



# Great Basin LCC Webinar Series

Is that what you need? Direct feedback helps climate change information exchange





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# Is this what you need? Direct feedback help climate change information exchange

D. Bachelet, M. Brown, M. Gough, Barry Baker  
Conservation Biology Institute



[www.theglobeandmail.com](http://www.theglobeandmail.com)

Great Basin LCC Monthly Webinars – June 27, 2016





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# Telling the stories – Case Studies

DATA BASIN | ARTICLES | MC2 DYNAMIC GLOBAL VEGETATION MODEL

## MC2 Dynamic Global Vegetation Model

By Dominique Bachelet Oct 23, 2015

**Simulating changes in vegetation cover, carbon and nitrogen cycling, water budget as well as projecting fire occurrence and effects**

The dynamic global vegetation model MC (version) 2 (Bachelet et al. 2015a and b, Creutzburg et al. 2015, Sheehan et al. 2015, Turner et al. 2015), the C++ version of MC (version) 1 (Bachelet et al., 2015), simulates vegetation type, plant growth and associated biogeochemical cycles, as well as their response to natural wildfires. MC2 consists of a more efficient version of MC1, better suited to run on a supercomputer to simulate large domains at fine scales. The model structure and algorithms of MC1 were conserved.

The model simulates the dynamics of lifeform species, including evergreen and deciduous broadleaf woody lifeforms (trees and shrubs), herbaceous lifeforms (grasses, forbs and sedges) respond to both climate change and increasing CO<sub>2</sub> concentration. It simulates competition by



DATA BASIN | ARTICLES | CBI'S LANDCARBON PROJECT

## CBI's LandCarbon Project

By Dominique Bachelet

**Contributing to the USGS' National Carbon Sequestration Assessment**

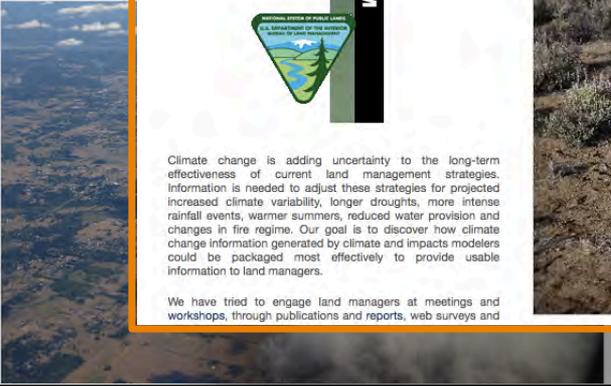
CBI's global change team was involved in a project designed to complement earlier results from a national carbon sequestration assessment, the LandCarbon project, conducted by the US Geological Survey (USGS) in response to section 712 of the U.S. Energy Independence and Security Act (EISA) of 2007 (US Government Printing Office, 2007).

The assessment examined carbon storage, carbon fluxes, and other GHG fluxes (methane and nitrous oxide) in all major terrestrial and aquatic ecosystems in two time periods: baseline (2001-2005) and future (from baseline to 2050).

Three regional assessments (Zhu et al. 2011, Zhu and Reed 2012, Zhu and Reed 2014) were generated using three biogeochemical models including Century version 4.0 (Parton et al. 1994, Metherell et al. 1993), the Erosion Deposition Carbon Model (EDCM; Liu et al. 2003), and the Land Greenhouse-Gas Accounting Tool (LGAT) biogeochemical models implemented in the General Ensemble Biogeochemical Modeling System (GEMS; Liu 2009, Liu et al. 2012).

CBI's contribution to this project had three objectives:

1. Because initial results from the LandCarbon project simulated the response of actual vegetation, our simulation



DATA BASIN

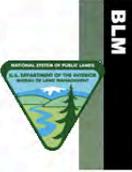
Get Started Explore Create Community My Workspace

DATA BASIN | ARTICLES | DELIVERING USABLE CLIMATE CHANGE INFORMATION TO SAGEBRUSH MANAGERS

## Delivering Usable Climate Change Information to Sagebrush Managers

By Dominique Bachelet Oct 23, 2015

**Success story of a BLM funded project**



Climate change is adding uncertainty to the long-term effectiveness of current land management strategies. Information is needed to adjust these strategies for projected increased climate variability, longer droughts, more intense rainfall events, warmer summers, reduced water provision and changes in fire regime. Our goal is to discover how climate change information generated by climate and impacts modelers could be packaged most effectively to provide usable information to land managers.

We have tried to engage land managers at meetings and workshops, through publications and reports, web surveys and



<http://bit.ly/28Z66f9>



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# Data Basin Gateways

<https://databasin.org/services/gateways/list>

**Yale Framework**  
INTEGRATING CLIMATE ADAPTATION AND LANDSCAPE CONSERVATION PLANNING

powered by DATA BASIN

Get Started | Explore | Create | Community | My Workspace

**What is the Yale Framework?**

The Yale Framework includes advice and tools to assist conservation planners in selecting the assessment and modeling strategies that fit their needs.

**What is included?**

**What can I do?**

**The Challenge**

Despite the 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.

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.

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

**Data Basin and the Framework**

The Yale 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**

- It organizes the reasoning behind the use of specific assessment approaches.
- It helps build a better understanding of the types of questions a model can credibly address.
- It ensures greater transparency with a strong foundation of data.
- It focuses assessments on the appropriate scale and planning use.
- It can serve as a tool for policymakers to evaluate the models behind proposed land use plans.

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<https://yale.databasin.org/>

**AdaptWest - A Climate Adaptation Conservation Planning Database for Western North America**

powered by DATA BASIN

Get Started | Browse Data | Create | Community | My Workspace

**What is AdaptWest?**

AdaptWest is a spatial database and synthesis of methods for conservation planning aimed at enhancing resilience and adaptation potential of natural systems under climate change.

**What is the purpose of AdaptWest?**

**What information is available?**

**How can I use AdaptWest?**

Get started quickly with the AdaptWest **Take a Tour**

**Protected Areas Data Explorer**

Explore and summarize current and projected future climate data for North America's national parks and other protected areas. Available metrics include seasonal and annual means, extremes, growing and chilling degree days, snow fall, drought indices, and more.

**Watershed Climate Data Explorer**

Explore and summarize current and projected future climate data for North American ecoregions and LCCs at the watershed level. Available metrics include seasonal and annual means, extremes, growing and chilling degree days, snow fall, drought indices, and more.

