Colorado Water

Newsletter of the Colorado Water Resources Research Institute. Fort Collins, Colorado 80523

WATER ITEMS AND ISSUES . . .

December 1994

THE FIFTH ANNUAL SOUTH PLATTE FORUM

For highlights see page 23

Keynote addresses by

JIM LOCHHEAD
Executive Director
Colorado Department of Natural Resources

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BILL YELLOWTAIL
Region VIII Administrator
U.S. Environmental Protection Agency

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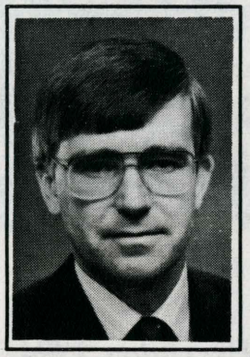
Kathleen Klein, Conference Coordinator and Kevin Dennehy, U.S. Geological Survey, do a final check on forum arrangements

A LITTLE HELP FROM OUR FRIENDS!

by Robert C. Ward



Watching the ebb and flow of water concerns and trying to sift from them some fundamental water research directions for CWRRI is both fascinating and difficult. Trends in the early '90s seemed to point toward water management that was more holistic and watershed-based. The concern seemed to be, "How we can meet expanding water needs while still maintaining some form of riparian ecological integrity?" Within this more inclusive form of water management direction, however, was a lack of specificity about what "integrated watershed management" really means.

As a result of these more holistic leanings and lack of specificity, CWRRI identified several particular concepts that needed clarification and quantification. With direction from its Research Planning and Advisory Committee (RPAC) and some excellent proposals from Colorado's higher education faculty, CWRRI began to examine what this trend might mean to water managers in Colorado. In particular, CWRRI began to study the evolving nature of ecological integrity, agricultural water conservation, sediment, and communication between water managers and taxpayers.

Today, examining the changes taking place in our society, I'm not sure I see a major shift in direction as much as a shift in approach. Let me explain. Colorado citizens seem to support a balance between ensuring the beauty and functions of our natural ecosystems and maintaining the economic and social health of our human communities. The means of defining and maintaining this balance, however, seem to be shifting toward more local and state initiative and away from strictly federal directives.

Regardless of the level of government that addresses the problem, however, we need to develop some agreed-upon way to view and measure the health of our Colorado riparian ecosystem. We need a common language with which to approach the concept of agricultural water conservation. We need to examine the role of sediment in our rivers and reservoirs. And we still must work to develop and maintain good communication between professional water managers and Colorado taxpayers.

As I note the changes taking place, I am confident that their practical implications will be properly interpreted and incorporated into ongoing CWRRI research as well as proposed research. How can I be so confident? The answer lies in the willingness of so many Colorado water managers and users to contribute their time and talents by serving on CWRRI's RPAC and participating in the day-to-day research itself. I can't tell you how valuable this assistance is to the development of relevant water knowledge by higher education faculty. I hope the information being developed by higher education's faculty will, in turn, be of assistance to Colorado's water management community as it confronts and solves new problems that derive from the changes taking place in our society.

As CWRRI, with the advice of its advisory committees, enters the final phases of deciding what water research to fund for 1995/96, it is critical that we properly assess any changes in concerns that have been generated. For example, a recent Supreme Court decision tied water quality management to water quantity management (Jefferson County Utility District No. 1 vs. Department of Ecology, the State of Washington). The Platte River Memorandum of Agreement raises concerns about quantifying water needs for endangered species. The 1994 election results may also produce new water management initiatives. And as Jim Lochhead notes in his article on page 9, growth has ramifications for water management.

While changes are taking place, their impacts on CWRRI research are immediately assimilated via the contributions of a number of Colorado water managers and users. A big thanks to those Colorado water managers and users who devote their time and talents to keep CWRRI's water research efforts relevant and timely.

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Robert C. Ward, Director

COLORADO WATER RESOURCES RESEARCH INSTITUTE
2ND REQUEST FOR PREPROPOSALS
Closing Date: January 10, 1995

Preproposals are invited for the Colorado Water Resources Research Institute FY1995-96 water research program. CWRRI is especially interested in projects that feature collaboration between university researchers and water management organizations. Demonstrating collaboration in the preproposal stage will enhance the possibility of an award. Highest priority will be given to projects that address Colorado's most critical water problems as identified by CWRRI's Research Planning Advisory Committee:

- **How much water is needed by endangered species and how do we get it to them?**
- **Integration of water quantity and quality management in Colorado - feasible? How?**
- **What is "Integrated Watershed Management?" How could it impact Colorado's water management system?**
- **Basin-of-origin protection - do the water courts need additional guidance in evaluating out-of-basin water transfers?**
- **Urban water conservation - where are we today?**
- **Hydro-modification - a source of pollution?**
- **What is the quality of Colorado's water?**
- **How can Colorado recognize a prospective drought and alert citizens, without creating a crisis mentality?**

The Colorado Water Resources Research Institute (CWRRI) has, for many years, funded individual faculty to study rather specific and narrow research questions. The lack of basic knowledge about water behavior, movement, quality, and impacts led to this research strategy. More recently, there are indications that knowledge synthesis (integrating existing knowledge to answer broader management questions) is an increasingly important focus for water "research." These indications come from evolving shifts in water management that now employ such concepts as "integrated watershed management" involving "ecological integrity" goals. Within such concepts, information needs are developing around water needs for endangered species, basin-of-origin protection, integrated water quality and quantity management, and informing the public about Colorado's water quality.

During this next cycle of CWRRI's water research program, in addition to basic research proposals, proposals that involve a number of faculty attempting to integrate knowledge that supports a better understanding of broader water management issues will also be sought. The goal is to have a blend of individual and group projects focused directly on high-priority needs of Colorado's water managers, users and citizens.

The proposals that attempt to synthesize knowledge must involve a group of faculty (and water managers/users) so that something like a "White Paper" on the topic can be developed. Such a product is designed to be readily useful to Colorado's water managers. Furthermore, it is desired that such groups of faculty, as part of their deliberations, also prepare a follow up proposal to seek additional funding from sources other than CWRRI. CWRRI monies are being used to direct faculty attention into those areas of investigation critically important to Colorado, realizing that CWRRI's funding levels cannot, of themselves, fund the level of research needed to adequately address the complexity of many of these issues.

Project Duration: Awards will be made for one year beginning July 1, 1995.

Funds Available: Current indications are that the number of 1995/96 awards will be reduced to 6 or 7 from the previous average of 8-10 per year. The funding range considered is between $10,000 and $25,000.

Indirect Costs/Cost Sharing: If additional funding for CWRRI's research program is obtained, cost sharing may be required of the principal investigator. Indirect costs must be provided as a contribution by the performing institution. Do not show indirect costs in this preliminary, direct-cost budget estimate. Financial arrangements for projects will be negotiated after successful preproposals have been identified.

Review Procedures: Preproposals will be evaluated by the Technical Advisory Committee (faculty of CU, CSM and CSU) and by the Research Program Advisory Committee (practitioners). Authors of preproposals judged to have a strong chance of final award will be invited to prepare full proposals. Criteria of selection include: (1) the ability of the proposed research "product" to be readily useful to Colorado's water users and managers; (2) relevance of research product to priority Colorado water problems; (3) scientific merit; and (4) performance record of principal investigator.

Eligibility: Open to regular, full-time faculty of Colorado State University, the University of Colorado and the Colorado School of Mines. For Instructions and Preproposal Format contact your Contracts and Grants office or call CWRRI (491-6308).

WATER RESEARCH

AGRICULTURAL TO URBAN WATER TRANSFERS IN COLORADO
Part 2

by
Teresa Rice and Larry MacDonnell
Natural Resources Law Center
University of Colorado

MANDATING A REDUCTION IN AGRICULTURAL WATER USE

Most agricultural water uses were established long ago. In some cases these uses involve a larger diversion or withdrawal of water than may be necessary to obtain good crop yields. Irrigation accounts for about 80 percent of western water consumption and 90 percent of all withdrawals from streams and aquifers. As western states struggle to make water resources available for a broad and expanding set of uses, there is a growing recognition that more efficient use of irrigation water could reduce this major source of demand. Under western water law, established water rights must be based on beneficial use, which incorporates the notion that the use must be reasonable and without waste. These concepts -- "reasonable use" and "waste" -- traditionally are measured by local custom and practice. A use is reasonable, and therefore not wasteful, if the method and quantity of use follows local custom. But, in many areas of the West, highly inefficient irrigation practices have been sanctioned and perpetuated under this standard. Some states are now reconsidering their laissez faire approach to water use practices.

Waste could be defined as any amount of water diverted in excess of the quantity needed to deliver to the field the minimum amount of water necessary to grow the crop. Some of the "excess" diversions return to the stream system as return flows. In many locations in the West, these return flows are relied upon by downstream irrigators, and the additional water applied to the lands may be valuable in flushing harmful salts from the soils. It may be possible to require that at least some portion of the return flows never be diverted. In many cases, however, this would necessitate improvements in diversion and delivery systems -- perhaps at considerable expense.

Another part of the excess may be consumptively lost to the system through evaporation, transpiration, and deep percolation. This water appears to be a good candidate for regulatory control. Yet such water may be the source of phreatophytes and wetlands providing valuable habitat. Legal, policy, and technical questions remain but, nevertheless, states are beginning to revisit assumptions about existing water rights and, in some cases, adopting programs and requirements to reduce agricultural water requirements -- thereby making water available for other uses.

States have taken different approaches to accomplish such a reduction in agricultural water use. Laws and programs that provide voluntary incentives to encourage users to reduce their water use are described in the next section of this report. These types of laws and programs generally impose a penalty, in terms of money or water, for failure to reduce use. For example, states may establish a duty of water for irrigation based on efficient use of water, and any portion of water rights held by the user over this duty would be subject to possible loss or forfeiture. Arizona has taken this type of approach in managing its groundwater. In California, state law definitions of waste and beneficial use, and enforcement of these provisions, have forced some irrigation organizations to seek improvements leading to more efficient use of water. Oregon is considering adoption of a duty of water for agricultural use, which would likely also require reductions of agricultural use in at least some areas of the state. Supporters of a regulatory approach to promote water conservation believe most water users will not change, will not invest in system improvements, unless mandated by law. Additionally, supporters argue, efficiency requirements can provide irrigation organizations with the justification they need, legally or politically, to make efficiency types of improvements. The following examples describe several of the regulatory approaches taken today by western states for the purpose of reducing agricultural water use.

PROVIDING INCENTIVES TO CONSERVE

Many western states now have laws and programs aimed at encouraging existing water users to reduce the amount of water used. These voluntary programs are usually referred to as water conservation or water salvage programs. Their intended result is to reduce agricultural water use, but there is a broader policy objective: to continue productive and beneficial agricultural use of water but with a reduced amount of water that can then be made available for other uses.

How is this done? Principally through improvements to water storage, diversion, delivery and return flow systems. Systems and uses established years ago may be diverting or withdrawing more water than is needed to achieve the same or better crop yields. Public and private investment in improvements may make water available for another use while allowing the agricultural use to continue. Some caution is called for as in some areas, like the upper Snake River basin in Idaho, there is a real issue as to the impact efficiency improvements may have on the traditional patterns of water yield in the basin.

How is a reduction in irrigation water use accomplished so that production is maintained? The primary method of reduction under these incentive-based approaches is through improvements to water storage, diversion, delivery, and return flow systems. As discussed, many agricultural water uses were established long ago, and may be diverting or withdrawing more water than is needed to achieve the same or better crop yields. Through public and private investment in efficiency improvements, water may be made available for another use while allowing the agricultural use to continue.

What is conserved or saved water and how does it differ from salvaged water? Some states broadly define conserved water to include any legally allowable improvements that increase the flow of water in a stream system, including the removal of water-loving plants. It would be measured by the amount of water saved as the reduction in the amount diverted, absent injury to other appropriators. Potential water saving measures under this broader meaning would include improvements in water delivery systems, improvements in on-farm water distribution and use, and the enhancement and management of return flows. The Center's report uses the term "salvaged" water to refer to a reduction in secondary consumptive use, making available water previously lost to the system by evaporation or transpiration. Under this meaning, salvaged water would be measured by the amount of water consumptively used before and after improvements. This definition originally was used by the Oregon Legislature in adopting their conservation program, but has since been replaced with a broader definition more akin to conserved or saved water. Thus, Montana law (unfortunately using the term "salvage" rather than "conserved" or "saved") authorizes making water available for beneficial use from an existing valid appropriation "through the application of water-saving methods."

With any of these definitions, states wishing to encourage conservation have modified water laws so that concepts of waste or beneficial use will not apply to water saved by conservation efforts and, in some cases, give the holder of the right some control over the saved water. For example, California law provides that a water right is not subject to forfeiture as a result of reduction in water use through water conservation efforts.

