

Colorado Water

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

WATER ITEMS AND ISSUES . . .

August 1995

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ENDANGERED SPECIES MANAGEMENT: PLANNING OUR FUTURE

6th Annual South Platte Conference - Oct. 25-26, 1995

Greeley, Colorado -- see page 22



Fall Specialty Seminar

EVAPOTRANSPIRATION AND IRRIGATION EFFICIENCY

FOR USE IN WATER TRANSFERS

Oct. 10-11, 1995

Arvada, Colorado -- see page 23

STUDYING CHANGE!

Editorial by Robert C. Ward

Changes are washing over Colorado's water management system in many ways. But this is nothing new. Wayne Aspinall, drawing upon a lifetime spent working on water issues, noted in the first issue of Colorado Water Rights (Fall 1982) that:

"... there never has been, there is not today, and there never will be a *status quo* in the administration of water rights under the doctrine of appropriation. The old adage to the effect that we live in an ever-changing world certainly applies to the administration of the distribution of water in Colorado."

This summer has offered a number of indications of the continuing evolution in Colorado's water management system. For example, the demand for water generated by population growth, discussed during the recent growth summits, continues to pressure Colorado's water management system. More active use of deep aquifer recharge during the winter, combined with withdrawals during the summer, is increasingly being promoted as one way to address the water needs of the south Denver metro area. Questions about treatment before recharge or after withdrawal are asked. Implications to water rights are of concern. The nature of groundwater hydrology in the area is being questioned.

Growth brings other water problems. Houses built in Colorado's mountains often must use on-site means of water supply and wastewater disposal. Are the increasing number of septic tank - leachfield systems negatively affecting Colorado's groundwater quality? Is so, in what ways and to what degree? Are we fouling our nest with such practices?

Increasing urban water demand also threatens the viability of Colorado's agriculture, if past practices of buying up farmland and agricultural water rights are used to meet the increasing demand. To protect the viability of agriculture while meeting urban water demands, new water management concepts need to be explored. Deficit irrigation is a concept that is being defined. There is growing interest in defining the concept of "agricultural water conservation" and the many ramifications it embodies.

The Water Quality Control Commission has identified, for the second year, water quality monitoring as a major priority for the coming year. Obtaining information on our environment is expensive, especially if each organization performs all its own measurements to obtain the information it needs. The Commission recognizes the need to better coordinate monitoring efforts and is working to bring about such coordination. If better coordination is to occur, questions arise as to what common methods can be agreed upon to obtain a sample, analyze it in the field and laboratory, and store the data in a computer.

In this same arena, the U.S. Geological Survey recently published its analysis of the existing nutrient, suspended sediment, and pesticide data from the South Platte River for water years 1980-1992. This effort to use existing data to draw a water quality picture of the South Platte is refreshing and indicates that the USGS, at least, will

be building off existing data/knowledge instead of completely "reinventing the wheel." Additional questions arise as to the role of salinity in the South Platte. How does water quality relate to ecosystem health in the South Platte? How can the information in the report be readily and conveniently conveyed to Colorado water users/managers and the public?

The U.S. Geological Survey also has begun placing its water data on the World Wide Web. The article on page 14 of this issue of COLORADO WATER describes our experiences with this development. Anyone who has tried, generally in vain I might add, to obtain water data from federal agencies in a timely fashion will appreciate this new development as the dawning of a whole new era in water management. The fact that I can sit in front of my computer and view data collected only yesterday by the USGS is a quantum leap into the future. Again questions: How can this new access to information be used to eliminate duplicate data collection and enhance water management decision making? How should it be analyzed and presented to decision makers -- the public?

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Robert C. Ward, Director

These example changes (there are many, many more), and the questions that spin off them, become the focus of CWRRRI's water research program. A ballot to determine the top research priorities for CWRRRI's 1996/97 research program is being sent to CWRRRI's Research Planning Advisory Committee (RPAC) for their vote. Membership of the RPAC is presented on page 5. The actual ballot is presented below. The top priorities are included in the call-for-preproposals that will be issued to higher education faculty by CWRRRI in its October newsletter.

As Wayne Aspinall noted in the above referenced article, Colorado's water leaders must be open to "studying the need for changes in intrastate water administration." CWRRRI offers Colorado the opportunity to study water management concerns brought on by change and generate the information which Colorado water users and managers can utilize to adjust, in an optimum fashion, to these changes. Thus, while change is constantly a part of Colorado's water management system, CWRRRI provides a research program to carefully study the ramifications of that change.

WATER RESEARCH



ESTABLISHING CWRRRI'S 1996/97 WATER RESEARCH PRIORITIES

There is still uncertainty in Congress over the future of the National Water Research Institutes program, of which CWRRRI is a part. Being optimistic, CWRRRI will proceed to establish its 1996/97 water research priority list via the following ballot process. The ballot below has been mailed to the 26 members of CWRRRI's Research Planning and Advisory Committee (RPAC). They will rank the water topics in order of most importance to Colorado's water users and managers.

The top eight topics will then be listed in CWRRRI's Request-for-Preproposals that will be issued to faculty in Colorado's higher education system the first of October. Faculty will have until early January, 1996, to prepare preproposals on the priority topics, hopefully in cooperation with Colorado's water users and managers. The preproposals are then evaluated and ranked by the RPAC

members and a Technical Advisory Committee (for technical merit). The top eight to ten proposals that emerge from this review process are then funded (often with modification as a result of RPAC suggestions).

The ballot is being published in *COLORADO WATER* to give all readers the opportunity to share their priorities with CWRRRI. CWRRRI seeks to become a clearinghouse for all water research needs and collaborative research opportunities. This can happen only if everyone contributes. Please share your thoughts and opportunities with RPAC members or me.

Indicate your top 10 rankings by placing a number in the box beside the selected item, using the number "1" as highest priority and "10" as the lowest.

- Conjunctive use of surface and groundwater: an old issue with new imperatives!**
- Groundwater recharge: what are the quality concerns?**
- Orphan site cleanup: a case for a water quality market?**
- With what, and by how much, do septic tanks pollute groundwater in Colorado's mountains?**
- Ways and means of creating minimum streamflows within Colorado's current water law system.**
- How much water do endangered species need?**
- The role of a state water plan in identifying needed structural improvements.**
- Restoring aquatic habitats: The search for realistic goals and affordable methods.**
- The historical presence of fish in Colorado's rivers.**
- Identifying indicator variables for reporting on the status and trends of Colorado's watersheds.**

- Predicting future water demands by all segments of Colorado's economy and environment.
- Measuring the value Colorado citizens put on healthy aquatic systems, including minimum stream flows.
- Colorado's River Compacts: Past, Present and Future impacts on local water management decisions.
- Colorado vs. Kansas: What are the water management ramifications to Colorado citizens?
- What do small water supply organizations need to measure in order to ensure their customer's clean water?
- Watershed Forums in Colorado: what are they and how will they affect current water management practices?
- Integrating state and federal water management agencies into one clear purpose: Desirable and feasible?
- Managing extreme hydrological events: Meeting the challenge!
- Deficit Irrigation: What, Where and When?
- Managing Colorado's water data: new computer technology - new access?
- Are we collecting the right data to manage Colorado's water in the 21st century?

- _____
- _____
- _____
- _____
- _____



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INITIATING A WATER MANAGEMENT DSS FOR THE SOUTH PLATTE BASIN

*Condensed from a report prepared by Henry H. Kunhardt and Darrell G. Fontane
 Department of Civil Engineering, Colorado State University*

During the past year, graduate student Henry H. Kunhardt has looked at the South Platte Basin's evolving and increasing demands for water. The basin has an exploding urban population, new mandates for instream flows, a strong traditional agriculture, and a water-based recreation industry all vying for water. There are also demands for aesthetic flows, such as those sought by Denver Mayor Webb and those the city of Boulder wants to provide in Boulder Creek. The Dec. 16, 1994 issue of the *Rocky Mountain News* announced that one of Webb's top priorities was to have the South Platte River running full, year-round, through downtown Denver...which was followed the next day by a headline in the *News* that "Fixing South Platte would be a tangled mess." Water officials and consultants agreed that options to provide aesthetic flows were complicated by existing water contracts, numerous water rights, increasing demands due to growth, and other constraints.

As the river system operates closer and closer to its absolute capacity, partial solutions may lie in better coordination of reservoir operations, further development of conjunctive use potential, and more innovative trading and cooperation between decreed water users. Yet, even with increasing demands, unappropriated water still flows in the South Platte during some parts of the year., and Colorado also needs to explore ways to more fully realize its entitlement under the interstate compact with Nebraska and maximize the beneficial use of that entitlement, while meeting ecological needs year-round.

For the South Platte River Basin, a water management decision support system (DSS), equipped with the proper models, could assist in evaluation of proposed (or needed) trading scenarios and augmentation plans by analyzing their potential flow and quality effects. The authors looked at the current status of South Platte decision support and the current status of 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.

