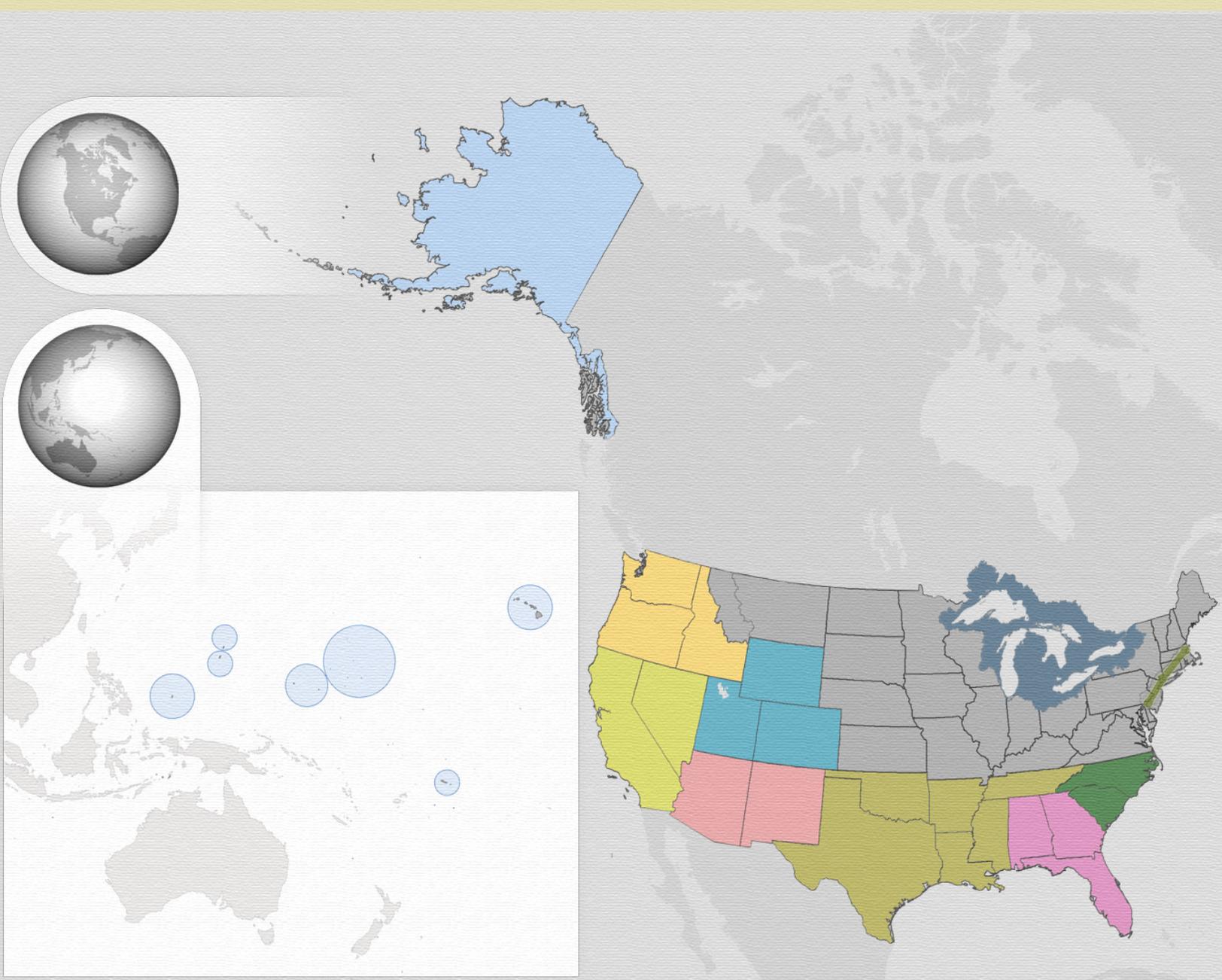




# NOAA RISA

## 2011 annual report

[www.cpo.noaa.gov/cpo\\_pa/risa](http://www.cpo.noaa.gov/cpo_pa/risa) | [www.noaa.gov](http://www.noaa.gov) | [www.commerce.gov](http://www.commerce.gov)

