

SOUTHWEST Climate Summit



**HOSTED BY THE SOUTHWEST
CLIMATE SCIENCE CENTER**

SUMMARY

The Southwest Climate Summit was held June 12-13, 2012 at the Westin La Paloma hotel in Tucson, AZ. The goals of the Summit were to present the findings of the Southwest Climate Assessment (available online in August 2012) and collect input from regional stakeholders for the Southwest Climate Science Center's long-term science plan. We accomplished both goals by blending talks given by Southwest Climate Assessment authors, talks by other climate scientists and resource managers, and time for questions and discussion between and among presenters and Summit participants. Copies of talks given at the Southwest Climate Summit are available at www.swcsc.arizona.edu.

Breakout sessions allowed participants to discuss, in greater detail, issues raised by the findings of the Southwest Climate Assessment and to contribute their ideas for questions or projects that should be undertaken by the Southwest Climate Science Center over the next 5 years. Summaries of breakout discussions can be found on page 3.

One hundred twenty people participated in the Summit with about 1/3 representing federal agencies, 1/3 from universities in the Southwest, and the rest from tribes (10 people), NGOs (11 people), Landscape Conservation Cooperatives (5 people), and state and local agencies and governments, private firms, and water utilities. A participant list can be found on page 9.

AGENDA

TUESDAY JUNE 12, 2012

PLENARY – WELCOME AND SUMMIT OVERVIEW

- Jonathan Overpeck – University of Arizona/SWCSC
- Dave Busch – USGS/SWCSC

PLENARY – SOUTHWEST CLIMATE ASSESSMENT SESSION 1: Our Changing Southwest Climate – Past and Future

- Jonathan Overpeck (University of Arizona/SWCSC): The Southwest Climate Assessment: Key Findings and Implications for the Region
- Kelly Redmond (Desert Research Institute/SWCSC): The Weather and Climate of the Southwest
- Marty Hoerling (NOAA): Evolving Weather and Climate Conditions of the Southwest

PLENARY – SOUTHWEST CLIMATE ASSESSMENT SESSION 2: Climate Change Impacts and Options in the Southwest

- Erica Fleishman (UC-Davis/SWCSC): The Impact of Climate Change on Natural Ecosystems
- Dan Ferguson (University of Arizona/CLIMAS): Climate Change and American Indian Communities
- Karl Ford (BLM): Southwest Climate Change and Ecosystems: Land Management Implications

BREAKOUT SESSION: State of the Southwest Climate and Future Research Needs

KEYNOTE ADDRESS “Water is Key”

- **Tim Brick**; Immediate Past Chairman – Metropolitan Water District of Southern California

WEDNESDAY JUNE 13, 2012

PLENARY – EMERGING CLIMATE SCIENCE

- Dan Cayan (Scripps Institution of Oceanography/SWCSC): New Analyses of Global Climate Models CMIP5 and AR5
- Mike Dettinger (Scripps Institution of Oceanography/SWCSC): Atmospheric Rivers
- Brad Udall (University of Colorado/SWCSC): New Science About the Colorado River

PLENARY – PROVOCATIVE IDEAS IN CLIMATE RESEARCH (*Grand Ballroom*)

- Glen MacDonald (UCLA/SWCSC): Evolutionary Adaptation to Climate Change
- Susan Frankel (USFS): Forest Pests and Pathogens
- David Miller (USGS): Using Paleoclimate Data to Understand Ecological Responses to Climate Change
- Paul Weiland (Nossaman, LLP): Water Policy and Climate Change

BREAKOUT SESSION: Long term science planning for the SWCSC

PLENARY – Report back from breakouts: The Future of Southwest Climate Research

Please go to www.swcsc.arizona.edu for copies of the talks given at the Southwest Climate Summit.

BREAKOUT SESSIONS

The first breakout session, on Tuesday June 12th, focused on identifying the major issues or concerns faced by resource managers in the Southwest. Summit participants were divided into four groups. Each discussion was moderated by a representative from one of the Landscape Conservation Cooperatives (LCC) in the SWCSC region.