Oregon water law recognizes a right to sell or lease a portion of the amount of water saved through conservation improvements and gives a priority date to the saved water of one minute junior to the original right. Thus those investing in the improvements needed to produce the saved water can benefit from their investment. Under the Oregon approach to encourage conservation, conserved water is defined as "that amount of water that results from conservation measures, measured as the difference between: (a) The smaller of the amount stated on the water right or the maximum amount that can be diverted using the existing facilities; and (b) The amount of water needed after implementation of conservation measures to meet the beneficial use under the water right certificate." The state determines, based on historic use and the conservation measures proposed, how much water will be saved. From 25 to 75 percent of this saved water must be left in the stream, depending on the percentage of nonreimbursable public funds used for the conservation improvements. The balance of the saved water can be used by the original owner, or transferred to another use.

Washington has also established a voluntary state program to make conservation improvements and to determine additional uses of saved water. Under this program, known as the "Trust Water Right" program, holders of an appropriative water right may voluntarily transfer all or a part of their water right to the state, to be managed in trust by the Department of Energy. Only water "that has been beneficially used in a reasonable manner" will be considered for transfer. The amount saved (Trust water right) will maintain its original priority date, and is not subject to relinquishment or forfeiture. Once a water right is changed to a Trust water right, the Department may allocate the water right to one or more beneficial uses, including instream flows, irrigation, and municipal uses. Similar to the Oregon approach, some of the saved water may be retained by the owner, and be available for use or transfer by the owner, depending on the percentage of public funding for the conservation improvements. As yet, no transfers have occurred under the program, although several parties have expressed interest. One problem appears to be an understandable resistance to the idea of conveying water rights to the state. It is hoped that through pilot projects the benefits of the program can be demonstrated and some concerns alleviated.

Finally, Montana has adopted a water salvage program. Salvaged water is water saved through the application of water saving methods. There is no required dedication of saved water to the state for instream flows. The holder of water right may use the saved water on additional acreage, or transfer the water to another place and type of use subject to state approval.

Are these state incentive programs working? To date, there has not been much activity reported by these states. Very few applications have been submitted in general, although some states reported a high level of informal inquiry. Some of these states are examining their programs to see how to improve public participation. For example, Oregon changed its laws in 1993 after five years of low activity, easing the burden for applicants to show they will conserve water. Whether the change will generate more participation has yet to be seen. Montana is in a similar situation with its salvage program -- only two to three applications were received in the first year. In Montana, applicants have a difficult standard to meet in trying to prove the amount of water salvaged because many areas of the state have had no measuring devices. Therefore, the state is now trying to address this obstacle. Washington's Trust program has still not had a formal applicant, though they are getting close. The state is now trying to increase the potential funding level for conservation improvements from 30 to 100 percent, to provide a greater incentive for participation. In exchange, they expect to have a correspondingly higher percentage of the saved water transferred to the state.

In sum, these programs are moving slowly, with a lot of apprehension on part of water rights holders and agency fine-tuning of incentives and disincentives to improve participation.

SHORT-TERM TRANSFER APPROACHES

I will now turn to another way of meeting urban water needs -- by temporarily moving water from where it is not needed to where it is needed. We are seeing an increased interest in these short-term transfers of water in some areas of the West. Water is made available for transfer by various methods, for example, temporary land fallowing, changing crop type, and substitution of alternative water supplies. The advantage of this approach is that it can allow traditional water uses to continue in the long run while taking care of urban water needs. This works for example, where cities need drought-year supplies but in most years have sufficient water. State laws in many western states facilitate short-term transfers by allowing these transfers to occur more quickly and at a minimum cost than under the traditional transfer review process. Some state laws further encourage short-term transfers by setting up water banks, as in Idaho, Texas, and California. The qualification in these approaches is that they will not satisfy all urban demands. Cities still need a base supply. However, they can reduce the permanent transfers needed by taking care of periodic supply needs.

WATER BANKING

Water banking is one such approach. It helps to match those with excess water with those needing water. It usually involves the rental or lease of right to use water for a specific time, rather than the transfer of a water right. Water placed in a bank and available for temporary use is protected from forfeiture or abandonment. In general, banks require some type of administrator, often a state or local water management agency, and bank rules are adopted to govern operations.

One local example is the bank that has been proposed for the Fort Lyon Canal system in the Arkansas Valley of Colorado. Only shareholders of Fort Lyon could deposit water into the bank. To demonstrate the availability of the water, lands would need to be fallowed. On the buying side, any water user in the lower Arkansas Valley could rent from the bank. The price would be set by the market, with administrators using a sealed bid process twice a year to rent the banked water. A portion of the rental charge would go toward bank operating expenses. While this bank proposal is narrowly tailored to fit the needs in one canal system, it offers an opportunity to provide experience and win support for the water bank approach in Colorado.

DRY-YEAR OPTIONS

Dry-year options can make water available to an urban supplier for short-term needs. Usually the agricultural water user (seller) and the urban supplier (purchaser) enter a contract that gives the purchaser a future right to buy water under specific conditions and for a specified price. The seller agrees to make water available under specified conditions, such as low water supply years. When conditions occur, contract obligations are triggered. The seller generally fallows land and the saved water is transferred from irrigation use to another use where it is needed temporarily. The advantage to the use of dry-year options is it is cheaper to the urban supplier than acquiring a permanent supply sufficient to cover these periodic needs, yet not needed in most years. In addition, from the perspective of the agricultural community, there may be fewer negative third party impacts such as the drying up of agricultural lands and harm to related businesses. One disadvantage is that not all water rights are appropriate for this type of arrangement -- the water right must provide a reliable supply during times of drought. The agricultural operation of the seller must be sustainable during temporary suspension of operations, which is not the case, for example, with livestock operations, perennial crops or orchards. And, as suggested, to be viable for the purchaser, the cost of the dry-year option, including any system changes needed to physically link the water with the buyer's system, must be cheaper than the purchase of water rights for a permanent water supply.

One current dry-year option agreement is between the Metropolitan Water District of Southern California (MWD) and Aerias Dairy Farm. MWD has recently signed a dry-year option with Aerias Dairy Farm. The option involves 32,200 acre-feet of water, broken down as 4,600 acre-feet per year for any seven years over a 15-year time period. The agreement establishes in MWD a right to take water and an obligation to pay for the water and some other costs. Aerias, during the times MWD exercises its right, must change its farming practices to fallow the land and must implement certain land management activities to prevent the accumulation of weeds and dust. In this example, the Bureau of Reclamation and the State of California must approve the agreement because the Bureau has a role in the water storage and delivery system, and because the place of use for the saved water will change. One might wonder whether 15 years is enough time for conditions needed for MWD to exercise the option seven times. If the water supply is less than anticipated, then MWD will have a longer time period to exercise the option. An added enhancement in this arrangement is the ability of MWD to store the water for later use -- an opportunity not always available with dry-year options. The storage gives MWD more flexibility in acquiring and using the supply. If a purchaser under a dry-year option has no storage the water will have to be diverted for immediate use, which may call for giving the purchaser greater flexibility in deciding when to exercise the option. The Northern Colorado Water Conservancy District is looking at dry-year option opportunities in their system.

LAND FALLOWING AGREEMENTS

Land fallowing is often a part of other temporary water transfer arrangements, but may be a vehicle for freeing up water for direct transfer to storage or another use. In general, water is made available on a short-term (one to two year) basis and buyer takes and stores the water made available for later use. Compensation is based on the number of acres fallowed, and the water associated with that acreage. The buyer will want some assurance as to the quantity of water they will receive. The landowner will want assurance that the agricultural use can be resumed once the fallowing period has passed and that the water right will be protected from forfeiture during this time. Unlike

dry-year options, which are triggered by certain conditions, land fallowing agreements begin and end on certain dates.

Let's consider one example of a land fallowing agreement. Again, my example is the Metropolitan Water District of Southern California. MWD entered agreements with 63 individual farmers within the Palo Verde Irrigation District. There was also a master contract with Palo Verde and the Bureau of Reclamation because the arrangement required the consent of these entities. Fallowed land had to comprise no more than 25 percent of the base acreage of the farmer. Additionally, the land to be fallowed had to have a history of farming. The farmer had to demonstrate that these lands would have been irrigated absent the program. A minimum acreage of 18 acres was required to be eligible for participation. MWD was guaranteed 4.6 acre-feet of water per acre of fallowed land.

The 63 participating Palo Verde farmers collectively fallowed 20,215 acres of land for a two-year period, resulting in a savings of 186,000 acre-feet of water. Saved water was stored to the credit of MWD in Lake Mead, and must be used by the end of 1999. The total cost to MWD was about $26.7 million or about $140 per acre foot of water. This figure included a payment of $620 per acre per year to farmers, and payment of some of the district's costs and consultant fees. The price per acre-foot, $140, is within the range of water market in southern California. Any excess water saved by the land fallowing (over 4.6 AF) was credited to the district for use in restarting fallowed lands.

Conclusion

Traditional, permanent water transfers can be an important and necessary way to meet urban water needs, but should be used only to the extent they provide benefits for Colorado and under conditions that adequately mitigate their adverse third-party impacts. Permanent transfers should not impose uncompensated losses on local communities and resources. In meeting urban water supply needs, the emphasis instead should be on facilitating transfers of water that don't necessarily involve or require the permanent loss of agricultural production. Colorado legislators can play a role here by looking at how other states are attempting to do this, albeit with varying degrees of success. There are opportunities in Colorado (and other western states) to improve the use of water resources in a way that meets the needs of urban areas without undermining our agricultural economy and agricultural communities.

I will close this summary borrowing ideas again from Daniel Kemmis. We have been shaped by this region, in ways that give us shared values. The question for use now is whether all of us who inhabit this region -- those of us from Front Range cities and those of us from rural communities -- can recognize our shared values, and collectively find ways to meet urban needs while preserving agricultural communities.

This article is a summary of CWRRI Completion Report No. 177, ***Agricultural to Urban Water Transfers in Colorado: An Assessment of the Issues and Options****, by Teresa A. Rice and Lawrence J. MacDonnell of the Natural Resources Law Center, The University of Colorado. The report is available from the CE Resource Center, General Services Building, Colorado State University, Fort Collins, CO 80523. Phone: 303/491-6198. Price: $7.00 plus postage.*

WATER RESEARCH AWARDS

A summary of water research awards and projects is given below for those who would like to contact investigators. Direct inquiries to investigator c/o indicated department and university.

Colorado State University, Fort Collins, CO 80523

Assessment of Erosion & Sedimentation in the Rio Puerco Watershed, New Mexico, Robert G. Woodmansee, Rangeland Ecosystem Science. Sponsor: U.S. Geological Survey (USGS).

Defining & Delineating Ecoregional Patterns in Alaska, Roger M. Hoffer, Forest Sciences. Sponsor: (USGS).

***Ecological Effects Of Reservoir Operations on Blue Mesa Reservoir,** Brett M. Johnson, Fishery & Wildlife Biology. Sponsor: Bureau of Reclamation (USBR).

Application of Century Model to Evaluate the Ecological Effects of Climate Change, William J. Parton and Dennis Ojima, Natural Resources Ecology Lab. Sponsor: USDA/U.S. Forest Service.

Integrative Riparian Ecosystem Modeling Along the Yampa River, Colorado, Ellen E. Wohl, Earth Resources. Sponsor: Mellon Foundation.

***Water and Climate,** David A. Randall, Atmospheric Science. Sponsor: NASA-Goddard.

Removal of Biological Particles by Rapid Filtration, David W. Hendricks, Civil Engineering. Sponsor: American Water Works Assoc. Research Foundation.

***Evaluation of Water Rights Planning Models,** Neil S. Grigg, Civil Engineering. Sponsor: Riverside Technology, Inc.

***Toxicological Evaluation of Flood Plain "Slickens" Along the Clark Fork River,** A. William Alldredge, Fishery & Wildlife Biology. Sponsor: National Park Service (NPS).

***Describe Snowfall Characteristics & Observational Techniques,** Thomas B. McKee, Atmospheric Science. Sponsor: USBR.

***The Impact of Wildlife Related Recreation on the Alaskan Economy,** Edward W. Sparling, Agricultural & Resource Economics. Sponsor: USDA/U.S. Forest Service, Rocky Mountain Experiment Station.

Ecological Monitoring in Lake Mead National Recreation Area, Charles D. Bonham, Rangeland Ecosystem Science. Sponsor: NPS.

Middle East Water: Efficiency & Use in the Agricultural Sector, Evan C. Vlachos, Civil Engineering. Sponsor: Office of Resources, Trade & Technology.

Field to Farm to Ecosystem Scale Decision Support Models, Jose D. Salas, Civil Engineering. Sponsor: USDA-ARS.

***The Creation of Wetlands at the Rocky Mountain Arsenal: Monitoring the Patterns...,** David J. Copper, Cooperative Fish & Wildlife Research. Sponsor: Fish & Wildlife Service.

Transient Responses of Grasslands & Forests to Climate Change, William K. Lauenroth, Natural Resource Ecology Lab. Sponsor: Electric Power Research Institute.