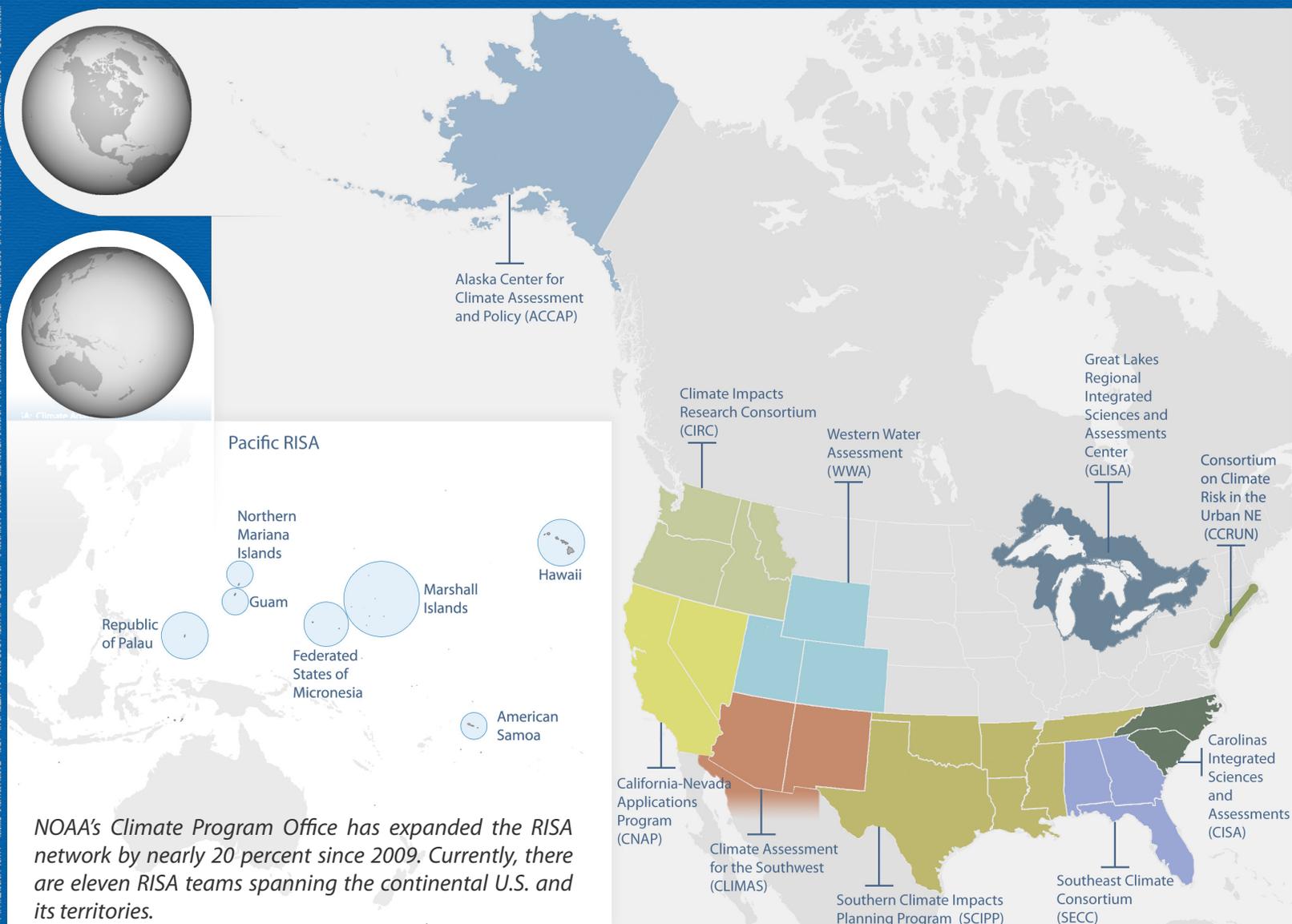


# NOAA RISA

## 2011 annual report

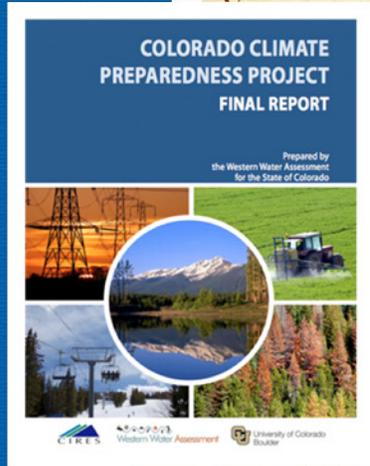
For over 15 years, NOAA's Regional Integrated Sciences and Assessments (RISA) program has been supporting research teams that conduct interdisciplinary and regionally relevant research to inform resource management, planning, and public policy. RISA teams help build the nation's capacity to prepare for and adapt to climate variability and change by providing cutting-edge scientific information to public and private user communities. NOAA is currently supporting eleven RISA teams (see Figure 1) through five-year, cooperative agreement awards. In 2011, three new awards were made to the following RISA teams: the Alaska Center for Climate Assessment and Policy; the California-Nevada Applications Program; and the Carolinas Integrated Sciences and Assessments program.

This report contains a description of the major activities and accomplishments of the RISAs in 2011. In Section I, each RISA presents one major accomplishment achieved during this past year that highlights a combination of research and interaction with decision makers or key partners. Section II presents topics that are emerging as major priorities in nearly all of the RISA regions, and gives examples of some of the approaches that the RISAs are taking, both independently and collaboratively, to tackle these issues.



# Chapter 1:

## RISA Descriptions and Major Accomplishments



in a bi-weekly webinar (web-based) on drought conditions, impacts and resources in the Southern Plains. Webinars are held on the 4th Thursdays of each month at 10:00 AM. The content is geared toward a general audience with the responsibility to manage or assist others with drought-related impacts.

To attend these webinars, you need to register via [www.southernclimate.org](http://www.southernclimate.org) or e-mail [scipp@mesonet.org](mailto:scipp@mesonet.org). Registration is free but limited to 100 participants. Each webinar will last about 90 minutes. You will be provided with a toll-free phone line to call in.

The report provides an overview of the current drought conditions and the many impacts across the region, and discusses the role of La Niña and wildfire conditions. You will also learn about the most topics for following webinars. The report is most heavily impacted from the current drought in Colorado and New Mexico — but participation is encouraged.

Prepared by a partnership of the following organizations:

To register or for more information, contact:

**Southern Climate Impacts Planning Program**  
<http://www.southernclimate.org>  
405-325-2541 or [scipp@mesonet.org](mailto:scipp@mesonet.org)

#### Webinar Topics:

- La Niña
- Cattle & Livestock
- U.S. Drought Monitor
- Ecological Impacts
- Assistance Programs
- Water Supply
- Ranch Drought Planning
- Wildfire
- Drought Ready Communities
- Agricultural Impacts





# Alaska Center for Climate Assessment & Policy

*ACCAP Professor Philip Loring facilitates a climate change discussion in Alaska on ongoing and future impacts of climate change.*  
Photo by: Ben Stevens.

*"In a short period of time ACCAP has established itself as a key Alaska go-to center for climate information."*

—Ian Dutton, Former President and CEO, Alaska SeaLife Centers

The Alaska Center for Climate Assessment and Policy (ACCAP) was established in 2006 with a mission to improve the ability of Alaskans to respond to a changing climate. ACCAP works directly with agencies, industries, and citizens to inform realistic community plans and climate adaptation strategies using the most scientifically accurate, reliable, and up-to-date information. Housed at the University of Alaska Fairbanks, ACCAP's work encompasses the entire state of Alaska. Core foci include coastal and living marine resources; applied climate downscaling; tribal impacts and adaptation; wildfires; community adaptation planning; and sea ice and its related infrastructure, transportation, security and ecosystem issues.

## **2011 Accomplishment:**

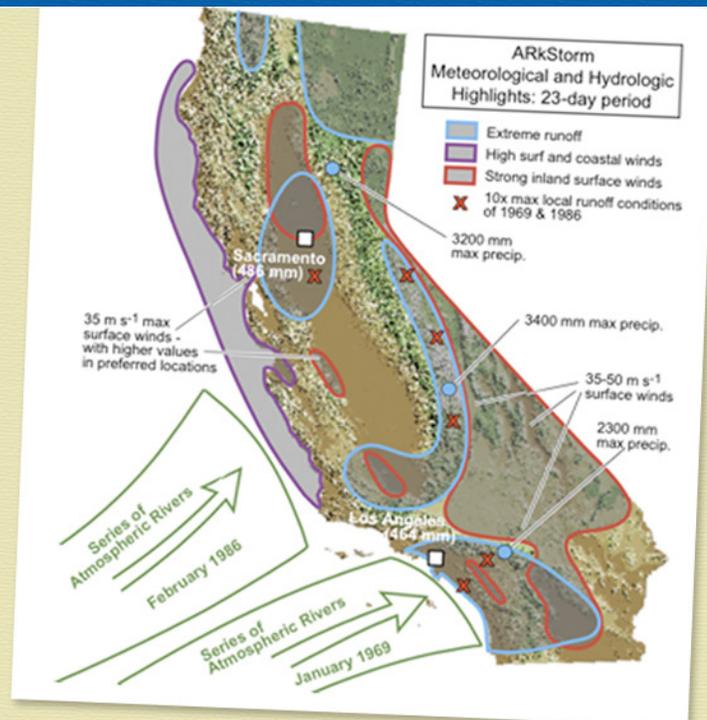
ACCAP faculty, in cooperation with the Alaska Native Tribal Health Consortium, are working with tribal environmental professionals in the Bristol Bay region of Alaska to understand ongoing and future impacts of climate change on community infrastructure. In early 2011, our team provided a climate change short course, offered as a continuing education module through UAF's Bristol Bay Campus. This training was a three-day intensive, providing both background material on the biophysical and socioeconomic dimensions of climate change, and concluding with examples of adaptation planning approaches as well as exposure to how tribal environmental professionals can contribute through citizen science to our understanding of climate change impacts in Alaska's coastal zone. Currently, we are in the process of identifying three to four communities in the region for which we will complete assessments in 2012 of both climate change impacts on human health and on local civic infrastructure such as water and wastewater facilities.

Visit:

<http://ine.uaf.edu/accap>

# California Nevada Applications Program

Summary map of extreme conditions resulting from the ARkStorm scenario.  
Photo courtesy of CNAP.



"[CNAP] provided [California's Department of Water Resources (DWR)] with expert advice on all aspects of climate change as DWR developed the recently released California Water Plan Update 2009, the State's strategic plan for water. Specific advice sought and provided by [CNAP] included the representation of climate change science in Update 2009, incorporation of climate change into water demand modeling, and the development of response strategies to address climate change impacts on water management."

—John Andrew, Assistant Deputy Director, California Department of Water Resources

The California Nevada Applications Program (CNAP) RISA was established in 1999. The Program covers California and Nevada, with an emphasis on water resources, wildfire, climate extremes, and the value of climate observations in decision-making. A strong physical science core is a hallmark of CNAP, whose team has members at the Scripps Institution of Oceanography at the University of California San Diego, the Desert Research Institute at the University of Nevada Reno, the University of California Merced, and the U.S. Geological Survey.