With the Colorado River Decision Support System (CRDSS) underway, the Colorado Water Conservation Board contemplates duplicating that framework for the South Platte. The authors note that at least two Ph.D dissertations and one paper addressing

decision support on the South Platte were written recently at Colorado State University:

John Eckhardt's 1991 dissertation, "Real-time Reservoir Operation Decision Support Under the Appropriation Doctrine," details a decision support tool for operation of two or more reservoirs. Eckhardt notes that operators suffer more from information overload than lack of information, and showed how a systems approach can help them sort out their options.

Jeffrey Fredericks' dissertation, completed in 1993, "Decision Support System for Conjunctive Stream-Aquifer Management Under Prior Appropriation," which developed several specialized routines for reading data from external databases. Fredericks performed an extensive inventory of existing water resources data and noted that no central facility exists for data collection and distribution. While he found that most data was available in a digital format, the various formats were not always compatible.

In a 1994 CWRRI paper, "Initiating a Water Management Decision Support System for the Platte River Basin," Masters student Robert Leaf reviewed some of the streamflow models that have been used in the South Platte Basin, including BESTSM, MODSIM and CRAM, and SAMSON.

CWRRI has identified several data needs for modeling the stream-aquifer relationship of the lower basin, including acreage and crops irrigated under individual ditches, well pumping amounts, ungaged return and tributary flows, reservoir operations rules, and river gain/loss relationships. In addition, some believe the spatial characteristics of the South Platte aquifer still are not adequately known. Any serious attempt to model the lower South Platte basin must account for the tributary aquifer. The current methods of calculating well depletions and recharge accretions provide generally acceptable results, but additional improvement would be desirable. Because the water resources planning model for the South Platte must include surface/groundwater interaction, the CRDSS model, now in its second year of development, would need to be modified (or replaced).

The authors see three remaining technical hurdles and at least two fundamental institutional issues:

Technical Hurdles--Final development and calibration of a basin-wide, surface/groundwater model, development and calibration of an appropriate water quality model, and most importantly, development and verification of the database to support the models.

Institutional Issues--While the South Platte Basin is smaller in area than the Colorado River Basin, it will be more complex to model. The development of a DSS should occur incrementally with close communication among model developers, water users and government administrators. An additional issue involves the legal constraints governing water salvage and exchanges. While it can be argued the South Platte is efficiently managed and used today, the situation is clearly changing rapidly. A Decision Support System for the South Platte could help Colorado address these problems.

CWRI will publish the full report by Henry Kunhardt and Darrell Fontane as part of its WATER IN THE BALANCE series. The report will be available in August. If you wish to receive a copy, contact the CWRI office at 970/491-6308.

The research was sponsored jointly by the U.S. Geological Survey through the State Water Institutes Program and Colorado State University.

The next issue of *COLORADO WATER* will contain a review of another *Water in the Balance* edition that soon will be printed. It will describe the South Platte Water Rights Management System developed for the South Platte by CADSWES/CU at Boulder.

WATER RESEARCH AWARDS

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

Colorado State University, Fort Collins, CO 80523

- Consumptive Use Model, Luis Garcia, Chemical and Bioresource Engineering. Sponsor: Riverside Technology, Inc.
- Planning Reintroduction of Native Cutthroat Trout to Tributaries of Blue Mesa Reservoir, Kurt D. Fausch, Fishery & Wildlife Biology. Sponsor: National Park Service (NPS).
- Viscous Effects in Pore Scale Modeling of Immiscible Fluid Flow Through Porous Media, Deanna S. Durnford, Chemical and Bioresource Engineering. Sponsor: USAF- Office of Scientific Research.
- *Quantification of Federal Reserved Water Rights for National Park Purposes, Thomas G Sanders and Dan Kimball, Civil Engineering. Sponsor: NPS.
- *Long-Term Ecological Measurements in Loch Vale Watershed, Rocky Mt. National Park, David M. Swift and Jill Baron, Natural Resource Ecology Lab. Sponsor: NPS.
- Larval Razorback Sucker in the Lower Green River, Utah, Robert T. Much, Fishery & Wildlife Biology. Sponsor: NPS.
- *Impact of Historical Land Cover & Landuse Change on Weather & Climate, Roger A. Pielke, Atmospheric Science. Sponsor: USGS.
- *Biological & Ecological Assessment of the Comanche National Grasslands, Christopher A. Pague, Fishery & Wildlife Biology. Sponsor: US Forest Service (USFS).
- *Flow Indexes & Watershed Modeling at Waikolu Basin (KALA), Gustavo E. Diaz and Jose D. Salas, Civil Engineering. Sponsor: NP S.
- Demonstration of Irrigation Technology to Improve Crop Yields, Returns, & Water Quality..., James C. Valliant and Charles R. Hart, Cooperative Extension. Sponsor: Colorado State Conservation Board.
- *Characteristics & Values of New Urban Immigrants Near National Forests, Jerry J. Vaske and Maureen P. Donnelly, Natural Resources Recreation & Tourism. Sponsor: USFS-Rocky Mt. Experiment Station.
- Modeling & Evaluation of the Effects of Residential Water Conservation Price & Non-Price Programs in Urban Areas..., Robert C. Ward, Colorado Water Resources Research Institute. Sponsor: University of Wyoming/AWWA.
- *Comparative Ecosystem Dynamics in Riparian Zones Along Regulated and Unregulated Rivers, David J. Cooper, Fishery & Wildlife Biology. Sponsor: NPS.
- *Modeling Forest Response to Environmental Change, Dean L. Urban, Rangeland Ecosystem Science. Sponsor: NPS.
- *94/95 Aquatic Studies, Eric P. Bergersen, Cooperative Fish & Wildlife Research. Sponsor: Colorado Division of Wildlife.
- Inventorizing & Monitoring Natural Resources Status & Trends in the National Park System, Jim C. Loftis and Luis Garcia, Chemical and Bioresource Engineering. Sponsor: NPS.
- Rocky Mountain Arsenal Drestel Biomonitoring Assays, Howard S. Ramsdell, Environmental Health. Sponsor: U. S. Fish & Wildlife Service.
- Initiation of Summitville Mine Site CERCLA Investigation, A. William Alldredge, Fishery & Wildlife Biology. Sponsor: EPA.
- *The Impact of Wildlife Related Recreation on the Alaskan Economy, Edward W. Sparling, Agricultural & Resource Economics. Sponsor: U.S. Forest Service-Rocky Mt. Experiment Station.

- *Responses of Hydrologic & Aquatic Ecosystem Processes to Potential Climate Change..., Jill S. Baron and David M. Swift, Natural Resource Ecology Lab. Sponsor: NPS.
- *Range-Watershed Training for Native Americans, Ellsworth T. Bartlett and Freeman M. Smith, Rangeland Ecosystem Science. Sponsor: U.S. Forest Service-Rocky Mt. Experiment Station.
- *Incremental Assessment of Habitat, Discharge & Modification for Low Flow, Steven R. Abt and Chester C. Watson, Civil Engineering. Sponsor: ARMY-Corps of Engineers.
- *The Influence of Flow Diversions on Macroinvertebrates..., James V. Ward, Biology. Sponsor: U.S. Forest Service-Rocky Mt. Experiment Station.
- *Dynamical & Electrical Studies of Convective Cloud Systems, Steve A Rutledge, Atmospheric Science. Sponsor: National Science foundation.
- Dam Foundation Erosion Study, Steven R. Abt and James F. Ruff, Civil Engineering. Sponsor: Bureau of Reclamation.
- *Integrated Research on Hazardous Waste Chemical Mixtures, Raymond. S. H. Yang, Environmental Health. Sponsor: Superfund.
- Wetlands Research in the San Luis Valley, David R. Anderson, Cooperative Fish & Wildlife Research. Sponsor: Colorado Division of Wildlife.
- Sampling of Colorado Squawfish in the Colorado River Inflow to Lake Powell, Robert T. Much. Sponsor: National Park Service.
- *Hydraulic Model Study of Rock Creek & Creste Dam Sediment Management, Albert Molinas and Steven R. Abt, Civil Engineering. Sponsor: Pacific Gas & Electric Company.
- *Statistical Methodology for Natural Wetlands Inventory Status & Trends Data, Kenneth P. Burnham, and David C. Bowden, Cooperative Fish & Wildlife Service. Sponsor: U.S. Fish and Wildlife Service.
- Rating Fitted Grade Control Structure Hydraulic Design, Chester C. Watson, Steven R. Abt, and Daniel Gessler, Civil Engineering. Sponsor: ARMY- Corps of Engineers.
- *Gas Phase Transport of Volatile Organic Compounds in the Vadose Zone, David McWhorter, Chemical and Bioresource Engineering. Sponsor: University of Waterloo.
- *Spatial Trends in Surface Water Quality, Noatak National Preserve, Daniel E. Brinkley, Forest Sciences. Sponsor: USFS.
- Cultivation of Pseudomonas Cepacia for In Situ Biodegradation of TCE, Kenneth F Reardon, Chemical and Bioresource Engineering. Sponsor: Camp Dresser McKee.
- *Laboratory Analysis to Determine the Extent of Whirling Disease in Colorado, Stephen A. Flickinger, Fishery & Wildlife Biology. Sponsor: Colorado Division of Wildlife.
- *Arkansas Darter Recovery: Defining Habitat Requirements & the Spatial Dynamics of Population..., Kurt D. Fausch, Fishery & Wildlife Biology. Sponsor: Colorado Division of Wildlife.
- Cover-Type Mapping of Republican Watershed Using Satellite Data, Roger M. Hoffer, Forest Sciences. Sponsor: Colorado Division of Wildlife.
- Landsat TM Data for Vegetation Type Mapping of the South Platte Watershed, Roger M. Hoffer, Forest Sciences. Sponsor: Colorado Division of Wildlife.
- Environmental Resource Inventory of the North Foothills Open Space, Christopher A. Pague, Fishery & Wildlife Biology. Sponsor: Boulder County Parks & Open Spaces.
- Identification of Causes & Extent of Toxicity in Surface Waters at Coal Creek..., Stephen A. Flickinger, Fishery & Wildlife Biology. Sponsor: NPS.
- Reclamation Plan for Summitville Superfund Site, Edward F. Redente, Rangeland Ecosystem Science, Colorado Dept. Of Health.
- Conservative Eulerian-Lagrangian Methods for Modeling of Groundwater Solute Transport, Robert C. Ward, CWRRI. Sponsor: USGS.

