

# **News, Weather and Water**

## Proceedings of the 19th Annual South Platte Forum

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October 2008



# **Colorado Water**

## Resources Research Institute

**Information Series No. 106**

**Colorado  
State**  
University

Proceedings of the 19th Annual South Platte Forum

# NEWS, WEATHER AND WATER

October 22-23, 2008—Radisson Conference Center—Longmont, Colorado

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*The research on which this report is based was financed in part by the U.S. Department of the Interior, Geologic Survey, through the Colorado Water Institute. The contents of this publication do not necessarily reflect the views and policies of the U.S. Department of the Interior, nor does mention of trade names or commercial products constitute their endorsement by the U.S. Government.*

Colorado Water Institute, Reagan Waskom, Director  
Colorado State University, Fort Collins, CO 80523-1033

## 19th Annual South Platte Forum

# NEWS, WEATHER AND WATER

October 22-23, 2008—Radisson Conference Center—Longmont, Colorado

### **Wednesday, Oct. 22**

**registration & continental breakfast — 8:00 a.m.**

**welcome — 8:30 a.m.**

Reagan Waskom, Colorado Water Institute

**weather at the top of the hour — 8:50 a.m.**

*Local Global Warming: What Can We Say, What Do We Know?*

David Yates, National Center for Atmospheric Research

**extended weather outlook — 9:25 a.m.**

- *How Weather Messes Up Perfectly Good Water Supply Forecasts*  
Tom Perkins, Natural Resource Conservation Service
- *Tracking Climate Trends in Colorado*  
Nolan Doesken, Colorado Climate Center

**networking spotlight (break) — 10:15 a.m.**

*Break sponsored by Applegate Group, Inc.*

**developing stories — 10:45 a.m.**

Moderator: Amy Woodis, Metro Wastewater Reclamation District

- *Overview of the South Platte Decision Support System Alluvial Groundwater Model*  
Gordon McCurry, CDM
- *How Policy Makers Can Use SPDSS Modeling*  
Jim Hall & Ray Bennett, Colorado Division of Water Resources
- *Judicial Review Forum*  
Casey Shpall, Colorado Department of Law

**awards and sports (lunch) — 12:00 noon**

*Luncheon sponsored by Deere & Ault Consultants, Inc.*

**friends of the south platte award—12:35 p.m.**

Presented to: Platte River Greenway Foundation, [www.greenwayfoundation.org](http://www.greenwayfoundation.org)

**special keynote presentation—12:45 p.m.**

Sonny Lubick, Former CSU Football Coach

**letters to the editor — 1:20 p.m.**

Moderator: Landon Gates, Colorado Farm Bureau

- *The Economic Stakes of South Platte Management: They're Bigger Than You Think*  
Neil Grigg, Colorado State University Engineering
- *Does (Habitat+Biology) – Water = Doom for Aquatic Systems?*  
Jim Dorsch, Metro Wastewater Reclamation District
- *Irrigation Dry-up Impacts on Land and People*  
Bruce Bosley, Colorado State University Extension

**networking spotlight (break) — 2:35 p.m.**

**breaking news — 3:00 p.m.**

Moderator: Troy Bauder, Colorado State University Extension

- *Fertilizer and Pesticides: Their Impact on Front Range Shallow Aquifer Water Quality*  
Karl Mauch, Colorado Department of Agriculture
- *What Is in Our Water? Fate and Effects of Consumer Product Chemicals*  
Larry B. Barber, U.S. Geological Survey
- *Barr Lake and Milton Reservoir Watershed: Movement Towards Meeting Water Quality Standards*  
Laurie Rink, Mile High Wetlands Group, LLC

**entertainment tonight — 4:35 - 6:00 p.m.**

Reception and Poster Session

## 19th Annual South Platte Forum

# NEWS, WEATHER AND WATER

October 22-23, 2008—Radisson Conference Center—Longmont, Colorado

### Thursday, Oct. 23

#### welcome — 8:30 a.m.

Brian Werner, Northern Water

#### regional news: the sturgeon general's report — 8:45 a.m.

Jerry Kenny, Platte River Recovery Implementation Program

#### south platte investigative reports — 9:15 a.m.

- *Aquatic Invasive Species: A to Z (Asiatic Clams to Zebra Mussels)*  
Mary Fabisiak, City of Westminster
- *Assuring a Brighter Future for Colorado Through Aquifer Recharge*  
Greg Kernohan, Ducks Unlimited, Inc.
- *Effect of Pine Beetles and Forest Health Improvement Projects on Water Quantity and Quality*  
John D. Stednick, Colorado State University Watershed Science

#### networking spotlight (break) — 10:30 a.m.

#### no-spin zone — 10:55 a.m.

Kathleen Curry, Colorado State Representative, District 61

#### hot off the press (lunch) — 11:20 a.m.

#### special keynote presentation—11:55 a.m.

*Imagining Colorado's Water Future*

Harris Sherman, Executive Director, Colorado Department of Natural Resources

#### the rest of the story — 12:30 p.m.

Moderator: Bill Jerke, Weld County Commissioner, South Platte Basin Roundtable Chair

- *South Platte Round Table: Three Years and Counting*  
Harold G. Evans, City of Greeley Water and Sewer Board
- *Round Tables: More Than Just the South Platte*  
Doug Scott, Past IBCC Representative & Metro Roundtable Chair
- *What Alternative Do We Have?*  
Jim Yahn, North Sterling Irrigation District; South Platte Basin Roundtable Alternatives to Ag Dry Up Subcommittee
- *Rivers Run Through It: South Platte Basin Nonconsumptive Needs*  
David Nickum, Colorado Trout Unlimited

#### who's who in state news—1:55 p.m.

- *There's a New Girl In Town*  
Jennifer Gimbel, Director, Water Conservation Board
- *South Platte Basin Water Administration Issues and Solutions*  
Dick Wolfe, State Engineer, Director, Division of Water Resources
- *South Platte Basin Wildlife Management: Where Do We Go From Here?*  
Tom Remington, Director, Division of Wildlife
- *Challenges in Maintaining Recreation Water*  
Dean Winstanley, Director, Division of Parks

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Wednesday, Oct. 22, 8:30 a.m.

## **Weather at the Top of the Hour**

**Moderator: Reagan Waskom, Ph.D.**

*Director, Colorado Water Institute, Colorado State University, E102 Engineering, Fort Collins, CO 80523-1033, (970) 491-6308, Reagan.Waskom@ColoState.EDU*

*Reagan Waskom is the director of the Colorado Water Institute and Colorado State University Water Center. Dr. Waskom is a member of the Department of Soil & Crop Sciences faculty at CSU. He has worked on various water related research and outreach programs in Colorado for the past 21 years.*

## **Global Warming in Local Places, What Can We Say and What Do We Know?**

**David N. Yates**

*Research Applications Program, National Center for Atmospheric Research, 3450 Mitchell Lane, Boulder, CO 80301, (303) 497-8394, Yates@ucar.edu*

While “global warming” literally means an increase in the earth’s mean annual temperature, practically, it is an intensification of the hydrologic cycle that will have ramifications at local places. Of course the hydrologic cycle is the primary mechanism for transporting water and energy around the globe, but its representation in Climate Models, particularly water vapor, is difficult. Modern society has come to depend on the stability or stationarity of the hydrologic cycle to, for example, determine the viability of regional agricultural, the availability and sustainability of freshwater resources, and the scale to which infrastructure investments are needed to supply water and protect against floods. A disturbance of the hydrologic cycle through increased concentrations of greenhouse gases places into question some of these assumptions. Regional warming, changes in the ‘character of precipitation’ (e.g. when, where, and how it occurs), prolonged wet and/or dry spells, frost frequency, heat waves, etc. could influence agricultural output, the reliability of water supplies, changes in ecosystem dynamics and services, human health, and other impacts. This talk will present the ability of GCMs to simulate precipitation and the societal changes to be anticipated relative to natural resource conservation