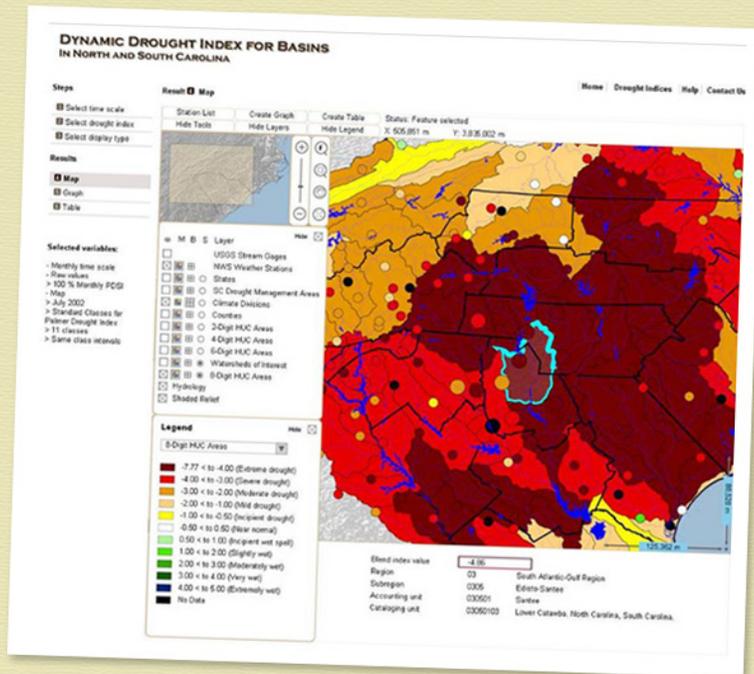
## 2011 Accomplishment:

West Coast winter storms are not as notorious as southeastern U.S. hurricanes, but these storms can bring high winds, large rainfall totals, and major floods, storm surges, and coastal erosion to California. This past year, CNAP members Mike Dettinger, Tapash Das, Kelly Redmond and Dan Cayan organized and designed meteorological events and data for the ARkStorm Scenario, a disaster preparation effort, under auspices of USGS Multihazards Program. ARkStorm was based upon a plausible and eventually inevitable, "atmospheric river" winter storm sequence that delivered copious precipitation, peak river discharge, and massive coastal impacts. About 120 experts across many disciplines and agencies were involved. ARkStorm revealed this extreme winter storm and flood event would require large-scale evacuations of people and livestock to avoid massive loss of life. Impacts would be felt statewide, with potential costs of over \$700 billion. One-quarter of California's buildings could suffer some form of flood damage. Results indicate that existing flood protection, including river and estuarine levee systems, is inadequate. Better observations and advanced modeling will help to extend and improve forecasts. ARkStorm underscored the need for better awareness and functionality to manage such an extreme storm and flood event.

<http://meteora.ucsd.edu/cnap>

Visit:

# Carolinas Integrated Sciences and Assessments



The Carolinas Dynamic Drought Index Tool displays multiple drought indices for different time scales and across user-specified regions. The tool displays several layers showing weather stations, streams and lakes, climate division boundaries, and 8-digit Hydrologic Unit Codes.

Source: CISA Dynamic Drought Index Tool Webpage.

*"In my opinion, the entire process [of conducting the Vulnerability and Consequence Adaptation Planning Scenario session] provided an extremely important benefit for the Town...The thought process with your tool requires the users to understand all consequences of the action, takes most of the emotionalism out and provides fact-based documentation. This not only forces us to address the many consequences (intended and unintended) associated with the examination but also creates a richer experience for all involved."*

—Vulnerability and Consequence Adaptation Planning Scenario (VCAPS) session participant, Sullivan's Island, South Carolina

Established in 2004, the Carolinas Integrated Sciences and Assessments (CISA) program works with stakeholders across North Carolina and South Carolina to incorporate climate information into water and coastal management and related decision-making processes. CISA's activities encompass five focus areas: drought, climate and watershed modeling, coasts, health, and adaptation. Efforts include improving drought monitoring and management; linking climate variability to watershed and land-use planning; planning for coastal adaptation; and characterizing regional climate vulnerabilities. CISA is based at the University of South Carolina, with investigators located at the Southeast Regional Climate Center (UNC-Chapel Hill), North and South Carolina Sea Grant, North Carolina State Climate Office, South Carolina State Climate Office, and East Carolina University.

## 2011 Accomplishment:

CISA has developed the Carolinas Dynamic Drought Index Tool (DDIT)—a prototype that displays multiple drought indices for different time scales and across user-specified regions. CISA and the NOAA Regional Climate Centers (RCCs) have been refining the functionality of the DDIT and transferring the tool to the Applied Climate Information System (ACIS) developed and used by the RCCs. For example, the 50-year base period (1950 - 2004) of DDIT was changed to a 40-year period (1970s - present) for the eastern U.S. based on data availability in the region. The drought index values for user-selected areas and periods will be retrieved using the web services of ACIS, instead of using a database with stored, pre-calculated values. The types of spatial features handled by the ACIS will be expanded to include various scales of watersheds and region-specific layers of the DDIT, such as the South Carolina Drought Management Areas. CISA also made significant progress displaying uncertainty in drought mapping. A cognitive cartographic study measured user interpretation of uncertainty symbols in drought maps.

Visit:  
[www.cisa.sc.edu](http://www.cisa.sc.edu)

# Climate Assessment for the Southwest

*Persistent drought conditions for over a decade have contributed to significant impacts on rangelands in northeastern Arizona. The photo above shows damage from a series of spring 2009 dust storms. CLIMAS researchers have teamed up with the Hopi Tribe Department of Natural Resources to improve drought monitoring and planning.*

**Photo by:** Dan Ferguson, University of Arizona.



*“My staff and I have limited technical knowledge regarding climate models and downscaled climate data, and guidance and support [from the Climate Assessment for the Southwest] have not only contributed to our understanding, but have also ensured that we are providing the best results for the Tucson community.”*

—Leslie Ethen, Director, Office of Conservation and Sustainable Development, City of Tucson

The Climate Assessment for the Southwest (CLIMAS) was founded in 1998 to work closely with stakeholders in Arizona and New Mexico to improve the region’s ability to respond sufficiently and appropriately to climatic events and climate changes. CLIMAS is based at the University of Arizona’s Institute of the Environment, but also includes researchers at New Mexico State University. Current CLIMAS research, largely guided by needs in the region, focuses on six primary themes: climate adaptation and vulnerability; water and drought; decision support; economics and livelihoods; health; and translation and communication of science.

## 2011 Accomplishment:

With additional support from NOAA’s National Integrated Drought Information System and Sectoral Applications Research Program, CLIMAS embarked on a project in September 2010 to: 1) formally assess tribal drought information needs in the semi-arid Four Corners region of the Southwest; and 2) develop decision-support products, communication mechanisms, and partnerships to increase Navajo and Hopi resource managers’ capacity to respond to drought and develop longer-term climate change adaptation strategies. In 2011 the research team completed an initial assessment with Hopi resource managers, yielding key insights that will guide the remaining phase of the project. In response to needs identified during the assessment, the research team is developing a Four Corners climatology that incorporates analysis of multiple datasets (including data from tree rings, weather stations, stream gages, and satellites). The climatology document and companion website will provide Four Corners resource managers baseline information about climate variability and change in the region, and information for tribal leaders as they consider climate-related decisions like drought declarations. As a result of the initial assessment, the research team has also developed a draft drought impacts survey to provide tribal managers a method for routinely collecting on-the-ground drought information to support decision-making.

