

# From the Headwaters Through the Urban Kidney to the State Line

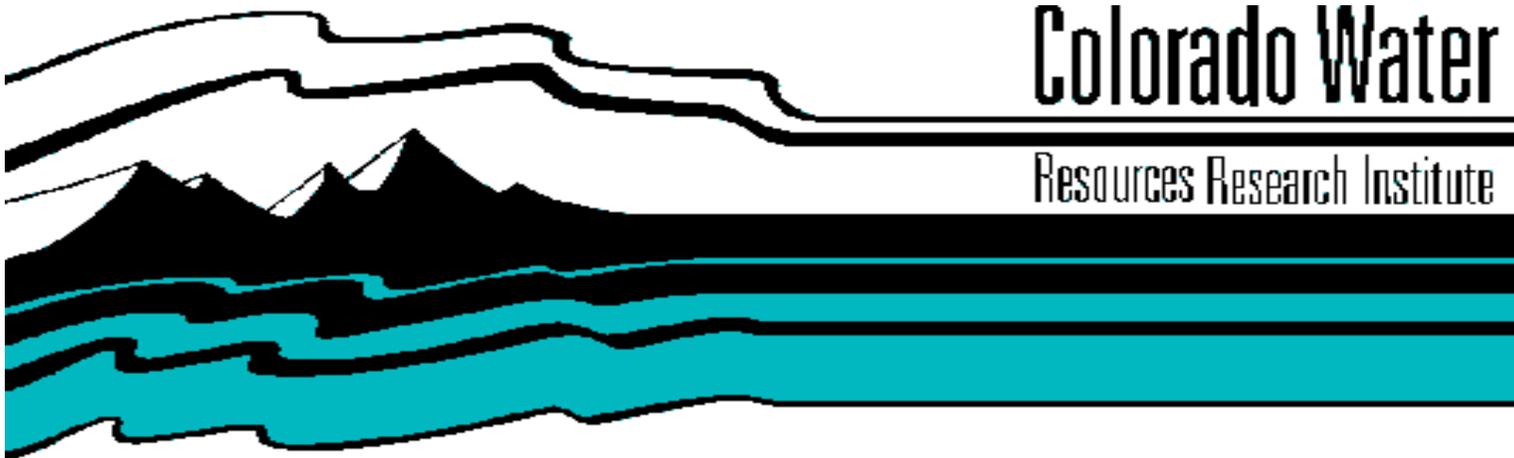
## This is a Hard Working River

Proceedings of the 16<sup>th</sup> Annual  
South Platte Forum  
October 26-27, 2005  
Longmont, Colorado

Jennifer Brown, Editor

October, 2005

Information Series No. 100



# Colorado Water

## Resources Research Institute

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# This Is A Hard-Working River

October 26-27, 2005 - Radisson Conference Center - Longmont, Colorado

## Proceedings of the 16<sup>th</sup> Annual South Platte Forum



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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 Resources Research 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 Resources Research Institute, Robert C. Ward, Director  
Colorado State University, Fort Collins, CO 80523-2033

# From the Headwaters Through the Urban Kidney To the State Line

# This Is A Hard-Working River

## Wednesday, October 26

8:00 Registration & Continental Breakfast

8:30 **Welcome**

Robert Ward, Colorado Water Resources Research Institute

9:00 **Top 'O the Basin to Ya**

**At Home in the Headwaters: Issues Affecting the Upper South Platte Watershed**

Carol Ekarius, Upper South Platte Coalition

**Post-Fire Recovery Efforts at Cheesman Reservoir**

Frank Dennis, Colorado State Forest Service

**Black Water: Observations of Post-Fire Conditions on Hydrology and Water Quality**

Mike Stevens, U.S. Geological Survey

**Impacts of Wildfires on a Municipal Water Utility**

Stephen Lohman, Denver Water

10:30 Networking and Poster Viewing

11:00 **Habitat by Humanity**

**Sick in the Head: Ecological Restoration of South Platte Headwater Wetlands**

Brad Johnson, Johnson Environmental Consulting

**Avoiding Federal Control: South Platte Protection Plan**

Patricia Wells, Denver Water

11:55 Lunch

12:30 Friends of the South Platte Award—Sakata Farms

12:45 **National Perspective on Pharmaceutical Issues**

Dana Kolpin, U.S. Geological Survey

1:30 **Can We Soak the Urban Sponge?**

**Colorado's Water Future: Statewide Water Supply Initiative Findings and Recommendations**

Rick Brown, Colorado Water Conservation Board

**Navigating 404 Waters: A Water Supply Update**

Chandler Peter, U.S. Army Corp of Engineers

**H2'06: Renewable Water for ECCV's Future**

Dave Kaunisto, East Cherry Creek Valley Water and Sanitation District

**Past Water Supply Studies and the Next Steps**

Jerry Sonnenberg, Colorado Farm Bureau

3:05 Networking and Poster Viewing

3:30 **What's Coming Down**

**Weather and Climate Impacts on Water Supply**

Nolan Doesken, Colorado State University

**What Was Old Is New Again in Water Conservation**

Brent Mecham, Northern Colorado Water Conservancy District

**2005 Legislative Overview and 2006 Expectations**

Jeannette Hillery, League of Women Voters

4:45 Day 1 ends

**From the Headwaters  
Through the Urban Kidney  
To the State Line**

**This Is A  
Hard-Working  
River**

**Thursday, October 27**

8:00 Registration

8:30 **The Royal Flush**

**Removal of Emerging Micropollutants During Water/Wastewater Treatment**

Jörg Drewes, Colorado School of Mines

**The Urban Kidney- A Renal Failure or Success?**

Todd Harris, Metro Wastewater Group

**The South Platte: Aurora's Water Future**

Peter Binney, City of Aurora

**Government Funding of Environmental Projects: Investment or Charity?**

Richard Kuchenrither, Black and Veatch

10:05 Networking and Poster Viewing

10:30 **Is This Your River on Drugs?**

**The Ecological Exposure, Effects and Risk Management of Endocrine Disruption Chemicals and Pharmaceuticals**

Jim Lazorchak, U.S. Environmental Protection Agency

**Effects on Aquatic Biota: A Local Perspective on She/He Fishes**

David Norris, University of Colorado

**Farm-Fresh Antibiotics in our Streams**

Ken Carlson, Colorado State University

Noon Lunch

12:45 **Luncheon Keynote**

Diane Hoppe, Colorado State Legislature

1:25 **Species: Are They Coming or Going?**

**The South Platte Recovery Program: Making Commitments Happen**

Don Ament, Colorado Department of Agriculture

**Is the Native Fish Community in the Cross Hairs of Federal Listing?**

Tom Nesler, Colorado Division of Wildlife

*Mark Your Calendar!!*

The 17th Annual South Platte Forum

October 25-26, 2006

Location TBA

Wednesday, Oct. 26, 9:00 a.m.

## **Top 'O the Basin to Ya**

Moderator: Carol Ekarius

### **At Home in the Headwaters: Issues Affecting the Upper South Platte Watershed**

**Carol Ekarius**

*Executive Director, Coalition for the Upper South Platte, PO Box 490, Hartsel, CO 80449, (719) 302-2852, carol@uppersouthplatte.net*

The Upper South Platte Watershed covers 2,600 square miles ranging from the Continental Divide to the foothills southwest of Denver. It is a tremendous asset for Colorado, but it faces intense challenges. Three quarters of Colorado's citizens depend on it for municipal water (from either native flows or trans-mountain diversions delivered via the river); it is a natural treasure, providing critical habitat for every species of mammal that calls Colorado home, as well as several threatened and endangered species; it is an important fishery; and it is a recreation jewel for Colorado's citizens and visitors. Carol Ekarius, executive director of the Coalition for the Upper South Platte will provide an overview of the issues and challenges affecting the watershed, from agricultural changes to water system operations.

