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WATER ITEMS AND ISSUES . . .

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ENDANGERED SPECIES MANAGEMENT: PLANNING OUR FUTURE

6th Annual South Platte Conference
October 25-26, 1995

See page 20

David Graf, Conference Coordinator

Colorado State University

♦ ♦ ♦

PARDON THE DELAY - POLITICS AT WORK!

Editorial by Robert C. Ward

CWRRI is not issuing its usual call for proposals at this time due to a situation that is developing in Washington, D.C. with respect to the Federal portion of our budget. The final version of the House-Senate Conference Report on the FY 1996 Interior Appropriations Bill was released Sept. 22, 1995. While the Water Institutes program is to receive the same total amount of funding as in FY 1995, the money is being programmed differently for FY 1996. The exact wording of the Conference Report is as follows:

> "The managers have agreed to fund a competitive program for the water resources research institutes with at least a 2 to 1 funding match from non-Federal sources. The managers expect that this approach likely will lead to the closure of some of the institutes. The managers recommend that in fiscal year 1996 a modest base grant of $20,000 per participating institute be provided with the balance of the funding for the program to be competitively awarded based on National program priorities established by the USGS. The need for continuing a small base grant beyond fiscal year 1996 should be carefully examined by the USGS in the context of its fiscal year 1997 budget priorities. The managers do not object to competitions being regionally-based if that approach is determined by the USGS to be the most productive, from the standpoint of meeting the most compelling information needs, and the most cost effective. If a regional approach is selected, the managers suggest that the USGS regions be consolidated so that there are no more than 4 or 5 large regional areas. The competition should not be structured to ensure that every participating institute in a region gets a competitive award. The USGS should report to the Committees in the fiscal year 1997 budget submission on how the competition is to be structured and should report in subsequent budget submissions on the distribution of competitively awarded grants by institute."

As I read these words, they imply a strong desire in Washington, D.C. to have the USGS set water research priorities at the national/regional level rather than at the individual, state-based water institutes level. Furthermore, it appears that there is a desire to eliminate some institutes.

With respect to CWRRI, we are programmed to receive only $20,000 for FY 1996. This is down from the almost $80,000 we received in FY 1995. In order to obtain additional funding through the USGS, we now must prepare proposals to do research that is decided by USGS through some form of national or regional structure that is currently undefined.

The immediate effect of this policy is to stop CWRRI from soliciting proposals for a 1996/97 Research Program. We simply don't know how the FY 1996 program will be structured nor how it will operate.

If CWRRI had issued a call-for-proposals at this time, the following water research topics would have been the top priority. These priorities were determined by Colorado water users and managers, primarily as represented by CWRRI's Research Planning Advisory Committee.

- Predicting future water demand by all segments of Colorado's economy and environment.
- Are we collecting the right data to manage Colorado's water in the 21st century?
- With what, and by how much, do septic tanks pollute groundwater in Colorado's mountains?
- How much water do endangered species need?
- Colorado vs. Kansas: What are the water management ramifications to Colorado citizens?

The following two items were tied in the ranking:

- Identifying indicator variables for reporting on the status and trends of Colorado's watersheds.
- Managing Colorado's water data: new computer technology -- new access?

The following two items were tied in the ranking:

- Conjunctive use of surface and groundwater: An old issue with new imperatives!
- Groundwater recharge: What are the concerns?

While CWRRI will delay (and possibly cancel) its call-for-proposals, there is still much uncertainty as to exactly how the USGS will work to implement the recommendations of the Conference Report. Until the USGS clarifies how it will proceed, CWRRI will be unable to act.

At the present time, we are examining our options for continued operation. We are working closely with other water institutes to formulate a response to these changes that makes sense for all states. As soon as the exact consequences of this new policy to CWRRI are clear, we will announce our future plans.

WATER RESEARCH

CWRRI'S ANNUAL REPORT SUMMARY

"GROWTH" was Colorado's buzzword in 1995 . . .

Governor Roy Romer convened several "growth summits" across the state to address the situation. At the request of the Western Governors' Association, the Western States Water Council prepared a report of the problems and issues associated with water policy and growth management in the western states (**Water Policy and Growth Management, A Report Prepared for the Western Governors' Association by Staff of the Western States Water Council (WSWC), June 1995**).

The report examines the experiences of states and localities in dealing with water policies as tools in growth management. It confirms that the West's demographics have changed -- it is no longer primarily rural. The target areas of new growth include suburbs of metropolitan areas, small and medium-sized cities, resort communities, and gateway towns to national parks. The report notes that Douglas County, a suburb of Denver, is one of three counties in the Rocky Mountain West included in the four fastest-growing counties in the nation. Yet, there is also a good deal of new growth in agricultural valleys, largely in unzoned and unplanned rural areas.

Added to concern about growth, concern about the loss of Colorado's agricultural land to nonagricultural uses led Governor Roy Romer to establish a Task Force on Agricultural Lands. The consequences, in general, are identified as farmland being directly converted to urban development and indirectly converted through water transfers to suburbs and growing communities.

The WSWC report notes that although irrigated agriculture remains the largest water user and retains considerable influence regarding water law and policies, cities are increasing their impact on the politics of water. At the same time, public support is increasing for instream values -- water for fish and wildlife habitat, recreation, and aesthetic values. While the report emphasizes that growth management "has been and should remain primarily a local responsibility," it also notes that "the history of success by local governments to manage growth by controlling water availability is checkered." The success of state growth and management efforts is hard to gauge because little information is available concerning their effects.

How do Coloradans view growth issues and priorities for water use? The 4th annual Colorado Environmental Poll was conducted in March, 1995 by CSU's Human Dimensions in Natural Resources Unit. Poll results showed that when asked to prioritize water uses in the state, respondents were evenly split between agricultural purposes (44 percent) and efforts to maintain a balance in nature (43 percent). In a reflection of paradoxical attitudes toward growth, less than ten percent ranked the needs of growing cities as their highest priority.

Long-term planning as well as local, watershed planning are recommended in the WSWC report as tools to address a variety of challenges. In Colorado, at last count, the watershed-based approach was active in the following basins: the Arkansas River, South Platte River, Colorado River, Gunnison River, Poudre River, Boulder Creek, St. Vrain River, Big Thompson River, Clear Creek, Yampa River, Animas River, Eagle River, Bear Creek, Cherry Creek and the Blue River.

CWRRI has inventoried these efforts and they are described in an article in the August 1994 issue of COLORADO WATER -- **"Watershed-Based Initiatives in Colorado: What's Really Going On?" and a subsequent article to be published in the October 1995 issue, "Watershed Management Initiatives in Colorado -- An Information Exchange."**

Information access is another very important tool, the WSWC report says. There is significant potential for state and local government collaboration in developing GIS applications for use in local and regional water planning. Two CWRRI projects dealt with the information needs of GIS applications in regional water planning. The Colorado State Engineer's Office is currently working with the Colorado Water Conservation Board and South Platte water users on the South Platte Water Rights Management System, and the projects described below were designed to complement that effort.

Decision Support for Water Rights Administration --Understanding the water administration of the South Platte River Basin is no small task. This project summarized key studies related to water rights administration in the basin and proposes a strategic plan to complete the components of a decision support system for water rights administration. These include data collection and data storage, a definition of model needs, an identification of models to meet those needs, and the development of a models interface to a data management system and integration with a decision support system. The final steps are the design and implementation of a models "base" maintenance system.

Initiating a Water Management Decision Support System for the South Platte Basin-- Investigators looked at the current status of South Platte decision support and potential DSS components (databases) models that have been used in the basin, including SPWRMS,

MODSIM, CRAM, SAMSON and BESTSM, and the CADSWES water rights model. (*WATER IN THE BALANCE* No. 2, Aug. 1995).

The WSWC report notes that future growth-management efforts will revolve around natural resource constraints. Information needs now, more than ever, are centered around "integrated" goals: Watershed Planning; Agricultural Water Conservation; Basin-of-origin Protection; Integrated Water Quality and Quantity Management; and Informing the Public about Water Management Activities and Goals.

CWRRI, in response to these needs, is devoting more of its research monies to projects that feature integrated expertise between university researchers and water management organizations. In particular, many members of CWRRI's Research Planning Advisory Committee participate as task force members for research projects. CWRRI research efforts related to the above topics will now be examined.

WATERSHED PLANNING

There is growing consensus that resource planning should be undertaken on a wider basis to address challenges that include water supply, water quality, instream flows, fishery protection, and recreational use. The 1994 proposed reauthorization of the Clean Water Act listed among its purposes: "To assure that water pollution control programs more comprehensively protect the ecological integrity of water bodies...through enhanced protection of the physical and biological components of the waterbodies." How do we define "Ecological Integrity?"

An interdisciplinary task force organized by CWRRI has looked at the definition and measurement of ecological integrity and how water users can take a more holistic and inclusive view of aquatic ecosystems. A task force of scientists representing six different disciplines cooperated to provide physical, biological, and social science perspectives on the definition and measurement of ecological integrity (**Ecological Integrity and Western Water Management: A Colorado Perspective**).

AGRICULTURAL/URBAN WATER CONSERVATION

Federal Census of Agriculture Reports show that, since 1978, Colorado farmland has declined by 90,000 acres per year on average – equal to a path one mile wide and 140 miles long along Colorado's Front Range (the distance from Fort Collins to Colorado Springs). The Governor's Task Force on Agricultural Lands, in cooperation with the Colorado Department of Agriculture, is examining the trends, causes, and consequences of agricultural land conversion and will develop recommendations by December. A just-completed CWRRI project may provide baseline information for the task force.

Agricultural Water Conservation: Myth or Reality? was identified as one of the top ten water research priorities by CWRRI's Research Planning Advisory Committee (RPAC). CWRRI organized a task force to spell out exactly what the concept "Agricultural Water Conservation" means to the State of Colorado and its citizens. The task force was comprised of members from Colorado State's Departments of Soil and Crop Sciences, Chemical and Bioresource Engineering, and Cooperative Extension. Seven members of CWRRI's Research Planning Advisory Committee (RPAC) also served on the Task Force.

With dimming prospects for water storage projects, urban water conservation will continue to be a top priority for the State of Colorado. Approximately 70 percent of the summer water use in urban areas is for lawn watering. Excessive water use for lawns not only wastes scarce water resources -- it also may cause groundwater quality problems because the deep percolation water carries harmful chemicals such as fertilizers and pesticides to the groundwater.

