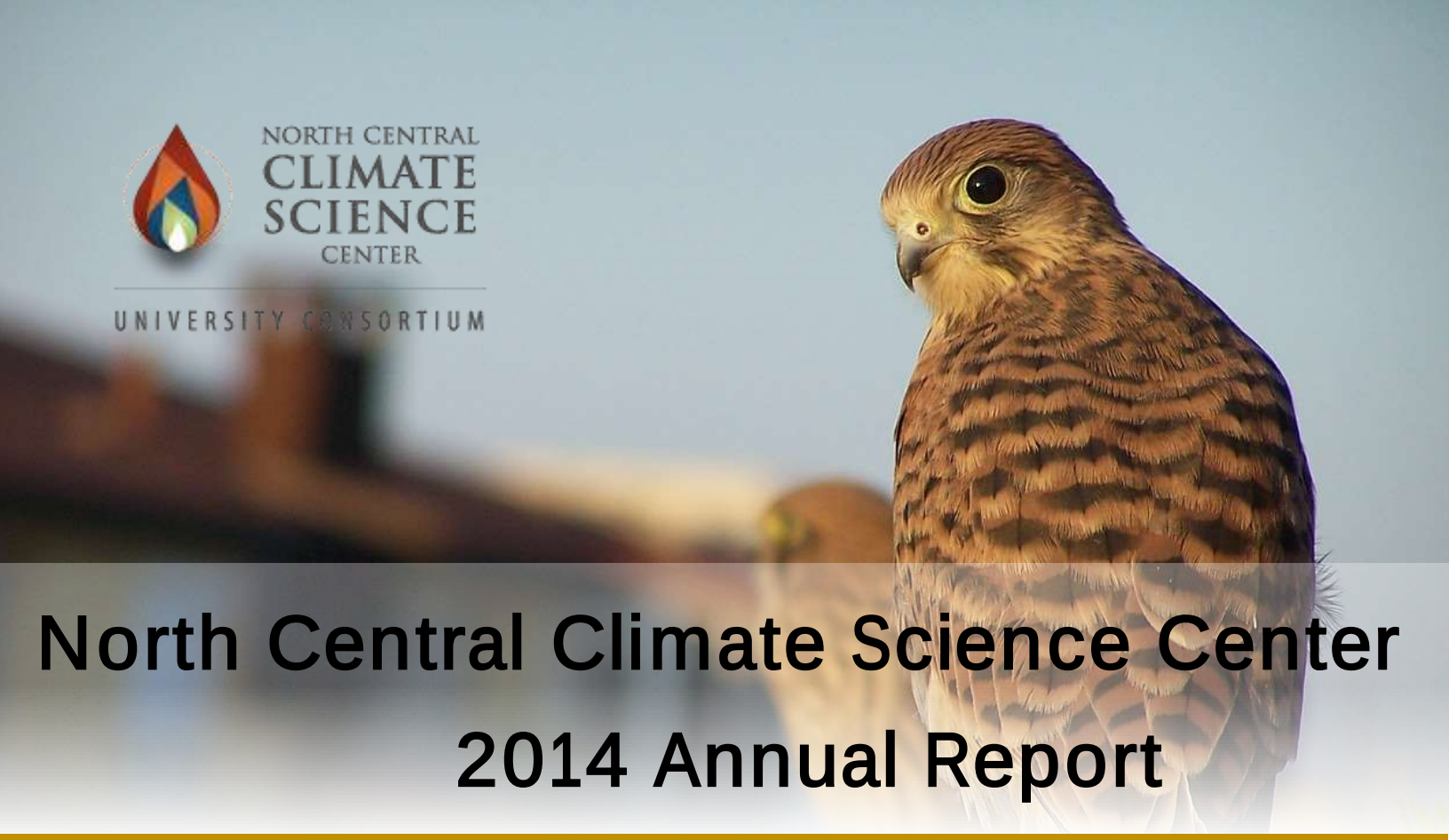


NORTH CENTRAL CLIMATE SCIENCE CENTER

UNIVERSITY CONSORTIUM

North Central Climate Science Center 2014 Annual Report

2014 Highlights

- Continued to develop Foundational Science Areas to support management research
- Released first NC CSC Quarterly Newsletter – Focused on Adaptation
- Enhanced Drought Risk and Adaptation Initiative (DRAI)
- Began working with Colorado Bureau of Land Management to inform state climate adaptation plan
- Created Climate Primers for NC CSC partners

