



# 2015 SOUTHWEST CLIMATE SUMMIT

## **Bridging the Gap – From Science to Management Action in Climate Adaptation**

November 2-3, 2015 – Holiday Inn Capitol Plaza, Sacramento, California

### **SUMMARY REPORT FROM THE SOUTHWEST CLIMATE SCIENCE CENTER**

The 2015 Southwest Climate Summit held in Sacramento, California provided the opportunity for natural resource managers, scientists, public agencies, tribes, non-governmental organizations, and the private sector to share information and expand their networks. The Summit was guided by its theme, “bridging the gap – from science to management action in climate adaptation,” to feature presentations by leading thinkers, oral and poster sessions, and workshops designed to engage participants in building collaborative partnerships for resilient southwestern landscapes. The conference included crosscutting plenary sessions covering science and policy efforts of broad interest, more-focused concurrent sessions, and time for discussion and networking between resource managers and scientists.

As a whole, the Summit comprised a series of ongoing and overlapping conversations about enabling bold decisions in the face of climate change, decision support for adaptation management, and how to navigate the complexity of climate science. The Summit highlighted key principles for successful climate adaptation, including: focusing on future conditions while planning for change, designing actions in a watershed or ecosystem context, prioritizing actions for multiple benefits to nature and people, and collaborating and communicating across sectors.

Summit participants were able to take back many lessons learned about how to better catalyze effective climate adaptation. Among the lessons: if we take action, it will have a positive impact for adaptation; we need to shift towards co-production of knowledge between managers and scientists; tribal members provide expertise that should be included in adaptation partnerships and projects; and there are many successful climate adaptation projects ongoing, all of which we can build upon and champion.

#### **Attendance:**

- Over 250 attendees
- Representation
  - 51% Government Agencies, 27% Academic, 13% NGOs, 6% Tribal, 4% Consulting Groups
  - Attendees came from 15 states and the District of Columbia: AZ, CA, CO, DC, IN, KS, NM, NV, OK, OR, RI, SC, UT, VA, WA, WV

## **Agenda:**

The Summit featured 3 plenary sessions, 4 concurrent sessions each consisting of 1 hour of talks followed by 30 minutes of open discussion, 1 interactive session divided into 3 topics, and 1 poster session.

Seventy-six speakers represented various government agencies, academic institutes, NGOs, and tribal organizations. Keynote speakers included Lynn Scarlett, The Nature Conservancy; Robert Bonnie, U.S. Department of Agriculture; Ellie Cohen, Point Blue Conservation Science; Brad Udall, Colorado State University; and Stephen Jackson, DOI Southwest Climate Science Center.

Topics for the concurrent sessions included Rangeland Systems, Tribal Climate Adaptation, Colorado River Watershed, Landscape Conservation Design, Climate Models, Forested Ecosystems, Coastal Ecosystems, Sacramento-San Joaquin Watershed, Effective Partnership Models, and Effective Decision Support Models.

## **Conveners:**

The Summit was convened by numerous people and organizations providing valuable time and input to achieve wide-reaching goals. The Summit was organized and led in a partnership between the California Landscape Conservation Cooperative and the Southwest Climate Science Center; other conveners included Desert Landscape Conservation Cooperative, Great Basin Landscape Conservation Cooperative, North Pacific Landscape Conservation Cooperative, Southern Rockies Landscape Conservation Cooperative, United States Department of Agriculture Southwest Climate Hub, United States Department of Agriculture California Sub Hub, John Muir Institute of the Environment at the University of California at Davis, National Oceanic and Atmospheric Administration's Regional Integrated Sciences and Assessments program, Climate Assessment for the Southwest, California Nevada Climate Applications Program, US Fish & Wildlife Service, Bureau of Reclamation, Bureau of Land Management, U.S. Environmental Protection Agency, and the United States Geological Survey.

## **Conclusions:**

Overall, the Summit achieved its goals of connecting research scientists to stakeholders to discuss climate change research, impacts, and adaptation strategies across the southwestern region. 95% of the people surveyed rated the Summit as Good (25%), Very Good (44%), or Excellent (26%).