In a CWRRI research project conducted at the Agricultural Engineering Research Center at Colorado State University, the use of small lysimeters to accurately measure water lost as deep percolation in lawn watering is being tested. The project, **Consumptive Use and Return Flows in Urban Lawn Water Use**, will develop methods to estimate the amount of water lost as deep percolation in lawn water use, how much of the loss is preventable, and what management practices will help. The study is partially funded by the State Engineer's Office and the City of Colorado Springs. It is conducted at a field research site at the Foothills campus of Colorado State University. The State Engineer's Office and the City of Colorado Springs have provided annual supplemental funding for this ongoing project.

INFORMING THE PUBLIC ABOUT WATER MANAGEMENT ACTIVITIES AND GOALS

As growth and its associated problems continue, water resources education becomes more critical. What do Colorado residents know about water? The 1991 Colorado State Fair contained an exhibit called Colorado Resources: Liquid Gold. It was one of the first attempts to bring together a large cross-section of the Colorado water community to work on an educational effort. Consider the responses of the public to the following water-related questions.

"What percent of Colorado's water is consumed by the Denver Metropolitan Area?" (The answer is about 3 percent.) Almost 60 percent of the respondents answered 35 percent or more.

"What percent of Colorado's water is consumed by agriculture?" (The answer is about 80-85 percent.) Fifty-seven percent answered that agriculture consumes 40 percent or less.

Providing public information about water was voted a top priority by the Institute's Research Planning Advisory Committee (RPAC). CWRRI created a Public Water Information Task Force to examine how to better inform the public about water issues so that it can rightly assume its role as an informed decision maker regarding water management in Colorado. Water users/managers from local agencies, state agencies, federal agencies and the private sector served on the task force for the project, **People and Water: An Information Puzzle**.

WATER QUALITY AND QUANTITY MANAGEMENT

What is the quality of our rivers and groundwaters? Are current programs adequate to prevent contamination of streams and rivers? Has the implementation of pollution abatement programs improved water quality and ecosystem health of streams and rivers? The impacts of agriculture and increasing urbanization on water quality can include increased loads of sediment, salinity, nutrients and pesticides. How should we manage our water resources with respect to water quality issues?

While some rivers are sediment balanced, some are sediment rich and some are sediment poor. Some, at certain times, are grossly damaged by sediment. A CWRRI Task Force was established to provide a defining statement on sediment in Colorado rivers and streams, to analyze the role of sediment in the health of Colorado rivers and streams, to examine situations where sediment is a problem, and where it is needed and where it becomes excessively damaging. Task Force members for the project, **Colorado Sediment: The Good, The Bad and The Ugly!** included representatives of the Colorado Division of Wildlife and the State Engineer's Office.

Use of Best Management Practices by Colorado farmers can help reduce the agricultural contamination of Colorado water resources and minimize non-point source pollution.

Looking at the problem from a larger perspective was a CWRRI pilot study to develop a GIS-based model that evaluates agricultural non-point source pollution at a watershed level -- **Linking a Geographic Information System (GIS) to Non-Point Source Pollution Models to Assess the Implementation of Best Management Practices.** The model will be designed to pinpoint problems such as the generation and destination of sediment and runoff-borne nutrients and pesticides. The display and analytical capabilities of such a system can greatly aid in: visualization of the problem; the assessment of alternative scenarios and solutions; and the evaluation and recommendation of best management practices for Colorado farmers.

Abandoned mine sites are scattered across the West, and they have contributed significant amounts of trace metals to nearby waters. At the St. Kevin Gulch site near Leadville, Colorado, acidic surface water runoff from an abandoned mine recharges the natural wetland of Tennessee Park. The recharge occurs as surface water and groundwater flow from the surrounding mountains.

A CWRRI research project, in cooperation with the Geological Survey, is characterizing iron transport through the Tennessee Park wetland to test the hypothesis that reduced iron is transported out of the wetland and flushed into the underlying aquifer during late summer and fall. Investigators also evaluated applicability of reaction transport modeling to acid mine drainage impacts and remediation. USGS support to the project, **Characterization of Iron Transport Between an Alluvial Aquifer and a Natural Wetland Impacted by Acid Mine Drainage**, included access to existing site data and to field and laboratory equipment.

How can urban stormwater quality be effectively managed as part of a multipurpose, watershed-based management program? A CWRRI project conducted at the University of Colorado used the City of Boulder and the Boulder Creek Watershed as a case study.

Researchers on the project, **Cost-Effective Management of Urban Runoff Quality**, developed a prototype decision support system (DSS) for the watershed that includes an integrated database, stormwater simulation models, a simple GIS, and a management model that will permit various options to be evaluated at the watershed scale. The research updates and extends previous research in which the principal investigator conducted nationwide assessments of the economic impact of urban stormwater management and the expected receiving water responses (under sponsorship of the Environmental Protection Agency). The Denver Urban Drainage and Flood Control District, the City of Boulder, and the U.S. Environmental Protection Agency also supported the study.

SPWRMS HELPS ADMINISTRATION OF SOUTH PLATTE RIVER SYSTEM

Abstracted from South Platte Water Rights Management System
WATER IN THE BALANCE No. 4, September 1995

The system of water rights currently used in Colorado began with the gold rush that followed the discovery of gold at Sutter's Mill, California in 1848. Mining required large volumes of water, and frequently early miners were in conflict. As a result, settlers developed rules and procedures governing the allocation of water that resembled the staking of mining claims, which developed into what is known as the prior appropriation doctrine. The first person to divert and utilize water from a stream had rights to the amount of water diverted, thus becoming the senior appropriator on that stream. All subsequent water users were junior appropriators whose right to divert water depended upon the satisfaction of more senior rights.

Only Colorado still uses prior appropriation in its purest form. And in much of Colorado, including the South Platte River Basin, legal rights exist to more water than is physically available, especially during the peak of the summer irrigation season. Much of the case load in a modern Colorado water court involves the transfer of water rights among different uses and users.

To administer the water supply and increase the efficiency of its use, managers must know how much water is in the river before deciding who may use it. The South Platte Water Rights Management System (SPWRMS) was conceived to make river system data available and to enhance the administrative decision-making process for a river whose resources remain essentially fixed but which faces increasing domestic and industrial demands.

The foundation of the SPWRMS is a central database located at the Office of the State Engineer in Denver. The database contains administrative information, such as the State Water Rights Tabulation for Division 1, as well as real-time river flows for numerous gages on the South Platte and its tributaries. Water administrators record real-time information about their respective portions of the river to the central database as they perform daily management tasks, making that information immediately available to other system users. SPWRMS users have access to current diversions, flows, and river calls as well as historical information. Water administrators in Denver and Greeley access the database using UNIX workstations and local computer networks. Water commissioners throughout the South Platte Basin connect to the database over conventional phone lines, using laptop PCs with modems to submit information about their own districts and to retrieve data concerning other parts of the basin. Throughout the day, streamflow data enters the database automatically as it arrives via satellite transmission.

SPWRMS software keeps track of river calls. When a senior appropriator contacts the Colorado Division of Water Resources to request that a call be set, water administrators use SPWRMS to see who will be affected by the new call. An important feature of the system is its knowledge of upstream-downstream relationships between points on the river. River calls are stored in the central database, providing users with an up-to-date representation of the call structure for the entire basin. SPWRMS, by providing near real-time information concerning the state of the river and its tributaries, can help determine possible injury to holders of more senior rights by modifications in the use of a given right and can help water administrators protect instream flows and avoid higher-than-necessary instream flows. The software does not replace, but supports and extends, the individual's decision-making capabilities.

The SPWRMS was developed by CADSWES, the Center for Advanced Decision Support for Water and Environmental Systems. CADSWES, located at the University of Colorado at Boulder, is an interdisciplinary research and development center of the College of Engineering and Applied Science. SPWRMS, a basinwide effort, was developed through the efforts and funding of the State Engineer's Office; the Colorado Water Resources Research Institute; the U.S. Geological Survey; Denver Water; the Cities of Aurora, Boulder, Englewood, Lakewood, and Thornton; the Centennial Water and Sanitation District (Highlands Ranch); the Division of Parks and Outdoor Recreation; Consolidated Ditches (Fort Lupton); the Riverside Reservoir and Land Company (Fort Morgan); and Farmers Reservoir and Irrigation Company (Brighton). The report is available from CWRRI (Phone 970/491-6308).

KANSAS RESEARCHERS ANALYZE WATER TRANSFER CASES

In a project sponsored by the Kansas Water Resources Research Institute, researchers investigated the legality of different types of water transfers under current Kansas laws and regulations. They found that Kansas' Water Transfer Act (1982) potentially places extraordinary administrative barriers to water transactions in order to prevent the possibility of third party effects. These barriers could conceivably create sufficient transaction costs to prevent an otherwise beneficial water transfer. Three informational problems were identified in any developing water market:

- the establishment of consumptive use;
- matching buyers and sellers; and
- third party challenges to a water transfer.

Three suggestions are presented for managing these informational problems:

- First, provide a rule-of-thub method of establishing the consumptive use associated with a water right.
- Second, institutionalize information transfer by establishing a central clearing house for water transfers.
- Third, provide potential third-party challengers with realistic information about the cost of mounting an effective challenge to a proposed water transfer.

For information about the report contact: The Kansas Water Resources Research Institute, 144 Waters Hall, Kansas State University, Manhattan, KS 66506-4007 (913/532/5729.

WATER RESEARCH AWARDS

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

Colorado State University, Fort Collins, CO 80523

PCR Diagnosis of Whirling Disease in Colorado Trout, Robert P. Ellis, Microbiology. Sponsor: Colorado Division of Wildlife

Forest Characteristics & Songbirds on the Yampa River, Richard L. Knight, Fishery & Wildlife Biology. Sponsor: The Nature conservancy.

South Platte County Classification of Riparian Vegetation of the South Platte River Basin, Christopher A. Pague, Fishery and Wildlife Biology. Sponsor: Colorado Department of Natural Resources (DNR).

Conduct a Statewide Biological Survey for U.S. Naval Oil Shale Reserve No. 1, Garfield County, Colorado, Christopher A. Pague, Susan Spackman, and Renee Rondeau, Fishery and Wildlife Biology. Sponsor: Fluor Daniel (NOPSER) Inc.

Aquatic Resource Analysis, Stephen A. Flickinger, Fishery and Wildlife Biology. Sponsor: Colorado Division of Wildlife.

Larimer County Wetlands Inventory & Evaluation, Christopher A. Pague, Fishery and Wildlife Biology. Sponsor: DNR.

Park County Inventory & Evaluation of Park County Peatlands, Christopher A. Pague, Fishery and Wildlife Biology. Sponsor: DNR.

Routt County Classification of Riparian Vegetation of the South Platte River Basin, Christopher A. Pague, Fishery and Wildlife Biology. Sponsor: DNR.

Effects of Woody Vegetation on Channel Roughness, Steven R. Abt, and Chester C. Watson, Civil Engineering. Sponsor: DOD-ARMY-Corps of Engineers.