**Featured Datasets**

**AdaptWest News**

May 4 - A new version of the ClimateNA software is available

Dec 13 - New climate velocity for North America at 1km resolution, based on projections from 8 individual CMIP5 GCMs

Nov 10 - New land facet data for North America at 100m resolution

Oct 24 - New data explorer: compare climate trends for major protected areas of North America

Oct 15 - New climate data viewer: watershed-level summaries within LCCs and ecoregions

Sponsored by: **Wilburforce Foundation**

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<https://adaptwest.databasin.org/>

## Communicating Research Project Results



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# Working with the Landscape Conservation Cooperatives

The screenshot shows the NPLCC Conservation Planning Atlas website. The header includes the logo and navigation tabs: GET STARTED, BROWSE, CREATE, COMMUNITY, MY WORKSPACE. A main banner reads "About the NPLCC Conservation Planning Atlas" with a "Take a Tour" button. Below are sections for "Costal and Marine Resources", "Freshwater Resources", "Terrestrial Resources", and "Aquatic Resources". A "Featured Galleries" section lists various topics like "Mapping Pacific Northwest Riparian Areas" and "Data used in the NPLCC Priorities Tool". A large map titled "NPLCC Land Cover and Protected Areas" is displayed, with a description: "This map represents an overview of the North Pacific LCC geography and some of the habitat and protected areas in the region. Explore the LCC and some of the data layers that the NPLCC has supported." The footer contains navigation links and a copyright notice for 2016 Conservation Biology Institute.

<https://nplcc.databasin.org/>

The screenshot shows the SALCC Conservation Planning Atlas website. The header includes the logo and navigation tabs: Get Started, Browse, Create, My Workspace. A main banner reads "Welcome to the South Atlantic LCC Conservation Planning Atlas (CPA)" with a "Take a Tour" button. Below are sections for "Explore the Blueprint 2.0 in the Simple Viewer", "Learn More About the Conservation Blueprint", and "Access Blueprint 2.0 Data". A "Recommended Items" section features several map thumbnails with titles like "Blueprint 2.0", "Sacred Lands, 1014, Eastern U.S.", and "Draft Blueprint 2.1". A "Neighboring LCC Conservation Planning Atlases and Geonodes" section shows maps for Appalachian LCC, Gulf Coast Plains LCC, Gulf Coastal Plains and Ozarks LCC, Peninsular Florida LCC, and Southeast Region. The footer contains navigation links and a copyright notice for 2016 Conservation Biology Institute.

<https://salcc.databasin.org/>

The screenshot shows the Caribbean LCC Conservation Planning Atlas website. The header includes the logo and navigation tabs: GET STARTED, EXPLORE, CREATE, MY WORKSPACE. A main banner reads "About the Caribbean LCC Conservation Planning Atlas" with a "Take a Tour" button. Below are sections for "Action Team Galleries", "Protected Areas", "Cays Systems", and "Featured Items". A "Protected Areas" section lists "Natural Protected Areas of Puerto Rico" and "U.S. Virgin Isl.". A "Featured Items" section lists "Natural Protected Areas of Puerto Rico", "U.S. Virgin Islands 2007 GAP-Simplified Land Cover", and "Puerto Rico 2000 GAP-Simplified Land Cover". A "Protected Areas, Land Cover and Benthic Habitats of Puerto Rico" section includes a large map and text: "Explore the latest terrestrial and marine Protected Areas data (Reo, 2015) for Puerto Rico with the Puerto Rico 2000 Simplified Land Cover and NOAA's Benthic Habitats." The footer contains navigation links and a copyright notice for 2016 Conservation Biology Institute.

<https://caribbeanlcc.databasin.org/>

## One-Stop-Shop for Relevant Spatial Datasets



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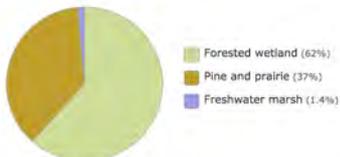
# Special Tools for Some Gateways

Blueprint 2.0 identifies priority areas for shared conservation action based on ecosystem indicator condition and connectivity.

The screenshot shows the homepage of the South Atlantic Conservation Planning Atlas (CPA). It features a navigation bar with 'Get Started', 'Browse', 'Create', and 'My Workspace'. A main banner welcomes users to the South Atlantic LCC Conservation Planning Atlas (CPA) and provides a 'Take a Tour' button. Below the banner are three main sections: 'Explore the Blueprint 2.0 in the Simple Viewer', 'Learn More About the Conservation Blueprint', and 'Access Blueprint 2.0 Data'. The 'Access Blueprint 2.0 Data' section includes links for 'Conservation Blueprint 2.0', 'Ecosystem Indicators', and 'Future Threats'. A 'Recommended Items' section displays various data visualizations and reports. At the bottom, there are links to 'Neighboring LCC Conservation Planning Atlases and Geonodes' and a footer with contact information and a copyright notice for 2016 Conservation Biology Institute.

<https://salcc.databasin.org/>

## Ecosystem-specific Indicators



The screenshot displays the South Atlantic Conservation Blueprint 2.0 interface. The main header reads 'South Atlantic Conservation Blueprint 2.0 Sub-watershed and marine lease block summaries'. The current view is for the 'Lower Pocatigo River' in the 'Lower Pee Dee Basin' (HUC 12: 030402050407, approx 37,814 acres). The interface includes a navigation bar with 'Priority', 'Indicators', 'Landcover', 'Partners', and 'Ownership'. The 'Indicators' tab is active, showing three indicators with their respective values and South Atlantic averages:

- Freshwater marsh:** Value 1.44, South Atlantic average: 0.82.
- Freshwater marsh birds:** Value 0.42, South Atlantic average: 0.82.
- Pine and prairie:** Value 0, South Atlantic average: 0.14.

A map on the right shows the geographic area with priority areas highlighted in shades of purple and pink. A legend titled 'Blueprint 2.0 Priority' defines the colors: dark purple for 'Highest priority', medium purple for 'High priority', pink for 'Corridors', and light pink for 'Medium priority'. The interface also includes a search bar, zoom controls, and a 'basemaps' button.

<http://blueprint.southatlanticlcc.org/v2/index.html>



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# Special Tools for Some Gateways

<https://drecp.databasin.org/>



Mike Gough

Desert Renewable Energy Conservation Plan (DRECP)  
Site Survey Report  
Report generated on June 26th 2016 11:07

<http://bit.ly/29cQpAk>



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To Create Customized Web Tools  
Feedback is CRITICAL!



