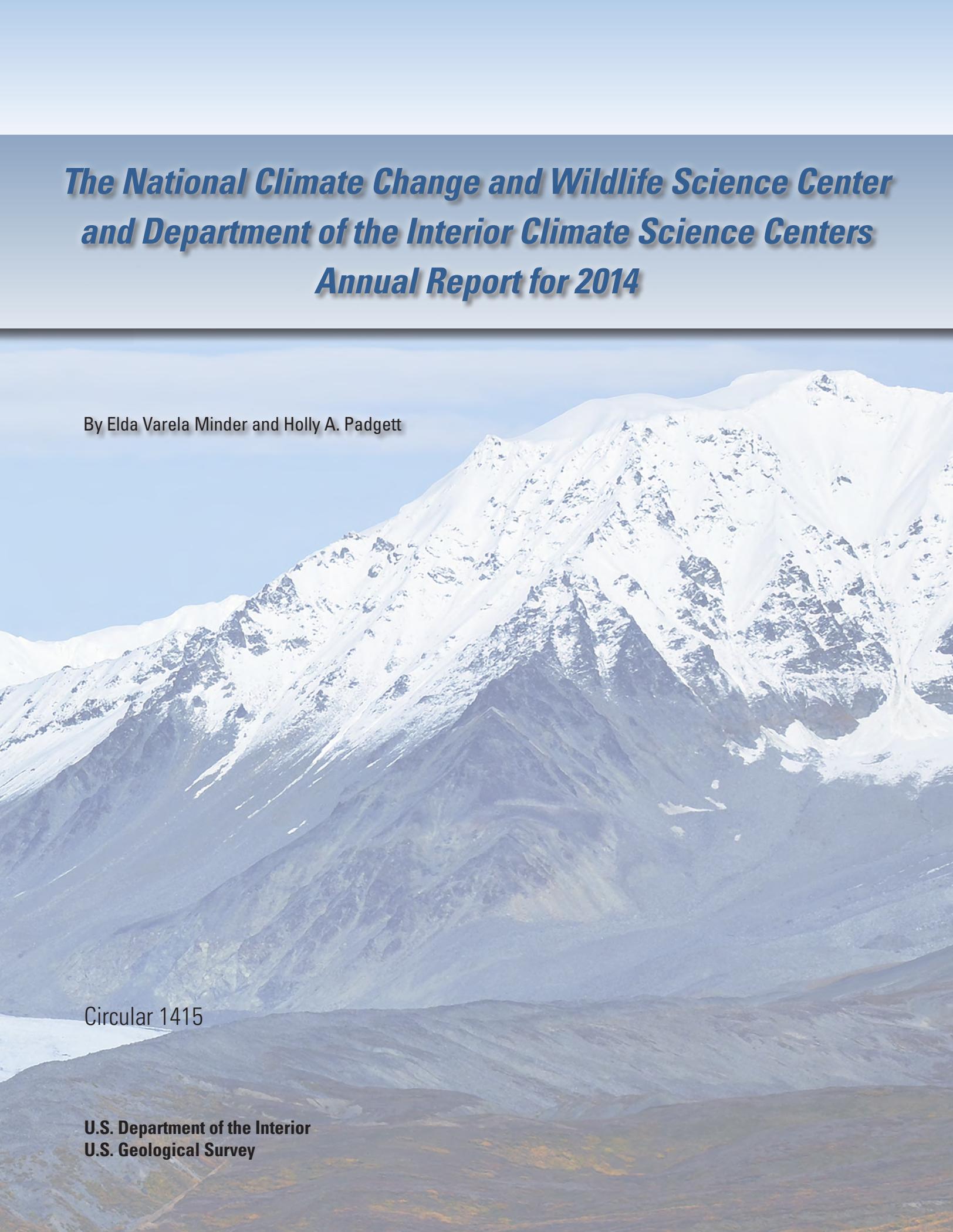


*The National Climate Change and Wildlife Science Center
and Department of the Interior Climate Science Centers
Annual Report for 2014*

Circular 1415

U.S. Department of the Interior
U.S. Geological Survey

Cover. Gulkana Glacier, Alaska, view from west of the Glacier, August 2013. Photograph by Joan Holzer, USGS.



***The National Climate Change and Wildlife Science Center
and Department of the Interior Climate Science Centers
Annual Report for 2014***

By Elda Varela Minder and Holly A. Padgett

Circular 1415

**U.S. Department of the Interior
U.S. Geological Survey**



U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2015

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Contents

Introduction.....	1
Providing Science and Tools to Address the Impacts of Climate Change	1
National Science Priorities	1
NCCWSC Research Highlights and Publications	2
CSC Research Highlights and Publications.....	3
New CSC Agendas and Plans	3
2014 Select Publications	3
Data/Tools	5
Partnering to Ensure High Quality and Usable Science for All Stakeholders	7
New Federal Partners	7
Building Relations and Communicating Our Science	7
Tribal and Indigenous Communities Activities.....	7
Workshops/Courses	9
Conferences/Meetings	11
Communicating with Partners	12
Media/News	12
Training the Next Generation of Scientists and Managers	13
Student Activities.....	13
Strengthening the NCCWSC/CSC Enterprise	15
More about the NCCWSC and DOI CSCs.....	16
DOI Climate Science Centers	16

Abbreviations

ACCCNRS	Advisory Committee on Climate Change and Natural Resource Science
AK CSC	Alaska Climate Science Center
AOOS	Alaska Ocean Observing System
ACOATS	Alaska Online Aquatic Temperature Site
AISES	American Indian Science and Engineering Society
ASBPA	American Shore and Beach Preservation Association
ALCC	Arctic LCC
CSC	Climate Science Center
CMNSDI	College of Menominee Nation Sustainable Development Institute
CMIP5	Coupled Model Intercomparison Project Phase 5
CWRM	Commission on Water Resource Management
DLNR	Department of Land and Natural Resources
DOI	Department of the Interior
EROS	Earth Resources Observation and Science
ELOKA	Exchange for Local Observations and Knowledge of the Arctic
FY	Fiscal Year
GCMP	Southeast Global Change Monitoring Portal
IHS	Indian Health Service
IHIs	Indigenous community Health Indicators
IPCC	Intergovernment Panel on Climate Change
ITBC	Intertribal Buffalo Council
LCC	Landscape Conservation Cooperative
NASA	National Aeronautics and Space Administration
NC CSC	North Central Climate Science Center
NCCWSC	National Climate Change and Wildlife Science Center
NCTC	National Conservation Training Center
NDMC	National Drought Mitigation Center
NICE-T	NASA Innovations in Climate Education-Tribal
NE CSC	Northeast Climate Science Center
NIDIS	National Integrated Drought Information System
NKN	Northwest Knowledge Network
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	National Resources Conservation Service
NW CSC	Northwest Climate Science Center
OCCRI	Oregon Climate Change Research Institute
OU	University of Oklahoma
PI CSC	Pacific Islands Climate Science Center
RISAs	Regional Integrated Sciences and Assessment Programs



SAHM	Software for Assisted Habitat Modeling for VisTrails
SC CSC	South Central Climate Science Center
SCENIC	Southwest Climate and Environmental Information Collaborative
SDM	Structured Decision Making
SE CSC	Southeast Climate Science Center
SGCETC	Self-Governance Communication and Education Tribal Consortium
SNOWY	Strategic Needs of Water on the Yukon
SW CSC	Southwest Climate Science Center
TEK	Traditional Ecological Knowledge
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USET	United South and Eastern Tribes
UHM	University of Hawaii at Mānoa
UMN	University of Minnesota
WALCC	Western Alaska Landscape Conservation Cooperative
WERC	Water and Environmental Research Center
YRITWC	Yukon River Inter-Tribal Watershed Council



Rainbow Falls, Hawaii (Photograph by Alan M. Cressler, U.S. Geological Survey).

The National Climate Change and Wildlife Science Center and Department of Interior Climate Science Centers Annual Report for 2014

Introduction

The National Climate Change and Wildlife Science Center (NCCWSC) and the Department of the Interior (DOI) Climate Science Centers (CSCs) had another exciting year in 2014. The NCCWSC moved toward focusing their science funding on several high priority areas and, along with the CSCs, gained new agency partners; contributed to various workshops, meetings, publications, student activities, and Tribal/indigenous activities; increased outreach; and more.

