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Welcome!



Colorado has a long and proud history of leadership in education, technology, and environmental stewardship. We enjoy abundant natural resources and, as a headwater state, we face important water resource challenges. As we look to the future, the management of our state water supplies and the issues of drought and climate risk will become increasingly important. As part of this effort it is imperative that we develop a thorough scientific understanding of climate risk and its potential effects and impacts. With this information we can continue to improve our ability to plan and prepare for drought and address impacts to our climate. This is a vital step in helping our state and nation sustainably manage and develop our water resources to meet the economic, water supply, environmental, and recreational needs of our citizens.

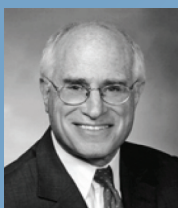
I am pleased to welcome you to this important conference on Managing Drought and Climate Risk. We have brought together many of our leaders in science, technology, policy, and education to examine and discuss a wide variety of important topics. Over the next several days I ask that you think creatively, examine new partnerships, and bring forth innovative ideas for how Colorado can be a leader in our understanding and response to drought and climate risk.

Thank you for attending, sharing your knowledge, and helping make Colorado the great state that it is!

Bill Ritter, Jr.

Governor Bill Ritter, Jr.

Harris Sherman, *Executive Director,*
Department of Natural Resources



As Director of the Department of Natural Resources, I am very appreciative of the support the Governor and legislature have provided to help Colorado wisely manage and conserve our natural resources. Over the last few years we have increased our capacity and expertise in the

Office of Water Conservation and Drought Planning and the Colorado Water Conservation Board. We are often faced with many competing needs as we manage our wildlife, develop our mineral resources, and strive to support the business and economic development of our communities. While at times these challenges may seem daunting, I am continually impressed with the talent, optimism, and ingenuity of our citizens and those of you who have devoted your careers to natural resource management. Working together, I am certain we will develop new and successful approaches to managing and protecting our vital natural resources.

James B. Martin, *Executive Director,*
Colorado Department of Public Health and Environment



At the Colorado Department of Health and Environment we have a strong interest in understanding how changes in temperature and water supply impact our natural resources and stakeholders. Changes in hydrology will directly affect water quality and aquatic life, and will also

impact how we analyze and permit industrial and stormwater discharges. To be successful we must better understand potential changes in base river flow, consider greater flow variation, and take into account changes in land use and land cover. This conference is another important step in gathering and sharing critical information to ensure a bright future for Colorado. Please enjoy the conference and I look forward to working with you in the future to address these important issues.



Arkansas River, CO

October 8–10, 2008

Grand Hyatt Denver

1750 Welton Street | Denver, CO 80202

Since 1999, the Colorado Basin has been undergoing the effects of prolonged drought. The region, including the State of Colorado, has experienced droughts in the past; however, the present and future reliability of its water resources face the combined effects of climate change, increased growth, and changing landscapes.

Preparedness is the key to successfully addressing the challenges of increasing drought risk and demands on water availability. Drought preparedness includes drought early warning and mitigation planning, implementation of proactive adaptation measures, and increased public awareness.

Conference participants will assess the status of drought risk, impacts, and preparedness in Colorado and the improvements that may be needed for management under different conditions such as climate change. The Conference goals are to share information and experience on drought preparedness across the public and private sectors, and to identify pathways for adaptation to the impacts of climate change and demand on water resources in the State of Colorado.

Conference
Goals

Day 1 - Wednesday, October 8, 2008 - Imperial Ballroom

7:00 a.m. – 8:00 a.m. **CONTINENTAL BREAKFAST** – *Imperial Ballroom Foyer*

Conference Begins

8:15 a.m. – 8:30 a.m. **Veva Deheza**, *Section Chief, CWCB Office of Water Conservation & Drought Planning*
Introductions – Conference Goals and Logistics

8:30 a.m. **Harris Sherman Introduces Governor**

8:30 a.m. – 9:10 a.m. **Governor Bill Ritter, Jr.**
Overview of Colorado Climate Action Plan and what it means for Colorado's Water Resources

Session 1: Overview: The State of the State

9:10 a.m. – 9:55 a.m. **Harris Sherman**, *Executive Director, Department of Natural Resources*
A Look to the Future
Martha Rudolph, *Environmental Director, Colorado Department of Public Health and Environment*
Drought Impacts: Does the absence of water quantity matter for water quality?

10:00 a.m. – 10:20 a.m. **BREAK** – *Imperial Ballroom Foyer*

Session 2: Drought and Climate in Colorado

10:20 a.m. – 11:45 a.m. **Moderator: Andrea Ray**, *Scientist, NOAA, Earth Systems Research Laboratory*
Nolan Doesken, *State Climatologist*
Drought Characteristics in Colorado: 1890 to 2008
Jennifer Gimbel, *Executive Director, Colorado Water Conservation Board*
Current Initiatives Addressing Water Supply Adaptation to Drought and Climate Change
Joseph Barsugli, *Cooperative Institute for Research in Environmental Sciences, Climate Diagnostic Center*
CWCB Report on *Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation*

Noon – 1:30 p.m.