HELLO

my name is

~~Climate Change~~

~~Global Warming~~

IT'S COMPLICATED



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# Translational Science



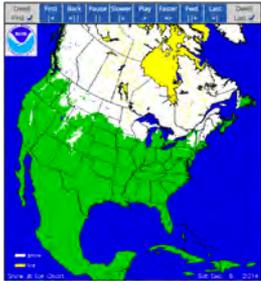
Melanie Brown





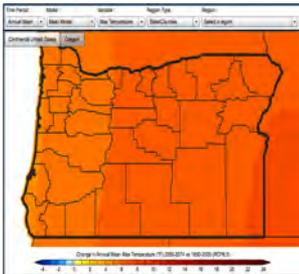
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# Step I. Learning what is useful Getting Feedback on Climate –Related Web Applications

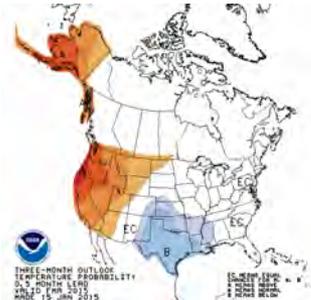


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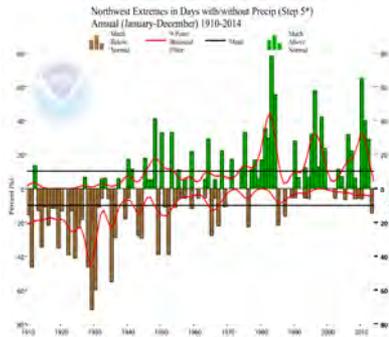
USGS National  
Climate Change Viewer



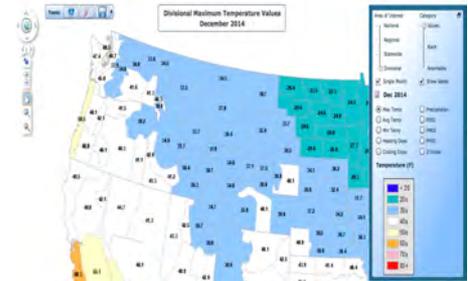
<http://on.doi.gov/1H49xLH>



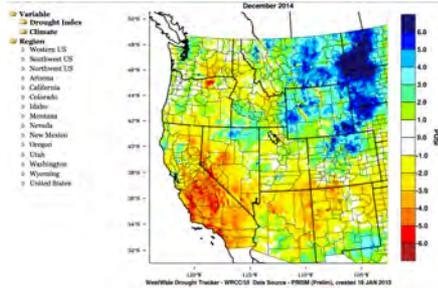
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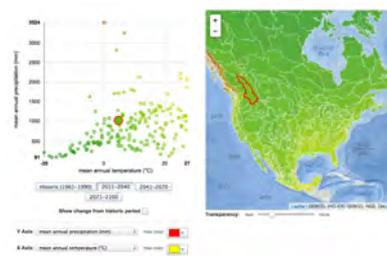
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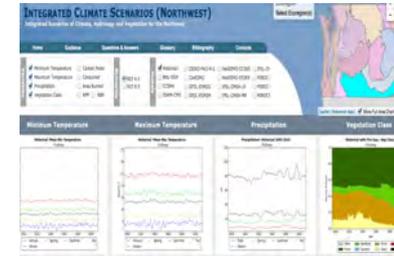
<http://l.usa.gov/1xy4y1N>



<http://bit.ly/28WKv5J>



<http://bit.ly/28X04LM>



<http://bit.ly/28XCbaQ>

Based on the type of users' activities: planning, scheduling prescribed fire, seeding ...  
Phase I – BLM sagebrush managers – E. Oregon and W. Idaho



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# 1<sup>st</sup> Lesson Learnt – Intent is not enough





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## Lessons Learnt : Phase I

- **Managers want reliable climate tools**
- **Tools must be easily accessible**
- **Temporal scale is important: seasonal vs average**
- **Weather forecast more useful for ST activities**
- **Climate projections useful for LT planning**
- **A variety of important variables apart from T & P**
- **Fine spatial scale is essential for applicability**
- **Climate science has too much jargon**
- **Datasets should be downloadable to include in reports**



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# since we interviewed participants, changes have occurred ...



1 publication  
accepted

**USGS**  
science for a changing world

**U.S. Geological Survey**

Emergency Preparedness Publications Hazards Newsroom Education Jobs Partnerships Lib

**Page Not Found**

The page you are looking for has either been removed, does not exist or has had its name changed.

**To correct this problem please try the following:**

- If you typed the page address directly into the address bar, make sure that it is spelled correctly.
- Go to the [main page of USGS](#) and follow the links to the information you want.
- Click the "BACK" button to try another link.
- Go to the [USGS Search page](#) and look for the information you need.
- If you received this page while using a bookmark, check your bookmarks.

**If you're looking for USGS science**

**You can look for information by browsing** through categories and related terms in our [Subject Categories](#).

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Page Contact Information: [Ask USGS](#)

Page Last Modified: Monday, January 06, 2014

Not there any more!

**U.S. Climate Resilience Toolkit**

About | Contact | Funding Opportunities | FAQ

Get Started Taking Action **Tools** Topics Expertise

Search

**Tools** A lot of sites!!

Tools are available to help you manage your climate-related risks and opportunities, and to help guide you in building resilience to extreme events. Browse the list below, or filter by topic and/or tool functionality in the boxes above. To expand your results, click the Clear Filters link.

**Adaptation Tool Kit: Sea-Level Rise and Coastal Land Use**

This toolkit presents information on 18 different land-use tools (generally used legal devices) that could be used to preemptively respond to threats that sea level rise poses to public and private coastal development and infrastructure.

[Read more >](#)

**Adaptation Workbook for Natural Resources**

Forest managers, natural resource professionals, and motivated landowners can use this structured process to consider the effects of climate change on forests and related ecosystems.

[Read more >](#)

**AdaptWest Climate Adaptation Planning Database**

Planners can access data and detailed information for much of North America to compare conservation approaches and inform planning.

[Read more >](#)

**Advanced Hydrologic Prediction Service**

This comprehensive suite of graphical forecast products shows a range of information on current and projected river levels for almost 4,000 stations in the contiguous United States.

[Read more >](#)

**AgroClimate—Tools for Managing Climate Risk in Agriculture**

Interactive tools and climate information provide support to improve crop management decisions and reduce production risks associated with climate variability, climate change, and extreme weather events in the southeastern United States.

**AirNow Air Quality Forecast**

Visit this website to check the current and projected Air Quality Index—which describes how clean or polluted the air is—in your area.

[Read more >](#)

**Alaska Climate and Weather Highlights**

Access information on historical or recent storms and other climate-related events in Alaska and surrounding waters.

[Read more >](#)

**Alaska Coastal Profile Tool**

Explore how beach and coastal elevation profiles along Alaska's coastline have changed over time.