Providing Science and Tools to Address the Impacts of Climate Change



In 2014, the NCCWSC and the CSCs awarded nearly \$6 million to universities and other partners in support of 50 new research projects that will better prepare natural and cultural resource managers to make decisions about helping wildlife, ecosystems, and communities adapt to the impacts of climate change. **You can learn more about the 2014 projects initiated by the NCCWSC at <https://nccwsc.usgs.gov/nccwsc-projects>.**

National Science Priorities

The NCCWSC defined a set of national science priorities and initiated several projects to address these priorities in 2014. These priority research areas include understanding the ecological consequences of drought; climate impacts to migratory birds, marine birds, and waterfowl; and available down-scaled climate information. These themes are meant to build on CSC-level projects to understand larger trends in climate change impacts, synthesize regional information, and ensure that species, habitats, and climate impacts that span multiple geographies are addressed. Additionally, other research projects have focused on the effects of global change on inland fisheries and the use of scenario planning to inform land and wildlife management.

Ecological Drought: In 2014, the NCCWSC initiated projects related to understanding ecological drought—a persistent and abnormal deficiency of biologically available water to terrestrial and aquatic ecosystems. Research teams will examine how climate change is expected to affect [vegetation growth patterns](#), which in turn can affect herbivore species, such as elk, moose, and [deer](#), in Wyoming and surrounding areas. Another team will examine the impact of climate change and extreme drought on [desert bighorn sheep](#) in the Southwestern U.S. In spring 2014, the NCCWSC also released a national funding opportunity to solicit proposals related to ecological drought for research funding in fiscal year (FY) 2015 (several projects have been selected and will be announced in 2015).

Migratory Birds: The NCCWSC is working to address the lack of an information framework to help researchers and managers understand the impact of climate change across the life cycle and migratory range of bird species. This work



A mule deer released after being radio-collared (Mark Gocke, Wyoming Game and Fish Department).

“These climate studies are designed to help address regional concerns associated with climate change, providing a pathway to enhancing resilience and supporting local community needs. The impacts of climate change are vast and complex, so studies like these are critical to help ensure that our Nation’s responses are rooted in sound science.” – U.S. Secretary of the Interior Sally Jewell, December 18, 2014 (funding announcement [press release](#)).

will involve synthesizing previous work conducted by the CSCs as well as funding new projects in 2015 and beyond to understand these impacts. This work will build on projects funded by the CSCs, such as a 2014 Northeast CSC project focused on developing [ecological indicators](#) of climate change from the North American Breeding Bird Survey. The Alaska CSC also incorporated this theme into its funding opportunity announcement for 2015 funds.

Downscaled Climate Information: The NCCWSC is partnering with agencies, scientists, and others to improve the guidance available to managers on the selection and use of future climate projections. NCCWSC and CSC researchers will continue this work in 2015 to produce a guidance document.

Global Inland Fisheries: Inland fish species, and their associated fisheries, are especially vulnerable to global change because they generally have limited habitat availability and a direct link with terrestrial systems, land-use patterns, and freshwater use. In 2014, NCCWSC funded researchers to identify data and knowledge gaps related to how climate change can affect [inland fisheries](#) and to identify the major climate change drivers related to these fisheries. In a second project, researchers will assess the climate change effects on [native trout](#) throughout the United States.



Native westslope cutthroat trout swim in the north fork of the Flathead River in northwestern Montana (Jonny Armstrong, USGS).

Scenario Planning: The NCCWSC is supporting a team of researchers and management partners to design and implement a [pilot scenario](#) planning effort that will provide (1) information on the climate change impacts and adaptation options that can be used in management plans affecting boreal forests and moose in the Northeast and (2) a set of best practices that can teach others about how scenario planning can be used in future projects.

NCCWSC Research Highlights and Publications

In line with the NCCWSC’s efforts to fund research to understand the impacts of climate change on global inland fisheries, in 2014, a NCCWSC-supported research team published a paper, [A morphometric approach for stocking walleye fingerlings in lakes invaded by rainbow smelt](#), describing an approach for determining the appropriate size for walleye fingerlings that can be stocked in lakes to prevent predation by invasive rainbow smelt. Researchers from NCCWSC were also co-authors of the paper, [Inland capture fishery contributions to global food security and threats to their future](#), which

explores several major threats to inland fisheries, which are an important part of ensuring global food security now and in the future. Lastly, the NCCWSC Chief co-authored the paper, [Maintaining resilience in the face of climate change](#), where the authors suggest that government institutions may currently lack the capacity to manage substantial changes to ecological, legal, and resource management systems that are projected to occur with climate change.

NCCWSC-supported researchers also published articles on:

- [Temperature effects induced by climate change on the growth and consumption by salmonines in Lakes Michigan and Huron](#)

Journal: Environmental Biology of Fishes

Findings suggest that lake trout and steelhead will be better able to adapt to climate change than Chinook salmon due to the large amount of prey the Chinook salmon would need in order to survive in warmer waters.

- This article is a product of a NCCWSC-supported project.

- [Effects of land use and climate change on stream temperature I: Daily flow and stream temperature projections](#)

Journal: Journal of the American Water Resources Association

Results suggest that the relations between land-use change, climate change, and stream temperatures are very complex.

- This article is a product of a NCCWSC-supported project.

- [Effects of land use and climate change on stream temperature II: Threshold exceedance duration projections for freshwater mussels](#)

Journal: Journal of the American Water Resources Association

The models used for this research indicated that stream temperature thresholds for freshwater



Young freshwater mussels as seen through a microscope (Teresa Newton, USGS).

mussels could be exceeded within the next 50 years in many parts of the upper Tar River Basin, North Carolina, which could have negative consequences on the recruitment of freshwater mussels.

- This article is a product of a NCCWSC-supported [project](#).
- [The effects of elevated water temperature on native juvenile mussels: Implications for climate change](#)

Journal: The Society for Freshwater Science

Research described in this article found that climate change may cause further harm to already endangered or threatened freshwater mussels in North America.

- This article is a product of a NCCWSC-supported [project](#).
- [Projecting climate effects on birds and reptiles of the Southwestern United States](#)

Journal: Open-File Report 2014–1050

Study results indicate that dramatic distribution losses and a few major distribution gains are forecasted for Southwestern bird and reptile species as the climate changes.



Arizona black rattlesnake (Erika Nowak, USGS).

- This article is a product of a NCCWSC-supported [project](#).
- [Retrospective analysis of associations between water quality and toxic blooms of golden alga \(*Prymnesium parvum*\) in Texas reservoirs: Implications for understanding dispersal mechanisms and impacts of climate change](#)

Journal: Harmful Algae

The study described here concluded that in the past, golden algal blooms spread because of human or natural introductions, and climate did not play a role. However, findings suggest that climate change could play a role in future bloom events.

- This article is a product of a NCCWSC-supported [project](#).

CSC Research Highlights and Publications

CSC-supported scientists continued to develop plans and provide managers with publications, data, and tools based on their research and findings. Select CSC produced publications follow:

New CSC Agendas and Plans

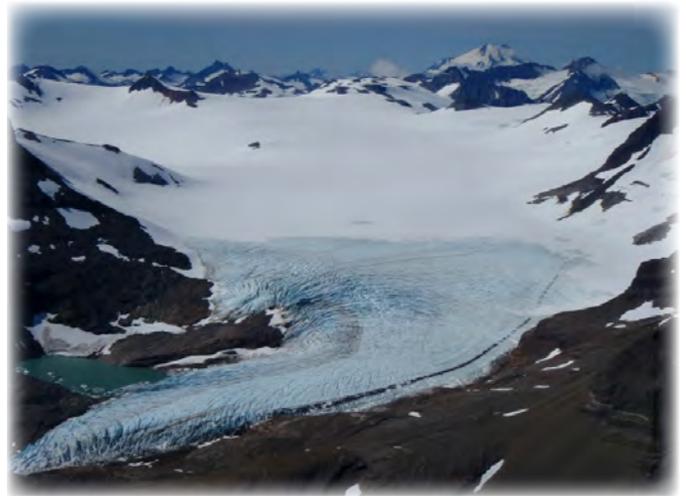
- [Northeast Climate Science Center Strategic Science Agenda 2013–2018](#)
- [Northeast Climate Science Center Communications Plan](#)
- [Pacific Islands Climate Science Center Five-Year Science Agenda, 2014–2018](#)
- [Tribal Engagement Strategy of the South Central Climate Science Center, 2014](#)
- [Southwest Climate Science Center 2015 Annual Science Workplan](#)

2014 Select Publications

Alaska CSC

New Study Improves Understanding of How Glacier Mass Balance Processes Impact Streamflow

[Assessing streamflow sensitivity to variations in glacier mass balance](#)



Glacier in Coast Range (USFWS Alaska).