Visit:

[www.climas.arizona.edu](http://www.climas.arizona.edu)

# The Climate Impacts Research Consortium



*In the Pacific Northwest, stakeholders are playing close attention to climate change and factoring it into the major decisions involved in landscape and watershed management.*

Source: CIRC.

*“CIRC can help us in interpreting information by identifying uncertainty and filtering the ‘noise’ around new climate research and messages, playing the role of ‘air traffic controller’ by emphasizing the new relevant knowledge.”*

—Member of the CIRC Stakeholder Advisory Council, July 2011

Established in September 2010, the Climate Impacts Research Consortium (CIRC) provides information and tools for making decisions about landscape and watershed management in a changing climate. The Consortium covers Idaho, Oregon, Washington, and Western Montana, with its activities: regional downscaled climate scenarios (integrated climate, hydrological, vegetation models); regional and basin scale climate impacts assessment; social science analysis and network analysis; coastal climate hazard, risk and vulnerability assessment; visual planning scenarios and tools; climate extension; public health; and community adaptation. Core universities include Boise State University, Oregon State University, University of Oregon, University of Idaho, and the University of Washington.

## 2011 Accomplishment:

In spring 2011, the CIRC surveyed stakeholders from the Pacific Northwest to identify regional climate information needs. About 1100 surveys were sent to staff in NGOs, tribes, the private sector, and local, state, and federal agencies. Of these, approximately 30 percent were returned. As shown in Table 1, the largest proportion of survey respondents worked in a federal or state resource agency (51%), with the fewest responses from a single sector coming from public health (1%), transportation (2%), and tribal (3%) management or staff. The survey asked respondents a series of questions about potential climate impacts to their organization; needed climate information and priority activities for the CIRC; and what, if anything, their organization has already done in response to climate impacts. Table 2 presents responses to a question about how important different types of impacts would be to the respondent’s organization. Various hydrologic impacts topped the list.

Visit:

<http://pnwclimate.org>

Occupation	
Federal natural resource agency manger or researcher	34%
State natural resource agency manager or researcher	17%
Non-governmental organization manager or staff	11%
Planning manager or staff	8%
Utility manager (water, energy, private)	7%
Local, county, or regional government manager	6%
Tribal government manager or staff	3%
Transportation manager or staff	2%
Public health manager or researcher	1%
Other	23%

Table 1: Occupation of people who responded to the CIRC stakeholder survey.

Climate Impact	Important	Most Important
Changes in timing of water availability	86%	18%
Decreases in snowpack	88%	14%
Increases in flooding	92%	12%
Changes in abundance/distribution of species	67%	6%
Longer droughts	85%	6%
More frequent wildfires	66%	5%
More intense storms	88%	5%
Increases in coastal erosion	53%	4%
Extreme heat events	73%	3%
More frequent storms	84%	2%
Increases in invasive species	76%	1%
Increases in landslides	64%	1%

Table 2: Responses to question: "How important is this impact to your organization? Second column includes ratings for "very important" or "moderately important." Third column shows responses to the question "which single impact is most important?"



# Consortium for Climate Risk in the Urban Northeast

*Replacing gray, centralized and monofunctional wastewater and stormwater infrastructure with green, decentralized and multifunctional infrastructure improves urban ecohydrology, ecology, and overall environmental quality.*

**Credit:** Franco Montalto, Drexel Univ./CCRUN.

*“New York City faces real and significant risks from climate change. The CCRUN will be a critical partner in our ongoing efforts to analyze our climate vulnerabilities and increase our resilience.”*

—Adam Freed, Senior Policy Advisor on Climate Change Adaptation, New York City Office of Long-Term Planning and Sustainability

The Consortium for Climate Risk in the Urban Northeast (CCRUN) was founded in 2010 to serve stakeholder needs in assessing and managing risks from climate variability and change within the Philadelphia-New York-Boston urban corridor, including relevant portions of Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania. CCRUN is designed to address the complex challenges often associated with densely populated, highly interconnected urban areas in three key sectors: water, coasts, and public health. Specific challenges addressed include climate impacts on urban heat island effects; poor air quality; intense coastal development, and multifunctional settlement along inland waterways; integrated infrastructure systems; and highly diverse, fragile socio-economic communities.

## **2011 Accomplishment:**

CCRUN, in partnership with New York City and Philadelphia, is assessing the cost-effectiveness of green infrastructure (GI) strategies for reducing runoff and related problems in urban watersheds, in addition to assessing its use as a climate change adaptation strategy. This assessment utilizes the free, web-based LIDRA (Low-Impact-Development Rapid Assessment) tool developed by CCRUN member Drexel University, among others, to identify the economic and environmental impacts of GI in economic sectors, as well as how trees in the GI space contribute to carbon sequestration and energy savings. Initial field findings show that a GI strategy managing combined sewer overflow (CSO) events can outperform the two conventional strategies over a 50-year span by reducing GHG emissions as much as 30-fold while also reducing CSOs. Expanded assessments will include new, more accurate estimations of urban evapotranspiration that can be used to forecast how urban green spaces and their benefits (both environmental and economic) may fare under future climate conditions across a range of built environments.

Visit:  
[www.ccrun.org](http://www.ccrun.org)

# Great Lakes Regional Integrated Sciences and Assessments Center

*The table summarizes decision-making and research needs identified through an analysis of past reports and assessment in the Great Lakes region.*

Decision-making Needs	Research Needs
<p><b>Costs of impacts and the costs and potential benefits of specific adaption strategies</b></p> <ul style="list-style-type: none"> <li>• Assessment case studies</li> <li>• Socioeconomic model integration</li> <li>• Development of standardized assessment procedures</li> </ul> <p><b>Assistance with understanding how to approach these decisions</b></p> <p>Channel into familiar iterative, adaptive management strategies Engagement through “bottom-up” and decision-scaling cooperative approaches</p> <p>How to integrate climate change considerations into everyday decisions</p>	<p>“Key numbers”: thresholds and indicators of change that are focal points of problem identification</p> <p>Though focus has diminished, interest in downscaled, localized climate predictions remains common</p> <p>Particular challenge of the uncertainty involved with desired precipitation forecasts</p> <p>Case studies of successful climate change policy</p> <p>Support with socioeconomic impacts and vulnerability assessments</p>

*“We’re working with GLISA to develop useful climate information for stormwater, wastewater, and water managers and planners in our watershed. The information will help inform future decisions on infrastructure, land use planning, watershed restoration, and public health. The GLISA researchers and staff bring unique perspectives and critical expertise to our project. It is a fruitful project bringing scientists, practitioners, and policy makers together to solve complex climate issues.”*

—Laura Rubin, Executive Director, Huron River Watershed Council

Established in 2010, the Great Lakes Integrated Sciences and Assessments Center (GLISA) is a collaboration of the University of Michigan and Michigan State University. GLISA supports diverse research projects and outreach efforts that address issues of climate variability and change in the Great Lakes basin, which includes portions of seven U.S. states and the province of Ontario. The initial focus areas of the center are agriculture, water management, and natural resources-based tourism.

## 2011 Accomplishment:

In 2011, GLISA-funded social scientists, led by Dr. Maria Carmen Lemos at the University of Michigan, completed their review of nearly 50 reports and assessments of the effects of climate change and variability in the Great Lakes region. The assessment found that ideas on how to respond to climate are increasing in scope from narrow to broad. Older documents were more likely to focus on uncertainty and a lack of cost-benefit analysis as big constraints to action, while newer documents tended to show a much more innovative way of thinking. The reports analyzed for this project also serve as the centerpiece of a study of stakeholder networks, with the broader goal of improving science-policy networks and informing decision-making in the Great Lakes region. Directed by Dr. Ken Frank at Michigan State University, this study evaluated the interconnections of report authors and how the network changed over time. This work will continue into 2012.