Geomorphology of the Little Snake River, Ellen E. Wohl, Fishery & Wildlife Biology. Sponsor: NPS.

Development of a Watershed-Based Methodology for Screening-Level Assessment of Nonpoint Source Pollution form Inactive and Abandoned Hardrock Mines, Jim C. Loftis, Agricultural & Chemical Engineering. Sponsor: Environmental Protection Agency (EPA).

Analysis of Water Resource Issues in Yosemite National Park, Lee H. MacDonald, Earth Resources. Sponsor: NPS.

Flood Hazards Associated with Glacier - Lakes in the Eastern Himalaya Mountains, Ellen E. Wohl, Earth Resources. Sponsor: Engineering Grant.

***Studies of the Influences of Land Use & Watershed Processes on Erosion & Stream Sediment...,** Lee H. MacDonald, Earth Resources. Sponsor: NPS.

***Quantification of Federal Reserved Water Rights for National Park Purposes,** Thomas G. Sanders, Civil Engineering. Sponsor: NPS.

***Establishment of Baseline Water Quality Conditions in the National Park Service,** John D. Stednick, Earth Resources. Sponsor: NPS.

***Distribution & Dynamics of Radionuclides in Ecosystems of the Savannah River Site,** Floyd W. Whicker, Radiological Heath Sciences. Sponsor: University of Georgia.

Mitigation in Agriculture: IRCC Assessment, Edward T. Elliott, Natural Resources Ecology Lab. Sponsor: SCS.

***Distribution & Dynamics of Radionuclides in Ecosystems of the Savannah River Site,** Floyd W. Whicker, Radiological Health Sciences. Sponsor: University of Georgia.

Arkansas River Basin Research Study, John D. Stednick, Earth Resources. Sponsor: Colorado Division of Wildlife.

University of Colorado, Boulder, CO 80309

***Bridge Management Systems,** George Hearn, Civil, Environmental & Architectural Engineering. Sponsor: State of Colorado.

Biodenitrification in Sequencing Batch Reactors, Joann Silverstein, Civil, Environmental & Architectural Engineering. Sponsor: Los Alamos National Laboratory.

***Effects of Climate Change in the Colorado Alpine: Ecosystem Response to Altered Snowpack & Rainfall Regimes,** Timothy Seastedt, Institute of Arctic and Alpine Research Environmental, Population & Organismic Biology. Sponsor: NSF.

Automatic Construction of Accurate Models of Physical Systems, Elizabeth Bradley, Computer Science. Sponsor: NSF.

Nutrient Modelling of South Platte River, William Lewis, Environmental, Population and Organismic Biology. Sponsor: USGS.

***Development and Experimental Verification of Theories for Up-Scaling of Water Flow & Solute Transport in Saturated Porous Media,** Tissa Illangasekare, Civil, Environmental & Architectural Engineering. Sponsor: Dept. of the Army.

Hydrology, Hydrochemical Modeling and Remote Sensing of Seasonally Snowcovered Areas, Mark Williams, Institute of Arctic and Alpine Research. Sponsor: University of California at Santa Barbara.

***Conceptual Planning For Integrated Analysis (Integral) of Water Resource Systems and Power Operations,** David Sieh, Civil Environmental & Architectural Engineering. Sponsor: Tennessee Valley Authority.

***Nitrogen Dynamics: Interactions Between Snowmelt and Runoff,** Mark Williams, Institute of Arctic and Alpine Research. Sponsor: NPS.

Generating an Assessment of Nesting Success of Neotropical Birds on the South Fork, Snake River, Idaho, Carl Bock, Environmental, Population & Organismic Biology. Sponsor: Bureau of Land Management.

Study Stream & Riparian Restoration by Beaver, Carol Wessman, Cooperative Institute for Research in Environmental Sciences. Sponsor: USDA/U.S. Forest Service.

Quantifying the Spatial Statics of Snow Meltwater Flow Using Lysimeter, Mark Williams, Institute of Arctic and Alpine Research. Sponsor: USDA/U.S. Forest Service.

Assessment of Institutional Alternatives for Water Management in the Truckee and Carson River Basins, Lawrence MacDonnell, Natural Resources Law Center. Sponsor: Nature Conservancy.

Strategies to Control Bromide and Bromate, Gary Amy, Civil Engineering. Sponsor: American Water Works Assn. Research Foundation.

Dynamic Characterization of Shallow Foundations in Granular Soils, Ronald Pak, Civil Engineering. Sponsor: National Science Foundation.

***Measuring the Subjective Benefits and Costs of Environmental Programs,** William Schulze, Economics. Sponsor: Environmental Protection Agency.

***Hydrology and Water Resources Research,** David Kassoy, Civil Engineering. Sponsor: US Geological Survey.

*Supplement to existing award.

FEATURES

COLORADO'S WATERSHED MANAGEMENT INITIATIVES

by Jim Lochhead, Executive Director
Colorado Department of Natural Resources

(Keynote address given at the South Platte Forum on October 26, 1994)

It is great to have this conference look at the issue of watershed management. What has galvanized this issue, in my opinion, is the issue of growth in Colorado and all its ramifications. We are dealing with those ramifications when we talk about watershed management on the South Platte River and how we deal with growth and sprawl development in this state.

Some of you may have seen the recent poll in the *Denver Post* concerning the attitudes of Coloradans about growth. I think there were some interesting responses that relate to how we approach the issue of watershed management in this state.

Seventy-five percent of the respondents felt that if Colorado keeps growing as it has, the quality of life in this state will be harmed.

Sixty-two percent of the respondents felt that the state should be doing more to control and regulate Colorado's growth.

Respondents were asked, "Have we gone too far in regulating the environment? Have we gone so far that we are actually hurting the state's economy?" Sixty-five percent of the respondents said no.

Interestingly, however, they were also asked if Colorado should be promoting business and economic development in this state. Should we be using tax dollars to go out of state? Fifty-five percent of the people said yes.

So if growth is a problem, we haven't gone far enough and need to be doing more, but we also need to promote more economic development in the state. Sixty-three percent said we should help local business continue to expand.

Then a series of questions was asked about types of regulation. If you want to regulate growth, what are the types of regulation you want to impose? Should we require an impact fee of $3000 to go to school districts? Fifty-two percent said no.

Should we limit the number of residential building permits annually in this state? That was a close one, with only forty-eight percent agreeing that we should limit building permits. Should we impose a tax on building materials? Seventy-one percent said no.

Today's *Denver Post* [October 26, 1994] is also interesting, because it talks about the tools that we might bring to the table to deal with the growth issue. It talks about these tools, but at the bottom of the article is a reality check.

On **POPULATION CAPS** it says, "Yes, but you may limit one community only to ship them off to another one."

On **ENVIRONMENTAL LAWSUITS**, should we be resorting to the courts to protect the environment? The reality check says that it is only an expensive, ad-hoc approach and doesn't get at the broader vision of what we want to do.

On **SHARING TAX REVENUES**, we have a real tax problem in this state. Workers may live in one community, shop in another community, and work in yet a different community, and the tax and sales revenues are not shared equally. What about statewide sharing of sales tax revenues? The reality check is that bookmakers in Las Vegas don't list odds high enough to cover the possibility.

Should we **LIMIT SPRAWL**? Yes, but what limits work? Can you get cities and counties together to try and make sprawl control work?

Should we use the **BALLOT BOX OR REFERENDUM** idea? You can stop developers, but it is a very ad-hoc approach.

Should we **ESTABLISH URBAN GROWTH BOUNDARIES**? That might work, but, again, it involves partnership between communities and between counties and communities.

How about **CENTRAL STATE PLANNING**? That will not happen in the lifetime of existing residents, and I have to agree with that.

OPEN SPACE has a big potential and we certainly need to deal with it, particularly here in Northern Colorado where communities have grown right against each other. You need to have a broader vision and the reality check reflects that. You buy one piece of open space and sprawl develops around it.

Then you have the general problem of government. Some of you may have seen an article in *Time* magazine on how people feel about Washington. It reflected an opinion poll based on the question: "Do you think the federal government does the right thing most of the time?" Thirty years ago 72 percent of the people said yes. Today that percentage is down to about 19 percent, so people don't have a very good feeling about government.

We have problems. People want good jobs. They want us to be doing more about growth, but they don't trust government and are not willing to bring to the table the specific tools needed to deal with the issue. Where do we go? Seemingly, we are back into the old situation of gridlock.

Where are we going in Colorado? Governor Romer has announced a nine-step growth plan that reflects all the values I will talk about. It also reflects the idea of watershed planning and broader development of visions about what we want to see in the long term, 50 years from now, for example. I draw from a number of lessons to reflect on where we are going.

Jim Lochhead with Herrick Roth, Colorado Forum and Jeannette Hillery, Colorado League of Women Voters

(1) The top-down, command-and-control regulatory environment is not going to work. We need to have an approach from a local level, reflecting community values, having a sense of community, and generated from the bottom-up. People feel a lack of control over their future. Involvement in the public process means they can have a voice in our future direction. We need to develop that feeling of empowerment, and I feel the way to do that is to make government responsive at the local level.

(2) Collaboration--all stakeholders need to be at the table and have a voice. There must be a respect for personal property rights. We need to avoid confrontation and rhetoric and sit down at the table in a collaborative fashion to get the job done.

(3) We need an integrated approach. There is not one single answer to these issues. Our approach should be from a number of different angles, whether we are talking about water management, land use planning, or management of federal lands. We need to have a broader vision on integrated approaches.

(4) The approach needs to be multi-jurisdictional. These problems all transcend local jurisdictional boundaries and all of the various levels of government. We also need to be aware that there are certain mandates in federal and state law that we need to respect. A lot of this involves getting state and federal governments into a process early, at the front end.

I will use the EPA as an example. We have a system of laws governing permitting processes in which the EPA might not have direct jurisdictional authority in a particular permitting decision. Whatever authority they have in a particular decision usually comes in at the back end of a process. You go all the way through it and suddenly EPA jumps in. We need to get all of the agencies involved at the front-end of the process. I am not necessarily picking on the EPA. If all are involved at the front end and everybody has common understanding of where we are going, then you have a greater chance of success.

(5) Information and data--it is imperative to any solid decision we make on public policy, particularly in the natural resources area, that we have good information and data on which to make decisions.

We are moving forward with some very good modeling initiatives in the South Platte River in terms of the administration of data on water use.

We have modeling efforts on the Colorado River that will enable us to have a good foundation on which to make policy decisions.

The Colorado Division of Wildlife has some very exciting projects on habitat mapping that can be made available to local jurisdictions.

The Colorado State Geologist is doing some GIS and other mapping that can be made available to local interests.

If we can work collaboratively with the university system that we have, the federal government, and the state resources we

have, we can pool our resources, develop common information and data bases, and make them accessible to local governments and groups. We can have a common base of information on which to base policy decisions, a base that gives us a good foundation upon which to do some of the broader things we need to do.

We have taken these lessons and have applied them to a number of initiatives at the watershed and landscape level. Let me describe some initiatives. Colorado is trying, in terms of water issues on the South Platte River and in other areas, to move to this broader watershed approach. You may be aware of our efforts on the South Platte and Platte Rivers to deal with endangered species issues in Nebraska. We have a three-state process underway to do that. Water users and other interested parties on the South Platte River need to be aware of potential endangered species concerns on Colorado's part of the river. Just taking care of the problem in Nebraska will not be the ultimate solution to Section 7 of the Endangered Species Act. As a state we need to try to get ahead of the listing curve of the Endangered Species Act in every basin with which we are dealing.

You are aware of the bypass-flow controversy that we have in Northern Colorado. I think we ended up with a good result, but the process of getting there was very painful. The permittees and water users stepped up to the table with a lot of expertise from both a legal and an engineering standpoint, pooled their resources, and came up with joint management plans. They tried to find ways to resolve the habitat and flow issues of the Forest Service in a way that did not affect their ultimate system yield. They were successful in doing that, and I think the decision of the Forest Service was generally favorable. The process is not yet over, and there is language in the permits that needs to be worked out. I hope, however, that the process can be resolved and serve as a model for the way we need to do business with the Forest Service in the future.

There are more than 800 permits on Forest Service land in the state of Colorado with which we need to work, and we need to develop a more logical approach to how we do those. We cannot repeat what we did on these last eight permits with the other 800 permits out there. What we have done is to sit down with the Forest Service and develop a dialogue about how we can approach these logically, on a landscape or watershed level, in a way that addresses legitimate threats to the habitat as a result of the operation of these facilities. We can bring the stakeholders to the table. That involves the environmental community, the angling community, and the permittees, trying to develop the kinds of solutions that address those habitat needs and protect system yield.

In the Front Range Water Forum, we are working to develop a number of different approaches to the future development and use of water supplies in the Denver-Front Range area. That forum is not going to provide any ultimate answers, but we hope that it can provide some technical possibilities and opportunities so that Front Range decision makers and water providers can work out some collaborative processes to utilize the resources we have in the most effective way. I am hopeful that the process can achieve that kind of result without the overreaching politics into which we continually get sucked when we talk about Denver-Front Range cooperation.