Moderators for the Tuesday sessions were:

Rebecca Fris – California Landscape Conservation Cooperative
Todd Hopkins – Great Basin Landscape Conservation Cooperative
Genevieve Johnson – Desert Landscape Conservation Cooperative
Debra Schlafmann – California Landscape Conservation Cooperative

Participants were asked to identify their most pressing management concern about climate change, respond to the presentation of the findings of the Southwest Climate Assessment, and consider whether those findings would impact their agency's concerns about climate change in the Southwest.

Several broad themes emerged from these discussions. The common themes or issues are listed in bold with examples of actual questions or statements made by Summit participants underneath the broad category.

Need to link climate models and ecosystem and/or hydrologic models

- We need more information on what we can expect to see on the landscape
- What will be the impact of climate change on threatened and endangered species?
- Can we predict changes in snowmelt, streamflow, and snowpack?

Scaling models (and other information) to meet management decisions

- We need models downscaled to the basin level
- Need more landscape-scale information
- Spatial models for my area that I could play with would really help my decision-making

Data access and interpretation

- I need to know where to find climate data
- People in the field don't have time to look at all the data
- Data quality – how do you choose which data sets to use?
- Need guidance on evaluating current climate models and their ranges of projections

Incorporating climate change into existing planning frameworks

- Agencies are instructed to include climate change in all their planning documents. How do we know how climate change will affect one particular species?
- BLM has a multiple-use mandate. How do we balance all those needs in the face of climate change?

Dealing with uncertainty

- How do we best communicate the uncertainty of climate science to stakeholders?
- How do we characterize or discuss uncertainty?

Other concerns included

- How do we balance the socio-economic needs of the present with expected climate change impacts?
- What will be the impact on both water availability and water use if drought conditions worsen?
- How will climate extremes such as fire or storms affect people and ecosystems?
- How will climate change affect human health?
- How will climate change affect cultural survival for native people if culturally important species are disappearing?

The discussions about climate change-related concerns lead into the second breakout session on Wednesday June 13th, which focused on identifying particular projects or questions the SWCSC could focus on in its five-year science plan.

Moderators for the Wednesday sessions were:

Christine Albano – Southwest Climate Science Center

Rebecca Fris – California Landscape Conservation Cooperative

Todd Hopkins – Great Basin Landscape Conservation Cooperative

Kevin Johnson – Southern Rockies Landscape Conservation Cooperative

We asked participants to consider projects that were climate focused, could apply to multiple LCCs and/or across the Southwest region, might require 2-5 years to explore, and could benefit from regional partnerships (pooling of regional resources such as money, time, and expertise).

Breakout group participants then prioritized several of these projects and presented them to the plenary session. The key questions or research needs identified by Summit participants were:

GROUP ONE

1. Expand Research

- Ecological research
 - Anticipate surprises
 - Ecosystem integration
 - Biodiversity, keystone species, T&E species, invasives
 - Ecological modeling
 - Fire
 - Ecohydrology
- Climate variations
 - Outlier & extreme events
 - Climate variations (ie. Atmospheric rivers, etc)

- Improve regional modeling and downscaling
 - Regionally specific information
 - Integrate Mexican (Canadian?) climate models and research
- Ocean and coastal issues
 - Sea level rise, acidification, ocean warming, etc.
- Land use change & impacts to/ of agriculture

2. Data Management and Dissemination

- Provide information on species
 - Baselines
 - Changes under different climate scenarios
- Identify the data, toolkits, strategies, best management practices, etc. that are needed in management
- Identify how to apply scientific information to management
- Provide both raw and synthesized data
- Integrate economic and demographic data

3. Communication

- Improve communication
- Use social & communication networks
- Personalize science & climate information
- Provide more information to managers on available climate information
- Use and develop visualization strategies
- Better understand what kind of information actually produces changes in behavior and decisions

GROUP TWO

1. Short-term

- Define spatial and temporal hydrology distribution (modeling, monitoring)
- Extremes:
 - Mine existing climate data for extremes
 - Use data record to evaluate model ability to simulate extremes
 - Project extremes using validated models
- Climate “threat” to specific species (case studies along gradient of species)