Visit:

[www.glisa.umich.edu](http://www.glisa.umich.edu)  
[www.glisa.msu.edu](http://www.glisa.msu.edu)



## Pacific RISA

*Participants gathered at the East-West Center in Honolulu for the Pacific RISA workshop on "Climate Change Impacts on Freshwater Resources in Hawai'i" on July 8 and 15, 2011.*

**Photo by:** East-West Center External Affairs Office.

*"PEAC and Pacific RISA are partners with similar ambitions. We both aim to support Pacific Island communities in mitigation and adaptation to the physical and social impacts of climate. Through this great partnership, we act as a resource for one another in conducting research and developing products and services."*

—LTJG Charlene Felkley, Pacific ENSO Applications Center (PEAC) Outreach Officer

Since 2003, the Pacific RISA program has supported Pacific island and coastal communities in mitigating and adapting to the impacts of climate variability and change. Our current projects involve an interdisciplinary team of researchers from the East-West Center and the University of Hawai'i. The Pacific RISA supports decisions about the management of freshwater supplies in Pacific Island environments through integrating stakeholder needs with relevant policy and downscaled predictions of future climate and local water budgets. The Pacific Region encompasses Hawai'i and the U.S.-Affiliated Pacific Islands (Guam, Republic of Palau, Republic of the Marshall Islands, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, and American Samoa).

### **2011 Accomplishment:**

Pacific Island communities need guidance to assess future water resources in a changing climate. To improve climate adaptation activities and support partnerships between scientists and decision makers in the Hawaiian Islands, the Pacific RISA used a multi-method approach of interviews, workshops, and a survey to characterize what climate information decision makers need, why they are not using available information. Findings indicated that stakeholders faced challenges making decisions integrating uncertain information (e.g., projected rainfall) with more certain information, and managing trade-offs between different factors (e.g., costs versus cultural values).

Stakeholders expressed interest in learning about impacts of projected water demand on sustainable yield, and how to separate natural variability from long-term climate change. Generally, policy makers wanted the most-probable and worst-case scenarios. Overall, survey respondents showed high climate literacy, but more than 25 percent of respondents incorrectly believed there was little scientific consensus about whether climate change is happening. This study demonstrates the use of collaborative, iterative, analytic-deliberative processes to explore.

Visit:

[www.pacificrisa.org](http://www.pacificrisa.org)

Results of the Pacific RISA's stakeholder climate literacy survey. Source: Finucane, M.L., Keener, V., Miller, R., Corlew, K., Burkett, M., Grecni, Z. (2012, In preparation.) *Climate Change and the Management of Fresh Water Resources in the Central O'ahu Watershed*.

Climate Literacy Items from Hawai'i Survey [correct answer]	% scoring correctly
Climate change will cause some places to get wetter, while others will get drier [true]	97.7%
If we were to stop burning fossil fuels today, global warming would stop almost immediately [false]	93%
Climate change will increase crop yields in some places, and decrease it in others [true]	93%
Climate change will cause temperatures to increase by roughly the same amount in all countries [false]	93%
Weather changes from year to year [true]	90.7%
Ocean currents carry heat from the equator toward the north and south poles [true]	86%
The greenhouse effect keeps the earth from being as cold as outer space [true]	83.7%
Climate means the average weather conditions in a region [true]	81.4%
A major cause of climate change is electrical generation from fossil fuels such as coal [true]	79.1%
If we were to stop burning fossil fuels today, the amount of carbon dioxide in the atmosphere would decrease almost immediately [false]	79.1%
The temperature of the earth is affected by whether the earth's surface is light or dark colored [true]	76.7%
A major cause of climate change is pollution/emissions from business and industry [true]	74.4%
In your view, do most scientists agree or disagree with one another about whether climate change is happening? [agree]	72.1%
Assuming climate change is happening, do you think it is caused mostly by things people do, mostly by natural causes, or by both? [people]	65.1%
Climate changes from year to year [false]	65.1%
A major cause of climate change is the use of aerosol spray cans [false]	62.8%

# Southeast Climate Consortium



A photo taken during a meeting of the Public Water Supply Utilities Climate Impacts Working Group, a collaborative effort focused on increasing the relevance of climate change and variability data and tools to the planning and operations of Florida's public water supply utilities.

Credit: UF Water Institute.

*"I think we need long term changes as far as agriculture is concerned. It's about like trying to turn a cruise ship, you know. You don't turn a sharp left or a sharp right, okay, but you can start bending in one direction or another...I think that this kind of climate data and information can help make those minor shifts in one direction or another."*

—Extension professional and member of the climate working group for row crop agriculture

Established in 1998, the Southeast Climate Consortium (SECC) RISA is a collaboration of the University of Florida, Florida State University, University of Miami, University of Georgia, Auburn University, and the University of Alabama–Huntsville to support climate-related activities in Alabama, Florida, and Georgia. SECC helps develop: 1) mature research programs on managing seasonal and longer-term climate risks to agriculture and water resources; 2) new programs for coastal communities; 3) research programs that build on SECC expertise in diverse modeling fields; and 4) strong extension and assessments programs for agriculture (AgroClimate) and developing similar strengths for water resources.

## 2011 Accomplishment:

The SECC is investigating novel methods to engage decision makers from different sectors so that the decision makers become full partners in the research process. Decision makers and researchers currently meet in small working groups consisting of 15-20 people. Key features include:

- At the end of each meeting members discuss whether they want to continue or disband the group. This ensures that members are committed to and benefiting from the meetings.
- Members arrange the meeting schedule so that it is regular enough to maintain continuity, yet not so frequent as to become burdensome.
- Meetings emphasize interactive discussions. The organizer polls members before each meeting to get their inputs to the program.

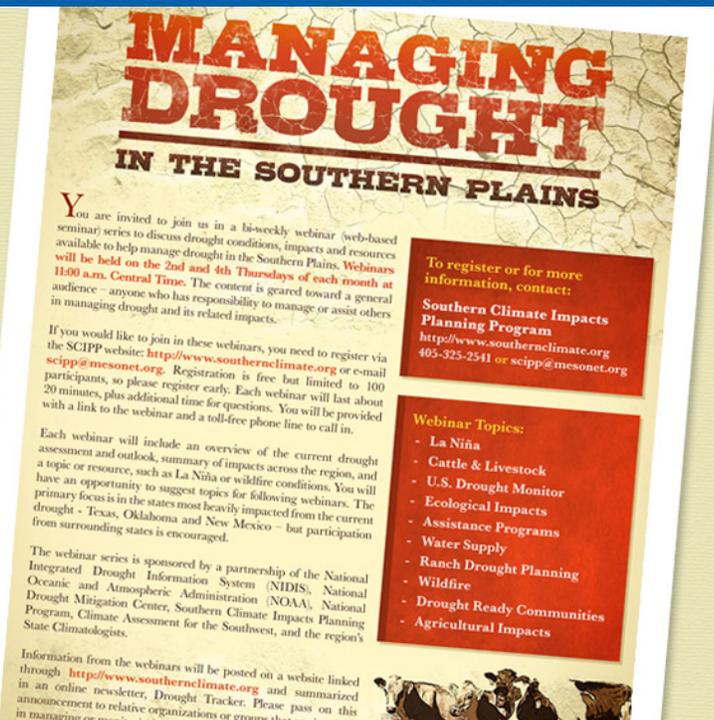
Over the past two years, the SECC has assessed the effectiveness of the working group model for the agricultural and water resources sectors. While there are differences in interests between the two groups, the working group model is highly effective for both.

# Visit:

[www.seclimate.org](http://www.seclimate.org)

# Southern Climate Impacts Planning Program

A flyer announcing the Managing Drought in the Southern Plains bi-weekly webinar series organized by SCIPP. Image courtesy of SCIPP.