*Carol Ekarius has served as the executive director of the Coalition for the Upper South Platte, a nonprofit watershed group that works to protect water quality and the ecological health of the Upper South Platte Watershed, since 1999. Carol has been involved in water-related work since the early 1970s when she started her first job at a wastewater treatment plant. She is also a published author and freelance writer who covers agriculture and environmental issues.*

### **Hayman Fire Recovery Efforts at Cheesman Reservoir**

**Frank C. Dennis**

*Special Projects Forester, Colorado State Forest Service, 9769 W. 119 Dr., Ste. 12, Broomfield, CO 80021, (303) 465.9043, cdennis@lamar.colostate.edu*

The 2002 Hayman Fire is the largest fire in Colorado's history. This massive fire burned 138,000 acres; an area the size of Denver, during a several week period. The second day of the fire was one of the most destructive when the fire ran more than 19 miles and burned more than 60,000 acres. Centered in the path of this amazing run was Denver Water's historic Cheesman Reservoir. Between the Hayman Fire and the earlier Schoonover Fire, all but a few hundred acres of this 7,500 acre property burned. Most areas burned severely enough to kill most of the trees and created hydrophobic soil conditions. Faced with the threat of massive sediment flows coming into the reservoir, Denver Water and the Colorado State Forest Service took on the challenge of rehabilitating the property by using a menu of treatment practices.

The presentation will look at the historic forest conditions that existed at Cheesman Reservoir prior to the fire, explore the reasons for the numerous fires occurring along Colorado's Front Range, explain the various rehabilitation efforts undertaken, and document the results and recovery as a result of these efforts.

*Frank C. ("Chuck") Dennis graduated in 1973 from Northern Arizona University with a bachelor's degree in forestry. While in college Chuck worked for the U.S. Forest Service on various range, timber, watershed and fire projects. Following graduation, Chuck worked at two different sawmill operations in Montrose, Colorado, with an emphasis on wood and wood waste utilization. Chuck began his career as a forester with the Colorado State Forest Service in 1975. He had various assignments dealing with insect and disease, forest management, land use planning, running a logging and sawmill operation using inmate labor, fire, and timber management. Chuck worked his way to the position of district forester in 1986 on the Golden District. In 1994 he took a special assignment with Jefferson County to work with them on land use planning and the development of wildfire-related regulations, as well as serving as the County's Wildland Fire Coordinator. In January 1997, he assumed responsibility for the State's new position of wildfire hazard mitigation coordinator. He was one of the co-founders of the Jefferson County Fire Council's Wildfire Committee, the County's Incident Management Group (IMG), and the Colorado Wildland Fire Conference. In early 1999 responsibility for managing all of Denver Water's wildland properties, and Colorado's representative to the Upper South Platte Watershed Restoration Project were added to his duties. Most recently he has taken on responsibility as Colorado's Operations Forester for the Front Range Fuels Treatment Partnership.*

Chuck is a member of the Society of American Foresters. He received the SAF Presidential Field Forester Award in 2004. He is a past board member of the Colorado Forestry Association and of the City of Westminster's Open Space Advisory Board. Chuck has been happily married to Melinda for 34 years and is the father of four daughters and grandfather of six. He enjoys bike riding, fishing, hunting, and woodworking.

## **Black Water: Observations of Post-Fire Hydrology and Water Quality**

**Michael R. Stevens**

*with Anthony J. Ranalli*

Hydrologist, U.S. Geological Survey, Denver Federal Center, P.O. Box 25046, MS-415, Denver, CO 80225,  
(303) 236-4882, ext. 318, mrstevens@usgs.gov

Concern over Colorado water-quality issues have intensified because of the 2002 wildfires. Water-quality sampling of burned and unburned watersheds in the areas affected by the Hayman and Hinman wildfires was done to provide information to scientists, watershed managers, and public water suppliers regarding the extent to which wildfires may cause water-quality degradation.

In response to the 2002 wildfires in the western United States, the U.S. Geological Survey (USGS) initiated a project to characterize the effects of wildfire on water quality. As part of the project a literature review was done and in 2003 water-quality samples were collected from streams draining burned and unburned watersheds in the Colorado Hayman and Hinman fire areas. The literature review summarized 39 articles which detailed the effects of fire on the concentration of nitrogen and phosphorus and dissolved organic carbon in surface water. The literature indicates that pronounced effects of fires on stream-water quality are most likely to occur if a fire is severe enough to burn large amounts of organic matter, windy conditions are present during a fire, heavy rain occurs following a fire, and the fire occurred in a watershed with steep slopes and on soils with low cation-exchange capacity. Pronounced effects of fires on lake and reservoir water quality are most likely to occur if, in addition to the factors listed for streams, the lake or reservoir is oligotrophic or mesotrophic, the ratio of lake or reservoir surface area to watershed area is small, and the residence time of water in the lake or reservoir is short relative to the length of time that elevated post-fire nutrient concentrations occur. Eutrophication of N-limited lakes as well as P-limited lakes may occur following a fire due to increasing N:P ratios caused by prolonged increases of nitrogen concentrations, especially nitrate in post-fire runoff.

The results of USGS water-quality sampling during 2003 in streams at the Hayman (near Denver, CO) and Hinman Fires (near Steamboat Springs, CO) also are displayed at a poster session at this conference. Selected results include: (1) the highest concentrations of organic carbon, nutrients and metals measured during the study occurred during high stream flows associated with Hayman area rainstorms during the spring and summer of 2003 (about one year after the Hayman Fire), and (2) the majority of the organic carbon, phosphorus, and metals measured during high stream flow were in particulate form. For example, after a May 31, 2003 rainstorm in the Hayman Fire area, the concentration of organic carbon, nutrients, and metals measured in samples collected from a stream draining a burned watershed (Fourmile Creek at time 2030 hrs) and a stream draining an unburned watershed (Pine Creek at time 2200 hrs) were, respectively: total organic carbon (234 milligrams per liter (mg/L) vs. 3.18 mg/L), dissolved organic carbon (23 mg/L vs. 3.0 mg/L), total phosphorus (5.95 mg/L vs. 0.013 mg/L), nitrate (2.26 mg/L vs. 0.053 mg/L), ammonium (0.064 mg/L vs. <0.015 mg/L), total iron (96,400 micrograms per liter (ug/L) vs. 354 ug/L), total manganese (9,280 ug/L vs. 47.0 ug/L), total aluminum (59,800 ug/L vs. 91 ug/L), and total mercury (0.165 ug/L vs. <0.018 ug/L). Even higher concentrations were measured in Fourmile Creek about 4 hours earlier (at time 1635) as follows: total organic carbon (4,160 mg/L), dissolved organic carbon (30mg/L), total phosphorus (55.2 mg/L), nitrate 4.39 mg/L, ammonium (0.373 mg/L), total iron (542,000 ug/L), total aluminum (364,000 ug/L), and total mercury (0.380 ug/L).

### References

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Moody, J.A., and Martin, D.A., 2001, Hydrologic and sedimentologic response of two burned watersheds in Colorado, U.S. Geological Survey Water Resources Investigations Report 01-4122, various pagination.

Ranalli, A.J., 2004, A summary of the scientific literature on the effects of fire on the concentration of nutrients in surface water, U.S. Geological Survey Open-File Report 2004-1296, 23 p.

Ranalli, A.J and Stevens, M.R., 2004, Streamwater Quality Data from the 2002 Hayman, Hinman, and Missionary Ridge Wildfires, Colorado, 2003, U.S. Geological Survey Data Series Report, 5 p. and tables. Online only, <http://water.usgs.gov/pubs/ds/ds109/>.