*David Yates is a project scientist in the research applications laboratory at the National Center for Atmospheric Research in Boulder, Colorado and a research associate with the Stockholm Environment Institute’s U.S. Center in Davis, California. His research has focused both on local scale hydrologic problems (flash floods, land use-land cover, climate change), as well as climate change impacts on water and agricultural systems. Dr. Yates is PI on an EPA Office of Research and Development project which is developing an analytic tool- the Water Evaluation and Planning model- for looking at the combined effects of climate change and land-use on ecological resources and freshwater services. This tool was partially developed with funding from the AWWA Research Foundation to help water utilities with long-range planning that includes climate change impacts. With Kathleen Miller and support from the AWWA Research Foundation, Dr. Yates has helped develop an educational primer for use by the drinking water utility industry that outlines the current state of scientific knowledge regarding the potential impacts of global climate change on water utilities, including impacts on water supply, demand and relevant water quality characteristics.*

## **How Spring Weather Messes Up Perfectly Good Water Supply Forecasts**

**Tom R. Perkins**

*Senior Hydrologist, USDA/NRCS National Water and Climate Center, Water and Climate Services Branch, 1201 NE Lloyd Blvd, Suite 802, Portland, OR 97232-1274, (503) 414-3059, tom.perkins@por.usda.gov*

For more than 70 years, the Natural Resources Conservation Service (NRCS) and cooperating agencies have produced long-lead volumetric water supply forecasts throughout the Western U.S. These statistical regression-based forecasts primarily rely on measurements of current snowpack water content and indices of the basin soil moisture deficit, such as antecedent streamflow and autumn precipitation. These forecasts are used to operate reservoirs, plan irrigation schedules and manage the environment.

The accuracy of seasonal water supply forecasts from year to year is largely a function of climate variability, with the single greatest uncertainty being the amount of precipitation falling after the forecasts have been issued. In the last 30 years, the West has seen a shift towards multi-year extreme dry and wet periods. Along with this shift towards higher climatic variability and persistence, there has also been a dramatic rise in wild and unpredictable spring precipitation. Spring weather in the South Platte Basin is a prime example of extreme climate variability, which makes forecasting much more of a challenge.

*Tom Perkins is a senior hydrologist with the USDA, Natural Resources Conservation Service, National Water and Climate Center in Portland, Oregon. Tom and his team provide water supply forecast products and services for a broad range of water users and managers in the western U.S. He has also worked as a hydrologist for the NWS, Northwest River Forecast Center; North Pacific Division, Corps of Engineers; and a small engineering firm in Colorado Springs. Originally from north central Utah, Tom attended Utah State University and obtained a bachelor's degree in watershed science.*

## **Tracking Climate Trends in Colorado**

**Nolan Doesken**

*Climatologist and Senior Research Associate, Colorado State University, Fort Collins, CO 80523, (970) 491-8545, nolan@atmos.colostate.edu*

## ***About the South Platte Forum***

The South Platte Forum was initiated in 1989 to provide an avenue for a timely, multi-disciplinary exchange of information and ideas important to resource management in the South Platte River Basin. Its stated mandates are:

- ✱to enhance the effective management of natural resources in the South Platte River Basin by promoting coordination between state, federal and local resource managers and private enterprise, and
- ✱to promote the interchange of ideas among disciplines to increase awareness and understanding of South Platte River Basin issues and public values.

*The expressed opinions and information at the Forum and in this program are not necessarily endorsed by the South Platte Forum or any of its sponsoring agencies.*

Wednesday, Oct. 22, 10:45 a.m.

## Developing Stories

**Moderator: Amy Woodis**

*Governmental/Legislative Liaison, Metro Wastewater Reclamation District, 6450 York Street, Denver, CO 80229, (303) 286-3240, [awoodis@mwr.dst.co.us](mailto:awoodis@mwr.dst.co.us)*

*Amy Woodis has been with the Metro Wastewater Reclamation District in the environmental services department since 2000. On behalf of Metro, she participates in a number of water quality standards development workgroups through the Colorado Water Quality Forum. She also coordinates legislative and regulatory activities on behalf of the District.*

*Ms. Woodis received her bachelor's degree from Smith College, her master's degree from Santa Clara University, and her law degree from George Mason University. She is a member of the Florida and Colorado bars and is an adjunct lecturer at the Regis University College for Professional Studies in the public administration program. She also is a member of the board of directors of the Colorado Wastewater Utility Council, an association of forty-one agencies, municipalities, and special districts, whose mission is to promote professional and responsible environmental protection by supporting legislation and regulations that achieve well-defined benefits while promoting local flexibility.*



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## **Overview of the South Platte Decision Support System Alluvial Groundwater Model**

**Dr. Gordon McCurry**

Associate; Senior Hydrologist, CDM, 555 17<sup>th</sup> Street, Suite 1100, Denver CO 80202, (303) 383-2300,  
mccurryg@cdm.com

The Colorado Water Conservation Board is in its sixth year of a study to evaluate the water resources of the South Platte River watershed, conducted under the South Platte Decision Support System project. The overall goals of the project are to collect, evaluate and map information on water supply and water use, update HydroBase, the State's water resources database, and develop data-centered models to be used in water resources planning. The groundwater portion of the study has followed these steps and is now in the process of developing a regional groundwater flow model of the alluvial aquifer system of the South Platte River and its tributaries. Information on aquifer configuration, aquifer properties, groundwater levels, stream gain/loss, pumping, and other flows into or out of the aquifer system collected in earlier phases were used to develop model inputs. These will be described briefly. The groundwater model is in the process of being calibrated to observed stream flows, water levels and other data. Once calibrated the model will enhance our understanding of groundwater flow in the alluvial aquifer, help identify and prioritize data gaps, and assist in evaluating the effects of various water resources activities within the basin. The current status of the modeling will be summarized and upcoming activities and schedule will be discussed.

*Dr. McCurry is a groundwater hydrologist with more than 25 years of experience with water resource evaluations. He is a senior scientist and project manager with Camp, Dresser & McKee in Denver. His areas of emphasis are aquifer evaluations, groundwater modeling, and stream-aquifer interactions. Dr. McCurry has been managing the groundwater portion of the South Platte Decision Support System, a multi-year project funded by the Colorado Water Conservation Board to investigate the water resources of the South Platte River basin. This study includes development of a regional groundwater flow model of the alluvial aquifer system which will be the topic of his presentation today.*

*Mark Your Calendar!!*

The 19th Annual South Platte Forum  
October 21-22, 2009  
Location TBA

*Fill out your evaluation and help select the topics!*

## **What Questions Might Policy Makers Want Answered with SPDSS Modeling?**

**Jim Hall, PE and Ray Bennett, PE**

*Colorado Division of Water Resources, 810 9<sup>th</sup> Street, 2<sup>nd</sup> Floor, Denver, CO 80203, (970) 381-3158, jim.hall@state.co.us*

Colorado's South Platte Decision Support System (CDSS) contains water resource data and planning models that may be used to answer questions by policy makers. The SPDSS data base includes relational (tabular) and spatial (map) data that can be used to analyze various water resource issues. Major planning tools include consumptive use, ground water and water resource planning models. This presentation will summarize the needs identified from interviews with 35 different entities (72 individuals) throughout the basin and from our own personal experiences associated with the CDSS tools. Examples will be provided for typical questions that can be addressed by the database and each of the planning models.