Potential Losses of EPTAM during Sprinkler Application & the Influence of Soil Moisture..., Scott Nissen, Plant Pathology & Weed Science. Sponsor: Potato Administration of Colorado.

Summitville Mine Site CERCLA Investigation: Livestock & Waterfowl Risk Management, A. William Alldredge, Fishery and Wildlife Biology. Sponsor: Colorado Department of Public Heath and Environment.

***Ecology & Status of Rio Grande Sucker,** Brett M. Johnson, Fishery and Wildlife Biology. Sponsor: Colorado Division of Wildlife.

Trophic Interactions in Colorado Reservoirs-Bioenergetics, Brett M. Johnson, Fishery and Wildlife Biology. Sponsor: Colorado Division of Wildlife.

Field Demonstration of Infiltration Controls for Landfills, Thomas, Hakonson, Fishery and Wildlife Biology. Sponsor: DOD-NAVY.

Research on Stream & Riparian Contaminant Risk Assessment Methods for Monitoring Fish...., Stephen A. Flickinger and Del Wayne R. Nimmo, Fishery and Wildlife Biology. Sponsor: USDI- National Biological Survey.

Systems Analysis Methods for Water & Natural Resources Decision Making, Marshall Flug, Civil Engineering. Sponsor: USDI-National Biological Survey.

Development & Application of Biological Assessment Techniques, Glenn E. Haas, and Terence P. Boyle, Natural Resource and Recreation & Tourism. Sponsor: USDI-National Biological Survey.

Pulse Irrigation Strategies for Colorado Greenhouses, Steven E. Newman, and Douglas A. Hopper, Horticulture. Sponsor: Colorado Floriculture Foundation.

Economic & Ecological Sustainability on the Colorado Plateau, William P Spencer, and John R. McKean, Agricultural & Resource Economics. Sponsor: USDI-National Biological Survey.

Research Workshop on the Hydrometeorology, Impacts & Management of Extreme Floods, Jose D. Salas, Civil Engineering. Sponsor: NSF - Engineering Grant.

***Developing Tools to Predict Persistence of Extent & Reintroduced Colorado River Cutthroat Trout...,** Kurt D. Fausch, Fishery and Wildlife Biology. Sponsor: Colorado Division of Wildlife.

***Gas Phase Transport of Volatile Organic Compounds in the Vadose Zone,** David McWhorter, Chemical and Bioresource Engineering. Sponsor: University of Waterloo.

***Soil Water Storage & Use as Affected by Climate Zone, Soil Position & Crop Rotation,** Gary A. Peterson, Soil and Crop Sciences. Sponsor: University of Nebraska.

***Optimal Conjunctive Use of Surface & Groundwater Resources in the Lower Nile:..,** John W. Labadie, Civil Engineering. Sponsor: Utah State University.

***Integrated Model for Optimization of Water Allocations,** Gustavo E. Diaz, Civil Engineering. Sponsor: USDA-USFS-Rocky Mountain Experiment Station.

***Statistical Methodology for National Wetlands Inventory Status & Trends Data,** Kenneth P. Burnham, and David C. Bowden, Cooperative Fish and Wildlife Research. Sponsor: DOI-U.S. Fish & Wildlife Service.

***Evaluate & Establish Selected Native Plant Materials on Mancos Shale Soils,** Edward F. Redente, and Terry McLendon, Rangeland Ecosystem Science. Sponsor: DOI-National Park Service.

***Field to Farm to Ecosystem Scale Decision Support Models,** Jose D. Salas, Civil Engineering. Sponsor: USDA-Agricultural Research Service.

***Hydrologic Assessment of Rangelands Using Rainfall Simulation,** Harold Goetz, and Milton J. Trlica, Jr., Rangeland Ecosystem Science. Sponsor: USDA-Agricultural Research Service.

***Consumptive Use Model,** Luis Garcia, Chemical and Bioresource Engineering. Sponsor: Riverside Technology, Inc.

***Field Studies & Modeling of Cropping Systems & Their Impact on Water Quality...**, Gary A. Peterson, and Gregory Butters, Soil and Crop Sciences. Sponsor: USDA-Agricultural Research Service.

***Structural & Functional Roles of Course Wood Debris in Tropical Stream-Riparian-Upslope...**, Alan P. Covich, Fishery & Wildlife Biology. Sponsor: NSF-Biological Centers.

Biogeochemical & Hydrologic Controls on Nutrient Fluxes in Freshwater Ecosystems..., Jill Baron, Natural Resources Ecology Lab. Sponsor: NSF/GEO/Geosciences.

Cross-site Watershed Analysis of Stream Riparian Dynamics, Alan P. Covich, Fishery & Wildlife Biology. Sponsor: USDA/U.S. Forest Service.

Sandia Landfill Cover Demonstration, Thomas Hakonson, Fishery & Wildlife Biology. Sponsor: Sandia Corporation.

Integrated Assessment of the Effects of Climate and Land Use Change on Ecosystem Dynamics..., James E. Ellis, Natural Resources Ecology Lab. Sponsor: NSF/GEO/Geosciences.

Classification & Characteristics of Wetland & Riparian Habitats on the Boulder Range..., Renee Rondeau, Fishery & Wildlife Biology. Sponsor: USDA/U.S. Forest Service.

Hydrologic Assessment of Rangelands Using Rainfall Simulation, Harold Goetz, Rangeland Ecosystem Science. Sponsor: USDA/ARS.

***A Combined Analysis of Tag Recovery and Recapture Data to Estimate Stock-specific Mortality...**, Cooperative Fish & Wildlife Research. Sponsor: National Biological Survey

Yellowstone National Park Water Analysis, John Tessari, Environmental Health. Sponsor: National Park Service.

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

***The Natural Resource Workstation - Wetland Capabilities**, Luis Garcia, Chemical & Bioresource Engineering. Sponsor: USBR.

The University of Colorado, Boulder, CO 80309

Assessment of Spectral Mixture Analysis for Development of a Global Snowcover Mapping Algorithm, Anne Nolin, Cooperative Institute for Research in Environmental Sciences (CIRES). Sponsor: NASA.

***Landscape Response to Holocene Climate Change: Evidence from Remotely Sensed Data and Ground-Based Studies in NE Colorado**, Alexander Goetz, CIRES. Sponsor: NASA.

An Experimental Data Base for the Evaluation of Theories for Upscaling in Modeling of Groundwater Flow, Solute Transport and Multiphase Flow in Aquifers, Tissa Illangasekare, Civil Engineering. Sponsor: Department of the Army.

Biodiversity of an Arctic Riparian Ecosystem, Marilyn Walker, Environmental, Population & Organismic Biology. Sponsor: NSF.

***Conceptual Planning for Integrated Analyses of Water Resource Systems and Power Operations**, Edith Zagona, Civil Engineering (CADSWES). Sponsor: Tennessee Valley Authority.

***Modeling for Design and Testing of Treatment and Remediation Technologies for Aquifers Contaminated with Organic Wastes**, Tissa Illangasekare, Civil Engineering. Sponsor: Kansas State University.

Ozone-Induced Biodegradability of Disinfection By-product Precursors, Gary Amy, Civil Engineering. Sponsor: National Water Research Institute.

***Hydrology, Hydrochemical Modeling and Remote Sensing of Seasonally Snowcovered Areas**, Mark Williams, Geography. Sponsor: University of California.

***A Study on the Effects of Minimum Flows on the Metabolism of a Rainforest Stream**, William Lewis, Environmental, Population and Organismic Biology. Sponsor: US Forest Service.

***Numerical Modeling Study of the Gulf of Mexico Basin**, Lakshmi Kantha, Aerospace Engineering. Sponsor: Department of the Navy.

Predicting Sediment Delivery and Stratigraphy on Marginal Slopes and Shelf Basins, James Syvitski, Geological Sciences. Sponsor: Department of the Navy.

Satellite Remote Sensing of Ecosystem Structural and Functional Changes..., William Emergy. CIRES. Sponsor: NASA.

***The Diurnal Cycle of Atmospheric Water Vapor and Clouds and its Impact on Regional and Global Energy Budgets**, Murry Salby, Astrophysical, Planetary and Atmospheric Sciences. Sponsor: NASA.

***Effects of Climate Change in the Colorado Alpine: Ecosystem Response to Altered Snowpack and Rainfall Regimes**, Timothy Seastedt, Geography. Sponsor: NSF.

The Colorado School of Mines, Golden, CO 80401

Geostatistical Evaluation of Geological and Hydrological Conditions for Site Assessment and Remediation, Eileen Poeter and Kadri Dagdelen, Dept. Of Geology and Geological Engr. Sponsor: Sandia National Laboratories (DOE).

A Detailed Examination of the Chemical, Hydrologic, and Geologic Properties Influencing the Mobility of 222Rn and Parent Radionuclides in Groundwater, Eileen Poeter and Bruce Honeyman, Dept. Of Geology and Geological Engr. Sponsor:, Sandia National Laboratories (DOE).

*Supplement to existing award.

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 stream flow, reservoir storage, and precipitation for the summer period (May-October). During the summer period stream flow 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 July 1, 1995 and reflect conditions during the month of August.

Basin	Sept. 1, 1995 SWSI Value	Change From Previous Mo.	Change From Previous Yr.
South Platte	+3.1	-0.3	+1.3
Arkansas	+2.8	-0.7	+3.1
Rio Grande	+2.7	-0.8	+4.6
Gunnison	+3.4	+0.4	+5.9
Colorado	+3.8	+0.3	+6.1
Yampa/White	+1.6	-2.1	+5.2
San Juan/Dolores	+3.3	-0.2	+5.8

SCALE

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

SEMINARS

COLORADO STATE UNIVERSITY
Soil and Crop Sciences Department
Faculty/Graduate Student Seminar Schedule
Fall 1995

Time: 3:10 pm. Place: C146 Plant Sciences Building, CSU main Campus.

Oct. 26 **Pesticide Disposal - Doing it Correctly** -- Kathryn Apely

Nov. 9 **Solubility Controls of Fine-Textured Basaltic Lunar Simulants** -- James Oglesby

Nov. 16 **I. Water Quality in Colorado** -- Reagan Waskom
II. Using the Portable Chlorophyll Meter to Evaluate N Status of Corn -- Reagan Waskom

Nov. 30 **Adsorption of Metribuzin as Influenced by Soil Properties** -- Wahid Samsuri

Dec. 7 **Identification and Evaluation of Best Management Practices for Reducing NO3 Leaching Using Field Studies and the NLEAP Models** -- James Boyd

Dec. 14 **The Effect of Growth Retardants on Dry Matter Partitioning, Yield, and Water Use in Wheat** -- Mohammed Al-Ghamdi

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COLORADO STATE UNIVERSITY
Water Resources Science and Engineering Seminar Series
Fall 1995

Time: 12:10 pm. Location: Room 208 Lory Student Center, Colorado State University (except for Oct. 26 to be held in room 206). For information contact Jorge A. Ramirez at 970/491-5048.