*Michael R. Stevens has been a hydrologist with the USGS since 1988. He has a bachelor's degree from Fort Lewis college and a master's degree in geological engineering from the Colorado School of Mines.*

## **Impacts of Wildfires on a Municipal Water Utility**

**Steve Lohman**

*Manager of Water Quality, Denver Water, 1600 W. 12 Ave., Denver, CO 80254, (303) 628-5994, [stephen.lohman@denverwater.org](mailto:stephen.lohman@denverwater.org)*

This talk will cover the impacts of wildfires on water treatment plants and storage reservoirs. Specific water quality issues related to wildfires will be discussed.

*Steve Lohman has spent the past 20 years working on various water quality and water treatment projects. He became Denver Water's manager of water quality 10 years ago. Since 1996 Steve has been dealing with water quality issues related to the numerous wildfires along the Front Range. He has a bachelor's degree in chemistry and a master's degree in biochemistry.*

**Wednesday, Oct. 26, 11:00 a.m.**

## **Habitat by Humanity**

**Moderator: Brooke S. Fox**

*Natural Resource Policy Consultant, (970) 674-1699, [brookesfox@comcast.net](mailto:brookesfox@comcast.net)*

*Brooke Fox is a third generation Coloradoan working as a natural resource consultant and negotiator on open space, endangered species, land management, and other issues for local governments and land management entities. Brooke acted as the Douglas County and the Douglas County Water Resource Authority's lead representative during the formulation of the South Platte Protection Plan, and was appointed to the South Platte Protection Plan Enhancement Board as an at-large member. Brooke also serves as a consultant for Douglas County and the Rio Grande Conservation District's habitat conservation planning efforts to comply with the Endangered Species Act.*

*Brooke received a Bachelor of Arts degree in political economics from The Colorado College, and a Master of Arts degree in environment and resource policy from George Washington University. Prior to starting her consulting business, Brooke was the director of open space and natural resource for Douglas County for five years; a field representative for U.S. Senator Hank Brown; and a natural resource and legislative assistant for Beveridge and Diamond, P.C and Crowell and Moring, P.C in Washington, D.C..*

*Brooke enjoys spending time with her husband and two children in Windsor, Colorado.*

## **Sick in the Head:**

### **Ecological Restoration of South Platte Headwater Wetlands**

**Brad Johnson**

*Senior Ecologist, Johnson Environmental Consulting, 1518 W. Oak St., Ft. Collins, CO 80521, (970) 490-1388, [bjohnson-jec@comcast.net](mailto:bjohnson-jec@comcast.net)*

Headwater wetlands provide the building blocks for the great rivers that dissect Colorado, serving as the ultimate water sources for tributary streams, cleaning the water, and providing the foundation for aquatic foodwebs. The headwaters of the South Platte River mainly lie in Park County. Although uniformly rural and in many places still wild, wetlands in this region have seen hard use over the past 150 years. Groundwater driven, organic soil wetlands known as fens have been particularly hard hit by land users. In their natural state, the organic soils found in fens filter toxins from the water column and store water, releasing it slowly throughout the dry summers. These functions, among many others, improve water quality, maintain essential stream base flow, and help reduce flood pulses.

The constant and reliable flow of water from these wetlands did not go unnoticed by ranchers, miners and water developers and many ditches were constructed in the wetlands to more efficiently convey

water to streams, reservoirs and irrigated meadows. These works have had catastrophic effects on the wetlands with the result of degrading dependent aquatic systems.

As our knowledge of the effect of these actions has grown, society has placed a significant value on rehabilitating the scars of the past. In Park County such efforts have been particularly focused and effective. As a case in point, Denver Water and Johnson Environmental Consulting have been working cooperatively with Federal and State agencies on an ambitious project to restore ecological functioning to a 68 acre fen along Four-Mile Creek. This project seeks to restore the natural flow regime and dependent ecological processes to the fen by reconstructing the excavated soil profile within major and secondary drainage ditches. The fen restoration project is being coordinated with a separate U.S. Fish and Wildlife Service-led restoration of 5½ miles of straightened and entrenched channel of Four-Mile Creek that runs adjacent to the fen. Together these projects will restore the ecological integrity of this important and expansive riverine ecosystem.

*Brad Johnson first became interested in wetlands while hunting and fishing with his father in the Midwest. Upon being ousted from his parent's house, he attended the University of Wisconsin - Madison where he received a bachelor's degree in botany. Brad then fled the flatlands and came out to Colorado State University to attend graduate school. His protracted graduate career culminated in his receiving a master's and doctorate from CSU in botany with an emphasis on wetlands ecology. Brad has been studying fens and other wetlands since 1990, focusing primarily on investigating the environmental functions they perform and developing ways to restore functioning to impaired systems. Brad is currently a research scientist in the Department of Biology at CSU and president/senior ecologist of Johnson Environmental Consulting.*

## **Avoiding Federal Control: South Platte Protection Plan**

**Patricia Wells**

*Denver Water Board, General Counsel*

In 1996 water providers who relied on the South Platte River for their supplies were faced with a potential federal regulatory disaster when the U. S. Forest Service issued its conclusions that the river was eligible to be included in the national Wild and Scenic Rivers system. Wild-and-scenic designation would forever preclude further development of a vital water supply for the Denver metropolitan area. Motivated by this threat, water suppliers proposed a local alternative to designation. Once the Forest Service expressed interest in an alternative, a coalition of diverse interests, including environmental and recreational groups, cooperated to develop a comprehensive alternative that would protect the river's outstanding values, while allowing it to continue to serve its water supply function. This presentation will explain the process and the outcome of the local alternative, the South Platte Protection Plan.

*Patricia Wells serves as general counsel for the Denver Board of Water Commissioners, a position she has held for 13 years. She spends considerable time dealing with water and natural resource issues of all descriptions, along with an eclectic mix of contract, tort, employment and municipal law. Prior to joining Denver Water, she served for eight years in the administration of Denver Mayor Federico Peña as either City Attorney or Deputy City Attorney. Her legal employment includes stints as a staff attorney for the Environmental Defense Fund and a judicial clerk for Ninth Circuit Court of Appeals. Ms. Wells serves on the board of the Colorado Water Trust and as an officer of a section of the International Municipal Lawyers Association. She received her Bachelor of Science from Auburn University and her Juris Doctorate from Harvard Law School. She is an aging jogger, a disappointed Colorado Rockies fan and a soccer/lacrosse/rugby mom.*

**Wednesday, Oct. 26, Noon**

### **Friends of the South Platte Award Presentation**

The Second Annual Friends of the South Platte Award is presented to Sakata Farms, Inc. in honor of their dedication and contributions to the South Platte River Basin and the South Platte Forum.

Special thanks to John Fielder for his generous donation and 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).

See the end of this proceedings for more details on the Friends of the South Platte Award.