The University of Colorado, Boulder, CO 80309

- FHWA Bridge Management Systems, George Hearn and Dan Frangopol, Civil, Environmental and Architectural Engineering. Sponsor: Michael Baker, Jr., Inc.
- Denitrification Demonstration Project, Joann Silverstein, Civil, Environmental and Architectural Engineering. Sponsor: Electric Power Research Institute.
- *Biodiversity of Open Space Grasslands at a Suburban/ Agricultural Interface, Carl Bock and Jane Bock, Environmental, Population and Organismic Biology. Sponsor: City of Boulder.
- Enhanced Optimized Coagulation for Removal of Particulate and Microbial Contaminants, Gary Amy, Civil, Environmental and Architectural Engineering. Sponsor: American Water Works Association Research Foundation (AWWA).
- Arsenic Treatability Options and Evaluation of Residuals Management Issues, Gary Amy and Marc Edwards, Civil, Environmental and Architectural Engineering. Sponsor: AWWA.
- Supplement To: Effects of Climate Change in the Colorado Alpine, Timothy Seastedt, Environmental, Population and Organismic Biology. Sponsor: National Science Foundation (NSF).
- *The Final Stages of a Collapsing Marine Ice Sheet: Late Glacial Sediment Fluxes, Paleoceanography and Chronology: Hudson Strait and Adjoining Shelf, Canada, Anne Jennings and John Andrews, Geological Sciences. Sponsor: NSF.
- Generation and Application of AVHRR-Derived Ice Motion for the Arctic and Antarctic, William Emery and James Maslanik, Aerospace Engineering. Sponsor: National Aeronautics and Space Administration.
- *Late Glacial Paleoceanographic and Climate Conditions on the East Greenland and the SE Baffin (Canada) Margins: Comparisons and Contrasts, John Andrews and Anne Jennings, Geological Sciences. Sponsor: University of California at San Diego.
- *Polar Exchange at the Sea Surface, Jeffery Key and Roger Barry, Geography. Sponsor: University of Washington.
- Decommissioning and Decommissioning Verification Decision Support System for the Rocky Flats Environmental Technology Site, Rene Reitsma, Civil, Environmental and Architectural Engineering. Sponsor: Colorado School of Mines
- *Evolution of Sea-Ice Characteristics, Cloud Properties and Radiation Fluxes During the Autumnal Freezing of the Beaufort Sea Coastal

- Waters, Judith Curry, Guosheng Liu, Jeffrey Tilley, James Maslanik and Jeffrey Key, Aerospace Engineering. Sponsor: NSF.
- *Late Quaternary Paleooceanography of the Arctic Ocean, William Briggs, Institute of Arctic and Alpine Research. Sponsor: NSF.
- Collaborative Research--New Application of AVHRR to the Study of Small Scale Ice Sheet Surface Morphology: A Window on Regional Ice Dynamics, Theodore Scambos, Astrophysical, Planetary and Atmospheric Sciences. Sponsor: NSF.
- *Ice Sheet/Ocean Interactions, East Greenland Continental Margin During the Last 14,000 Years: Sedimentology, Stratigraphy, and Micropaleontology of High-Resolution Marine Records, John Andrews, Kerstin Williams and Anne Jennings, Geological Sciences. Sponsor: NSF.
- *Evolution of Sea-Ice Characteristics, Cloud Properties and Radiation Fluxes During the Autumnal Freezing of the Beaufort Sea Coastal Waters, Jeffrey Key, Cooperative Institute for Research in Environmental Sciences. Sponsor: NSF.
- *Biosphere/ Atmosphere Interactions: Biochemical Causes to Global Implications, Russell Monson, Environmental, Population and Organismic Biology. Sponsor: NSF.
- *Paleoclimate Records from Lake Sediments in a Cape Dyer-Quvitu Transect, Eastern Baffin Island, Arctic Canada, Gifford Miller and John Andrews, Geological Sciences. Sponsor: NSF.
- *The Effects of Climate Variation on Disturbance Regimes and the Dynamics of Montane Forests in the Colorado Front Range, Thomas Veblen, Geography. Sponsor: NPS.
- Endangered Species/Limnology, William Lewis, Environmental, Population and Organismic Biology. Sponsor: U.S. Fish and Wildlife Service.
- *Impact of Flow and Geomorphology on Food Web Dynamics of the Colorado River Native Fish Community, John Pitlick, Geography. Sponsor: U.S. Fish and Wildlife Service.
- A Numerical Study of Dynamical Processes in Marginal Seas with Seasonal Ice Cover, Lakshmi Kantha, Aerospace Engineering. Sponsor: Department of the Navy.
- Predictability of the Coupled Ocean-Atmosphere System on Intraseasonal and Interannual Time Scales, Peter Webster, Judith Curry, Sue Ellen Haupt, John Hart, A. Capotondi, Hai-ru Chang, Astrophysical, Planetary and Atmospheric Sciences. Sponsor: National Oceanic and Atmospheric Administration.

*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 snow pack, reservoir storage, and precipitation for the winter period (Nov.-April). During the winter period snow

pack is the primary component in all basins except the South Platte, where reservoir storage is given the most weight. The following SWSI values were computed for each of the seven basins on July 1, 1995 and reflect conditions during the month of June.

<u>Basin</u>	<u>July 1, 1995 SWSI Value</u>	<u>Change From Previous Mo.</u>	<u>Change From Previous Yr.</u>
South Platte	+3.9	+0.7	+2.5
Arkansas	+1.2	-1.3	-0.5
Rio Grande	+2.7	+4.1	+2.1
Gunnison	+3.8	+2.2	+3.7
Colorado	+2.7	+4.2	+4.5
Yampa/White	+2.9	+5.2	+6.7
San Juan/Dolores	+2.9	+4.4	+2.7

SCALE

-4 -3 -2 -1 0 +1 +2 +3 +4

Severe
Drought

Moderate
Drought

Near Normal
Supply

Above Normal
Supply

Abundant
Supply

UNIVERSITY WATER NEWS



GROWTH IN COLORADO -- POLL FINDS DIVERSE OPINIONS AND CONCERNS

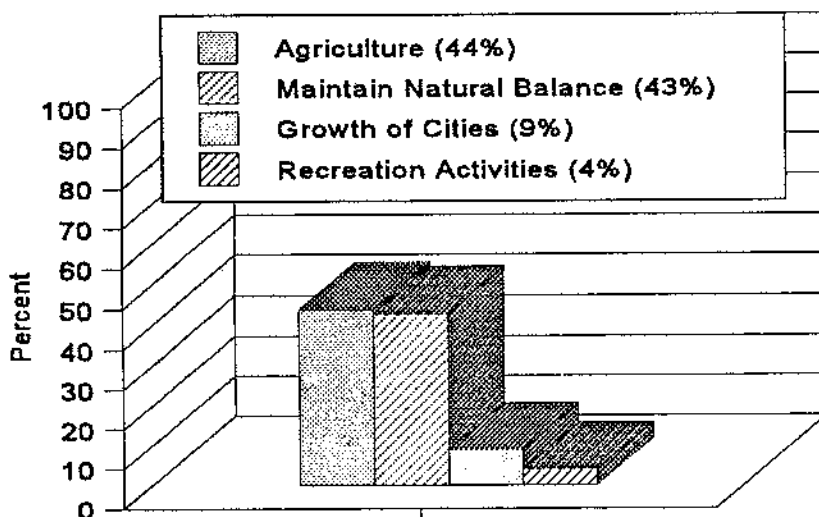
The population of Colorado, one of the fastest-growing states in the nation, is expected to double by the year 2050. The 1995 Colorado Environmental Poll, conducted in March, shows the average Coloradan's response to issues of growth in the state including priorities for water usage, states' rights regarding endangered species, natural resource spending, tourism, wolf reintroduction, and

the use of lottery funds for the Great Outdoors Colorado GOCO initiative. Consistent with 1992 election returns, 78 percent of the respondents supported the GOCO initiative. Views of the state's projected growth and its impact, based on the 1995 Colorado Environmental Poll, are indicated below.