In other areas of the state, such as the Arkansas River, we are trying to balance the interests of the angling community, the environmental community, and the commercial rafting industry in terms of the flows that are being regulated. Not everyone is happy in that process, but it is one in which everybody has a voice and stake. Decisions are made with that kind of input, and in that respect the process works very well.

Finally, we are doing what I will characterize as an experiment. The Governor's growth initiative concerns the development of regional visions of what we want Colorado to look like. In the Yampa River basin we will try to develop that vision among a partnership that is generated at the local level. Moffat and Routt Counties and the cities of Craig, Steamboat Springs, and Hayden have all expressed an interest in working together to develop a common vision of what the Yampa River might look like 50 years from now. They have invited the state and federal governments to work with them to help develop and realize that vision. The state and federal governments have offered to come to the table and provide the types of resources that are needed to help the local interests develop that. The theory is that everyone can align their policies, their regulations, and what they do in accordance with that vision. It is a huge undertaking and an experiment at this point, but I think the opportunities are limitless as to what we can accomplish. It goes back to the question of how we do business in the area of public policy and in state and federal government.

I would encourage you to think big as you go through these various scenarios on the South Platte River and hear about different ways of watershed management on the South Platte. I think that the idea of developing common visions for a future is good. I think the best place to start is to develop common values about what you want to see preserved. We have certain values here in Northern Colorado we want preserved. We need to articulate those values and then bring them into fruition in the future.

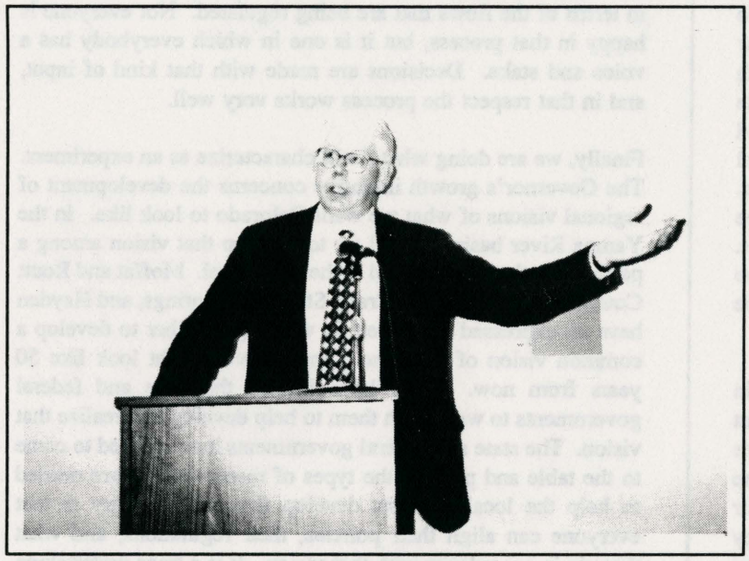
As you think about growth, consider that the Governor is going to convene a state-wide conference on the issue of growth to explore these kinds of issues, the attitudes of Coloradans about what we want to see, the kinds of tools we want to use to deal with the issue of growth, and how we as a state can work together to respect and be responsive to our regional and cultural differences. It is a huge challenge, and I think it will only be through this type of process that we will be able to do it together. It is both a big challenge and an exciting opportunity, and I am looking forward to working with it and with you. Hopefully this conference will give us all some additional ideas on which to work.

(For additional information contact Jim Lochhead at Phone 303/866-3311 or FAX 303/866-2115.)

INTEGRATED WATERSHED MANAGEMENT, THE FEDERAL PERSPECTIVE

by Bill Yellowtail, Regional Director
U.S. Environmental Protection Agency, Region VIII

NOTE: Bill Yellowtail was keynote speaker at the South Platte Forum on October 27, 1994. CWRRI regrets that, due to difficulties with audio equipment, his presentation did not tape. We appreciate receiving the following outline from the EPA Regional Office for use in *COLORADO WATER*. While the outline gives the essence of Mr. Yellowtail's comments, it does not capture the tenor of his presentation.



Bill Yellowtail, EPA Region VIII Director, discusses the watershed protection approach for the South Platte Basin

Ecosystem protection. Sustainability. Environmental Democracy. Right. Finally you're getting it. But American Indians are not for much for saying "We told you so." We're just glad, because maybe it's not too late, yet.

Old Man Coyote and Napi and others, as recited by our elders, instructs us in the Sacred Trust. They have for centuries. The magpies and nighthawks, the rabbits and bears, even the stars and rocks and trees have voices and personalities. They are brothers and sisters of each other and of us pitiful humans. They are our guardians, and as kin, we are theirs.

Old Man Coyote, supernatural clown and trickster of tribal legend, is often the butt of his own joke, usually the victim of his own selfish scheme--as we are the victims of our own arrogance toward our environment. The lesson is ancient, but always modern.

These days we (Indians, too) are reduced to regulations and bureaucrats and environmental impact statements. But the fatal flaw in legalism alone is that it relieves us of any necessity for ethical investment. With a sound philosophical core we might restore sensibility to humanity's imperative struggle: that is to reconcile our materialistic appetite with the desperate reality that our life-space is not infinite after all.

Perhaps America is ready to accept this gift that Indians have to give, this old/new ethic of the sacred trust.

The strategy must be to capture its essence in a form that all of us twenty-first century global citizens can consume and make our own. Ruth Rudner is of a different tribe than my own. But she holds the gift of the Sacred Trust; and she delivers it faithfully.

--Bill Yellowtail, Crow Indian

I. **Introduction**

A. The value of the South Platte River resource -- from drinking water to migrating songbirds -- is a value that is increasing as more people rediscover the river, return to the river.

B. We all hold an environmental ethic and trust regarding this resource. The future of the South Platte is in our hands.

C. "The interest in this conference shows that <u>you</u>, the participants of this forum, have recognized your difficult responsibilities as stewards and managers of the natural resources of the South Platte Basin."

D. I recognize that the participants of the forum have struggled with the concept of a holistic, basin-wide approach for managing the natural resources dependent on the South Platte River. The dialogue of this conference is the necessary first step to discovering what an integrated management framework for the South Platte will look like.

II. EPA's Perspective on the Watershed Approach

A. There was much discussion about watershed management requirements as Clean Water Act drafts were written, but the Act may well not be reauthorized in the next two years.

B. Regardless of reauthorization status, the watershed protection approach is clearly in EPA's future. Other themes of Clean Water Act reauthorization, such as pollution prevention and shifting from engineering treatments to mitigating the effects of pollution, are also being incorporated into EPA's fabric.

C. The watershed approach is an effective framework to meet the goals of the Clean Water Act (chemical, physical, and biological integrity).

D. It builds on the watershed frameworks used in the past for erosion control, flood management, and water planning. It incorporates new tools such as risk assessment and GIS. The watershed approach needs participation by all stakeholders and expects government to be more innovative and efficient than in the past. In other words, the watershed approach means that EPA must seek innovative ways to meet its mandates that look little like the typical top-down attitudes.

III. EPA's Role in Watershed Protection

A. EPA will continue to play the role of the "gorilla in the closet." Its enforcement, permitting, oversight, and standard setting authorities are critical to dissuade polluters and prevent loss of ecosystem function.

B. But EPA must also emphasize and develop its other roles as a facilitator, coordinator, and partner of efforts to set and implement goals for places like the South Platte River Basin. These roles include:

- providing technical and financial assistance,
- supporting environmental education,
- creating incentives for using integrated approaches to watershed management,
- providing incentives to conserve resources and prevent pollution,
- finding alternatives that may be less damaging than proposed actions,
- finding ways to use resources more efficiently,
- finding ways to meet resource needs that sustain the functions of the river, and
- helping agencies coordinate common efforts.

C. I am not here to tell YOU what EPA will do to YOU. Rather, I need to hear from you what YOU think is EPA's role in the South Platte Basin.

- How can EPA most efficiently and effectively meet its mandates of the Clean Water Act?
- How useful is the command and control tactic?
- Can the public and the environment be better served if EPA collaborates in a comprehensive, goal-setting approach where EPA's enforcement authorities are just one of many options to prevent pollution and maintain the resource for all future uses?
- How can EPA help voluntary efforts to sustain the functions and processes of the South Platte River and avoid the need to bring out the gorilla?

D. EPA prefers that leadership for these efforts come from state or local levels, but EPA will take the lead in watershed protection where there is a leadership vacuum and critical resources are at risk. In this case the results can be less effective and less desirable than when the watershed effort is led by people with direct management and environmental concerns. Do you need EPA to take the lead?

E. If EPA takes the lead, we could implement a plan for the watershed with those who are willing to participate. We will implement the plan to the extent possible by focusing and coordinating all of our authorities whether they are regulatory, financial assistance, inspection, permitting, or review.

F. However, the key to the future of the South Platte is not with only EPA authorities or coordinated federal action. It is found in your leadership and collaboration.

IV. Taking the Watershed Approach

A. There are some people who benefit from conflict, and in a basin like the South Platte conflict is inevitable. But generally neither the people who depend on and enjoy the South Platte, nor the environment are well-served by protracted conflict. Management and protection through conflict is a disservice to all of our customers. We must all seek better ways to meet our common stewardship responsibilities.

B. We must ask:

- What are our visions for the future of the South Platte, its corridor, and its tributaries? Are our visions compatible? How do we reconcile visions that appear incompatible?

- What is it we are trying to integrate?

- What are our management objectives?

- Where is the accountability to the public? If the accountability does not reside completely with the Federal government, where does it rest?

- If EPA is not the watershed manager, who will be? If leadership is not taken by the managers of the South Platte's resources or other stakeholders, should EPA step in and take on the role? Is the gorilla really the one you want to take the lead?

- Finally (as someone who is new to the basin but sees the difficulties), I wonder why, in such a large basin with so many significant players and increasing demands, no leader or leaders have come forward?

C. EPA's trust is to protect the biological, physical, and chemical integrity of the South Platte Basin. Thus, we believe a watershed vision should include:

- Protection of native species of aquatic life;

- A recognition that flows in the river and its tributaries are necessary for maintaining aquatic life;

- A way to protect riparian and wetland areas; and

- An assurance that all of the stakeholders are involved in management objectives.

V. **Kudos** - Recognition of Good Works. Despite the lack of overall leadership, some people are stepping out to take on some responsibility:

- Metro Wastewater in recent years has cleaned up residual chlorine discharges and much of the toxic ammonia. Metro is investing heavily in studies to assess problems with low dissolved oxygen and how to improve dissolved oxygen in the South Platte.

- Volunteers for the Adopt-A-Platte are working with the Audubon Society to collect information on birds and recreation use along four miles of the South Platte.

- The Colorado Division of Wildlife has begun studies of fish populations in the lower river in order to prevent any species of fish from becoming threatened or endangered.

- Park County is mapping its wetlands so that can develop wetland protection measures.

- The Clear Creek Forum has created on-the-ground restoration projects and laid the building blocks for difficult goal-setting discussions.

- City and county governments are taking leadership in other tributaries such as Boulder Creek and the Poudre.

VI. **Everyone has a duty to the trust to manage the resource for the future.**

A. These are not the times to sit back out of temerity or suspicion or skepticism or personal profit and wait for someone else to be the leader. These are not the times to fire missiles at those who do not step out.

B. Nobody can assure the sustainability of the South Platte's resources alone. Without everyone's participation, everyone's desire to make a good faith effort, to put away positions and fears in favor of doing the right thing, the conflicts will escalate and there will be serious losers.

C. As Eleanor Towns pointed out, we need mutual commitments to collaborate, to avoid political or judicial Solomons that cut the baby in two.

D. When we resort to the courts or Congress to make decisions we are abrogating our own responsibilities and leaving the destiny of this watershed to people who know little about this watershed. The interests and needs of people and other life in the South Platte Basin are not served well by court decisions and Congress.

Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it is the only thing that ever has. --Margaret Mead

When it (the people of the West) fully learns that cooperation, not rugged individualism, is the pattern that most characterizes and preserves it, then it will have achieved itself and outlived its origins, then it has a chance to create a society to match its scenery. --Wallace Stegner (Sound of Mountain Water)

(Bill Yellowtail can be reached at the EPA Regional Office, Denver, Phone 303/293-1616)

UNIVERSITY WATER NEWS

CCHE SCHOLARSHIPS GIVEN TO CSU ENGINEERING STUDENTS

(Contributed by Laurel Saito, CCHE Program Coordinator)

Thirteen undergraduate engineering students at Colorado State University were awarded Colorado Commission on Higher Education (CCHE) scholarships for the 1994-95 academic year as part of CSU's Water Resources Program of Excellence. CCHE's renewal of the program enabled the university to offer these scholarships and graduate research opportunities and to enhance the equipment available to the program. Recipients include Engineering Science major Juancarlos Simbana, Agricultural Engineering major Kevin Flikkema and Environmental Engineering major Stephanie Brock. Simbana, a junior, plans to attend medical school or graduate school. Sophomore Flikkema and senior Brock are interested in working before attending graduate school.