*Jim Hall was born and raised in Colorado. After high school, Jim attended Colorado State University where he earned a bachelor's degree in civil engineering. Jim then started work for the Division of Water Resources first as a hydrographer and then as an engineer associated with litigation and water supply plans for new developments. For two years, Jim left and was the water manager for a metropolitan city. In 1992 Jim took a job as assistant division engineer in Water Division 1. Jim was appointed Division Engineer December 1, 2002. In this role, he is the manager of approximately 50 staff and responsible for water administration, dam safety and hydrography in the South Platte, Republican and Laramie River Basin. Jim is a registered professional engineer in the State of Colorado.*

*Ray Bennett is the project manager for Decision Support System Development in the Colorado and Rio Grande Basins and the DWR representative for the South Platte Decision System. Ray has a bachelor's degree in environmental engineering from Humboldt State University, California, and a master's degree in civil engineering from UCLA. He is registered professional engineer in Colorado and California. Ray is a specialist in water resources and has been with the Colorado Division of Water Resources for 12 years. Prior to that Ray served as a private consultant for 11 years.*

## **Judicial Review Forum**

**Casey Shpall**

*Deputy, Natural Resources and Environment Section, Colorado Department of Law, 1525 Sherman Street, 5th floor, Denver, CO 80203, (303) 866-5069, casey.shpall@state.co.us*

Wednesday, Oct. 22, 12:35 p.m.

## Friends of the South Platte Award Presentation

The Fifth Annual Friends of the South Platte Award is presented to the Platte River Greenway Foundation in honor of their dedication and contributions to the South Platte River Basin and the South Platte Forum.

### Platte River Greenway Foundation



**Jeff Shoemaker**

*Executive Director, 5299 DTC, Blvd., Suite 710, Greenwood Village, CO 80111, (303) 455-7109, wjs@greenwayfoundation.org*

Since 1974, the Greenway Foundation has partnered with numerous public and private agencies, corporations and individuals to create over \$60 million of environmental, aquatic, recreational and open space improvements along the South Platte River and tributaries throughout the Denver metro area.

Wednesday, Oct. 22, 12:45 p.m.

### Keynote Speaker

**Sonny Lubick**

*Former Colorado State University Football Coach*

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# Friends of the South Platte

This award program was initiated in 2004 to recognize individuals and organizations who, through diligence and dedication, have made exceptional contributions in the South Platte River Basin.

## Hall of Fame

**Chuck GrandPre**  
“founder” of the South Platte Forum  
Honorary Friend of the South Platte

**Gene Schleiger**  
2004 Friend of the South Platte

**Sakata Farms, Inc.**  
2005 Friend of the South Platte

**Robert Ward**  
2006 Friend of the South Platte

**Don Ament**  
2007 Friend of the South Platte

**Platte River Greenway Foundation**  
2008 Friend of the South Platte

**Nominations:** To nominate an individual or organization for the Friends of the South Platte award, visit [www.southplatteforum.org](http://www.southplatteforum.org). Honorees are selected by the organizing committee.

**Special thanks** to John Fielder for his generous donation of the picture “South Platte Sunset” and his support of the Friends of the South Platte Award. “South Platte River Sunset” can be found with John’s other fine art prints at John Fielder’s Colorado, his art gallery in the Cherry Creek mall. You can also view his work, learn about workshops and order books at [www.johnfielder.com](http://www.johnfielder.com).

Wednesday, Oct. 22, 1:20 p.m.

## Letters to the Editor

**Moderator: Landon Gates**

*Director of Public Policy, Colorado Farm Bureau, (303) 749-7516, Lgates@colofb.com*

*Landon Gates joined the Farm Bureau in 2005 and is currently the director of public policy for regulatory and national affairs. A native from Yuma, Colorado, Landon graduated from Colorado State University in 2002 with a bachelor's degree in animal science. Landon, a former legislative intern for the Colorado Cattlemen's Association, has experience in local, state and national politics. Landon has worked several ballot initiative campaigns and most recently worked as a legislative aide for Denver City Council before joining Farm Bureau. In his current position Landon is in charge of lobbying on legislation at the national and state level as well as working on regulatory issues impacting the agriculture industry. Landon is currently living in Denver and has recently been selected to serve as the agriculture industry representative on the Governor's Pollution Prevention Advisory Board.*

### **Economic Stakes of South Platte Water Management: Bigger Than You Think**

**Neil S. Grigg**

*Professor, Department of Civil and Environmental Engineering, Colorado State University, Fort Collins CO 80523, (970) 491-3369, neilg@engr.colostate.edu*

The South Platte River Basin is home to the majority of Colorado's growing population of some 5 million. Growth in the basin is continuing at a rapid pace and the state faces important water decisions to meet all needs. For a perspective on the issue, consider that the South Platte Basin is about twice the size of Israel but has only about the same supply of water as that water-short nation. While the basin's growing population is still only about half that of Israel, it faces similar issues in making its water supplies stretch further to nurture both the economy and the environment.

Compared to Israel, Colorado faces more difficult water management choices because issues and decisions are so fragmented. The dilemma is to find balanced approaches that work for all stakeholders, while remaining true to our doctrine of water rights and complying with federal environmental laws. Israel's national water company can take a centralized approach to moving water around, for example, whereas such decisions are very difficult in Colorado.

The economic stakes of South Platte water are high. Issues range across urban growth, industrial development, farming, recreation, and environmental enhancement. The cost of water is high and rising, and many agricultural users are already cut off from affordable supplies. While many defend the current management framework, the state must ask if more innovation is needed to ensure that a valid and fair market for water exists, at the same time that federal law and compact entitlements are met.

This presentation will explain the framework of South Platte water management, identify economic linkages and issues, review policy studies for reform, and present a vision for an improved cooperative approach to move ahead.

*Neil S. Grigg is a professor of civil and environmental engineering at Colorado State University where he teaches courses in water resources management. At Colorado State he has also been department head of civil engineering and director of the Colorado Water Resources Research Institute. He is a graduate of the U.S. Military Academy, Auburn University, and Colorado State University, where his graduate work was in hydraulic engineering. He has worked as a consulting engineer and state environmental official, and on a number of international projects, as well as government policy and advisory panels. In addition to his work as a professor, he serves the U.S. Supreme Court as River Master of the Pecos River. He is a registered professional engineer in three states and has written a number of articles and books. His most recent books are: Total Water Management, Practices for a Sustainable Future (AWWA Press); Colorado's Water: Science & Management, History & Politics and The Water Manager's Handbook: A guide to the water industry (both by Aquamedia Publications).*

## **Does (Habitat+Biology) – Water = Doom for Aquatic Systems?**

**Jim Dorsch**

*Water Quality Scientist, Metro Wastewater Reclamation District, 6450 York St. Denver, Co 80224, (303) 286-3368, jdorsch@mwrdd.dst.co.us*

The recent drought has resulted in a mad scramble for water across the state. As a result there is an increasing trend of converting agricultural water to drinking water. These changes in water use have stirred concerns over the effects these conversions may have on aquatic systems. Is this change going to have a negative impact on aquatic systems?

It is common knowledge that changes in water use from agriculture to drinking water could further exacerbate low flow conditions in streams and rivers. In particular if there is a change in where the water is diverted how does that affect the aquatic habitat and biota downstream? It is also common knowledge that a lack of water or a change in the typical flow regime can have a negative effect on aquatic life and habitats. What changes to the habitat and biota can we expect with the change of water use from agriculture to drinking water? Are the effects going to be significant enough to result in serious impacts to aquatic habitat and the biota? The black and white answer to these questions is yes, because we know that if there is little or no water in a system then there is little or no habitat and biota.

However, is this answer short sighted and represents a narrow point of view? Is more to be considered? What other immediate issues are out there affecting our aquatic systems that need to be addressed and could exacerbate any negative effect of changing agricultural water to drinking water? What better aquatic system to look at to attempt to answer some of these questions than the South Platte River. Let's take a look at a system that is impacted in many ways. Can we accurately predict what the effects the conversion of agriculture water to drinking water may have on this aquatic system?