Percent	Response
55	There is too much population growth in their own communities
74	Too many people are moving to Colorado*
75	Growth restrictions should not be left to market forces
56	State government agencies should serve as regulatory vehicles
65	Local government agencies should serve as regulatory vehicles

* Responses differed according to where the individual grew up (Colorado or elsewhere) and the length of residence in Colorado. Eighty percent of respondents who grew up in Colorado felt too many people are moving to the state; 66 percent of those who grew up in another state agreed with the statement. Similarly, 78 percent who have lived here for more than 5 years think the population is growing too rapidly, while less than 60 percent of those who arrived within the last 5 years expressed this opinion. Regardless of length of time in the state, 90 percent of all respondents reported a connection between population growth and environmental problems.

Priorities for water use



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). Less than 10 percent ranked the needs of growing cities as their highest priority, and less than 5 percent saw recreation opportunities as the best use of water.

The perceived need for increased spending on environmental issues was highest for recycling efforts (70 percent), water conservation activities (64 percent), and pollution control (64 percent). A majority of respondents also saw a need to increase funding for protecting prime agricultural lands from development (59 percent), and environmental education (57 percent). For the acquisition of open space, protection of endangered species of fish and wildlife,

environmental research, managing state parks, and fish and wildlife management, responses were more evenly divided between increasing spending (42 percent to 46 percent) and maintaining the current level of funding (45 percent to 59 percent). Less than 10 percent thought spending efforts in each of these categories should be decreased.

Percent	Response
90	Population growth in Colorado is causing environmental problems
83	Government should have the right to protect the environment when development threatens environmental quality
77	States should have the right to limit federally mandated reintroduction of endangered species
98	Tourism is beneficial to the state economy
58	There is a need to promote tourism in the state
59	Public taxes should not be used to support the industry

The Colorado Environmental Poll (CEP) was developed to help decision makers assess public opinion on contemporary natural resource issues. It included interviews with 410 randomly selected Colorado residents of the age of 18 or over conducted during the weeks of March 6 and March 20, 1995. Data were collected at CSU's Department of Natural Resource Recreation and Tourism Telephone Survey Lab. This is the fourth annual CEP; previous polls were conducted in August 1992, April 1993, and January 1994. The poll has a margin of error of ± 5 percent at the 95 percent confidence level.



BETSY RIEKE NOMINATED AS NRLC DIRECTOR

Betsy Rieke, Assistant Secretary for Water & Science in the Department of the Interior, has been nominated by Dean Gene R. Nichol of the School of Law for the position of Director of the Natural Resources Law Center, subject to approval by the University of Colorado Board of Regents. The appointment will be effective August 1. Rieke will replace Larry MacDonnell, the Center's first and only director (1983-1994).

Rieke was recently credited with helping water interests in California reach a truce in battles over the Sacramento-San Joaquin Delta. Before going to Washington in 1993, Rieke served in the Arizona Department of Water Resources, as Director from 1991-1993, and earlier as Chief Legal Counsel. She also practiced with the law firm of Jennings, Strouss & Salmon in Phoenix. For over a decade she worked on implementing Arizona's Groundwater Code, passed in 1980 to provide a dependable long-term water supply for Arizonans. She has also chaired various negotiations to resolve other Arizona water issues. Born in Buffalo, N.Y., Rieke graduated in 1965 from Oberlin College and received her law degree with highest distinction in 1981 from the University of Arizona.

C.U. Law Professor David Getches has been Interim Director for the Center since January 1, and will serve until Ms. Rieke's arrival in August.



ISWR RECEIVES AWARD FOR DANUBE RIVER BASIN STUDY

Dr. Irene Murphy, under the auspices of the International School for Water Resources at Colorado State, will conduct a year-long study of international cooperation in the Danube River Basin. The project will assess the effectiveness of programs to resolve Danube River Basin transboundary environmental conflicts from 1990 through 1995. The project will be under the guidance of Professor Evan Vlachos, Associate Director of ISWR and Civil Engineering Joint Faculty. The award, a United States Institute of Peace grant, was announced in July by ISWR. The study will be published as a book.

CSU RECEIVES \$5 MILLION SUPERFUND GRANT

Colorado State University of one of 17 schools nationwide to receive a \$5 million Superfund grant. With the grant, research teams will investigate how chemicals can be cleaned up at three of Colorado's hazardous-waste sites and how they are affecting the ecosystem. The research is aimed at Colorado sites, but the information collected will be used at sites throughout the country. Twenty-six researchers from CSU will work on at least eight projects at Superfund sites along the Upper Arkansas River near Leadville, at the California Gulch in the Arkansas River and at the Lowry Landfill.

- ▶ A four-person research team led by Will Clements, Department of Fishery and Wildlife Biology, will study the impact of cadmium, copper, lead and zinc contamination on the ecosystem in the Upper Arkansas River near Leadville.
- ▶ A group will investigate whether long-term exposure to mixtures of chemicals found at Superfund sites increases the risk of cancer. Experiments will be done on the livers of rats.
- ▶ The use of microbes in detoxifying hazardous chemicals will be studied at the Lowry Landfill. Microbes are disease-causing microorganisms. The project will use microorganisms and pollutants found at the Lowry Landfill. Information obtained from the laboratory investigation could be applied to large-scale waste sites around the country.
- ▶ Develop a new technique to pull bacteria directly from the waste sites and identify bacteria species. By looking at bacteria from the site, researchers can better determine which are most effective in waste reduction efforts and further study the interaction between the bacteria and chemical wastes.

Raymond Yang, Department of Microbiology, is Colorado State University's Superfund Director. The grant is funded by the National Institute of Environmental Health Sciences.

Source: *Fort Collins Coloradoan*, 6/22/95

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PROJECT PLANS WATER PAGE FOR NET

With a grant from the CSU Program of Research and Scholarly Excellence, faculty, graduate students and undergraduate student interns will begin the development of an InterNet page of Colorado Water Knowledge for citizens and policy-makers in July. Freeman Smith of the Department of Earth Resources at Colorado State developed the proposal and will lead the project, 'Colorado Watersheds: Water Knowledge.

- ▶ A questionnaire and statewide newspaper articles will be used to invite questions about Colorado water that citizens and policy-makers would like answered.
- ▶ Faculty and graduate students will assist undergraduate students in the CCHE Scholars Program and other interested undergraduate students in identifying and recovering the information needed to answer the questions.
- ▶ Graduate students will create and install the InterNet page in a format that will provide easy access for users.
- ▶ The ease of using the InterNet page will be evaluated with on-campus students and faculty and with off-campus users with access to InterNet.

On-campus: The project will directly involve the collaboration of CWRRI, Cooperative Extension, and Representatives of the departments of Chemical and Bioresource Engineering, Civil Engineering and Earth Resources (Robert Ward, Dan Sunada, Freeman Smith) will jointly guide the project.

Off-campus: Student interns will network with Colorado offices, institutes, professional and citizen organizations, forums, alliances, and others that are actively involved in disseminating water knowledge. The purpose is to establish communication and sharing of water knowledge and to obviate any duplication of efforts.

The award for the project came from Colorado State's Program of Research and Scholarly Excellence through the Department of Civil Engineering. President Albert C. Yates approved the designation of Water Resources Research as a Program of Research and Scholarly Excellence in February, 1995.

The project will be coordinated with the 1995 Program of Research and Scholarly Excellence sponsored by the Colorado Commission on Higher Education, also through the Department of Civil Engineering.

EDITOR'S IN-BASKET

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WEF PLANS WATER HISTORY PROJECT

Officials of the Colorado Water Education Foundation recently announced the receipt of a \$50,000 grant to study the history of water in the state. The grant is from the Colorado Historical Society through a State Historical Fund grant award, the El Pomar Foundation and individuals. The grant funds will be used to identify for the first time the state's significant water history sites and events. The WEF is looking for interested individuals to be members of a state-wide network, The Water History Advisory Network (WHAN). It will bring together local, regional, and state-wide perspectives. For more information call Tyler Stevens at 719/578-5393.

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CWA DEVELOPING WATER FACTS BOOK

A **Colorado Water Facts Book** is under development by The Colorado Water Alliance. The objective is to provide an overview of Colorado water facts by watershed, to explain basic water information such as sources and uses of water in Colorado, to explain the role of water conservation, and to explain basic water law principles. If you have comments or ideas for the book, contact Terry Moulton or Chris Bridges of the Colorado Office of Water Conservation, Phone 303/866-3441 or FAX 303/866-4474; or Milan Rewerts, Cooperative Extension at Colorado State University, 970/491-6281.

