



COLORADO WATER

Newsletter of the Water Center at Colorado State University

JUNE 2002



FOCUS ON DROUGHT

*All of Colorado declared
drought disaster area
see page 7*

Clockwise from left :

Barker Reservoir. *Photo courtesy of the
Boulder Daily Camera.*

***Dry South Platte riverbed north-
east of Sterling.*** *Photo courtesy of
Sterling Journal Advocate.*

Dillon Reservoir. *Photo courtesy of the
Denver Post.*



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Knowledge to Go Places

WATER ITEMS AND ISSUES . . .

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CORRECTION

On the cover of the April issue of *Colorado Water* we identified archivist Patty Rettig indexing Water Archive materials. The person should have been identified as CSU student Colleen McCorkell.

COLORADO WATER

Vol. 19, No. 3

June 2002

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COLORADO WATER is a publication of the Colorado Water Resources Research Institute. The scope of the newsletter is devoted to enhancing communication between Colorado water users and managers and faculty at the research universities in the state. This newsletter is financed in part by the U.S. Department of the Interior, Geological 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 United States Government.

Published by the

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EDITORIAL**DROUGHT INFORMATION***Editorial by Robert Ward*

With a publication frequency of six times per year, *Colorado Water* ordinarily does not respond to the news of the day — however, the drought changes everything!

To respond to the drought, we need to apply knowledge and understanding that has often been drowned under the complacency engendered by 20 years of 'above normal' precipitation. Thus, this issue of *Colorado Water* focuses on drying out (as opposed to dusting off) available drought information that can provide lessons from past research and education efforts.

Dan Smith, a Professor in CSU's Soil and Crop Sciences Department, provides his thoughts (page 4) on various efforts to mitigate the effects of drought and notes that society, to exist in Colorado's semi-arid climate, has prepared itself to address potential water shortages. Thus, in many cases, the current drought forces a sharpening of already existing tools and available science to manage and alleviate the situation.

Cooperative Extension recently organized an extensive information response that provides drought-related information suitable for a broad cross-section of Colorado citizens. It is described by Reagan Waskom and John Ortman on page 6 of this issue of *Colorado Water*.

On page 10, Rich Homann and Katherine Timm, with the Colorado State Forest Service, describe plans to reduce fire risks associated with this year's dry forest conditions and how the increasing population growth in the wildland-urban interface magnifies the consequences of forest fires in Colorado's 'Red Zone.'

The Colorado Climate Center, located in the Atmospheric Sciences Department at CSU, has developed an informative webpage providing insight into the nature of drought in Colorado that can be accessed at <http://ccc.atmos.colostate.edu/>. CWRRI has placed a drought 'button' on its webpage where a number of past drought-related research reports can be found (<http://cwri.colostate.edu/droughtpubs.html>).

Both the Colorado Climate Center and CWRRI webpages highlight the report, **A History of Drought in Colorado: Lessons Learned and What Lies Ahead**. Developed jointly by the Colorado Climate Center and CWRRI with collaboration from the Colorado Water Conservation Board, the report summarizes more than 20 years of research findings related to drought in Colorado. It was prepared for the Governor's Flood and Drought Conference in 1999 to explain the nature of Colorado's aridity and the implications for humans living in the state's various river basins.

Colorado State, to help organize the volumes of drought information it has available, provides an overview on the webpage: <http://www.drought.colostate.edu/>. This university-wide site includes the sources specifically described in this issue of *Colorado Water*.

As readily available information is employed to mitigate effects of the drought, areas of weakness in existing knowledge may be exposed. Water research and education responses to identified information gaps will be addressed by CWRRI and its higher-education partners via refocusing research and education resources on this high-priority topic.



PERSPECTIVES ON DROUGHT RESPONSES

by D. H. Smith, Professor, Department of Soil and Crop Sciences

The current drought in Colorado has stimulated widespread interest in the topic of water conservation. From public commentary on editorial pages to actual policy decisions by various government agencies, it is obvious that water resources management is a topic that can dominate public attention, given the appropriate circumstances. Naturally, those of us who work with water issues every day are impressed by this sudden surge of interest by the general public and the response of various agencies on several fronts. As a water professional in an academic environment, the increased public attention devoted to water management and policy issues has provided invaluable insight into common public perceptions about water. In the discussion below, I have provided my reaction to some of the recent discourse from the viewpoint of one involved in water education and research. Hopefully, this perspective will be useful to Colorado water professionals across a spectrum of activities.

Several editorials have commented on the need for greater urban water conservation to provide more water for agricultural irrigation. Historically, the magnitude of water use by irrigated agriculture relative to all other uses suggests the futility of this approach. In Colorado and most other western states, irrigation accounts for 80 to 90 percent of all water use. Obviously, given this lack of balance in distribution of use, maximum saving of urban water would have minimal impact on the quantity of water available for irrigation. In fact, limited water supplies may provide an economic incentive for temporary transfer of water from agricultural to urban use. Reasons for this include the likely decrease in crop yields and income because of reduced irrigation water availability, and the higher prices for water paid by municipal suppliers because of existing shortages. As a result of recent legislation (HB 1414), these temporary arrangements for leasing of irrigation water to cities can be made without judicial review and with no risk to the agricultural water right.

Strategies used by cities to reduce urban water use in the face of shortages have ranged from conservation recommendations to strict regulations on use. Most are designed to decrease landscape irrigation, because this accounts for approximately 50 percent of all domestic water use in urban

areas and much of this is consumed by evaporation or plant losses. While the intent of this action is sincere, some recommendations or mandates may fail to account for certain constraints inherent in urban environments or basic principles affecting water use.

As one example, a few cities have restricted landscape irrigation to minimum intervals of

three to four days. These regulations provide the benefit of distributing demand, but they can also contribute to inefficient water use because of soil conditions in urban areas. Reconstituted surface soils in many subdivisions along the Front Range consist of heavy clay to a depth of several feet. Even with incorporation of recommended levels of compost, the rooting depth of turfgrasses in these soils is often minimal, and the entire profile below the root zone is subject to the formation of compaction layers. Under these conditions, the effective water holding capacity and water intake rates can be limiting. Attempts to increase water application rates in response to 3- to 4-day watering restrictions on these soils may result in excessive runoff unless irrigation application is carefully managed.

Recommendations on the timing of landscape irrigation can also result in inefficient use of water. Suggestions vary somewhat, but usually indicate that the best period for irrigation is between sunset and sunrise, because of lower air temperatures and wind. Indeed, both wind speeds and temperatures undergo a declining trend throughout this period. However, atmospheric conditions during the early evening hours (between sunset and midnight) can result in significant evaporative losses if water application is occur-

...limited water supplies may provide an economic incentive for temporary transfer of water from agricultural to urban use. Reasons for this include the likely decrease in crop yields and income because of reduced irrigation water availability, and the higher prices for water paid by municipal suppliers because of existing shortages.



ring. These losses are avoidable because plant water use during the entire dark period is reduced to near nothing. As temperatures approach the dew point (usually after midnight), night-time evaporative losses during an irrigation event are minimal. This condition actually persists until about two to three hours after sunrise. Therefore, a better recommendation would be to target landscape irrigation to the period between midnight and one to two hours after sunrise. This restriction could potentially result in imbalances in demand, but this is unlikely because the targeted period for irrigation is restricted to those hours when all other household demands are minimal.

As a final observation, the direct efforts of various water management agencies and CSU's Cooperative Extension Service, in responding quickly to the demand for information on water conservation, is impressive. Water conservancy districts across the state and municipal water suppliers have made special efforts to publicize the availability of web-based

information on efficient use of water. Similarly, CSU has provided a wealth of information on drought to a wide range of clientele groups (see, for example, the article by Reagan Waskom and John Ortman in this newsletter). It is noteworthy that most of the information referenced by these agencies was already available on existing web pages or in the form of outreach publications. For example, the irrigation management programs of the Northern Colorado Water Conservancy District and Denver Water's ongoing conservation efforts have provided vital information for many years. Several agencies associated with CSU, the Colorado Water Resources Research Institute and Cooperative Extension in particular, have maintained a wide array of publications relevant to water conservation. The existence of this information from a number of different sources reflects the underlying appreciation for the scarcity of water in the west and the overall importance of conservation in the management of water resources.

Litigation / Water Rights — County of Park vs. Park County Sportsmen's Ranch

On April 8, the Colorado Supreme Court ruled that a state water right holder has the right to utilize ground water to transport water beneath a third party's property. The suit, brought by two landowners in South Park, alleged that Park County Sportsmen's Ranch (PCSR) would be liable for trespass if it recharged the aquifer, which lies partially beneath their property, for storage and subsequent pumping to recover the water. The landowners sued after PCSR filed an application for a conditional water right decree for the conjunctive use project, which would be utilized by the city of Aurora. The landowners asked the state district court to declare that such use would constitute a trespass. They further alleged that PCSR had to either obtain their permission to utilize the ground water beneath their land, or the city would have to condemn the land and compensate them for its use.

The case was removed to the water court, which ruled against the landowners in favor of PCSR, stating, "...artificial recharge activities involving the movement of underground water into, from, or through tributary aquifers underlying surface lands of the Landowners would not constitute a trespass," and that no consent would be needed for the proposed project. Absent any actions by PCSR to build facilities on the surface, or any other action that would injure the landowner's enjoyment of their land, the water court concluded that there would be no taking, and saw no reason to restrict the use of ground water beneath the land.

The landowners appealed to the Colorado Supreme Court. Meanwhile, the water court denied PCSR's application for the conditional water right. When the Colorado Supreme Court granted certiorari, the landowners argued that the case was moot since there was no longer an existing controversy. With two justices dissenting, the court found that since PCSR could simply modify its application and re-file, the case was still justiciable. The court relied on a state statute that explicitly grants a water right holder the privilege of utilizing natural formations for the passage of water (COLO. REV. STAT. §37-87-103). The Colorado Supreme Court said, "In sum, the holders of water use rights may employ underground as well as surface water bearing formations in the state for the placement of water into, occupation of water in, conveyance of water through, and withdrawal of water from the natural water bearing formations in the exercise of water use rights."

Source: *Western States Water* weekly newsletter, 5/26/02



CSU COOPERATIVE EXTENSION DROUGHT RESPONSE

by Reagan Waskom and John Ortman

My ditch company tells me we may be out of water by mid-summer – what can I do? Why are my horses eating all of the grass in the pasture? What can I do if my well goes dry? What are the best landscape plants for new homes in Colorado?

Lately, Colorado State University Cooperative Extension agents and campus faculty are being inundated by media and private citizen questions about water – or the lack thereof! While we cannot make it rain, Colorado State University Cooperative Extension is trying to respond to the drought by providing information on the options that various clientele groups may have to cope with the drought. For some, it is merely an inconvenience, while for others, this year could spell the end to a long family tradition of farming or ranching. CSU has a history of helping farmers and ranchers in Colorado, yet there are few simple answers for cattlemen out of grass or farmers without irrigation water. To help meet informational needs about drought management strategies, a series of meetings are being held throughout the state. Meetings are planned for each of Colorado's seven major watershed areas, and the schedule can be found at:

<http://www.cnr.colostate.edu/RES/rc/meets.htm>.

In a new development, the USDA Farm Service Agency has released Conservation Reserve Program acres in a number of counties for grazing and haying. Requests for other counties are pending. A list of those counties, and the rules and regulations for use, is kept current at:

<http://www.cnr.colostate.edu/RES/rc/crp.htm>.

In addition to meetings, CSU Cooperative Extension has developed research-based web resources on agriculture, homes and landscapes, small acreages, fire protection, and mental health. These can be accessed at

<http://drought.colostate.edu/>.

Another resource is a listing of hay for sale for livestock owners with limited forage resources at

<http://www.ext.colostate.edu/LINKS/haylist.html>.

Media tipsheets and news releases from Colorado State University are regularly updated at

<http://agnews.colostate.edu/>.

Examples of press releases include: Drought Q & A; Tips To Reduce Water Used on Lawns and Yards; and CSU Offers Ideas to Conserve Water Around the Home.

Original articles produced by Colorado State University Cooperative Extension include:

Home Horticulture

- Drip Irrigation for Home Gardens
- Mulches for Home Grounds
- Lawn Care
- Xeriscaping: Ground Cover Plants
- Xeriscaping: Creative Landscaping
- Xeriscaping: Retrofit Your Yard



- Xeriscaping: Garden Flowers
- Xeriscaping: Trees and Shrubs

Fire Protection

- Creating Wildfire-Defensible Zones
- Fire-Resistant Landscaping
- Forest Home Fire Safety
- FireWise Plant Materials
- Grass Seed Mixes to Reduce Wildfire Hazard

Farm & Ranch Family Tough Times Resource List

- Children's Anger and Tantrum
- Clinical Depression in Later Life
- Dealing With Couples' Anger
- Dealing With Other's Anger
- Dealing With Our Anger
- Evaluating Family Life Websites
- Farming and Ranching: Health Hazard or Opportunity
- Manage Anger Through Family Meetings
- Ranching and Farming With Family Members
- Suicide in Later Life
- Transitions and Changes: Who Copes Well?
- Transitions and Changes: Practical Strategies
- Youth and Suicide

CONGRESSIONAL UPDATE

Drought --Senator Pete Domenici (R-NM) introduced the long-awaited National Drought Preparedness Act of 2002 on May 16 to establish a National Drought Council and improve national drought preparedness, mitigation and response efforts. The Western Governors' Association (WGA) helped draft and strongly supports S.2528, and H.R. 4754, companion legislation introduced on the same day by Rep. Alcee Hastings (D-FL). In a February 24 letter to U.S. Department of Agriculture (USDA) Secretary Ann Veneman, WGA Co-Lead Governors for Drought, Judy Martz of Montana and Gary Johnson of New Mexico called passage of the bill "a priority for Western Governors."

Western States Water Council (WSWC) members had a number of opportunities to review the proposed legislation prior to its introduction, and members are invited to contact their congressional representatives and encourage them to join as cosponsors of the bill.

In the Senate, the legislation has been referred to the Committee on Environment and Public Works, which Senator Domenici recently joined, and in the House to the Transportation and Infrastructure Committee, as well as the Agriculture and Resources Committees.