*Jim Dorsch is a water quality scientist with Metro Wastewater Reclamation District and has been with the District since 1998. His primary responsibility is to ensure that the District's discharge does not have any harmful effect on the water quality and biology of the South Platte River for 36 miles downstream of the District's discharge. He also provides scientific technical advice to the District on regulatory activities that may involve the South Platte River. He participates in a number of water quality standards development workgroups organized by the Colorado Water Quality Control Division. Prior to his employment with the District he was an aquatic biologist for the Colorado Division of Wildlife*

## **Irrigation Dry-up Impacts on Land and People**

### **Bruce Bosley**

*Extension Agent, Logan and Morgan County Extension, 508 S. 10th Ave, Suite 1, Sterling, CO 80751,  
(970) 522-3200, ext 285, [bruce.bosley@colostate.edu](mailto:bruce.bosley@colostate.edu)*

There are many impacts when farm irrigation water is permanently removed. These impacts extend well beyond changes in the particular soils of the dried up fields. They also impact aquifers, weeds within the field and the adjacent areas, the farmers themselves as well as the surrounding farms and ultimately the rural towns and counties near these farms. This interactive discussion will center on the farm & field impacts but will also include impacts on the communities affected by the farm changes.

*Bruce Bosley has worked as a CSU Extension Agent for more than 20 years in Logan and Morgan Counties of Northeast Colorado. He was an independent crop consultant prior to that. His professional goal is providing research based education to help farmers and ranchers improve their net profits and enhance the sustainability of their business operation and land resources. His current program emphasizes developing integrated cropping and crop/livestock systems in dryland and limited irrigation farms. He also provides programs on alfalfa and forage crop production and troubleshooting on crop and rangeland pests and disorders. Finally he provides training on plant identification for weed management, grazing, plant – livestock poisonings, and use in reduced water landscapes. Bruce writes a weekly news column on these as well as agricultural and natural resource topics published through 11 area newspapers and journals. He also reports on these topics on area radio stations.*



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Wednesday, Oct. 22, 3:00 p.m.

## **Breaking News**

**Moderator: Troy Bauder**

Colorado State University, Dept. of Soil and Crop Sciences, Fort Collins, CO 80523-1170, (970) 491-4923, tbaud@colostate.edu

*Troy Bauder is the state Extension Water Quality Specialist in the Department of Soil and Crop Sciences at CSU. Troy received his bachelor's degree in agronomy and his master's degree in soil science from Colorado State University. He is responsible for conducting statewide educational and applied research programs on water quality, especially related to protection of ground water quality from impairment to agricultural chemicals as authorized under the Agricultural Chemicals and Groundwater Protection Act (SB90-126). His research and outreach activities include nitrogen management using high nitrate irrigation water, aquifer vulnerability to contamination, and factors affecting adoption of BMPs by Colorado producers. Prior to attending CSU, Troy received hands-on training in water as a farm hand, landscaper, and well repair technician. He is actively engaged in the family farm near Sterling, Colorado.*

### **Pesticides and Fertilizer: Their Impact on Front Range Shallow Ground Water Quality**

**Karl Mauch**

Groundwater Specialist, Colorado Department of Agriculture, Agriculture Chemicals and Groundwater Protection Program, 700 Kipling St., Ste. 4000, Lakewood, CO 80215, (303)239-5713, karl.mauch@ag.state.co.us

The Agricultural Chemicals and Groundwater Protection Program within the Colorado Department of Agriculture (CDA) is mandated "...to protect groundwater and the environment from impairment or degradation due to the improper use of agricultural chemicals while allowing for their proper and correct use..." In response, the Program has assessed all of Colorado's major irrigated agricultural areas to date, and is now turning its attention to some major urban settings along the Front Range. Similar to agricultural areas, there are shallow groundwater sources and a variety of possible pesticide users in urban areas which presents the potential risk for groundwater contamination. In 2008 the Program established and sampled a monitoring well network from Fort Collins to Colorado Springs comprised of CDA-owned, industry-owned, and commercially-owned monitoring wells, all derived from cooperative negotiation. Sixty-eight monitoring well samples were collected and sent to both the CDA laboratory for analysis of nitrate, nitrite, and 104 pesticide compounds and metabolites, and to the Soil, Plant, and Water Testing Laboratory at Colorado State University for the analysis of basic inorganic constituents.

The results from both labs will be presented and discussed at the South Platte Forum. The discussion will also include the potential implications of contaminated groundwater in present day urban areas and comparison of USGS' evaluation of 30 random wells sampled in Denver-metro in 1993 with the 38 monitoring wells in Denver-metro sampled by CDA in 2008. In the USGS' National Water-Quality Assessment Program (NAWQA) study from 1992-2001 in 50 major watersheds throughout the U.S. it was found that pesticides occur in shallow groundwater in 55% of urban area samples. The NAWQA Program admits however, that their assessment alone does not and cannot tell the entire story about contaminated waters, nor does it fully evaluate all groundwater sources of interest. They urge other entities to study and evaluate the groundwater quality within their specific areas of interest in order that we all may better understand the extent of contamination. CDA has responded to this call and looks forward to presenting the results.

*Karl Mauch is the groundwater monitoring specialist for the Agricultural Chemicals and Groundwater Protection Program at the Colorado Department of Agriculture. He has held the position since August, 2006. Mr. Mauch acquired both his bachelor's and master's degrees from Colorado State University in soil science with emphasis on environmental soil science. He also holds a certification in geospatial science which thoroughly ties in with his work in the Program. Long-term career goals include conducting needed and useful research within his field, and to be a dependable expert on Colorado's groundwater quality with relation to agricultural chemicals. He and his wonderful wife Kim, love to travel and keep busy in the beautiful Colorado outdoors by hiking, biking, fishing, camping, and of course, golfing!*

## **What's In Our Water? Fate and Effects of Biologically Active Consumer-Product Chemicals**

**Larry B. Barber**

*U.S. Geological Survey, 3215 Marine Street, Boulder, CO, 80303, lbbbarber@usgs.gov*

The fate and effects of emerging contaminants, in particular biologically active consumer product chemicals, in surface waters impacted by municipal wastewater treatment plant (WWTP) effluents is a topic of growing concern as demands on aquatic ecosystems increase due to factors such as population pressures and climate change. There are a number of chemicals, such as alkylphenolic compounds and steroidal hormones, in WWTP effluents that have been shown to impact the endocrine system of fish and other aquatic organisms. This paper summarizes research on the fate of organic and inorganic contaminants of consumer-product origin in WWTP effluents and receiving streams. These field-based, process-level investigations provide insight into the occurrence and sources of the compounds, the rates and mechanisms controlling their transport and attenuation, and their effects on aquatic ecosystems.

*Dr. Larry B. Barber is a research geochemist with the U.S. Geological Survey in Boulder, Colorado. He received his doctorate and master's degrees in geology from the University of Colorado and his bachelor's degree in geology at the University of Arkansas. For the past 25 years he has conducted research on the fate of organic and inorganic chemicals in natural water systems, with a focus on consumer-product derived contaminants in treated wastewater and the implications for water reuse. His research involves field and laboratory studies that quantitatively integrate chemistry, biology, hydrology, and geology in evaluating the environmental fate of contaminants.*

## **Barr Lake and Milton Reservoir Watershed Association: Movement Toward Meeting Water Quality Standards**

**Laurie Rink**

Manager, Mile High Wetlands Group, LLC, 80 S. 27th Avenue, Brighton, CO 80601, (303) 777-0188,  
laurie@wetlandbank.com

The Barr Lake and Milton Reservoir Watershed (BMW) Association incorporated as a 501(c)6 nonprofit stakeholder watershed group in May 2005. BMW Association participants include representatives of cities and towns, major wastewater treatment facilities, irrigation companies, drinking water providers, agricultural water users, and recreational groups. These stakeholders are dedicated to encouraging cooperation of all interested parties in efforts to improve the water quality of Barr Lake and Milton Reservoir. The organization operates using a collaborative and consensus-based decision making process.