The North Central Climate Science Center is one of eight regional centers created to help meet the changing needs of land and resource managers across the United States. The Center brings together the latest data, tools, and knowledge on the impacts of climate change and works directly with resource managers to promote climate-informed conservation and provides university and USGS researchers the opportunity to work with an engaged and proactive applied-management community. The NC CSC is a collaborative effort between USGS personnel, the North Central University Consortium, and a stakeholder advisory committee made up of federal resource managers and tribal leaders.

ReVAMP

In 2014, the North Central Climate Science Center continued to develop on the ReVAMP concept, striving to serve as a Resource for Vulnerability Assessment, Adaptation, and Mitigation Projects. The ReVAMP model enhances management-focused projects by supporting three research teams who work in collaboration to learn about climate drivers, impacts, and adaptive capacity in the north central region.

Foundational Science Area: Understanding and Quantifying Climate Drivers

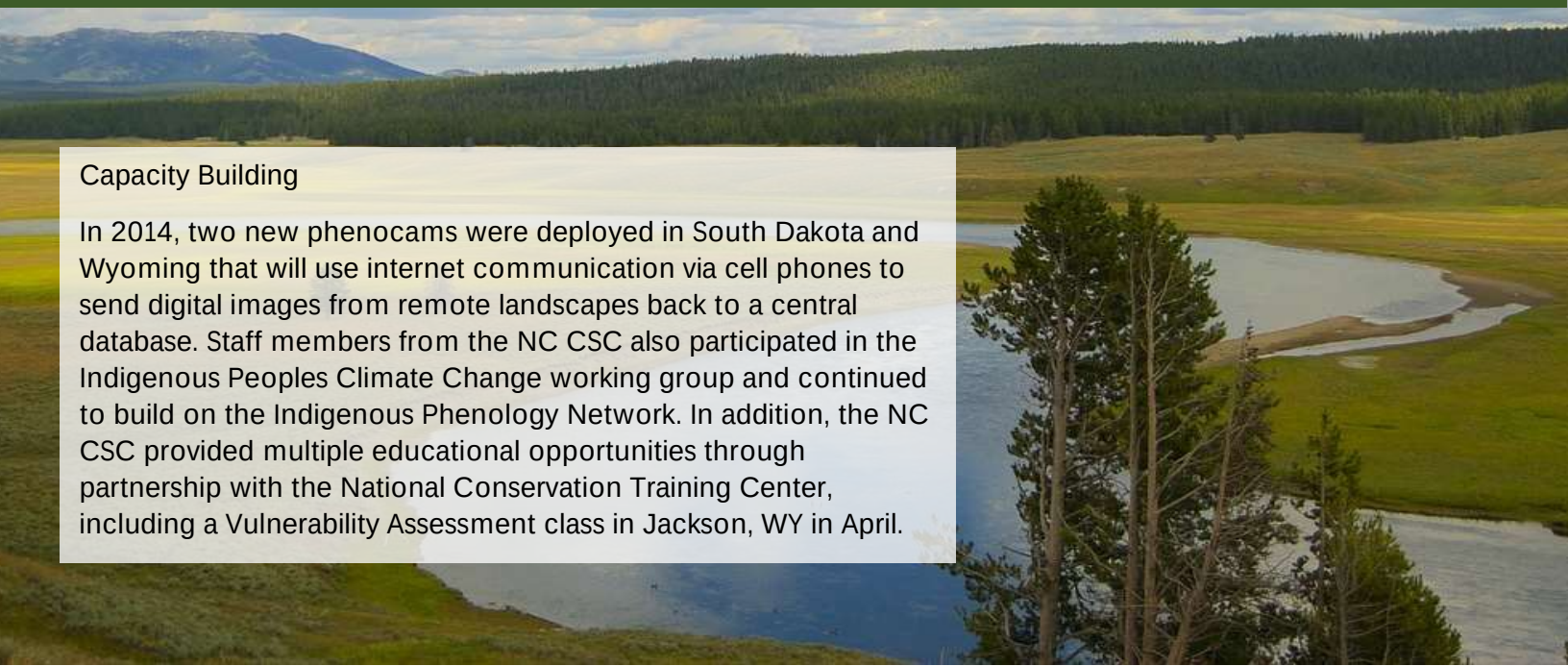
In 2014, the Climate Drivers foundational science area began to explore the role of evapotranspiration in driving climate in the north central region. This effort included a workshop designed to introduce ecologists to the concept and a collaborative process with management-focused projects of deciding how to incorporate the driver into future climate models. The team also developed a series of habitat models in partnership with Brian Miller (NC CSC), Colorado Natural Heritage Program, and CO Dept. of Parks and Wildlife to provide guidance on climate scenarios. Additionally, the climate drivers FSA compiled a list of guidance documents for the use of climate data that could assist management-focused projects and others.