LUNCH – Grand Ballroom

Keynote Speaker: Dr. Susan Solomon, *Senior Scientist, NOAA Earth Systems Research Laboratory, Boulder, Colorado*

Session 3: Drought - A Part of Colorado's History

1:30 p.m. – 2:40 p.m. **Moderator: John Rehring**, *Vice President, CDM*
Jeff Lukas, *University of Colorado*
The Long View of Drought in Colorado: What Tree Rings Tell us About Hydrologic Variability
Ben Harding, *AMEC/Hydrosphere*
The 1977 and 1981 Droughts in Colorado
Kelly DiNatale, *Associate and Senior Water Resources Engineer, CDM*
Lessons Learned from the 2002 Drought: Implications for Municipal Water Supply Planning

2:40 p.m. – 3:00 p.m. **BREAK** – *Imperial Ballroom Foyer*

Session 4: Lessons from Drought Planning and Management: Other State and Regional Perspectives

3:00 p.m. – 5:30 p.m. **Moderator: Mike Hayes**, *Director, National Drought Mitigation Center*
An Update on Drought Planning: The West in Perspective
Bill DeOreo, *President, Aquacraft*
Role of Water Conservation in a Long-Range Drought Plan
Mark Pifher, *Director, Aurora Water*
Water Supply and Water Quality
Mike Crimmins, *Climate Assessment for the Southwest (CLIMAS), University of Arizona*
Drought Planning and Preparedness: Examples from Arizona
Jeanine Jones, *Interstate Resources Manager, California Department of Water Resources*
Drought Preparedness Lessons from California
Martin Hoerling, *Meteorologist, NOAA Earth Systems Research Laboratory*
Is a Crisis Looming for Colorado River Water Supply?

5:30 p.m. – 7:30 p.m.

RECEPTION – *Sunlight Peak Room, 37th Floor Pinnacle Club*

Day 2 - Thursday, October 9, 2008 - Imperial Ballroom

7:00 a.m. – 8:00 a.m. **CONTINENTAL BREAKFAST** – Imperial Ballroom Foyer

Overview of Day 1 and Introduction for Day 2

8:00 a.m. – 8:10 a.m. **Veva Deheza**, Section Chief, CWCB Office of Water Conservation and Drought Planning

Session 5: National Integrated Drought Information System: What is it and what is the NIDIS pilot study in the Upper Colorado River Basin?

8:10 a.m. – 8:30 a.m. **Roger Pulwarty**, NOAA, Intergovernmental Panel on Climate Change Author, Director of NIDIS

Session 6: Overview of 2002 Colorado State Drought Mitigation and Response Plan, 2007 Update, and Future Plans

8:30 a.m. – 9:00 a.m. **Dick Wolfe, P.E.**, Colorado State Engineer

Session 7: Expert Panels (all Plenary): Managing Drought-Related Risks: Sectors and Cross-sectors

Panels: Each panel will have three to four panelists, with a moderator

Key Issues:

- What is status and trends?
- How does drought planning and management take place each session/year and over the long-term?
- What are the information and partnership needs?
- What drought triggers do you use? How do you coordinate sustainability?
- How do you plan for drought and climate change?

9:00 a.m. – 10:10 a.m. **Agriculture Panel**

Moderator: **James Pritchett**, Professor, Colorado State University

Reagan Waskom, Director, Colorado Water Institute
Agricultural Impacts and Adaptation to Drought and Climate Variability in Colorado

Pat O'Toole, President, Family Farm Alliance

Water, Climate, and Impact on Rural Communities

John Stulp, Commissioner, Colorado Department of Agriculture

Can Ag Do More With Less?

10:10 a.m. – 10:30 a.m. **BREAK** – Imperial Ballroom Foyer

10:30 a.m. – Noon

Municipal Panel

Moderator: **Brad Udall**, Director, Western Water Assessment

Laurna Kaatz, Climate Scientist, Denver Water

Planning for Climate Change: Front Range Climate Change Vulnerability Study

Douglas Kenney, University of Colorado

Success Stories in Urban Demand Management during Drought

Lee Rozaklis, Hydrosphere/AMEC

Boulder's Experiences Planning for Drought and Climate Change

Noon – 1:30 p.m.

LUNCH – Grand Ballroom

Keynote Speaker: **Dr. Patricia N. Limerick**, Faculty Director, Center of the American West and Professor of History, University of Colorado at Boulder

1:30 p.m. – 3:00 p.m.