Of note, just prior to its introduction the draft bill was altered to give the Federal Emergency Management Agency (FEMA) lead responsibility (rather than USDA). In addition to organizing a National Drought Council and outlining its duties and responsibilities, the bill creates a Drought Assistance Fund to provide technical and direct financial assistance to states, tribes, local governments and other entities for the development and implementation of drought preparedness plans. Title II amends the Stafford Act to improve wildfire suppression efforts.

Western States Water Newsletter, 5/17/02

DISASTER AREA COVERS STATE -- *Friday, May 31, 2002 - Denver Post* - Colorado has now officially been declared a federal agricultural disaster area because of the worst drought in decades. That will make farmers in all of Colorado's 64 counties eligible for low-interest loans of up to \$500,000. According to the U.S. Farm Service Agency, it's the first time since 1977 that all of Colorado has been declared a drought disaster area. The interest rate on the disaster loans is 3.75 percent, which could allow a farmer who has lost a crop to plant another one for the summer, said Lewis Frank, a Logan County farmer and state director of the Farm Service Agency. The disaster designation also allow ranchers to avoid large capital gains tax payments if they have to sell off all their cattle.

Officials said they can't predict how many of Colorado's 30,000 farms and ranches will be eligible for disaster loans because total financial losses won't be known for several months.

If Congress were to pass an aid package for drought-afflicted farmers, the aid would most likely be directed to the counties that have been designated. Gov. Bill Owens had requested the aid. Drought aid was stripped out of this year's farm bill before it was passed. But the \$2 billion package was reintroduced as a separate bill in the Senate.

The U.S. Department of Agriculture has declared disasters in 10 other states, including all of Arizona, 66 of Texas' 254 counties, seven counties in Kansas, 13 in South Dakota and four in Idaho.



WATER SCHOLARSHIPS AWARDED AT CSU

Water users in northeastern Colorado are funding a new \$2500 scholarship at Colorado State University while the Upper Yampa Water Conservancy District (UYWCD) will fund the second year of a scholarship it initiated for the school year 2001/02. Both scholarships are administered by the CSU Water Center.

The one-year scholarships provide financial assistance to committed and talented students who are pursuing water-related careers at CSU. The UYWCD \$2,500 scholarship is open to any major at CSU, while the new Northeast Colorado Water Users (NCWU) scholarship is restricted to engineering majors. Criteria for the scholarships are that the recipient be a full-time student enrolled at CSU; that financial need may be considered; that preference is given to students from the area of Colorado represented by the scholarship; and that a minimum GPA of 3.0 is required.

Upper Yampa Water Conservancy District Scholarship Recipient

Jamie Harrington, a junior in Chemical Engineering at CSU, is the recipient of the 2002/2003 Upper Yampa Water Conservancy District Scholarship. Jamie, who is also obtaining a minor in Environmental Engineering, hopes to pursue a career in groundwater treatment upon graduation in May, 2003. She is currently a laboratory assistant for a CSU research project that uses micro-organisms to treat contaminated groundwater. She is interested in the possibility of using microbiological treatment of groundwater in situ to avoid pumping for treatment purposes.

Jamie is a graduate of Alameda High School and maintains a 3.7 GPA in her Chemical Engineering studies at CSU. She currently serves as Vice President of the CSU Student Chapter of the American Institute for Chemical Engineers and is a member of several honor societies. She is responsible for organizing field trips for the Chemical Engineering students and is arranging a trip to Steamboat Springs in the fall to tour the local water and wastewater plants. This summer, Jamie will participate in a groundwater bioremediation research project at



Jamie Harrington, recipient of the 2002/03 Upper Yampa Water Conservation District Scholarship, is congratulated by Dan Smith, a member of the CSU Water Center's Scholarship Committee and Professor of Soil and Crop Sciences at CSU.

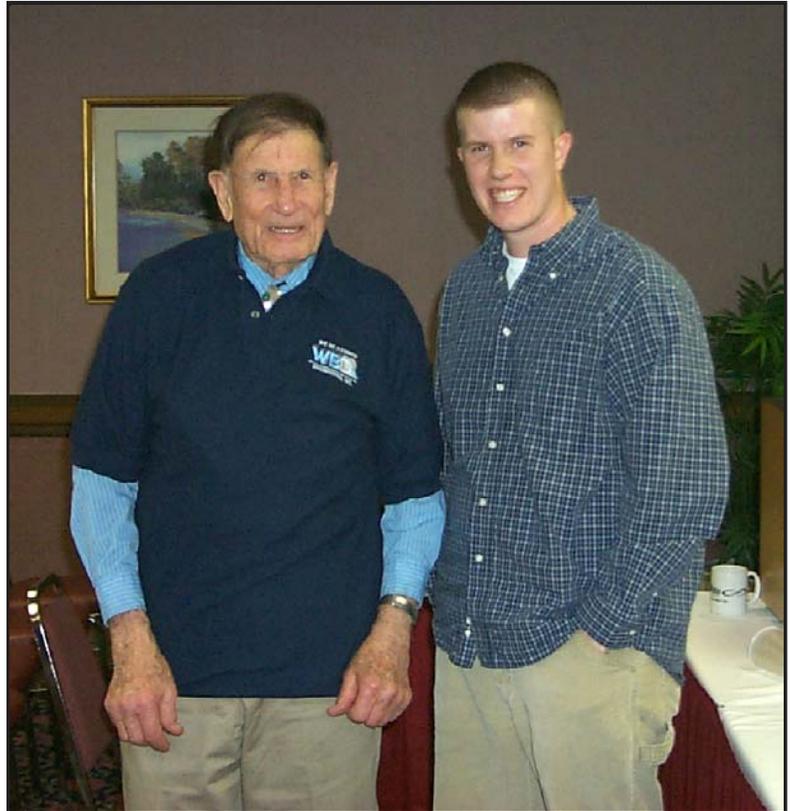
North Carolina State University. Jamie enjoys intramural sports, including flag football and volleyball.

The 2001/02 holder of the UYWCD Scholarship, Josh Duncan, presented his Civil Engineering team's senior design project to the Manager of the UYWCD, John Fetcher, via a conference call on May 16, 2002. Josh's team placed third in the Engineering Days competition with their feasibility analysis of expanding Stagecoach Reservoir by diverting unappropriated water from Morrison Creek. Josh will pursue a Master of Science degree in CSU's hydraulics/hydrology graduate program this fall.

Northeast Colorado Water Users Scholarship Recipient

Skyler Gartin, who recently completed two years of pre-engineering studies at Northeastern Junior College (NJC), is the first recipient of the Northeast Colorado Water Users Scholarship. Skyler, with a 4.0 GPA, plans to major in Civil Engineering at CSU with an emphasis in irrigation systems. Skyler notes he gains a healthy appreciation for water efficient irrigation systems when he watches an aquifer disappear! The Ogallala aquifer is beneath the family farm in Merino, Colorado.

Skyler, while maintaining a 4.0 GPA in high school, was All-State in football and All-Conference in baseball. He served as his senior class president and worked on a number of farms in the Merino area while in high school. At NJC, Skyler received a number of honors recognizing his excellent math and science skills, while continuing his active participation in student government.



Above: Josh Duncan (right) explains his Senior Design Project to John Fetcher, Manager, Upper Yampa Water Conservancy District.



Left: Skyler Gartin (left), recipient of the first Northeast Colorado Water Users scholarship, receives congratulations from Jim Yahn, Northeast Colorado Water Users representative.



**FOREST CONDITION AND DROUGHT
ARE FORMULA FOR DISASTER IN COLORADO:
NATIONAL FIRE PLAN FUNDING PROVIDES SOME RELIEF**

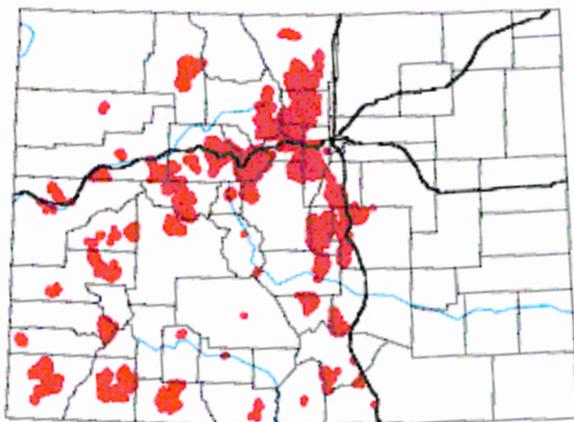
Rich Homann, fire division supervisor, Colorado State Forest Service

Katherine Timm, communications and outreach coordinator, Colorado State Forest Service

Colorado's forests are old, dry and ready to burn — and the drought conditions in the state this year will increase the risk of catastrophic fire, particularly in the area known as the Red Zone (see Figure 1). In order to reduce the risk to life and property, the Colorado State Forest Service (CSFS) is partnering with federal, state, and local agencies and private landowners to implement National Fire Plan grants

throughout the state. The primary objectives of the National Fire Plan are to reduce hazardous fuels that allow wildfires to burn hot and spread quickly, to give communities the tools they need to assess risk and develop plans to mitigate those risks, and to inform the public about what they can do to reduce risk from catastrophic wildfires.

Figure 1. Interface Areas of High Forest Fire Risk in Colorado



Red Zone, 6,304,969 acres

1990 census

749,390 people

372,800 housing units

2000 census

979,851 people

474,000 homes



Following is a brief description of the influences that have contributed to current forest conditions in Colorado, and examples of what is being accomplished through the National Fire Plan to reduce risks associated with forest conditions, increasing growth in the wildland-urban interface, and the drought. Conditions in Colorado as of May 11 ranged from moderate drought to extreme drought (see Figure 2). Jim Hubbard, director, Colorado State Forest Service, presented this information in his May 18 testimony before the Senate Committee on Energy and Natural Resources at a field hearing in Lakewood conducted by Sen. Ben Nighthorse Campbell.

Situation — The Condition of Colorado's Forests

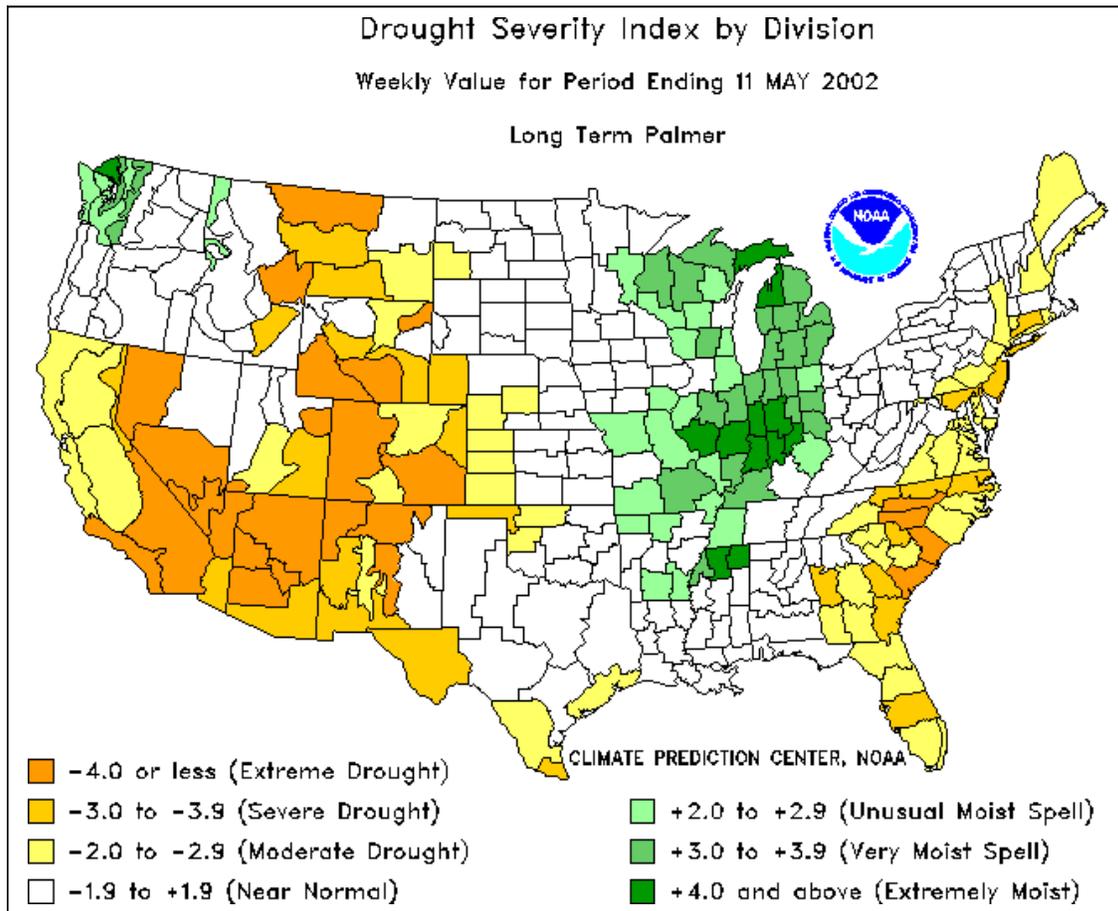
Forest condition, or health, is defined by the interaction

between three components: resilience to disturbance, biological diversity, and ability to meet people's needs.

Several issues and influences contribute to the current condition of Colorado's forest resources. Those of primary concern are trends in forest cover change, insect and disease cycles, expansion of the wildland-urban interface, and watershed health.

The lack of large-scale disturbance is the single-most important factor related to forest health. The majority of Colorado's forested landscapes are considered to be disturbance driven, which means they evolved with natural cycles of wildfire, insect and disease infestations, flooding, avalanches, and windstorms. Changes in human values and the

Figure 2. Palmer Drought Index



resulting shift in land-management practices interrupted these disturbance cycles, primarily through fire exclusion and reduced harvesting activity on public lands.

Without disturbances that periodically rejuvenate forest stands and ensure a variety of forest types, ages and densities, many of Colorado's forests have become unnaturally crowded and concentrated in older age classes. This lack of diversity, along with intense competition for resources such as water and light, has left many forest stands vulnerable to insect and disease attack, catastrophic wildfire, and other types of damage on a vast scale. Further complicating the situation is the public's resistance to cutting trees. All these factors combined create a formula for disaster.

It took over a 100 years for forests to achieve this condition and it will take many years of careful management and interagency collaboration to improve forest conditions on a landscape scale and reduce the risk of catastrophic fire in Colorado's wildland-urban interface.