Journal: Climatic Change

U.S. Geological Survey (USGS) Alaska (AK) Science Center glaciologist Shad O’Neel was lead author on a study which evaluated relations among seasonal and annual glacier mass balances, glacier runoff, and streamflow in two glacierized basins in different climate settings. The study shows the importance of glacier volume loss to streamflow in the continental climate, but shows that this contribution to streamflow is small in a maritime climate where winter snowfall rates are high and variable. The overall goal of the study was to improve the understanding of how glacier mass balance processes impact streamflow, ultimately improving our conceptual understanding of the future evolution of glacial runoff in continental and maritime climates.

North Central CSC

A New Framework for Helping Managers Deal With the Complexities of Climate Change

[Integrating research tools to support the management of social-ecological systems under climate change](#)

Journal: Ecology and Society

In this paper the authors, Brian Miller from Colorado State University and Jeffrey Morisette, the North Central (NC) CSC USGS Director, review three tools that have proven useful for climate change research, but whose application and development have been largely isolated: species distribution modeling, scenario planning, and simulation modeling. The researchers describe how the respective strengths and weaknesses of these methods can be viewed as complementarities and then offer an analytical framework, or workflow, for integrating the methods. The authors go on to explain how this workflow can help shift climate change research from “useful to usable” and contribute to the goal of producing “actionable” climate science.

Northeast CSC

Climate Change and Woody Debris

[Linking climate change and downed woody debris decomposition across forests of the eastern United States](#)

Journal: Biogeosciences

Northeast (NE) CSC-supported researchers at the University of Massachusetts, Amherst, looked at the impacts of climate change on the decomposition rates of downed woody debris and found that climate change may result in a more rapid decomposition of woody debris in Eastern U.S.

forests. The researchers hope that their results will lead to improved models that incorporate climate change scenarios for depicting future dead wood dynamics. This article is a product of a NE CSC-supported [project](#).

Northwest CSC

Assessing Population Vulnerability for Stream Species Using Bull Trout as a Case Study

[Combining demographic and genetic factors to assess population vulnerability in stream species](#)



Bull trout and westslope cutthroat trout (Jonny Armstrong, USGS).

Journal: Ecological Applications

Northwest (NW) CSC-supported scientists introduced a novel modeling framework for aquatic systems that integrates demographic, genetic, and environmental variables. This framework could be used to guide conservation and management efforts in identifying populations vulnerable to environmental change. This article is a product of a NW CSC-supported [project](#).

Pacific Islands CSC

Predicting Long-Term Shoreline Change

[Long-term shoreline change at Kailua, Hawaii, using regularized single transect](#)

Journal: Journal of Coastal Research

Pacific Island (PI) CSC-supported researchers from the University of Hawaii at Mānoa present an alternative approach to estimating long-term trends in shoreline change. The authors tested their technique against historical data and found that it had better predictive capability than two other techniques for naturally complex shorelines like those found on the Pacific islands. The authors also concluded that this method is more straightforward for land managers and, therefore, is a more practical approach for long-term planning.

South Central CSC

Climate Change Impacts on Freshwater Availability and Coastal Wetland Species

[Freshwater availability and coastal wetland foundation species: Ecological transitions along a rainfall gradient](#)

Journal: Ecology

A USGS-led research team discusses the influence of freshwater availability on the coverage of foundation plant species in coastal wetlands along a northwestern Gulf of Mexico rainfall gradient. The team identified regional ecological thresholds and nonlinear relations between measures of freshwater availability and the relative abundance of foundation plant species in tidal wetlands. This article is a product of a South Central (SC) CSC-supported [project](#).

Southeast CSC

Southern Megalopolis: Future of Urban Sprawl

[The southern megalopolis: Using the past to predict the future of urban sprawl in the Southeast U.S.](#)



I-75 North, Atlanta, Georgia (Photograph by Alan M. Cressler, USGS).

Journal: Plos One

Striking visualizations created by a team of Southeast (SE) CSC and North Carolina (NC) State University researchers and published in PLOS One garnered a great deal of media attention. The paper predicts that the extent of urbanization in

this region could increase by 101percent to 192percent in the next 50 years and describes a megalopolis that extends from Atlanta, Georgia, to Raleigh, North Carolina. This kind of urbanization can significantly affect forests, grasslands, and other non-urban areas and the capacity of species to respond to climate change. Urban growth models such as the one in this paper can help inform decisions of natural resource managers and urban planners. This article was highlighted in several [media outlets](#). This article is a product of a SE CSC-supported [project](#).

Southwest CSC

Managing Novel Ecosystems

[Managing the whole landscape: Historical, hybrid, and novel ecosystems](#)

Journal: Frontiers in Ecology and the Environment

Given the finite nature of the Earth's ecosystems, in this report the Southwest (SW) CSC USGS Director Stephen Jackson and others emphasize the need to value all ecosystems in some way and to conserve nature in its many forms, including entirely unprecedented patterns, and to consider different ways of managing ecosystems.

Data/Tools

Alaska CSC

AK CSC and USGS Scientists Publish Guidelines for the Collection of Water Temperature Data in Alaska

By [Kristin Timm](#)



Pikmiktalik River, Yukon Delta National Wildlife Refuge (Travis Booms, USFWS, Alaska).

Created in conjunction with the development of the [Alaska Online Aquatic Temperature Site \(AKOATS\)](#), USGS Open-File Report 2014-1182, [Guidelines for the collection of continuous stream water-](#)

[temperature data in Alaska](#), is part of a series of products being developed with the Western Alaska Landscape Conservation Cooperative and the Alaska Natural Heritage Program aimed at creating an Alaska-wide stream and lake water temperature monitoring network. On the basis of USGS protocols, this document provides suggestions for the development and design of continuous stream water temperature monitoring sites with a discussion of concepts, procedures, and data management for other government agencies and non-governmental organizations conducting monitoring and research specifically within Alaska.

North Central CSC

Online Mapping Tool Shows States and Federal Land Boundaries Within the NC CSC Region

The NC CSC’s University Consortium has developed and posted an online mapping tool to show DOI lands (broken down by agency), Tribal lands, and the spatial extent of funded projects for the North Central domain. The overview for the tool is available [online](#), with a link to a [more detailed and interactive map](#) that allows the user to toggle different map layers on and off.

Northwest CSC

[WaterViz for Hubbard Brook](#)

This visualization tool represents the nexus between the hydrologic sciences, visual arts, music, and computer design. Hydrologic data captured from a small watershed at the Hubbard Brook Experimental Forest in the White Mountains of New Hampshire using an array of environmental sensors are transmitted to the Internet and used to drive a computer model that calculates all components of the water cycle for the watershed in real time. This visualization is intended to allow the viewer to intuit the dynamic inputs, outputs, and storage of water in this small, upland forested watershed as these processes are occurring.