The presentation will touch on the following topics:

- Goals and objectives that support the water quality mission and vision for Barr Lake, Milton Reservoir, and the associated watershed;
- Overviews of the history and key regulatory guidelines pertinent to the watershed and the BMW Association;
- Current and potential future water quality concerns;
- Strategies and timeline to quantify sources of water quality contaminants and to identify the best management measures available to mitigate water quality impacts through a pH total maximum daily load (TMDL);
- Association partners, as well as financial and technical resources, needed to develop a pH TMDL and implement management measures; and
- Information and education program plans to broaden stakeholder involvement and encourage public awareness of watershed issues.

*Laurie Rink is a practicing ecologist working out of Brighton, Colorado. She earned a double degree from the University of Colorado at Boulder in 1984 in environmental, populational, organismic biology and environmental conservation. She continued with graduate degree studies in biology and engineering. Laurie co-owned and operated a design/build environmental restoration firm for the first twelve years of her career. In 1999 she formed the state's first company devoted to the mission of mitigation and conservation banking. Her firm has built and is operating a wetland mitigation bank in Adams County. Laurie also manages the water quality program in the Barr and Milton water storage and delivery systems on behalf of the Farmer's Reservoir and Irrigation Company. She was one of the founding members of the Barr Lake and Milton Reservoir Watershed Association and has acted as Chair for the past three years.*

Thursday, Oct. 23, 8:30 a.m.

## **Regional News: The Sturgeon General's Report**

**Moderator: Brian Werner**

*Brian is the public information officer for the Northern Colorado Water Conservancy District in Berthoud. He also serves as the public affairs coordinator for the Northern Integrated Supply Project, a water storage project going through the environmental permitting process with a final environmental impact statement, record of decision, and permit to construct anticipated in early 2009.*

*As PIO Brian oversees public affairs for the District including media relations, youth and public education, facility tours, and informational publications. His duties include writing and editing the District's magazine, WATERNEWS, and numerous informational brochures and pamphlets. He has coordinated more than 50 children's water festivals in Colorado and produced a video on the Colorado-Big Thompson Project. In addition, he gives numerous tours and presentations on the Colorado-Big Thompson, Windy Gap and other projects the District has built or is considering building.*

### **The Platte River Recovery Implementation Program: Overview of Year One and Next Steps**

**Dr. Jerry Kenny**

*Executive Director, Platte River Recovery Implementation Program; President and CEO, Headwaters Corporation, 3710 Central Avenue, Suite E, Kearney, NE 68847, (308) 237-5728, kennyj@headwaterscorp.com*

This presentation will cover the Platte River Recovery Implementation Program and provide information on the following aspects of the Program: a short history, the target species, the habitat area, the cost and timeline, the governance, the major areas of emphasis including overall goals of the land, water and adaptive management plans, and the progress to date.

The Platte River Recovery Implementation Program (Program) brings together the states, federal government, water users, and environmental groups to work collaboratively to improve and maintain the associated habitats for the designated species.

The long-term goal of the Program is to improve and maintain the associated habitats which includes: 1) improving and maintaining migrational habitat for whooping cranes and reproductive habitat for least terns and piping plovers; 2) reducing the likelihood of other species found in the area being listed under the Endangered Species Act; and 3) testing the assumption that managing water flow in the central Platte River also improves the pallid sturgeon's lower Platte River habitat.

*Dr. Jerry Kenny is the President and CEO of Headwaters Corporation and serves as the Executive Director of the Platte River Recovery Implementation Program (PRRIP), a cooperative effort of the Department of the Interior, the states of Colorado, Nebraska, and Wyoming, and several water user and environmental organizations. Headwaters Corporation was formed primarily to provide the structure for development of the Executive Director's Office and staff to serve the PRRIP.*

*The purpose of the PRRIP is to address threatened and endangered species issues in the central and lower Platte River basin. The target species are the whooping crane, piping plover, interior least tern, and pallid sturgeon. Recovery of the species is to be accomplished through restoration of suitable habitat by increasing stream flows at certain times, restoring riparian lands to grassland conditions, and restoring the river to braided river conditions.*

*Dr. Kenny is a water resources engineer by education and experience, with a bachelor's degree in civil engineering from the University of Nebraska and a master's and doctorate degree in engineering science from Washington State University. Dr. Kenny is a licensed Professional Engineer with more than thirty years experience in the consulting arena specializing in water and natural resources related projects. His assignments have included international and domestic projects from across the United States, but the focus of his career has been in water related projects in the Western United States. Jerry's technical expertise includes the disciplines of hydrology and hydraulics and the planning and permitting of water resources projects serving multiple purposes. Over the past 15 years, he has specialized in leading large, multi-disciplinary teams working to solve water problems on a large-basin scale.*

*Jerry is a native of Nebraska, but until moving to Kearney to serve as Executive Director of the PRRIP, he and his wife had lived and worked primarily in the Denver, Colorado area since 1979.*

Thursday, Oct. 23, 8:30 a.m.

## **South Platte Investigative Reports**

### **Aquatic Invasive Species A to Z (Asiatic Clams to Zebra Mussels)**

**Mary Fabisiak**

*Water Quality Administrator, City of Westminster, 8900 Pierce St., Westminster, CO 80021, (303) 430-2400 x 2187, [mfabisiak@ci.westminster.co.us](mailto:mfabisiak@ci.westminster.co.us)*

Invasive species have huge economical and environmental impacts around the world. Often they are no more than a nuisance. However several invasive species have the potential to affect our basic water treatment and delivery structures. This presentation will journey through the alphabet of invasive species, ending with the current real threat of the zebra mussel. History, biology, impacts, and control strategies for zebra mussels will be presented.

*Mary Fabisiak has been the Water Quality Administrator at the City of Westminster for 3½ years. She supervises the water and wastewater laboratories and is very active in state and local activities to protect water quality. She participates in numerous Water Quality Forum Workgroups with stakeholders from many different disciplines. Previous to employment with Westminster, Mary worked in a similar capacity at the City of Northglenn. She also has many years experience in an environmental laboratory.*

### **Assuring a Brighter Future for Colorado through Aquifer Recharge**

**Greg Kernohan**

*Conservation Program Manager CO/WY, Ducks Unlimited, Inc., 3624 Platte Drive, Fort Collins, CO 80526, (970) 481-7793, [gkernohan@ducks.org](mailto:gkernohan@ducks.org)*

## **Water quantity and Water Quality Changes in Beetle-Killed Catchments in North-Central Colorado**

**John D. Stednick, Ph.D.**

*Professor, Watershed Science, College of Natural Resources, Colorado State University, Fort Collins, CO 80523-1472, jds@cnr.colostate.edu*

The mountain pine beetle is killing millions of lodgepole pine trees in Colorado. As the lodgepole forests die, the hydrological processes of interception and evapotranspiration decrease, thus potentially increasing soil moisture and streamflows. Past research on the White River Plateau in Colorado documented an increase in streamflow following a beetle epidemic (Love, 1955). Given the current beetle outbreak, how much water yield increase could be expected, and are these increases detectable with the current stream-gauging network.

A review of the effects of timber harvesting on water yield found that the annual water yield increase in higher elevation forests is proportional to the amount of forest canopy removed (Stednick, 1996; MacDonald and Stednick, 2003). Beetle-killed forests will have reduced interception and evapotranspiration losses, and should respond similarly. The increase in water yield is proportional to the amount of the forest canopy removed or killed (Stednick, 1996; Stednick and Troendle, 2004).

Analysis of covariance on streamflow records as “pre-treatment” period (up to beetle outbreak) and a “post-treatment” period (after beetle outbreak) identified water yield increases, decreases, or no change. The variability in the water yield response may be due to the forest stand characteristics. Forest cover types were initially separated as even-aged or uneven-aged and provided additional insight into water yield responses.

Forested catchments are excellent sources of water quality, due to the efficiency of nutrient cycling and the effectiveness of streamside vegetation in protecting surface waters from sediment and thermal loading (Stednick, 2000). Water quality samples were collected and data compared to past records. Nitrate-nitrogen concentrations increased after beetle infestation in some catchments and appear to persist. Water temperatures were higher at several sites as well. These water quality changes may have significant effects on downstream uses.