[Read more >](#)

<https://toolkit.climate.gov/tools>



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# Step 2. Trying to meet the needs Incorporating Feedback in CBI's Climate Console



Barry Baker



**DETAILS**



Melanie Brown

**EASY to UNDERSTAND**



Mike Gough



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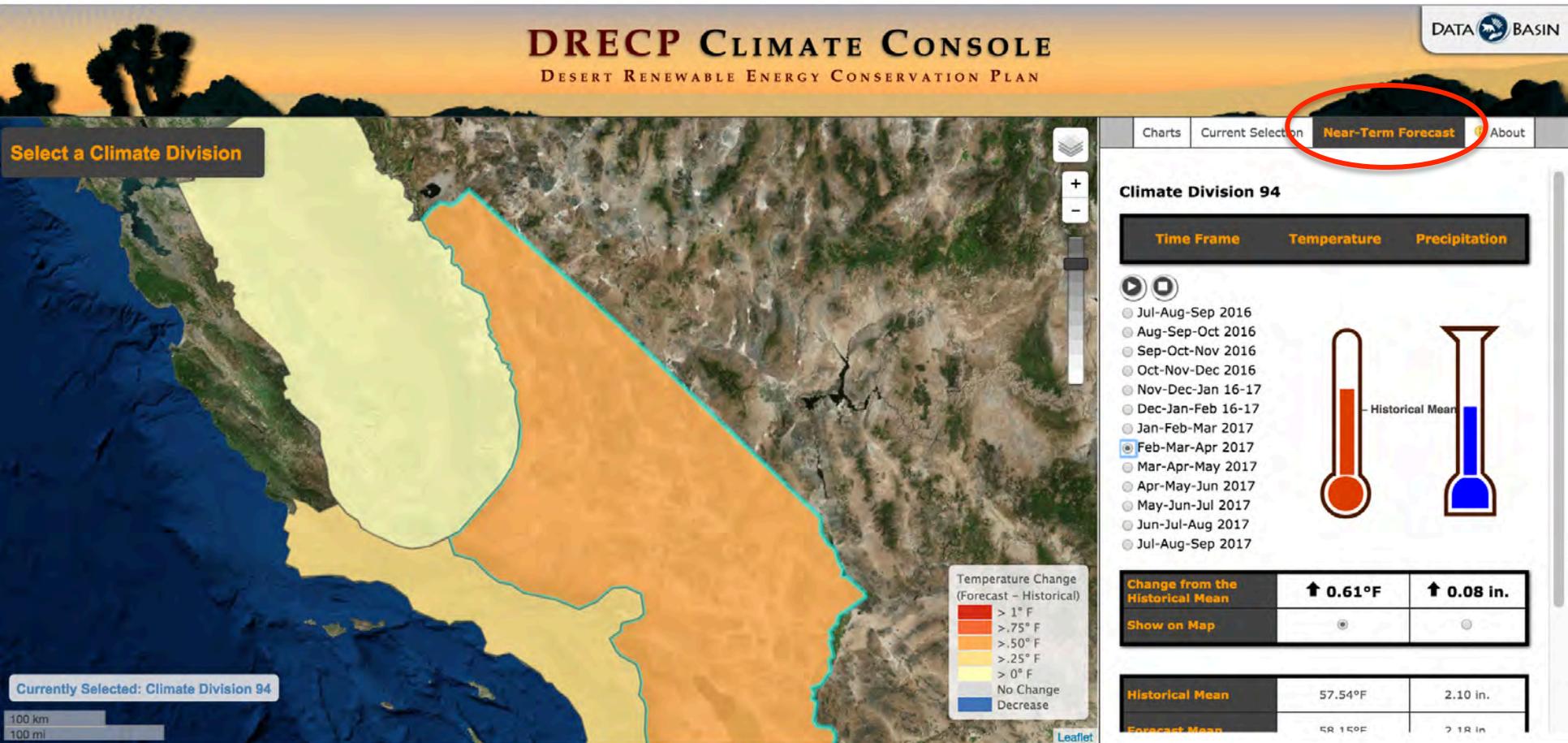
## Lessons Learnt – Phase 2

- 1. Start with users' needs in mind**
- 2. Meeting the needs does not always translate into actionable science**
- 3. Short term projections are more actionable**
- 4. Impact projections more important than just climate**
- 5. Simpler is better but ...**
- 6. Adaptive management is great in theory**
- 7. Climate change often secondary to land use**



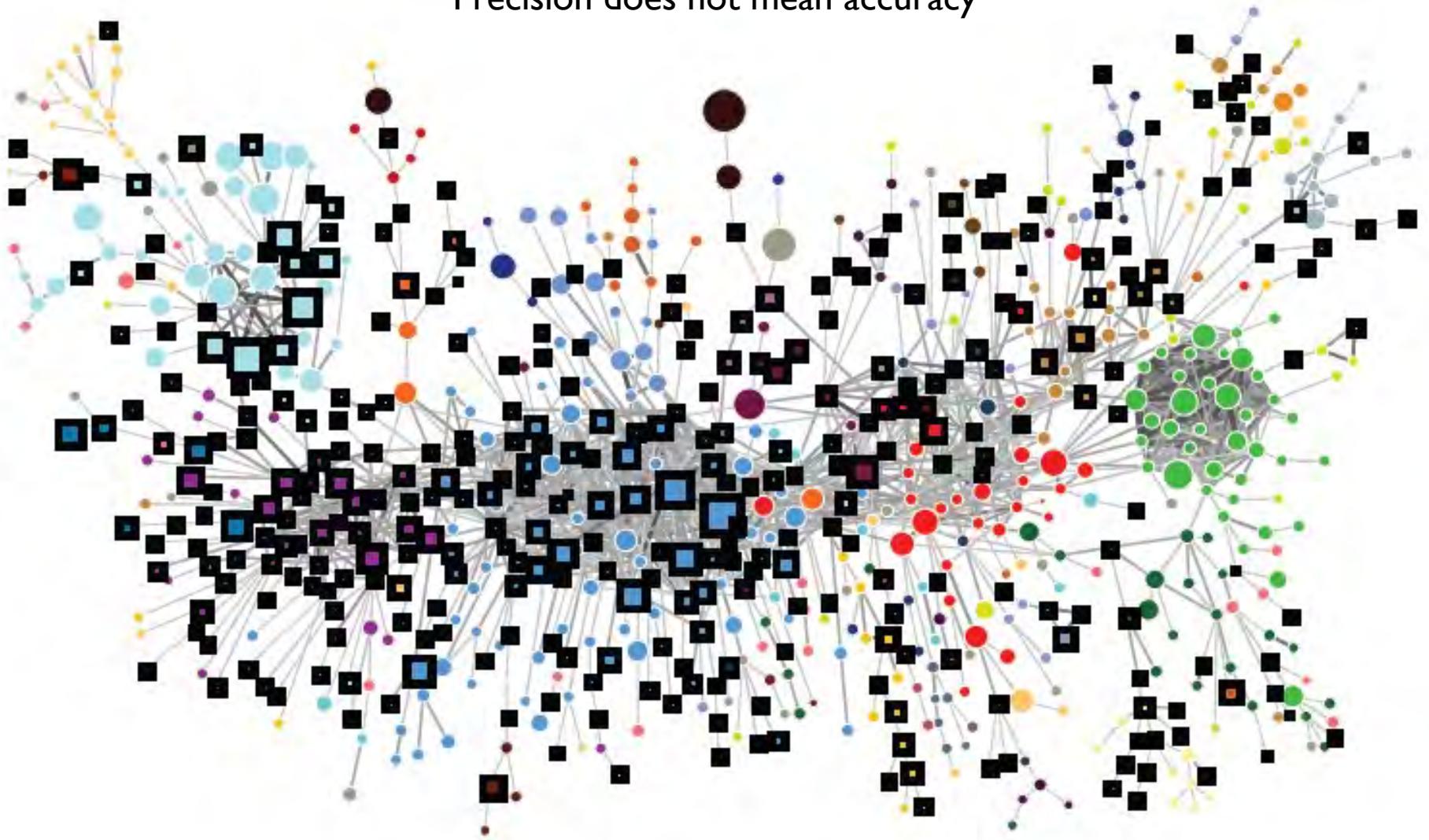
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# Challenge #1: ST weather forecast vs CC projections