Northwest CSC

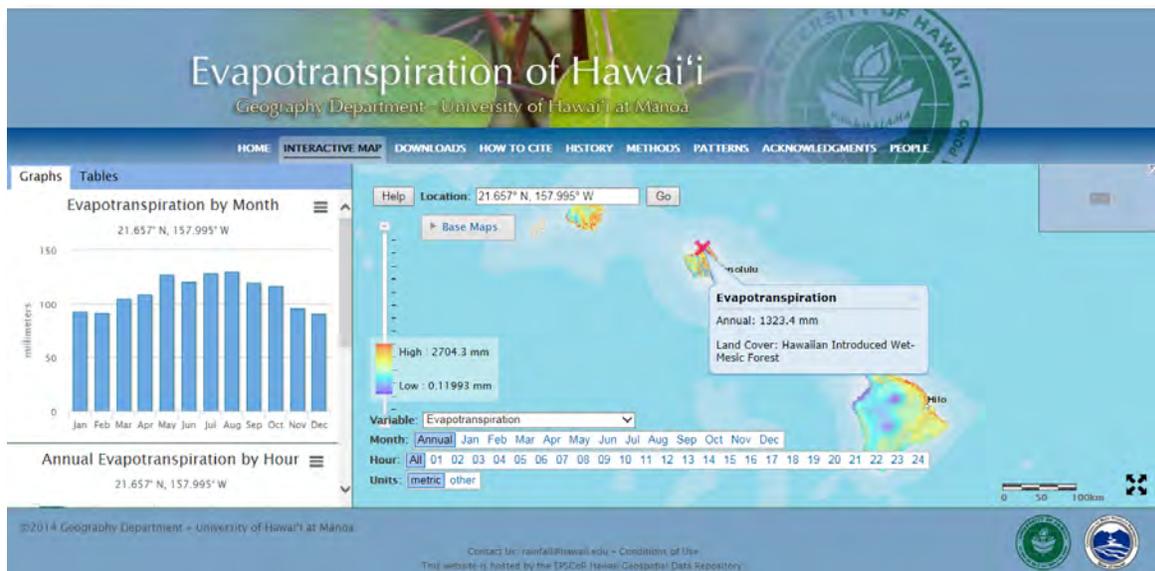
NCCWSC and NW CSC Develop Data Management Guidelines

The University of Idaho—one of the primary partners of the NW CSC—is developing guidelines for the handling, formatting, and curation of metadata, social science data, and Tribal project data. These guidelines will be available as a reference to all CSCs throughout the national network. The NCCWSC is a primary sponsor of these activities, with the NW CSC providing funding specifically for the Tribal data effort.

Pacific Islands CSC

[University of Hawaii at Mānoa Geography Department Unveils Interactive Water Resource Management Web site](#)

The Geography Department in the College of Social Sciences at the University of Hawaii at Mānoa, with support from the PI CSC, unveiled a new, interactive evapotranspiration, solar radiation, and climate [Web site](#) for the main Hawaiian Islands. Expanding the existing Rainfall Atlas of Hawaii Web site, this new site forms a family of products that provides critical information on the State’s climate and water processes, all accessible in a single location.



A screenshot of the “Evapotranspiration of Hawaii” interactive [web site](#).

Southeast CSC

New Global Change Monitoring Portal for the Southeast

The SE CSC has developed a new database and Web interface that allows the search and display of information about ecosystem observational networks and monitoring sites in the Southeast. Specifically, the [Southeast Global Change Monitoring Portal](#) (GCMP) aims to support the efforts of multiple Federal, State, and other organizations by providing a centralized, comprehensive catalog of observational networks associated with aquatic and terrestrial ecosystems in the Southeast U.S. that may be influenced by climate change.

Southwest CSC

[New Online Tool Connects Climate Information, Data and Tools with User Needs](#)

The Southwest Climate and Environmental Information Collaborative ([SCENIC](#)), a new online application, provides access to climate data, tools, and applications for decision support as well as meaningful access to other links and resources related to climate and climate change in the Southwestern U.S.

Partnering to Ensure High Quality and Usable Science for All Stakeholders

“Interior has developed a nationwide network of Climate Science Centers and Landscape Conservation Cooperatives through which scientists and land managers work together to translate science into hands-on solutions that partners from all levels of government and the private sector can use to make sure our resources are resilient.” – U.S. Secretary of the Interior Sally Jewell, June 3, 2014

During 2014, the NCCWSC continued to receive guidance from both DOI and its Federal advisory committee, The Advisory Committee on Climate Change and Natural Resource Science (ACCCNRS), on its mission and goals. The Secretary of the Interior, Sally Jewell, [reaffirmed](#) her commitment to the President’s Climate Action Plan with plans to address climate change through numerous different initiatives throughout DOI. The ACCCNRS met three times as a full committee in 2014 and created additional work group meetings focused on Actionable Science, Refining the Role of the NCCWSC and CSCs in the Climate Science Decision Support Landscape, Tribal and Indigenous Peoples Matters, and Program Evaluations. The ACCCNRS also produced a [report to the Secretary of the Interior](#) with recommendations regarding the importance of actionable science, coordination with

partners, engagement with Tribal and indigenous peoples, and evaluation of the NCCWSC and CSC enterprise. This report was finalized for release in 2015.

New Federal Partners

In February 2014, U.S. Department of Agriculture (USDA) Secretary Tom Vilsack [announced](#) the locations of seven new [USDA Climate Hubs](#) and three Sub-Hubs across the country that will “deliver science-based knowledge and practical information to farmers, ranchers, and forest landowners to support decision-making related to climate change.” In several regions, the CSCs have already established relations with the Climate Hubs, and all of the CSCs will continue building these partnerships, collaborating also with the National Oceanic and Atmospheric Administration (NOAA) Regional Integrated Sciences and Assessment Programs (RISAs) and the Landscape Conservation Cooperatives (LCCs) to collectively provide data, findings, tools, and forecasts for resource managers.

In July 2014, Secretary Jewell [announced](#) a new partnership between the USGS and the Bureau of Indian Affairs and a plan to place five Tribal Climate Extension Support Liaisons at the CSCs to strengthen coordination and engagement with Tribal and indigenous peoples and communities. These liaisons will work at the regional level with tribes to identify basic climate information and knowledge needs of tribes and will work with other Federal partners to address those needs.

Building Relations and Communicating Our Science

Tribal and Indigenous Communities Activities

The CSCs continue to strengthen the relations with their regional Tribal and indigenous partners:

- [Understanding Climate Change Impacts in the Aleutian Islands](#): In partnership with the Aleutian and Bearing Sea Islands LCC and Alaska Ocean Observing System (AOOS), the **AK CSC** sponsored a community conversation on climate change in Unalaska, Alaska. The primary focus of this session was on hearing from local residents about changes in the environment that they had observed and information needs within the Aleutian Island communities. The session was hosted by the Qawalangin Tribe of Unalaska and took place at the Museum of the Aleutians in September 2014.
- **USGS Scientists Investigate Current and Historical Winter Conditions in the Yukon-Kuskokwim Delta Through Integration of Indigenous Knowledge, Snow, and Water Chemistry Data**: The **AK CSC** and USGS Alaska Science Center hydrologists joined fellow USGS researchers in conducting an innovative project known as “Strategic Needs of Water on the

Yukon” or [SNOWY](#). The SNOWY project developed as a result of collaboration between Alaska Native communities, the Yukon River Inter-Tribal Watershed Council (YRITWC), the Exchange for Local Observations and Knowledge of the Arctic (ELOKA), the USGS, the U.S. Forest Service (USFS), and Colorado State University.