Foundational Science Area: Impacts and Vulnerabilities

Much of the focus of the Impacts and Vulnerabilities FSA in 2014 was on understanding impacts in the Greater Yellowstone Ecosystem, including pulling together a draft hydrological analysis of local montane meadow conditions using MODIS data, creating species distribution and woody encroachment maps. The Impacts FSA additionally submitted a number of manuscripts that spanned the Yellowstone region and beyond to highlight existing vulnerabilities and necessary areas for future impacts research in the north central region.

Foundational Science Area: Adaptive Capacity of Stakeholder Communities

The Adaptation FSA developed a strong focus on drought throughout 2014, enhancing research into the Drought Risk and Adaptation in the Interior project (DRAI) which relies on social-ecological systems theory to understand adaptation initiatives in the north central region. Much of the work this year included involvement from tribal leaders, with meetings in September and October that brought together tribal representatives, scientists, and members of local and state governments to help shape a discussion of drought, impacts, and early warning systems for planning in the Missouri River Basin.



Capacity Building

In 2014, two new phenocams were deployed in South Dakota and Wyoming that will use internet communication via cell phones to send digital images from remote landscapes back to a central database. Staff members from the NC CSC also participated in the Indigenous Peoples Climate Change working group and continued to build on the Indigenous Phenology Network. In addition, the NC CSC provided multiple educational opportunities through partnership with the National Conservation Training Center, including a Vulnerability Assessment class in Jackson, WY in April.

Management Focused Projects

In an effort to impact climate informed decision-making on the ground, the North Central Climate Science Center supports a number of management focused projects. These solicited projects help to connect the NC CSC's Foundational Science Areas with research being done to inform the practical application of climate science on the ground in the north central region.

Current and continuing management-focused projects

Natural resource management decision-making under climate uncertainty: building social-ecological resilience in Southwestern Colorado

- This project seeks to create opportunities for scientists, land managers, and affected residents to learn from each other and identify actions that can be taken to curb the negative impacts of climate change in the San Juan and Gunnison Basins.
    - In 2014, this project team collaborated with stakeholders in Southwest Colorado to refine research goals, identify vulnerable ecosystems and species, and develop ecological response models. In late 2014, the team held adaptation workshops to develop strategies for target ecosystems.