Oct. 19	**Stable Isotopic Approaches to Lake Budgets and the Role of Lake/Groundwater Interaction on the Chemical Dynamics of Groundwater Dominated Lake Systems** -- Dr. Carl J. Bowser
Oct. 26	**A Multicriteria Decision Support Approach for Design and Evaluation of Shallow Landfill Burial Systems** -- Dr. James C. Axcough II
Nov. 2	**Snow Distribution in Alpine Watersheds - Integrating Measurements, Statistics, and Spatial Models** -- Dr. Kelly Elder
Nov. 9	**Metal Retention by a Wetland After Receiving Acid Mine Drainage for 100 Years** -- Dr. John D. Stednick
Nov. 16	**A Generalized Model for Optimal Water Allocation Using an Object Oriented Programming Technique** -- Dr. Gustavo Diaz
Nov. 23	No Seminar -- Thanksgiving Break
Nov. 30	**A River Basin Network Model with Integration of Water Quantity and Quality** -- Mr. Tewei Dai
Dec. 7	**Development of a Snow Updating System for the Columbia River** -- Dr. Markus L. Ritsch

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COLORADO STATE UNIVERSITY
Natural Resources and Agricultural Economics
Seminar Series

Time: 12:10 to 1:10. Place: C337 Clark Building, Colorado State University Main Campus.

Oct. 18	**A Case Study of Sustainable Resources Use in the Grand Chaco of South America** -- Paul Huszar
Oct. 25	**Evaluating the Economic Theory Underlying Sustainable Resource Use** -- Thomas Miller
Nov. 1	**Comparison of CVM and Paired Comparison Valuation Methods: Preliminary Results** -- George Peterson
Nov. 8	TBA
Nov. 16	**Equality of WTP and WTA with Real Markets and Real Transactions (or I told you so)** -- Beatrice Lucero

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COLORADO STATE UNIVERSITY
Environmental Engineering Seminar Series
Fall 1995

Time: Noon to 1:00 pm. Place: Senate Chambers Room, Lory Student Center, CSU Main Campus. For information contact: Scott S. Hermsen at 970/223-5586.

Oct. 23	**Emerging Regulations Within the Safe Water Drinking Act** -- Mr. Brock McEwen, P.E.
Oct. 30	**Cleanup and Reinjection of Groundwater** -- Mr. Courtney Hemenway
Nov.	Topic: **Asbestos** -- Ms. Brenda South
Nov. 13	**Fort Collins Wetlands Project** -- Ms. Sonya Straka
Nov. 20	**No Seminar (Thanksgiving)**
Nov. 27	**Broderick Superfund Site Case Study** -- Mr. Brian Symons, PE
Dec. 4	Topic: **Remediation Case Study** -- Mr. Peter Bierbaum, PE

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COLORADO STATE UNIVERSITY
Chemical and Bioresource Engineering CB739BV Seminar
Fall 1995

Refreshments at 3:15 p.m. Meetings start at 3:30 p.m. Place: Meetings are all held in the Lory Student Center (LSC). Rooms vary and are listed below. For further information contact: Lanita Doering at 970/491-5252.

Oct. 13 Room 203 LSC	**Optional Siting and Capacity of Water Resource Points by Integrating Objective-Space Dynamic Programming with GIS** -- Mr. Hamed Rami
Oct. 20 Room 180 LSC	**Water and Nutrient Management for Corn** -- Dr. Grant Cardon
Oct. 27 Room 180 LSC	**Basics of Growth Analysis and Crop Modeling** -- Dr. Frank Moore
Nov. 3 Room 203 LSC	**Physical Behavior of Coal Tar in a Artificial Fructure** -- Mr. Doug Hansen
Nov. 10 Room 166 LSC	**Supplemental Irrigation Reservoir Site Location Using GIS** -- Mr. Frank Leibrock
Nov. 17 Room 203 LSC	**Research Needs in Water Quantity and Quality Modeling** -- Dr. Laj Ahuja
Nov. 24	**No Seminar (Thanksgiving)**
Dec 1 Room 165 LSC	**TBA**

UNIVERSITY OF COLORADO
HOT TOPICS IN NATURAL RESOURCES
FALL 1995

Time: 12:00 Noon (Box Lunch will be provided).
Cost: $13 if received 3 working days before program .
Place: Holland & Hart, 555 17th Street, 32nd Floor, Denver Colorado.

For information contact Kathy Taylor at the Natural Resources Law Center, Campus Box 401, Boulder, CO 80309-0401. Phone 492-1288; Fax 492-1297.

Nov. 1 **Environmental Regulation of Oil and Gas Development on Tribal Lands: Who has Authority?** -- Richard Collins, Tom Shipps and Marla Williams

Nov. 29 **A Sweet Home No More? The Future for Habitat Protection Under the Endangered Species Act** -- Federico Cheever, Paul Seby, Paul Gertler, Elizabeth Rieke (moderator).

INTERNATIONAL GROUND WATER MODELING CENTER
Colorado School of Mines, Boulder, Colorado

1996 Short Course Schedule

Date	Title, Instructors, Software	Location
Jan. 22-26	Practical Use of Models for Assessment and Remediation of NAPL Contaminated Sites. Instructors: Jack Parker and ES&T staff. Joint sponsorship with IGWMC. Software: SPILLCAD, ARMOS, MOTRANS.	Las Vegas
Jan. 29-30	RCRA Statistics. Instructors: Horsey, Davis.	San Francisco
Jan. 31-Feb. 2	Applied Ground Water Modeling, Practical Use of Ground Water Models in MS Windows. Instructor: Jim Rumbaugh. Software: WINFLOW, MODFLOW for Windows.	San Francisco
Feb. 13-16	Introduction to the MODFLOW Ground-Water Flow Modeling System. Instructors: Andersen, Greenwald (GeoTrans. Inc.). Software: MODFLOW, MODPATH, PREMOD, POSTMOD.	CSM
Mar. 11-15	Application of the HELP Model. Instructors: Peyton (U. Of Missouri) Schroeder (U.S. Army Corps). Software: HELP	Atlanta
Mar. 27-28	Applied Ground Water Modeling. Practical Use of Ground Water Models in M.S. Windows. Instructor: Jim Rumbaugh. Software: WINFLOW, MODFLOW FOR Windows.	Atlanta
Apr. 1-2	Introduction to Health Risk Assessment for the Environmental Professional. Instructor: Debra Nelson, Univ. Of Oklahoma.	CSM
Apr. 3-4	Soil and Groundwater Modeling for Risk Assessment and Soil Clean-up Level Evaluation. Instructors: Hetrick, Barden, Scott. Software: AT123D and SESOIL.	CSM
May 13-17	Principles and Applications of Chemical Reaction Modeling in Ground Water. Instructors: Parkhurst, Plummer, Glynn (USGS). Software: PHREEQE, PHREEQC, PHREEQM, NETPATH, MINTEQA2	CSM

May 27-29	Principles and Applications of Aquifer Testing: Instructors: Arnold (IGWMC), Gutentag and Downey (USGS). Software: Aquix4S.	CSM
June 3-7	Practical Modeling of Three-Dimensional Contaminant Transport and Remedial Action Designs using MODFLOW and MDT. Instructors: Zheng (Univ. of Al.) Neville (SSP Inc.). Software: MODFLOW, MDT.	CSM
June 10-14	3D Environmental GIS and Desktop Mapping for Subsurface Investigations. Instructors: Intergraph Inc. Personnel, Scott (EGI). Software: ERMA.	Milwaukee
June 17-21	Parameter Identification for MODFLOW. Instructors: Hill, Cooley, Yager (USGS). Software: MODFLOWP, PEST.	CSM
June 24-26	Use of Modeling in Day to Day Ground Water Analysis. Instructors: Van der Heijde, Arnold (IGWMC), Kolm (CSM). Software: THWELLS, SOLUTE, CHEMFLOW, ASM.	CSM

MEETINGS IN REVIEW

20TH GUNNISON WATER WORKSHOP CONTINUES TRADITION

by David Graf

The 20th Annual Colorado Water Workshop, **THE ENDANGERED WEST**, continued a tradition of interdisciplinary water dialogue. This year's conference investigated the relation of our historical use of water in the west with changing demands for that water. Specifically, how does Western Water Law -- both state water rights and interstate compact requirements -- reconcile itself with the increasing demands for habitat and endangered species protection and a growing urban demand? Should farms be abandoned in order to use agricultural water to satisfy these new demands? What are the possibilities for new water development projects to relieve urban and ecosystem demands? Are there different institutional arrangements that might facilitate conflict resolution rather than gridlock?

Representatives from water districts, conservation organizations and all levels of government convened for three days in Gunnison, August 2-4, to discuss and debate the increasingly complex water allocation system in Colorado and the West. At the heart of the discussions was the prospect for conflict resolution. Those currently holding water rights perceive urban and environmental demand as threats to a traditional, time-tested water allocation system; the growing metropolitan and environmental constituencies perceive the status quo as a threat to their primary objectives, economic vitality and ecosystem health, respectively.

The first day, entitled "The Endangered West," set the historical stage and itemized some of the threats to traditional water uses. The second day, "Water Users and Environmental Protection," investigated relationships between species and habitat considerations within the context of western water management. The lessons learned from various recovery programs (Upper Colorado River, San Juan, South Platte/Platte, Sacramento/San Joaquin Delta) were discussed, and suggestions for improving the institutional structures governing development and implementation of recovery plans were emphasized. The third day, "Working It Out," examined modern institutional arrangements oriented toward watershed/basin-scale water management plans.

The serious dialogue central to the conference was interspersed with field trips, a barbecue, storytelling, movies, small group discussions, and a theatric presentation at the "Cottonwood Cafe" featuring Joe Fed, regional biologist from the 'U.S. Wild Animal Service' intent on listing the slimy-backed river rat, considered pestilence by local constituencies. The improvisation that followed revealed the inherent conflicts between traditional water uses (ranching, farming) urban demands for new water projects, and species protection mandates under the Endangered Species Act.

The following article by Kathleen Klein, former graduate student at CWRRI and currently employed by the Colorado Water Conservation Board, gives Kathleen's perceptions on progress in watershed planning and management following her two-year involvement with watershed forum groups across the State of Colorado.