Some comments from the survey include:

“The long discussion sessions following presentations were enjoyable and very fruitful, helpful for me as a presenter”

“I was impressed that all levels of government and non-profits are engaged in trying to deal with the realities of climate-change.”

“It was a great overview of the projects, people and partnerships involved in climate change adaptation science and management”

# **2015 Southwest Climate Summit Agenda**

November 2-3, 2015 | Holiday Inn | Sacramento, CA

Bridging the gap – from science to management action in climate adaptation

## **Sunday, November 1**

7:00 – 9:00PM **Informal Welcome Mixer and Registration** | *California*

## **Monday, November 2**

7:30 – 8:30AM **Morning Refreshments and Registration**

8:30 – 8:50AM **Welcome** | *California* • Mark Schwartz, University of California, Davis

8:50 – 9:30AM **Opening Keynote** | *California* • Lynn Scarlett, Managing Director for Public Policy, The Nature Conservancy

9:30 – 10:30AM **Plenary Session I: Emerging issues in the climate of the Southwestern U.S.** | *California*

Our understanding of climate, future climate, and the likelihood of changing intensity and frequency of extreme events is rapidly evolving. The southwestern US is a complex climatic landscape, with monsoonal rains, montane storms, and coastal upwelling providing strong local drivers of climate at scales that are important for resource management. Leading scientists working at the interface of improving our understanding of southwestern climates, are paired with scientists using this information to improve prediction of resource outcomes will provide the latest information about changing climates and what we should expect in terms of emerging science in the coming years.

Moderator: Jonathan Overpeck, University of Arizona

- Kelly Redmond, Desert Research Institute
- Glen MacDonald, University of California, Los Angeles
- Dan Cayan, University of California, San Diego

10:30 – 11:00AM **Break**

11:00 – 12:00PM **Plenary Session II: Adaptation management for a changing climate** | *California*

It is critical that resource managers take action now to help our natural resources adapt to a rapidly changing climate. At the same time, resource managers are faced with an ever-increasing amount of climate science and information and are challenged to make sense of it all and incorporate it into their everyday decision-making. How is climate adaptation occurring at the federal, state, and local level? This panel will provide insights on how managers are adapting in a world of change and will provide case studies and lessons learned for those looking to better adapt in the future.

Moderator: Rebecca Fris, California Landscape Conservation Cooperative

- Hugh Safford, U.S. Forest Service
- Kevin Hunting, California Department of Fish and Wildlife
- Michael Anderson, California Department of Water Resources
- Ellie Cohen, Point Blue Conservation Science

12:00 – 1:30PM **Lunch** (provided)

1:30 – 3:00PM **Concurrent Session I: Climate science to resource impacts**

## **Rangeland Systems I: Climate to impacts | *Granada/Hermosa***

The drought in California is of historic proportion, both in its intensity and its effect on California Rangelands. This session will delve into the impacts of climate variability, particularly drought, on California rangeland health. Presenters provide foundational science and links to management action in climate adaptation. The 2015 California Rangelands Vulnerability Assessment, which describes climate impacts and systemic vulnerabilities, will serve as the springboard for a moderated 30-minute discussion on solutions and next steps.

Moderator: Joel Brown, USDA Southwest Climate Hub

- Ken Tate, University of California, Davis | *Impacts of Drought on California's Working Rangelands*
- Kathryn Purcell, U.S. Forest Service | *Wildlife Response to Climate Change and Drought in Oak Woodlands*
- Kristin Byrd, U.S. Geological Survey | *Integrated climate and land use change scenarios for water supply on California rangelands*
- Pelayo Alvarez, Independent Consultant | *A Climate Vulnerability Assessment for California Rangelands*

## **Tribal Climate Adaptation I: Tribal climate adaptation planning | *Fresno/El Dorado/Diablo***

Southwest Tribes are developing climate adaptation plans to preserve traditional culture and resources. Presented here are case study Tribal climate adaptation efforts from the Northern California coast and Great Basin landscapes. Speakers also focus on unique characteristics to thinking about Tribal adaptation such as understanding historical ecology and cultural landscapes and preserving Tribal self-determination and knowledge sovereignty.