- **[NC CSC Attends Meeting With the Intertribal Buffalo Council](#)**: The NC CSC engaged with the Intertribal Buffalo Council (ITBC) during a half-day meeting in Rapid City, South Dakota, in September 2014. The purpose of the meeting was to (a) share “ways of knowing” between the local and technical knowledge holders about drought decisions, indicators, impacts, and responses; (b) identify manager’s needs; and (c) inform the ITBC about funding opportunities for drought-related projects as well as decision support tools and opportunities through various organizations (NOAA/National Integrated Drought Information System [NIDIS], National Drought Mitigation Center [NDMC], NCCWSC, USDA Climate Hub, and others).
- **A U.S. Fish and Wildlife Service (USFWS) National Conservation Training Center (NCTC) Climate Change Vulnerability Assessments Course Offered in North Central Region**: The NC CSC assisted several Tribal environmental professionals in attending this meeting by providing funds to cover travel expenses.
- **[College of Menominee Nation a Recipient of NASA’s 2014 Innovations in Climate Education-Tribal Awards](#)**: The award is made through the National Aeronautics and Space Administration (NASA) Innovations in Climate Education-Tribal (NICE-T) activity, and the NE CSC consortium member College of Menominee Nation was a recipient for 2014. The awards activity supports Tribal colleges and their partners as they seek to improve teaching and learning about global climate change on their campuses, and the winning proposals illustrate innovative uses of NASA educational material to support elementary, secondary, and undergraduate teaching and learning.
- **[Shifting Seasons Summit](#)**: College of Menominee Nation Sustainable Development Institute (CMN SDI), a consortium member to the NE CSC, hosted the Shifting Seasons Summit in October 2014 that involved information sharing and training related to Tribal climate change adaptation. The summit brought together Tribal decision makers, Federal agencies, indigenous practitioners, land resource managers, and climate change scientists to share knowledge and resources that may benefit both Tribal and non-tribal entities for climate change adaptation specifically in the Northeast Region. The SE CSC also gave a presentation at the summit.
- **[Building Tribal Capacity for Climate Change Adaptation Webinar](#)**: Speakers from the NE CSC consortium member at the College of Menominee Nation presented a webinar on “Building Tribal Capacity for Climate Change Adaptation.” The webinar discussed the climate change adaptation training for tribes that was discussed at the Shifting Seasons Summit held in October 2014. The discussion included providing an overview of the summit’s participants and activities, lessons learned, outcomes, and plans for future Tribal adaptation training.
- **[Publication on Indigenous Community Health and Climate Change](#)**: In a [study](#) with funding support from the NW CSC and the North Pacific LCC, members of the Swinomish Indian Tribal Community in Washington State, the Tsleil-Waututh First Nation in British Columbia, and the USGS applied indigenous community health indicators (IHIs) they had developed together to identify climate adaptation priorities for their coastal communities. The paper, detailing the study, is titled “[Indigenous community health and climate change: integrating biophysical and social science indicators](#),” and was published in the journal Coastal Management.
- **[NW CSC Supports Tribal Student Attendance at the Pacific Northwest Climate Science Conference](#)**: The NW CSC supported the attendance of 50 students and Tribal staff at the September 2014 Pacific Northwest Climate Science Conference in Seattle, Washington. Students and staff from 10 Northwest tribes also participated in a regional conference with more than 400 other climate scientists and practitioners.
- **The NW CSC Seeks to Apply Indigenous Knowledge to Climate Change**: The NW CSC, the Coeur d’Alene Tribe, and University of Idaho’s [Northwest Knowledge Network](#) (NKN) began work to identify the indigenous knowledge and practices of the Schitsu’umsh people that underlie their interactions with the historically dynamic environment of the Palouse, a major Northwest agricultural area. This [pilot project](#) will inventory and organize traditional ecological knowledge (TEK) and contextual information (metadata) while developing a set of best practices for Tribal/ governmental collaborative ethnographic research.
- **The NW CSC Assists Tribes With Climate Change Adaptation**: The NW CSC, in partnership with the [Institute for Tribal Government at Portland State University](#), has launched a systematic assessment of climate change capacity for 15 tribes in the Columbia River Basin and three inter-tribal organizations (Columbia River Inter-Tribal Fish Commission, Upper Columbia United Tribes, and the Upper Snake River Tribes). This effort is intended to identify specific technical, scientific, and policy capacity requirements for each tribe; promote climate change education and program development; and assist tribes to increase their knowledge of climate change, potential effects on Tribal resources, and adaptation plans.

- **The SE CSC Participates at the United South and Eastern Tribes (USET) Meeting:** The program coordinator at the SE CSC was a presenter at the Natural Resources Committee of the USET meeting on Oneida Indian lands in New York State in December 2014 and provided an update on both SE and NE CSC activities and discussed Tribal engagement opportunities.

SC CSC Takes the Lead in Working With Regional Tribes on Environmental Initiatives

The SC CSC team, led by their Sustainability Scientist and Tribal Liaison with the SC CSC consortium member Chickasaw Nation, April Taylor, worked with tribes to promote environmental awareness and enhance environmental programs within Tribal communities. The team participated in several tribe led [events](#), including the 17th [Annual Tribal Environmental Summit](#) (March 2014), the [Chickasaw Nation Native Explorers](#) (March 2014), and the “To Bridge A Gap” meeting (April 2014), and helped organize and lead a series of workshops with SC CSC Tribal partners by

- Hosting the 2014 TESNAR [Technical Training in Support of Native American Relations] Environmental Assessment and Problem Solving with GIS [Geographic Information System] [Workshop in August 2014](#). The workshop was developed to provide training for Tribal environmental staff that use GIS and Tribal GIS staff that are interested in environmental problem solving.
- Leading the “[Climate 101](#)” course for Oklahoma tribes in September 2014 that provided an introduction to climate change to assist tribes as they prepare to develop vulnerability assessments and climate adaptation strategies. Training classes took place in Ft. Cobb, Wyandotte, Durant, and Stroud, Oklahoma. The target audience for these classes is Tribal environmental professionals, culture keepers, and planners.

The SC CSC also engaged with tribes at several Tribal events:

- The SC CSC described several of the training classes and educational outreach that the SC CSC had planned for the year at the January 2014 [American Indian Science and Engineering Society \(AISES\) Meeting](#) with Oklahoma Tribal leaders and their educational directors in order to encourage participation in these events. [AISES](#) was hosted by the USDA Natural Resources Conservation Service (NRCS) in partnership with the Oklahoma Tribal Conservation Advisory Council and Citizen Potawatomi Nation.
- The SC CSC also gave a presentation on “Climate Change Science and Impacts to Tribes” at the Tribal

Self-Governance Annual Consultation Conference in May 2014 which was hosted by the Self-Governance Communication & Education Tribal Consortium (SGCETC), DOI, and the Indian Health Service (IHS).

- April Taylor (SC CSC sustainability scientist) conducted educational outreach at the environmental education area of the [American Indian Shawnee Trail Days](#) in June 2014, an event that celebrates the rich history of Oklahoma and the exciting culture of pioneers and American Indians.
- The SC CSC gave a presentation on photo geotagging to monitor climate change, and participants were able to view a series of historical maps on display. April Taylor and Mike Langston (USGS) gave demonstrations of greenhouse gas emissions and ocean acidification at the [Indian Education Summit Pre-conference Institute](#) in September 2014, which was held with participation from the SC CSC, the University of Oklahoma (OU) American Indian Institute, OU Outreach, and the Oklahoma State Department of Education.
- The SC CSC’s Tribal outreach activities helped the Choctaw Nation of Oklahoma and the SC CSC apply for and receive a [\\$150,000 grant](#) from the Bureau of Indian Affairs in FY 2014 to offer vulnerability assessment training to Native Americans in Oklahoma and New Mexico in 2015. The NCTC will provide the instructors for this training.
- Release of Video by Native Americans About Climate Change Impacts. Designed to facilitate dialogue regarding climate change and Native Americans in the South-Central United States, the video, “[Listening for the Rain](#),” was released by the OU in August 2014. The video documents the experiences of Native participants who attended five workshops on Tribes and climate change. The workshops were held in Oklahoma and New Mexico in 2013, and funding was provided by the SC CSC. These workshops were conceived by Paulette Blanchard, an Absentee Shawnee and graduate student at OU, who also narrates the video.

Workshops/Courses

The CSCs and their partners hosted a series of workshops and courses in 2014 for scientists and managers to assist managers with decision making, promote science communication, and foster research collaborations:

- Climate Science Centers contributed to the [Rising Voices II workshop](#): The NC, NE, PI, SC, and SW CSCs provided support for the Rising Voices II workshop that took place in Boulder, Colorado. Representatives from the NC CSC attended the workshop.

- The NC CSC collaborated with the NCTC to offer a NCTC-sponsored climate change vulnerability assessment [course](#) in Jackson, Wyoming. This course was designed to guide conservation and resource management practitioners in identifying species and systems that may be vulnerable to projected changes in climate and why they may be vulnerable.
- The NE CSC helped the Northern Institute of Applied Climate Science to host a workshop on “[Climate Change and Southern New England Forests](#)” for natural resource professionals on the University of Massachusetts campus in Amherst, Mass.
- The Program Manager of the NE CSC facilitated 4 days of discussions among scientists and National Park Service (NPS) and USFS resource managers during [climate change refugia workshops](#).
- The NW CSC and the [Climate Impacts Research Consortium](#) hosted a [1-day workshop](#) on future Northwest scenarios, in Portland, Oregon, to help managers make use of the latest models and datasets predicting future scenarios for the Northwest.
- The PI CSC participated in the “Preserving Freshwater Resources and Minimizing the Impacts of Drought” [workshop](#) in the Republic of the Marshall Islands. The workshop was hosted by NOAA through the U.S. Agency for International Development in April 2014 on the island of Majuro. The workshop was designed to provide climate science services to the island communities to improve water management practices.
- The SE CSC held a [science video training workshop](#) for N.C. State University researchers and students led by a USGS researcher. The goal was to demystify the video-making process and teach the basics of planning, shooting, editing, and publishing a science video.
- The SW CSC sponsored the “Colorado River Basin streamflow projection under Intergovernmental Panel on Climate Change (IPCC) Coupled Model Intercomparison Project Phase 5 (CMIP5) scenarios: From the global to basin scale using an integrated dynamic modeling approach” [workshop](#) at the University of Arizona in Tucson. SW CSC Principal Investigators reported on their progress and discussed results to date on these scenarios with stakeholders.