Three juniors in Chemical Engineering were also awarded scholarships. Jennifer Tonso plans to work with alternative and renewable energy, and Rebecca Karst intends to pursue a career in pharmaceuticals or biomedical engineering. Suzanne Hyde is considering graduate school in the biotechnology field. An additional scholarship was given to Chemical Engineering major Russell Callahan, who currently is studying in Monterrey, Mexico this semester.

The remaining scholarship recipients are Civil Engineering majors: seniors Yusuf Siddiqui, Carlos Sanchez, Thomas Rutledge and Kyle Hamilton; and sophomores Timothy Martinez and Benjamin Madrill. Siddiqui, Rutledge and Hamilton will either work in engineering or enroll in graduate school. Sanchez, a participant in the CCHE scholarship program for several years, would like to work with water resources, groundwater, water conveyance or environmental issues upon graduation in December. Timothy Martinez, also pursuing a minor in Environmental Engineering, plans to obtain graduate education in addition to working. Benjamin Madrill intends to work in the engineering field. This semester the students are participating in several seminars on water resources and environmental engineering topics, and each is preparing a paper on a water-related topic.

RECENTLY HIRED FACULTY WITH WATER EXPERTISE

The following faculty with expertise in water resources have joined the Civil, Environmental and Architectural Engineering Department at the University of Colorado in Boulder.

Marc Andrew Edwards, Assistant Professor -- Ph.D and M.S. in Environmental Engineering, B.S. in Bio-Physics from SUNY, Buffalo with honors. His current research focuses on corrosion control and water treatment. Honors include Outstanding Doctoral Thesis Award from the Association of Environmental Engineering Professors and Citation of Excellence Award from the Water Pollution Control Federation for his Masters' thesis.

Russell J. Qualls, Assistant Professor -- Ph.D and M.S. in Civil and Environmental Engineering with Hydraulics/Hydrology specialization and minors in Water Resources Systems and Atmospheric Sciences. His current research involves the use of remotely sensed surface temperatures and remotely sensed vegetation indices to estimate land surface energy fluxes, including evapotranspiration.

Harihar Rajaram, Assistant Professor -- Sc.D from Massachusetts Institute of Technology in Civil Engineering, M.S. from the University of Iowa in Civil and Environmental Engineering, and B. Tech. from the Indian Institute of Technology, Madras, in Civil Engineering. Dr. Rajaram received the only International Student Scholarship awarded at the University of Iowa in 1985-87. He is pursuing research on transport processes in heterogeneous natural soils.

James Patrick Heaney -- Formerly Chairman of the Department of Civil, Environmental and Architectural Engineering, Dr. Heaney is now located at the Center for Advanced Decision Support for Water and Environmental Systems (CADSWES) at the University of Colorado. He came to Colorado from the University of Florida where he was Professor of Environmental Engineering and Director of the Florida Water Resources Research Center.

DIRECTOR ASSUMES UCOWR AND AWRA POSTS

Robert C. Ward was recently named President-Elect of the Universities Council on Water Resources (UCOWR), a voluntary organization of universities actively engaged in education, research, public service, legislation and policy in fields related to water resources. UCOWR resources include an expertise directory that lists faculty specialties in the water resources fields and UWIN, the Universities WATER Information Network that provides a clearinghouse of water information that is available to users around the clock.

Ward also has been elected to a three-year term as Mountain District Director of the American Water Resources Association (AWRA). AWRA, with over 3,000 members worldwide, is dedicated to the advancement of research, planning, management, development and education in water resources. The Mountain District includes the States of Colorado, Montana, New Mexico, Utah and Wyoming. The national organization also sponsors state sections and student chapters. For more information about the AWRA Colorado Section, contact this year's President, Jerry Kenny of Boyle Engineering Corporation, at 303/987-3443. To learn about the student chapter at Colorado State University contact John Stednick, Department of Earth Resources, 303/491-7248.

USING MOSAIC TO ACCESS UWIN

by David Williams

The Universities Water Information Network (UWIN) is an on-line server, funded through the United States Geological Survey (USGS) and maintained by the Universities Council on Water Resources (UCOWR) at Southern Illinois University in Carbondale. UWIN's main objective is to provide a forum for the timely dissemination of information to water resources professionals in a timely manner.

The staff frequently updates UWIN, and recent changes include the ability of users to access UWIN through Mosaic. Mosaic is a network package accessing the World Wide Web (WWW), which lists network servers around the world. WWW makes accessing UWIN much easier than before. The WWW environment is quite user-friendly, and UWIN commands are accessible with the click of a mouse.

Current services available on UWIN include:

- the **Water Resources Science Information Center** (WRSIC) of USGS. The WRSIC is a directory of abstracts of water resources research since 1967, and it can be searched by keywords available on-line;
- a **Calendar of Events** in water resources, including conferences, calls for papers, workshops, and more;
- an **Experts Database**, listing academic and non-academic experts in water resources. Experts are listed in keyword categories available on-line;
- a list of **Employment Opportunities** available in non-academic and academic areas;
- a database on **United States Groundwater Information** which, at the time of this printing, is still under construction; and
- the popular bulletin board service **Water Talk**, currently with boards for Hydrology, International Water Resources Related Issues, Groundwater Quality, Water Policy, Water Education, and GIS.

To access UWIN via Mosaic and the World Wide Web, install the Mosaic software onto your computer and use the following access path:

http://www.uwin.siu.edu

If you cannot directly perform that access, you will have to work your way through some WWW screens until you reach UWIN. A typical access might resemble the following:

1. Access the WWW main screen via Mosaic.
2. From the WWW main screen, choose **Other Web Servers** around the world. This brings up a listing of options, showing different types of Web groupings.
3. Under "World Wide Web, Server Indices," choose **Central Index of WWW Servers**. This brings up a list of all WWW servers in the world.
4. Under "W3 Servers, North America, United States of America," choose **Illinois** (do not click on "Sensitive Map"). This brings up a list of Web servers in the state of Illinois.
5. Under "Southern Illinois University," choose **Universities Water Information Network**.
6. You should now be looking at the UWIN main screen.

You should now be able to access any of the options offered on UWIN through the Web. These include all of the previously mentioned services as well as options for sending feedback to UWIN on how you like UWIN's WWW service.

If you need more information on UWIN, please contact:

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c/o UCOWR Headquarters
4543 Faner Hall
Southern Illinois University
Carbondale, IL 62901-4526
(618) 536-7571

faye@uwin.siu.edu

RESTRUCTURING OUTREACH -- A NEW COOPERATIVE EXTENSION MODEL

In a November 7 speech at the annual meeting of the National Association of State Universities and Land Grant Colleges in Chicago, CSU President Albert Yates outlined a model for restructuring university outreach programs. Yates' speech, titled "The Renaissance of Outreach in the Land-Grant Tradition," discussed the historic purposes of university outreach and extension programs and how they need to evolve to serve a changing society. At the meeting, the U.S. Department of Agriculture Extension Service honored Yates with its 1994 Seaman A. Knapp Award, named in honor of the man considered "the father of Cooperative Extension."

In his remarks, Yates unveiled some of the specific changes proposed in a plan drafted by Kirvin Knox, Associate Provost for Agriculture and Public Service and Dean of the College of Agricultural Sciences. Colorado State currently operates Cooperative Extension offices in 58 Colorado counties, and its areas of outreach include providing unbiased research information and education in the areas of agriculture and natural resources. Yates said key features for restructuring Cooperative Extension include:

- Creation of a small number of regional centers strategically

located throughout Colorado. Such centers will combine the efforts of Cooperative Extension, the Agricultural Experiment Station and continuing education.

- These proposed regional centers will be linked to the main campus by state-of-the-art telecommunications technology, offering extraordinary possibilities for extended services.
- Middle management will be reduced, giving field agents greater responsibility for their programs and greater discretion to be innovative.
- All faculty members will be charged to regard themselves as specialists whose skills may be brought to bear on critical issues, with field agents directing university expertise to areas of greatest need.
- Programs will be based on clear consumer needs and directed toward serving diverse populations.

The concepts Yates described emerged from discussions with agricultural leaders that Kirvin Knox initiated nearly two years ago. In 1992 Knox began a series of meetings with Cooperative Extension constituents including farmers, ranchers, community leaders and county commissioners on how to restructure Cooperative Extension to be more responsive to the changing demographic, cultural, social and economic needs of Colorado. He believes that counties will receive better service from regionalization because they will have access to more university experts and resources. Knox aims to complete an implementation model by January 1. Some other states have requested copies of the proposal to use as a model for their extension programs.

Source: Condensed from two articles in *COMMENT, Nov. 17, 1994* by Cara Neth and Joan Allmendinger. *COMMENT* is published by the Public Relations Department, Colorado State University.

EDITOR'S IN-BASKET

USDA REORGANIZATION UNDERWAY

Congress has approved and President Clinton has signed the Department of Agriculture Reorganization Act of 1994. On October 20, Secretary of Agriculture Mike Espy signed orders which began implementation of the reorganization of USDA. The reorganization is expected to save $2.5 billion, close 1,100 field offices, reduce staff by at least 7,500 and eliminate 14 of the 43 USDA agencies. The $2.5 billion in savings from the reorganization will come from office closings and streamlining of USDA in Washington, not out of the programs run by USDA.

The legislation establishes the Research, Education and Economics mission area, headed by an Under Secretary, which is composed of four agencies: The Cooperative State Research, Education and Extension Service (CSREES); the Agricultural Research Service (ARS); the National Agricultural Statistics Service (NASS); and the Economic Research Service (ERS). The legislation specifically calls for the merger of the former Cooperative State Research Service and the former Extension Service into CSREES. With reorganization, each of the following mission areas in USDA will have its own Under Secretary:

Research, Education, and Economics -- R.D. Plowman (Acting)
Farm and Foreign Agricultural Services -- Eugene Moos
Rural Economic and Community Development -- Bob J. Nash
Food, Nutrition, and Consumer Services -- Ellen Haas
National Resources and Environment -- James R. Lyons
Food Safety -- Michael R. Taylor (Acting)

In addition, there will be three Assistant Secretaries handling the areas of Marketing and Regulatory Programs, Congressional Relations, and Administration. Implementation of the reorganization will begin immediately, starting with the headquarters structure in Washington, DC.

Source: *Experiment Station Letter* 2242, 10/21/94; *CSREES Administrator's Newsletter* 11/7/94

WaterWiser--NEW WATER EFFICIENCY CLEARINGHOUSE

Officials of the U.S. Environmental Protection Agency (USEPA) and the American Water Works Association (AWWA) have unveiled details of a new Water Efficiency Clearinghouse. The Clearing house, funded by the USEPA and headquartered at the Denver-based AWWA, provides information about water efficiency to professionals in both the public and private sectors. The Clearinghouse, called **WaterWiser**, has access to more that 3,000 references, including technical reports, papers, conference proceedings, and literature on water conservation programs conducted throughout the nation. Information on utility water-saving measures; government, commercial, and industrial water conservation programs; wastewater reuse; and general data on water efficiency is available to help professionals plan and assess water efficiency programs. Although the primary users of WaterWise will be utility and government water management professionals, the service will be available on a limited basis to the public. Most information will be provided at no cost.

To access the new service call **WaterWiser** toll-free at 1-800-559-9855 between 8 a.m. and 5 p.m. Mountain Time. **WaterWiser** services will be available on the Internet by the end of 1994. The Clearinghouse is funded through grants from the USEPA.

WATER SUPPLY

The Surface Water Supply Index (SWSI) developed by the State Engineer's Office and the USDA/SCS is used as an indicator of mountain-based water supply conditions in the major river basins of the state. It is based on snow pack, reservoir storage, and precipitation for the winter period (Nov.-April). During the winter period snow pack is the primary component in all basins except the South Platte, where reservoir storage is given the most weight. The following SWSI values were computed for each of the seven basins on Nov. 1, 1994 and reflect conditions during the month of Oct.

Basin	Nov. 1, 1994 SWSI Value	Change From Previous Mo.	Change From Previous Yr.
South Platte	+1.9	+0.1	-1.1
Arkansas	+2.0	+2.4	-0.3
Rio Grande	+1.6	+0.7	+1.9
Gunnison	+0.8	+2.4	-0.2
Colorado	-1.4	+0.1	-3.5
Yampa/White	-3.0	+0.2	-3.9
San Juan/Dolores	+1.4	+0.2	+1.7

SCALE

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

WATER NEWS DIGEST

WATER PROJECTS

Homestake II Suffers Defeat in State Court

The Colorado Court of Appeals on Thursday, November 17, overturned a lower court's decision and denied a permit for the Homestake II water project. Homestake II would have been the second phase of a plan to divert water from alpine wetlands near Vail to Aurora and Colorado Springs. The first phase was completed in 1967, but this ruling overturns a 1992 ruling by a lower court, which had reversed the Eagle County Commission's 1988 denial of permits for the project.