WATERSHED MANAGEMENT INITIATIVES IN COLORADO -- AN INFORMATION EXCHANGE

by Kathleen C. Klein

Watershed-based management in Colorado again was the subject of an informal gathering of interested participants at the Gunnison Water Workshop. In response to popular request, last year's watershed coordinators' meeting was repeated this year as part of the Water Workshop program. The meeting was held Thursday, August 3, to discuss watershed management efforts across the state and to exchange information regarding the trials and tribulations associated with taking the "watershed management approach."

Fifteen people attended the gathering (until the Water Workshop barbecue got rolling) whereupon five truly dedicated folks finished out the session. Six of the participants were actually working in individual watersheds on various management initiatives, and the remainder of the group represented organizations such as the Bureau of Land Management, Bureau of Reclamation, University of Colorado, Colorado Department of Natural Resources and the Colorado Water Conservation Board, U.S. Geological Survey, Water Quality Forum, and League of Women Voters.

The watershed-based approach to water resources problem-solving continues to take hold in Colorado. Approximately fifteen different organizations are actively working to manage river corridors statewide. At last count, organizations were active in the following basins: the Arkansas River, South Platte River, Colorado River, Gunnison River, Poudre River, Boulder Creek, St. Vrain River, Big Thompson River, Clear Creek, Yampa River, Animas River, Eagle River, Bear Creek, Cherry Creek, and the Blue River. Public interest in watershed protection and management continues to grow as demand for our limited water resources becomes increasingly competitive.

This year's information exchange was organized to provide a forum for individuals working on watershed initiatives to meet each other, update each other on program efforts, and to exchange thoughts regarding the watershed-based approach. Representatives from the Upper Arkansas River Forum, Summit County Water Quality Committee, South Platte Forum, Clear Creek Watershed Forum, and the Animas River provided presentations and handouts regarding activities in their respective basins. Other participants then described their particular interest in watershed management.

"The watershed-based approach to water resources problem-solving continues to take hold in Colorado. Approximately fifteen different organizations are actively working to manage river corridors statewide. At last count, organizations were active in the following basins: the Arkansas River, South Platte River, Colorado River, Gunnison River, Poudre River, Boulder Creek, St. Vrain River, Big Thompson River, Clear Creek, Yampa River, Animas River, Eagle River, Bear Creek, Cherry Creek, and the Blue River."

Topics of discussion included organizational format, funding options, and problem-solving approaches. Water quality goals again emerged as the primary motive for action in most of the five basins discussed. Endangered species and land use were also identified as concerns by the participants. During the administrative format discussion, local-control was the most popular option noted. However, drawbacks to local control, such as limited funding and the need to constantly justify the program's existence, were cited. Heavy-handed involvement by federal agencies sometimes leads to local mistrust of the program, but funding problems and group objectives can be simplified if a federal agency chooses to adopt a cooperative, decentralized approach.

The role of the State of Colorado in promoting watershed management was also the subject of debate. While some noted that state funding would be advantageous, others noted that local control of watershed management efforts is paramount and that if state funds were used, local participants would prefer minimal involvement from state staff.

It was noted that watershed programs that encompass more than one local jurisdiction were running into problems with local governments that were not willing to fund efforts not directly benefiting their local jurisdiction. State involvement as a means to address these cross-jurisdictional problems was discussed. State participation as an information source, or resource, was viewed favorably. In addition, it was noted that a supportive voice or endorsement at the state level could enhance participation from local interests.

Watershed management as a resource management tool is not easily described. As the concept is developed and implemented our experience base grows, but many questions have yet to be addressed. For instance, how do we structure and fund programs that may not have a crisis at their base, but are essentially pro-active resource planning efforts designed to head off a crisis? What role should the state take in encouraging these efforts? How do we integrate issues such as fish and wildlife habitat protection and recreation needs into the current watershed management organizational model? Continued communication and information sharing efforts like the Gunnison meeting are needed to develop creative solutions to these and many other critical water resources management questions.

UNIVERSITY WATER NEWS

12 Students Receive CCHE Scholarships

Twelve Colorado State University engineering students have received the Colorado Commission on Higher Education (CCHE) Water Resources Scholarship for the 1995-96 academic year. In 1990, CSU's water resources program was designated as a "program of excellence" and has benefited from five years of funding for special programs, research and undergraduate scholarships. The students were awarded scholarships in recognition of their outstanding achievements. Through the scholarship program, they will be introduced to the diverse and complex issues of water resources and participate in activities that will promote water resources education of the general public. During the first semester of the program the students will aid the Departments of Civil Engineering, Chemical and Bioresource Engineering, and Earth Resources in the development of an Internet home page for Colorado water resources information.

AWRA-Colorado Section Awards Scholarships

The Colorado Section of the AWRA has awarded two scholarships from the Rich Herbert Memorial Scholarship Fund. The students are **Mette S. Jordan**, Ph.D student, Earth Resources Department, Colorado State University; and **Kevin R. Maddoux**, B.A., Environmental Science and International Studies, University of Denver. Mette was awarded a $1,000 scholarship to support research entitled "Stratigraphy of Holocene Floods in the Western Great Plains: Implications for Regional Climate Variability." Kevin received a $750 scholarship to support research investigating the effects of climatic fluctuations on subalpine wetlands.

The accuracy of Dr. William Gray's predictions for the hurricane season has led to a busy year for the CSU professor. Since 1985, his overall predictions for both hurricanes and named tropical storms have been very close to actuality with the exception of two years, 1989 and 1993. Gray's forecasts are based on five indicators that could be affected by changes in the overall circulation pattern.

- El Nino--When El Nino dissipates into a cooler La Nina event (as it is now) hurricanes tend to increase.
- Rainfall in the Sahel region of northwestern Africa--When it rains in the Sahel during summer, more hurricanes form.
- Wind direction over the equator--When winds blow from the west (as they are now) more hurricanes can be expected.
- Pressure and change patterns over western Africa
- Pressure and change patterns over the Caribbean.

Gray predicts as many as 30 years of significantly increased hurricanes, with "destruction as never before experienced."

U.S. Water News 9/95

ISWR Hosts Managers/Engineers

The International School for Water Resources (ISWR) hosted a group of 17 water treatment managers and engineers from the Central Asian Republics in August. The participants received training in water treatment technologies, management techniques, and visited state-of-the-art computer facilities around the state. The Central Asian Republics were part of the former Soviet Union. Dr. Dave Hendricks was technical lead for training and Dr. Darrell Fontane, Director of ISWR, was administrative lead. Experts in water treatment operation and management worked with participants including Dr. William Bellamy, alumnus of the Civil Engineering Department, Dr. William Miller, retired Manager of Denver Water, and Dr. Jack Hoffbuhr, Deputy Exec. Director of the American Water Works Association.

EDITOR'S IN-BASKET

The Great Plains Agricultural Council (GPAC) , ending a half-century lifespan, was terminated as of September 30, 1995. Melvin D. Skold, GPAC Executive Director, said "This decision was not hastily reached." The GPAC had faced a shrinking and uncertain financial base as well as faltering federal agency support. Skold said the current Executive Committee will continue through the GPAC close down, through 1996. He said that some GPAC standing committees will try to continue activities through other forums.

American Rivers Names Most Endangered

The **Clarks Fork of the Yellowstone River** was named by American Rivers as North America's most endangered river for the second year in a row, because of proposed development of the "New World" gold mine northeast of Yellowstone National Park. Second is the Nation's most endangered urban river, the **Los Angeles River**. The remaining rivers on the 10 most endangered list are: **The Columbia and Snake River System**--Salmon runs are nearing extinction due to hydropower dams and destruction of natural habitat in the watershed. **The Animas River**--Threatened by last big USBR project. **The Missouri River**--Damming and channelization has eliminated braided channels, islands and sandbars, and nearly destroyed critical habitat. **The Kansas River**--Susceptible to amounts of herbicides entering the river each year. **The Mississippi River**--is losing key links in its complex food chain -- water plants, insects, and mussels -- that scientists say will lead to ecological collapse. **The Cheat River**--Acid runoff from abandoned mines killed all aquatic life for 11 miles, the Army Corps of Engineers wants to dam the river, and property rights advocates oppose designation as a National Wild and Scenic River. **The Penobscot River**--Threatened by the proposed Basin Mills Hydroelectric Dam. Great Northern Paper, Inc. Operates six dams and requests 30-50 year license renewals while opposing environmental improvements to the project. **The Thorne River**--A massive timber sale threatens the core of the Thorne River watershed in Southeast Alaska's Tongass National Forest.

WATER PUBLICATIONS, DATABASES

NEW CWRRI REPORTS

CWRRI Reports are available from the Cooperative Extension Resource Center, General Services Building, Colorado State University, Fort Collins, CO 80523. Phone 970/491-6198, FAX 970/491-2961.

Initiating a Water Management Decision Support System for the South Platte River Basin, by Darrell G. Fontane and Henry Kunhardt. *WATER IN THE BALANCE* No. 2, August 1995. Free. Call CWRRI at 970/491-6308.

NEW REPORTS FROM MISCELLANEOUS SOURCES

Riparian/Wetland Expertise Directory, by Barbara Tellman, University of Arizona's Water Resources Research Center and Roy Jemison, U.S. Forest Service. Paperback publication is available free from: the U.S. Government Printing Office #1995-674-899/25054; or the Arizona WRRC at phone 520/792-9591 or FAX 520/792-8518. The directory can also be searched or downloaded at WWW http://ag.arizona.edu/AZWATER/.

NEW USGS REPORTS

Contact the U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, Mail Stop 517, Denver Federal Center, Denver, CO 80225 or call 303/236-7476.

Ground-Water Flow and Effects of Agricultural Application of Sewage Sludge and Other Fertilizers on the Chemical Quality of Sediments in the Unsaturated Zone and Ground Water Near Platteville, Colorado, 1985-89, by Neville G. Gaggiani. Prepared in cooperation with the Metro Wastewater Reclamation District, Denver, Colorado. Water-Resources Investigations Report 94-4037.

Summary of Bridge Scour Analyses at Selected Sites in Colorado, 1991-93, by J.E. Vaill, J.M. Kuzmiak, M.R. Stevens, U.S. Geological Survey; and Peter Montoya, Colorado Department of Transportation. Prepared in cooperation with the Colorado Department of Transportation. Open-File Report 95-296.

Hydrologic Assessment of a Riparian Section Along Boulder Creek Near Boulder, Colorado, September 1989-September 1991, by Robert Kimbrough. Prepared in Cooperation with the City of Boulder, Colorado. Water-Resources Investigations Report 94-411.

Quality of Water in the Alluvial Aquifer and Tributary Alluvium of the Fountain Creek Valley, Southwestern El Paso County, Colorado, 1991-92, by Michael E. Lewis. Water-Resources Investigations Report 94-4118.