Growth in the Wildland-Urban Interface

The rapid growth in the wildland urban-interface poses the additional challenge of trying to manage natural resources while protecting lives and property. Currently, nearly 1 million Coloradans reside in the interface, and the projected growth in Colorado is expected to far exceed the national average. Over the next five to 20 years, Colorado is expected to grow at a rate of two times the national average. In Teller and Park counties, the growth rate in the next two decades is predicted to be approximately 6 percent. Douglas County leads the rapid growth with 191 percent change in population between 1990 and 2000, 60,391 to 175,766. Many of these residents have built homes in the interface, valued at \$181 million in just the first quarter of 2002.

Hazards and Risks in the Wildland-Urban Interface

The risk of wildfire in Colorado's wildland-urban interface poses a daunting challenge to public safety, fiscal responsibility, and natural resource integrity in the state. The 2000 fire season brought this challenge to the forefront of public attention when

four interface fires along Colorado's Front Range destroyed 74 structures and threatened thousands more, interrupted utility service, and impacted water and air quality. The cost to state coffers for suppressing these fires was staggering, contributing to the most expensive wildfire season in Colorado's history.

The large fires in Colorado this spring have cost \$4,290,798 to suppress, and that doesn't include the Schoonover, Bucktail, or Cow Camp fires. The Black Mountain fire caused the evacuation of residents from 1,700 homes. All indications are that it will continue to be unusually dry, adding to an already volatile situation.

The cost of suppressing unnaturally large and destructive fires in the complex wildland-urban interface environment often presses state and local resources beyond their capacity. To address these critical needs, the Colorado State Forest Service, in collaboration with federal, state, county, and local agencies, as well as private landowners, is taking steps to mitigate the risks of catastrophic wildfire, particularly where lives and property are at greatest risk. Much of what is being accomplished is a direct result of the funding provided through the National Fire Plan.

National Fire Plan (NFP) Projects in Colorado

To identify communities at risk, Colorado's Interface Red Zone map was used (attached). The Red Zone is based on hazard (amount of fuel/condition of the forest), risk (the potential for ignition), and value (number of homes). This assessment identified 1,609 communities with nearly 1 million residents and over 6 million acres as being at risk from catastrophic wildfire. Figures include private and federally owned acres. Colorado's mix of ownership necessitates interagency collaboration to address the problem.

NFP funding in federal fiscal year 2001 allowed the Colorado State Forest Service to implement 67 projects that ranged from statewide fuel treatment awareness to community based hazard fuels treatments; \$1.5 million was used for fuel hazard treatments, \$167,000 for planning and assessment, and \$366,460 for awareness. All federal dollars were leveraged, some by as much as 10 to 1. Following are a few examples of successful projects that have been implemented in Colorado.

The Baca Grande Mitigation Project received a \$25,000 grant to reduce hazard fuels. They developed a 5-acre demonstration area; treated 47 acres of defensible space on 52 properties, and conducted wildfire information workshops for 54 property owners.

The Larimer County Slash Disposal Project received a \$65,200 grant to reduce hazardous fuels. They completed 198 miles of access improvement and fuelbreak construction and created 21 acres of demonstration projects. The match for this grant was \$294,022.

Through a \$16,561 grant, the Colorado State Forest Service reproduced and distributed 7,500 Burning Issues CDs, a high school fire ecology curriculum. Each science teacher in 317 Colorado high schools received a lab pack for use in their senior high science classes. In addition, workshops were offered to train teachers about the effects of fire on watersheds and communities.

Federal, Local and State Coordination

Colorado has chartered a NFP implementation group with representatives of the land management agencies and local government. Through regular meetings, this body has coordinated identification of communities at risk, treatment projects, exchange of planning and monitoring information, assistance to communities, and a common approach to delivery of prevention messages.

The land ownership pattern in Colorado and much of the west requires a cross-boundary landscape scale approach. All jurisdictions must be included to achieve success. NFP emphasis has been focused on firefighting and fuel treatment. This is appropriate for Colorado's forest condition and interface risk.

As the NFP moves forward, more attention needs to be given to community assistance. The sustainability of federal investment will depend on local connection and capacity. Through programs like State Fire Assistance, Volunteer Fire Assistance, Community Assistance, and Economic Action, local programs are enhanced. From small beginnings, capacity grows and sustainability results. The NFP can play an important role to help communities become an integral part of preparedness, mitigation, watershed restoration, and prevention.

Visit www.colostate.edu/Depts/CSFS
to see the following documents in their entirety:

**2001 Report on the Conditions
of Colorado's Forests**

**Report to the Governor—
Colorado Wildland Urban Interface.**

MEETING BRIEFS

HYDROLOGY DAYS HONORS CSU GRAD IGNACIO RODRÍGUEZ-ITURBE

More than 200 persons, representing 13 countries, attended the 22nd Annual AGU Hydrology Days meeting held on the Colorado State University campus April 1-4, 2002. The Hydrology Days vision is to provide an annual forum for outstanding scientists, professionals and students involved in basic and applied research on all aspects of water to share ideas, problems, analyses and solutions. The focus includes the water cycle and its interactions with land surface, atmospheric, ecosystem, economic and political processes, and all aspects of water resources engineering, management and policy.

The 22nd Annual AGU Hydrology Days was dedicated to Professor Ignacio Rodríguez-Iturbe, a CSU graduate, "In recognition of his outstanding contributions to hydrologic science. During a career spanning over 30 years, he has been a major force in the development of the scientific foundations of hydrologic science..." Professor Rodríguez-Iturbe obtained a Ph.D in Hydrology in the Department of Civil Engineering, Colorado State University, in 1967. Born in Venezuela, where he also worked for many years, Professor Rodríguez-Iturbe is a citizen of both Venezuela and the United States. He presently is Theodora Shelton Pitney Professor of Environmental Studies and Professor of Civil and Environmental Engineering at Princeton University.



Marilee Rowe, Conference Coordinator, chats with Marshall Flug of the U.S. Geological Survey.



Above: Dr. Jorge Ramírez (right), CSU Professor of Civil Engineering and organizer of Hydrology Days, presents Hydrology Days Award to Professor Rodríguez-Iturbe during a luncheon in his honor.



On March 22 of this year, Professor Rodríguez-Iturbe was also honored by being named the 2002 Stockholm Water Prize Laureate for his significant scientific contributions to the understanding of the interaction among climate, soil and vegetation structures, surface water, floods and droughts. He is the first South American to receive the Prize. In announcing the award, the Stockholm Water Prize Nominating Committee wrote:

Professor Ignacio Rodríguez-Iturbe is awarded the 2002 Stockholm Water Prize for lasting contributions to surface hydrology. With scholarship, creativity, enthusiasm and inspiration he has been in the forefront of the scientific evolution that placed hydrology in the fellowship of Earth Sciences.



Clockwise from top left: Andy Pineda (left), No. Colo. Water Conservancy District, and Jose Salas, CSU's Dept. of Civil Engineering; Larry Quinn, (left) recent CSU Ph.D. graduate and international water consultant, and Maurice Albertson, CSU's Dept. of Civil Engineering; Prof. Ignacio Rodriguez Iturbe (left), Jose Salas, and Sandy Woods, Chair, CSU's Dept. of Civil Engineering; Gigi Richard (left), CSU graduate and Asst. Prof. at Mesa State College, and Ellen Wohl, CSU's Dept. of Earth Resources; Carlos Puente (left), Dept. of Land, Air and Water Resources, University of California at Davis, and David Tarboton, Utah State University.

The \$150,000 Stockholm Water Prize is an international award presented annually by the Stockholm Water Foundation. It honors outstanding achievements in science, engineering, technology, education or public

policy related to protection of the world's water resources. His Majesty King Carl XVI Gustaf of Sweden is the patron of the Stockholm Water Prize.

During a Hydrology Days special technical session, Professor Rodríguez-Iturbe discussed hydrologic dynamics and ecosystem structure. He cited the key variable in water-controlled ecosystems as soil moisture content, and focused on the impact inter-annual rainfall variability has on the statistics of soil moisture and the resulting water stress that vegetation may have to undergo during the growing season.

He described a model used extensively in ecological dynamics, driven by stress conditions resulting from annual rainfall fluctuations, that assesses vegetation competition in water-limited ecosystems. The distribution of mean soil water content during the growing season was used to show the evolutionary dynamics that competing trees and grasses exhibit, and which are driven by annual rainfall amounts. Model results showed that ecosystem structure is very sensitive to the inclusion of realistic estimates of inter-annual rainfall variability.

The model was also implemented to approximately describe the conditions of two ecosystems characterized by grass-tree competition, one near La Copita, Texas and the other in Nylsvley, South Africa. Long-term simulations were run for many different characteristics of the annual rainfall amounts. The results suggested that under commonly observed inter-annual rainfall fluctuations, water-controlled ecosystems tended to self-organize in a manner that reflects a maximum in the richness of possible dynamical responses.



AG AND RURAL LEADERSHIP PROGRAM ENHANCES SKILLS OF RURAL CITIZENS

The Colorado Agriculture and Rural Leadership program will begin this fall under the guidance of Colorado State University. The program, which was started and formerly managed by the Colorado Department of Agriculture, will be integrated into the College of Agricultural Sciences and Cooperative Extension.

The first Colorado Agriculture and Rural Leadership classes under the new structure will begin during the fall of 2002. Participants will explore leadership theory and philosophy, state and federal policies that impact rural communities and the agricultural industry, rural and agricultural issues, domestic and international economies, and experiential lessons in broad areas of agriculture. The university will provide staff to direct, develop and manage the program and a portion of tuition will be paid for by the leadership organization, according to Don Nitchie, program director.

Each two-year class is limited to 25 people, and participants can be nominated or request applications to apply directly to the program. Nominations should be made as soon as possible. Applications are due by Aug. 5. Additional information and nomination forms are available at www.agsci.colostate.edu/CARL or by contacting the program office at 970-491-2246.

Third Annual RIVER RENDEZVOUS

July 24, 5-9 p.m.

Dinner, dancing and a dazzling array of auction items down by the riverside
Hosted by the RIVERS COUNCIL of the Roaring Fork Conservancy

See the web site at www.roaringfork.org
Phone: 970/927-1290 FAX: 970/927-1264

CSU HOSTS 11TH CHILDREN'S WATER FESTIVAL

Marian Flanagan of the Colorado Water Resources Research Institute (CWRRI) teamed with Ty Smith (photo at right) of the Colorado Alliance for Minority Participation (CO-AMP) once more for Careers in Water, an educational activity at the 11th Annual Children's Water Festival held on May 14th at Colorado State University's Lory Student Center. Sixteen hundred third graders attended the event. The Northern Colorado Water Conservancy District, Fort Collins Utilities, and U.S. Bureau of Reclamation sponsored the water festival. Visiting students attended 5 of 25 presentations from 9 a.m. to 2 p.m., most of which emphasized different aspects of water use and how water travels from its origin to its users. Of those attending the festival, 163 students from 7 schools were introduced to a variety of careers available in the water industry, after which they



dressed in garb representing career roles and posed for group pictures. Additional activities that day included the popular Water Wizard, the Mad Scientist, hands on activities and displays in the Exhibition Halls, as well as others outdoors. Students from public schools in the area, private schools, and the Home School Association attended the day's festivities. It was a fun time for all ages.







NATURAL RESOURCES LAW CENTER
Living With The Endangered Species Act in Colorado
A Workshop/Discussion Series in 2002

About the Series: The federal Endangered Species Act, established by Congress in 1973, has as its stated purpose to conserve threatened and endangered species of plants and animals and the ecosystems upon which they depend. In *TVS v. Hill*, the U.S. Supreme Court called the ESA “the most comprehensive legislation for the preservation of endangered species ever enacted by any nation” and stated that “the plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, whatever the cost.” Thirty-three federally listed threatened or endangered species are found in Colorado. Continuing growth places pressure on the remaining habitat important to these species. Development almost anywhere in the state is likely to encounter the legal responsibilities set out in the ESA. This series begins with a one-day short course explaining the ESA and its regulations. Next are half-day sessions focusing on the difficult issues involving “take” of a protected species, the emerging legal requirements for protection of the Preble’s meadow jumping mouse, and programs for protecting endangered fish. The series concludes with a look at emerging approaches for species and habitat protection in Colorado. *Instructor: Larry MacDonnell*

Session Four, July 15, 2002	ESA and Water Use in Colorado , 8:00 a.m. - 11:30 a.m., 3 CLE credits, Cost: \$75 with CLE, \$50 without CLE Renaissance Hotel, 3801 Quebec, Denver
Session Five, Sept. 19, 2002	Living With the Endangered Species Act in Colorado , 8:30 a.m. - 4:30 p.m., 5 CLE credits, Cost: \$100 with CLE, \$75 without CLE Renaissance Hotel, 3801 Quebec, Denver

To register contact Jeannie Patton by phone at (303) 492-1288 or by e-mail: jpatton@spot.colorado.edu. You may also fax in your registration form to (303) 492-1297.

<http://www.colorado.edu/Law/NRLC/>



PEOPLE

Although privatization of water services has long been an option for U.S. municipal governments, interest for private-sector participation in water utility ownership and operations grew markedly during the 1990s, both in the United States and abroad. In 1999 a committee was appointed to review water services privatization in the United States. The committee’s report, **Privatization of Water Services in the United States: An Assessment of Issues and Experience**, was released in March 2002. The committee was chaired by **Charles W. Howe** of CU. A prepublication copy of the report is available through the Water Science and Technology Board (WSTB) at 202/334-3422.

James Heaney, CU, is serving on a panel to study the effectiveness of the **Critical Ecosystem Studies Initiatives (CESI)** program. The panel is organized under the existing National Research Council Committee on Restoration of the Greater Everglades System. It will assess the types and funding levels of the science being conducted in the National Park Service CESI program in light of the scientific activities of other entities and the needs of the overall restoration effort. Heaney formerly was Director of the Florida Water Institute.

WSTB, Newsletter from the Water Science and Technology Board, National Research Council, Vol. 19, No. 1, March/April 2002.