*"You guys do great work and I appreciate everything you do for me and my business . . . I use as many tools as I have time to get my hands on and the neat thing about what you do and the format, it's concise and tells a story visually. The customers I work with rave about what I send them and I am only touching the tip of the iceberg."*

—Mark Hodges, Plains Grains Inc. (<http://plainsgrains.org/>)

Established in 2008, the Southern Climate Impacts Planning Program (SCIPP) mission is to increase resiliency and preparedness for climate and weather extremes both current and in the future. The SCIPP team supports the multi-hazard mitigation planning process through interactions with planners, city government, and other stakeholders. SCIPP also synthesizes climate information sources, conducts education and outreach on weather and climate, and supports new research to better understand social vulnerabilities, hazard perceptions, extreme events, climate variability, and information needs. Related areas of work include coastal planning, water resources, and climate adaptation. A collaboration between the University of Oklahoma and Louisiana State University, SCIPP covers the South Central U.S. region, including Oklahoma, Texas, Arkansas, Louisiana, Tennessee, and Mississippi.

## 2011 Accomplishment:

A drought of strong intensity and vast geographical extent gripped the South Central U.S. in 2011. To respond to these severe ongoing conditions, multiple efforts were launched to engage decision makers from regional, state, and local arenas in a conversation about drought. SCIPP used a four-pronged approach supporting regional workshops, state drought planning, a series of webinars, and local impact reporting to assure that all arenas were addressed. The net effect of these efforts is that interaction between these arenas and between the academic and practitioner communities increased substantially. Many decision makers participated in more than one effort, such as state drought planners attending the regional workshops or local Farm Service Agency offices participating in the drought webinars and impact reporting. In a follow-up survey, 79 percent of respondents indicated that they had forwarded information from a webinar to another person or organization. In addition to assisting managers with the drought, these discussions have yielded a treasure trove of information that will inform subsequent development of best practices guidelines, improve drought planning, and connect state and local monitoring more closely.

Visit:

[www.southernclimate.org](http://www.southernclimate.org)

## COLORADO CLIMATE PREPAREDNESS PROJECT FINAL REPORT



## COLORADO CLIMATE PREPAREDNESS PROJECT FINAL REPORT

Prepared by  
the Western Water Assessment  
for the State of Colorado



# Western Water Assessment

*In early 2011, WWA released the final version of the Colorado Climate Preparedness Project report.*  
Image courtesy of WWA.

*"WWA is unique due to their ability to provide detailed scientific analysis in an easily digestible manner that engages and informs decision makers."*

—Jennifer Gimbel, Executive Director, Colorado Water Conservation Board

The Western Water Assessment (WWA) program started in 1999 (initially called the Western Water Initiative) and covers the states of Colorado, Wyoming, and Utah. WWA's research efforts focus on three major themes: 1) decision support for the Colorado River Basin and headwaters; 2) ecological vulnerabilities, impacts, and adaptation; and 3) emerging initiatives and adaptation strategies to inform climate services. The program is based at the University of Colorado-Boulder, although it collaborates with researchers at the University of Wyoming and Utah State University.

### 2011 Accomplishment:

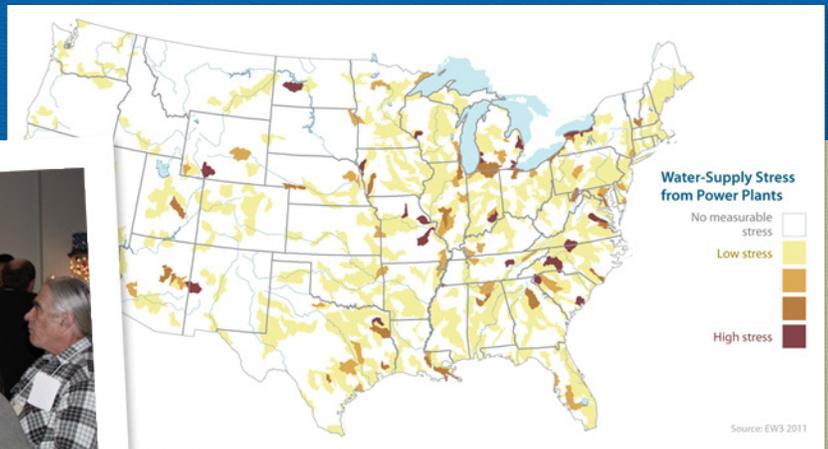
In early 2011, WWA released the final version of the Colorado Climate Preparedness Project, which examined the status of climate adaptation efforts across Colorado's state government in five climate-sensitive sectors: water; agriculture; electricity; outdoor recreation; and wildlife, ecosystems, and forests. Through a series of interviews with key actors, WWA researchers elicited information about current or planned climate adaptation activities and identified future climate-related needs and impacts across the state. Interview results demonstrated widespread awareness of potential climate impacts across the state government in Colorado, although the level of concern varied among the different sectors. Stakeholders in all five sectors are particularly aware of their sensitivity to climate change impacts on water resources such as changes in runoff patterns, snowpack, and storage, although they do not have as great of an understanding of a variety of other relevant potential climate change impacts. In addition to a report discussing sensitivities and possible responses, the project included a database of relevant actors and other resources that could be applicable to future statewide adaptation efforts. The report is available at [http://wwa.colorado.edu/CCPP\\_report.pdf](http://wwa.colorado.edu/CCPP_report.pdf), while the database can be accessed at [www.coloadaptationprofile.org](http://www.coloadaptationprofile.org).

# Visit:

[wwa.colorado.edu](http://wwa.colorado.edu)

# Chapter 2:

Emerging Issues and Approaches Across the RISAs





*Representatives of Oklahoma and Texas tribal nations met in Norman, Okla. on December 12, 2011 to discuss the impact of climate variability and change on their tribal sectors and cultures.*

**Photo by:** Mike Morris and Paulette Blanchard

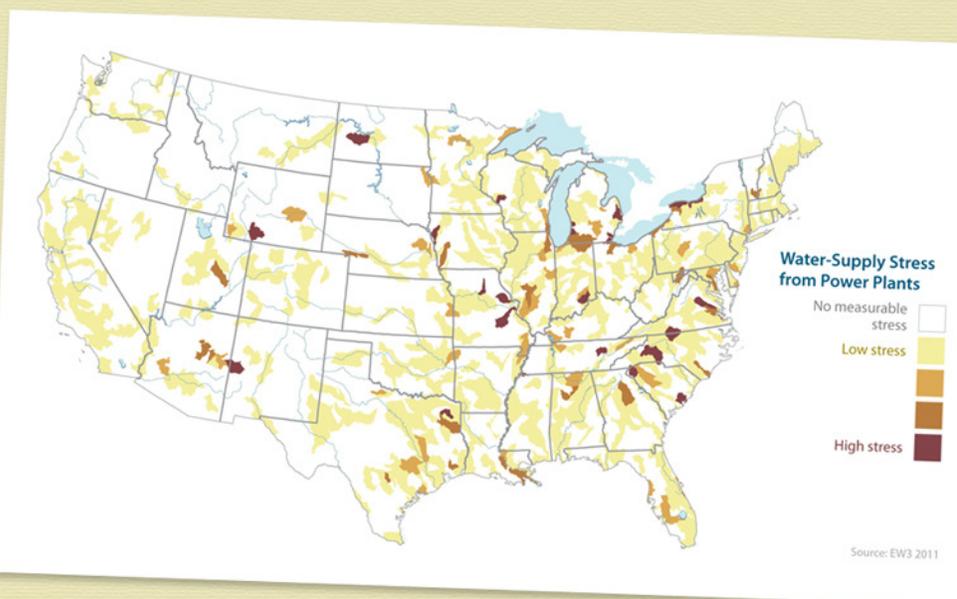
## Working with Indigenous Communities

*More RISAs are beginning to work with Native communities on climate change planning and adaptation. In many regions, Native communities are some of the most vulnerable to climate changes. However, because of long tenure on their landscapes, generations of accumulated indigenous knowledge, and, in some cases, strong tribal leadership, they have the potential to be major players in wider-scale adaptation efforts. Over the past years, RISAs have conducted and participated in many activities involving collaboration with indigenous communities.*