### **References**

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- MacDonald, L.H. and J. D Stednick. 2003. Forest and Water: A state of the art review for Colorado . Colorado Water Resources Research Institute Completion Report No. 196.
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- Stednick, J.D. 2000. Effects of vegetation management on water quality: timber management. Pp.147-167. USDA Forest Service. Southern Research Station. General Technical Report SRS-039. 246pp.
- Stednick, J.D. and C.A. Troendle. 2004. Water yield and timber harvesting practices in the subalpine forests of the Central Rocky Mountains. Chapter 7. In: A Century of Forest and Wildland Watershed Lessons. G.G. Ice and J.D. Stednick Editors. Society of American Foresters.

*Dr. Stednick is a professor of watershed science at Colorado State University. His area of expertise is the understanding of land use effects and natural disturbances on water quality and quantity. Recently-funded research projects include: the effects of fire on water resources at different spatial and temporal scales; effects of coal bed methane water discharge on soils and downstream water quality, conjunctive use effects on water quality; the applicability of nutrient standards to streams in the Southwest, and the effects of beetle killed forests on water resources. Before coming to CSU he worked as a U.S. Forest Service hydrologist in Alaska, with other professional experiences as a commercial fisherman, fire fighter, EMT, and logger.*

Thursday, Oct. 23, 10:30 a.m.

## **No-Spin Zone**

### **Legislative Update**

**Kathleen E. Curry**

*Colorado State Representative, District 61, 200 E. Colfax, Denver, CO 80203, (303) 866-2945,  
kathleen.curry.house@state.co.us*

Thursday, Oct. 23, 11:20 a.m.

## **Keynote Speaker**

### **New Directions for Colorado's Water Policies – A Review of the Most Urgent and Pressing Challenges that Colorado Will Face in Its Water Future**

**Harris Sherman**

*Executive Director, Colorado Department of Natural Resources, 1313 Sherman Street, Rm 718, Denver, CO 80203,  
(303) 866-4902, harris.sherman@state.co.us*

Thursday, Oct. 23, 12:30 p.m.

## **The Rest of the Story**

**Moderator: Bill Jerke**

*Chair, Weld County Commissioners; Chair, South Platte Basin Roundtable, Weld County, PO Box 758, Greeley CO 80632, (970) 336-7204, bjerke@co.weld.co.us*

*Bill Jerke serves as chair of both the Weld County Board of Commissioners and the South Platte Basin Roundtable. He has served as a County Commissioner since 2001 and is a former past State Representative. While serving eight years in the legislature, he carried numerous water-related bills, many of which became law. Bill irrigates on the South Platte River, holds stock in the Western Mutual Ditch and the Union Ditch, and owns three irrigation wells.*

## **The South Platte Roundtable: Three Years and Counting**

**Harold Evans**

*Chairman, City of Greeley Water and Sewer Board, 1821 Frontier Road, Greeley, CO 80634, (970) 330-1828, harold@evansmanagement.com*

What has and has not been accomplished by the Roundtable? What does the future hold for the South Platte Roundtable?

*Mr. Harold Evans is the president and owner of the Evans Group LLC a construction management consulting firm. He holds a master's degree in civil engineering from the University of Missouri and is a Licensed Professional Engineer in Colorado and Missouri. Mr. Evans is presently serving as the chairman of the Greeley Water and Sewer Board. Regional and state water activities include the South Platte Round Table, SWSI Phase 1 and Phase 2 Roundtables, and the Governor's South Platte River Basin Task Force.*

***See You Next Year!!***

**The 19th Annual South Platte Forum  
October 21-22, 2009**

*Visit [www.southplatteforum.org](http://www.southplatteforum.org) to get details and register.*

## **Roundtables: More Than Just the South Platte**

### **Doug Scott**

*Past IBCC Representative and Metro Roundtable Chair, 5750 DTC Pkwy, Greenwood Village, CO 80111, (303) 773-1700, dougscott@aol.com*

*At the time of Doug Scott's appointment to the Metro Roundtable - as the municipal representative for Arapahoe County - he was Mayor of Cherry Hills Village. He was elected both chairman of the Metro Roundtable and as one of its two IBCC representatives (along with Chips Barry of Denver Water) each of the past three years. Whether as a former general partner in a venture capital firm, or from managing municipal water issues, or as a past Bighorn Fellow or licensed commodities broker, Doug brings a unique perspective to Colorado water issues.*

## **What Alternative Do We Have?**

### **Jim Yahn, P.E.**

*North Sterling Irrigation District, P.O. Box 103 - 112 N. 8th Ave, Sterling, CO 80751, (970) 522-2025, jim@northsterling.org*

With the ever-increasing demand for water from front range municipalities and industry, agriculture water users in the South Platte Basin are at a crossroads. Do farmers stand by and allow past trends of drying up farm ground to satisfy the cities' thirst continue, or are there alternatives to buying and drying? The South Platte Basin roundtable has formed the Alternatives to Ag Dry Up Subcommittee to facilitate discussion between ag users and municipal and industrial water users so that new and perhaps innovative alternatives of supplying water can be explored with both sides at the table.

*Jim Yahn, P.E., is the manager of the North Sterling and Prewitt Reservoirs, a position he has held for more than 16 years. He is responsible for overseeing the diversion and distribution of water to more than 350 farmers. Together the reservoirs are a source of irrigation water for approximately 70,000 acres. The North Sterling, on average, diverts 115,000 acre feet of water annually from the South Platte River, while the Prewitt, on average, diverts 40,000 acre feet. The reservoirs' diversion structures are approximately five miles apart near the Morgan/Logan County line.*

*Jim is a registered professional engineer, receiving a bachelor's degree in agricultural engineering from Colorado State University. Prior to his employment with the North Sterling and Prewitt Reservoirs he worked as a private consulting engineer in Fort Collins for 5 years. He is a native of Colorado and was raised on a family ranch that used water from the North Sterling Reservoir System.*

*Jim served as a member of the Senate Bill 73 Committee in 2003 and was a member of the Governor's South Platte Basin Task Force in 2007. Currently Jim serves as the vice-chair of the South Platte Roundtable, where he heads up the Roundtable's Alternatives to Ag Dry Up subcommittee. In addition to his work-related committees, Jim is President of the Northeastern Junior College Advisory Council. In his spare time Jim farms and ranches with his wife Tracy and two children, preaches part time for Cowboy Up Ministries, and enjoys singing with a contemporary Christian band.*

## **Rivers Run Through It: Nonconsumptive Needs In the South Platte Basin**

**David Nickum**

*Executive Director, Colorado Trout Unlimited, 1320 Pearl Street, Suite 320, Boulder, CO 80302, (303) 440-2937 x101*

While need assessments for consumptive water use are well-established with many suppliers having reasonably solid figures on their present and anticipated future needs, the same cannot be said for nonconsumptive water uses such as recreation and the environment. As required under HB1177, members of the South Platte and Metro Basin Roundtables have been working with state contractors on development of a nonconsumptive needs assessment for the South Platte basin. This effort has included data collection on various key attributes associated with nonconsumptive uses, from high-use paddling areas to habitats for at-risk species. Using this data, roundtables will identify priority stream reaches for site-specific analysis to actually quantify nonconsumptive flow needs. Additionally, a broader-based approach developed by The Nature Conservancy may be able to help look at nonconsumptive needs on a larger watershed basis. In this presentation we will hear the latest from this ongoing effort to better understand this important piece of the South Platte's water picture.

*David Nickum is the Executive Director of Colorado Trout Unlimited and a member of the Metro Basin Roundtable. A resident of Colorado's South Platte watershed since 1995, he has been involved in a range of water issues within the basin including development of the South Platte Protection Plan as an alternative to Wild and Scenic designation and negotiation of a cooperative conservation alternative for the permit renewal of Long Draw Reservoir. Nickum is a graduate of Duke University (and still a Blue Devils basketball fan), and enjoys hiking and fishing with his family in the Upper South Platte and in Rocky Mountain National Park.*

Thursday, Oct. 23, 1:55 p.m.