The annual Geological Society of America (GSA) meeting will be held in Denver October 27-30. **John McCray** and **Tom Boving** of the Department of Geology and Geological Engineering at CSM are organizing a topical session on subsurface transport and remediation for this year’s meeting. The session is titled, “Subsurface Characterization, Remediation and Natural Attenuation of Organic Contaminants in Heterogeneous Physical or Chemical Settings. More information about the conference can be found at the website <http://www.geosociety.org/meetings/2002/>. See Call for Papers in *Colorado Water*, page 34.

Plan to Learn More Modeling Skills from IGWMC Short Courses

APPLIED ENVIRONMENTAL STATISTICS

August 12-16, 2002 – By Dr. Dennis Helsel and Dr. Ed Gilroy

This five-day course develops hands-on expertise for all environmental scientists who interpret data and present their findings to others. Hypothesis tests are explained in the light of data with non-detects, outliers, and skewed distributions. Methods for estimation and prediction are illustrated along with their common pitfalls. Hands on exercises follow each lecture. The course emphasizes: when each method is appropriate; how to plot and present data; assumptions behind statistical tests, and their implications; how to build a good regression model, and trend analysis with common pitfalls. No requirement of previous training or experience in statistics.

PRACTICAL SIMULATION OF VARIABLE-DENSITY FLOW, SOLUTE TRANSPORT, AND SEAWATER INTRUSION

October 21 - 25, 2002 – By Dr. Clifford Voss and Dr. Craig Simmons

The aim of this course is to familiarise attendees with: 1) the basics of solute transport processes for both constant and variable-density flow, 2) numerical aspects of simulating constant and variable-density flow with solute transport, 3) setting up, running, post-processing and evaluating flow and transport models, and 4) practical aspects of transport modeling and case studies. Attendees will learn to run a variable-density flow and solute transport simulator (U.S. Geological Survey's SUTRA code) using a graphical interface.

MODFLOW: INTRODUCTION TO NUMERICAL MODELING

October 23 - 26, 2002 – By Dr. Eileen Poeter

This course is designed for the hydrogeologist and environmental engineer familiar with ground-water flow concepts, but who have limited or no experience with ground-water flow modeling. Basic modeling concepts: conceptual model development, definition of boundary and initial conditions, parameter specification, finite-differencing, gridding, time stepping, and solution control using MODFLOW-2000 and UCODE. Basic modules of MODFLOW are explained and concepts are reinforced with hands-on exercises. Calibration is presented via the public domain universal inversion code, UCODE.

UCODE: UNIVERSAL INVERSION CODE FOR AUTOMATED CALIBRATION

October 25 - 26, 2002 – By Dr. Eileen Poeter

If you have a working knowledge of ground-water flow modeling and some knowledge of basic statistics, you will benefit the most from this short course. This course introduces to ground-water professionals to inverse modeling concepts and their use via UCODE, relying heavily on hands-on exercises for automatic calibration of ground-water models to promote understanding of UCODE and avoid "black-boxing."

SUBSURFACE MULTIPHASE FLUID FLOW AND REMEDIATION MODELING

October 31 - November 1, 2002 – By Dr. John McCray

This course presents approaches and modeling tools for solving realistic subsurface multiphase-flow problems related to vadose-zone and saturated-zone transport and remediation. The course begins with a detailed conceptual and mathematical description of multiphase fluid flow and interphase partitioning of organic chemicals between phases. A graphical user interface for T2VOC, Petrasim, by Thunderhead Engineering, will be used in this course.

PHREEQC MODELING: THE BASICS

October 31 - November 1, 2002 – By Dr. Geoffrey Thyne

This course uses a hands-on approach to teaching. Students will learn environmental applications of modeling through a series of short lectures followed by problem sessions directly related to the lecture. Problems are designed to provide a review of basic geochemical principles, specifically by using the PHREEQC code. Lectures are interspersed with modeling sessions to discuss and reinforce the geochemical and modeling concepts set forth in class problems.

For more information, contact: International Ground-Water Modeling Center

Colorado School of Mines
Golden, Colorado, 80401-1887, USA
Telephone: (303) 273-3103 / Fax: (303) 384-2037
Email: igwmc@mines.edu



VISIT <http://www.mines.edu/research/igwmc/short-course/>

RESEARCH AWARDS

A summary of research awards and projects is given below for those who would like to contact investigators. Direct inquiries to investigators c/o indicated department and university. The list includes new projects and supplements to existing awards.

The new projects are highlighted in bold type.

COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO Awards for March 27, 2002 to May 28, 2002

Title	PI	Dept	Sponsor
Managed Groundwater Recharge for Habitat Restoration	Garcia, Luis	CWRRI	USGS
Description & Interpretation of Salinization in the Lower Arkansas River Valley	Gates, Tim	CWRRI	USGS
Enhancements to South Platte Mapping and Analysis Program (SPMAP)	Garcia, Luis	CWRRI	USGS
Quantifying the Effectiveness of Best Management Practices (BMPs)	Stednick, John	CWRRI	USGS
Watershed Assessment for Illinois Streams	Watson, Chester	Civil Engr.	DOD
Effects of Fuel Management on Wildlife Populations & Habitats	White, Gary	FWB	USDA-USFS-RMRS
Validation & Enhancement of AMSR-E Cloud & Precipitation Products	Stephens, Graeme	Atmos. Science	NASA
International Workshop on Soil & Sediment Biodiversity & Ecosystem Functioning	Wall, Diana	NREL	Winslow Fdn.
Ecological Effects of Reservoir Operations on Blue Mesa Reservoir	Johnson, Brett	FWB	USBR
Applying Spatial & Temporal Modeling of Statistical Surveys to Aquatic Resources	Davis, Richard	Statistics	EPA
Developing Sustainable Dryland Cropping Systems in SW Colorado	Berrada, Abdelfettah	SW CO Res. Ctr.	Utah State
Enhancements to the Model Development & Maintenance River and Reservoir Operations Model	Labadie, John	Civil Engr.	USBR
Research Experiences for Undergraduates Program in Water Research at Colorado State University: SITE	Ramirez, Jorge	Civil Engr.	NSF
TRMM Precipitation Radar & Microphysics: Interpretation & Precipitation Estimation	Venkatachalam, C.	Elec/Computer Engr.	NASA
The Effects of Climate Regime on TRMM Retrievals	Berg, Wesley	Atmos. Science	NASA
Use of Tropical Rain Measuring Mission Data to Test an Improved Parameterization of Stratiform Precipitation	Randall, David	Atmos. Science	NASA
Analysis of Data from Tropical Rainfall Measuring Mission to validate Tropical Rainfall Measuring Mission...	Rutledge, Steven	Atmos. Science	NASA

FEDERAL SPONSORS: BLM-Bureau of Land Management, COE-Corps of Engineers, DOA-Dept. of the Army, DOD-Dept. of Defense, DOE-Dept. of Energy, DON-Dept. of the Navy, DOT-Dept. of Transportation, EPA-Environmental Protection Agency, HHS-PHS-Public Health Service, NASA-National Aeronautics & Space Administration, NBS-National Biological Survey, NOAA-National Oceanic & Atmospheric Admin., NPS-National Park Service, NRCS-Natural Resources Conservation Service, NSF-National Science Foundation, , USAID-US Agency for International Development, USBR-US Bureau of Reclamation, USDA/ARS-Dept. of Agriculture, Agricultural Research Service, USDA/NRS-Dept. of Agriculture, Natural Resources Service, USFS-US Forest Service, USDA-USFS-RMRS-Rocky Mountain Research Station, USFWS-US Fish & Wildlife Service.

STATE/LOCAL SPONSORS: CDA-Colorado Department of Agriculture, CDNR-Colorado Dept. of Natural Resources, CDPHE-Colorado Dept. of Public Health and the Environment, CDWL-Colorado Division of Wildlife, NCWCD-Northern Colorado Water Conservancy District. OTHER SPONSORS: AWWA-American Water Works Assn., CID-Consortium for International Development.

UNIVERSITY DEPARTMENTS, INSTITUTES AND CENTERS: Colorado State: BSPM-Bioagricultural Sciences & Pest Management, CBE-Chemical & Bioresource Engr., CFWLU-Cooperative Fish & Wildlife Unit, CSMTE-Center For Science, Mathematics & Technical Education, CIRA-Cooperative Inst. for Research in the Atmosphere, DARE-Dept. of Agric. & Resource Economics, FWB-Fishery & Wildlife Biology, HLA-Horticulture & Landscape Architecture, NREL-Natural Resource Ecology Lab, NRRT-Nat. Resources Recreation & Tourism, RES-Rangeland Ecosystem Science, SCS-Soil & Crop Sciences. University of Colorado: ACAR-Aero-Colorado Center for Astrodynamic Research, AOS-Atmospheric & Oceanic Sciences, CADSWES-Center for Advanced Decision Support for Water and Environmental Systems, CEAE-Civil, Environmental, and Architectural Engineering, CIRES-Cooperative Institute for Research in Environmental Sciences, CRCMAST-Cooperative Research Center for Membrane Applied Science & Technology, EPOB-Environmental, Population & Organismic Biology, IAAR-Institute for Arctic & Alpine Research, IBS-Institute of Behavioral Science, ITP-Interdisciplinary Telecommunication Program, LASP-Lab. For Atmos. And Space Physics, PAOS-Program in Atmospheric and Oceanic Sciences.

Title	PI	Dept	Sponsor
Tropical Rainfall Measuring Mission Sounding Studies	Johnson, Richard	Atmos. Science	NASA
Natural Substrates & Inhibitors of Microbial MDR Pumps	Stermitz, Frank	Chemistry	N.E.Univ.
Reclamation Plan for Summitville Superfund Site	Redente, Edward	RES	CDPHE
Applied Research in Support of Implementation of Nat'l. Weather Stochastic Modeling & Simulation of the Great Lakes Net Basin	Deo, Shripad	CIRA	NOAA
Technological Transfer & Validation of the CIRA Scheme for the Tropical Rainfall Potential (TRaP) Technique	Kidder, Stanley	CIRA	NOAA
Carbon Cycle Science & Related Opportunities in Biology & Biogeochemistry of Ecosystems & Application	Kalkhan, Mohammed	NREL	USGS
High Line Canal Water Usage of Cottonwoods Study	Jacobi, William	BSPM	Denver Water
Development of Guidelines & Specifications for Using Culvert Pipe Liners	Thornton, Christopher	Civil Engr.	DOT
Nuclear Magnetic Resonance Characterization of Heterogeneous Porous Media	Watson, Ted	CBE	Texas A & M
Fish Losses Associated With Irrigation Diversions On the Wind River Indian Reservation, Wyoming	Bergersen, Eric	CFWLU	USGS
Upper San Juan Basin Biological Assessment	Sovell, John	FWB	SW Land Alliance
Mountain Plovers on Private Lands	Wunder, Michael	FWB	USGS
Water Usage by Cottonwood Trees	Jacobi, William	BSPM	Denver Water
Effects of Flaming Gorge dam Releases on Lodore/Whirlpool Canyon Fish Community	Bestgen, Kevin	FWB	USBR
Removal & Control of Nonnative Fishes in Colorado & Gunnison River Floodplain Source Ponds	Bestgen, Kevin	FWB	USBR
Testing a High-Sensitivity ATR-FTIR Water Monitor for Ionic CWA Breakdown Products	Strauss, Steven	Chemistry	DOD-ARMY
Fire, Runoff, and Erosion in Forested Areas: Prediction and Validation	Macdonald, Lee	Earth Resources	USDA-USFS
Membrane Behavior of Clay Soil Barrier Materials	Shackelford, Charles	Civil Engr.	NSF
Watershed Assessment for Illinois Streams	Watson, Chester	Civil Engr.	DOD
Yampa River Nonnative Fish Control: Translocation of Northern Pike from the Yampa River	Hawkins, John	FWB	USBR
Developing a Rapid Assessment Approach to Evaluating the Effectiveness of Compensatory Wetland Mitigation . . .	Johnson, James	Biology	CO Geological Survey
Convective Cloud Systems in Climate Models	Randall, David	Atmos. Science	NSF

UNIVERSITY OF COLORADO, BOULDER, COLORADO 80309

Awards for March 1, 2002 to March 31, 2002

Title	PI	Dept	Sponsor
Zeolite Membrane for Waste Minimization in Chemically Challenging Environments	Noble, Richard	CRCMAST	State of CO
Deep-Water Polynyas: Formation, Maintenance and Relationship to Antarctic Climate	Lynch, Amanda	CIRES	Jet Propulsion Lab
Variability of Tropical Indian Ocean Induced by Intraseasonal Atmospheric Forcing	Han, Weiqing	PAOS	NSF
Experimental Forecasting of Major Bangladesh Floods: Science and Applications	Webster, Peter	PAOS	USAID
Laurentide Ice Sheet Dynamics: Applying Cosmogenic Exposure to Constrain Chronology and Glacial Style in the Eastern Canadian Arctic	Miller, Gifford	IAAR	NSF
Expectation for the Detection of Climate Change in Vertical Temperature Data	Weatherhead, E.C.	CIRES	NSF

Title	PI	Dept	Sponsor
Assessment of Basal Melt of Petermann Gletscher in Northwestern Greenland	Steffen, Konrad	CIRES	NSF
Climatology of Arctic Canada	Steffen, Konrad	CIRES	NASA
Evaluation and Verification for Application to Land-Use Change: Atmospheric Correction, Soils and Sparse Vegetation Mapping	Goetz, Alexander	CIRES	NASA
Riverware Model System Improvement - LC Riverware	Zagona, Edith	CADSWES	USBR
Riverware Model System Improvement - Hydrologic Database	Zagona, Edith	CADSWES	USBR
Yakima Maintenance Agreement	Zagona, Edith	CADSWES	USBR
Upper Colorado Research, Development, and Support for Riverware	Zagona, Edith	CADSWES	DOI
Analysis of Active Blind Thrust and Fold Hazards in the Southern Los Angeles Basin from Shallow Aquifers...	Mueller, Karl	Geological Sci.	USGS
Lyotropic Liquid Crystal Polymer Membranes for Nano Filtration and Catalytic Treatment of Shipboard Wastewater	Gin, Douglas	Chem. & Biochem.	DON
Estimation of Transport Parameters Using Forced Gradient Tracer Tests in Heterogeneous Aquifers	Rajaram, Harihar	CEAE	DOA



WATER SUPPLY

While it is typical for portions of the state to be experiencing dry conditions, this year is highly unusual in that the entire state is under drought. This is demonstrated by the SWSI values, which are in the moderate to severe drought range for all basins. Statewide, the May 1 snowpack averages a paltry 19 percent of normal. The Rio Grande and San Juan/Dolores River basins tie for the lowest snowpack figure at 6 percent of normal, while the Yampa/White River basin has the highest at 32 percent of normal. Most of the lower-elevation snowpack measuring sites were already snow free on May 1.

