



## PERFORMANCE/PROGRESS REPORT

**Agreement Number:** L14AC00103

**Project Title:** BLM OR-WA CESU Climate Data - Identifying Tools Based on What Users Do

**Reporting Period**  
**Begin & End Dates:** 7/14/14 to 7/14/15 **Final Report?**  YES  NO

**Recipient Organization:**

Name: Dominique Bachelet  
Address: 36 SW Washington Ave., Suite 202, Corvallis OR 97330  
Telephone: 541-368-5807  
Email: dominique@consbio.org

**Reporting Frequency:**

- Quarterly  
 Semi-annual  
 Annual

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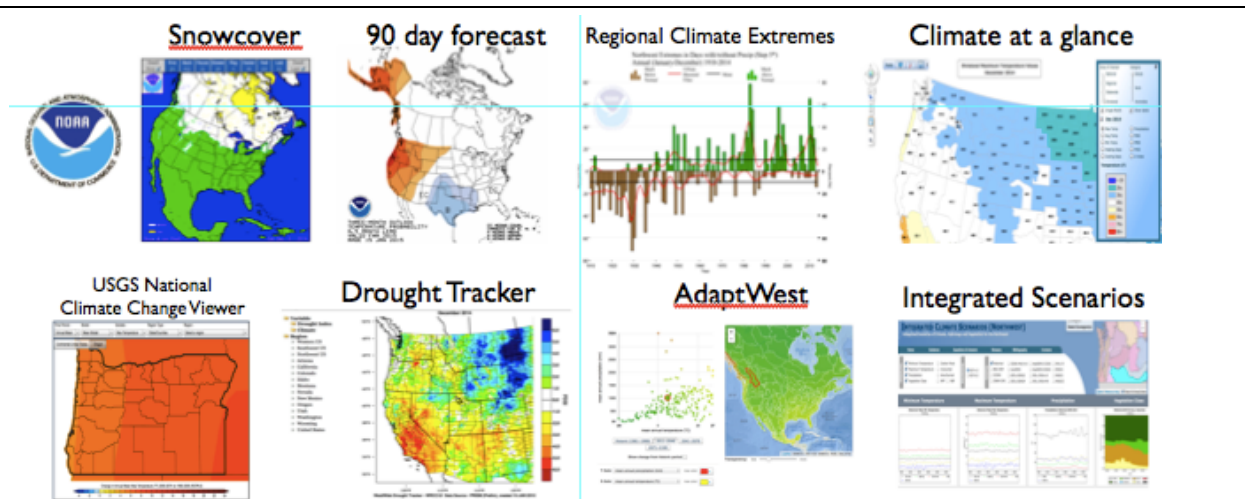
**Report On:**

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 (e.g. <http://consbio.webfactional.com/pnw/table.html>), through publications and reports (e.g. <http://www.wiley.com/WileyCDA/WileyTitle/productCd-1119011698,subjectCd-AG80.html>), web surveys and, for the first phase of this project, through phone interviews (<http://ir.library.oregonstate.edu/xmlui/handle/1957/56343>). We found that one-on-one interactions over the phone were most effective to learn how consideration of climate change figures into the decision-making process of management activities.

BLM managers from eastern Oregon and western Idaho were asked to share their knowledge about sagebrush management and restoration as well as review a series of 8 climate-related web pages (Figure 1) from a variety of sources (NOAA, USGS, DRI, CBI).

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**Figure 1.** Climate-Related Web Sites Shown to E. Oregon and W. Idaho land managers. Each web page was accessed during phone interviews Nov-Dec 2014 and may have changed, been updated or even discarded since (from upper left to lower right: <http://www.ncdc.noaa.gov/snow-and-ice/snow-cover/>; <http://www.cpc.ncep.noaa.gov/products/predictions/90day/>; <http://www.ncdc.noaa.gov/extremes/cei/graph/nw/5/01-12>; <http://gis.ncdc.noaa.gov/map/cag/#app=cdo>; [http://adaptwest.databasin.org/app/ecoregion\\_climate\\_explorer](http://adaptwest.databasin.org/app/ecoregion_climate_explorer) ; [http://www.usgs.gov/climate\\_landuse/clu\\_rd/apps/nccv\\_viewer.asp](http://www.usgs.gov/climate_landuse/clu_rd/apps/nccv_viewer.asp); <http://www.wrcc.dri.edu/wwdt/index.php>; <http://consbio.webfactional.com/integratedscenarios/>)