NOAA's climate division are too coarse!

Precision does not mean accuracy

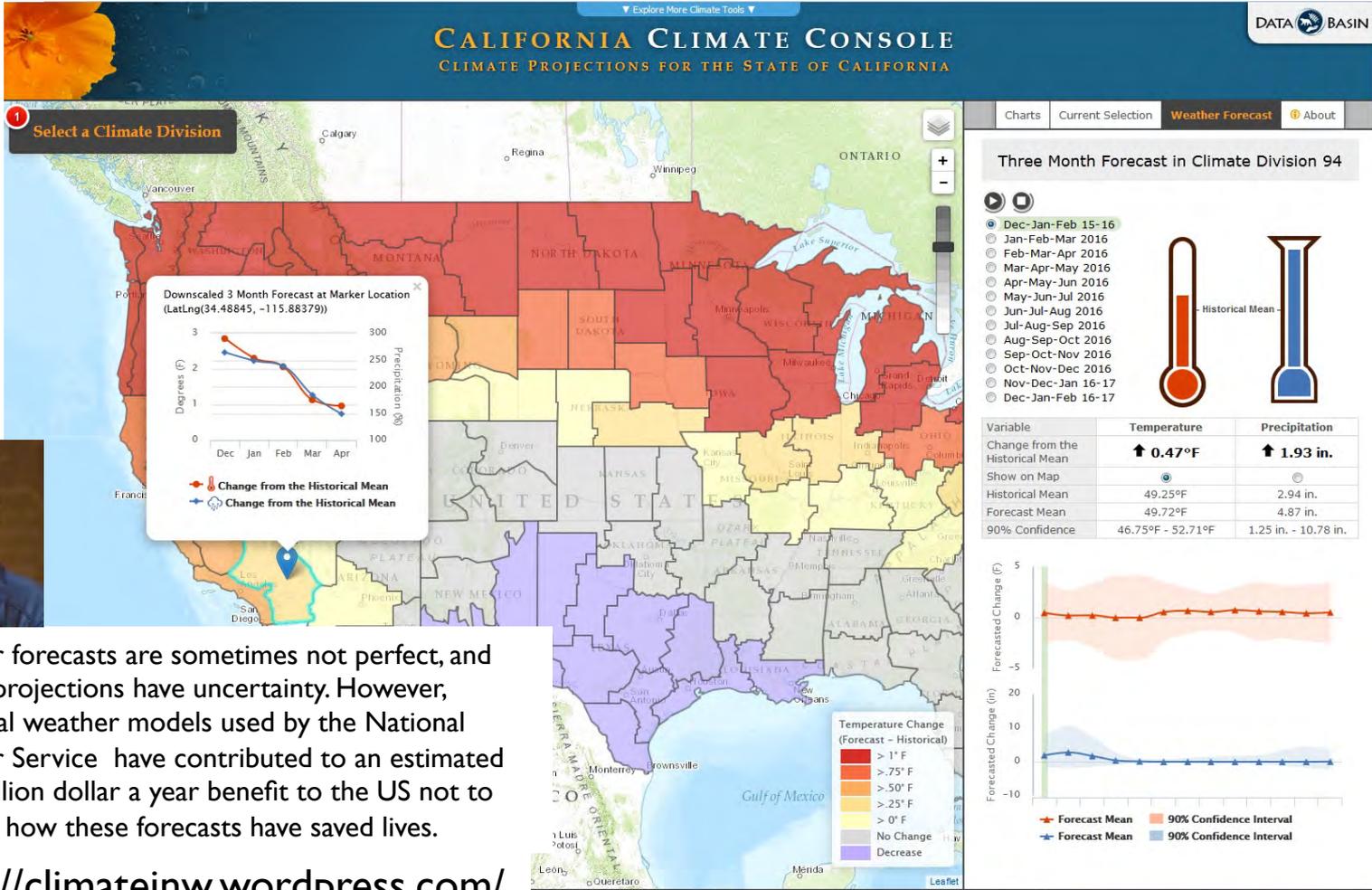


It's complicated!



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# Next Steps: Collaboration with John Abatzoglou



Weather forecasts are sometimes not perfect, and climate projections have uncertainty. However, numerical weather models used by the National Weather Service have contributed to an estimated \$31.5 billion dollar a year benefit to the US not to mention how these forecasts have saved lives.