The appeals court agreed with Eagle County and the Holy Cross Wilderness Defense Fund that the county was justified in denying the application to build the project in the wilderness area. Homestake II called for building diversion canals and tunnels to tap spring runoff from streams within the Holy Cross Wilderness. The water, up to 21,000 acre-feet a year, would be stored in the existing Homestake Reservoir south of Redcliff and then diverted under the Continental Divide to the cities. It would meet the needs of 105,000 new urban residents.

Eagle county residents argued against the project, complaining that it would dry up lush wetlands within the wilderness and take water from the Eagle River. The appeals court said testimony at public hearings indicated that the cities' plan to mitigate the impact of the project on the Holy Cross wetlands was deficient and would be ineffective to prevent a substantial destruction of certain plant species in the area, including a rare species of moss which had been found in very few areas in the continental U.S. The court also said the cities failed to show that alternatives to the project aren't feasible.

Denver Post 11/18/94, 11/26/94; Grand Junction *Daily Sentinel* 11/22/94, *Montrose Daily Press* 11/18/94

Austin Dam Too Costly, Officials Say

Officials with the Tri-State Generation and Transmission Association said building a dam at Austin for electricity is too expensive. The company is now focused on alternatives, particularly one that could get Tri-State's water rights at the Austin site traded for storage in the Wayne F. Aspinall unit, a series of three federally owned dams upstream from the Gunnison River. They have also approached Senator Ben Nighthorse Campbell about putting such a trade into his bill to convert the Black Canyon of the Gunnison National Monument into a national park.

Grand Junction *Daily Sentinel* 9/19/94

Broomfield Begins Work on Reservoir

After years of work and worry, Broomfield is moving its drinking water supply away from Rocky Flats. The city has begun work on the new 200 acre-foot Broomfield Reservoir and a 32-mile pipeline that will bring a new supply of Western Slope water. A new water treatment plant will be going up too. By mid-1996, the three-piece project should be ready. Broomfield will then end operations with Great Western Reservoir, which supplies half of the city's drinking water and sits just downstream of the former Rocky Flats plant.

Denver Post 10/28/94

WATER ALLOCATION

Utah Reviews Las Vegas Water Lease Proposal

Utah is reviewing a controversial proposal to lease about 100,000 acre-feet of excess Colorado River water to Las Vegas and other downstream communities for 75 to 100 years. If the state charged $200 per acre-foot for the water, the state could earn $20 million a year to help pay for Utah water projects. The idea of leasing or selling some of Utah's Colorado River water was considered in 1984 and in 1989 but dropped because of concerns about losing water needed by future generations and fear of disrupting the complex legal agreements and compacts dividing the river's water.

Greeley Tribune 11/16/94; Montrose *Daily Press* 11/18/94

Fort Collins May Purchase Dixon ReservirWater Rights

The city of Fort Collins has reached a preliminary agreement with two shareholders in the Dixon Canon Ditch and Reservoir Company to purchase Dixon Reservoir water rights. The ditch company had leased the reservoir to the Colorado Division of Wildlife (DOW) for the past seven to ten years, but the company was no longer interested in leasing the water and wanted to sell the water rights. The DOW, however, has a policy of not purchasing water rights. The city is interested in acquiring the water rights of the 45-acre reservoir, because it sits at the site of the popular city-owned Pineridge Open Space. Most of the water would be used by the city's Parks and Recreation Department to irrigate the grounds of a city park South of Drake Road.

Fort Collins *Coloradoan* 11/12/94, 11/25/94; Montrose *Daily Press* 10/27/94

Pinewood Springs Receives Last Load of Water From Army

The Army, on Friday, September 23, delivered its last load of water to the unincorporated mountain town of Pinewood Springs. The town will now be paying $1,000 per day to have water hauled privately from Lyons. The town's wells, springs, and the Little Thompson River dried up this summer, and the town depleted its 700,000 gallons of stored water. The district serves 215 private water taps, and it is zoned to serve 300. Many more than the 215 private water taps have been sold for $5,000 each to property owners who plan to build homes. The Larimer County Zoning Administration may ask the county commission for permission to quit granting building permits until Pinewood Springs resolves its water shortage.

Grand Junction *Daily Sentinel* 9/25/94; Colorado Springs *Gazette Telegraph* 9/27/94

WATER QUALITY

High Mercury Levels Found in Sanchez Reservoir Fish

State health authorities warned on October 31 against eating brown trout, carp, northern pike, walleye, white sucker, or yellow perch from Sanchez Reservoir because of elevated mercury levels. Routine sampling found levels exceeding 0.5 parts per million (ppm), the "action level" set by the Colorado Department of Public Health and Environment. Highest level of methylmercury measured in fish from the reservoir was 2.17 ppm, and the average level was about 0.85 ppm. Pregnant and nursing women, women planning a pregnancy, and children 9 years of age or younger are at greatest risk from eating the fish.

Denver Post 11/1/94; Fort Collins *Coloradoan* 11/4/94; Grand Junction *Daily Sentinel* 11/3/94

Pueblo Questions New Environmental Water Standards

Changes in water quality standards for selenium in municipal sludge, the subject of an ongoing federal court battle, had threatened to force Pueblo to buy as much as $30 million in specialized treatment equipment. An additional $2 million per year might also have been needed for operations. The city argued in the U.S. Court of Appeals that the standard is unfair for a city such as Pueblo, where selenium occurs naturally as a result of the area's heavy shale deposits. If ordered to meet the standard, Pueblo likely would have had to build a plant to perform reverse osmosis water treatment. The court, however ruled against the Environmental Protection Agency.

Pueblo Chieftain 9/21/94, 11/23/94

Judge Orders Army and Shell to Pay for Arsenal Cleanup

A federal judge has ordered the Army and Shell Oil Company to pay Colorado an estimated $5.6 million for costs in overseeing the cleanup of Rocky Mountain Arsenal. U.S. District Court Judge Jim Carrigan said the ruling reinforces the state's oversight authority in the cleanup of hazardous materials at federal Superfund sites. The Army and Shell Oil manufactured chemical weapons and pesticides at the 27-square-mile arsenal, beginning in 1942. Toxic chemicals and hazardous waste leaked from storage pits and contaminated the groundwater that surrounding neighborhoods use for drinking water and irrigation. Cleanup is expected to last a decade.

Grand Junction *Daily Sentinel* 11/24/94; *Montrose Daily Press* 11/23/94

Colorado Eases Silver Pollution Limits

The Colorado Water Quality Control Commission is dumping a 7-year old government standard for silver pollution. Since 1987 Colorado has maintained two basic limits for silver contamination of water. The "acute" standard guards against spills strong enough to instantly kill fish and other aquatic life, but controversy surrounds the "chronic" standard, which addresses lower concentrations of silver too weak to immediately kill trout but strong enough to wipe out populations over the long-term. Silver Coalition experts argued for the elimination of the chronic standard, saying there was no conclusive proof that silver in the wild was a slow-acting fish killer. Experts from the wildlife and health departments disagreed.

Denver Post 9/26/94

Too Many Pesticides in Water, Group Says

A study by an environmental group that wants stricter regulations says that millions of Americans swallow unhealthy doses of five widely used farm pesticides in their drinking water. The Environmental Working Group says more than 3.5 million people in 121 Midwestern towns and cities face an elevated risk of cancer as a result. In all, 14.1 million Americans routinely consume the weed killers atrazine, cyanazine, alachlor, metolachlor, and simazine, the study said. The federal Environmental Protection Agency said the report should be viewed with concern but not alarm. It agrees with recommendations but denies that large numbers of people face a higher risk of cancer.

Colorado Springs *Gazette Telegraph* 10/19/94; *Denver Post* 10/19/94; *Greeley Tribune* 10/18/94; Fort Collins *Coloradoan* 10/19/94

WETLANDS

Fort Collins Mining Area Reclaimed by Wetlands

An area of gray, rutty soil off of Prospect Road on the edge of the Poudre River was home to one of Western Mobile's gravel mines for 15 years. Now, it is a 37-acre beaker for scientists, students, and environment watchers who want to witness the rebirth of nature. The WREN pit, as the area is called, is rapidly being transformed from a gravel pit to a natural wetland. Over the past years, sedges and cattails have grown where mounds of gravel used to sit. Sprigs of grass and cottonwood saplings have sprung up in the crusty ruts of old bulldozer tracks. The city of Fort Collins is in the process of buying the land from its owner, WREN Broadcasting Company in Kansas, for $35,000. Western Mobile had leased the mineral rights from WREN. The city expects it will cost between $25,000 and $30,000 for future habitat enhancement. The money will come from the city's quarter-cent sales and use tax fund dedicated to natural areas.

Fort Collins *Coloradoan* 10/11/94

Standley Lake Protection Project Underway

Work crews are constructing a wetlands site on the west side of Standley Lake. The wetlands will comprise phase one of the Standley Lake Protection Project – a federally funded $28.9 million plan designed to prevent Rocky Flats runoff from contaminating the drinking water supply of the northern suburbs. Teaming up on the project are the cities of Westminster, Northglenn, and Thornton. The water project was conceived out of fear that a flood could wash plutonium particles from the nuclear weapons plant into Standley Lake. To help prevent that, Woman Creek Reservoir will be built to collect water that runs through the plant site. After testing and, if necessary, treatment for contamination, water in the reservoir will be pumped to the Walnut Creek drainage basin.

Denver Post 8/4/94, 9/15/94

Wetlands Introduced at Coors Field

Coors Field in Denver is becoming the first ballpark in the United States to have wetland ponds as part of its storm drainage system. Without the system, the drainage from the stadium would go into the storm sewer system and, eventually, into the South Platte River. The system will consist of a two-chamber vault that will hold up to 330,000 gallons of runoff from inside the stadium. Some of the water will be pumped to constructed wetlands northeast of the stadium. The wetlands contain microbes that will feed on garbage usually contained in the stadium's runoff – gum, popcorn, hot dogs and beer. They can also handle oil, gas, and antifreeze from the parking areas. These constructed wetlands are able to trap sediments and break down a wide range of pollutants into elemental compounds.

Rocky Mountain News 11/19/94

WILDLIFE

Disease Threatens to Kill Endangered Fish

Goldfish in a private pond in Fort Collins tested positive for a highly contagious disease that could prove fatal to some of Colorado's endangered fish. The goldfish were infected with the bacterium that causes goldfish ulcerative disease, or goldfish furunculosis. Symptoms begin with discolored patches of scales, which eventually fall off, revealing large open sores. The disease attacks members of the sucker, carp, and minnow families, including the endangered Rio Grande sucker, Colorado squawfish, and razorback sucker. Although the disease is common in commercial goldfish operations and has been found in several wild waters in the East, the outbreaks in Fort Collins, Grand Junction, and Brush are believed to be the first confirmed cases in Colorado either in ornamental ponds or in the wild. The disease poses no threat to humans or any warm blooded animal. The Division of Wildlife (DOW) recommends burning or burying dead goldfish. If you find dead or dying suckers, minnows, or carp with lesions, contact the DOW.

Fort Collins *Coloradoan* 9/13/94

Whirling Disease May Be Affecting River Fish Growth

Many of the state's rivers are unable to produce adult wild trout as they once did. Sampling in the Poudre River over the past four years has shown a precipitous decline in the number of wild rainbow and, to a lesser extent, wild brown fry. Sampling done on the Colorado and Gunnison rivers has shown similar results. Some Division of Wildlife (DOW) specialists believe that whirling disease may be the cause. The disease, which affects only young trout and salmon species, is caused when parasites are ingested by tubifex worms that live in the sediment of river and lake beds. The parasite then passes through the worm and is released as a spore. The spores then infect susceptible fish, causing deformities in the cartilage of fish fry (fish less than 4 inches in length). The deformity causes fish to whirl in the water, making them easy prey for other fish.

The DOW state aquatics pathologist in Brush, however, found signs not consistent with the disease in both rainbow and brown trout, which are immune from whirling disease. To him, the symptoms suggested the possibility of gas-bubble disease, a result of supersaturation of atmospheric gas in water. Sources of supersaturation include deep-water dam discharge, runoff and vertical-dam spillways.

Fort Collins *Coloradoan* 10/17/94

(The above article brought the following response from Harold K. Hagen, Professor of Fishery and Wildlife Biology at Colorado State University. The response is condensed.)

We are given a boxed set of FACTS about whirling disease...It is stated that 'brown trout evolved with the disease in Europe and are immune to it.' There is no evidence to support this claim of immunity. Studies have found brown trout as vulnerable as rainbow in some situations...Most WD infections are transmitted through an intermediate host (tubifex worms) but there could be other methods of transmission...To date there is no evidence that whirling disease has caused death, either in the wild or in a hatchery, to the extent that an entire year class could be destroyed, anywhere. Death is rare even in the most stressed conditions...Biologists might believe that 'whirling' fry become easy prey for other fish but there is again no supporting evidence...Is there really a mystery in why the rivers of Colorado are failing to produce adult wild trout as they once did? Let's try increasing fishing pressures...competing uses for limited water...new sources of pollution...destruction of habitat...