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LOW-INTEREST LOANS AVAILABLE TO WATER USERS

The Colorado Water Conservation Board (CWCB) Construction Fund was established in 1971 to make low-interest loans for the development and rehabilitation of raw water projects. Typical projects include dams, ditches, raw-water pipelines, and municipal wells. All projects must be technically, financially, and

economically feasible. Loans to small towns are available at about 5 percent interest, while agricultural loans are available at about 4 percent. The loan term is usually 30 years. These terms apply to the following CWCB loan programs:

*The Small Project Loan Account -- New in 1995--*The Small Project Loan Account was created as part of the 1995 annual Colorado Water Conservation Board (CWCB) Construction Fund bill. It allows the CWCB to directly approve individual loans up to \$100,000 without separate legislative authorization, so that funds are available sooner. The CWCB can approve loans from the Small Project Loan Account when it determines that delay of the project would cause undue hardship on the borrower. A total of \$1 million is available from the Small Project Loan Account in 1995.

*Emergency Loans Also Available--*The Emergency Infrastructure Repair Account has existed since 1993, and has funded 4 projects so far. Over \$450,000 has been loaned, and projects include agricultural dam and canal repairs, and municipal pump station and well equipment rehabilitation. The CWCB can directly approve Emergency Loans when it determines the loan is necessary to prevent risk to human health or well being, caused by a flood or other disaster. Eligible projects include repairs to dams, ditches or

raw water supplies. A total of \$1.5 million is available for loans from the Emergency Infrastructure Repair Account in 1995.

Standard Loans Usually the Best Option for Larger Projects-- Construction Fund Loans for large projects must pass through the annual legislative process. The application deadline is August 31, 1995 for consideration during the 1996 legislative session. Loans are made for up to 75 percent of the total project cost. Approximately \$20 million is currently available for Standard Construction Fund Loans.

FOR MORE INFORMATION AND AN APPLICATION
CALL JOHN VAN SCIVER AT 303/866/3441

OR WRITE

CWCB LOANS C/O JOHN VAN SCIVER
1313 SHERMAN, ROOM 721
DENVER, COLORADO 80203



WQCC IDENTIFIES PRIORITIES FOR COMING YEAR

At its recent 1995 retreat, the Water Quality Control Commission identified three major priorities for the coming year:

*Staff Relationship Improvements--*The WQCC will enhance efforts, including the Water Quality Forum, to establish a more inclusive informal pre-rulemaking process that allows all interested persons an opportunity for a full airing of issues and options.

*Water Quality Monitoring--*Enhancement of monitoring efforts was identified as a priority at the 1994 retreat, and since then the Division has obtained additional general funds for ambient monitoring activities and the Water Quality Forum has progressed with a review of Colorado water quality monitoring efforts including *field monitoring and laboratory analysis protocols, data base management options and coordination of monitoring efforts*. WQCC will maintain this area as high priority, and monitor and provide input into the ongoing efforts of the Water Quality Forum.

*Watershed Management--*The Commission will maintain another issue as high priority that was identified in 1994: encouraging use of the watershed management approach to water quality protection. The Commission will schedule two work sessions over the next few months: the first to provide an update of various local and regional watershed initiatives already underway in Colorado; and the second to provide for input from and discussion with Division staff and members of the Water Quality Forum regarding what actions the Commission can take to encourage and assist with watershed management efforts. The following WQCC members act as principal contacts or liaisons for basin or watershed initiatives:

Cherry Creek Reservoir	Julie Kraus
Chatfield Reservoir	Kala Greene
Bear Creek Reservoir	Marian Law
Dillon Reservoir	Tom Steinberg
Clear Creek Watershed	Sue Ellen Harrison
Upper Arkansas Watershed	Peter Nichols

Animas River Basin
Colorado River Headwaters

Roger Bill Mitchell
Tom Steinberg

Other Selected Water Quality Issues

- ▶ WQCC will participate in the task force being established by the Department of Natural Resources and the Colorado Department of Public Health and the Environment to address water quality issues related to mining operations.
- ▶ WQCC will implement a new plan to provide for periodic public reviews of all Commission regulations.
- ▶ WQCC will review, refine and conduct informational hearings on Procedural Regulations for Site Applications for Domestic Wastewater Treatment Works.
- ▶ WQCC will consider further whether to adopt a written policy statement regarding human health-based water quality criteria and standards.

The Federal Clean Water Act

Colorado representatives have been involved in discussions of the Clean Water Act including:

potential revisions to the Act to assure preservation of state authority to allocate quantities of water and the protection of established water rights; and

a proposal for a "Good Samaritan" provision to create additional incentives for states or other third parties to undertake remediation of water quality impacts at inactive and abandoned mine sites.

WET SPOTS ON THE WEB

FIND WATER DATA QUICKLY AND EASILY -- SEE WHAT'S ON-LINE

by Julie Eyre and David Williams

With an ever-increasing demand by computer users to gain access to resources on the internet, CWRRI tries to keep its readers informed of changes or additions to that access in the area of water resources. Because access information has appeared in every recent issue of *Colorado Water*, we have decided to dedicate a section of the newsletter to that endeavor. This new section "Wet Spots on the Web," will feature the latest access channels we find and comment on their possible benefit to Colorado water users and managers.

The use and popularity of the World Wide Web (WWW) has grown beyond belief during the last six months. It is possible to find information on the web supplied by the U.S. Geological Survey (USGS), the Environmental Protection Agency (EPA), the National Institutes for Water Resources (NIWR), the Universities Water Information Network (UWIN), the Army Corps of Engineers (ACE), National Center for Atmospheric Research (NCAR), Natural Resources Conservation Service (NRCS), and many others. Information available varies from location to location.

Since the Colorado Water Resources Research Institute went on-line with its web page in December of 1994, more than 800 users have accessed it. Some of the options our page has to offer include: an on-line version of our newsletter *Colorado Water*; publication abstracts for the CWRRI completion reports, technical reports, information seires, and special reports; a guide to water faculty and water related courses at Colorado State University, Colorado School of Mines, and the University of Colorado at Boulder; and links to homepages for other institutes and agencies. The CWRRI homepage is located at the following URL:

<http://www.colostate.edu/Depts/CWRRI/>

A very helpful site we found lately is the USGS's Water Resources for Colorado page. This location provides computer retrieval of historical and current water flow data for selected sites in Colorado through the WWW. Data collected at Colorado sites by the U.S.

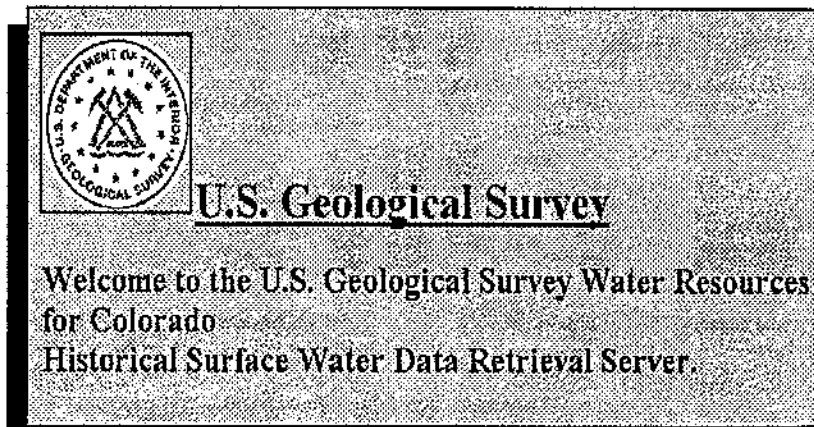


Figure 1. The USGS Historical Surface Water Data Retrieval Server provides data for many gaging stations around the state of Colorado.

Department of the Interior, USGS as part of a nationwide network of hydrologic stations can be accessed from the USGS home page at the following URL:

<http://webserver.cr.usgs.gov/>

Real-time water data retrieval includes data for the prior seven days, transmitted by satellite, and is updated about every four hours. Data for about 180 stations show streamflow discharge in CFS and gage height. Some stations have continuous data for water temperature and specific conductance (a property that provides an estimate of the amount of dissolved solids in the water). A few sites provide data on precipitation, air temperature, and groundwater level.

The historical streamflow retrieval includes daily average streamflow for about 950 sites in Colorado. The historical period of record for each station is dependent on the number of years each station was operated up to water year 1993.

While browsing this site, we were able to access real-time water data for many Colorado streamflow gaging stations and historical water data for even more stations. Figure 2 shows part (we could not include all of the graphic in this article) of a graphical display of streamflow data over a six day period for a Colorado gaging station. The dark line across the figure shows the reported flow, and tick marks in vertical sets of three show (from top to bottom) the historic high flow, the historic mean, and the historic low flow. Data is also available in tabular form. With water data easily accessible to any Colorado water user, manager, or researcher, this site may prove itself an invaluable tool for water-resources decision-making processes.

Not all active gaging stations are equipped with real-time satellite data transmitters. Additionally, other agencies, as well as USGS, operate hydrologic data stations in Colorado. For more information, contact the USGS at 303/236-4882.