Streamflows during April were all below normal. While as we enter the runoff season actual quantities of flow will rise, flows will drop when measured as a percent-of-average. NRCS-forecasted volumes over the runoff season are nearly all lower than 50 percent of average, with some less than 25 percent of average. The lowest forecasts are in the southern portion of the state. In typical years the runoff peaks in May or June; this year, some streams peaked in April. Diversions for irrigation have started in many areas of the state, and only ditches with senior priority dates are able to take water. Many junior priority farmers and ranchers, some of whom

rely on spring runoff flows as the only time they can take water, will not have any streamflow water to irrigate with this year.

Some reservoirs are holding above normal storage; most are below normal, with overall storage volumes below normal. Irrigation reservoirs will be heavily utilized this irrigation year and many are expected to be drained by the end of the season.

The Surface Water Supply Index (SWSI) developed by the State Engineer's Office and the USDA Natural Resources Conservation Service is used as an indicator of mountain-based water supply conditions in the major river basins of the state. It is based on snowpack, reservoir storage, and precipitation for the winter period (November through April). During the winter period, snowpack is the primary component in all basins except the South Platte basin, where reservoir storage is given the most weight. The following SWSI values were computed for each of the seven major basins for May 1, 2002, and reflect the conditions during the month of April.

Basin	5/1/02 SWSI Value	Change from the Previous Month	Change from the Previous Year
South Platte	-2.5	-0.6	-2.6
Arkansas	-2.9	-0.1	-1.3
Rio Grande	-3.6	-0.5	-4.7
Gunnison	-3.1	-0.3	-1.6
Colorado	-3.0	-0.4	-1.3
Yampa/White	-3.9	-0.4	-1.1
San Juan/Dolores	-3.7	-0.2	-3.6

SCALE								
-4	-3	-2	-1	0	+1	+2	+3	+4
Severe Drought	Moderate Drought	Near Normal Supply	Above Normal Supply	Abundant Supply				

GS 592 WATER RESOURCES SEMINAR
Tuesdays, 4:10pm, C-142 Clark Building
Fall 2002 theme: Cross Currents in the Arkansas River:
Changing Values, Competing Demands, and Policy Reactions

Water users and managers in the Western United States face many new challenges, including changing societal values, increasing competition for water, and adapting institutional arrangements. We often think of these challenges in the context of such high profile situations as the Columbia River system in the Pacific Northwest or the Cal Fed efforts in the San Francisco Bay area. Similar challenges, while perhaps not as high profile nationally, are facing each of Colorado's rivers. The Arkansas River, in particular, faces considerable change – change brought on by an interstate compact lawsuit; new definitions of 'beneficial use'; pilot testing of the concept of a water 'bank'; and intrastate concerns over future of trans-mountain diversions. The Fall 2002 offering of the Water Resources Seminar (GS 592) will use the experiences of the Arkansas River to examine a number of key issues facing Colorado water managers as well as citizens. Topics to be discussed include:

- The Arkansas River 'as it was!' What changes are creating pressures on the traditional water management system?
- Redefining 'beneficial use' under the prior appropriation doctrine.
- Changes in water allocation brought on by population growth, water sales, and lawsuits.
- What will water management look like in the Arkansas Valley in 2020?

Students interested in taking the one-credit seminar should sign up for GS 592, Water Resources Seminar, Section ID Number: 281888. Interested faculty, students and off-campus water professionals are encouraged to attend and participate.



Discarded Computers and Cell Phones Pose Potential Risk to Groundwater

The digital age's promise to make life easier comes at a cost, with the road to the promised land littered with dead and obsolete PCs and printers. The chemical and metal by-products of discarded computers can end up contaminating soil, groundwater and air. Studies show that in the U.S. in 1998 about 21 million personal computers became obsolete, with only 2.3 million or 11 percent being recycled. Experts predict that another 315 million PCs will become obsolete by 2004. The worst offender is the cathode ray tube, or CRT, the technical name for the glowing screens used in computer monitors and televisions. The average 14-inch monitor uses a tube containing about five to eight pounds of lead. Dumped in a landfill, this lead can seep into groundwater. Crushing or burning the tube can release pollutants into the air. According to the Silicon Valley Toxics Coalition, electronic computer equipment includes more than 1,000 different materials, including lead and cadmium, lead oxide and barium, mercury in switches and flat screens, brominated flame retardants, and chromium in the PC's steel exterior.

Legal efforts are underway to control dumping of computer equipment. U.S. Environmental Protection Agency regulations prohibit businesses from dumping computers into the trash. The California Department of Toxic Substances Control considers monitors hazardous waste, and state law there prohibits the dumping of computer monitors into landfills. The European Parliament has taken more extreme measures.

Recent legislation requires manufacturers of electrical and electronic equipment to reduce hazardous substances by paying recycling costs of their products.

Cell phones also pose possible risks to groundwater when discarded in landfills, since these devices contain many toxic materials including mercury, cadmium and lead. Cell phone users tend to upgrade their units every 18 months, with an estimated 40 million cell phones in the U.S. last year replaced by new and improved versions. Worldwide, the number of cell phone users is expected to climb from the current 600 million to an expected one billion by this year.

(Editor's note: Taken in part from Arizona Water Resource, September-October 2001).

USBR Celebrates Centennial Anniversary

“...Congress established the Bureau of Reclamation on June 17, 1902, to provide for the irrigation, storage, diversion, and development of water that ultimately made settlement of the West possible. Today, Reclamation has more than 180 projects located throughout the 17 Western States. Its facilities provide agricultural, municipal, and industrial water to about 33 percent of the West's population; hydroelectricity for more than 4 million households; and recreational opportunities at over 300 sites...”

John W. Keys, III
 Commissioner



WATER NEWS DIGEST

by Marian Flanagan

DROUGHT

Owens signs water bills to help battle drought

Gov. Bill Owens signed two water bills to help Coloradans battle a worsening drought. Under HB1414 by Rep. Diane Hoppe, R-Sterling, and Sen. Lewis Entz, R-Hooper, the state engineer will be able to approve substitute water supply plans much faster than in the past. The other legislation, HB1152 by Hoppe and Sen. Jim Isgar, D-Hesperus, is the annual Colorado Water Conservation Board's projects bill. It authorizes millions of dollars in new low-interest loans for water projects, more than \$30 million in new loans and nearly \$5 million for satellite monitoring of rivers and streams, water supply studies, watershed and flood control plans. By signing the bill, Owens authorized the CWCB to issue a \$15 million loan to Parker for construction of the Rueter Hess Dam and Reservoir and reservoir rehabilitation loans of \$490,000 for Lake Henry and \$420,000 for the city of Fountain's Keeton Reservoir.

The Pueblo Chieftain Denver Bureau / May 24, 2002

Drought tops constituents' concerns

Before the drought, it was believed that Colorado's economy was poised for recovery from what had turned out to be a very dismal year. The impact on state tax revenues last year was huge. Current revenue projections for next year are continuing to decline. The budget bill that was passed at the end of the legislative session will need to be adjusted. Part of the reason for the continuing decline in the budget is the impact that the drought is having on two major industries in this state - agriculture and tourism. Dryland farmers will have nearly a total crop loss. Irrigators that have stored water are receiving a reduced allocation of water and irrigators that rely on stream flows will receive little or no water. Cattlemen all over the state are in a desperate situation. Some have sold out and many more may have to, driving down an already depressed market. The USDA (U. S. Department of Agriculture) opened up grazing on Conservation Reserve Program lands in 12 of Colorado's hardest hit counties; however, the CRP lands are also suffering from drought. Most CRP land is not fenced and does not have water available for livestock to drink. Questions about this program should be directed to the USDA Farm Service Agency in your county. The impacts to tourism from the drought are harder to predict.

by Sen Jim Isgar, *Telluride Daily Planet / May 28, 2002*

Water woes continue to worsen - Irrigation ditches getting turned off

At the April 29th Upper Gunnison River Water Conservancy District meeting, Colorado Division of Water Resources Engineer Wayne Schieldt announced that area water commissioners had already started shutting off ditches with water rights dating back to 1941, in an effort to make up the water needed to fill the 1904 right of the Gunnison Tunnel, and that they would have to continue cutting into more senior rights. The UGRWCD spent more than three hours discussing its options. Part of the discussion was about curtailment of ground water rights. Many board members believed that junior well rights should be curtailed, as well as irrigation water rights. But because there are not rules and regulations in place for administering a call to ground water rights, Schieldt's only choice is to reduce irrigation water use. The district currently has a pool of approximately 23,000 acre-feet of UGRWCD water that can be released from Taylor Reservoir for this purpose. The board agreed to release no more than 4,500 acre-feet of it before its next meeting because once this water hits Blue Mesa it is considered natural flow, and other water users use it downstream. District staff is looking into an exchange agreement with downstream users that will give the UGRWCD credit and some type of future benefit from the water. Even if all 23,000 acre-feet of second fill water were used, it still wouldn't cover the call. District Manager Kathleen Curry informed the board that without the call, it would take around 30,000 acre-feet to get the basin through until July. To make up the difference, the district may be able to purchase water from the Bureau of Reclamation under the Drought Relief Act, which allows the emergency purchase of water at \$69 per acre-foot. The district hopes that the measure it has taken will help all irrigators in the valley, even those not downstream of Taylor Reservoir, by minimizing the call and allowing gates to be reopened.

Gunnison Country Times / May 2, 2002

New drought rules force water saving on city facilities

Colorado Springs Utilities has activated phase one of its new drought-response plan, forcing the city to cut back its water use and asking residents and businesses to do the same. Measures limiting private customers' ability to wash cars or water lawns would not become mandatory until phase two. The City Council will enact that phase only if water usage is not reduced by 10 percent in the next month or so. Utility spokesman Don Miles acknowledged the increase in water use could have resulted from the record number of almost 5,000

new homes built in the Springs in the past year, but conservation must take place regardless. While phase one of the drought plan does not force anything on the public, the city says phase two may not be far away.

The Colorado Springs Gazette / May 1, 2002

Castle Rock sees record number of water violations

Water monitors patrol the town looking for violations and educating residents about water restrictions. More than 180 violations were issued the first weekend, although the number of water violations has since decreased, according to Ron Redd, town utilities director. Redd said, "The increase is likely because of newcomers who aren't used to water restrictions...Castle Rock's mandatory water restrictions have less to do with the drought than with water demand management. Water restrictions don't save water but spread the use out, so that everyone in town isn't watering at the same time." Our peak demand day will be sometime in July," Redd said. "That day we estimate between 12.5 [million] to 13 million gallons of water will be used." Castle Rock's water system can handle between 13.5 million to 14 million gallons a day. Residents also are being encouraged to look at water-wise plants in their yards, because xeriscaping can save between 30 percent and 70 percent on water use. Castle Rock is in the early stages of putting in a demonstration xeriscape garden at Community Park in Metzler Ranch. Even with xeriscaping and water restrictions, the water issues still loom on Castle Rock's horizon because it relies on ground water instead of surface water. "At some point, reuse water is going to become a high priority," Redd said. Sometime this summer, the town hopes to have a consultant on board that will help it look at ways to incorporate reuse water into its water goals.

Douglas County News Press / May 15, 2002

Lafayette to ban new residential water taps

Lafayette will ban all new residential water taps this summer, other than projects already in the works. Beginning June 1st, no more residential water taps will be authorized. In November, voters in Lafayette affirmed a 1996 amendment to the town charter limiting growth to about 200 homes a year. Now, with the city's water supply so limited that people are allowed to water their lawns only once a week, growth is being regulated, too. Lafayette is the first metro-area community to respond to the drought by regulating home water use and shutting down growth. The Louisville City Council is scheduled to vote June 4th on a water-tap ban similar to Lafayette's. The Lafayette measure is focused on residential water taps because homes typically use more water than business according to city spokeswoman Alexandra Lynch. Bigger municipalities such as Aurora probably won't follow Lafayette's lead on this because they operate on bigger water margins, according to Peter Binney, Aurora's director of utilities.

The Denver Post / May 30, 2002

State in water trouble, says division engineer

Colorado is in trouble water-wise, Division 3 Water Engineer Steve Vandiver told the Rio Grande Water Conservation District board of directors, in Alamosa. Vandiver said he has never seen anything like this in his 30 years here. Some of the major canals such as the Prairie and Farmer's Union canals may not run at all this year. Vandiver said he thinks the underground storage in the valley may be depleted this season and that is something that is difficult to replace. The downstream states of New Mexico and Texas, with their increased demand on water, are feeling the lack of water, as well. Elephant Butte Reservoir in south central New Mexico holds Rio Grande Compact water. In 1977, the reservoir got so dry it only had 50,000 acre-feet of water, killing the fish. Right now it has less than 800,000 acre-feet with 3,000 acre-feet per day going down the river to Texas, and it isn't even the peak season.

The Pueblo Chieftain / April 19, 2002

Drought may spawn floods

Colorado's deepening drought may be setting the state up for extreme thunderstorms and floods this summer, if weather patterns repeat themselves. Rains are predicted over new suburbs along the Front Range where they would drain away without easing the drought. Forecasts don't call for heavy mountain rains that would replenish the major reservoirs. "The Denver metro area hasn't experienced any major flooding since '73, so we're coming up on 30 years," said Larry Lang, of the Colorado Water Conservation Board, who chairs the Colorado Flood Task Force. "It's true the most-dangerous floods occur in drought years, and the Front Range is completely different from 30 years ago," he said. "We could have urban flood problems in areas that were not populated in the '65 or '73 floods."

Rocky Mountain News / May 16, 2002

Drought is expected to cost area millions

Pueblo County can expect to feel a multimillion dollar effect from the drought that stretches across much of the Mountain States. The county's crops, from alfalfa to peppers, will probably produce only half of their usual \$412 million in farm revenues. At the same time, ranchers are beginning to cull their herds and can expect between only 25 percent and 50 percent of their average \$28 million income.