<https://climateinw.wordpress.com/>

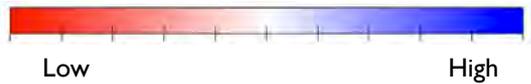
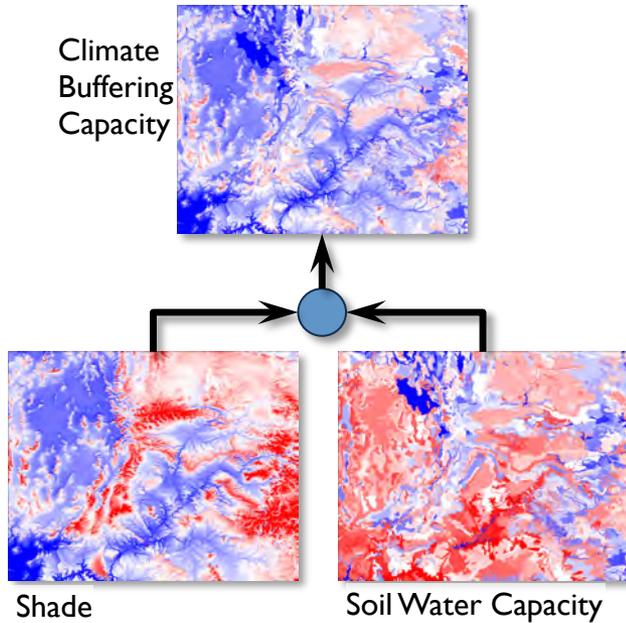


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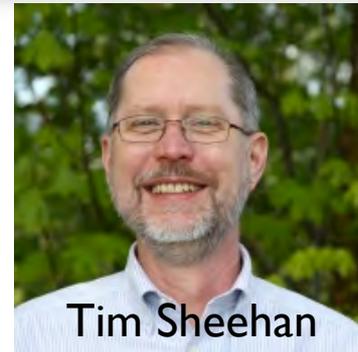
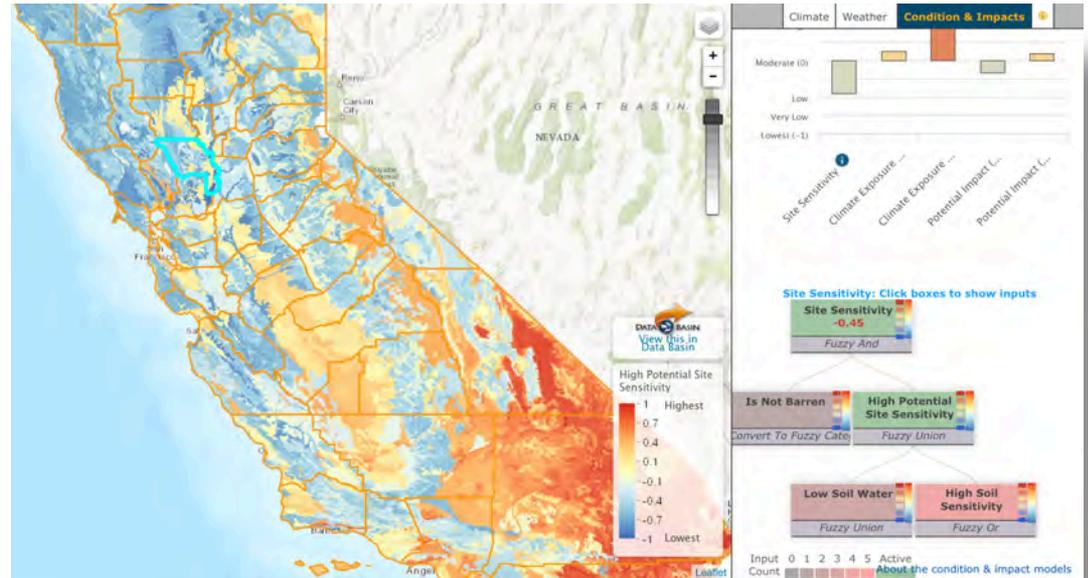
# Challenge #2: Adaptive Management Decision Support Tools can help

## Environmental Evaluation Modeling System

EEMS



climateconsole.org



Tim Sheehan



Mike Gough



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# Designing New Tools: Seed Source Tool

**Seedlot Selection Tool**

Configuration | Saved Runs

1 Choose an objective  
Find seedlots | Find planting sites

2 Select a planting site  
Lat: 47.69 | Lon: -123.31  
Region: Region 1

3 Select planting site climate  
Current

4 Choose species  
Species 1

5 Choose variables & transfer limits

**bFPF: The day of the year on which FFP (frost-free period) begins**  
Value: 159 | Transfer limit (+/-): 100

**CMD: Hargreaves climatic moisture deficit (mm)**  
Value: 66 | Transfer limit (+/-): 100

Add a variable...