An Oregon State University (OSU) undergraduate student (Melanie Brown), CBI intern, performed ~30 one-on-one interviews and gathered valuable information on climate-dependent management activities and web tool relevance provided with much enthusiasm and interest by BLM managers. Not only did they share their knowledge and opinions on climate web tools with enthusiasm but they also recommended their colleagues contact the student, increasing the sphere of influence of individual phone calls. These results were highlighted in OSU quarterly publication (<http://oregonstate.edu/terra/2015/05/anatomy-of-a-climate-tool/>). Furthermore, a manuscript summarizing the undergraduate's student thesis results is undergoing collegial reviews this Fall (2015) before being submitted to a peer-review journal for publication.

**Result Highlights include:**

- Collaboration between climate scientists and land managers is key to effective tool development that creates accessible, useable, and useful climate tools for land management.
- There is a need for basic information and climate change education to promote the use of existing climate-related web sites and prevent misinterpretations.
- Managers need finer spatial scales relevant to their management areas, no larger than a county or ecoregion, and temporal scales that include both near-term weather forecast and longer-term climate projections.
- The climate variables most frequently mentioned were precipitation and temperature, but more specifically their seasonality.
- Managers need information on climate impacts as opposed to just changes in climate.

**We believe the success of this project was due in part to:**

- The managers' eagerness to share their knowledge with a student: they were willing to share information about what their jobs entailed and explain how climate affects their day to day activities (education component). The young intern was a good listener recording the information and sending back transcriptions for approval of content.
- The managers' lack of concern over their limited background in climate science: the young intern was not an expert either so managers could candidly share some of their concerns about the tools and ask more questions than they would in a formal setting with colleagues and supervisors. The

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student could help them navigate through the tools and sometimes help them avoid misinterpretation.

- The managers' real interest in climate change information: discipline-specific jargon is often the main cause of misunderstanding. Personal conversation and dedicated time for interviews allowed managers to 1) discover sites where relevant information was readily available to them, 2) ask specific questions about obscure terminology and improve their understanding of the science behind the projections (education component).

The feedback the student received on climate-related web pages and tools from phase 1 interviews was critical to 1) improve existing CBI tools and 2) explore entirely new designs. As a follow up, some of the requested changes were made by CBI developers that included:

- Toggle switch between SI units and US units (e.g. Fahrenheit/Celsius)
- Measure of uncertainty (inclusion of box and whisker plot)
- Short term forecast as well as climate projections (in collaboration with NOAA and University of Idaho colleagues)
- Fine temporal scale: seasonal, monthly
- Fine spatial scale: in collaboration with colleagues from U. Idaho (J. Abatzoglou and K. Hegewisch (challenging compromise between accuracy and precision).

A blueprint for a new type of tool was also designed by the intern after extensive conversations with research team members to focus specifically on impacts to the vegetation cover, as requested by the managers.

### **Project accomplishments:**

#### Publications:

Brown, M. 2015. Creating Useful and Usable Climate Tools for Sagebrush Land Management Through Scientist and Manager Collaboration, **Oregon State University thesis**. <http://hdl.handle.net/1957/56343>

#### Media:

**Terra Magazine** at OSU - <http://oregonstate.edu/terra/2015/05/anatomy-of-a-climate-tool/>).

#### Presentations at National Meetings:

Brown, M., D. Bachelet and T. Sheehan. Developing Usable Climate Tools For Sagebrush Land Managers. **Great Basin Consortium Conference**: "Climate Programs, Water Limitations, and Geospaces in the Great Basin", Boise, ID, 17-19 Feb 2015.

Bachelet, D. Developing Usable Climate Tools for Land Managers. **North Central CSC Open Science Conference**, "Integrating Research and Management of Change from the Mountains to the Plains", Fort Collins, CO, 20-22 May 2015.

Upcoming: Bachelet, D., M. Brown, M. Gough, T. Sheehan, K. Ferschweiler. So you have data, now what? Sixth Annual **Northwest Climate Conference**, Coeur D'Alene Nov 3-5, 2015.

#### Recorded Presentations:

February 2015 - public CBI **Webinar** available on-line: <http://consbio.org/products/webinars/usable-climate-change-information>

Note: *November 12, 2015 - CBI Webinar will take place to summarize results from the continuation of the project*

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**Certification:** I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the award documents.

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*Printed Name & Title of Person Completing Report*

Dominique Bachelet

October 27, 2015

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*Signature*

*Date Submitted*