"We have a \$38 million ag economy," said Pueblo County extension officer Frank Sobolik, who made the crop and livestock estimates. But it's going to be only a \$12.5 million to \$18.5 million economy this year, he predicted. That in turn will impact the overall Pueblo economy by \$36.5 million to \$55.5 million as sales slow in such things as fertilizer, feed and equipment sales. By the time the effect extends state-wide, the impact from Pueblo County alone will grow to \$87.5 million to \$129.5 million, according to a formula developed by Colorado State University Cooperative Extension Service. Alfalfa growers expect to get a single cutting this year on fields where they normally get four cuttings of the hay. Ranchers have to make hard decisions right now, whether to buy hay at up to \$150 a ton if they can find any, or to cut back on their herds.

The Pueblo Chieftain / May 9, 2002

Federal water managers stop filling reservoir

An unexpected call for additional water in the Colorado River forced federal water managers to stop filling Ruedi Reservoir near Basalt during the last week of April, so as to send more water downstream to fill senior (older) water rights. The water call and reduced meltwater from low snowpack will likely result in a less-than-full reservoir this summer, impacting boating and recreational uses. The reservoir currently stands at 64 percent of its total capacity, compared to 94 percent last year. The U.S. Forest Service manages the recreational and surface uses of the water. Underwater hazards and safe access from boat ramps are the two main safety concerns caused by unusually low water levels.

Aspen Daily News / April 25, 2002

Dolores River too dry to cry - River of Sorrows barely flowing as drought takes toll

In this fourth year of drought in southwestern Colorado, the Dolores River is living up to its name, "River of Sorrows." McPhee Reservoir has shrunk to a fraction of its usual size, causing severe problems downstream for farmers, anglers and rafters. The stocked trout below the river's McPhee Dam are doomed. The water will be too shallow and warm in the fishery's 60-foot-wide channel for most cutthroats, browns and rainbows to survive the summer, Division of Wildlife biologist Mike Japhet said. The Dolores River takes its water from melting snow on Lizard Head Pass near Rico and the north side of the La Plata Mountains, or the Silver Mountains, which are brown and bare. Most irrigators in this water district grow alfalfa. They've seen their usual allotment of water, roughly 24 inches per irrigated acre, shrink to 8 inches. The town of Cortez, which takes its drinking water from the Dolores, began restricting lawn watering this week. The other towns that drink from this river, Dove Creek and Towaoc, are asking people to voluntarily conserve. Under the dam-operating agreement, domestic water supply is given priority over other users, and so the severe shortage will be borne largely by farmers and fish. DOW can restock the trout, although it will be several years before anglers see any 14-16-inch trout in these catch-and-release waters again. Beyond the 12-mile trout fishery there is a hundred more miles of the Dolores before it empties into the Colorado River near Moab, Utah, the river and canyon home to otter, bighorn sheep and native fish like bluehead and flannelmouth suckers, speckled dace, mottled sculpin and the rare roundtail chub. Wildlife managers opted to go with steady flows this year instead of minimal spring flows and relatively big summer dam releases, which perhaps could keep the water cold enough for trout during the hot months.

Denver Post Four Corners Bureau / May 16, 2002

Drought could dry up Mother Cabrini's 'miracle' spring

Drought threatens to dry up what's believed to be a miraculous 90-year-old water supply at the popular Mother Cabrini Shrine in Golden. Unless substantial rain comes soon, the water is expected to run out by August, for the first time in its history. The first water "miracle" came in 1912, when Mother Cabrini wanted to buy the outcrop as a summer camp for homeless youngsters, but there appeared to be no water supply. One day she was sitting with some sisters and orphaned children in the area of the present grotto, playing with her cane. "Her cane pushed some rocks, and the water started to come up and it's the spring we still have," a Sister explained. Since then, water has been easily collected in an 8,000-gallon glass-lined tank. In March, the shrine's maintenance head alerted sisters the water was not being replenished, but they have not given up on the formidable Mother Cabrini and are praying for another miracle.

The Rocky Mountain News / April 30, 2002

Drought 2002: drought not all bad news for fish

Although drought may spell doom and gloom for agriculture, the outlook for local fisheries is not so bleak. Mike Japhet, an aquatic biologist for the Colorado Division of Wildlife suspects that the fish aren't going to die all at once. But there is "significant concern" that the drought may cause localized trout die-offs, especially in lower-elevation streams, as water temperatures raise. Fish typically seek deeper pools to avoid becoming isolated when water levels drop. As fish seek out the deeper pools, larger fish could become territorial, pushing out smaller fish. But it's "nature's way," Japhet said, and the larger fish will be the ones more apt to spawn next year, which will help with recovery. Native fish like the endangered Colorado River Cutthroat, for the most part, should be fine. The stocking of local rivers and reservoirs with fish from the DOW Durango fish hatchery should help the situation. In fact, the DOW will probably have more fish to

stock this year because of advances in protecting against whirling disease. In addition, the water supply for the fish hatchery is lower than it usually is this time of year, so the DOW is stocking fish faster than usual.

Special to the Durango Herald / May 10, 2002

Lack of water, food prompts herd sell-offs

Las Animas County farmers and ranchers are experiencing their worst nightmares since at least the early 1950s. Normally green grasslands used to feed cattle are parched and brown, with little or no relief in sight. Desperate area wildlife has been consuming what's left of the sparse green pasture grass usually reserved for cattle. With little or no feed, county cattle ranchers have had no choice but to sell off their herds. Las Animas County Commissioner Ken Torres and fellow commissioners Robert Valdez and Mark Ritz passed a resolution declaring the county a drought disaster area to help qualify farmers and ranchers for state and federal aid.

Trinidad City Council also passed a citywide water conservation and restriction plan limiting water usage during the day. "I don't think it was even this bad in the early '30s," said Stan Barron, 80, a prominent lifetime western Las Animas County rancher. County farmer Delbert Hedges reported that it's the first time in 26 years he hasn't gotten irrigation water from Trinidad Lake dam, leaving his cattle grazing ponds bone dry. In addition, the vast drought-impacted eastern Colorado plains that stretch several hundred miles in every direction could affect millions of people next fall with food shortages. Recent gale-force winds are also advancing dirt into grassy areas and removing valuable topsoil, making matters worse. The extreme drought is causing mental stress and anguish among farmers and ranchers trying to hold things together.

Local USDA officials are projecting a 50 percent decline in farm revenues for El Paso County this year. The county has a lot of prairie but few rivers, so the dominant agricultural activity is grazing livestock. Farmers along Fountain Creek or with wells in the Ellicott Valley can irrigate hay and alfalfa crops, but most crop-farmers and ranchers depend entirely on rainfall. Officials still don't know how dry this year will be or how long the dry spell will last. John Valentine, a conservationist for the region's four soil-conservation districts, said the recent fires east of Fountain burned 11,500 acres, claiming lots of pastureland ranchers were eyeing for reserves.

The Pueblo Chieftain / May 28, 2002, The Colorado Springs Gazette / May 15, 2002

ENDANGERED SPECIES

Silver minnows' ruling dries up New Mexico

The State of New Mexico is appealing a recent federal district court ruling that could jeopardize water for the city of Albuquerque in order to provide water for the Rio Grande silvery minnow, an endangered fish that inhabits the Middle Rio Grande. The order agrees with the U.S. Fish and Wildlife Service's opinion of last summer that efforts to preserve the water levels in the Middle Rio Grande kept minnow loss at only three fish, but up to 250 minnow losses would have been acceptable. The judge, however, decided in the lawsuit, brought by the Forest Guardians, an environmental group, that San Juan-Chama water, as well as Middle Rio Grande Conservancy District water, should be considered for use if needed to preserve the endangered fish. It authorizes the U.S. Bureau of Reclamation to use the water if necessary. New Mexico state engineer Tom Turney said that if the water is taken from the San Juan-Chama Project or the Middle Rio Grande Water Conservancy District to save the fish it could have a "devastating effect" on communities, particularly Albuquerque which is "mining ground water" to a dangerous point.

The Pueblo Chieftain / May 11, 2002

RECREATION

Serene to extreme: Whitewater season nears

While there is no doubt the rivers in the west will be running low this summer because of below-average snowfall and continuing drought conditions, there definitely will be a whitewater rafting season. Some of the more fragile rivers in Colorado, such as the Dolores River, the Animas, San Miguel or the North Platte, probably will have short or no seasons this year. For other places, such as Westwater Canyon of the Colorado River, low water makes a more exciting experience because chutes and funnels are created that make the rapids extremely challenging.

Douglas County News Press / May 8, 2002

Low H2O can't deflate rafting biz, but Lower water levels may offer a less-wild rafting experience

While some rivers will have shorter rafting seasons because of negligible runoff, the flow of water in the Colorado River through Glenwood Springs is kept constant by the Shoshone power plant, which sits in the middle of Glenwood Canyon. It has the second oldest water right on the Colorado River, which keeps water flows constant. Boating on the Roaring Fork River, however, may be curtailed this year due to low water levels. A 2001 report on commercial rafting compiled by the Colorado River Outfitters Association, reported rafting on the Colorado River through Glenwood Springs as the second most popular rafting destination in the state. According to CROA, Colorado draws the most customers for commercial whitewater rafting of any state in the country. The most popular rafting destination in is the Arkansas River, which this summer may not be the wild whitewater extravaganza of recent years, but many outfitters expect a steady row of customers despite low-water drought conditions. See Arkansas River Reports: <http://www.coloradoparks.org/arkansas/outfitters.asp>, and Colorado River Outfitters Association: <http://www.croa.org>.

Glenwood Springs Post Independent / April 24, 2002; The Pueblo Chieftain / May 26, 2002

Rafters group seeks clear running on Colorado rivers

The state's river-rafting outfitters are paddling toward putting a "right to float" question before state voters. The Colorado Department of Natural Resources has been trying to bring landowners and boaters together over the issue of river access and rights. Three years ago DNR formed the River Surface Recreation Forum to try to avoid litigation, legislation or ballot questions on the issue. "The goal was to come up with administrative solutions," said Ron Cattany, deputy director of the Colorado Department of Natural Resources. The Surface Recreation group has worked to get federal funding for a new river ranger position on the Lake Fork of the Gunnison, is installing signs to let boaters know if land is public or private, has created and distributed a brochure on river etiquette, and is willing to serve as a negotiator on any conflicts that spring up between boaters and landowners. But the broader issue is not likely to go away for either commercial or private boaters, especially with the growing number of kayakers seeking to get to more sections of rivers and with the increase in the number of private rafters heading out on their own for river trips.

The Aspen Times / May 3, 2002

Summer forecast: muddy with sluggish tourism

Lake levels are expected to crest at 10 to 15 feet below normal, leaving the Frisco Bay Marina far from normal operations, and the entire lake visually deficient from the pristine mountain reservoir of years past. Dillon Town Manager Julie Boyd said Dillon officials have some grave concerns about the coming summer. Dillon is a lakeside town that thrives on summer marina business and outdoor concerts on the shores of Lake Dillon. On the bright side, Frisco Mayor Bob Moscatelli said, the low levels allow Denver Water to do some dam repairs originally slated for 2003."

Summit Daily News / May 14, 2002

WATER DEVELOPMENT**New A-LP task force to study water use**

The Animas-La Plata Water Conservancy District has announced plans to form a task force to outline critical issues for building a domestic water system in western La Plata County. The water could be drawn from the Ridges Basin Reservoir, which is to be built as part of the Animas-La Plata Water Project. The district hopes to determine if such a system is practical and whether the district could move ahead with it. Among the chief questions will be money. The district has no assured funding source for such a system. The task force would report its findings in three or four months. A feasibility study might follow depending on the issues identified by the task force. Mike Griswold has invited the Southern Ute Indian Tribe, the Ute Mountain Ute Indian Tribe, San Juan Rural Water Users of San Juan County, N.M., a group of Lake Durango water users and the city of Durango to each name a representative on the task force. Those who decide to participate would join no more than three members of the A-LP board as members of the group.

The Durango Herald / May 16, 2002, May 23, 2002

GASP gets Ovid reservoir decree

Ground Water Appropriators of the South Platte (GASP) has received a decree for a reservoir in the Ovid area. The reservoir will allow for storage during wet times and releases to satisfy interstate compact demands from Nebraska and to ease burdens on Colorado's lower reaches of the South Platte River. The project, which will now go into the design phase, could be under construction by winter and done by next irrigation season. With a very junior decree, there would be no water available for the reservoir during present dry conditions but there are some opportunities outside the irrigation season when water could be stored. "It is unfortunate that it took this long," GASP manager Jack Odor said of the decree.

Fort Morgan Times / May 8, 2002

WATER LEGISLATION/WATER RIGHTS**Alternate water source bill passes Legislature**

On May 1, Colorado legislators passed a bill to define when the state engineer may approve substitute water supplies for users awaiting court approval of permanent changes in water rights. Sen. Lewis Entz carried House Bill 1414 in the Senate. He said it was needed to grant the state engineer statutory authority within limits established in a substitute water supply ruling by the Colorado Supreme Court last December. The user still must get approval for the substitute water supply plan while a court application is pending. Under HB1414, which was carried through the House by Rep. Diane Hoppe the state engineer may renew all existing substitute water supply plans for one more year, until the end of 2002. The state engineer may approve a plan after notice is given and comments are received from opponents. In cases involving public health and safety emergencies, he may approve substitute water supply plans without any notice and comment for up to 90 days. If the use lasts longer than 90 days, the plan would be subject to notice and comment.

Pueblo Chieftain / May 2, 2002

Owens signs bill to protect streams

On May 21, Gov. Bill Owens signed into law a bill that gives the Colorado Water Conservation Board increased authority to acquire more water for streams and lakes to help preserve their natural environment. Senate Bill 156 allows the board to accept donated water rights to maintain natural surface-water levels, helping to protect the environment. The bill, however, prevents the board from accepting any donated water rights that would require the removal of existing infrastructure without the permission of its owner. Sen. Ken Gordon, D-Denver, and Rep. Matt Smith, R-Grand Junction sponsored the measure.