Inventory of Biological Investigations Related to Stream Water Quality in the South Platte River Basin, Colorado, Nebraska and Wyoming, 1891-1994, by Cathy M. Tate and Jorge R. Ortiz-Zayas. This publication is a product of the National Water-Quality Assessment (NAWQA) program in the South Platte Basin. Open-File Report 95-379.

Wetlands: Characteristics and Boundaries. The report, prepared at the request of Congress, provides a reference definition of wetlands. It was produced by the Committee on Wetlands Characterization of The Water Science and Technology Board, National Research Council. Dr. William Lewis of the University of Colorado, Boulder, chaired the wetlands committee. For more information call (800)624-6242 or 202/334-3313.

SOFTWARE

MARS-5 Groundwater Software Database Browser--The International Ground Water Modeling Center at the Colorado School of Mines announces release of a MS Windows-based groundwater software database and browsing utility. The database is a new implementation of IGWMC's MARS (Model Annotation and Retrieval System). For information contact: IGWMC, Colorado School of Mines, Golden, CO 80401; Phone 303/273-3103, FAX 303/384-2037, email: igwmc@mines.edu.

JOB ANNOUNCEMENTS

Surface Water Hydrologist, Desert Research Institute, Water Resources Center, Position #P-20-004. Requires strong researcher with a Ph.D. in civil engineering, hydrology or a related field. For further information contact Research Professor Richard H. French, Surface Water Hydrology Search Committee Chairman at (702) 895-0467 or e-mail dick@snsc.unr.edu. Application reviews will begin January 5, 1996.

Assistant Research Scientist, School of Renewable Natural Resources, University of Arizona, Tucson. Non-tenure track, fiscal year faculty appointment with the Watershed Resources Program, School of Renewable natural Resources. The position is 100 percent research. For information contact Dr. Richard H. Hawkins, Chair, Watershed Search Committee, School of Renewable Natural Resources, 325 Biological Sciences East, University of Arizona, Tucson, Arizona 85721. Phone 520/621-7273; email rhawkins@ag.arizona.edu.

WATER NEWS DIGEST

WATER POLICY

National Water Policy Discussions–In light of criticisms within the Colorado water community over the national water policy recommendations included in the Long Peaks Working Group Report several years ago, it is interesting to see how national water policy discussions are evolving today. The Interstate Council on Water Policy (ICWP), building on the work of the Western Governor's Association and the Western State Water Council, recently drafted National Water Policy Principles suggesting we:

(1) manage ground and surface water as an integrated system, by hydrologic units, considering all phases of the water cycle;
(2) manage water for long-term sustainability, recognizing needs both for human use and the health of aquatic ecosystems;
(3) increase government effectiveness by realigning government roles and responsibilities for water management;
(4) eliminate fragmentation and duplication of water management responsibilities by consolidating government water programs wherever possible;
(5) recognize and include all affected interests in policymaking;
(6) stress environmental outcomes, not the bureaucratic process;
(7) use economic incentives rather than regulatory requirements where feasible to achieve water management objectives;
(8) recognize the value and limitations of risk-based decisionmaking;
(9) expand the availability of water information to the public and the public's understanding of water.

These principles support a much more comprehensive decisionmaking process than is currently used in many states and, in particular, Colorado, where, for example, water quality and quantity are managed by separate state government agencies.

Western States Water, Issue No. 1114, Sept. 22, 1995

WATER ALLOCATION

Group Advises State to File For Instream Water Rights

A statewide group is recommending that Colorado file for an instream flow water right of 2-million acre-feet a year for the Colorado River through the Grand Valley. Flows of 1 million acre-feet are recommended for the Yampa River. The two rights are part of a 7.9 million acre-feet that could eventually be reserved for the endangered fish recovery program in Western Slope rivers. The water rights would keep in the river water that must leave the state to satisfy California, Arizona, and Nevada water rights. It is over and above the water Colorado has the right to use under the Colorado River Compact. The filing is to be finalized by the Colorado Water Conservation Board by December 31.

Grand Junction *Daily Sentinel* 9/1/95

WATER PROJECTS

Four Northern Colorado Dams Slated for Inspection

Four dams in Northern Colorado use the same support system as a dam that failed in California in July. A July 17 break in a gate at Folsom Dam, about 20 miles east of Sacramento, drained California's second-largest reservoir of nearly half its water supply. Breakage of the Folsom gate, which was supported by radial arms, caused the Bureau of Reclamation to announce last week that it would reinspect all 90 dams in the West that employ radial arms. The four dams in Northern Colorado employing radial arms include Olympus Dam at Lake Estes, Shadow Mountain Dam, Granby Dam, and Green Mountain Dam. Together the dams store up to 715,000 acre-feet of Colorado-Big Thompson water, enough to supply 3.5 million people for a year. By comparison, Folsom dam can store 1 million acre-feet.

Fort Collins *Coloradoan* 7/18/95

WATER TRANSFER

San Luis Valley Water Sale Possible

Baca Ranch owner Gary Boyce said recently that he has discussed selling water from his ranch with Las Vegas officials. Boyce, who owns the biggest ranch on the floor of the San Luis Valley, purchased the Baca Grant from American Water Development Inc. this spring for $13 million, using the water rights as collateral for the loan. He has teamed up with former state engineer Jeris Danielson in Stockman's Water, a water development group. The sale, which would transfer from 25,000 to 30,000 acre-feet of water, could possibly be used to supply 180 center pivot sprinkler quarters in the San Luis Valley.

Pueblo Chieftain 8/4/95

Feasibility of AB Lateral Project Subject of Doubt

Two important factors in deciding whether the AB Lateral hydroelectric power plant near Montrose is feasible remain unknown. The company proposing the project, in partnership with the Uncompahgre Valley Water Users Association, has not identified the cost of financing or a buyer for its electricity. The 1982 agreement the UVWUA signed with a Sithe Energies Inc. subsidiary, proposes to take water diverted from the Gunnison River above the Black

Canyon, carry it through canals and a pipeline to the hydro plant, then dump it into the Uncompahgre River near Montrose. There is also concern that farmers in the association might have to repair damage from high flows in the Uncompahgre River caused by the project; however an agreement between the Sithe subsidiary and the UVWUA should protect farmers from any liability for damages.

Grand Junction *Daily Sentinel* 9/24/95

Congressional Effort Could Help Build Animas-LaPlata Project

A Bipartisan group of lawmakers plans to add language to a 1996 Energy and Water Development spending bill that no further financial or environmental studies are needed on Animas-La Plata. The language also directs Interior Secretary Bruce Babbitt to start building the dam and irrigation system. The effort is designed to blunt anticipated court challenges from project opponents, who claim Animas-LaPlata is not cost-effective and violates key environmental statutes, including the National Environmental Policy Act and the Clean Water Act. A moratorium on further studies would mean the USBR was not required to complete its work, and the language would prevent government agencies and private citizens from challenging the study's findings. New Mexico officials have said that the measure could block New Mexico from preventing large-scale violations of the Clean Water Act and lead to other adverse effects on wildlife and the environment. USBR recently concluded the cost of Animas-LaPlata far outweighs its economic advantages -- for every dollar invested by taxpayers, the project would return just 36 cents.

Denver Post 7/23/95, 9/16/95; Grand Junction *Daily Sentinel* 9/16/95

Aurora/Colorado Springs Ask for Review of Homestake Ruling

The cities of Aurora and Colorado Springs will file, before Sept. 5, a petition asking the U.S. Supreme Court to review state court rulings against the Homestake II water project. Homestake II calls for Aurora and Colorado Springs to draw water from the Holy Cross Wilderness in Eagle County to cope with growth in the two cities. The project was stalled by a 1987 decision by Eagle County to halt a land-use permit for development.

Denver Post 8/17/95

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WEATHER

Wet Rainy Spring Cuts Revenues from City Water Departments

Spring's heavy rainstorms have created a cash drought for Denver Water, which posted an $11.5 million loss for the first six months of 1995, mainly because homeowners were using so little water. The month of June was so wet that water sales plummeted 42 percent, the city's second greatest loss in 10 years. Losses were just over $12 million in 1993. Water departments in other states were experiencing similar cash flow problems. Precipitation in Salt Lake City in this water year has been 19.27 inches, compared to 13.55 inches in an average year. Much of that rain fell in Spring, driving demand down at exactly the time that it usually goes up and causing a $2 million shortfall in the water department budget. While the budget shortfalls are not severe enough to justify talk of rate increases, utilities say they will have to postpone some routine maintenance work.

Denver Post 7/26/95, 7/30/95, 8/9/95; *Greeley Tribune* 8/10/95

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WATER QUALITY

City of Rye Runs into Problems with Water Treatment

The State Health Department issued a "boil water order" for the town of Rye after an August 27 storm caused muddy runoff to reach the Rye Water Treatment Station. Officials noted that the mountain water reaching the station was cloudy and possibly contaminated with bacteria. Soon after, the Health Department ordered Rye to upgrade its public drinking water system or build a new one. An engineer working with the town is putting together a plan and cost estimate to submit with a grant proposal in an effort to get funds to remedy the problem. Meanwhile, the order to boil water, initially in effect until September 13, was extended indefinitely. Rye has only about 70 to 80 homes on the water system but also has a restaurant and two schools with about 500 students.

Denver Post 9/10/95; *Pueblo Chieftain* 9/3/95, 9/6/95, 9/16/95

Alamosa Water Goes from Contaminated to Clean in Dispute Between City and Private Testing Lab

In early September, workers at the Alamosa post office were warned against drinking water from the fountain in the building. Tests performed by private labs, Sangre de Cristo Laboratory in Alamosa and Industrial Labs of Denver, on water collected from the fountain were positive for coliform bacteria. This is especially alarming since Alamosa does not chlorinate its water, which is drawn from the city's deep wells. Sangre de Cristo Laboratory also collected samples from around the city, including the hospital and schools. The drinking fountain in the hospital emergency room tested positive for coliform. After Alamosa city officials criticized the findings of the lab, the Colorado Department of Health decided to perform tests of its own. Samples were taken upstream and downstream of the post office in the city's distribution system and tested negative for coliform, as did two samples form the city's wells.

Denver Post 9/14/95; *Pueblo Chieftain* 9/6/95, 9/7/95, 9/13/95

Town of Lochbuie Lives with Tainted Water

Nearly a year has passed since the State ordered Lochbuie to clean up its tainted water supply, but town officials have not settled on a solution. The Colorado Department of Health and Environment issued the mandate last October as part of a larger enforcement order to clean up the town's water. Lochbuie must provide safe drinking water for all its citizens by the end of 1996. The mandate also calls for city officials to provide safe drinking water for pregnant women and infants under 6 months and younger. Lochbuie reached an out of court settlement last year in a lawsuit against its water supplier, Beebe Draw Water and Sanitation District, regarding who was responsible for the water quality. The settlement left Lochbuie free to search for another water supplier.