2. Medium to long-term

- Provide access to datasets
- Develop set of planning scenarios at different scales (20, 50 years)
- Integrate climate data into existing decision support tools
 - (User-friendly information transfer & visualization tools,
 - Decision support and data synthesis support)
- Climate extremes
- Monsoon predictability
- US/Mexico border management (e.g., species) and climate change

3. Philosophical, Policy

- Philosophy/strategies of resource management:
 - How do we deal with threatened, endangered species? Species triage

GROUP THREE

1. Climate change concerns for tribes

- Culturally significant species / sites or places – vulnerability assessments and tribal collaboration
- Need to identify areas that will be important to tribes in the future. Climate impacts don't just occur within tribal boundaries.
- Find an effective mechanism to gather and document tribal issues and needs with respect to climate change (joint CSC and LCC effort)

2. Monitoring

- Where would you monitor to improve climate data in the Southwest?
- Improve climate monitoring, especially in understudied areas

3. Improving Interpretations of Climate Information

- Improve knowledge of historic and pre-historic information. Identify some key locations to study the past.
- How will climate change affect invasive species?
- What climate variability does to water use in urban settings?

4. Communication Issues

- How can we communicate science questions and findings with all the tribes in the SW CSC?
- Consider the importance of tailoring information to specific areas, how can we make it most relevant?
- Leverage existing resources or groups with communication networks
- The CSCs and LCCs should work with the partners of steering committee members

GROUP FOUR

1. Determine the effect of climate change on people and societies

2. Provide standardization, guidance, for monitoring (developing models to guide monitoring).

3. Develop approaches to better determine and communicate uncertainty.

4. Conduct vulnerability assessments at local scale (temporal and spatial): How is my ecosystem going to be affected by climate change?

5. **Identify interactive effects of disturbances (i.e. invasive species, grazing, other land use, fire) and climate change on ecosystems and adaptation and mitigation measures.**

NEXT STEPS

The SWCSC Director, Principal Investigators, and staff will begin drafting their long-term science plan during the summer of 2012. We will draw from input provided by participants in the Southwest Climate Summit, participants in the Landscape Conservation Cooperatives' needs assessment processes, and input from the SWCSC's Stakeholder Advisory Committee¹ when identifying priorities for the Center. We will collaborate with the Stakeholder Advisory Committee to finalize the plan beginning in the fall of 2012.

The long-term science plan will form the basis of a series of strategic science plans (outlined yearly). These strategic plans will be used to generate the annual requests for proposals issued by the SWCSC. We anticipate that RFPs will be distributed in early 2013.

¹ A list of the current SWCSC SAC members can be found at our website:
www.swcsc.arizona.edu

2012 Southwest Climate Summit Participants

Sharon Adams – White Mountains Land Trust
Christine Albano – UC Davis/SWCSC
Lee Allan – PRESS – Indian Country Today Media Network
Delbert Altaha Jr. – White Mountain Apache Tribe
Carol Beardmore – U.S. Fish and Wildlife Service/Sonoran Joint Venture
Pamela Benjamin – National Park Service
Chris Black – U.S. Air Force
Debra Block – USGS
Michael Block – Metropolitan Domestic Water Improvement District
J.R. Bluehouse – U.S. Institute for Environmental Conflict Resolution
Tim Brick – Metropolitan Water District of Southern California*
Keely Brooks – Southern Nevada Water Authority
Tim Brown – Desert Research Institute
Dave Busch – USGS/SWCSC*
Nichole Carnevale – Nambe Pueblo
Dan Cayan – Scripps Institution of Oceanography/SWCSC*
Ruth Cerezo-Mota – UCLA/SWCSC
Kathy Chavez – Pima County Regional Wastewater Reclamation Department
Karletta Chief – University of Arizona
Mitch Chrismer – U.S. Institute for Environmental Conflict Resolution
Melanie Colavito – University of Arizona
Susanne Cotty – Pima Association of Governments
Brian Cunningham – University of Arizona
Britta Daudert – Desert Research Institute/SWCSC
Tony Davis – PRESS – Arizona Daily Star
Mike Dettinger – USGS/SWCSC*
Jesse Dickinson – USGS
Jennie Duberstein – Sonoran Joint Venture
Leslie Ethen – City of Tucson
Dan Ferguson – University of Arizona/CLIMAS*
Deborah Finch – USDA Forest Service
Erica Fleishman – UC Davis/SWCSC*
Karl Ford – Bureau of Land Management National Operations Center*
Susan Frankel – USDA Forest Service*
Rebecca Fris – California LCC
Terry Fulp – Bureau of Reclamation
Jaimie Galayda – University of Arizona/CLIMAS
Sasha Gershunov – Scripps Institution of Oceanography/SWCSC
Dave Graber – National Park Service
Alex Hall – UCLA
Eric Hartge – Stanford University
Jane Hayes – USDA Forest Service
Katie Hirschboeck – University of Arizona
Marty Hoerling – NOAA ESRL*
Thomas Hoisch – Northern Arizona University