# **Pharmaceuticals and Other Organic Wastewater Contaminants in Water Resources of the United States**

**Dana W. Kolpin**

*with E.T. Furlong; Focazio, M.J.; Meyer, M.T.; Zaugg, S.D.; Barber, L.B.; Barnes, K.K.  
Research Hydrologist, U.S. Geological Survey, 400 S. Clinton St., Iowa City, IA 52244, (319) 358-3614,  
dwwkolpin@usgs.gov*

Since 1998 the U.S. Geological Survey has been developing analytical capabilities to measure pharmaceuticals and other organic wastewater contaminants (OWCs) in a variety of environmental matrices. Currently the USGS can analyze more than 150 OWCs using a variety of LC/MS and GC/MS techniques. To date more than 500 samples from across the United States, representing a wide range of climatic and hydrologic conditions, have been analyzed for OWCs. Early research focused on broad-scale reconnaissance studies, providing the first nationwide data on the occurrence of OWCs in water resources of the United States. These results documented that OWCs are commonly present in streams and, to a lesser extent, aquifers, particularly at sites that are immediately downstream or down gradient of contaminant sources. Some of the most frequently detected compounds included cholesterol (plant and animal steroid), DEET (insect repellent), caffeine (stimulant), triclosan (antimicrobial disinfectant), and tri(2-chloroethyl)phosphate (fire retardant). Prescription pharmaceuticals and antibiotics also have been commonly detected at ng/L concentrations. Detection of multiple OWCs was common, with as many as 38 OWCs being found in a single water sample. These results indicate that synergistic or additive effects from mixtures of OWCs will need to be evaluated. Subsequent research has focused on sources of OWCs and their fate and transport through the environment. Samples from municipal wastewater treatment plants and animal waste storage lagoons indicate that both human and animal waste can be sources of OWCs to the environment. Early results indicate that concentrations of OWCs generally increase as the percent of streamflow derived from municipal discharges increases. Recent research has shown that bed sediment can also act as a reservoir of pharmaceuticals and other OWCs to the environment.

*Dana Kolpin is a research hydrologist for the USGS. His research interests include the occurrence of pesticides, pharmaceuticals, and other emerging contaminants in the environment. He had been the project chief of the USGS Toxic Program's Emerging Contaminants Project ([toxics.usgs.gov/regional/ecm.html](http://toxics.usgs.gov/regional/ecm.html)) since 1998.*

**Wednesday, Oct. 26, 1:30 p.m.**

## **Can We Soak the Urban Sponge?**

**Moderator: Dale Rademacher:**

*Director of Water/Wastewater Utilities, City of Longmont, (303) 651-8355, [dale.rademacher@ci.longmont.co.us](mailto:dale.rademacher@ci.longmont.co.us)*

*Mr. Rademacher is a 4<sup>th</sup> generation resident of the St. Vrain Valley and was raised on the family farm east of Longmont. He has been involved in water issues since his early childhood summers which were spent irrigating crops on the farm. Dale graduated from Colorado State University with a bachelor's degree in civil engineering in 1982. He is a registered professional engineer and started work at the City of Longmont Water & Wastewater Utilities Department in 1984. Dale has been the director of the department for the past eight years. Dale and his wife Karen have four children, Kyle, Jeff, Greg and Katie.*

## **Colorado's Statewide Water Supply Initiative - Helping Ensure Colorado will have Adequate Water for Our Citizens and the Environment**

**Rick Brown**

*Project Manager, Statewide Water Supply Initiative, Colorado Water Conservation Board, 1313 Sherman St., Ste. 721, Denver, CO 80203, (303) 866-3514, [rick.brown@state.co.us](mailto:rick.brown@state.co.us)*

The Statewide Water Supply Initiative (SWSI) is a project being undertaken by the Colorado Water Conservation Board. SWSI is a basin by basin look at current and future (forecasted to the year 2030) water supply and water demands, and an evaluation of how Colorado's future water needs may be addressed. The SWSI process relies heavily on local input, with stakeholders from a variety of interest groups participating in Basin Technical Roundtables in Colorado's eight major river basins. The presentation will summarize the findings

and recommendations of the first phase of SWSI, and will outline how the second phase of work will address future water needs and options for addressing those needs. The integration and coordination of SWSI and the Intrastate Compact Process will also be highlighted.

*Rick Brown has been with the Colorado Water Conservation Board for six years. He was hired to work on Platte River endangered species issues. Rick was asked to manage the Statewide Water Supply Initiative in February 2003. In May 2005 Rick was appointed acting deputy director for the CWCB and is expected to remain in that role for one year at which time Dan McAuliffe will return from active Army duty with the Judge Advocate General's Office.*

*Prior to joining the Board, Rick worked for 10 years with the Colorado Department of Public Health and Environment. His work at CDPHE focused on investigation and remediation of contaminated hazardous waste sites under the federal Superfund program. Rick also has experience at the local government level having worked for Boulder County Health Department.*

*Rick is a native of Colorado and obtained a bachelor's degree from the University of Colorado.*

## **Navigating 404 Waters: A Water Supply Update**

### **Chandler Peter**

*Regulatory Project Manager, U. S. Army Corps of Engineers, 2232 Dell Range Blvd., Ste. 210, Cheyenne, WY, 82009, (307) 772-2300, chandler.j.peter@usace.army.mil*

The presentation will provide an update of the status of some of the largest water supply projects in the Colorado Front Range currently undergoing environmental reviews to comply with Section 404 of the Clean Water Act. Topics will include identification and discussion of critical information needed to satisfy regulatory requirements which facilitate the NEPA and 404 permit review process. Areas of focus will involve substantiating project purpose and need and the alternatives analysis process.

*Chandler Peter is a senior project manager with the U.S. Army Corps of Engineers, Omaha District Regulatory Branch, located in the Cheyenne, Wyoming Field Office. He is responsible for directing Corps-led Environmental Impact Statements (EIS) on a variety of projects, ensuring compliance with the National Environmental Policy Act and associated permitting under the provisions of Section 404 of the Clean Water Act. He also serves as a Corps' principal contact for other Federal agency-led EIS projects when the Corps acts as a cooperating agency. He is currently responsible for the Corps' evaluation of the following water supply projects in the South Platte Basin in Colorado: Moffat Collection System Project, Northern Integrated System Project (NISP), the Halligan-Seaman Water Management Project, and the Windy Gap Project.*

## **H2'06: Renewable Water for ECCV's Future**

### **Dave Kaunisto**

*District Manager, East Cherry Creek Valley Water and Sanitation District, 6201 S. Gun Club Rd., Aurora, CO 80016, (303) 693-3800, dave@eccv.org*

The East Cherry Creek Valley Water & Sanitation District (ECCV) is home to 50,000 residents in Arapahoe County and the city of Centennial. ECCV has developed an independent water system that historically relied on non-tributary aquifers for water supplies. ECCV has almost 100 wells that pump water into ECCV facilities and on to its customers. These aquifers hold a set amount of "non-renewable" water that cannot be replenished. ECCV needs additional, renewable water supplies to continue to meet its customers' needs. Therefore in 2003 the ECCV Board of Directors acted to address this issue by approving the Northern Project. Named H2'06, this project will begin pumping renewable water into the District in 2006.

In 2006 renewable water will flow to ECCV customers through the new system that will transport water from its source in the South Platte River. Renewable South Platte River water will be delivered to ECCV through the Beebe Draw, a shallow alluvial aquifer located north of Barr Lake State Park. A planned 31-mile pipeline will transport the water to ECCV. In the future, when more water is delivered to ECCV, a reverse-osmosis treatment facility will be built to address aesthetic aspects of the water. Six neighboring districts have agreed to fund the upsizing of the pipeline and will be acquiring their own water supplies.

H2'06 will provide clean drinking water for the District into the future. Combined with its well system tapping underground resources, this renewable water source will enable ECCV to combine the benefits of a surface water supply with its drought-resistant aquifer supplies. The steady and dependable supply of water brought by the H2'06 water project will offer ECCV customers assurance of security in the values of homes and property. The foresight of District leadership to solve water supply problems before they start will benefit all ECCV customers.

*Dave Kaunisto is the district manager of the East Cherry Creek Valley Water & Sanitation District, having joined the District in 1997. During Dave's tenure, the District has doubled in size, and now provides water, sewer, and stormwater service to an estimated 50,000 people. Projects such as the Western Water Project and the Irrigation Supply Project have been built during that time to keep up with demand. Prior to joining the District, Dave worked for the City of Westminster for 14 years.*

## **Past Water Supply Studies and the Next Steps**

**Jerry Sonnenberg**

*Board of Directors, Colorado Farm Bureau, 4465 Rd 63, Sterling, CO 80751, (970) 522-5677, jsonnenberg@ria.net*

Abstract not available.