Fort Collins *Coloradoan* 11/20/94

Funds for Craig Fish Hatchery Approved

A committee has approved $300,000 for developing designs for a proposed new fish hatchery in Craig. The U.S. Fish and Wildlife Service said the fish hatchery would be used for endangered fish from the Colorado River. Outdoor ponds at Craig would be used to raise endangered fish for future stocking efforts or for use in field studies. In 1995, biologists and engineers planning the Craig facility will finalize the proposed hatchery design, acquire permits, and complete the requirements of the National Environmental Policy Act.

Montrose Daily Press 9/16/94

PEOPLE

EPA Announces Appointments

Dana Minerva, special assistant to EPA administrator Carol Browner, has been named Deputy Assistant Administrator for Water. Minerva has served as EPA's point person for coordinating activities with the Office of Management and Budget and as Deputy Associate Administrator for Regional Operations and State and Local Relations. Mark Luttner, the acting deputy, returns to his post as the Water Office's Director of Policy and Resources management. A new EPA Office of Indian Affairs is expected to be officially established next month, and Browner has named Terry Williams as Director. He is the former Environmental Director for the Tulalip Tribe in Marysville, Washington. Last May, at a national tribal conference, Browner announced the creation of the new office.

Western States Water 9/30/94

Salazar Tapped for Water Panel

President Clinton announced that he plans to name Kenneth L. Salazar, a water lawyer and former head of the Colorado Natural Resources Department, to chair the Rio Grande Compact Commission. The commission administers the fair sharing and use of Water from the Rio Grande River among the states of Colorado, New Mexico, and Texas. Salazar, who had served under Governor Roy Romer since 1987, resigned as head of the natural resources department in February.

Fort Collins *Coloradoan* 10/6/94

MISCELLANEOUS

Montrose to Pay $999,999 for Land for Sludge

The Montrose City Council has agreed to pay $999,999 to purchase nearly 500 acres of farmland north of Olathe for disposing of treated sludge. The city will use the property as a site for dumping stabilized and treated sludge from the digester recently installed at the city's wastewater treatment plant. The property will be leased back to Collins Farms, the current owner, for $60 an acre, with the company continuing to grow corn on 323 irrigated acres of the property.

Montrose Daily Press 10/6/94

Ruling Clears Water Rights on Gunnison

District Judge Robert A. Brown ruled that the state can accept the donation of a coal company's conditional water right and that it may convert the right to an instream flow. The ruling removes two obstacles as the Colorado Water Conservation

Board works to secure a permanent flow of 300 cubic-feet-per-second (cfs) in the Gunnison River from Crystal Dam to the confluence of the North Fork and Gunnison rivers. In March 1988, the Pittsburgh & Midway Coal Company donated the conditional, or undeveloped, water right for 300 cfs to The Nature Conservancy, which in turn sought to donate the right to the state water board. In 1992, the state water board accepted the Gunnison River right and filed in Montrose Water Court for a change of use to instream flow.

Grand Junction *Daily Sentinel* 11/1/94

Internet to Link Users and Managers

Water users and managers are invited to hop on the information superhighway using the Colorado River Decision Support System. Users can tap into such diverse information as environmental regulations for water, flows needed for fisheries, and water used for farming. The system uses a Mosaic interface that connects its users through the Internet. For information, call Lynn Johnson or Mike Tang in the Civil Engineering Department at the University of Colorado at (303) 556-2372.

Grand Junction *Daily Sentinel* 11/1/94

LEGISLATION

Romer Calls for Compliance Aid for Small Towns

On October 7 Governor Roy Romer called for the state to help Colorado's small towns with technical assistance and extensions of time to comply with environmental regulations. Romer said he plans to ask the 1995 General Assembly to start with towns of fewer than 2,500 people and, if it works, to expand the assistance program to communities up to 10,000 population, attacking problems of wastewater treatment, drinking water, solid waste disposal, and leaking gasoline storage tanks one at a time. Under the proposal, the towns would be on a 10-year compliance schedule, subject to the approval of the Colorado Department of Public Health and Environment.

Greeley Tribune 10/8/94; *Pueblo Chieftain* 10/8/94

WATER RATES

Hotchkiss Boosts Water Tap Fees

The Hotchkiss Town Board of Trustees approved an amendment to the existing town water tap ordinance, increasing tap fees. For single homes, the in-town water tap fee will jump from $1,200 to $2,500, while out of town fees will more than triple from $1,800 to $5,500 per unit. For apartments and other multi-living units, the new in-town fee will rise from $1,200 to $2,500 plus $1,250 per dwelling unit. For multi-units outside Hotchkiss, the tap fee will be $5,500 plus $2,750 per dwelling unit. Commercial water tap fees will be $2,500 in-town and $5,500 out of town.

Montrose Daily Press 9/19/94

Fort Collins Schedules Water Rate Increase

Fort Collins has scheduled a water rate hike for 1995 to cover rising costs. For single family homes that are not metered, water rates will increase from $27.39 to $ 29.44 per month. For the typical house with a meter, rates will increase from $23.20 to $24.43 per month. The new rates also include incentives for conservation, and if customers cut consumption it could save the city millions of dollars in the long run by delaying the construction of new major water and sewer facilities.

Fort Collins *Coloradoan* 11/13/94

Colorado Springs Council OKs Water Rate Hike

Water rates in Colorado Springs may increase in 1996 to pay for $26 million of water lines in areas served by smaller, aging mains. Those mains cannot pump water fast enough during emergencies – putting older neighborhoods at risk from fire. Average monthly bills for city residents would increase 59 cents to nearly $26. The council's action isn't final; a hearing will take place next fall, and a formal vote will come at that time.

Colorado Springs *Gazette Telegraph* 11/17/94

RECREATION

Fruita Gets $10,000 for Riverfront Plan

Great Outdoors Colorado has announced $465,000 in grants to nonprofit organizations and local governments for 19 open-space planning and development projects. A $10,000 grant will be used for the Fruita Riverfront Action Plan to set aside portions of the Colorado River near Colorado Highway 340 for recreation, open space, and trails. The funds are part of a $1.5 million program the Great Outdoors Colorado board approved in June for open space and natural area protection.

Grand Junction *Daily Sentinel* 9/27/94

GROUNDWATER

Scott's Sued for Groundwater Pollution

The justice department, on behalf of the U.S. Army, has sued Scott's Liquid Gold Inc. for contributing to groundwater pollution on the Rocky Mountain Arsenal site. Scott's officials said on Sept. 12 that the suit is without merit and was brought only because the government faced a deadline beyond which it might not be reimbursed for pollution control funds it has already spent. The Superfund site was used to produce nerve and mustard gas and later for pesticide production. The suit claims volatile organic chemicals released at Scott's Denver plant have migrated through the soil and groundwater beneath the plant, forming and/or joining a plume of contamination that migrated into the aquifer used by the South Adams County Water and Sanitation District Public Water System.

Denver Post 9/13/94

THE FIFTH ANNUAL SOUTH PLATTE FORUM - INTEGRATED WATERSHED MANAGEMENT IN THE SOUTH PLATTE BASIN: STATUS AND PRACTICAL IMPLEMENTATION

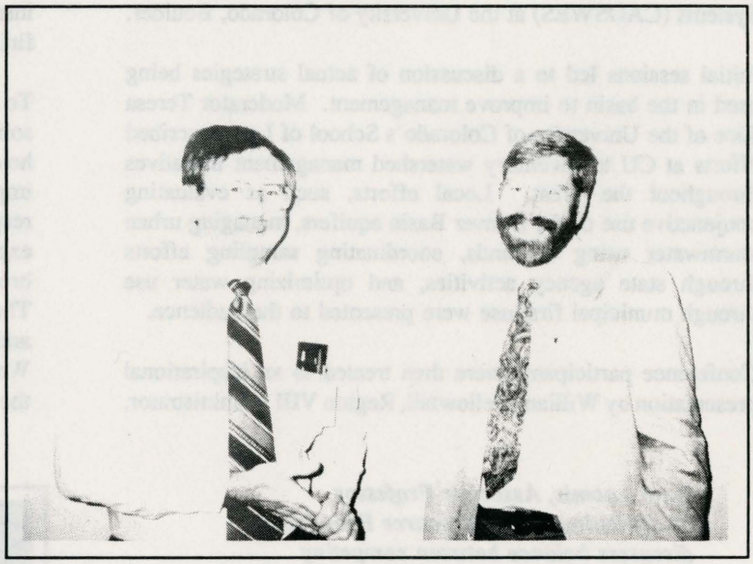
by Kathleen Klein and David Williams

This year's South Platte Forum attracted over 160 people to discuss the issues associated with a coordinated water management approach in the South Platte Basin.

Day 1 opened with a series of presentations that demonstrated incentives for cooperation within the basin. These included:

- Complying with the Endangered Species Act, as demonstrated by target flows in the South Platte River and their effect in the Big Bend region of the Platte River in Nebraska.
- Forest Service reauthorization of permits for Front Range reservoirs on tributaries of the South Platte.
- Keeping up with increasing water demands, even through difficult water delivery times.

A definition of integrated watershed management was explored with presentations on applications, commensurability, and appropriate tools.



Doug Kemper, Manager of Water Resources, City of Aurora, and John Vanroyen, Metro Wastewater Reclamation District

CADSWES workstation illustrates South Platte Water Rights Management System. This project received seed money from CWRRI.

Day 2 began with a number of technical sessions highlighting the development of tools for implementing integrated watershed management. Participants were addressed over lunch by Jim Lochhead, Executive Director of the Colorado Department of Natural Resources (see page 9). Lochhead remarked on growth and sprawl in the South Platte River basin, citing recent surveys on the feelings of citizens concerned with growth in the Denver metro and other areas. He said that there is a great need to include in the planning process all parties involved in developing projects. Lochhead topped off a morning of defining integrated watershed management with a call to implement integrated management in all projects.

The afternoon session dealt with the South Platte River basin physical setting. Presentations included technical research on assessing impacts of non-point sources of pollution, trace-element concentrations in fish tissue and bed sediment, the effects of fuel oxidants on degradation of hydrocarbons, and studies on the concentration of nutrients and pesticides in the basin.

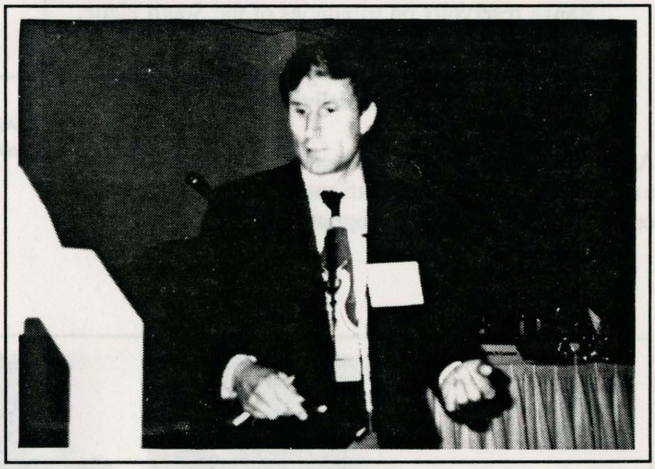
Included was a description of the South Platte Water Rights Management System, a GIS modeling approach for evaluating consumptive water use in the basin, and the role of climate information to support watershed management. A hands-on display was also provided to demonstrate the use of the Water Rights Management System to conference participants. The decision support system was developed by the Center for Advanced Decision Support for Water and Environmental Systems (CADSWES) at the University of Colorado, Boulder.

Initial sessions led to a discussion of actual strategies being used in the basin to improve management. Moderator Teresa Rice of the University of Colorado's School of Law described efforts at CU to inventory watershed management initiatives throughout the West. Local efforts, such as evaluating conjunctive use of the Denver Basin aquifers, managing urban stormwater using wetlands, coordinating sampling efforts through state agency activities, and optimizing water use through municipal first-use were presented to the audience.

Conference participants were then treated to an inspirational presentation by William Yellowtail, Region VIII Administrator, U.S. Environmental Protection Agency (see page 12). Mr. Yellowtail presented EPA's position on the implementation of watershed-based management approaches and sought input from participants regarding direction and process needs. Following Mr. Yellowtail came more summaries of strategic ideas for implementation. Descriptions of the use of water banks, the Northern Colorado Water Conservancy District's augmentation/recharge accounting program, the Boulder instream flow program and the Clear Creek Watershed Forum finished up the two-day program.

To facilitate next year's efforts, the organizing committee solicited input from the participants. Attendees were asked how the concept of integrated watershed management could be implemented on the South Platte. Over 35 individuals responded, and recommended keeping the Forum going, expanding the role of the Forum into an action group, and broadening the range of participation to all basin interests. The organizing committee appreciates the thoughtful responses and is currently examining options. We will keep you posted! We thank the Forum participants, and will continue to address the informational exchange needs of the South Platte Basin.