Surrogate species for wetland-dependent birds in the Prairie Pothole Region: selection, evaluation, and management application in the face of climate change

- This project considers how nesting duck habitat conservation may have benefits for other species of waterfowl and wet-land dependent birds in the north central region, and most importantly how these conservation initiatives will be impacted by climate change.
    - The research team spent much of 2014 analyzing and reformatting criteria for the selection of surrogate species using species archetype cluster models. They also used multiple approaches to identify areas of landscape that are likely to provide suitable habitat for wetland dependent birds given future climate and land use conditions.

Informing implementation of the Greater Yellowstone Coordinating Committee's Whitebark Pine Strategy based on climate sciences, ecological forecasting, and valuation of WBP-related ecosystem services

- This project was established to assist the Greater Yellowstone Coordinating Committee (GYCC) in the implementation of its Whitebark Pine Strategy. Whitebark pine is a keystone endangered species that has undergone high mortality as a result of climatic warming.
    - In 2014, the research team published a number of manuscripts to outline vulnerability and climate suitable locations for whitebark pine in the Greater Yellowstone Ecosystem. The team also began first steps for a social science valuation of WBP in the context of climate change.



Publications

Biagini, B., R. Bierbaum, M. Stults, S. Dobardzic, and S. M. McNeeley (2014). A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility. *Glob. Environ. Chang.*

Bierbaum, R., Smith, J., Lee, Arthur.....**McNeeley, S.M**. et al. 2014: Adaptation, *U.S. National Climate Assessment 2014*, U.S. Global Change Research Program

Chang T, Hansen AJ, Piekielek N (2014) Patterns and Variability of Projected Bioclimatic Habitat for *Pinus albicaulis* in the Greater Yellowstone Area. PLoS ONE 9(11): e111669. doi:10.1371/journal.pone.0111669.

Gordon, E., R. Klein, V. Deheza, and **S. McNeeley**, 2014: Chapter 5 – Water Sector. *Colorado Climate Change Vulnerability Study*, Eds. E. Gordon and D. Ojima. Boulder, CO and Fort Collins, CO.

Hansen, A.J. and L.B. Phillips, 2015. Which tree species and biome types are most vulnerable to climate change in the US Northern Rocky Mountains? Forest Ecology and Management 338:68-83.

McNeeley, Shannon M. "A "toad's eye" view of drought: regional socio-natural vulnerability and responses in 2002 in Northwest Colorado." Regional environmental change 14.4 (2014): 1451-1461.

McNeeley, S. & H. Lazarus (2014) "The Cultural Theory of Risk for Climate Change Adaptation" *in* Weather, Climate and Society, Volume 6: Issue 4

Rose, R. A., Byler, D., Eastman, J. R., Fleishman, E., Geller, G., Goetz, & Hewson, J. (2015). Ten ways remote sensing can contribute to conservation. Conservation Biology, 29(2), 350-359.

Staff:

Jeffrey Morisette, USGS Director
Dennis Ojima, NCUC Director
Shannon McNeeley, Research Scientist
Brian Miller, Research Scientist
Marian Talbert, Biostatistician
Colin Talbert, Geospatial Analyst
Bob Flynn, GIS and Data Specialist
Tom Hilinski, Research Associate
Jill Lackett, University Program Mngr.
Stacy Lynn, Research Coordinator
Geneva Chong, Capacity Building
Ty Beeton, Research Associate
Amanda Weber, Student Assistant
Gabriel Senay, EROS Scientist

Contact Us

Colorado State University
1476 Campus Delivery
Fort Collins, CO 80523

Jeffrey Morisette:
morisettej@usgs.gov

Dennis Ojima:
dennis@nrel.colostate.edu

REVAMPCLIMATE.COLOSTATE.EDU

U.S. DEPARTMENT OF THE INTERIOR MARCH 3, 1849

Colorado State University

USGS science for a changing world

NORTH CENTRAL CLIMATE SCIENCE CENTER
UNIVERSITY CONSORTIUM