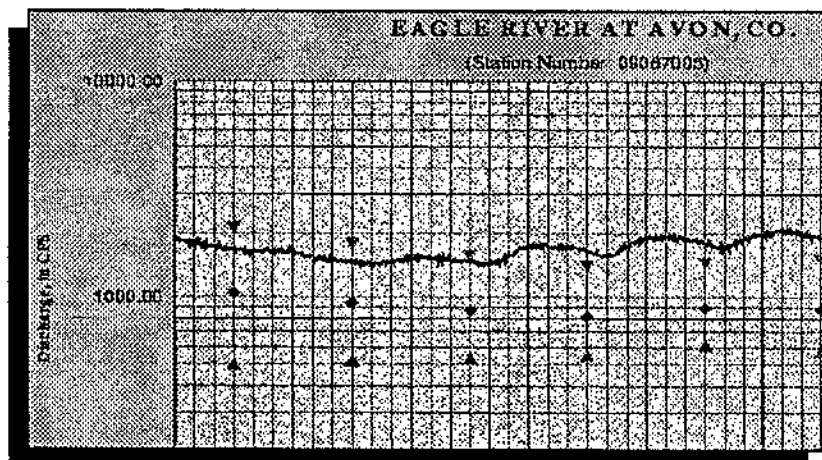


Figure 2. Real-time water data, expressed graphically in CFS.

In addition to the water quantity data mentioned above, USGS also has some limited water quality data for western area rivers. We were able to find some data on the Rio Grande and the Colorado River. Parameters reported included pH, alkalinity, bicarbonate, carbonate, dissolved oxygen, fecal coliform, and nitrogen and phosphorous content. There were only a few sampling stations reported, and all were downstream of Colorado. Hopefully, future web listings can include water quality data for stream segments in Colorado.

Another recent find is the NASA Hydrologic Cycle Distributed Active Archive Center (DAAC) at the Marshall Space Flight Center (MSFC). The MSFC DAAC is one of the nine data centers established for NASA's Earth Observing System (EOS) Data and Information System (EOSDIS) Project. EOS and EOSDOS are part of NASA's contribution to the U.S. Global Change Research Program, an interagency effort of the federal government to develop a predictive understanding of the global environment.

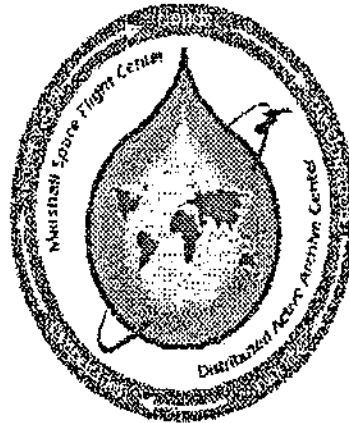
The DAAC provides several surface-based climatological data sets of precipitation and streamflows. Since January 1994, the DAAC has processed and archived precipitation data derived from the U.S. National Weather Service radars. There is no charge for data obtained from the DAAC. For more information on the DAAC, call 205/922-5932 or access by the following URL:

<http://wwwdaac.msfc.nasa.gov/>

The National Weather Service homepage offers frequently updated weather data, including precipitation and other surface parameters. It has forecasts and weather maps, and it is located at the following URL:

<http://hpcc1.hpcc.noaa.gov/nws/nwshome.html>

The Smart Growth and Development Center, sponsored by the Colorado Department of Local Affairs, provides internet access to information on growth and development and Governor Romer's



The Hydrologic Cycle DAAC at Marshall Space Flight Center Huntsville, Alabama

The George C. Marshall Space Flight Center (MSFC) Distributed Active Archive Center (DAAC) is known as the HYDROLOGIC CYCLE DAAC because our data holdings are primarily aimed at researchers investigating facets of the hydrologic cycle. We do, however, welcome requests from researchers in other disciplines, K12 educators, students and others who desire data and information from our system.

Figure 3. The NASA Hydrologic Cycle Distributed Active Archive Center provides on-line access for ordering climatological data.

Click on an icon to view images or ...



Select a state for text forecasts.

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| <input type="radio"/> Alaska | <input type="radio"/> Indiana | <input type="radio"/> Nebraska |
| <input type="radio"/> Alabama | <input type="radio"/> Iowa | <input type="radio"/> Nevada |
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| <input type="radio"/> Arkansas | <input type="radio"/> Kentucky | <input type="radio"/> New Jersey |
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| <input type="radio"/> Delaware | <input type="radio"/> Massachusetts | <input type="radio"/> North Dakota |
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Figure 4. Options for current weather data or weather forecasts on the National Weather Service homepage.



Colorado Smart Growth and Development Summit

Smart Growth and Development summit and regional meetings. It is located at the URL:

<http://www.colorado.edu/SmartGrowth/frontpage.html>

Other "Wet Spots" include UWIN (see *Colorado Water*, December 1994), NIWR (see next page), various universities and university departments, numerous branches of the Army Corps of Engineers and the Department of the Interior, and the Natural Resources Conservation Service, which is located at the URL:

<http://www.ncg.nrcs.usda.gov/>

With the wealth of water data and information available on the World Wide Web, water managers, users, and researchers have access to resources like never before. Streamflow measurements, hydrologic conditions, and water quality are never more than a few keystrokes

away. This resource, under the presumption that it will continue to expand and meet the needs of a growing water community, should prove to be invaluable to the state of Colorado.

NIWR PUBLICATION DATABASE

ALMOST 10,000 RESEARCH REPORTS PRODUCED BY THE NATIONAL INSTITUTES FOR WATER RESOURCES AT YOUR FINGERTIPS WITH THE NIWR PUBLICATIONS ELECTRONIC DATABASE

The NIWR electronic publication database provides, on computer diskettes, a listing of 9849 publications produced since 1984 by the National Institutes for Water Resources (NIWR), comprised of the 54 Institutes in the State Water Resources Research Institute Program. The publications cover the period 1984-1995. Included DOS software allows the user to search the database by key words in the publication's title, other descriptive key words and phrases, state, author, type of publication and year. Search criteria may be easily developed from any combination of these database elements, and the on-screen results may be further selected and then printed on paper, printed to a file or used to create a new database in dbf format. A brief report summarizes the breadth of the information provided by the database. Although the database is quite large, searching is very rapid, even on older PCS. Installation of the database is simple but requires nearly 10 Mbytes of hard disk space.

Also, the NIWR World Wide Web homepage, which contains information on the NIWR program and connections to the 54 state water institutes, can be reached by accessing the following URL:

<http://wrri.eng.clemson.edu/>

The NIWR Publication Database cost is \$10.00, primarily to cover the cost of distribution. Please remit to NIWR. NIWR is a non-profit organization, Federal ID #02-0449162.

Clip here and mail

Please send me the National Institutes for Water Resources Publication Database on disks of the size and density checked below:

3.5" HD

3.5" DD

5.25" HD

5.25" DD

I have enclosed payment of \$10.00 to cover the costs of this database.

Name: _____

Address: _____

City, State & Zip: _____

WATER NEWS DIGEST



THE 1995 FLOODS

On June 21, 1995, Colorado's snowpack stood at 558 percent of normal, according to hydrologist Larry Tunnell of the National Weather Service. At the same time, officials estimated localized flooding and heavy rains had resulted in at least \$9 million in damage to roads, bridges and parks and more than \$20 million in crop damage.

Dams may be politically incorrect these days, but this year they gave Colorado water managers the flexibility they needed to prevent even more major flooding in the wake of heavy late-season snow and rain. "North Delta would have been under water" if not for dams, and the Colorado River at Grand Junction would have peaked considerably higher as well, according to the area chief of the Bureau of Reclamation's water and land division. The Delta City Manager said the City Council would send a letter of appreciation to the Bureau. Despite the Bureau's efforts, the Gunnison River nearly overflowed its banks. Computer projections indicate flows would have been more than 50 percent higher without the controlled release of reservoir water. The State Engineer's office also credits dams with minimizing local flood damage, which has cost an estimated \$9 million in damage to roads, bridges and parks and more than \$20 million in damages to crops.

Denver - 6/15/95 -- The Army Corps of Engineers said record levels were expected at Bear Creek and Chatfield reservoirs, and it planned to release water from the dams periodically at least through early August.

Greeley - 6/18/95 -- Greeley has a series of reservoirs in the Poudre River Basin. Spring rains filled Milton Seaman Reservoir in the lower Poudre basin, and higher elevation reservoirs were ready to catch melting snow. Greeley released water from reservoirs to accommodate runoff from the Deadman area, where snowpack contained 24 inches of water, with 30 inches of moisture remaining in the snowpack at Joe Wright Reservoir near the top of Cameron Pass.

Steamboat Springs - 6/20/95 -- Crews rushed to Long Lake to shovel out a channel and allow snowmelt to flow out safely. Workers at the dam discovered water spilling over its top, which is 400 feet wide and sits upstream of city homes, stores and a mobile home park.

Palisades - 6/13/95 -- The Vincent reservoirs on Grand Mesa above Palisade remained stable and surges in Rapid Creek stabilized.

Pueblo - 6/7/95 -- Lake Pueblo grew to its deepest level since the high-water mark days of the mid-1980s. The water was about 7 feet short of the high-water mark, 4,880 feet in elevation.