Water for Environment and Recreation Panel

Moderator: **Geoff Blakeslee**, CWCB Board Director, The Nature Conservancy

Greg Espegren, Aquatics Specialist, Trout Unlimited

Trout Unlimited's Conservation Success Index

Tony Dixon, Regional Deputy Forester, US Forest Service

Saving Our Source: Forest Headwaters and Water Supply in a Changing Climate

Steve Torbit, Regional Executive Director, National Wildlife Federation

Western Governors Association, Wildlife Habitat and Corridor Initiative Context, Process, Results, and Implications

Luke Cartin, Environmental Manager, Vail Resorts Inc.

3:00 p.m. – 3:20 p.m.

BREAK – Imperial Ballroom Foyer

3:30 p.m. – 5:00 p.m.

Regional and County Watershed and Communication Planning

Moderator: **Susan Morea**, Senior Vice President, CDM

Eric Kuhn, General Manager, Colorado River District

2002 with Perfect Hindsight

Brian Werner, Public Information Department Manager, Northern Colorado Water Conservancy District

Water Manager's Worst Fear: 2002

Greg Fisher, Denver Water

Is Drought the Same Everywhere?

Day 3 - Friday, October 10, 2008 - Imperial Ballroom7:00 a.m. – 8:00 a.m. **COFFEE SERVICE** – Imperial Ballroom Foyer**Overview of Day 1 and 2 and Introduction for Day 3: Focus on No-Regrets Planning**8:00 a.m. – 8:20 a.m. **Jim Verdin**, USGS, Deputy Director of NIDIS**Session 8: Responding to Drought and Adapting to Climate Change**8:20 a.m. – 9:35 a.m. **Moderator: Brad Udall**, Director, Western Water Assessment**Gordon McCurry, Ph.D.**, Associate, CDM
The Effect of Climate Change on Municipal Water Demands in Colorado**Ted Kowalski**, Program Manager, CWCB
Tools to Keep Colorado River Water Working for Colorado: Augmentation, Water Banking, and Water Administration**Zeke Williams**, Partner, Faegre & Benson
Drought and Climate Change in the Environmental Review Process Under the National Environmental Policy Act**Session 9: Developing a Drought Early Warning System for Colorado: Information Services for Adaptation**9:35 a.m. – 11:30 a.m. **Moderator: Robert Webb**, Climate Analysis Branch Chief, NOAA9:35 a.m. – 10:05 a.m. **Mark Svoboda**, Climatologist, National Drought Mitigation Center
Introduction and Live Demonstration of the U.S. Drought Portal at www.drought.gov.10:05 a.m. – 10:25 a.m. **BREAK** – Imperial Ballroom Foyer10:25 a.m. – 11:45 a.m. **Roger Pulwarty**, NOAA, Intergovernmental Panel on Climate Change Author, Director of NIDIS
Duane Smith, Executive Director, Oklahoma Water Resources Board, Past Chairman of Western States Water Council
Facilitating Proactive Risk Management: Challenges, Roles, and Opportunities for Adaptation**Brief Conclusion of All Three Days and Final Thoughts – 11:45 a.m. – Noon**

Paonia Reservoir, CO

Keynote Speakers**Dr. Patricia N. Limerick**, Faculty Director, Center of the American West, and Professor of History, the University of Colorado at Boulder

Patty Limerick is the Faculty Director and Chair of the Board of the Center of the American West at the University of Colorado, where she is also a Professor of History. Dr. Limerick has dedicated her career to bridging the gap between academics and the general public and to demonstrating the benefits of applying historical perspective to contemporary dilemmas and conflicts.

Dr. Susan Solomon, Senior Scientist, National Oceanic and Atmospheric Administration (NOAA) Earth Systems Research Laboratory, Boulder, Colorado

Susan Solomon is widely recognized as one of the leaders in the field of atmospheric science. She has been employed by NOAA as a research scientist. Dr. Solomon's scientific papers have provided not only key measurements but also theoretical understanding regarding ozone destruction, especially the role of surface chemistry. In 1986 and 1987, she served as the Head Project Scientist of the National Ozone Expedition at McMurdo Station, Antarctica and made some of the first measurements there that pointed towards chlorofluorocarbons as the cause of the ozone hole. In 1994, an Antarctic glacier was named in her honor in recognition of that work. In March of 2000, Dr. Solomon received the National Medal of Science, the United States' highest scientific honor, for "key insights in explaining the cause of the Antarctic ozone hole."



Pyramid Peak - Elk Mountain, CO

The following publications have been provided to participants:

Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation, Colorado Water Conservation Board

Citizens Guide to Climate Change, Colorado Foundation for Water Education

**To learn more about this topic,
visit our website
www.cwcb.state.co.us**



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Thank you for joining us!