*Jerry Sonnenberg is a Colorado native who has been farming and ranching since 1979. Currently he operates his 3600 acre family farm near Sterling. Jerry serves on the Colorado Farm Bureau Board of Directors, the Republican River Conservation District Board of Directors the Colorado Water Congress Policy Committee and also holds the position of President for the Coloradan's for Conservation and Development.*

**Wednesday, Oct. 26, 3:30 p.m.**

## **What's Coming Down**

**Moderator: Bret Bruce**

*Supervisory Hydrologist, U.S. Geological Survey, Denver Federal Center, Building 53, MS 415, Lakewood, CO 80225, (303) 236-4882 x232, bbruce@usgs.gov*

*Bret Bruce has been a USGS hydrologist for past 15 years. He is currently serving in the USGS Colorado Water Science Center as supervisory hydrologist and project chief for the South Platte NAWQA Study and the High Plains Regional Ground-Water Study. Bret has more than 25 years experience in the fields of geology, hydrology, and geochemistry. He has public and private sector experience in oil-and-gas, geothermal, environmental consulting, and water quality. Bret has a bachelor's degree in geology from the University of Maine and a master's degree in geology and water resources from the University of Wyoming.*

## **Weather and Climate Impacts on Water Supply**

**Nolan Doesken**

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

This presentation will include a summary of rainfall, snow accumulation, subsequent runoff and stream flows plus the current status of reservoir storage for the 2005 water year. Statewide conditions will be examined, ranging from the generous winter snows across southern Colorado to the beneficial late spring rains over portions of the South Platte Basin. An update on the status of drought conditions in Colorado will be given. Conditions and changes in Colorado drought will be compared to other parts of the country that have also been dealing with drought during the past five years. Historical time series of precipitation and temperature will also be shown to give a visual picture of recent climate trends and anomalies, and how they fit into the long-term picture. Finally, example data from the Community Collaborative Rain, Hail and Snow Network and CSU's Colorado Agricultural Meteorology Network will be provided to show how these programs are helping track and map the local details of weather and water that we all care about.

*Nolan Doesken is a climatologist and senior research associate at the Colorado Climate Center at Colorado State University. He has been involved in climate monitoring and water resources assessment in Colorado since starting work at CSU in 1977. He is also the founder of the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) and coordinates the Colorado Agricultural Meteorological Network (COAGMET).*

## **What Was Old Is New Again in Water Conservation**

### **Brent Q. Mecham**

*Landscape Water Management & Conservation Specialist, Northern Colorado Water Conservancy District, 220 Water Ave., Berthoud, CO 80513, (970) 622-2324, bmecham@ncwcd.org*

Recently there has been renewed interest in understanding the role of soil microbiology upon water and nutrient usage of plants and grasses used in the urban landscape. When properly managed this unseen world can greatly assist in the growth and health of the plants we see all around us in our communities. When we learn to take care of this microscopic world the trees, shrubs, lawns and flowers are able to thrive with fewer inputs such as fertilizers and water. Improved water quality and conservation comes with making complimentary changes to both irrigation and horticultural practices.

The presentation will list some of the more fundamental landscape and irrigation practices that should be done and discuss why they work so well when they are used.

*Brent Mecham is a landscape water management and conservation specialist with the Northern Colorado Water Conservancy District. He has more than 25 years of training and field experience with landscaping and sprinkler systems. Under his direction, the recently completed Outdoor Laboratory for Landscape and Irrigation Education has been installed at the District's offices. He is an active member of the Irrigation Association and is a Certified Irrigation Designer, Contractor and Irrigation Auditor as well as an instructor for them on many irrigation topics around the country.*

## **Legislation: A 2005 Overview and 2006 Expectations**

### **Jeannette Hillery**

*Legislative Chair, League of Women Voters of Colorado, 999 Meadow Glen Dr., Boulder, CO 80303, (303) 494-7718, jmhillery915@comcast.net*

What were the major pieces of water legislation during the 2005 legislative session? A brief description of what is happening with the Basin Roundtables, which was passed in 2005, and what this might mean for the South Platte will be presented. The discussions from the interim committee on 2006 legislation.

*Jeannette Hillery was born in Jamaica, NY and lived on the east coast until moving to Colorado in 1993. She has a bachelor's degree in sociology and psychology from Northeastern University in Boston and a master's degree in social work from Fordham University.*

*Jeannette worked in the social welfare field, predominantly as a manager of education and social programs. She joined the League of Women Voters almost 30 years ago and has been active in leagues in New York, Massachusetts and Colorado. She began her interest in water while living on Long Island, which has a sole source aquifer and good quality water, which needs protection. Quantity was not the issue. This led to interest and participation, through league activities in non-point source pollution issues.*

*While living in Massachusetts, she became more involved with water issues of the Charles River and Boston Harbor and continued activities on lobbying for more programs to deal with non-point source pollution.*

*The League activities have always involved following legislation and being active with governmental process. Since moving to Colorado, she has followed water and natural resource legislation and lobbied at the capital. She has worked on several initiative campaigns dealing with water issues. She is the Natural Resource Chair for the League of Women of Colorado.*

*Other activities and interests include singing, horseback riding, playing golf, reading and traveling with her husband, Dave.*

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

**If you have a poster you would like to present at the 2006 South Platte Forum,  
Oct. 25-26, 2006, email a one-page abstract to Jennifer Brown,  
jennifer@jbbrown.com, by Aug. 1, 2006.**

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

Thursday, Oct. 27, 8:30 a.m.

## **The Royal Flush**

Moderator: Dana Kolpin

### **Removal of Emerging Micropollutants During Water/Wastewater Treatment**

**Jörg E. Drewes**

*Assistant Professor, Colorado School of Mines, Environmental Science and Engineering, Golden, CO 80401-1887, (303) 273-3401, jdrewes@mines.edu*

There is increasing interest regarding the occurrence of organic micropollutants which have been associated with potential adverse health effects on humans and aquatic life. Compounds of concern fall into the category of pharmaceutically active compounds and personal care products (PPCPs), endocrine disrupting compounds (EDCs), emerging disinfection by-products, industrial chemicals, and household chemicals. The majority of these compounds are discharged on a regular basis to wastewater. Since wastewater treatment plants are not specifically designed to remove trace levels of organic compounds, some of the compounds can make it through the treatment process and are therefore discharged to the environment. Where drinking water sources are impaired by wastewater discharge and run-off, some of these compounds can be present in the raw water of drinking water treatment facilities.

This presentation is an overview on the groups of organic micropollutants which might be present in wastewater effluents. The removal efficiencies of conventional (primary, secondary, tertiary treatment and disinfection) and advanced (MBR, membrane treatment, advanced oxidation, soil-aquifer treatment) treatment technologies in removing these compounds are presented. On the drinking water side, observed concentration ranges of compounds of concern are reported and removal efficiencies of conventional and advanced drinking water treatment processes are presented.