John Martin Reservoir - 6/21/95 -- This year's snows and rain have put more water in John Martin Reservoir than in nearly a decade. The lake had more than 300,000 acre-feet of water in early June, while at this time in past years the reservoir hasn't had much more than 100,000 feet. John Martin can hold more than 600,000 acre-feet of water, so there is still plenty of room, but to make sure the Corps of Engineers planned to spill water through the dam's gates June 28 or 29 to allow plenty of room to hold any floods.

Rocky Mountain National Park - 6/28/1995 -- Much of the high country in Rocky Mountain National Park and Boulder County remained snowbound, with 4-10 feet of snow above the 9,500-foot level. Long's Peak was all but inaccessible.

Las Animas - 6/15/95 -- Local and state workers successfully shored up a damaged levee section that protects the city from Arkansas River flood waters.

Thunderstorms and Hail

Georgetown - 6/18/95 -- Heavy mountain thunderstorms sent Cabin Creek over its banks and into the streets of the historic mining town of Georgetown. Backhoe operators dug out a diversion ditch down Griffith Street that parallels Cabin Creek and water was flowing like a rushing river. A clogged culvert feeding a side creek into Cabin Creek may have caused the sudden 18-inch rise in streams that threatened the town.

Buena Vista - 6/19/95 -- Sandbags lined the streets where Cottonwood Creek had threatened some homes, but the waters receded.

Plains Counties and Towns - 6/15/95 -- Flooding caused by heavy rains caused some of the most severe damage. Bent and Prowers counties together had about \$1.7 million in damages. Bouts of flooding were a problem throughout the Arkansas and Platte River valleys. Officials said crop damage to Weld County farmers could approach \$10 million, but they were also assessing damage to homes and business, automobiles and roads and highways. Flooding and hail on fields between Platteville and Fort Lupton caused \$1 million in damage. An agriculturist with Western Sugar Co. in Greeley said 4,000 acres of sugar beets sustained heavy damage as a result of hail and flooding along the South Platte River. Hail and rain also inflicted heavy loss on winter wheat in the northeast part of Weld County. Insurance officials in Evans, Colorado said the company expected 1,500 home and business claims with \$4 million in damage and another 750 claims for vehicles estimated at \$1.5 million. The Weld County Public Works Department and the Colorado Department of Transportation continued to assess road damage. The south Weld County town of Gilcrest was hit hard by rain and hail the night of June 7, washing out two town roads and wreaking havoc with the sewer system.

Sources: *Montrose Daily Press*, 6/15/95, 6/23/95; *Pueblo Chieftain*, 6/7/95, 6/15/95, 6/19/95, 6/21/95; *Denver Post*, 6/13/95; *Greeley Tribune*, 6/18/95, 6/26/95; *Grand Junction Daily Sentinel*, 6/18/95



GROUNDWATER

Committee Drafts Groundwater Rules for Arkansas Valley

On June 26, Arkansas Valley water users got their first look at proposed new groundwater rules, which have evolved since Colorado's recent court loss to Kansas. The Arkansas River Coordinating Committee, appointed by Gov. Roy Romer, looked at several water issues in the valley, including new rules dealing with the pumping of groundwater by large agricultural, municipal and

commercial wells. One proposed key rule change involves the elimination of "free" pumping. Currently, well owners may pump water on Mondays, Tuesdays, and Wednesdays without replacing any of what is taken from Kansas and the owners of older water rights in Colorado. On June 19, State Engineer Hal Simpson and other state officials met with a subcommittee of the Southeast Colorado Water Conservancy District, which oversees the Fryingpan-Arkansas Project, to work out several differences about the rules, and those changes were to be incorporated into the draft. The state hopes to submit the new rules to the Div. 2 Water Court in August or September, undergo court scrutiny in the winter, and make the rules effective by April 1996.

Source: *Pueblo Chieftain*, 6/21/95

Store Water in Aquifers, Experts Say

A CH2M civil engineer says if the state's annual runoff were diverted into the huge aquifers under Denver and the suburbs, the stored water could supply suburban growth for decades. The State Engineer's office estimates that Castle Rock, Parker, Stonegate and other water districts in southern Arapahoe and northern Douglas counties could store a combined 60,000 acre-feet of water a year. The State Legislature passed a law this year making it easier to store water in aquifers, yet hardly any of the surplus water that flowed across Colorado this spring was stored for future use. State Engineer Hal Simpson said treated water can be injected into aquifers through the winter, as well as during the spring runoff. The Front Range Water Forum is soon expected to release a report saying that aggressive injection could keep the south metro aquifers viable as a drinking source for 300 years or longer, compared with about 100 years if no injections are made. Simpson said it also reduces the need to purchase prime farmland for water. This spring, CH2M Hill helped the Centennial Water District, which serves Highlands Ranch, inject 30 million gallons of water into the Arapahoe and Denver aquifers through existing wells. Willows Water District in western Arapahoe County near Englewood, injected 189 million gallons of water donated by Denver Water into an aquifer as part of a demonstration project between last October and this April. Aquifer storage can be expanded as money becomes available, and it can be done without evaporation loss or large-scale environmental destruction.

Governor Roy Romer, in a statewide conference call with reporters on July 14, said saving the huge pools of underground water is part of his "smart growth" strategy. He said the technology is applicable to other basins in the state, but his focus for now is on the South Platte.

Sources: *Grand Junction Daily Sentinel* (AP), 6/27/95; *Greeley Tribune*, (AP) 6/27/95; *Denver Post*, 7/16/95

AWDI Sells Baca Ranch

Gary Boyce, neighbor to the AWDI's 105,000-acre San Luis Valley Baca Ranch, has bought the ranch for \$13 million. Once again Valley residents are concerned that water supplies will leave southern Colorado's most productive agricultural valley, but Boyce has said that they needn't worry -- the water he would market would be from abundant, privately owned surface flows on his new property, not from the deep underground aquifer. Boyce estimates springtime runoff alone at as much as 50,000 acre-feet of water, or 16.3 billion gallons. Three years ago Boyce and former State Engineer Jeris Danielson formed Stockmen's Water Company to compete with AWDI by buying water rights from other local ranchers. They

maintain that water can be withdrawn from the valley without harming neighbors' water rights.

Source: *Denver Post*, 6/3/95

Oil Company Plans to Drill Wells on Baca Ranch

Lexam Explorations, which holds the mineral, oil and gas rights on the Baca Ranch, announced its intention to drill two exploratory oil wells on the property. Area residents say the drilling site is in a groundwater recharge zone, about 400 yards from Dead Man's Creek. A concern is that if Lexam buries waste from the drill without checking it, the firm could unwittingly bury radioactive material which could seep into and contaminate the groundwater. Saguate County will review the situation.

Source: *Pueblo Chieftain*, 6/9/95

San Luis Valley Taylor Ranch Offered for Sale

The owner of the Taylor ranch proposes to sell the ranch for \$21.5 million, but has tacked on a condition that would permit him to continue logging operations for at least 10 more years. The La Sierra Foundation is spearheading efforts to acquire the ranch in partnership with state government, but says continued logging after the ranch is sold is unacceptable. The recent resumption of logging operations prompted the San Luis Town Council to join Costilla County commissioners in approving a referendum for the November ballot authorizing a government authority to acquire and maintain the ranch. Ken Salazar of Sangre de Cristo Land Grant Commission asked Taylor to provide information on the "current and proposed timbering activity on the Taylor Ranch." A subsequent article in the *Denver Post* reported that the manager of the Taylor ranch said he plans to open up the property as a four-season recreational area to create jobs in hopes of winning over an antagonistic community. The goal is to bring in revenue for the ranch, improve the health of the forest by thinning it, improve wildlife and maintain or enhance watershed conditions, he said.

Sources: *Denver Post*, 7/14/95, 7/15/95



RECREATION

Greeley, Windsor and Weld County OK River Trail

The city councils of Greeley and Windsor approved a master plan for the 22-mile Cache la Poudre River Trail after hearing a presentation from the Poudre River Trail Advisory Board and input from the public at a public meeting on June 5. The master plan was funded by Greeley, Windsor and Weld County and was developed by BHA Design of Fort Collins. The Board of Weld County Commissioners signed off on the master plan for the proposed 19-mile Cache la Poudre River Trail linking Greeley to Windsor, but not without some assurances that the plan could be changed in the future. A Weld County Commissioner indicated concerns involve the cost of the project. Greeley and Windsor have each received \$50,000 GOCO grants for the trail, and Weld County received a \$45,000 grant for improvements at Missile Site Park, which would be used in part to develop a trailhead. The cost of the trail is \$7.6 million.