Moderator: Mary Mahaffy, North Pacific Landscape Conservation Cooperative

- Joe Hostler, Yurok Tribe | *Climate Change Impacts to Yurok Resources: A Tribal Study Identifying, Assessing, and Adapting to Changes in Water and Aquatic Resources, Food Security, and Tribal Health Impacts*
- Ron Reed, Karuk Tribe | *Climate Change: A Karuk Tribal Perspective*
- Aaron Dixon, Susanville Indian Rancheria
- Karletta Chief, University of Arizona | *Collaborative and resilience water management planning under climatic and non-climatic stressors for two southwestern tribes*

## **Colorado River Watershed I: Climate to impacts | *California***

The Colorado River Basin is already seeing an increasing range of impacts due to drought, rising temperatures, and increasing evapotranspiration – changes that are reflected in less late-season snow, declining flows, low reservoir levels, and depleted groundwater. Recent changes are reason for concern, but they also provide an early motivation to focus on possible future climate impacts and how to manage for improved resilience. This session will examine the on-going drought and its implications for the Colorado River Basin, as well as new research on what is likely ahead in terms of climate and hydrological change in the basin. A second set of presentations will focus more on ecological impacts, implications, and possible management strategies.

Moderator: Kathy Jacobs, University of Arizona

- Brad Udall, Colorado State University | *A Tale of Two Colorado River Droughts*
- Jonathan Overpeck, University of Arizona | *Climate change and the future of the Colorado River*
- Julie Vano, Oregon State University | *Understanding uncertainties in future streamflow projections*
- James Famiglietti, University of California, Irvine | *Estimating groundwater storage changes and evapotranspiration in the Colorado River basin*

## **Landscape Conservation Design | *Balboa/Calaveras***

Landscape Conservation Design (LCD) is both an integrated collaborative process and a spatially explicit product that identifies targets of interest, projected landscape patterns, desired future conditions and implementation strategies for natural resource managers. With the help of Landscape Conservation Cooperatives, a number of LCDs are underway in the Southwest. This session will highlight 4 different LCDs that are in various stages of development. Each talk will discuss the status of their work, the management questions they are helping to answer, and the lessons being learned throughout the process.

Moderator: Megan Cook, U.S. Fish & Wildlife Service

- Debra Schlafmann, California Landscape Conservation Cooperative | *LCDs - How climate change is changing our resource planning methods*
- Louise Misztal, Sky Island Alliance | *Landscape Conservation Design in the Desert*
- Todd Hopkins, Great Basin Landscape Conservation Cooperative | *The Northwest Basin and Range Landscape Conservation Project*
- Andrea Graffis, California Landscape Conservation Cooperative | *The Central Valley Landscape Conservation Project*

3:00 – 3:30PM **Break**

3:30 – 5:00PM **Concurrent Session II: Resource impacts to management action**

### **Rangeland Systems II: Impacts to actions | *Granada/Hermosa***

Rangeland managers adjust stocking rates based upon carrying capacity, which is directly related to recent precipitation, making the system vulnerable to drought and longer-term climate change impacts. This session focuses on rangeland adaptation to climate change via the presentation of case studies and specific examples. Speakers representing cooperative extension, the California Cattlemen's Association and Academia highlight both recent strategies to cope with a changing climate and broader understanding of historic and expected transformation of western rangelands. A moderated 30-minute discussion following the presentations will generate specific actions and solutions within the context of present rangeland health.

Moderator: Kris Havstad, U.S. Department of Agriculture Southwest Climate Hub

- Mike Crimmins, University of Arizona | *Developing precipitation monitoring strategies for Arizona ranchers and range managers to manage drought risk*
- Leslie Roche, University of California, Davis | *Climate impacts to actions – insights from on-ranch grazing strategies*
- Nathan Sayre, University of California, Berkeley | *When is carrying capacity? Problems of time in adapting to drought in Southwestern desert grasslands*
- Justin Oldfield, California Cattlemen's Association | *Impact of California's Historic Drought on California ranchers and the beef cattle industry*

### **Tribal Climate Adaptation II: Traditional Ecological Knowledge & management in the face of climate change | *Fresno/El Dorado/Diablo***

Partnerships between Tribes and other natural resource managers are essential to continuing traditional cultural practices and applying numerous effective climate adaptation strategies on-the-ground. This session will show models of successful partnerships that are based on respect for proper inclusion of Traditional Ecological Knowledge into natural resource management.