Run Tool



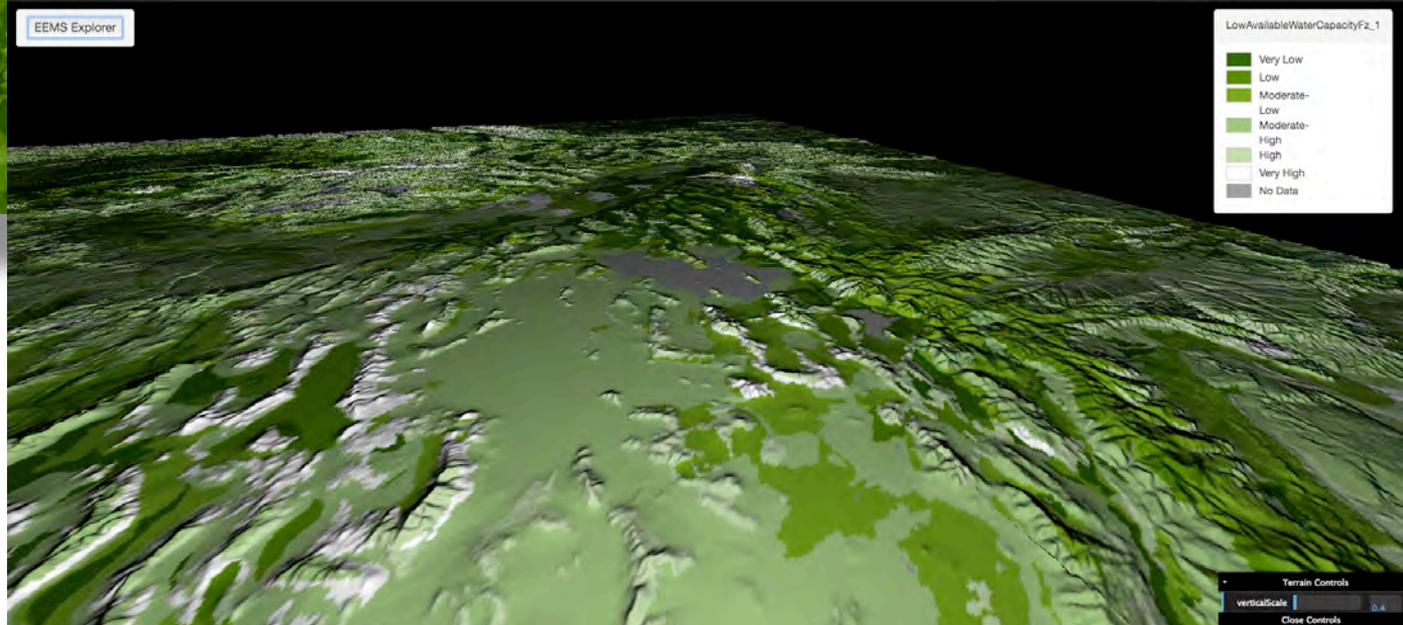
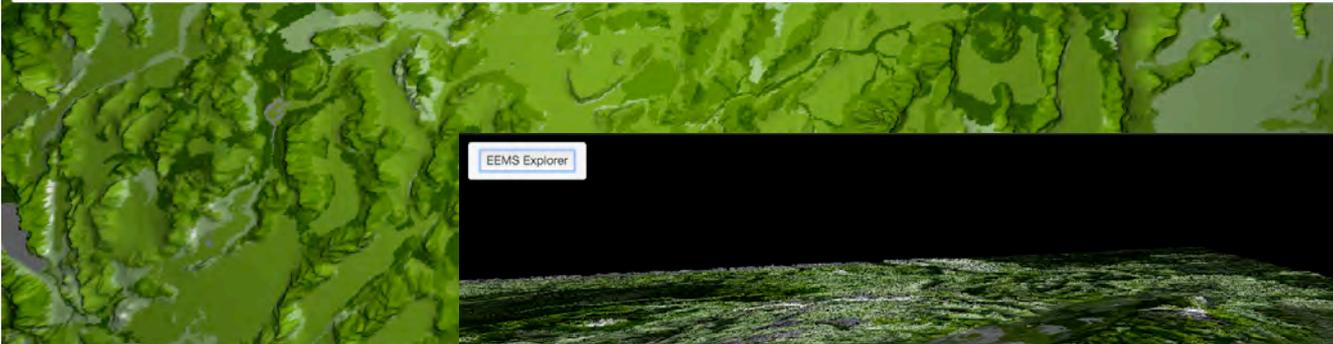
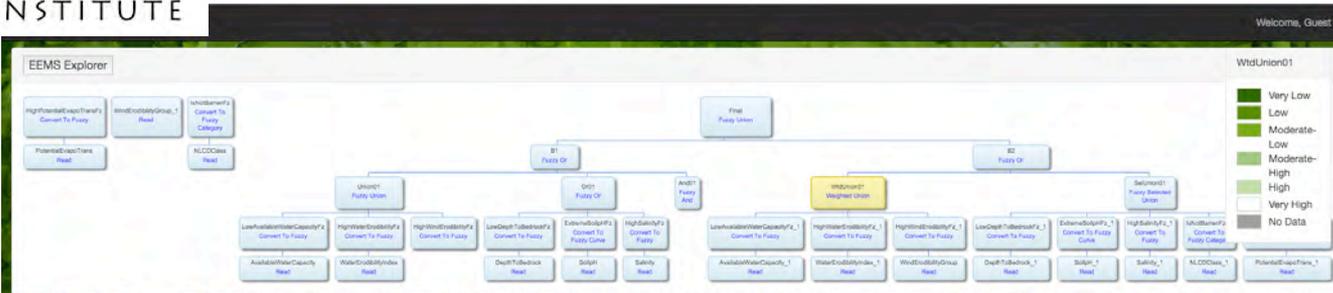
Nik Molnar





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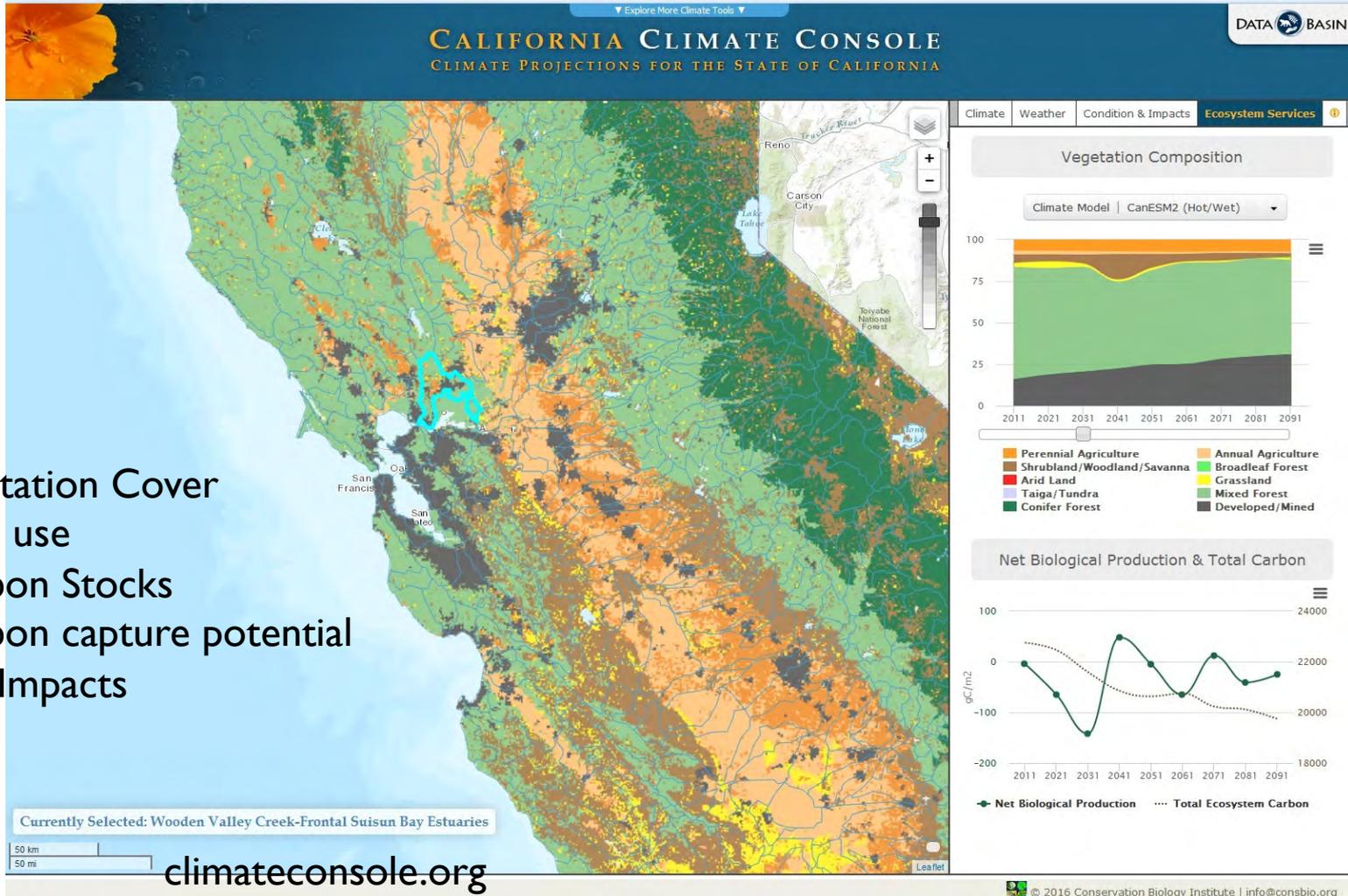
# Next – Improved Visualization (3D) and Interactive On-line