*Jörg E. Drewes is an assistant professor of environmental science and engineering at the Colorado School of Mines. Before joining CSM in 2001, Dr. Drewes served as the associate director of the National Center for Sustainable Water Supply at Arizona State University. Dr. Drewes received his master's degree and doctorate in environmental engineering from the Technical University of Berlin, Germany. Dr. Drewes has been actively involved in research in the area of water reclamation and water reuse for more than thirteen years.*

*Dr. Drewes' research interests are water and wastewater treatment engineering; potable and non-potable water reuse (soil-aquifer treatment and microfiltration/reverse osmosis); state-of-the-art characterization of natural and effluent organic matter; contaminant transfer among environmental media; and fate of endocrine disrupting compounds and pharmaceuticals in natural and engineered systems. His research in these areas has been funded by AwwaRF, WERF, U.S. EPA, U.S. Bureau of Reclamation, the National Water Research Institute, the Water Reuse Foundation, and private industry. Dr. Drewes has published more than 60 journal papers, book contributions, and conference proceedings. He was awarded the Willy-Hager Award in 1997, the Quentin Mees Research Award in 1999, and the 2003 Dr. Nevis Cook Excellent in Teaching Award. Dr. Drewes is member of the AWWA, WEF, IWA, ACS, North American Membrane Society, American Membrane Technology Association, and the AWWA/WEF Rocky Mountain Section Water Reuse Committee.*

### **The Urban Kidney- A Renal Failure or Success?**

**Todd Harris**

*Water Quality Officer, Metro Wastewater Reclamation District, 6450 York St., Denver, CO 80229-7499, (303) 286-3255, tharris@mwrd.dst.co.us*

What has been described as the Urban Kidney removes wastes from the South Platte and provides downstream users with reclaimed water. What is this Urban Kidney? What does it remove and what do we know that it passes on? How does it work? Is it healthy, or is dialysis required? How can we use sound science and the Urban Kidney to ensure human health, environmental health, and a sustainable South Platte River?

*Todd Harris is an aquatic biologist/ecologist. His experience includes being a consultant to EPA; a farmer; a consulting firm owner; a faculty member Purdue University Natural Resources & Entomology Departments; a systems ecologist; and an EPA biologist. Todd has Bachelor of Arts from Gustavus Adolphus College, a Master of Science from the University of Illinois, and a doctorate from the University of Georgia. Todd is a native of Wisconsin and presently lives on small farm near Platteville, CO.*

## The South Platte River – Aurora’s Water Future

**Peter Binney**

Director of Utilities, City of Aurora, 15151 E. Alameda Pkwy., Aurora, CO 80012, (303) 739-7378, pbinney@auroragov.org

Forecasts of population growth in communities throughout the South Platte Basin dictate the need for additional water supplies. The State Water Supply Initiative (SWSI) identified the need for an additional 409,000 acre-feet of municipal water supplies by 2030. Aurora will develop more than 40,000 acre-feet of firm yield for its projected water needs in that time frame. A detailed assessment of alternative water development projects for Aurora has been completed. The best option for Aurora is to meet a large percentage of that need by developing the city’s reusable return flows in the South Platte River north of the metropolitan area. Development of these resources reduces the need to import additional water supplies from the Colorado and Arkansas river basins or transfer other existing water uses to municipal use. An added benefit is that this water development program has the least environmental impacts of all alternative water sources available to the city.

Aurora conducted a comprehensive review of the quantity and quality of water available for its customers through this project. As with any surface water, source water quality studies of the Lower South Platte by Aurora have identified the presence of regulated and unregulated compounds that will be treated before introduction to Aurora’s drinking water system. To maintain the high quality of customer acceptance of Aurora’s drinking water, Aurora Water has developed a water purification program and source water and finished water monitoring program that ensures all drinking water standards are exceeded at all times.

The city will incorporate natural conditioning of source waters pumped from the alluvium along the South Platte River. Results of ongoing pilot programs have demonstrated high removal rates of nutrients, pathogens and organic compounds in aquifer treatment areas. This conditioned water will then be pumped to the city for treatment at the new Aurora Reservoir Water Purification Facility. This advanced water treatment plant will include chemical and physical processes to further remove any remaining compounds to exceed all applicable and anticipated state and federal drinking water standards. The plant will also ensure the water’s aesthetics so that it will be indistinguishable from other source waters.

While presenting additional treatment requirements, the waters of the Lower South Platte River are a valuable and significant source of water. This water will meet much of the anticipated needs of future residents in Aurora and the communities north of the metropolitan area. The public’s need for safe and reliable water supplies in their drinking water systems can be met through effective use of available and innovative treatment technologies as well as comprehensive monitoring programs.

*Peter Binney is the director of utilities for the City of Aurora and has the responsibility for all water and wastewater services in this community of 300,000 people. Before joining the City three years ago, he was a consulting engineer for 25 years and served municipal and federal clients throughout the western United States as well as in Europe, South America and Southeast Asia. His primary area of expertise is in water supply development and water resources engineering.*

*Since taking this position with the City of Aurora, Mr. Binney has overseen the development of a water conservation program that has reduced municipal water consumption by more than 25%, has acquired major blocks of water through innovative cash and effluent exchange programs, initiated leases and interruptible supply programs with agricultural water users and initiated a major capital improvements program to develop a new water source for the City. The City is actively identifying various cooperative programs with agricultural water users to develop dry year leases, interruptible supply programs, continued farming programs, term acquisition programs as well as conventional water transfers.*

*Mr. Binney is a registered professional engineer and holds post-graduate degrees from the University of Colorado and the University of Canterbury. He is a member of the American Society of Civil Engineers, American Water Works Association and the Society of American Military Engineers.*



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## **Government Funding of Environmental Projects: Investment or Charity?**

**Richard Kuchenrither**

*Black and Veatch, 6300 S. Syracuse Way, Ste. 300, Centennial, CO 80111, (720) 834-4200, kuchenritherr@bv.com*

Providing government support for solving environmental problems must be viewed as an investment that provides society returns for many decades and not an expense. Using examples from Cleveland, Baltimore and Denver this presentation will demonstrate how improved water provides the foundation for economic development and growth. This development usually follows the improved water quality by as much as a decade dimming the memory of the "bad old days" when fish would float rather than swim.

This delay aside, it is easy to show the direct link between water quality improvement and the creation of thousands of jobs and millions of dollars in tax revenues and why government funding represents a great investment.

*Dr. Richard Kuchenrither is a senior vice president for Black & Veatch Engineers in Denver. He has served as a design engineer, project manager and technical consultant. He is an internationally recognized expert in environmental engineering and biosolids management issues. He has served on numerous technical advisory committees over the years, helping cities like New York, Boston, and Los Angeles solve major environmental problems. He has testified before congress on numerous occasions on various environmental issues.*

*Dr. Kuchenrither received his bachelor's and master's degrees in civil and environmental engineering from the University of Colorado and his doctorate in environmental health from the University of Kansas. He is a past president of the 40,000 member Water Environment Federation and currently serves on the board of Directors of the Water Environment Research Foundation. He is a past member of the nominating committee for the Stockholm Water Prize and served as the Kappe Lecturer for the American Academy of Environmental Engineers. He was recently named an Honorary member of the Water Environment Federation.*

Thursday, Oct. 27, 10:30 a.m.