Moderator: Michelle Selmon, California Department of Water Resources

- Hawk Rosales, InterTribal Sinkyone Wilderness Council | *Climate Adaptation Efforts of the InterTribal Sinkyone Wilderness Council*
- Ron Goode, North Fork Mono Tribe | *Restoring mountain meadows and the link to the water supply system*
- Kenneth Holbrook, Maidu Summit Consortium | *Maidu Summit Conservancy: and other emerging native led land trusts*
- Frank Lake, U.S. Forest Service | *Incorporation of Tribal Traditional Ecological Knowledge of Forestry and Fire Ecology into Climate Change Research and Management*

### **Colorado River Watershed II: Impacts to actions | *California***

The Colorado River Basin is already seeing an increasing range of impacts due to drought, rising temperatures, and increasing evapotranspiration – changes that are reflected in less late-season snow, declining flows, low reservoir levels, and depleted groundwater. Recent changes are reason for concern, but they also provide an early motivation to focus on possible future climate impacts and how to manage for improved

resilience. This session will examine the on-going drought and its implications for the Colorado River Basin, as well as new research on what is likely ahead in terms of climate and hydrological change in the basin. A second set of presentations will focus more on ecological impacts, implications, and possible management strategies.

Moderator: Carolyn Enquist, Southwest Climate Science Center

- Jack Schmidt, Utah State University | *Stream flow, sediment transport, and channel change of the Colorado River: a watershed perspective*
- Ken Nowak, Bureau of Reclamation | *Drought and its Impacts on the Colorado River System*
- Bill Hasencamp, Metro Water District | *Challenges in Maintaining a Reliable Colorado River Water Supply to California*
- Julie Stromberg, Arizona State University | *Dryland Riparian Ecosystems: Sensitivity and Resilience to Climatic Extremes*

### **Climate Models | *Balboa/Calaveras***

With more than 25 global climate models, four emission scenarios, and a handful of downscaling options, choosing the right climate model is a complex decision. This session will highlight key features to consider when thinking about climate models and making management resource decisions. Why do we think that some climate models, emission scenarios and downscales are more robust for projecting future conditions than others? Attendants will emerge with a clearer understanding of how to make these difficult choices and where they might go to support those decisions.

Moderator: Mark Schwartz, University of California, Davis

- Sasha Gershunov, Scripps Institution of Oceanography | *Weather extremes in a changing climate*
- Laurie Flint, U.S. Geological Survey | *Translating Climate Change into Hydrology at Fine Spatial Scales for Resource Management Applications*
- Robert Hijmans, University of California, Davis | *What (future) climate data should I use?*
- Sam Veloz, Point Blue Conservation Science | *Strategies for making climate projections actionable*

5:30 – 7:30PM **Poster Session and Reception | *California***

## **Tuesday, November 3**

7:00 – 8:00AM **Morning Refreshments**

8:00 – 8:25AM **Morning Keynote | *California*** • Robert Bonnie, Under Secretary for Natural Resources and Environment, U.S. Department of Agriculture

8:30 – 10:00AM **Concurrent Session III: Climate science to resource impacts**

### **Forested Ecosystems I: Climate to impacts | *Granada/Hermosa***

A cycle of drought induced stress, increased pest and pathogen impact, increased fire vulnerability, and increasing fire size, frequency, severity and impact are driving ecosystem change in the montane forested regions of the southwest. Emerging science is striving to better understand where and when these drivers will be strongest. Resource managers are developing adaptation strategies for managing forests to increase resilience to climate change through changing ecosystem composition, and resilience to fire through changing stand structure. This paired set of talks will walk through examples of science addressing the stressors, and adaptation strategies being developed in response to those stressors.

