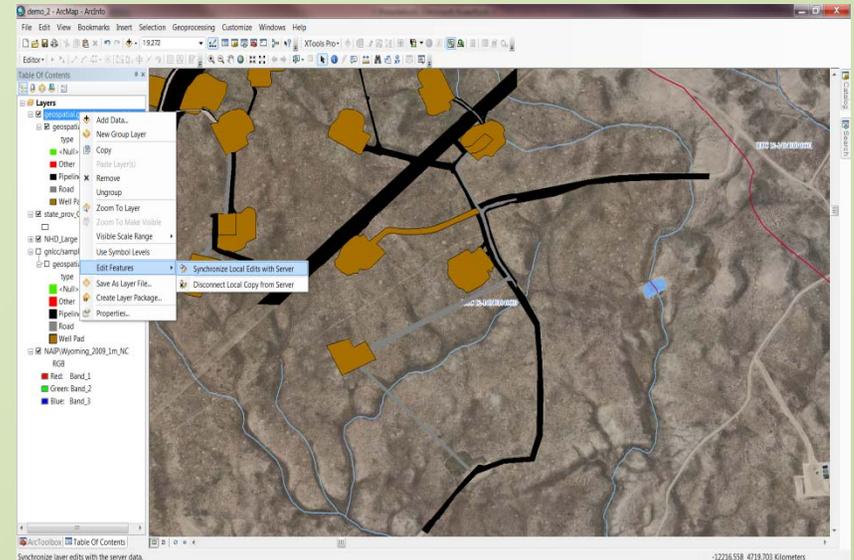
LC MAP

Dataset Collaboration

LC MAP lets GIS analysts access geospatial datasets through their ArcGIS desktops. Community members can develop derivative datasets from uploaded themes or just use data in analyses

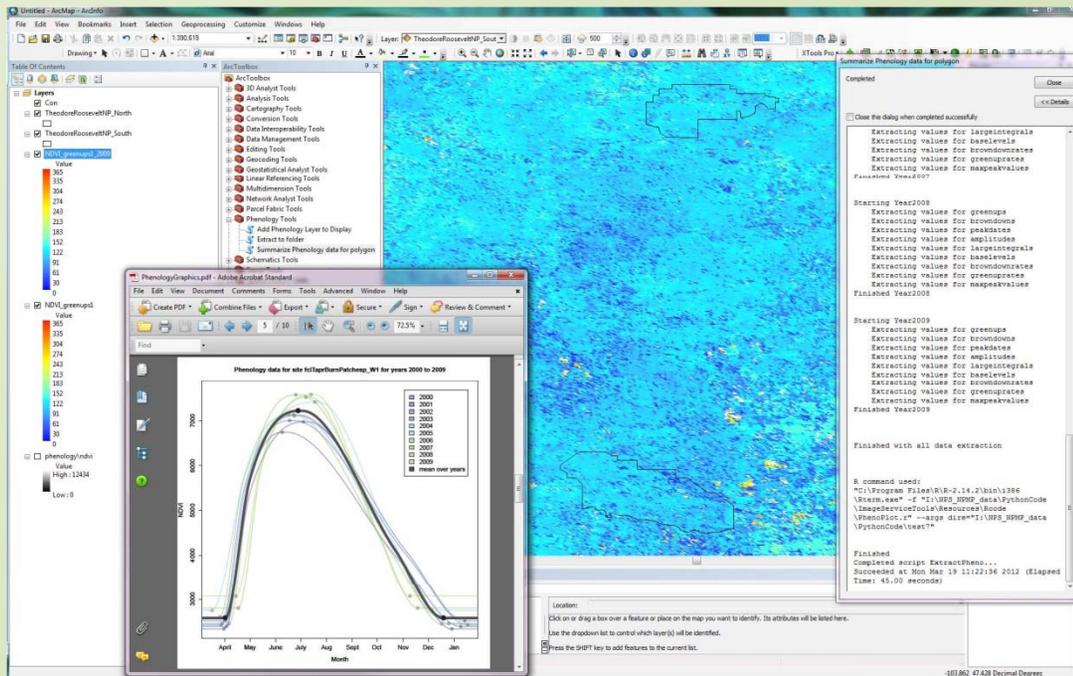
Example Use

- LCC cooperators upload original data into the Repository
- LCC GIS analysts use the ArcGIS Share to edgematch
- System captures all versions and changes, and helps group develop and complete metadata
- LCC managers determine release rules



LC MAP Data Analysis

- Each LCC can set up space for source datasets, model components, scripts, workflow tracking tools, and metadata
- Modelers and analysts can collaborate on model workflows, upload model outputs, then repeat and evaluate runs



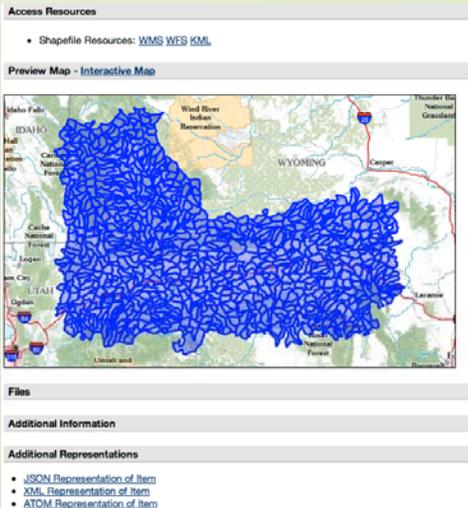
Example Use

- GNLC loads national phenology, ArcGIS toolkit with embedded R model
- Modelers from all LCCs can connect from their desktop systems, access components, run model, and upload outputs

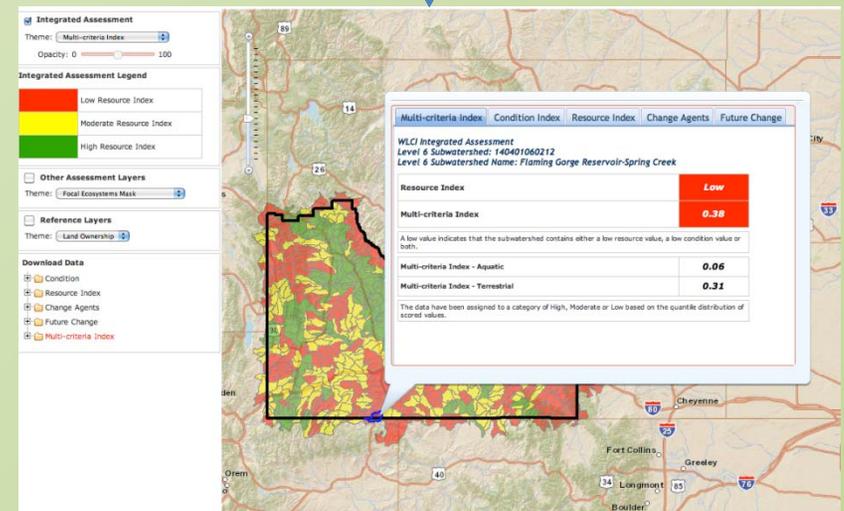
LC MAP

Use By LCC Portals

Items stored in LC MAP (datasets, files, metadata, information articles, ...) have a number of Web services automatically generated when published



Custom LCC portals and power users access these services to present these items as requested by their users or needed by their analyses



Thank You



Emily Fort: efort@usgs.gov

Leslie Honey: Leslie_Honey@naturereserve.org

Jim Strittholt: stritt@consbio.org

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