- Pacific RISA hired an indigenous environmental knowledge research specialist in May 2011 as part of its efforts to represent existing and historical native Hawaiian practices in the development of current adaptation strategies.
- CISA began a partnership with the Southeast Indigenous Peoples' Center (SIPC) to investigate the relationship between drought, water supply, and water quality.
- In Fall 2010, WWA researchers worked with NIDIS and the University of Colorado Law School to organize a Tribal Climate Change Adaptation Workshop that allowed tribal leaders across the West to share up-to-date climate adaptation and drought response strategies. WWA continues to work with tribes in Colorado and Wyoming to understand adaptation needs and provide drought planning assistance.
- CLIMAS, as part of ongoing collaborations with the Hopi Tribe and Navajo Nation, is working to address limitations in hydroclimatological and ecological monitoring across the region to better assess current and future drought. CLIMAS is working with tribal resource managers to develop better drought monitoring tools and methodologies. CLIMAS researchers are also developing a collection of tree-ring chronologies for a region coinciding with tribal lands. In September 2011 CLIMAS also produced the report *Drought Preparedness for Tribes in the Four Corners Region*, which was based on a NIDIS-sponsored workshop in spring 2010.
- ACCAP has served as a consultant to WWA and SECC on vulnerability assessments and adaptation planning for native lands. The Center has also developed a guidebook

Calculating the Water supply stress index both with and without power plant water use shows the contributions of plants in each basin, including where power plants were the primary driver of water-supply stress.

Image courtesy of *Freshwater use by U.S. power plants: Electricity's thirst for a precious resource*. A report of the Energy and Water in a Warming World initiative. Cambridge, MA: Union of Concerned Scientists. November. Online at : [www.ucsusa.org/electricity-water-use](http://www.ucsusa.org/electricity-water-use)



titled *Climate Change Adaptation Planning Guidebook for Native Communities*. The work with Native communities across RISAs presents a real opportunity for developing more effective strategies for overall regional climate risk management. ACCAP works closely with the Alaska Native Tribal Health Consortium Center for Climate and Health on projects assessing climate health impacts in Northwest Alaska. ACCAP is also working with tribal communities along the length of the Yukon River documenting traditional knowledge and climate impacts specific to fisheries and changing seasonality. Additionally, ACCAP is spearheading the development of an integrated food security and climate adaptability research initiative, in partnership with stakeholders in the Kenai Peninsula and Bristol Bay regions of coastal Alaska, including Alaska Native communities and Native organizations. The goals of the initiative are to measure food insecurity in coastal communities and establish a method for measuring community adaptability through the development of an adaptive capacity index to measure fishing communities' capacity to adapt to changes in climate and fisheries yields.

## Climate and the Energy Sector

*Climate change and increases in climate variability and extreme events are expected to alter both energy supply and demand, and pose major challenges to the energy industry. A number of RISAs have been looking at how climate impacts the energy sector in their respective regions.*

- With leveraged funding from the NOAA National Marine Fisheries Service, ACCAP contributed to a project that investigated how climate can impact the timing and magnitude of river discharges in Southeast Alaska and how that could pose challenges to the management of reservoir systems. Preliminary findings suggest that an increasingly interconnected power grid and implementation of monitoring systems in Southeast Alaska can mitigate some of the challenges ([http://ine.uaf.edu/accap/documents/seak\\_report\\_final.pdf](http://ine.uaf.edu/accap/documents/seak_report_final.pdf)).
- CLIMAS has engaged in an econometric analysis of climate, weather, socio-demographic factors, electricity-use, and water-use data in part to improve electricity load forecasts. CLIMAS has found that the consideration of climate information can significantly reduce

forecast error in electricity load forecasts and improve model performance in estimating the economic value of water across wet and dry climate cycles.

- WWA hosted a workshop in August 2011 aimed at coordinating efforts to model water requirements for power plants across the U.S. In addition, WWA researchers have edited and contributed to a book titled *The Water-Energy Nexus in the American West*.

## Regional Network Analysis

*RISA teams have been using social science methods to analyze how their stakeholders and partners interact. Social network analysis is a fairly new method being applied within the RISA work and offers the ability to analyze information flows and the strength of relationships, and to identify key players within networks of scientists and users of scientific information.*

- GLISA conducted research on knowledge formation and climate change to explore how stakeholders in the Great Lakes access environmental knowledge and how that knowledge affects decision makers. They mapped the interactions between key actors. Preliminary results indicate that government agencies and academics co-participate in events, but the two groups wrote papers separately. Results also indicate that regionally focused organizations participate in different events than national and state agencies.
- Pacific RISA and SCIPP are conducting surveys with targeted stakeholders as part of larger regional network analysis efforts. SCIPP used a combination of in-depth interviews and surveys to identify stakeholders needs for climate information on a range of time scales. Most indicated that shorter time scales were more critical to their decision-making and that inter-annual climate variability is at least as important as longer-term climate change projections.
- Some RISAs also worked together over the past year to develop shared methodologies that will facilitate the comparison of networks across regions. CISA, GLISA, and WWA have been working together to catalog user needs for climate information and have developed a common framework to analyze existing reports and interview key decision makers in

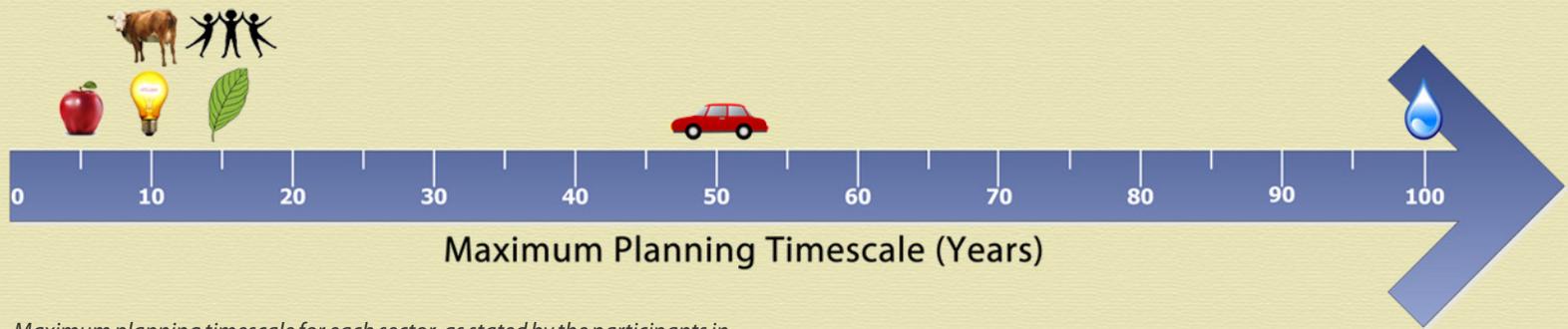
each team's respective region. These network analysis efforts are expected to produce a clearer understanding of each region's actors and their roles in the development and delivery of climate information.

- ACCAP has interviewed scientists on their perception of stakeholder knowledge to better inform the process of user-inspired science. Results reveal that partnerships between ACCAP scientists and stakeholders influence research design and guides tool development. Additional results show the extent to which communicating climate science to stakeholders requires translation, nuance and awareness of political, cultural and social context.