Denver Post 9/25/95

Mount Zirkel Wilderness Suffers Pollution

As the Mount Zirkel Wilderness Area catches snow from winter storms, it is also trapping acid snow. Forest Service officials believe that the acid snow arises from emissions from two coal-fired power plants about 35 miles from the wilderness area. While there is no confirmed scientific link between the acid snow and the Hayden and Craig generating stations, a 1977 amendment to the Clean Air Act sets "pristine" as the air quality standard for 1958 wilderness areas and national parks. In 1993, Regional Forest official Elizabeth Estill notified Governor Roy Romer that the power plants violated the federal air-quality law for wilderness and that the acidic emissions threatened water-borne life in the area. The Hayden plant now has no pollution controls. The case's outcome could build on a precedent for forcing coal-fired power plants to curb pollution.

Colorado Springs *Gazette Telegraph* 9/4/95; Fort Collins *Coloradoan* 9/5/95

Rifle Near Completion of Radioactive Cleanup Project

The cleanup of radioactive waste near Interstate 70 at Rifle is nearing completion. Since first excavation began in 1992, trucks have logged 3.5 million miles carrying uranium and vanadium mill tailings from the site. Ninety-six percent of the tailings have been removed. There has been discussion of turning the land into anything from a golf course to a sewer plant.

Greeley Tribune 9/4/95

Rocky Flats Refits Drums

Workers at the former Rocky Flats nuclear weapons plant have refitted more than 1,500 drums containing radioactive wastes with filtered lids to improve safety. Plant officials said they hope to have 2,045 drums refitted by the end of September.

Fort Collins *Coloradoan* (A) 8/23/95

Rockwool Cleanup on Hold

No progress has been made by the Colorado Department of Health or the Colorado attorney general's office in efforts to persuade Susquehanna Corp. to complete remediation work at a 12-acre site near Pueblo. The closure plan called for top soil and replanting of a shot pile, a byproduct of insulation making, but that was not done. Rockwool-Susquehanna said there is no more money available for the project. The owner lives in Paris. The site needs about four or five monitoring wells, and they typically cost from $3,000 to $10,000 each. Arsenic was found in the groundwater before remediation began, and 2,400 cubic yards of arsenic-contaminated soil was removed during the cleanup. The property remains a hazardous waste site because of high levels of lead in the shotpile.

Pueblo Chieftain 8/11/95

EPA Asks for Public Input on Superfund Site

The Environmental Protection Agency wants public input on the proposed cleanup of contaminated soils at the Smeltertown Superfund Site north of Salida. Public input will be collected through October 5, and the EPA will make a final decision on a cleanup proposal. Of five proposals for the site, EPA favors a plan to consolidate and cover all exposed lead and arsenic contaminated soils. However, due to budget cuts and restrictions proposed for EPA's 1996 budget, it may not be able to complete the planned cleanup.

Pueblo Chieftain 8/5/95, 9/6/95, 9/15/95

MLRB Will Appeal Ruling

The State Mined Land Reclamation Board will appeal facts within a ruling that dismissed its $3 million claim against three top officials of Mid-Continent Resources Inc. Eagle District Judge William Jones ruled that the state's claim holding the Mid-Continent officials personally liable for the costs of reclamation was premature because the coal company's bankruptcy is still in process. It isn't yet known whether the bankruptcy will yield the $3 million needed for reclamation.

Grand Junction *Daily Sentinel* 8/17/95

Zoning Board Rejects Park Hill Toxic Waste Station

The Denver Zoning Board has rejected a bid for a toxic-waste transfer station in Park Hill, near the old Stapleton Airport. The Board voted 5-0 to overturn a permit for the station previously granted to Laidlaw by Denver Zoning Administrator Dorothy Nepa. Laidlaw had argued that toxic waste would sit at the transfer site for less than 10 days before being shipped to Tennessee. Under the current system, Laidlaw trucks collect toxic waste from 1,000 different metro-area firms and then drive the waste directly to Tennessee.

Denver Post 9/20/95

Summitville Cleanup Faces Budget Cuts, Budget Probe

A House-passed bill on EPA's 1996 funding would cut the Superfund, which funds the Summitville cleanup, by 36 percent or $560 million. To become law, the funding bill must be passed by the Senate and signed by President Clinton. EPA officials have also confirmed that the agency's inspector general is conducting an internal review of the cleanup. The inspector general is looking at the activities of Environmental Chemical Corp., a California-based firm the government hired to treat the mine's toxic drainage. The EPA in December 1992 added Summitville to its Superfund list of the nation's most polluted sites after 160 million gallons of poisonous mine runoff drained into tributaries of the Alamosa River. The 1,400-acre site, located near Wolf Creek Pass, once was Colorado's largest gold mine.

Pueblo Chieftain 9/6/95, *Denver Post* 9/14/95

♠ ♠ ♠

MISCELLANEOUS

The Arkansas River Coordinating Committee has formally voted to repay Kansas with water for the excess water Colorado has used. Gov. Roy Romer had campaigned for a cash payment. Under the plan, the state would buy available water rights and allow the water to flow down to Kansas. And Kansas is now in a dispute with Nebraska over water in the Republican River. The state is trying to resolve the issue without a lawsuit.

Pueblo Chieftain 8/14/95, *Denver Post* 6/20/95

ENDANGERED SPECIES MANAGEMENT: PLANNING OUR FUTURE

The Ramkota Inn, Greeley, CO

Wednesday, October 25

8:00 - 8:20 **Registration**

8:20 - 8:30 **Welcoming Remarks**

8:30 - 9:00 Management of Native Aquatic Species in Colorado: Taking Time Out From the Urgent to Deal With the Important; *David Harrison - CO Water Conservation Board*

9:00 - 10:00 **Using Science in the Decision Making Process: Quantifying The South Platte Ecological System**

- Setting Priorities for the Conservation of Natural Diversity in the South Platte Watershed Using Natural Heritage Methodology; *Chris Pague - Colorado Natural Heritage Program*
- Habitat Considerations in the South Platte River Basin; *Janet S. Heiny - U.S. Geological Survey, Water Resources Division*
- Multiple Variables Important to Understanding Biological Diversity in the South Platte River Basin; *Cathy M. Tate - U.S. Geological Survey, National WaterQuality Assessment Program*

10:00 - 10:20 **BREAK**

10:20 - 11:40 **Status of South Platte Basin Ecology**

- A Historical Perspective on Riparian Ecosystems in the Western Great Plains; *Mike Scott - National Biological Service*
- Declining, Threatened and Endangered Fish in the South Platte Basin; *Kevin Bestgen - Research Scientist, Colorado State University Larval Fish Labratory; Dept. of Fishery and Wildlife Biology*
- Animal and Habitat Relationships in the South Platte Basin with Emphasis on Threatened and Endangered Species; *Dr. Jim Fitzgerald - Dept. of Biological Sciences, UNC Greeley*
- Colorado Riparian Vegetation Classification: The South Platte River; *Gwen Kittel, Renee Rondeau - CO Natural Heritage Program*

11:40 - 1:00 **LUNCH: Colorado Governor Roy Romer**

1:00 - 2:00 **Considering Ecological Integrity in Multiple Use Resource Management**

- Defining Ecological Integrity; *Dr. Alan Covich - Colorado State University, Dept. of Fishery and Wildlife Biology*
- Social Attributes of Ecological Integrity; *Dr. John Wilkins-Welles - Colorado Stat University Dept. of Sociology*
- Changing Approaches to Endangered Species Act Implementation; *Joan Friedlander, U.S. Forest Service*

2:00 - 2:20 **BREAK**

2:20 - 4:00 **Panel Discussion - Endangered Species Management on the Mainstem Platte: An Update on the 3-State Memorandum of Understanding**

Moderator: *Betsy Rieke - University of Colorado, Boulder; Natural Resource Law Center*

Panel Participants

Ralph Morganweck - Director, Region VI, U.S.Fish and Wildlife
J. Michael Jess - Director, NE Dept. Of Natural Resources
Jeff Fassett - WY State Engineer
Jim Lochhead - Director, CO Dept. of Natural Resources

4:00 - 5:00 **SOCIAL HOUR**

Thursday, October 26

8:30 - 9:30 **State Involvement in Declining Species Preservation and Enhancement**

Moderator: *Eddie Kochman - CO Division of Wildlife*

Panel Participants

Robert McLavey - Deputy Commissioner, CO Dept. Of Agriculture
Laura Davis - Chairperson, CO Water Quality Control Commission
Arnold Salazar - Chairperson, CO Wildlife Commission

9:30 - 9:50 **BREAK**

9:50 - 11:10 **Opportunities for Water Resource Management**

- Implications of Agricultural Water Conservation for Endangered Species Management; *Kathleen C. Klein, Colorado State University*
- The South Platte River: The Other Part; *Leo Eisel, PhD., P.E., Brian Kolstad, P.E. - McLaughlin Water Engineers*
- Greeley's Water Program: Protection, Conservation and Innovation; *Nancy Koch - City of Greeley, Blaine Dwyer - ECI*
- Case Study of Regulatory Protection of Groundwater Quality and Endangered Species; *F. Robert McGregor, P.E., E. Robert Weiner, P.E., Kenneth Wright, P.E. - Waste Engineering, Inc.*

11:10 - 12:10 **Economic Considerations: Costs of Species Preservation and Recovery**

- Economic Impacts of Critical Habitat Designation in the Colorado River Basin; *Dr. David Brookshire - University of New Mexico, Dept. of Economics*
- Economic Values of Endangered Species: Indicators of Public Preference; *Dr. John Loomis, Douglas White - Colorado State University, Dept. of Economics*
- Endangered Species Preservation in Practice: The Denver Metropolitan Area; *Mary Powell - MDG & Associates, Inc.*

12:10 - 1:30 **LUNCH: Mr. Don Barry, Special Council to the Director, U.S. Fish and Wildlife (INVITED)**

1:30 - 3:00 **Panel Discussion: The Future of Endangered Species Management in The South Platte Basin**

Moderator: *Dr. Robert Ward, Director, CO Water Resources Research Institute*

Panel Participants

Steve Torbit - National Wildlife Federation
Tom Pitts - Hall, Pitts & Associates
Dan Luecke - The Environmental Defense Fund

Sponsors

CO Division of Wildlife
Northern CO Water Conservancy District
U.S. Geological Survey
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Denver Water
CO Water Resources Research Institute

For additional information, call David Graf at (970) 491-6308.