John Loomis, Associate Professor of Agricultural and Resource Economics, discusses balance between competing water uses in the South Platte watershed, including instream flow, fisheries, Recreation and aesthetics. He described the use of benefit-cost analyses and trade-offs between traditional water uses and environmental uses -- analyses that would objectively compare the value of water in competing uses.



MEETINGS

A RIVER OF DREAMS AND REALITIES--
ARKANSAS RIVER BASIN WATER FORUM
January 17-18, 1995
University of Southern Colorado, Pueblo

For information contact:
Colorado State Cooperative Extension
Pueblo at (719) 549-2049
Cooperative Extension, Rocky Ford at (719) 254-7608
Southeast Colorado Resource Conservation
and Development, Lamar at (719) 336-9421
Southeast Colorado Water Conservancy District
Pueblo at (719) 544-2040

CONFERENCE ON TAILINGS AND MINE WASTE '95
AND SUMMITVILLE FORUM
January 17-20, 1995
Colorado State University, Fort Collins

For information contact:
Janet Lee Montera
Department of Civil Engineering
Colorado State University
Fort Collins, CO 80523
Phone 303/491-7425
FAX 303/491-7727

PARADIGMS IN TRANSITION: NATURAL RESOURCES MANAGEMENT IN THE NEW CENTURY

April 11, 1995

Cherokee Park Room of the Lory Student Center, Colorado State University

Admission is free and the public is welcome to attend.

Featuring:

Curt Meine, Susan Jacobson, Robert Costanza, Steward Pickett, Mark Brunson, and Patricia Nelson-Limerick

This forum will serve as a stage where historians, economists, ecologists, sociologists, and educators critically appraise the history and reasons for the present-day changes, and attempt a took into the future. How did we get here, what factors initiated this tumultuous period of change, and future forecasts will be the topics of speakers chosen to present hard-hitting and incisive summaries. Sponsored by the Environment and Natural Resources Policy Institute at Colorado State University, and the Colorado State University Chapter of the Society for Conservation Biology. For further information contact Richard Knight at 303-491-6714,Joyce Berry at 303-492-5405, or Dan Binkley at 303-491-6519.

1995 SEMINAR ON FLOOD MANAGEMENT IN ST. LOUIS

March 30-April 1, 1995 -- St. Louis, Missouri

The Seminar, **The Realities of Floods--A Multi-Disciplinary Review of Flood Management Issues,** will provide an open discussion of integrated flood management policies considering political, institutional, engineering, environmental and economic perspectives. Lectures during the technical sessions will be presented by invited speakers and will focus on three topics: **Politics of Floods, The Flood Management Milieu** and **Management of Floods**. A concluding session will address **Where Do We Go From Here?** A study tour will review flood control and water management features in the St. Louis area.

The Conference is sponsored by the U.S. Committee on Irrigation and Drainage. "Our goal for this Seminar is to bring together representatives of the involved interests and disciplines to develop a framework for flood management policy that all can accept and adopt," according to Darell D. Zimbelman, President of USCID.

To receive program and registration information, contact U. S. Committee on Irrigation and Drainage, 1616 Seventeenth Street, Denver, CO 80202. Phone 303-628-5430; FAX 303-628-5431.

1995 ANNUAL CONVENTION COLORADO WATER CONGRESS

January 25-27, 1995

Holiday Inn, Northglenn

Invited speakers include Dr. Albert Yates, President, Colorado State University; Gale Norton, Colorado Attorney General; Tom Donnelly, Executive Vice President, National Water Resources Association; and luncheon speaker Governor Roy Romer.

General Session topics are: A debate on the "Public Trust Doctrine and Presentations on the Colorado River by Representatives of the States of Arizona, California, Nevada, New Mexico, Utah and Wyoming.

Six legislators will address the delegates at the Friday, January 27 Legislative Breakfast. The 15th annual Wayne N. Aspinall Water Leader of the Year Award will be presented at the January 27 luncheon.

For information contact:

Colorado Water Congress
1390 Logan Street, #312
Denver, Colorado 80203
Phone 303/837-0812
FAX 303/837-1607

1995 ANNUAL CONVENTION FOUR STATES IRRIGATION COUNCIL

January 11-13, 1995

University Park Holiday Inn

Fort Collins, Colorado

This year's program promises to provide updated information and lively discussion. Assistant Secretary for Water & Science, Betsy Rieke, has agreed to give the keynote luncheon address on January 12. The program includes a workshop on "How to Keep Your District Operating Smoothly."

General Session topics include a Bureau of Reclamation Overview, Water Spreading Panel Discussion, Proposed USBR Water Conservation Plan Guidelines and Contract Renewals, The Irrigation Initiative, Endangered Species Act, and the November Election Impact on Natural Resources Policy.

Workshops will focus on Automation Developments, Site-Specific Water and Chemical Management and Limited Irrigation.

The Banquet Speaker is the Honorable Conrad Burns, Montana Senator.

For further information contact: Brian Werner, Northern Colorado Water Conservancy District, 303/667-2437.

CALLS FOR PAPERS

YOUTH AND THE ENVIRONMENTAL INDUSTRY
Partnerships for Education and Employment

Executive Towers Hotel, Denver, Colorado
March 30-31, 1995

Conference Concept -- Environmental industry programs benefit society, but only a few of them focus the industry's resources on youth development. Integrated efforts and partnerships are needed where government, industry, education and non-governmental and volunteer organizations work together on youth and environmental programs, especially those concerned with at-risk youth. These programs can help talented young to enter the environmental field, teach citizens about the environment, promote science education, and link K-12 and higher education with the working world. The conference will focus on how partnerships can be used to coordinate and integrate separate program efforts such a jobs and internships, counselling for careers and academic, curriculum development, mentoring, recruitment and retention, and teacher development.

Papers and abstracts are solicited on topics such as:

*Success in environmental-education-employment programs
*Partnering for youth programs in the environmental industy
*Environmental and science education in K-12 systems
*University linkages with K-12 in environmental programs
*Roles of associations and public interest organizations
*Industry programs to enhance employment
*Environmental industy and workforce issues
*Environmental education in higher education
*Programs for women and minorities

Conference plan -- The first day will feature presentation of papers and abstracts. On the second day, workshops will focus on special topics in the morning and summaries will be presented after lunch. Adjourn by 3 pm of the 2 second day.

Send abstract or expression of interest by January 6, 1995 and brief papers by February 28, 1995 to: Neil S. Grigg or Janet Montera, Department of Civil Engineering , Colorado State University, Fort Collins, CO 80523. Tel: 303-491-7425 Fax: 303-491-7727.

15TH ANNUAL "HYDROLOGY DAYS"
April 3-7, 1995, Fort Collins, Colorado

HYDROLOGY DAYS provides a forum for hydrologists and hydrology students to get acquainted and to share problems, analyses and solutions. The five day program will include volunteered papers (mostly), invited papers (a few), and student papers (one full day at least). A written paper is not mandatory for participation in the program.

Deadline to submit the final written paper for preprinting in the Proceedings is February 28, 1995. Guidelines and special paper will be provided on request. Proceedings will be available at the conference.

Awards and prizes will be presented for the best student papers as oral or poster presentation in two or three categories: B.S. and/or M.S. and Ph.D. candidates.

Registration Fees/Information -- Regular: $140.00 By March 10, 1995; $170.00 After March 10, 1995. Students: Free By March 10, 1995; $10.00 After March 10, 1995.

Send three copies (original plus two) of abstract, per abstract preparation instructions by January 10, 1995 to:

Professor Morel-Seytoux
Hydrology Days
57 Selby Lane
Atherton, CA 94027-3926.
Tel and Fax: (415) 365-4080
email: morelsey@leland.stanford.edu

For registration and general information, contact:

Janet Montera
Hydrology Days
Civil Engineering Department
Colorado State University,
Fort Collins, CO 80523.
Tel (303) 491-7425
Fax (303) 491-7727

WHOSE THIRST IS FIRST?
A NEW PARADIGM FOR WATER MANAGEMENT?

THE UNIVERSITIES COUNCIL ON WATER RESOURCES
ANNUAL MEETING
PORTLAND, MAINE
August 1-4, 1995

"Integrated Resource Protection" -- "Integrated Watershed Management" -- "Ecosystem Management" -- There are many expressions being used to describe a more holistic approach to water management within a total watershed/ecosystem framework. To some, these words elicit a sigh of, "Here we go again!" To others, the words reflect a major paradigm shift in water management. To still others, the terms imply a threat to "take" water from existing uses and give it to other uses. What is really happening? UCOWR's 1995 annual meeting will examine the nature of changes taking place in society's efforts to manage water and reflect on the impacts these changes may have upon the water education, research and outreach efforts of higher education. This meeting is a must for those trying to understand the changes taking place in water management during the 1990s, and, in particular, those trying to determine higher education's role in these new initiatives.

Paper and poster presentation proposals are solicited on the following topics:

Integrated watershed management: A better approach to water management or more unfunded mandates?
Ecological integrity - a better water management goal or an excuse for "takings"?
Economic and social integrity - competing objectives?
Urban stormwater management vs. urban riparian ecosystems!
Ecosystem restoration - how?
Case studies describing "Integrated watershed management"
Integrated education for watershed management - current status?
Coastal Zone Management - An effective NPS strategy?

Send three copies of each proposal to the Technical Program Chair, Robert Ward. Proposals should be limited to 1000 words and must include affiliation and position of the author(s), address(s), and daytime telephone and FAX numbers. Speakers are expected to register for the conference. Participants will receive a copy of the Proceedings. **Paper and poster presentation proposals must be received by March 1, 1995.** Authors will be notified of acceptance by April 1, 1995. Address correspondence to the Technical Program Chair:

Robert C. Ward
Colorado Water Resources Research Institute
Colorado State University
Fort Collins, Colorado 80523
(303) 491-6308; FAX: 491-2293

Conference Site: The conference will be held at the Holiday Inn by the Bay in Portland, Maine. The conference hotel offers rooms with breathtaking views of Casco Bay or the White Mountains of New Hampshire. Sailing, golfing, salt water fishing, walks through historic Old Port or along Portland's beaches, and excellent seafood are offered along with outstanding conversations about evolving water management strategies!

LATE NEWS--The U.S. Supreme Court has refused to review a lower-court decision that denied a plan by American Water Development Inc. to pump water out of the San Luis Valley and sell it. In May, the Colorado Supreme Court backed a decision by Division 3 (Alamosa) Water Judge Robert Ogburn to deny AWDI's request for 200,000 acre-feet per year of San Luis Valley water. In September, AWDI appealed the Colorado high court's decision to the U.S. Supreme Court.

Source: *The Pueblo Chieftain*, 11/29/94

CALENDAR

1995

Jan. 17-20	TAILINGS 7 MINE WASTE '95 7 SUMMITVILLE FORUM, Fort Collins, CO. Contact: Janet Lee Montera, Phone 303/491-7425.
Mar. 5-8	CLEAN WATER-CLEAN ENVIRONMENT-21ST CENTURY, Kansas City, MO. Contact: ASAE Meetings & Conferences, Phone 616/429-0300; FAX 616/429-3852.
Apr. 23-26	WATER IN THE 21ST CENTURY; CONSERVATION, DEMAND & SUPPLY, Salt Lake City, UT. Contact American Water Resources Association, Phone 703/904-1225; FAX 703/904-1228.
May 14-18	WATER RESOURCES AT RISK, Denver, CO. Contact: Helen Klose, Amer. Inst. of Hydrology, 3416 Univ. Ave., SE, Minneapolis, MN 55404, Phone 612/379-1030.
May 23-25	WORKSHOP ON COMPUTER APPLICATIONS IN WATER MANAGEMENT, Fort Collins, CO. Contact L.R. Ahuja, USDA-ARS, Phone 303/490-8300; fax 303/490-8310.
June 25-28	WATER RESOURCES & ENVIRONMENTAL HAZARDS: EMPHASIS ON HYDROLOGIC & CULTURAL INSIGHT IN THE PACIFIC RIM, Honolulu, Oahu, Hawaii. Contact American Water Resources Association, Phone 703/904-1225; FAX 703/904-1228.
July 2-14	INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS, Boulder, CO. Contact IUGG XXI General Assembly, c/o American Geophysical Union, Phone 202/462-6900, FAX 202/328-0566, e-mail iugg_xxiga@kosmos.agu.org.
Oct. 21-25	WATER ENVIRONMENT FEDERATION 68TH ANNUAL CONFERENCE & EXPOSITION, Miami Beach, FL. Contact: Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314-1994. Phone 800/444-2933.
Nov. 5-9	1995 NATIONAL CONFERENCE OF THE AMERICAN WATER RESOURCES ASSOCIATION, Houston, Texas and Reconvened Conference Nov. 10-12, 1995, Cancun, Mexico, General Chairperson, Bechtel, 3000 Post Oak, Houston, TX 77252-2166, Phone 713/235-4921.

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