Durango Herald Capitol Correspondent / May 22, 2002

Boaters' river rights may stir up state House election

One of the hot issues in state congressional elections this November will be the so-called "right to float" on Colorado's rivers. Incumbent Gregg Rippey of Glenwood Springs said even though the Colorado Supreme Court ruled there is no inherent right to float, it is not an issue about right or wrong, and a workable compromise will have to be forged. Private property rights advocates and landowners say they have the right to prohibit boaters from drifting, paddling, rowing, sailing or motoring over private property. Boaters and commercial rafting companies say Colorado's rivers have always been public waterways and that floating past private property without touching bottom is a public right. They cite a state attorney general's opinion supporting their position. The state should study those stretches of water that have been historically public access and try to acquire floating easements over private property, Rippey said.

Aspen Daily News / April 27, 2002

WATER QUALITY**Fires could sully water supply - eroded hillsides may fill reservoirs with dirt, ash**

If a gully washer hits fire-blackened creek banks this summer, it could erode hillsides and fill Denver Water's reservoirs with debris and soot, slowing treatment and raising maintenance costs. Debris can cover the surface of reservoirs and block sunlight and kill aquatic life and can fall into the intakes of the hydropower turbines, damaging equipment. Immediate cleanup would be ordered. Denver Water operations manager Steve Work says the only way fire and erosion could lead to water shortages for customers is if it affected more than one treatment plant at a time during the peak of the lawn-watering season — a remote possibility."

Rocky Mountain News / May 24, 2002

Study: Shift in lake biology

Pollution from cars, farms and power plants is changing mountain lake ecosystems and might eventually cause water quality problems in communities east of the Continental Divide, according to a new University of Colorado study. A lake northwest of Nederland supports a very different group of organisms than it did several decades ago, according to CU researcher Diane McKnight. McKnight and her colleagues have been looking at the ecological history of several mountain lakes in Boulder's watershed by studying the bottom sediment layers. Excess nitrogen can end up in lakes, where it feeds algae. The nutrient favors bottom-dwelling species, so not only does the lake support more algae; it supports a different sort of algal community. Algae can impact water supplies in several ways. The organisms produce dissolved organic carbon which, at high levels, can combine with chlorine in water treatment plants to make harmful chemicals. Jill Baron, a nitrogen researcher with the U.S. Geological Survey in Fort Collins, has found higher nitrogen levels in lakes on the eastern side of the Continental Divide than in lakes on the Western Slope. Nitrogen pollution can also turn lakes acidic. Baron says the environmental changes are a manifestation of growth and energy consumption that's reversible, however. Controlling car emissions, cleaning up power plants and using alternative energy would help.

Boulder Daily Camera / May 30, 2002



MEETINGS

COLORADO WATER WORKSHOP Western State College, Gunnison, Colorado July 31-August 2, 2002

“**Reclamation at the Century Mark: The Legacy and the Challenge**” is the theme for the 27th Colorado Water Workshop at Western State College in Gunnison; it should be a lively retrospective on the massive water development that prevailed in the American West through the first two-thirds of the 20th century, then ran crosswise with the emergent environmental consciousness in the last third of the century. The Workshop will focus primarily on the Bureau of Reclamation and its works, but will also look at other large-scale public reclamation work at the municipal and state levels. Present to consider “the legacy and the challenge” will be major players in reclamation today, including Reclamation Commissioner **John W. Keys III**, and also reclamation’s more thoughtful critics, led by journalist and publisher **Ed Marston** and hydrologist **Dave Wegner**.

JULY 31, 2002

The Bureau’s Senior Historian, **Brit Storey**, will open the conference on July 31 with “an insider historian’s perspective” on the “Evolution of the Bureau of Reclamation.” That will be followed by presentations on two projects that represent the spectrum of Bureau work: Dolores Project Manager **John Porter** will look at the development of that primarily agrarian project in Southwestern Colorado, and Lower Colorado Region Deputy Director **Bill Rinne** will look at how the Boulder Canyon Project essentially launched the urban-industrial “New West.”

Ed Marston, publisher of the West’s leading environmental journal, *The High Country News*, will close the day’s presentations with a discussion of reclamation and environmentalism. Wednesday evening there will be a presentation of films illustrating “the Romance of Reclamation.”

AUGUST 1, 2002

Thursday morning’s program considers the “Legacy” of the first century of large-scale reclamation primarily from a Colorado perspective. **Randy Peterson**, the Bureau’s Upper Colorado Region Manager for Adaptive Management and Environmental Resources will give a major presentation on the Colorado River Storage Project, and there will be concurrent sessions looking at how some specific projects have changed from the original idea to the current reality. The morning will conclude with a session on the growing problem of maintenance and upkeep of the projects, some of which are approaching their “half-life.”

Thursday afternoon, **Dave Wegner** will lead off the “Challenge” sessions with an analysis of the challenge of “reoperating” major reclamation projects to reclaim natural systems from the consequences of the projects. Wegner orchestrated the first big analysis of project impacts, the Environmental Impact Statement for Glen Canyon Dam on the natural systems in the Grand Canyon. His presentation will be followed by shorter presentations on reoperation challenges and responses from Bureau people.

Later, representatives from the major water players in Colorado will consider what reclamation projects may be needed in the future. That evening, Bureau Commissioner **John W. Keys III** will present his perspective and vision for public reclamation in the 21st century.

AUGUST 2, 2002

Friday morning, the Workshop will look at other water-related issues facing the people of the state. A general session will explore the tension between an “Old West diversion culture” and a “New West in-stream culture.” That will be followed by some concurrent sessions. One session, in acknowledgment of the new Water Education Foundation established by the legislature, will examine the relationship between education and democracy. Are water issues problems for professionals or problems in democracy? Another session will explore the value of and challenges inherent in local watershed planning. A third will lay out the basic issues, problems and opportunities associated with the growing coal-bed methane boom. The morning will conclude with a report on the drought situation and its implications for future water development in the state; Colorado Commissioner of Agriculture **Don Ament** and **Doug Kemper** from the City of Aurora will participate, along with others.

The Honorable **Greg Hobbs**, Colorado Supreme Court Justice, will close the conference after lunch Friday with a talk on “Scarcity and the Opportunity for Community” – a hopeful look at how the state’s legal structure of water rights can carry Colorado through the short-term and long-term problems of increasing demands on a limited resource.

For a more detailed program for the Water Workshop and registration information see the web site www.western.edu/water, call conference coordinator George Sibley at 970-943-2055, or email an address to water@western.edu.

COLORADO WATER CONGRESS FALL WORKSHOP SCHEDULE

The Colorado Water Congress prepares a series of six to ten workshops each fall for the purpose of increasing and updating water knowledge both for the actively involved water community and general public knowledge.

These workshops are all held in the Colorado Water Congress Conference Room, 1580 Logan Street, Suite 400, Denver, Colorado. A 2002 Water Law Seminar will be held on September 9-10, 2002, and our fall workshops will be announced as they are scheduled.

Colorado Water Congress - Summer Convention
Manor Lodge, Vail, Colorado — August 22 - 23, 2002

2002 Water Law Seminar will be held on September 9-10, 2002,
in the Colorado Water Congress Conference Room, 1580 Logan Street, Suite 400, Denver, Colorado

The 2003 45th Annual Convention will be January 23-24, 2003 in Northglenn, CO
The 2003 Summer Convention will be August 21-22, 2003 in Steamboat Springs, CO
The 2004 46th Annual Convention will be January 29-30, 2004 in Northglenn, CO

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Web site: www.cowatercongress.org



COLORADO WATER CONGRESS SUMMER CONVENTION PROGRAM August 22, 2002

Topics and speakers include the following:

The Past, Present & Future in the Legislature Process -- Senator Lewis H. Entz, Hooper; CWC President, Presiding. A panel of 7 members of the Legislature: Senators Jack Taylor, Steamboat Springs; Jim Isgar, Hesperus; Jim Dyer, Littleton; and Representatives Diane Hoppe, Sterling; Carl Miller, Leadville; Matt Smith, Grand Junction; and Al White, Winter Park.

Future Directions of Three Key Departments:

Greg Walcher, Executive Director, Department of Natural Resources
Jane Norton, Executive Director, Department of Public Health and Environment
Don Ament, Commissioner, Department of Agriculture

Luncheon Speaker: Hal Simpson, Colorado State Engineer, **Drought, Drought, Drought, and More Drought**

Instream Flows, Past, Present & Future -- Panelists will be former Senate President Fred E. Anderson; Ray Christensen, Executive Vice President, Colorado Farm Bureau; Rod Kuharich, Director, Colorado Water Conservation Board; John R. Hill, Jr., Bratton & McCloy, LLC; and Mark Pifher, Trout, Witwer & Freeman P.C.

August 23, 2002

Present and Future Initiatives Issues (taxcut, initiative process changes, and public trust doctrine). Panelists will be Stephen H. Leonhardt, Fairfield and Woods, P.C. and Mark G. Grueskin, Isaacson, Rosenbaum, Woods & Levy, P.C.

Luncheon Speaker: W.R. Stealey, Southeastern Colorado Water Conservancy District Board member, **We Have Met the Enemy and It Is Us.**

FOR ADDITIONAL INFORMATION ABOUT THE PROGRAMS, CONTACT: Dick MacRavey, Executive Director, at Phone 303/837-0812, FAX 303/837-1607, E-mail macravey@cowatercongress.org Web site: www.cowatercongress.org



COLORADO WATER CONGRESS WATER LAW SEMINAR

September 9-10, 2002

September 9, 2002

- 7:45 a.m. REGISTRATION -- Presiding -- Senator Lewis H. Entz, CWC President
- 8:00 a.m. **The History of Colorado Water Law**--Hon. Gregory J. Hobbs, Jr., Justice, Supreme Court of Colorado
- 11:00 a.m. **Water Distribution Organizations** (Mutual Ditch Companies, Carrier Ditch Companies, Special Districts and Municipal Systems)--Mary Mead Hammond, Carlson, Hammond & Paddock, LLC, Denver
- 11:45 a.m. **The Water Court System and Procedure**--Mary Mead Hammond, Carlson, Hammond & Paddock, LLC, Denver
- 12:15 p.m. LUNCH--Speaker will be Representative Diane Hoppe, Chair, House Ag Committee
- 1:30 p.m. **The Colorado Division of Water Resources, Ground Water Commission, and the Office of the State Engineer: Responsibilities and Roles in Water Matters**--Jack Byers, Assistant State Engineer, State of Colorado
- 2:15 p.m. **The Impact on Colorado of Interstate Compacts**--Ken Knox, Assistant State Engineer, State of Colorado
- 3:00 p.m. **The Relationship Between the Federal Government and Colorado Water Law**--Sara Duncan, Manager of Intergovernmental Affairs, Denver Water, Denver
- 3:45 p.m. **Engineering Aspects of Water Rights**--Greg TenEyck, Principal, Leonard Rice consulting Water Engineers, Inc., Denver
- 4:30 p.m. **Water Conservancy Districts: Responsibilities and Roles in Water Matters**--Eric Wilkinson, Manager, Northern Colorado Water Conservancy District, Loveland

September 10, 2002--Presiding--Senator Lewis H. Entz, CWC President

- 7:45 a.m. **Overview of Colorado Ground Water Law**--Michael Shimmin, Vranesh and Raisch, LLP, Boulder
- 8:45 a.m. **The Colorado Water Resources & Power Development Authority: Its Responsibilities and Role in Water Matters**--Dan Law, Executive Director, Colorado Water Resources & Power Development Authority
- 9:30 a.m. **The Colorado Water Conservation Board: Its Responsibilities and Role in Water Matters**--Rod Kuharich, Director, Colorado Water Conservation Board
- 10:15 a.m. **Historical Overview of the Denver Water System**--Hamlet J. "Chips" Barry III, Manager, Denver Water
- 11:15 a.m. **The Colorado River, The Colorado River Water Conservation District, and Western Colorado Water Projects**--Eric Kuhn, General Manager; Peter Fleming, General Counsel or Jill McConaughy, Associate General Counsel, Colorado River Water Conservation District, Glenwood Springs
- 12:00 Noon LUNCH--Speaker will be Senator Jim Isgar, Chair, Senate Ag Committee
- 1:15 p.m. **Federal & State Water Quality Laws**--Tad Foster, Attorney at Law, Colorado Springs; and Tom Pitts, Water Consult, Loveland
- 2:45 p.m. **The Colorado Water Quality Control Division: Its Responsibilities and Role in Water Matters**--Carl Norbeck, Manager of the Watershed Section, Colorado Water Quality Control Division
- 3:15 p.m. **Colorado Water Resources Research Institute: Responsibilities and Roles in Water Matters**--Robert C. Ward, Director, Colorado Water Resources Research Institute, Fort Collins
- 3:45 p.m. **Water Education**--Tom Cech, Manager, Central Colorado Water Conservancy District
- 4:15 p.m. **Ethics and Water Law**--Steve Leonhardt, Fairfield & Woods, P.C.
- 5:00 P.M. ADJOURNMENT

THIRD ANNUAL COLORADO WATERSHED ASSEMBLY CONFERENCE**September 12-13, 2002****Beaver Run Resort in Breckenridge, Colorado**

The third Annual Colorado Watershed Assembly Conference will be held on Thursday and Friday, September 12 and 13, 2002, at Beaver Run Resort in Breckenridge (1-800-525-2253). Conference tracks are Building and Sustaining Watershed Groups; Implementing the Watershed Approach; and Technical Aspects and Tools. The \$75.00 registration is a bargain, as it includes 3 meals on Thursday and breakfast on Friday (and the barbecue alone is worth the price of admission!). The Conference is being held in conjunction with the 10th National Non-Point Source Monitoring Workshop, which is September 8th to September 12th. Contact/Update and CWA member scholarship information is available on the Watershed Assembly's website www.coloradowater.org or call (303) 312 6356 or (719) 837 2737.