Moderator: Connie Millar, U.S. Forest Service

- Phil van Mantgem, U.S. Geological Survey | *Drought, fire and climate change in the Sierra Nevada: Can our forests take the heat?*

- Jim Thorne, University of California, Davis | *Forest trends in the Sierra Nevada over 70 years, and identifying areas of future forest stress*
- Matt Brooks, U.S. Geological Survey | *Hydrologic vulnerability of Sierra Nevada meadows*
- David Ackerly, University of California, Berkeley | *Climate and vegetation change in California Coast Ranges: A Bay Area perspective*

### **Coastal Ecosystems I: Climate to impacts | *Balboa/Calaveras***

Coastal ecosystems in the southwest are facing increased threats due to changes in climate. Rising sea levels will affect these systems in many ways, including inundation of low-lying areas, erosion of coastlines, and increased salinity in estuaries. These effects will compound when sea-level rise is superimposed on natural climate cycles, storms, and tides (National Research Council, 2012). This first session will look at the latest science about coastal impacts in regards to fog changes, extreme weather events, sea-level rise, and upwelling.

Moderator: Mary Small, California Coastal Conservancy

- Alicia Torregrosa, U.S. Geological Survey | *Quantifying Coastal Fog for Management Actions*
- Monique Myers, Scripps Institute of Oceanography | *A Coastal Ecosystem Vulnerability Assessment for the Santa Barbara Area*
- Dan Cayan, University of California, San Diego | *Peak Sea Level Extremes along the California Coast and Projected Changes as Sea Level Rises*
- Mark Ohman, Scripps Institute of Oceanography | *Response of the California Current Ecosystem to Climate Forcing*

### **Sacramento-San Joaquin Watershed I: Climate to impacts | *California***

The Sacramento-San Joaquin watershed is one of the world's most productive agricultural regions, is a vital link in California's complex water delivery and transportation systems, and provides important habitat to protect biodiversity including endangered species and migratory birds. This watershed is also one of the highest impacted regions in California by growth, development patterns, and climate impacts such as increasing temperatures, drought, and loss of habitat. This first session will discuss the latest science impacting important habitats and species in the watershed.

Moderator: John Stella, The Nature Conservancy

- Jay Lund, University of California, Davis | *Water Management with Climate Change in California's Central Valley*
- Joshua Viers, University of California, Merced | *Habitat conservation and climate change adaptation at the intersection of the food-energy-water nexus*
- Peter Moyle, University of California, Davis | *Shifting the balance: climate change effects on fishes and aquatic ecosystems in California*
- Matt Reiter, Point Blue Conservation Science | *Climate-Smart Conservation Science of Birds in California's Central Valley*

### **Effective Partnership Models | *Fresno/El Dorado/Diablo***

Both scientists and practitioners are acutely aware of challenges that create barriers for both the effective creation and use of science by practitioners. Numerous models now exist that strive to create pathways to successful generation and use of science in making natural resource management decisions. The suite of speakers will address an array of models to create communities, organizations and processes that foster development of needed science, the effective communication of that science to end-users, and the use of that science in resource management.

Moderator: Deb Schlafmann, California Landscape Conservation Cooperative

- Todd Hopkins, Great Basin Landscape Conservation Cooperative | *Great Basin Climate Forums: Conversations about weather, climate and the Great Basin*
- Chrissy Howell, U.S. Forest Service | *Climate Adaptation Planning for the Sierra Nevada*

- Sara Hutto, Greater Farallones National Marine Sanctuary | *Climate-Smart Adaptation for the North-central California Coast and Ocean: A Multi-Agency Effort to Integrate Climate Adaptation into Existing Management Frameworks*
- Amber Parris, California Department of Fish & Wildlife | *San Diego Climate Science Alliance: Planting the seeds for innovative partnerships*

10:00 – 10:30AM **Break**

10:30 – 12:00PM **Concurrent Session IV: Resource impacts to management action**

### **Forested Ecosystems II: Impact to action | *Granada/Hermosa***

A cycle of drought induced stress, increased pest and pathogen impact, increased fire vulnerability, and increasing fire size, frequency, severity and impact are driving ecosystem change in the montane forested regions of the southwest. Emerging science is striving to better understand where and when these drivers will be strongest. Resource managers are developing adaptation strategies for managing forests to increase resilience to climate change through changing ecosystem composition, and resilience to fire through changing stand structure. This paired set of talks will walk through examples of science addressing the stressors, and adaptation strategies being developed in response to those stressors.