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# Challenge #3: Impacts more important than climate per se



Vegetation Cover  
Land use  
Carbon Stocks  
Carbon capture potential  
Fire Impacts



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# LANDSCAPE SIMULATOR



Where it started

**1. Select Reporting Units**

- Counties
- Ecoregion Subareas
- BLM Field Offices
- HUCS Watersheds
- Desert Tortoise Recovery Units
- User Defined (1km)
- Current Selection

**2. Select Features**  
(Use the tools below or click on a feature)

Currently Selected: Cronise Valley

**3. Select Starting Sagebrush Density**

High  
Medium  
Low

**4. Select Climate Model**

- Mean Model
- CanESM2
- HadGEM2-CC365
- MIROC5

**5. Select RCP Scenario**

- 4.5
- 8.5

**6. Select Projection Year**

- 2016
- 2017
- 2018
- 2020
- 2025
- 2035

**7. Select Season**

- Mar/Apr/May
- Jun/Jul/Aug
- Sep/Oct/Nov
- Dec/Jan/Feb

**8. Select Additions**

- Grazing regime
- Energy Installation
- Stand Replacing Fire <1 yr.
- Low intensity Fire <1 yr.

**9. Projected View**

**10. Information**

Sagebrush is projected to decline by 75% and cheatgrass increase by 50%

**simulate**

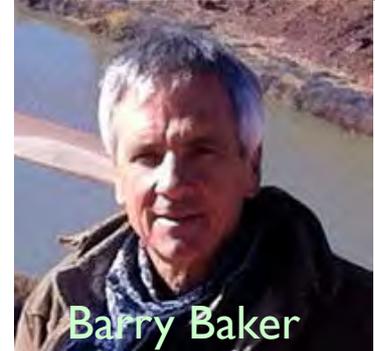
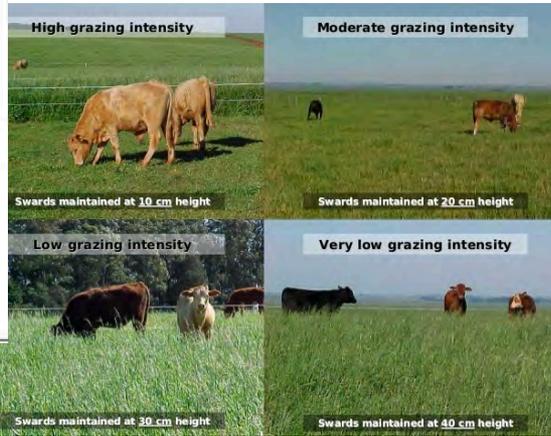
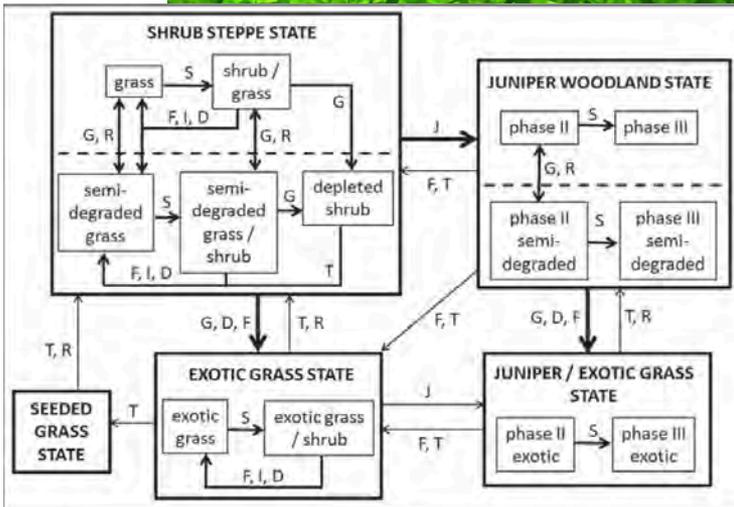


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# Sagebrush Country – Impacts of CC



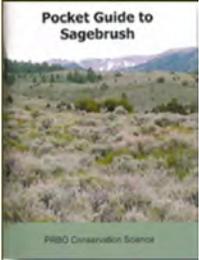
Where it is going





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# It will take a village (data workshop?)



*Research article*

## Climate change and land management impact rangeland sage-grouse habitat in southeastern Oregon

Megan K. Creutzburg<sup>1,2,\*</sup>, Emilie B. Henderson<sup>1</sup> and David R. Conklin<sup>3</sup>

Assessing potential climate change effects on vegetation using a linked model approach

Jessica E. Halofsky<sup>a,\*</sup>, Miles A. Hemstrom<sup>b</sup>, David R. Conklin<sup>c</sup>,  
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*Ellsworth and Kauffman: Native Bunchgrass Response to Prescribed Fire*  
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RESEARCH ARTICLE

## NATIVE BUNCHGRASS RESPONSE TO PRESCRIBED FIRE IN UNGRAZED MOUNTAIN BIG SAGEBRUSH ECOSYSTEMS

Lisa M. Ellsworth<sup>1\*</sup> and J. Boone Kauffman<sup>2</sup>





**Have no fear  
of perfection,  
you'll never  
reach it.**

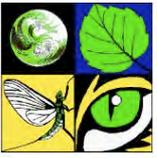
- Salvador Dali

but with your help we might get closer ...

Contact: [dominique@consbio.org](mailto:dominique@consbio.org)



Thank you for your attention!



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# How are we doing?



# IS THAT WHAT YOU NEED? DIRECT FEEDBACK HELPS CLIMATE CHANGE INFORMATION EXCHANGE

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*Dave Hopper, dave\_hopper@fws.gov*

A recording of today's webinar and slides from the presentation will be available at [www.GreatBasinLCC.org](http://www.GreatBasinLCC.org).

For more information on the Great Basin LCC webinar series contact: Todd Hopkins, science coordinator, [todd\\_hopkins@fws.gov](mailto:todd_hopkins@fws.gov), (775) 861-6492.

Let us know what you thought of today's webinar!

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