- The SW CSC co-sponsored the NCTC course “[Climate Smart Conservation](#)” (May 2014) in Tucson, Arizona, with the Desert LCC in coordination with the National LCC office. This [course](#) is based on a forthcoming guide to the principles and practice of Climate-Smart Conservation.

The SE and NE CSCs Host Climate Change Meeting for National Wildlife Refuge (NWR) Managers:

The “[Impacts of Climate Change](#)” meeting for NWR leaders from Alligator River, Cape Romain, and Blackwater NWRs was held at the Alligator River NWR, North Carolina, in March 2014. During the meeting, CSC scientists listened and learned about refuge managers’ greatest challenges for NWR adaptation to global change and the type of science that could assist them with the management decisions they must make. Following the “Impacts of Climate Change” meeting, managers and project leaders from four Atlantic coast refuges (South Carolina Lowcountry Complex, North Carolina Coastal Plain Complex, Chesapeake Marshlands Complex, and Parker River NWR) met for a [workshop](#) at the NCTC in Shepherdstown, West Virginia, in June 2014 to work with ecologists, decision scientists, geographers, natural resource economists, and social scientists to address decisions about long- and short-term coastal adaptation strategies.



Scientists and National Wildlife Refuge Managers who participated in the ‘Impacts of Climate Change’ meeting, including NE CSC Director Mary Ratnaswamy (second from left) and SE CSC Director Jerry McMahon (second from right). (Mary Ratnaswamy, USGS, NE CSC).

NW, SW, and SE CSC scientists gave presentations at the 2014 Ecological Society of America annual conference in Sacramento, California, in August. The SW CSC and the California LCC co-sponsored an [organized oral session](#) titled “Ecological Drought in California Forests: Linking Climate Science and Resource Management.” The NE CSC also [organized a session](#) titled “Breaking From the Center: Increasing Resilience to Climate Change and Extreme Events From the Sierra Nevada to the Atlantic Ocean.” The panel featured research from across all CSCs. In addition, SW CSC Director Stephen Jackson was named a [fellow](#) of the Ecological Society of America (ESA). The ESA states that it “designates as Fellows of the Society certain members who have made outstanding contributions to a wide range of fields served by ESA.”



Conferences/Meetings

NCCWSC and CSC scientists attended and gave presentations at some of the top conferences in their fields of research:

- Science projects from the **NC, NW, and SE CSCs** were presented and discussed at the [Second State-and-Transition Simulation Modeling Conference](#) in September 2014 in Fort Collins, Colorado. The workshop concluded with a panel on future directions led by NC CSC Director Jeff Morisette and highlighted how State and Transition Simulation Modeling can provide a community framework for quantitatively integrating climate change, ecological models, and management scenarios.
- **NE CSC fellows** gave a presentation on climate change impacts to bird species at the 132nd joint meeting of [American Ornithologists' Union, Cooper Ornithological Society](#) in September in Estes Park, Colorado, and a **PI CSC** scientist presented findings of avian malaria research in Hawaiian forest birds.
- Several NCCWSC- and NE CSC-supported researchers attended the [American Fisheries Society Meeting](#) in Quebec City, Canada, in August 2014. The researchers gave presentations on the different aspects of climate change impacts on freshwater and marine fishes and their habitats.
- Several of the CSCs worked together to develop poster sessions and presentations at the [2014 AGU \[American Geophysical Union\] Fall Meeting](#) in December 2014. Staff from the **SE, SC, and NC CSCs** organized a 1-hour panel discussion in the poster area with about 11 posters participating on the topic, "New Opportunities in Global Change Collaboration: Utilizing Federal–University Partnerships to Develop Actionable and Needs-Driven Science Agendas." The SC CSC

also led the poster session "Climate Science Centers: An 'Existence Theorem' for a Federal–University Partnership to Develop Actionable and Needs-Driven Science Agendas."

The CSCs also hosted a few regional meetings and presentations:

- The **NC CSC** co-hosted the "[Connecting the Drops: The 'Think or Swim' Climate Change Symposium](#)." The event was "A musical evening to Talk Story in The Aloha Spirit" and included music from Hawaii and interactive stories, conversations, and other thoughts about water and weather.
- The [Stream Temperature Data and Modelling Meeting](#) highlighted on-going stream temperature research in the Northeast. The meeting was hosted by the FWS North Atlantic LCC, EPA Region 1, **NE CSC** and the USGS Conte Anadromous Fish Research Center and was held at the USFWS Regional Office in Hadley, Massachusetts, on May 1.
- **The PI CSC** sent 16 researchers, including the Center Director, to the 22nd [Annual Hawaii Conservation Conference](#) in Honolulu, Hawaii, July 2014. The theme was "Navigating Change in the Pacific Islands" and encompassed presentations by 11 PI CSC-



Haleakala silverswords (National Park Service).

In its fifth year, the [Pacific Northwest Climate Science Conference](#) had a record-breaking turnout for the 2014 conference in Seattle, Washington! The conference was sponsored and organized in part by the NW CSC, and special focus was given to NW CSC-funded science during the plenary session titled "Dancing with the Management Stars: Science-Management Partnerships that Provide Actionable Science." NW CSC USGS Director, Gustavo Bisbal, introduced the session which featured three talks, each tag-teamed by a scientist and manager pair who explained the process of finding a common language to produce science to improve adaptation strategies in Northwest forests, mountains, and tidal wetlands, and reinforced the Center's dedicated focus on actionable science. Washington Governor, Jay Inslee, was a keynote speaker for the 2014 Pacific Northwest Climate Science Conference where he identified climate action as a moral responsibility and called on scientists to engage more actively with policy makers and with the public.



Washington Governor, Jay Inslee, addresses a packed auditorium at the 2014 Pacific Northwest Climate Science Conference. (Office of Governor Jay Inslee)

supported students and researchers that included topics on climate-driven changes in the Hawaiian Islands.

- **PI CSC** researchers presented research on climate change effects at high-altitude regions regarding ecosystem drivers in subalpine shrubland and population declines of the Haleakala silversword at the [Island Biology 2014 Conference](#), an International Conference on Island Evolution, Ecology, and Conservation. The July conference took place at the University of Hawaii at Mānoa (UHM) campus in Honolulu, Hawaii.
- In October 2014, the USGS Director of the **PI CSC** gave a presentation on “Stakeholder-Driven Science Needs to Address Changing Climate in the Pacific Islands Region” at USGS Headquarters in Reston, Virginia. Input from regional stakeholders has highlighted gaps in terrestrial and marine geospatial information, predictive models, and ecological understanding needed to support Pacific communities in making practical decisions as they manage risks and build resilience to climate impacts affecting natural resources, economic sectors, and public health. In the PI CSC Director’s talk, needs, opportunities, and priorities were discussed in the context of the PI CSC 5-Year Science Agenda.
- In conjunction with the Southern Plains Transportation Center, the **SC CSC** hosted the Region 6 Transportation—[Climate Summit](#). The summit took place in Norman, Oklahoma, in September 2014, at the National Weather Center. The purpose of the summit was to bring together weather and climate and transportation specialists to educate one another, spur new ideas, and promote fruitful collaborations for research at and between the regional universities, transportation departments, and government research institutions.
- **SE CSC** USGS Director Jerry McMahon and a team of researchers from the SE CSC gave presentations at the [Carolinas Climate Resilience Conference](#) in April in Charlotte, North Carolina. The conference was an opportunity for practitioners, researchers, and staff from local, State, and Federal agencies to share information about climate-related tools, resources, experiences, and activities in the Carolinas. Dr. McMahon was on the planning committee for the conference.