Moderator: Chris Keithley, California Department of Forestry and Fire Protection

- Adrian Das, U.S. Geological Survey | *Effects of the current unprecedented drought on giant sequoias: A preview of the future?*
- Becky Estes, U.S. Forest Service | *Responding to Disturbance: Post-Fire Management in the King and Rim Fires*
- Patrick Gonzalez, U.S. National Park Service | *Climate change, biome shifts, wildfire, and carbon in national parks of the Southwestern US*
- Peter Stine, U.S. Forest Service | *Integrating Efforts to Restore Resilience to Forest Ecosystems and Retaining/Enhancing Old Forest Characteristics for Species of Conservation Concern*

### **Coastal Ecosystems II: Impact to action | *Balboa/Calaveras***

Coastal ecosystems in the southwest are facing increased threats due to changes in climate. Rising sea levels will affect these systems in many ways, including inundation of low-lying areas, erosion of coastlines, and increased salinity in estuaries. These effects will compound when sea-level rise is superimposed on natural climate cycles, storms, and tides (National Research Council, 2012). This second session will highlight the planning and implementation by managers of climate change adaptation strategies up and down the coast to make our coastal area more resilient to change.

Moderator: Karen Thorne, U.S. Geological Survey

- Kirk Gilligan, U.S. Fish & Wildlife Service | *Seal Beach National Wildlife Refuge Climate Adaptation Planning and Thin Layer Salt Marsh Sediment Augmentation*
- Natalie Manning, National Oceanic and Atmospheric Administration | *NOAA Habitat Blueprint: Collaboration to Manage Natural Resources and Water Resources - an example from the Russian River Habitat Focus Area*
- Dani Boudreau, Tijuana River National Estuarine Research Reserve | *Using Scenario Planning to Overcome Uncertainty*
- Jeremy Lowe, San Francisco Estuary Institute | *Oro Loma Horizontal Levee: Experiments with nature-based adaptation to increase estuarine resiliency*

### **Sacramento-San Joaquin Watershed II: Impact to action | *California***

The Sacramento-San Joaquin watershed is one of the world's most productive agricultural regions, is a vital link in California's complex water delivery and transportation systems, and provides important habitat to protect biodiversity including endangered species and migratory birds. This watershed is also one of the highest impacted regions in California by growth, development patterns, and climate impacts such as increasing



temperatures, drought, and loss of habitat. This second session will highlight how managers are incorporating climate science into important management decisions and actions.

Moderator: Brad Burkholder, California Department of Fish & Wildlife

- Mike Mierzwa, California Department of Water Resources | *Addressing Hydrologic Variability in California's Central Valley*
- Arlan Nickel, Bureau of Reclamation & Armin Muniver, CH2M Hill | *Adapting Water Resource Management to Change in the Central Valley*
- Andrew Rayburn, River Partners | *Enhancing Climate Change Resilience in the Central Valley Through Strategic Restoration of Riparian Ecosystems*
- Greg Yarris, Central Valley Joint Venture | *Climate Change Considerations for Migratory Bird Conservation in the Central Valley*

### **Effective Decision Support Models | *Fresno/El Dorado/Diablo***

A primary challenge for resource managers and scientists alike is to select which among the many competing decision support frameworks one should use for any particular problem. Whether it is scenario planning, vulnerability assessment, structured decision making, project planning tools or climate smart conservation ideals, we are now inundated with support to create transparent, documentable decisions through a structured process. This session will feature a suite of practitioners who have experience applying one or more frameworks to make decisions and will discuss the strengths and weaknesses they encountered through applying these tools to resource management problems in the Southwest.