## **Who's Who in State News**

**Moderator: Doug Kemper**

*Secretary, Colorado Water Congress*

### **Partnerships in the South Platte Basin**

**Jennifer Gimbel**

*Director, Colorado Water Conservation Board, 1313 Sherman St, Ste #723, Denver CO, 80203, (303) 866-3441*

The Colorado Water Conservation Board is involved in many important collaborative projects in the South Platte River basin. These cooperative endeavors include diverse stakeholder groups such as environmental and conservation organizations, agricultural interests, water providers, other states, and federal agencies. I intend to speak about the CWCB's role in the Platte River Recovery Implementation Program ("PRRIP"). I also intend to speak about the State's work with the South Platte Related Activities Program or "SPWRAP" and Ducks Unlimited, involving recharge projects that have benefits related to: 1) wildlife by creating wetlands; 2) the State's commitments under the three State agreement related to the PRRIP; 3) the agricultural community in the Lower South Platte region; 4) water providers with new water projects. Some other projects and programs that I intend to highlight are the Chatfield Reallocation project, the Poudre Headwaters Restoration Project, and water projects such as Rueter-Hess Reservoir and the Aurora Prairie Waters Project.

*As the director of the Colorado Water Conservation Board, Jennifer Gimbel carries out the policies and directives of the Board relating to the conservation, development, and utilization of the state's water resources, and works closely with the State Engineer, General Assembly, the Executive Director of the Department of Natural Resources, and the Governor on water resource issues for the State of Colorado. She acts as the representative for the state on interstate and intrastate water issues, including issues relating to flood control, water conservation and drought planning, water information, river restoration and environmental aspects of water management. As Director, she is involved with federal and state legislation pertaining to water resources and represents the State of Colorado on commissions and entities such as the Arkansas River Compact Administration, the Upper Colorado River Commission, the Colorado River Basin Salinity Control Forum, the Western States Water Council, and the Missouri Basin States Association. Jennifer has more than 20 years experience as a water attorney, working first for the Wyoming Attorney General and then for the Colorado Attorney General on water, natural resource, and environmental issues. Before accepting the Director position, Jennifer worked for the Department of the Interior and the Bureau of Reclamation on Indian water rights, collaborative efforts on the Middle Rio Grande in New Mexico, and state and federal water rights issues.*

## **Future Water Administration Issues in the South Platte River Basin in Colorado**

**Dick Wolfe, M.S., P.E.**

*State Engineer, Director, Colorado Division of Water Resources, 1313 Sherman Street, Suite 818, Denver, CO 80203, (303) 866-3581 Ext. 8241, dick.wolfe@state.co.us*

The increased need for water in Colorado is coming from many areas including, municipal, agricultural, environmental, recreational, and energy. In the South Platte, the increased demand is generally being driven by the increasing population. In addition to new growth, some of the past growth's increased demand has been met from nonrenewable deep Denver Basin aquifer sources. These sources are not generally sustainable and should be replaced in the long term.

Additionally the use of alluvial ground water aquifers has led to painful conflicts between surface water users and ground water users. The curtailment and monitoring of those wells not in augmentation plans or substitute water supply plans along with the increased complexity and monitoring requirements of recent decreed augmentation plans and substitute water supply plans have dramatically increased the burden of administration. In addition to the need for additional staff to administer new and complex water decrees is the need to secure adequate vehicles or mileage compensation for water commissioners and other field staff to travel to measure stream flows and monitor diversions and returns. This monitoring includes the increase several fold to hundreds of new recharge structures and augmentation stations. This has become increasingly challenging with the explosive increases in fuel costs.

Many factors will continue to play a role in the decision making process for future water administration including storage (both above ground and below ground), recharge, transbasin diversions, conservation and reuse, recreational in-channel diversions, in-stream flows, healthy forests and watersheds, expansion of use of irrigation rights, water quality, and energy and mineral development.

It is important that the water users understand the role of the Division of Water Resources and the State Engineer. We are a regulatory agency tasked with administering the surface and ground waters of the state. My staff and I will make every effort to do this in an open, consistent way, but I am obligated to follow the doctrine of prior appropriation – a doctrine we strongly believe in. Cooperation, flexibility and honesty have shaped the river management system that we employ today to meet the challenges of effective and efficient management of the state's water resources. The enormous challenges facing us require the collective input of all stakeholders and a collaborative decision-making process that reaches common ground to develop a sustainable water future that meets our numerous and diverse needs.

*Dick Wolfe was appointed State Engineer and Director of the Colorado Division of Water Resources on November 26, 2007. As State Engineer Mr. Wolfe is responsible for the direction and management of the Colorado Division of Water Resources which has a staff of 297 employees and an annual budget of approximately \$26 million. The Division is responsible for distribution and administration of water in accordance with statutes and interstate compacts; the implementation of a statewide dam safety program; the permitting of the use of ground water and construction of wells; the collection and dissemination of data on water use and streamflow; and conducting various studies concerning water resources and the availability of water supplies. The State Engineer is Colorado's commissioner on five interstate compacts and is responsible for assuring compliance with these compacts. The State Engineer is also the Executive Director of the Colorado Ground Water Commission and is the Secretary of the Board of Examiners for Water Well and Pump Installation Contractors.*

*Mr. Wolfe's education experience includes bachelor's and master's degrees in agricultural engineering from Colorado State University in 1983 and 1986, respectively. He is an advisory board member of the Department of Civil and Environmental Engineering at Colorado State University. Mr. Wolfe is a registered professional engineer in Colorado and has authored several articles in various publications, including "Water Administration: State Engineer's Office" in the Colorado Water Law Bench Book. He led the South Platte Task Force in examining water issues in the Northeast Colorado Basin and made recommendations on possible solutions to the challenges facing the state's water users.*

*Mr. Wolfe is a native of Colorado and was raised on a farm in Weld County. He served on the Fort Lupton City Council and was the mayor of Fort Lupton from 1995 to 1997. He was a partner with Spronk Water Engineers for seven years specializing in water resources on various water right issues in Colorado, Kansas, Arizona, and New Mexico. He has been with the Division since 1993.*

## **South Platte Basin Wildlife Management: Where Do We Go From Here?**

**Tom Remmington**

*Division of Wildlife, 6060 Broadway, Denver, CO 80216, (303) 291-7208*

In the course of accomplishing our statutory mission of preserving and protecting the state's wildlife resources, the Colorado Division of Wildlife has come to own significant land and water in the South Plate basin. Nearly every State Wildlife Area and all six CDOW Fish Hatcheries or planting facilities within the basin have water rights and water features that are central to our fishery and wildlife management programs. CDOW, through creative management of these land and water resources, can be a valuable contributor to larger South Platte basin goals, such as water recharge and endangered species conservation. Participants will be updated on CDOW activities and plans with respect to recharge, wetland restoration, removal of woody vegetation from streambanks and islands, weed control, endangered species management, and habitat acquisition and protection in the South Platte Basin.

*Tom Remmington has spent his entire professional career affiliated with the Colorado Division of Wildlife, initially as a graduate student working on Division of Wildlife research projects on sage grouse and blue grouse, which led to a master's degree from Colorado State University and a doctorate from the University of Wisconsin in 1989.*

*He was hired as a permanent researcher in 1989 and spent ten years studying various issues related to farmland wildlife in eastern Colorado. He became the avian research leader in 1999 and was named Terrestrial Section manager in 2004. In this position he oversaw the Walk-In Access Program and programs related to Chronic Wasting Disease Surveillance, Lynx Restoration, Ranching for Wildlife and all aspects of big game management.*

*In 2007 the Colorado Chapter of the Wildlife Society honored Tom as the Wildlife Administrator of the year.*

*An avid hunter, fisherman, and wildlife viewer, he is committed to advancing the Division of Wildlife's mission to preserve, protect and enhance the wildlife resources of this state for the use and enjoyment of residents and visitors. He lives in Fort Collins with his wife Lyn and two English Setters.*

## **Challenges In Maintaining Recreation Water**

### **Dean Winstanley**

*Director, Colorado State Parks, 1313 Sherman St., Room 618, Denver, Colorado 80203, (303) 866-2884*

Colorado State Parks serves more than 11 million visitors annually at its 43 parks around the state. Many of these outdoor recreation gems are water-based and retaining adequate water levels is tremendously important to many Coloradans. A sizable percentage of our visitors live and recreate within the South Platte Basin.