CALLS FOR PAPERS

WEFTEC '96, The Water Environment Federation's 69th Annual Conference and Exposition, Oct. 5-9, 1996, Dallas, TX. Contact: **Water Environment Federation, Attn: Conference Program, 601 Wythe Street, Alexandria, VA 22314-1994.** Phone: 1/800/666-0206. Deadline: December 18, 1995.

GIS AND WATER RESOURCES, 32nd Annual Conference & Symposium, Sept. 22-26, 1996, Ft. Lauderdale, FL. Contact: **AWRA, 950 Herndon Parkway, Suite 300, Herndon, VA 22070-5528.** Phone 703/904-1225, FAX 703/904-1228, email: awrahq@aol.com. Deadline: December 1, 1995.

HYDROLOGY DAYS 1996
April 15-19, 1996
Colorado State University
Fort Collins, Colorado

Dedicated to Emeriti Professors Everett V. Richardson, Hsieh Wen Shen and Daryl B. Simons

Special Session: Hydraulics and Ecology
General Session: Hydrologic Engineering

Featured Speaker: Professor M. Levent Kavvas, Editor of the Journal of Hydrologic Engineering

Presentations by students in oral or poster form

Deadline for submission of an abstract for oral or poster presentation is January 23, 1996
For information contact:
H.. J. Morel-Seytoux, 57 Selby Lane, Atherton, CA 94027
Phone: 415/365-4080 FAX 415/365-4080 email: Morelsey@leland.stanford.edu
or
Janet Montera, Civil Engineering, Colorado State University, Fort Collins, CO 80523
Phone: 970/491-7425 FAX 970/491-7727

MEETINGS

SEVENTH AMERICAN FOREST CONGRESS
Washington DC, February 21-24, 1996

Historical Context -- Forest Congresses, bringing together representatives from public and private interests, have been held at critical points in the nation's history:

- The first, convened in 1882, laid the foundation for the conservation movement in the United States.
- The second, hosted by President Theodore Roosevelt in 1905, was followed bu the establishment of the national forest system. Subsequent Congresses, convened in 1946, 1953, 1963 and 1975 addressed critical policy issues of the time.
- Individuals from conservation organizations, business, universities, and federal, state and tribal government met in January 1995 at the Arbor Day Foundation in Nebraska in a Roundtable discussion where they issues a call to convene the Seventh American Forest Congress. The 1996 Congress may well prove to be the most important meeting since 1905.

FOR INFORMATION CONTACT: Office of the Seventh American Forest Congress -- 203/432-5117.

KAPPE LECTURE

DR. DAN OKUN -- NEW YORK CITY WATER SUPPLY

Colorado State University was selected by the American Academy of Environmental Engineers as the recipient of one of ten nationwide Kappe Lectures. The Kappe Lecturer for 1995 is Dr. Dan Okun, Kennan Professor, Emeritus, University of North Carolina.

DATE: **OCTOBER 30, 1995**
TIME: **4:00 p.m.**
PLACE: **Cherokee Park Room, Lory Student Center**
(Second floor, north hall, through entrance to University Club at west end of hall)
Colorado State University, Fort Collins, Colorado

Following the lecture there will be a reception in the Cherokee Park Room.

DIRECTIONS: From I-25 turn east on C14, then continue to Fort Collins and enter Mulberry (no turns). At College Avenue turn left (south) on Howes and enter the CSU oval (crossing Laurel Ave., the north boundary of the CSU campus). Take the first right from the oval to the parking lot in back of the Engineering Building and the Lory Student Center (east of the Engineering Building).

PARKING: There is metered parking that requires coins until 4:00 p.m.
or
Park in the A zone restricted area of the same parking lot, which is unrestricted after 4:00 p.m. If you get a citation send to David W. Hendricks, Civil Engineering, Colorado State University, Fort Collins, Colorado 80523.

UPCOMING COLORADO WATER CONGRESS MEETINGS

Oct. 18	**INSTREAM FLOW WATER RIGHTS: PAST, PRESENT AND FUTURE**	Northglenn, Colorado
Oct. 20	**14TH ANNUAL WORKSHOP ON FEDERAL AND STATE WATER QUALITY DEVELOPMENTS**	Northglenn, Colorado
Oct. 24	**LEGAL ETHICS IN WATER & ENVIRONMENTAL LAW**	Northglenn, Colorado
Nov. 8	**CWC WORKSHOP ON A REVIEW OF FEDERAL ENVIRONMENTAL LAWS IMPACTING WATER INTERESTS**	Denver, Colorado
Nov. 9	**CWC WORKSHOP ON WHAT YOU SHOULD KNOW ABOUT THE NINE INTERSTATE COMPACTS THAT COLORADO IS A SIGNATORY TO**	Denver, Colorado
Nov. 14	**CWC WORKSHOP FOR BOARD MEMBERS OF WATER CONSERVANCY/ CONSERVATION DISTRICTS**	Northglenn, Colorado
Nov. 15	**CWC WORKSHOP ON THE LEGISLATIVE PROCESS**	Denver, Colorado
Nov. 15	**CWC WORKSHOP ON THE FEDERAL PROCESS**	Denver, Colorado
Nov. 17	**CWC WORKSHOP ON THE INITIATIVE PROCESS: WHAT YOU NEED TO KNOW**	Denver, Colorado

For information contact the Colorado Water Congress, Suite 312, 1390 Logan Street, Denver, Colorado.
Phone: 303/837-0812. FAX: 303/837-1607.

CALENDAR

1995

Oct. 25-26 ENDANGERED SPECIES MANAGEMENT: PLANNING OUR FUTURE, 6th Annual South Platte Conference, Greeley, CO. Contact: David Graf, CWRRI, Phone 970/491-6308, FAX 970/491-2293.

Oct. 26-27 REACHING THE LIMITS: STRETCHING THE RESOURCES OF THE LOWER RIO GRANDE, Las Cruces, NM. Contact: New Mexico Water Resources Research Institute, Phone 505/646-4337, FAX 505/646-6418.

Nov. 2-4 RIVER RECOVERY AND RESTORATION, From Policy to Practice, Park City, UT. Contact: Suzanne Pollock Van Gytenbeek, Phone 801/328-3728, FAX 801/328-9941.

Nov. 3-6 INTERNATIONAL CONFERENCE ON EVAPOTRANSPIRATION AND IRRIGATION SCHEDULING IN CONJUNCTION WITH THE IRRIGATION ASSOCIATION EXPOSITION, San Antonio, TX. Contact: Judy Brown, American Society of Agricultural Engineers, e-mail: brown@asae.org, phone: 616/428-6323, FAX: 616/429-3852. For information about the International Irrigation Exposition contact: Claude Phene, Co-chair, Phone 209/298-0201, FAX 209/298-8068; or Sharon McKnight, Phone 616/428-6333, FAX 616/429-3852.

American Water Resources Association
1995 & 1996
Conference and Symposia Schedule

November 5-9, 1995/ Houston, Texas
[Reconvened Conference/ November 10-12, 1995/ Cancun, Mexico]
31st Annual AWRA Conference & Symposia

☆***Symposium on Water Management in Urban Areas***

☆***Symposium on the Advances in Development and Use of Models in Water Resources***

☆***Symposium on Western Hemisphere Water Resources***

July 14-17, 19966/ Syracuse, New York
Annual AWRA Symposium
Watershed Restoration Management: Physical, Chemical, and Biological Consideration

January 4-8, 1996/ Orlando, Florida
CONSERV96
A Forum on Water Conservation Technology, Strategies and Solutions

September 22-26, 1996/ Fort Lauderdale, Florida
32nd Annual AWRA Conference & Symposium
****
For Additional Information Please Contact
AMERICAN WATER RESOURCES ASSOCIATION
950 Herndon Parkway
Suite 300
Herndon, VA 22070-5528
Phone: (703) 904-1225
Fax: (703) 904-1228

Nov. 10 AGRICULTURAL WATER CONSERVATION-- MYTH/FACT/REALITY/TRANSFERS, Sheridan Wyoming. Contact: Wyoming Water Development Association (Don Brosz), 2304 Hillside Dr., Laramie, WY 82070.

Nov. 13-15 NATIONAL ASSOC. OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES, 108th Annual Meeting, Disney World, Lake Buena Vista, FL. Contact: NASULGC, Phone 202/778-0850, FAX 202/296-6456.

1996

Jan. 3-4 2ND ANNUAL ARKANSAS RIVER BASIN WATER FORUM, Pueblo, CO. Contact: Mike French, 640 W. Reservoir Rd., 719/561-9230 or Frank Sobolik, 215 W. 10th, 719/583-6566.

Jan. 10-12 SEVEN STATES UNITED, Joint Annual Conference, 4-States Irrigation Council and Upper Missouri Water Users Assoc. Cheyenne, WY. Contact: Brian Werner at 970/667-2437.

Rocky Mountain Section
American Water Works Association
Monthly Luncheons
Ramada Hotel
8773 Yates Dr., Westminster, CO
Boulder Turnpike and Sheridan Blvd.

11:30 a.m. - 1 p.m.

$10 includes buffet, beverage, tax, tip
For reservations and program Information:
Kim Wellington 303/721-9292

Jan. 16-19	CONFERENCE ON TAILINGS AND MINE WASTE '96, Fort Collins, CO. Contact: Linda Hinshaw, Department of Civil Engineering, Colorado State University, Fort Collins, CO 80523. Phone: 970/491-6081; FAX: 970/491-7727.
Feb. 21-24	SEVENTH AMERICAN FOREST CONGRESS, Washington DC. Contact: Office of the Seventh American Forest Congress, Phone 203/432-5117.
Feb. 25-28	WATER REUSE 96, San Diego, CA. Contact: Susan Blount, American Water Works Assoc., Phone 303/794-7711, FAX 303/794-8915.
June 11-14	COMPUTERS IN AGRICULTURE, 6th International Conference, Cancun, Mexico. Contact: Susan Buntjer, American Society of Agricultural Engineers. Phone 616/428-6327, FAX 616/429-3852, email: buntjer@asae.org.

COLORADO WATER
Vol.12, No.5 Date: October 1995

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COLORADO WATER is a publication of the Colorado Water Resources Research Institute. The scope of the newsletter is devoted to enhancing communication between Colorado water users and managers and faculty at the research universities in the state.

This newsletter was financed in part by the U.S. Department of the Interior, Geological Survey, through the Colorado Water Resources Research Institute. The contents of this publication do not necessarily reflect the views and policies of the U.S. Department of the Interior, nor does mention of trade names or commercial products constitute their endorsement by the United States Government.

Published by the Colorado Water Resources Research Institute, Colorado State University, Fort Collins, CO 80523. Phone: (303) 491-6308

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