Moderator: Erica Fleishman, University of California, Davis

- Alison Meadow, University of Arizona | *Evaluating the Process and Impacts of Co-Produced Science: How Do We Know When It's Working? How Do We Know What "Working" Means?*
- Giselle Block, U.S. Fish & Wildlife Service | *Making management decisions in light of climate change uncertainties at Seal Beach National Wildlife Refuge*
- Koren Nydick, National Park Service | *Lessons learned from using vulnerability and scenario frameworks to support climate adaptation in the southern Sierra Nevada*
- Beth Huning, San Francisco Bay Joint Venture | *Using Structured Decision-making for Climate Adaptation Planning*

12:00 – 1:30PM **Lunch** (provided)

1:30 – 3:00PM **Ideas exchange interactive session**

Because these are interactive sessions, we highly recommend that you pick one of the three sessions and stay in that session for the entire experience.

### **Overview of Online Tools | *Balboa/Calaveras/Granada/Hermosa***

With so many tools for exploring and visualizing climate science data available online and more constantly being developed, it can be challenging to know which tool might be useful for a specific project. This interactive session will take a tour across online climate science tools, educating the potential user about types of tools, intended uses, and the data behind them. The session will cover examples of tools for information discovery, data delivery, and specific management applications. Attendees will go away with an understanding about appropriate uses and limitations of some of the major online tools and be better able to evaluate tools for application in their projects.

### **Roadblocks to Bold Action | *California***

In this session, we are asking decision makers and planners across all sectors—water management, natural resources, energy, agriculture, transportation, human health—to share their “micro” stories of experiences they have had trying to understand and plan for these types of events. Thinking about how these climate-related events and changes will affect our region is a complicated and challenging task. By bringing together our diverse stories and experiences about how we have gone about understanding and planning for these events will help us better understand our current and future challenges and opportunities to make our region more climate resilient.

### **Building Climate Literacy for Resource Managers | *Fresno/El Dorado/Diablo***

Choosing to use a climate model for adaptation decisions can be a daunting challenge. Among the issues to grapple with range from understanding what a global circulation models does, to how climate modelers predict extreme events. Related fields are improving training through series of short (3-5 min) videos). This interactive session will introduce participants to examples of brief videos and then engage in an exercise to provide the CSC/LCC/Hubs with information on the training video tools needed by resource managers. Participants will emerge with a suite of resources that can help them get started (e.g., an index of existing instructional videos on climate models) along with a new perspective on model-based thinking.

3:00 – 3:30PM **Break**

### **3:30 – 5:00PM Plenary Session: Inspiring Bold Climate Adaptation Action | *California***

What would you do, if you were 10x bolder to implement management decisions that could really make a difference? The closing session will combine an interactive session to elicit what constitutes bold climate adaptation action and how we might overcome constraints to both the knowledge and social and political impediments to taking such action. We will close the Summit with thoughts on how we look to the future and design adaptation strategies for the future of people, nature and the functioning of natural systems in the southwestern US.

- Ellie Cohen, Point Blue Conservation Science
- Brad Udall, Colorado State University
- Steve Jackson, Southwest Climate Science Center

5:00PM **Conference Adjourns**

## **2015 Southwest Climate Summit Conveners:**

### **Southwest Climate Science Center**

The Southwest Climate Science Center (SW CSC), one of eight regional Climate Science Centers, is a collaborative partnership among USGS scientists, resource management agencies, and a consortium of six academic institutions from across the region. Its goal is to provide objective scientific information, tools, and techniques that land, water, wildlife, and cultural resource managers and other interested parties can apply to anticipate, monitor, and adapt to climate change impacts in the southwestern United States.

### **California Landscape Conservation Cooperative**

The California Landscape Conservation Cooperative (CA LCC) is a science-management partnership designed to promote understanding and integration of climate science into natural resource management in California. Through the process of Climate Smart Conservation, the CA LCC informs the implementation of conservation actions that increase the adaptive capacity of species and ecosystems in the face of climate change.

### **Desert Landscape Conservation Cooperative**

The Desert Landscape Conservation Cooperative (LCC) is a bi-national, self-directed, non-regulatory regional partnership formed and directed by resource management entities as well as interested public and private entities in the Mojave, Sonoran, and Chihuahuan Desert regions of the southwestern United States and northern Mexico. Through collaborative partnerships, the Desert LCC seeks to provide scientific and technical support, coordination, and communication to resource managers and the broader Desert LCC community to address climate change and other landscape-scale ecosystem stressors.