## **Is This Your River on Drugs?**

Moderator: Jim Lazorchak

## **U.S. EPA's Research on the Ecological Exposure, Effects and Risk Management of Endocrine Disruption Chemicals and Pharmaceuticals**

**James M. Lazorchak**

*with Gerald Ankley, Christian Daughton, Marc Mills and Mitch Kostich*

*Acting Chief, Molecular Indicator Research Branch Ecological Exposure Research Division National Exposure Research Laboratory, U.S. Environmental Protection Agency, 26 W. Martin Luther King Dr., Cincinnati, OH 45268, (513) 569-7076, azorchak.jim@epa.gov*

In February 1998 the U.S. EPA's Office of Research and Development (ORD) released its research plan for endocrine disruptors, which was subsequently updated in December 2003. In 1999 ORD's stated role in Pharmaceutical and Personal Care Products (PPCPs) was to: (1) define the scope of the scientific issues involved with PPCPs in the environment; (2) assist those new to the topic with locating published data; (3) advance the scientific dialog and catalyze debate in determining the importance of the topic with respect to environmental pollution; (4) enhance the public's overall awareness and understanding of the origins of chemical pollution and the roles of individuals (through their everyday activities, actions, and behaviors) in its causes and prevention; (5) foster international research both within and outside the government; and (6) create collaborations among scientists. Since 2000, ORD's major additional role has been to publish seminal papers or conduct research on PPCPs, including: environmental stewardship (pollution reduction), risk perception and water reuse/recycling, research needs and gaps, new methods of chemical analysis, new toxicological test methods for mammals and ecological targets, use of PPCPs as surrogates or markers for tracking human fecal contamination, development of a framework for assessing the hazard of pharmaceuticals in the aquatic environment, exploration of informatics to prioritize PPCPs for directing environmental monitoring and for designing pollution reduction programs, targeted characterization of U.S. domestic wastewater influents

and effluents for PPCPs, environmental occurrence of livestock growth enhancers (e.g., androgens such as trenbolone) and ethinylestradiol in wastewater treatment plant effluents, use of molecular biology and field ecology to develop indicators of exposure, investigation of sources of suspected EDCs that impact the environment and development of risk management strategies to minimize exposure of humans and wildlife to suspected EDCs. This presentation will highlight U.S. EPA's latest research efforts in exposure, effects and risk management strategies associated with EDCs and Pharmaceuticals.

*James Lazorchak's research in his early career centered on developing fish, invertebrate and plant bio-assessment and ecotoxicology methods to assess the biological integrity of lakes, streams, rivers and estuaries. His current research activities are to bring genomic tools to bioassessments and ecotoxicity tests to assess ecosystem health and develop water quality criteria, water quality standards and limits that can be used in regulatory programs of EDCs and pharmaceuticals.*

*James has a bachelor's degree in biology from Southeast Missouri State University, a master's degree in aquatic biology from Wright State University, a master's degree in environmental science from the University of Texas Dallas, and a doctorate in aquatic ecotoxicology from the University of Texas Dallas*

*His professional experience at the U.S. EPA includes: acting supervisory biologist and research aquatic ecologist, Chief Molecular Indicator Research Branch; chief, Bioassessment & Ecotoxicology Branch; environmental scientist, Enforcement Branch; senior environmental scientist, SAIC; environmental scientist, Permits and Standards Program; and environmental scientist, Inspections and Surveillance.*

## **Effects on Aquatic Biota: A Local Perspective on He/She Fishes**

**David O. Norris**

*Professor of Physiology, University of Colorado, Department of Integrative Physiology, 354 UCB, Boulder, CO 80309-0354, (303) 492-8379, David.Norris@colorado.edu*

Natural and synthetic chemicals that accumulate in the environment as a result of human activities can interfere with normal endocrine function and alter development and physiology of millions of species. These endocrine-disrupting chemicals (EDCs) most often are observed to either mimic natural hormones (agonists) or block the actions of natural hormones (antagonists) and most commonly have been observed to alter thyroid, adrenal, and reproductive processes. We have observed the correspondence between the presence of several estrogenic compounds in wastewater treatment plant (WWTP) effluents added to the South Platte River or its tributaries (e.g., Boulder Creek) and the disruption of normal sex ratios, appearance of intersex, feminization of males, and disruption of adult reproduction in the white sucker, downstream from the point of addition of WWTP effluent. These estrogens include natural estrogens (e.g., estradiol, estriol), pharmaceuticals (e.g., ethinylestradiol from birth control pills), estrogenic breakdown products of alkylphenols (e.g., nonylphenol), and molecules from plastics (e.g., bisphenol A). Estrogens excreted by men and women are conjugated to make a water-soluble form that does not bind to the estrogen receptor in target cells and is readily removed from the blood by the kidneys. However, these compounds are unconjugated during wastewater treatment so that active estrogens appear in the WWTP effluent. Because all of these estrogenic agents mimic natural estrogens in the body via binding to the estrogen receptors, their effects are additive. I will discuss our observations on white suckers in Boulder Creek at reference sites and below the addition of WWTP effluents and describe ongoing experiments conducted in collaboration with USGS and EPA personnel designed to establish cause-effect relationships between WWTP effluents and feminization of fishes. Implications for human populations also will be discussed.

*Dr. David O. Norris (PhD 1966, University of Washington) has been a professor at the University of Colorado since 1966 where he has studied environmental endocrinology of fishes and amphibians and has taught general biology, human physiology, endocrinology, histology, and forensic biology. He has published more than 100 scientific papers and abstracts in environmental endocrinology and forensic botany as well as several books including a textbook "Vertebrate Endocrinology" (Academic Press, 3rd edition, 1997) and "Endocrine Disruption: Implications for Health of Wildlife and Humans" (Oxford University Press, 2005). His research interests involve the role of natural and anthropogenic factors (pollutants) that operate through the brain and pituitary to affect thyroid, adrenal and gonadal physiology resulting in effects on development, sexual differentiation, sexual maturation and breeding, and aging. Dr. Norris also does research in forensic botany and consults with law enforcement groups throughout the U.S. and in several other countries.*

## **Farm Fresh Antibiotics in Our Streams - How Are They Being Delivered and How Can We Cut Back?**

**Ken Carlson**

Associate Professor, Dept. of Civil and Environmental Engineering, Colorado State University, Fort Collins, CO  
80523-1372, (970) 491-8336, kcarlson@engr.colostate.edu

More than half of the antibiotics used in the U.S. are administered to livestock, and about 90% of these are added routinely to the feed to promote weight gain. The practice of applying antibiotics or antimicrobials as feed additives was established more than 50 years ago and is especially common in the swine industry today. Though the exact mechanism of growth promotion is not fully understood, the interaction between the gastrointestinal flora and the host animal is known to play a major role. In spite of the benefits of routine antibiotic use, there is growing concern over the wider impact of this practice.

A major concern regarding wide-scale antibiotic use is that the presence of antibiotic residues in animal products and waste is likely to have an impact on the development of bacterial resistance in the wider environment. Others have specifically linked antibiotic use in livestock with the development of antibiotic resistant pathogenic bacteria in humans. Given these concerns, it is not surprising that these issues have begun to attract national attention from the general public.

One potentially major pathway for the spread of antibiotic resistance is the processing of livestock waste. When antibiotics are administered routinely, commensal bacteria are strongly selected for antibiotic resistance prior to excretion as feces. At the same time, a significant portion of antibiotics are excreted unaltered. In the U.S., about 130 times more urine and feces is produced by animals than by humans (United States Senate Committee on Agriculture, 1997), yet far less attention is given to its treatment. Typically animal wastes from concentrated animal feeding operations (CAFOs) are treated in anaerobic or facultative lagoons. After separation of the microorganisms from the treated wastewater, the liquid effluent is either land applied or discharged into surface water or groundwater, potentially contributing to the spread of antibiotic residues, antibiotic resistant bacteria and/or their genes. In addition, the biomass produced in these treatment systems is often land-applied as a soil amendment, exposing soil microbial communities to antibiotic pressure and introducing the potential that crops may become contaminated with antibiotic resistant microbes.

In our study, analytical methods for quantifying three ionophore antibiotics, monensin, salinomycin, and narasin, were developed for water and sediment matrices. Sample preparation was based on solid phase extraction (SPE) and HPLC tandem mass spectrometry (HPLC/MS/MS) was used to measure extracts. Ionophore antibiotics are only used to treat coccidiostats for broilers or turkeys, and to increase growth and feed efficiency for beef and dairy cattle. Since they are not used for human purposes, these compounds can act as markers for the transport of animal pharmaceuticals to the watershed.