Todd Hopkins – Great Basin LCC
Molly Hunter – Northern Arizona University
Deborah Huntzinger – Northern Arizona University
Stephen Jackson – University of Wyoming
Angie Jardine – University of Arizona/Institute of the Environment
Richard Johnson – Bureau of Indian Affairs
Genevieve Johnson – Desert LCC
Kevin Johnson – Southern Rockies LCC
Richard Kearney – U.S. Fish and Wildlife Service
Saeahm Kim – University of Arizona
Jim Leenhouts – USGS
Melanie Lenart – University of Arizona
Charlotte Lomeli – Shivwits Band of Paiutes
Glen MacDonald – UCLA/SWCSC*
Mohammed Mahmoud – Central Arizona Project
Joe Marlow – Sonoran Institute
Kyle McFee – Shivwits Band of Paiutes
Alison Meadow – University of Arizona/SWCSC
Robert Mesta – Sonoran Joint Venture
Paul Miller – Bureau of Reclamation
Dave Miller – USGS*
Louise Misztal – Sky Island Alliance
Rick Moore – Gran Canyon Trust
Valerie Morrill – Arizona Wildlife Federation
Dale Morris – Bureau of Indian Affairs
Rachel Murray – University of Arizona
Pamela Nagler – USGS
Jennifer Newmark – Nevada Department of Conservation and Natural Resources
Larry Norris – National Park Service
Pat O'Brien – National Park Service
Jonathan Overpeck – University of Arizona/SWCSC*
Gigi Owen – University of Arizona/CLIMAS
Vincent Pawlowski – Prescott College
Chester Phillips – University of Arizona
Suraj Polade – UCSD/SWCSC
Fred Powledge – PRESS – Freelance
Thom Rahn – Los Alamos National Lab
Kelly Redmond – Western Regional Climate Center/SWCSC*
Sky Dawn Reed – Gila River Indian Community
Laura Richards – Nevada Department of Wildlife
Aimee Roberson – U.S. Fish and Wildlife Service
Dana Roth – U.S. Fish and Wildlife Service
Wendy Ryan – Colorado State University
David Sampson – Arizona State University
Debra Schlafmann – California LCC
Chris Schmidt – Native Seeds/SEARCH
Nancy Selover – Arizona State University

LeRoy Shingoitewa – Hopi Tribe
June Shoemaker – Bureau of Land Management
Lawrence Snow – Shivwits Band of Paiutes
Mark Sogge – USGS
Lisa Soo – Bureau of Land Management
Francie Spencer – San Carlos Apache Tribe
Michelle Stokes – NOAA/NWS
Tom Suchanek – USGS
Kristin Szabo – Nevada Department of Conservation and Natural Resources
John Takekawa – USGS
Janet Travis – Gila River Indian Community
Valerie Trouet – University of Arizona
Sarah Truebe – University of Arizona
Benjamin Tuggle – U.S. Fish and Wildlife Service
Brad Udall – Western Water Assessment/SWCSC*
Selso Villegas – Tohono O’odham Nation
Greg Watson – U.S. Fish and Wildlife Service
Paul Weiland – Nossaman, LLP*
Jeremy Weiss – University of Arizona
Courtney White – The Quivira Coalition
Sarah White – University of Arizona
Matt Williamson – Grant Canyon Trust
Susan Rose Wotkyns – Institute for Tribal Environmental Professionals
Diana Zamora-Reyes – USGS

*Presenter

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