### **United States Department of Agriculture California Sub Hub**

The United States Department of Agriculture California Sub Hub is a subsidiary hub of the Southwest Regional Climate Hub comprised of natural resource and agriculture professionals across California. Its mission is to help California land users (farmers, ranchers, forest landowners, and tribes) and land managers maintain sustainable communities and ecosystems by adapting to climate variability and change.

### **United States Geological Survey**

The United States Geological Survey (USGS) is a science organization that provides impartial information on the health of our ecosystems and environment, the natural hazards that threaten us, the natural resources we rely on, the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and

useable information. The USGS serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

### **United States Department of Agriculture Southwest Climate Hub**

The United States Department of Agriculture Southwest Climate Hub aims to develop and deliver science-based information and technologies to agricultural and natural resource managers that enable climate-informed decision-making and provide assistance to enable land managers to implement those decisions. It supports the working landscapes and landowners of Arizona, California, Hawaii and the U.S. affiliated Pacific Islands, Nevada, New Mexico, and Utah.

### **Great Basin Landscape Conservation Cooperative**

The Great Basin Landscape Conservation Cooperative brings together researchers, tribes, universities, federal, state and local governments, and non-governmental organizations to address and protect the natural and cultural resources essential to sustaining health and quality of life. Its mission is to enhance understanding of the effects of changing climate and other natural and human impacts across the region and promote the coordination of science-based actions to enable human and natural communities to respond and adapt to those conditions.

### **North Pacific Landscape Conservation Cooperative**

The North Pacific Landscape Conservation Cooperative (NPLCC) is a self-directed partnership between federal agencies, states, Tribes/First Nations, non-governmental organizations, universities, and other entities to collaboratively define science needs and jointly address broad-scale conservation issues, such as climate change. The NPLCC combines the collective science capacity, infrastructure, creativity, perspectives, and sometimes, financial resources of existing partnerships and programs to address decision support needs on a comprehensive scale.

### **John Muir Institute of the Environment**

The John Muir Institute of the Environment at University of California, Davis supports innovation and discovery aimed at solving real-world environmental problems. The institute's faculty are committed to strengthening the scientific foundation for environmental decision making through collective entrepreneurship, a team-oriented approach that recognizes the complexities of environmental problems and the societal context in which they occur.

## **Southern Rockies Landscape Conservation Cooperative**

The Southern Rockies Landscape Conservation Cooperative (SRLCC) is made up of federal, state, tribal and private agencies or organizations involved in the management of key natural resources such as water, animals and plants. The SRLCC facilitates delivery of applied science to inform resource management decisions that address climate change and other stressors such as drought.

## **Climate Assessment for the Southwest**

The Climate Assessment for the Southwest (CLIMAS) program, part of NOAA RISA, has a mission to improve the region's ability to respond sufficiently and appropriately to climatic events and climate changes. The program promotes participatory, iterative research involving scientists, decision makers, resource users, educators, and others who need more and better information about climate and its impacts.

## **National Oceanic and Atmospheric Administration's Regional Integrated Sciences and Assessments**

National Oceanic and Atmospheric Administration's (NOAA) Regional Integrated Sciences and Assessments (RISA) program supports research teams that help expand and build the nation's capacity to prepare for and adapt to climate variability and change. Central to the RISA approach are commitments to process, partnership, and trust building to create lasting relationships with decision makers from the public and private sectors including local, regional, and state governments, federal agencies, tribal governments, utilities, the business community, and national and international non-profit organizations.

## **California Nevada Climate Applications Program**

The California Nevada Climate Applications Program (CNAP), part of NOAA RISA, develops and provides climate information and forecasts for decision-makers in California, Nevada, and the surrounding region in three main sectors: water resources and hazards, wildfire, and coasts. CNAP researchers collaborate with stakeholders to develop information and tools for climate adaptation, provide decision support for environmental resources management, and explore and predict potential effects of climate change and variability.

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