The occurrence of three ionophore compounds was determined at five sampling sites along the Cache la Poudre River in Northern Colorado representing pristine, urban, and agriculture landscapes. Samples were collected in May 2003 and April 2004 representing high and low stream flow conditions. Monensin and salinomycin were only detected at the sample points in the agriculture-influenced section with a range of 0.002 to 0.011 mg/L and 1.8 to 14.6 mg/kg for water and sediment respectively. Narasin was detected at sites 2 and 3 (urban landscape) at May 2003 but showed the highest concentration in agriculture areas. All three ionophores were found in the sediments at significantly higher concentrations than in water indicating the importance of this matrix when determining environmental impacts.

*Dr. Ken Carlson is currently an associate professor of environmental engineering at Colorado State University in Fort Collins, Colorado, an appointment he has held since 1998. He received his doctorate in environmental engineering at the University of Colorado – Boulder focusing on the removal of biodegradable organic carbon in drinking water filters. His dissertation won the first place academic achievement award from the American Water Works Association. He and his research group have been researching the occurrence, fate and transport of human and animal antibiotics for the last four years at CSU. The research has led to eight peer-reviewed journal articles on analytical methods and occurrence of these compounds in multiple environmental matrices ranging from drinking water to agricultural and municipal wastewater. Currently, his research group is studying how waste-handling practices in the agriculture industry can be modified to minimize release of these compounds to the environment.*

Thursday, Oct. 27, Noon

## **Luncheon Keynote**

### **Honorable Diane Hoppe**

*State Representative, District 65, Colorado General Assembly, (970) 522-3237, [diane.hoppe.house@state.co.us](mailto:diane.hoppe.house@state.co.us)*

*In November 2004 Diane Hoppe was re-elected to the Colorado House of Representatives representing the counties of Logan, Phillips, Sedgwick and Weld. Now in her fourth and final term, she was chosen by her colleagues to serve as the House Minority Whip. In addition she is a member of the House Agriculture, Livestock, and Natural Resources Committee and the House Appropriations Committee.*

*Representative Hoppe previously chaired the House Agriculture Committee and the Water Resource Review Committee for four years. She was the prime sponsor of much of the water related legislation passed in recent years.*

*Additionally, Diane is a founding member, and president of the Board of Trustees, of the Colorado Foundation for Water Education. She also serves on the El Pomar- Penrose Nonprofit Institute Advisory Board, and is president of the Board of Directors of the Partnership for the West.*

*Diane is a third generation Coloradoan and lives in Sterling. She has a degree in microbiology from the University of Colorado, has a farm and ranch background and served for nine years as a district aide to former U.S. Senator Hank Brown.*

Thursday, Oct. 27, 1:25 p.m.

## **Species: Are They Coming or Going?**

### **Moderator: Jay Skinner**

*Colorado Division of Wildlife, 6060 N. Broadway, Denver, CO 80216, (303) 291-7260, [jay.skinner@state.co.us](mailto:jay.skinner@state.co.us)*

*Jay Skinner has just completed 20 years with the State of Colorado; 18 of which have been with the Colorado Division of Wildlife. He spent 16 years working on various aspects of the state's Instream Flow Program. The DOW is responsible for providing biological support to the Colorado Water Conservation Board which includes quantifying and recommending instream flows to the CWCB. Jay recently was appointed to the manager position for the Division's Water Resources Unit in the newly formed Wildlife Conservation Section. He supervises all Division activities in water resources including water rights, water quality, instream flow, and statewide water resource management on the Division's properties and hatcheries. Jay has been actively involved in the South Platte Forum for the past 6 years. Jay lives on the outskirts of Parker in what is left of rural Douglas County, is married and has two teenage daughters.*

## **The South Platte Recovery Program: Making Commitments Happen**

### **Don Ament**

*Commissioner of Agriculture, Colorado Dept. of Agriculture, 700 Kipling St., Ste. 4000, Lakewood, CO 80215-8000, (303) 239-4104, [don.ament@ag.state.co.us](mailto:don.ament@ag.state.co.us)*

The Platte River Recovery Implementation Program is a basin wide effort undertaken by the Department of Interior and the states of Colorado, Nebraska and Wyoming to provide benefits for the endangered interior least tern, whooping crane and pallid sturgeon and the threatened piping plover. Through the program state and the federal government would provide land, water and systematic monitoring and research to evaluate program benefits for these species.

The three main elements of the program are 1)increasing stream flows in the Central Platte; 2)enhancing, restoring and protecting habitat lands for the target bird species; and 3)accommodating certain new water related activities.

The program's long-term objective for water is to provide sufficient water to and through the Central Platte habitat area to assist in improving and maintaining habitat for the target species. The land objective during the first increment is to protect, restore and maintain 10,000 acres of habitat. One of the programs purposes is to mitigate the adverse impacts of certain new water related activities through the implementation of state and federal depletion plans.

*Don Ament was appointed Commissioner of Agriculture January 12, 1999, by Governor Bill Owens. Don served twelve years in the Colorado General Assembly, chairing the Agriculture, Natural Resources, and Energy Committee and the Capital Development Committee. Prior to his election to the State Legislature Don*

served for five years on the State Board of Education, four of them as chairman. He also served 14 years on the RE-1 Valley School Board in Sterling, and is a former president of the Colorado Association of School Boards.

Nationally Ament chaired the American Legislative Exchange Council's Task Force on Agriculture, and is considered an expert in areas of water and property rights. Currently he serves as Chair of the National Association of State Departments of Agriculture (NASDA) Natural Resources and Pesticide Management Committee, Secretary of the Western Association of State Departments of Agriculture (WASDA), and is the Governor's appointee as Colorado's representative on the Tri-State Platte River Governance Committee with Nebraska and Wyoming.

Commissioner Ament's day-to-day activities include the leadership and support of the Department of Agriculture, representing agriculture on boards and commissions, and promoting the importance of the agricultural industry and the role it plays in preserving our quality of life. Don supports innovative ideas to increase and improve production agriculture and the utilization of computer technology to improve the states' e-commerce.

Ament has lived his entire life in Colorado, graduating with an engineering degree from the University of Colorado. Don continues to farm and ranch in Northeast Colorado. He and his wife, Patty, have three grown children, and three grandchildren.

## **Is the Native Fish Community in the Crosshairs of Federal Listing?**

### **Tom Nesler**

*Native Fishes Conservation Manager, Colorado Division of Wildlife, 317 W. Prospect, Fort Collins, CO 80526, (970) 472-4384, Tom.Nesler@state.co.us*

This presentation will be a collective overview of special status wildlife species that reside in the South Platte River basin and depend on habitat resources there to persist. Both aquatic and terrestrial species will be reviewed and information will be provided regarding their distribution, abundance, trends, major threats, and major recovery or conservation actions being undertaken on their behalf by government and private interests. Problematic non-native and invasive species will also be identified in the context of their negative impacts and threat to native species.

*Tom Nesler is currently the aquatic wildlife conservation manager for the Wildlife Conservation Section of the Colorado Division of Wildlife and has acted in this capacity since 1991. He represents the Division and Colorado as a technical expert in multi-agency, multi-state recovery and conservation programs for federal and state-listed aquatic species such as greenback cutthroat trout and Colorado River endangered fishes. More broadly, he coordinates conservation activities both internal and external to the Division to address native aquatic wildlife species conservation at the community and river basin level. He is a 28-year veteran of the Division and worked as an aquatic researcher involved in coldwater fisheries and reservoir ecology, and in Colorado River endangered fish recovery prior to his current assignment.*

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

**11th Annual South Platte Forum  
October, 25-26, 2006, Location TBA**

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

## ***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.*

## ***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, 2002

**Gene Schleiger**  
1st Annual Friend of the South Platte, 2004

**Sakata Farms, Inc.**  
2nd Annual Friend of the South Platte, 2005

***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.