Dean's presentation will cover three main topic areas: the importance of recreation in the South Platte Basin; the importance of water resources to the State Parks system; and the various management and planning strategies employed by Colorado State Parks to meet its needs.

*Dean Winstanley has been the Director of Colorado State Parks since November 2007. The agency manages more than 220,000 land and water acres at 43 parks around Colorado, serving 11 million visitors annually.*

*Dean's career combines budget and policy analysis for the executive director of the Colorado Department of Natural Resources with 15 years experience in state parks starting as assistant to the parks director. He graduated from Colorado College with a degree in business administration and worked in the Office of the Legislative Council as a senior research assistant and analyzed capital construction project requests from state agencies.*

*At State Parks, Dean served as the legislative liaison and strategic planning director. He managed a variety of special projects including environmental education and the volunteer corps. Dean also worked in a partnership with Great Outdoors Colorado (GOCO) on annual funding.*

## Poster Abstracts

### **Barr Lake and Milton Reservoir Watershed Association: Movement Toward Meeting Water Quality Standards in two Hyper-Eutrophic High Plains Reservoirs**

**Laurie Rink**

*Chair of Board, Barr Lake and Milton Reservoir Watershed (BMW) Association*

**Darcie Garland-Renn**

*Watershed Association Coordinator, Barr Lake and Milton Reservoir Watershed (BMW) Association, P.O. Box 9892, Denver, CO 80209, (303) 404-2944 ext. 22, dgrenn@integral-corp.com*

In 2002, the Barr Lake and Milton Reservoir Watershed (BMW) Association was formed to encourage cooperation, outreach, and awareness of all interested parties in a collaborative effort to improve the water quality of Barr Lake and Milton Reservoir, located northeast of Denver, Colorado. Stakeholders include city and county agencies, major wastewater treatment facilities, drinking water providers, agricultural water users, developers and recreational groups. Water quality issues include heavy nutrient loading, algal blooms, and high pH. Both reservoirs are included with medium priority on the 2008 Colorado 303(d) list for exceeding the upper pH aquatic life criteria of 9.0. The BMW Association members updated the *Barr Lake and Milton Reservoir Watershed Management Plan* in 2007 to provide water quality management-related information to all organizations, governments, agencies, and individuals with an interest in the water quality of Barr Lake and Milton Reservoir. The *2007 Barr Lake and Milton Reservoir Watershed Management Plan* covers the following topics:

- An overview of the hydrologic, geophysical, and biological setting of the watershed, and the associated human uses/impacts, including extensive GIS mapping;
- Current and potential future water quality concerns;
- The history and key regulatory guidelines pertinent to the watershed and the BMW Association;
- Strategies and timeline to model and quantify sources of water quality contaminants and to identify the best management practices available to mitigate water quality impacts through a pH total maximum daily load (TMDL);
- Technical and other resources needed to develop and implement a pH TMDL; and,
- Information and education program plans to broaden stakeholder involvement and encourage public awareness of watershed issues.

The BMW Association poster display presents information from the updated *2007 Barr Lake and Milton Reservoir Watershed Management Plan*, as well as technical results from the 2008 Reservoir Assessments that document baseline water quality conditions in the two waterbodies.

## **HAVE YOUR poster on display AT THE NEXT SOUTH PLATTE FORUM**

If you have a poster you would like to present at the 2009 South Platte Forum, Oct. 21-22, 2009, email a one-page abstract to Jennifer Brown, [jennifer@jjbrown.com](mailto:jennifer@jjbrown.com), by Aug. 1, 2009.

Include your name, organization, address, phone number and email address.

## **An Exploratory Evaluation of the Effects of Climate Change on Water Quality in Urbanized Portions of the South Platte River Basin**

**Jon Novick and Alan Polonsky**

*Denver Department of Environmental Health, Denver, CO*

The effects of climate change on the Front Range of Colorado have not been clearly defined; however, research has suggested that climate change will result in increased periods of drought and earlier runoff from snowmelt in the Rocky Mountains. An increase in drought and earlier runoff from snowmelt is anticipated to impact instream flows and water quality in the South Platte River Basin. In order to determine the potential effect of climate change on water quality in urban areas of the South Platte River Basin, the Denver Department of Environmental Health's Environmental Quality Division (EQD) has conducted an exploratory analysis of water quality data from its instream and in-lake sampling programs. The analysis involved comparison of instream and in-lake water quality data from periods of historic drought to data from non-drought periods. The analysis revealed that mean monthly instream flows in the South Platte River between March 2002 and January 2003 ranged from one fifth to one half of the mean monthly flows observed between 1998 and 2007. The low flows observed during this period resulted from poor precipitation in the mountains of Colorado and may be representative of the effects that weather extremes due to climate change would have on instream flows. EQD then evaluated instream water quality data collected during the 2002/2003 drought period to determine if there was any difference in data collected during the drought and non-drought years. The evaluation reveals that instream temperature and levels of total dissolved solids, ammonia, nitrate, phosphorous, and *E. coli* data were significantly higher during the drought than at other times. EQD believes that increases in the levels of these analytes are caused by a loss of dilution capacity within the South Platte River due to decreases in instream flow from the drought. The exploratory analysis conducted in this study indicates that some weather extremes, such as drought, resulting from climate change may have a negative impact on water quality in the South Platte River Basin. More detailed follow up evaluations should be conducted to determine the extent of the observed relationships.

## **Detecting and Planning for Changes in Water Supply for the South Platte Basin**

**Graeme Aggett**

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**Steve Malers**

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Water resources in the South Platte are increasingly impacted by changes in climate, land use, water use, and by other issues. The complexities of the natural and human-controlled system make it difficult to implement an all-encompassing, computer-based system that will accurately record historical information, and model past and future scenarios. In order to anticipate and respond to these challenges, there is a need to gain a consensus on baseline water supply conditions and potential future scenarios. The following examples will be presented as tools that can help us better prepare to face these challenges:

- Web-based climate change analysis.
- Front Range climate change study.
- Land use change analysis.

Utilize tools to automate model input, run, and results processing for multiple scenarios, detecting critical conditions and presenting results suitable for decision-making.

## The Role of Climate Variability In Operational Water Supply Forecasting

Dr. Thomas Pagano

Hydrologist, NRCS – National Water and Climate Center

The single greatest uncertainty in seasonal water supply forecasts is the amount of precipitation falling after the forecast issue date. There has been a long history of attempting to incorporate seasonal climate forecasts into operational water supply forecasts. The skill of these precipitation forecasts remains low, especially compared to higher skill snow-based streamflow forecasts. Early in the season (e.g., September-December), however, large-scale climate indices are the best available predictors of future water supplies.

This study documents the existence of strong decadal trends in water supply forecast skill. Across the Western U.S., 1 April forecast skill peaked in the 1960-1970s and has been on the decline more recently. The high skill period was a very calm period in the Western U.S., with a near absence of extreme (wet or dry) spring precipitation events. In contrast, the period after 1980 has had the most variable, persistent, and skewed spring and summer streamflows in the modern record. Spring precipitation is also now more variable than it has been since at least the 1930s. This rise in spring precipitation variability in the Colorado/Rio Grande Basins and the Pacific Northwest is the likely cause behind the recent decline in water supply forecast skill.

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