Communicating with Partners

NCCWSC continued to host the Climate Change Science and Management [Webinar Series in partnership with the U.S. Fish and Wildlife Service’s National Conservation Training Center](#). Eleven webinars were held in 2014 with topics ranging from sea-level rise modeling to social networks to mountain pine beetles and whitebark pine forests. Recordings of NCCWSC webinars can be found at <https://nccwsc.usgs.gov/webinars>. Regional webinar series were also hosted by the **NE CSC** ([Fall](#) and [Spring](#) series), **NW CSC**, and the **SW CSC**. These webinars highlight research projects across the different CSC regions and are appropriate for a wide audience including both scientists and managers.

In 2014, the NCCWSC Web site (<https://nccwsc.usgs.gov/>) and the bimonthly BioClimate newsletter from NCCWSC and the CSCs received major redesigns to support efforts to communicate the wide range of research and activities being conducted across the network. NCCWSC and the CSCs also gained a larger Web presence through social media platforms (Twitter and Facebook) and plans are to increase these efforts in 2015. Interested individuals are invited to explore the many ways to stay in touch with NCCWSC and the CSCs at <https://nccwsc.usgs.gov/social-media>, including signing up for the NCCWSC [BioClimate Newsletter](#).

NCCWSC also released a new fact sheet on their mission and partnerships. The fact sheet is available at <https://nccwsc.usgs.gov/content/fact-sheets>.

Media/News

NCCWSC and the CSCs interacted with State and agency leadership in many ways, emphasizing the value the Centers hold throughout the Nation:

- **The Alaska Dispatch Covered the AK CSC-Supported Publications About Climate Change Impacts in Alaska:** The studies discussed in the articles “The effects of a spruce bark beetle outbreak and wildfires on property values in the wildland–urban interface of south-central Alaska, U.S.A” and “Statistically downscaled projections of snow/rain partitioning for Alaska” were covered in the news articles “Massive burns of beetle-killed trees benefit Alaska home values” (December 2013) and “[Alaska’s future looks more rainy, less snowy](#)” (June 2014), respectively.

- **Massachusetts Senator Marc R. Pacheco Visited the NE CSC:** In his talk, Senator Pacheco focused on Massachusetts' status as a leader on green policies and clean energy practices, as well as plans for future climate legislation. The NE CSC discussed the goals, activities, and accomplishments of the Center with the Senator.
- **Director Ratnaswamy Discussed Climate Change Impacts With NH Senator Shaheen:** In April 2014, the NE CSC Director, Mary Ratnaswamy, participated in a round table discussion with New Hampshire Senator Jeanne Shaheen to discuss climate change and its impacts on the State.
- **Secretary Jewell Holds Roundtable with Scientists on Climate Change Impacts to the Pacific Northwest:** In February, Secretary of the Interior, Sally Jewell, met with leading scientists and stakeholders, including the NW CSC Director, Gustavo Bisbal, to discuss the impacts of climate change on the Pacific Northwest region. At the meeting, Secretary Jewell highlighted Interior's role in the President's Climate Action Plan to reduce carbon pollution, move the economy toward cleaner energy sources, and prepare communities for the impacts of climate change.
- **PI CSC University Director Briefs Hawaii Commission on Water Resource Management:** In June, the PI CSC University Director, Kevin Hamilton, was invited by the staff of the Hawaii Commission on Water Resource Management (CWRM) to give a briefing on possible climate change in Hawaii and its implications for water resources. As a part of the Hawaii Department of Land and Natural Resources (DLNR), the commission's mission is to protect the freshwater resources of Hawaii through wise and responsible management. The commission administers the State Water Code created in 1987 by the Hawaii State Legislature and is concerned that climate change will impact rainfall and evapotranspiration and will affect Hawaii's freshwater resources.
- **SE CSC Grand Opening Receives Attention from State Officials and DOI Leaders:** The SE CSC held its [grand opening](#) at its host institute North Carolina State University in January 2014. Congressman David Price was on hand to give opening remarks. Congressional staffers for Senators Hagan and Burr and Congressman Holding and Congresswoman Ellmers, and USGS Climate and Land Use Change Associate Director Matt Larsen also attended. The SE CSC USGS Director and the former SE CSC University

Director spoke at the event. The event also included a poster session to highlight the research work of SE CSC student fellows.

- **SE CSC Researcher Briefs DOI Secretary at Climate Change Event:** Secretary Jewell held a roundtable discussion in June in Jamestowne, Virginia, to discuss how climate change is affecting the region, including impacts to cultural resources from rising sea levels. A research ecologist with the SE CSC had the opportunity to brief the Secretary at this event. The roundtable of State and Federal employees, and the SE CSC researcher, emphasized the need for both data and education on climate change.

Training the Next Generation of Scientists and Managers

Student Activities

- **AK CSC/Water and Environmental Research Center (WERC), University of Alaska Fairbanks Oversee 2-Year Student Grant Competition:** The 2014 competition called for proposals that address water resource issues focused on the applied research needs of the Western Alaska LCC (WALCC) and (or) the Arctic LCC (ALCC). Specifically, the competition sought to support projects that will assist land managers in making management decisions regarding water resources in their respective cooperatives. The grant was intended primarily for the support of graduate or undergraduate student researchers.
- **The NC CSC Establishes Operational Training for the Software for Assisted Habitat Modeling (SAHM):** The Software for Assisted Habitat Modeling for VisTrails (SAHM) expedites habitat modeling and helps maintain a record of the various input data, the steps before and after processing, and the modeling options incorporated in the construction of an ecological response model. The [sessions](#) were held in March and September 2014.
- **NE CSC Fellows Retreat:** The NE CSC and the University of Missouri hosted the Second Annual NE CSC Fellows Retreat in October, where 22 postdoctoral and graduate students from six partner institutions gathered to share their research, develop interdisciplinary connections and collaborations, and learn about climate adaptation challenges facing forest [managers](#).



Participants at the NE CSC Fellows Retreat (Addie Rose, University of Massachusetts, Amherst).

- **NE CSC Hosts Climate Change Workshops for High School Students:** NE CSC scientists hosted two workshop sessions related to climate change impacts on biodiversity and the carbon cycle as part of the Massachusetts Envirothon team-based competition for high school students held at the University of Massachusetts Amherst in November.
- **New Postdoctoral Fellow in Forest Adaptation:** Alessandra Bottero, Ph.D., joined as a new postdoctoral fellow at the University of Minnesota (UMN), a NE CSC consortium member. Dr. Bottero will be working with scientists from UMN, the USDA Forest Service Northern Research Station, the USGS, and the University of Maine on a project examining potential adaptation strategies for forests across the Northeastern U.S.

- **The NW CSC’s Climate Boot Camp 2014:** The NW CSC held its annual Climate Boot Camp in August 2014 at Silver Falls State Park in Silverton, Oregon. Climate Boot Camp provides intensive professional development for CSC graduate students and early career professionals. The goal of the camp is to prepare fellows for successful careers by providing knowledge and abilities in climate science education, science communication, knowledge integration, and the science-policy interface, all in a climate change and adaptation context through a concentrated session of formal and non-formal education, skill development, and interaction with practicing professionals.
- **NW CSC Graduate Fellow, Sihan Li, Honored for Academic Excellence:** In May 2014 NW CSC graduate fellow, Sihan Li, will be one of two recipients honored with the Wayne V. Burt award for academic excellence demonstrated by a graduate student in physical oceanography or atmospheric sciences at Oregon State University. Li works with Dr. Philip Mote, University Director of the NW CSC and the Oregon Climate Change Research Institute (OCCRI) on a project called Weather at Home.
- **The PI CSC Adds a New Member to the IPRC Dynamical Downscaling Group:** Dr. Weiguang Meng, Ph.D., joined as a postdoctoral fellow with the International Pacific Research Center dynamical downscaling group at the University of Hawaii at Mānoa. Dr. Meng will be working on two projects funded by the PI CSC: “21st Century High-Resolution Climate Projections for Guam and American Samoa” and “Very Fine Resolution Dynamical Downscaling of Past and Future Climates for Assessment of Climate Change Impacts on the Islands of O‘ahu and Kaua‘i.”