**POSITION: Regional Extension Specialist (Irrigation Management/Water Resources), Arkansas River Basin, Rocky Ford CO — Vacancy #14-02 — Deadline 7/10/02**

THIS IS A FULL TIME 75% COOPERATIVE EXTENSION / 25% AGRICULTURAL EXPERIMENT STATION, ADMINISTRATIVE PROFESSIONAL POSITION

The Arkansas River originates in Lake County and then flows through Chaffee, Fremont, Pueblo, Otero, Crowley, Bent, and Prowers counties before it leaves the state. An important tributary, the Fountain River, flows through Colorado Springs and El Paso County. The recreational demands on the river are primarily upstream of the Pueblo dam. Production agriculture is primarily located downstream. There are environmental concerns throughout the basin. Irrigation management addresses continual challenges to economic agricultural production. More than 359,000 acres are irrigated in the Arkansas River Valley and the surrounding area, with alfalfa, corn, wheat and grain sorghum having the most significant acreage. In addition, a significant vegetable crop industry includes onions, cantaloupe, watermelons, tomatoes, and peppers. Salinity is a major problem in the Arkansas River Valley causing several million dollars of damage each year. Irrigation concerns in the deep well irrigated area outside the Arkansas River Valley are related to maximum economic production, irrigation efficiency, and optimum use of a limited water supply. The individual in this position will be stationed at the Cooperative Extension Office in Rocky Ford, Colorado. Rocky Ford is 60 miles east of Pueblo, a city of over 100,000 residents.

DEADLINE: Position is available. Applications (organizational application form required) and transcripts of college course work must be received or postmarked no later than July 10, 2002. Transcript(s) must show proof of degree(s) conferred.

PURPOSE OF POSITION: To provide leadership, direction and organizational assistance in the development and implementation of educational programs and applied research related to irrigation and water use in the Arkansas River Basin of southeastern Colorado.

SALARY: Salary range for this position is \$35,000 - \$62,000 based on relevant education and experience.

Application forms and additional information may be obtained by contacting:

Judith A. Barth
Coordinator, Human Resources
Cooperative Extension
1 Administration Building



Who's Running This Ecosystem?

The 13th Annual South Platte Forum

Oct. 23-24, 2002

Raintree Plaza

Longmont, Colorado

CALL FOR POSTERS

You are invited to submit a one-page abstract to the organizing committee by Aug. 1, 2002. Selected posters will be displayed throughout the forum with a staffed session during the networking hour, 3-7 p.m., Oct. 23. Authors whose posters are selected for presentation will be notified by Sept. 1, 2002. All accepted abstracts will be published in the conference proceedings. To submit poster abstracts or request additional information:

Jennifer Brown

South Platte Forum

513 N. Harding Ave.

Johnstown, CO 80534

Phone: (970) 213-1618

E-mail: conferenceplanner@msn.com

<http://southplatteforum.colostate.edu>

REGISTRATION

The forum will be held at the Raintree Plaza Conference Center in Longmont, Colo. For directions please visit their website at www.raintreeplaza.com or call 303-776-2000.

Early Registration - must be in by Oct. 1	\$85
Registration after Oct. 1	\$100
Additional invoicing fee if necessary	\$20
Registration fees include proceedings, meals, refreshments and the networking hour.	

Overnight Accommodations

Raintree Plaza	303-776-2000	\$109
Courtyard by Marriott	303-682-1166	\$93

Govt. rates will be honored at both locations. Reservations must be made by Oct. 1.

Who's Running
This Ecosystem?



The 13th
Annual
South Platte
Forum

Oct. 23-24, 2002
Raintree Plaza
Longmont, Colo.

REGISTER TODAY!!

Name _____

Affiliation _____

Street Address _____

City _____ State _____ Zip Code _____ Phone _____

Fax _____ E-mail Address _____ Amount Enclosed _____

Vegetarian Meal Preferred (check here)

Please check here if you plan to attend the poster session and networking hour from 4:30-6:00 p.m., Oct. 23. The cost is included in your registration fees.

To register, detach form and send with a check or money order to: South Platte Forum, c/o No. Colo. Water Conservancy Dist., PO Box 679, Loveland, CO 80539.

Who's Running This Ecosystem?
13th Annual South Platte Forum
Oct. 23-24, 2002, Raintree Plaza, Longmont, Colorado

Join us as we examine the science, institutions, and policy development associated with a more integrated approach to managing the South Platte's water resources.

Keynote Speakers

Robert E. Roberts, *Regional Administrator, U.S. EPA Region 8*
 Honorable Jonathan Hays, *District Judge, Water Division 1*
 Dan Luecke, *Former Director, Environmental Defense*
 Steve Simms, *State Attorney General's Office*

Redefining Beneficial Use in the South Platte Basin

Jan Schenk, *Former Mayor, Golden*
 Senator Ken Gordon, *Colorado State Legislature*
 Glen Porzak, *Attorney*

Protecting Our Future

Eric Wilkinson, *General Mgr., No. Colo. Water Conservancy Dist.*
 Robert Sakata, *Chair, Water Quality Control Commission*
 Brad Lundahl, *Conservation & Drought Planning, Colo. Water Conservation Board*

Integrating Habitat Protection with Agricultural Production

Allen Green, *State Conservationist, NRCS*
 Tim Davis, *Private Lands Coordinator, Colo. Div. of Wildlife*
 Greg Kernohan, *Wetlands Mgr., Ducks Unlimited*

Understanding Colorado Climate Changes

Nolan Doesken, *Asst. State Climatologist, Colo. State University*
 Roger Pielke, *State Climatologist, Colo. State University*
 Kevin Trenberth, *Climate Analysis Section, NCAR*

Fouling Your Nest

Cynthia Peterson, *Project Mgr., Colo. Water Protection Program*
 Robert Siegrist, *Professor, Colo. School of Mines*
 Troy Bauder, *Extension Specialist, CSU Cooperative Extension*
 Cathy Tate, *South Platte River Basin Study, US Geological Survey*

Sponsored by:

*Colo. Division of Wildlife, Colo. State Univ. Coop. Extension, Colo. Water Resources Research Institute, Denver Water,
 No. Colo. Water Conservancy District, US Bureau of Reclamation, US Environmental Protection Agency,
 US Fish and Wildlife Service, US Geological Survey*

The Geological Society of America 2002 Annual Meeting
October 27-30, 2002 -- Colorado Convention Center, Denver, Colorado

For information about the conference, go to the website: <http://www.geosociety.org/meetings/2002/> where you can submit an abstract on-line. A non-refundable submittal fee of \$15 for students or \$25 for all others is required for each abstract submitted. Because of scheduling limitations, you may present only one paper in oral or poster mode. **Deadline is July 16, 2002.**

Ground-Water Depletion and Overexploitation: A Global Problem



The volume of fresh ground water in storage has decreased significantly during the past century, but the magnitude and global impacts are uncertain. The U.S. National Chapter of the **International Association of Hydrogeologists (IAH)** is sponsoring a special session to focus on the magnitude and effects of ground-water mining, methods to quantify depletion, U.S. and international case studies, status and future trends, global impacts, and management solutions. This special session will be held during the: **2002 Annual Meeting of the Geological Society of America in Denver, Colorado, October 27-30**. The purpose of this session is to document methods and examples that would help define the magnitude of the problem, at both local and global scales, and explore local and regional management approaches to mitigate the problem or assure sustainable development. Papers are solicited on all related topics. **Abstracts deadline: July 16, 2002.** For further information about this session, please contact Leonard Konikow <lkonikow@usgs.gov>. For information about the GSA Meeting, go to their web site at: www.geosociety.org. For information about IAH, go to their web site at: www.iah.org.

RESTORING IMPAIRED WATERS -- TOOLS FOR TOMORROW
Colorado Nonpoint Source Forum
October 29-30, 2002 -- Colorado Springs, Colorado

You are invited to submit a one-page abstract to Jennifer Brown (information below) by Sept. 1, 2002. Selected posters will be displayed throughout the conference.

Keynote Perspectives

Justice Gregory Hobbs, Jr., Colorado State Supreme Court
 Jim Valliant, Retired Extension Specialist
 Tom Pointon, Arkansas Valley Producer

Forum Sessions

Agriculture, Silviculture, Urban, Construction, and Mining Tools
 Tools Available to Restore Impaired Waters
 Communicating with Your Public
 Successful Watershed Strategies
 The Sediment Dilemma -- Is it Just Muddy Water?
 Grant Proposals That Get Noticed

Jennifer Brown
 513 N. Harding Ave.
 Johnstown, CO 80534
 970/213-1618
 conferenceplanner@msn.com

Sponsored by the Colorado Nonpoint Source Council, the Colorado Department of Public Health and Environment, and the Colorado Watershed Assembly.

CALENDAR



July 1-3	AWRA Annual Summer Conference, GROUND WATER/SURFACE WATER INTERACTIONS, Keystone, CO. For inquiries and questions contact: Jerry F. Kenny, Chair, Conference Technical Program Committee, Phone 303/764-1525, FAX 303/860-7139, E-mail jkenny@hdrinc.com; Patricia A. Reid, AWRA Program Coordinator, Phone 540/687-8390, FAX 540/687-8395, E-mail pat@awra.org; Michael J. Kowalski, AWRA Director of Operations, Phone 540/687-8390, FAX 540/687-8395, E-mail mike@awra.org. The AWRA web site can be found at http://www.awra.org .
July 10-13	ENERGY, CLIMATE, ENVIRONMENT AND WATER -- ISSUES AND OPPORTUNITIES FOR IRRIGATION AND DRAINAGE, San Luis Obispo, CA. Contact: Larry Stephens at Phone 303/628-5430, FAX 303/628-5431, E-mail stephens@uscid.org. Internet: http://www.uscid.org/~uscid .
July 23-26	INTEGRATED TRANSBOUNDARY WATER MANAGEMENT, Traverse City, MI. For further details, access the website at http://www.uwin.siu.edu/ucowr/ . To receive future announcements, E-mail ewri@asce.org or ucowr2002@siu.edu, or call UCOWR headquarters at 618/536-7571.
July 28 – Aug. 1	SECOND FEDERAL INTERAGENCY HYDROLOGIC MODELING CONFERENCE, Las Vegas, NV. For details, see the website at http://water.usgs.gov/wicp/acwi/hydrology/mtconfwkshops/pdf/hydrol_conf02.pdf .
July 31- Aug. 2	COLORADO WATER WORKSHOP, Gunnison, CO. Contact: George Sibley Coordinator, Colorado Water Workshop, Western Water Workshop, Gunnison, CO 81231, Phone 970/641-8766, FAX 970/641-6280, E-mail water@western.edu.

CALENDAR

Cont'd



Aug. 22-23	COLORADO WATER CONGRESS SUMMER CONVENTION, Vail, CO. Contact: Dick MacRavey at Phone 303/837-0812, FAX 303/837-1607, E-mail macravey@cowatercongress.org , or see web site http://www.cowatercongress.org .
Aug. 27-29	WESTERN STATES WATER CONSERVATION ROUNDTABLE, Boise, ID. Sponsored by the "Bridging-the-Headgate" partnership. For information contact Allen Powers, USBR, Phone 208/334/1455 or Sue Lowry, Western States Water Council, Phone 307/777-5927.
Sept. 8-11	DAM SAFETY 02, Tampa, FL. See the web site at http://www.damsafety.org or call 859/257-5140.
Sept. 8-12	10TH NATIONAL NONPOINT SOURCE MONITORING WORKSHOP, Monitoring and Modeling from the Peaks to the Prairies, Breckenridge, CO. For details check the web site at http://www.ctic.purdue.edu/NPSWorkshop.html or contact Tammy Taylor at taylor@ctic.purdue.edu , Phone 765/494-9555 or FAX 765/494-5969.
Sept. 9-10	2002 WATER LAW SEMINAR, Denver, CO. Contact: Dick MacRavey at Phone 303/837-0812, FAX 303/837-1607, E-mail macravey@cowatercongress.org , or see web site http://www.cowatercongress.org .
Sept. 12-13	3RD ANNUAL COLORADO WATERSHED ASSEMBLY CONFERENCE, Breckenridge, CO. See website http://www.coloradowater.org or call 303/312-6356 or 719/837-2737.
Sept. 12-13	WESTERN WATER LAW: WATER SHORTAGE, SUPPLY AND QUALITY IN THE ARID WEST, Denver, CO. Register online at http://www.cle.com or call (800)873-7130.
Sept. 22-25	2002 GWPC ANNUAL FORUM, San Francisco, CA. Contact the Ground Water Protection Council, 13208 N. MacArthur Blvd., Oklahoma City, OK, 73142, Phone 405/516-4972 - Fax 405/516-4973. Forum information is available at the web site http://www.gwpc.org .
Sept. 27	COLORADO'S FUTURE: HOW CAN WE MEET THE NEEDS OF A CHANGING STATE? University of Colorado at the Colorado Springs campus. Contact: Prof. Daphne Greenwood at E-mail dgreenwo@uccs.edu or call 719/262-4031.
Oct. 23-24	WHO'S RUNNING THIS ECOSYSTEM? 13TH ANNUAL SOUTH PLATTE FORUM, Longmont, CO. Contact: Jennifer Brown, South Platte Forum, 513 N. Harding Ave., Johnstown, CO 80534, Phone 970/213-1618, E-mail southplatteforum@msn.com .
Oct. 23-26	USCID WATER MANAGEMENT CONFERENCE, Helping Irrigated Agriculture Adjust to TMDLs, Sacramento, CA. Contact: Larry Stephens at Phone 303/628-5430, FAX 303/628-5431, E-mail stephens@uscid.org . Internet: http://www.uscid.org/~uscid .
Oct. 27-30	THE GEOLOGICAL SOCIETY OF AMERICA 2002 ANNUAL MEETING, Colorado Convention Center, Denver, CO. For details see the website at http://www.geosociety.org/meetings/2002/ .
Oct. 29-30	COLORADO NONPOINT SOURCE FORUM, RESTORING IMPAIRED WATERS: TOOLS FOR TOMORROW, Colorado Springs, CO. For information contact Jennifer Brown at 970/213-1618 or email conferenceplanner@msn.com .
Nov. 3-7	AWRA 2002 ANNUAL CONFERENCE, Philadelphia, PA. Registration information available at the AWRA web site at http://www.awra.org .
Nov. 11-12	NASULGC 2002, 115TH ANNUAL MEETING, Chicago, IL. Call the Nat'l. Assn. Of State Universities and Land Grant Colleges at 202/478-6050, FAX 202/478-6046, or see the web site at http://www.nasulgc.org .
Nov. 18-20	GROUNDWATER: THE FORGOTTEN ELEMENT OF WATERSHED PROTECTION, Eugene, OR. Contact: Cindy Kreifels at the Groundwater Fdn. at 1/800-858-4844, 402/434-2740 (Lincoln) or E-mail cindy@groundwater.org .

Colorado State University
 Colorado Water Resources Research Institute
 Colorado State University
 Fort Collins, CO 80523