## National Climate Assessment

The Global Change Research Act of 1990 requires a report to the President and the Congress every four years that synthesizes and evaluates the activities of the federally funded U.S. Global Change Research Program. The National Climate Assessment (NCA) is currently being conducted to meet this requirement and will advance the current understanding of climate science and its relationship with social, ecological, and policy systems.

NOAA received funding in 2010 and 2011 to support the NCA, and RISA teams have played a crucial role over the past year in bringing regional information to the national assessment. RISA teams and regional partners have been gathering information about decision makers' use of climate information and perspectives on climate change using a number of social science methods. RISA teams have been working collaboratively and sharing stakeholder engagement experiences with each other. Most recently, all of the RISA teams are developing technical input to the regional and sectoral components of the NCA, and many RISA researchers are key authors for the NCA reports under development.



Maximum planning timescale for each sector, as stated by the participants in the Oklahoma climate needs assessment. Icons correspond to the following sectors (from left to right): human health, agriculture, energy, society/public safety, ecosystems, transportation, and water resources.  
 Image courtesy of \*Riley et al. 2012

# Water Utilities

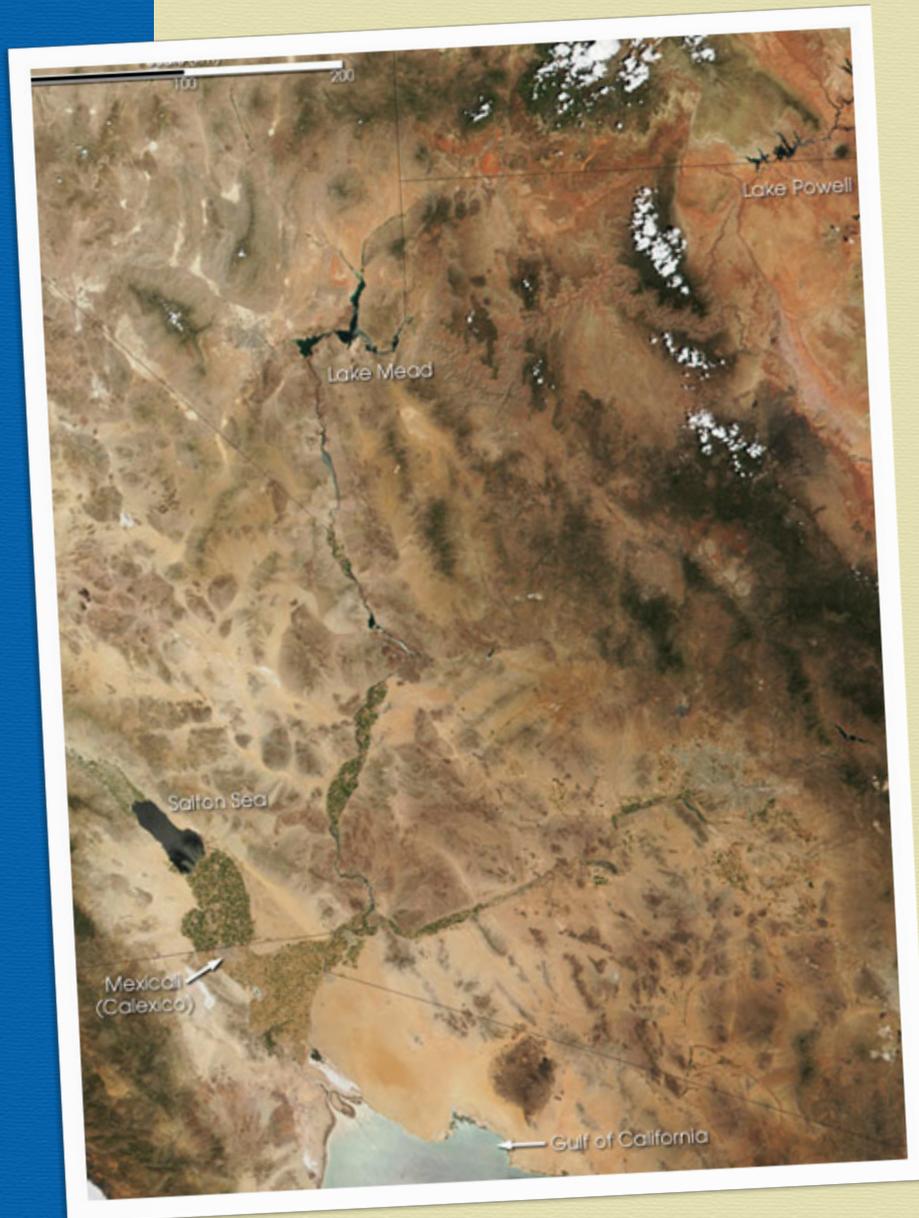
Water utilities across the U.S. have been proactive in engaging RISA researchers in order to understand how climate variability and change will affect their operations and planning. West Coast, Colorado, and Florida utilities have been particularly engaged with RISA teams.

- In December 2010, CIRC led a multi-RISA effort to bring RISA teams together with members of the Piloting Utility Modeling Applications (PUMA), which comprises five large municipal water utilities. Participants looked for opportunities for collaboration between RISAs and PUMA members to better incorporate climate information into planning for water utilities.
- At the same time, WWA met with six major utilities along Colorado’s Front Range to present the latest research and discuss concerns facing water utilities, including unusual patterns of snowmelt and the potential influences of bark beetle attacks on water quantity and quality.
- SECC has also been working with Pacific RISA, collaboratively drafting a paper on similarities in barriers to incorporating climate information into water utilities’ and row crop farmers’ planning and operations.
- CISA has collaborated with a local water utility and the U.S. Geological Survey to link climate and hydrologic models with a salt-water intrusion model in order to assess salinity threats to surface water resources and municipal water intakes in coastal areas. A decision-support tool is being designed to allow water resource managers to plan for salinity intrusion scenarios and extreme events.

\*Riley, R., K. Monroe, J. Hocker, M. Boone, and M. Shafer, 2012: An Assessment of the Climate-Related Needs of Oklahoma Decision Makers. Southern Climate Impacts Planning Program, 47 pp. [Available online at [http://www.southernclimate.org/publications/OK\\_Climate\\_Needs\\_Assessment\\_Report\\_Final.pdf](http://www.southernclimate.org/publications/OK_Climate_Needs_Assessment_Report_Final.pdf)]

# Colorado River Reconciliation

The Reconciling Colorado River Flows project was a joint effort of researchers from NOAA, the University of Washington, Scripps Institution of Oceanography, University of Arizona, and the University of Colorado. The project investigated the reasons for very wide ranges (~5-50 percent by 2050) in projections of decreased future Colorado River flows. Findings from the effort include: 1) the exact selection of GCMs can bias the results substantially even when multiple GCMs are utilized; 2) statistical downscaling techniques—which produce more precipitation than the original GCM upon which the downscaling was based—can lead to substantially increased runoff relative to downscaling techniques that preserve the amount of GCM-generated precipitation; 3) hydrology model sensitivity experiments that modify precipitation by 1 percent lead to changes in flows by approximately 2-4 percent, depending on the model utilized; 4) hydrology model sensitivity experiments that increase future temperatures by 1 degree Celsius show runoff reductions of 3-10 percent, depending on the model utilized. Papers for this effort are now in production.



*This Moderate-resolution Imaging Spectroradiometer (MODIS) true-color image shows the passage of the Colorado River as it flows from the Rocky Mountains in Colorado through the southwestern United States. Along its route, the river passes through an elaborate water-management system designed to tame the yearly floods from spring snowmelt and to provide a reliable supply of water for residents as far away as California.*

**Source:** NASA Earth Observatory

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