Ayse Karanci, SE CSC Global Change Fellow, 2013–2014

Ayse Karanci, a Ph.D. student in the N.C. State University Department of Civil, Construction, and Environmental Engineering, was a 2013–2014 Global Change Fellow through the SE CSC. She attended the structured decision making (SDM) class at the NCTC in summer 2013 with the SE CSC fellows and later incorporated SDM methods into her own research. She then had the opportunity to discuss this research with North Carolina Congressman David Price during a poster session that took place during the grand opening celebration of the SE CSC in January 2014. Ms. Karanci also went on to be invited to serve as a SDM apprentice to the NCCWSC/SE CSC project “Forecasting the Effects of Land-Use and Climate Change on Wildlife Communities and Habitats in the Lower Mississippi Valley.” The apprenticeship informed her graduate research on Barrier Islands and led to her recently (October 2014) being awarded the American Shore & Beach Preservation Association (ASBPA) Student Educational Award. The award includes a \$500 cash stipend, and the award winner attends the conference to present his or her findings to the coastal community. Ms. Karanci’s presentation titled “Modeling Overwash on a Barrier Island: Land Cover Implementation” focused on numerical modeling of storm-induced breaching and overwash along the North Carolina Outer Banks. She incorporated detailed information on land cover and vegetation into the model which has improved the accuracy of predictions. This research can be used to assess vulnerability and resilience of coastal systems across our Nation’s coasts.



North Carolina Congressman David Price inquiring about the increased vulnerability of the coasts to extreme events due to climate change with Ayse Karanci (N.C. State University Communications).

Dr. Meng will also be involved in the initial assessment of the concept of simulation and quantification of wet deposition/cloudwater intercept and associated soil moisture over the Hawaiian Islands.

- **SC CSC Sponsored Early Career Researcher Workshop, June 15–20, 2014, in Norman, Oklahoma:**

This professional development workshop assembled a multidisciplinary group of graduate students, post-doctoral researchers, and early career researchers conducting climate-related research across the South-Central U.S. A major benefit of this workshop will be the development of a cohort of early-career professionals who can continue networking through their research pathways and who can understand and eventually lead outcome-oriented, interdisciplinary research.

- **SC CSC 3-week Undergraduate Summer Internship for Underrepresented Minorities:**

The SC CSC offered a summer undergraduate internship opportunity from July to August 2014 for students of underrepresented minorities interested in science, technology, engineering, and mathematic fields. Interns were involved in hands-on activities related to climate research that allowed them to see the direct impacts of climate variability and change on forest ecosystems in Oklahoma, coastal areas in Louisiana, and the Texas Hill Country.

- **Global Change Fellows Complete Week of SDM Training:**

For the second year in a row, the SE CSC has sponsored a group of graduate students for training on SDM at the NCTC in Shepherdstown, West Virginia.

- **SE CSC Welcomes a New Postdoctoral Fellow:**

In Summer 2014, Colin Shea, Ph.D., joined the SE CSC team as a postdoctoral fellow. Dr. Shea has a background in ecology and natural resource management with an emphasis on the conservation of endangered fish and mussel species in lotic systems. He is currently part of a project aimed at assessing the range-wide status and dynamics of the New England Cottontail populations.

Strengthening the NCCWSC/CSC Enterprise

In 2014, the NCCWSC and CSC enterprise continued to grow with several new hires that will strengthen the network's infrastructure and capabilities.

NCCWSC

Melissa Matty, located in Tucson, Arizona, is an administrative officer for the network, providing crucial support on financial and administrative tasks.

Abigail Lynch, Ph.D., is a research fisheries biologist coordinating several projects related to the climate impacts on inland

fisheries and supporting NCCWSC in achieving other national science priorities.

North Central CSC

Gabriel Senay, Ph.D., is co-located at the NC CSC and the USGS Earth Resources Observation and Science (EROS) Center. Dr. Senay is focusing on the integration and application of remotely sensed data for agro-hydrologic modeling.

Northeast CSC

Alexander Bryan, Ph.D., is a new USGS postdoctoral fellow at the NE CSC, helping CSC partners and stakeholders make decisions about the selection and interpretation of climate projections and models.

Northwest CSC

Lisa Hayward Watts, Ph.D., joined the NW CSC as the communications coordinator. She leads science communication and outreach efforts for the NW CSC and is located at the University of Washington in Seattle.

Pacific Islands CSC

Kelvin Richards stepped into the role of University Director for the PI CSC after Kevin Hamilton retired from the position in 2014.

Sarah Nash joined the PI CSC as a program specialist. She is located at the University of Hawaii at Hilo and provides support on science coordination, communications, and building relations among stakeholders, partners, and universities in the region.

Southeast CSC

Ryan Boyles became the new University Director for the SE CSC after Damian Shea Boyles retired from the position in 2014.

Southwest CSC

Carolyn Enquist, Ph.D., is the new Deputy Director. Her work has largely focused on the conservation and management implications of climate change.

Lara Schmit is the Communication and Program Manager at the University of Arizona. She will work to translate technical scientific information into products suitable for non-scientists, including involvement in workshops, fact sheets, Web content, and media releases.

Anita Govert is the Grants and Contracts Coordinator at the University of Arizona. She will help in the area of grants management.

More About the NCCWSC and DOI CSCs

National Climate Change and Wildlife Science Center

Director: T. Douglas Beard, Jr., Ph.D.
Location: Reston, Virginia

NCCWSC Web site: <https://nccwsc.usgs.gov/>

DOI Climate Science Centers

Alaska Climate Science Center (AK CSC)

USGS Director: Stephen T. Gray, Ph.D.
University Director: Scott Rupp, Ph.D.

Host: University of Alaska, Fairbanks

DOI Web site: <http://www.doi.gov/csc/alaska/index.cfm>
Consortium Web site: <https://csc.alaska.edu/>

[FY 2014 AK CSC Projects](#)

North Central Climate Science Center (NC CSC)

USGS Director: Jeffrey Morisette, Ph.D.
University Director: Dennis Ojima, Ph.D.

Host: Colorado State University

DOI Web site: <http://www.doi.gov/csc/northcentral/index.cfm>
Consortium Web site: <http://revampclimate.colostate.edu/>

[FY 2014 NC CSC Projects](#)

Northeast Climate Science Center (NE CSC)

USGS Director: Mary Ratnaswamy, Ph.D.
University Director: Richard Palmer, Ph.D.

Host: University of Massachusetts, Amherst

DOI Web site: <http://www.doi.gov/csc/northeast/index.cfm>
Consortium Web site: <http://necsc.umass.edu/>

[FY 2014 NE CSC Projects](#)

Northwest Climate Science Center (NW CSC)

USGS Director: Gustavo Bisbal, Ph.D.
University Director: Phil Mote, Ph.D.

Host: Oregon State University

DOI Web site: <http://www.doi.gov/csc/northwest/index.cfm>
Consortium Web site: <https://www.nwclimatescience.org/>

[FY 2014 NW CSC Projects](#)

Pacific Islands Climate Science Center (PI CSC)

USGS Director: David Helweg, Ph.D.
University Director: Kelvin Richards, Ph.D.

Host: University of Hawaii, Mānoa

DOI Web site: <http://www.doi.gov/csc/pacific/index.cfm>
Consortium Web site: <http://apdrc.soest.hawaii.edu/PICSC/>

[FY 2014 PI CSC Projects](#)

South Central Climate Science Center (SC CSC)

USGS Director: Kim Winton, Ph.D.

University Director: Berrien Moore III, Ph.D.

Host: University of Oklahoma

DOI Web site: <http://www.doi.gov/csc/southcentral/index.cfm>

Consortium Web site: <http://southcentralclimate.org/>

[FY 2014 SC CSC Projects](#)

Southeast Climate Science Center (SE CSC)

USGS Director: Gerard McMahon, Ph.D.

University Director: Ryan Boyle, Ph.D.

Host: North Carolina State University

DOI Web site: <http://www.doi.gov/csc/southeast/index.cfm>

Consortium Web site: <http://globalchange.ncsu.edu/secsc/>

[FY 2014 SE CSC Projects](#)

Southwest Climate Science Center (SW CSC)

USGS Director: Stephen Jackson, Ph.D.

University Director: Jonathan Overpeck, Ph.D.

Host: University of Arizona, Tucson

DOI Web site: <http://www.doi.gov/csc/southwest/index.cfm>

Consortium Web site: <http://www.swcsc.arizona.edu/>

[FY 2014 SW CSC Projects](#)

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