Source: *Greeley Tribune*, 6/6/95, 6/13/95

Douglass Reservoir Opens to Public

Northern Colorado has a new public fishin' hole that has lured thousands of Colorado anglers since its April 1 opening. The reservoir is owned by the Windsor Reservoir and Canal Co., and the Colorado Division of Wildlife bought a 20-year lease to open it to public access. This has been a DOW goal since 1990, but many irrigation companies weren't interested because they feared liability for accidents. Since then, the state has acquired liability insurance for properties it leases, and owners are more willing to negotiate access, says the district wildlife manager. Douglass Reservoir was the No. 1 priority for public access because of its size -- 565 acres -- and its proximity to urban areas. It is managed strictly as an anglers' lake -- there are no camping or other recreational facilities -- and it has a boat ramp on the western shore. Only wakeless boating is allowed, and sailboats and sailboards are prohibited. Photographers and birdwatchers are welcome. Rainbow trout and a variety of warm-water fish are stocked in Douglass. The lake, near Wellington, is accessible from I-25 to Larimer Rd. 15 to Larimer Rd. 60 to Larimer Rd. 15A. Follow the signs to Douglass Lake. DOW hopes to open more lakes to public fishing.

Source: *Greeley Tribune*, 6/8/95

Newest Section of Colorado River Trail Opens

Visitors to the Grand Valley could celebrate Memorial Day weekend and National Trails Day with a hike on the newest section of the Colorado River Trail and free weekend fishing, courtesy of the Colorado Division of Wildlife. Festivities included a dedication ceremony, followed by a ribbon cutting and then the official opening. The new 1.75 section of trail was funded by Great Outdoors Colorado and the state parks. It is handicapped accessible and allows recreational access to parts of the Colorado River. Although the trail currently dead-ends, it is expected to be completed in 1996. The U.S. Bureau of Reclamation, co-owner of the property, is working in the area and wants to keep the property closed due to liability concerns.

Source: *Grand Junction Daily Sentinel*, 5/28/95

Grand Junction Receives Grant for Riverfront Study

The Urban Trails Committee of the Grand Junction/Mesa County Riverfront Commission was awarded a \$20,000 grant to study the feasibility of including canal roads as part of a public trail system. Half of the grant was promised by the Bureau of Reclamation, with \$5,000 each in matching funds from Grand Junction and Mesa County. The canal that will be studied is the Government Highline Canal, a 50-mile long waterway that begins at the dam in Carneo and ends five miles from the Utah border.

Source: *Grand Junction Daily Sentinel*, 5/21/95

BLM Bans Camping On Section of River

The Bureau of Land Management (BLM) has placed a moratorium on overnight camping within a section of the San Miguel River Special Recreation Management Area to prevent further deterioration of the riparian resources along the specified portion of the river corridor. The moratorium is consistent with San Miguel County's recent decision to close the section to motorized vehicle use. Day use for non-motorized uses including fishing, hiking, picnicking and boating will continue to be allowed, according to the Uncompahgre Basin

Resource Area Manager. In 1993 the river corridor was designated as both a special recreation management area and an Area of Critical Environmental Concern. Currently, BLM is working with a variety of local, county and federal agencies, user and interest groups and numerous individuals on a multi-objective basin-wide planning process for the San Miguel River Basin.

Source: *Montrose Daily Press*, 5/16/95



WATER DEVELOPMENT

USBR Completes Report on Animas La Plata

The Bureau of Reclamation completed a draft economic analysis of the Animas La Plata project in June, but declined to release the report while the House of Representatives debates the budget for the dam-and-irrigation plan. USBR officials found that for every \$1 invested, Animas La Plata will return 36 cents of benefits. All figures and analysis were approved by an independent group of nine farm and natural resource economists, the report said. That report is at odds with another \$45,000 study which said the project would generate \$1.66 of benefits for every \$1 spent. Another economic analysis by the inspector general of the U.S. Interior Department concluded that Animas-La Plata was "economically infeasible." Supporters said cutting funds would upend water rights settlements with the Southern Ute and Ute Mountain Ute tribes, who are entitled to more than one-third of the project's water.

Source: *Denver Post*, 7/12/95

Operations Begin at Wolford Reservoir

Water began flowing into Colorado's Wolford Reservoir, five miles north of Kremmling, in May. It was a milestone for the Colorado River Water Conservation District, which planned the \$47 million water storage project and will own and operate it. It was five months ahead of schedule and appears to be coming in under its \$47 million budget. Finishing touches will be completed this summer including building recreational facilities and doing wetlands mitigation work. Next fall or winter, when water needs are greater, Western Slope water users will get 60 percent of the water that flows into the reservoir and the other 40 percent will go to the Front Range, which paid for the entire project. The 60,000 acre-foot reservoir will also provide swimming, windsurfing, boating, camping, and fishing.

Source: *Grand Junction Daily Sentinel*, 5/21/95

State Supreme Court Refuses to Review Ruling on Homestake II

The state Supreme Court has refused to review a Court of Appeals ruling that upheld a 1988 action by Eagle County commissioners denying permits for the \$130 million project to divert water from the Holy Cross Wilderness near Vail. About 126,000 acres of land around Mount of the Holy Cross in the White River National Forest was designated as a wilderness area in the 1980 Colorado Wilderness Bill, but a clause in that bill said the protected designation could not detract from water rights of cities. The water project would have taken 20,000 acre-feet of water per year and divert it to Aurora and Colorado Springs.

Source: *Montrose Daily Press*, 6/8/95

Standley Project Under Budget

The Standley Lake Protection Project is a \$28.4 million venture designed to prevent Rocky Flats runoff from contaminating the lake, which supplies drinking water for 200,000 residents in Denver's northern suburbs. The project, a cooperative effort of federal and state agencies and the cities of Westminster, Thornton and Northglenn, is expected to be completed at least \$3 million under budget and possibly ahead of schedule. The project will divert Woman Creek from flowing through Rocky Flats and into Standley Lake. A reservoir is being built to collect all the creek water, and it will be pumped in an underground pipeline to Walnut Creek.

Source: *Denver Post*, 6/22/95

Privatization of Projects Proposed

Water projects owned by the Bureau of Reclamation are under scrutiny by some in Washington who suggest that selling the projects would raise cash to reduce the federal deficit and that the projects could be operated more efficiently at the local level. However, officials affiliated with the Colorado-Big Thompson Project believe it would be virtually impossible to place a value on the projects or to find a political coalition that would pass legislation to sell them. Where the water involved is owned by hundreds of shareholders ranging from municipalities to ditch companies to industrial companies, every shareholder would need assurance that water needs would be met, and it would be impossible for a private company to operate such a system profitably, according to Bennett Raley, legal counsel for the Northern Colorado Water Conservancy District. The district is spread over seven counties encompassing 1.5 million acres.

Source: *Fort Collins Coloradoan*, 6/18/95

AB Lateral Developers Might Consider Smaller Plant

A new permit application was submitted to the Corps of Engineers two weeks ago for the AB Lateral hydroelectric project. The manager for the Uncompahgre Valley Water Users Association, one of the project sponsors, said the plant's design could change from handling 950 cubic feet per second to 850 cfs. The water users and Montrose Partners plan to build a 43-megawatt plant north of Montrose, drawing water from the Gunnison River to generate the power, which then would be returned to the Uncompahgre River. In the new application, the developers propose to put riprap on banks and build small jetties to protect property along the river. The developers have spent the past two years performing more studies on the river to determine the velocity of the higher flows in the Uncompahgre. They also estimate that the amount of wetlands affected by the project would drop significantly. Residents who oppose the project said they plan to ask for a new review of the environmental study.

Source: *Grand Junction Daily Sentinel*, 6/20/95



ENVIRONMENT

Court Rules State Can't Give Up Water Rights

The Colorado Supreme Court has ruled 4-3 that the state can't give up water rights shielding the environment. The rule stems from a suit filed against the Colorado Water Conservation Board by the Aspen

Wilderness Workshop. The board had received a water court order in 1980 declaring that a minimum streamflow of 12 cfs was necessary in Snowmass Creek year-round in a 17-mile stretch of the creek from Snowmass Lake to the Roaring Fork River to preserve the environment. But in 1992, because of additional development in the Aspen area and a request that the figures be reexamined, the board decided the 1980 decree was based on a computational error. The result was a board decision that would allow for reduced streamflow during the winter months but provide for some increases during the summer. That would also allow the Aspen Skiing Co. to divert more water for snowmaking from Oct. 15 to Nov. 3. A majority of the court ruled that the board must first return to water court to show a lesser streamflow was sufficient. The case has been sent to the state water court for further proceedings.

Source: *Rocky Mountain News*, 6/20/95

USBR Offers Ruedi Reservoir Water

The USBR has buyers lined up for its second round of water sales from Ruedi Reservoir. It has offered 38,650 acre-feet of water from the reservoir on the Fryingpan River east of Basalt. About 20 potential buyers, mostly towns and water conservancy districts, have offered to buy 16,951 acre-feet, according to the Bureau. Many of the present and potential buyers use Ruedi water for augmentation plans. They have a well or diversion elsewhere, and rely on a release of water from Ruedi to meet downstream needs and make up for the water they have taken. But in May, Colorado River Basin Water Judge Thomas Ossola rejected a plan filed by Aspen Highlands developers to use Ruedi water to augment diversions from Maroon Creek for snowmaking. Ruedi water contracts will also be constrained by minimum streamflow water rights filed to protect trout fisheries. USBR won't augment a diversion that would dry up a stream or damage the fishery. It plans to allocate the remaining 21,699 acre-feet of unsold Ruedi water to boost flows in the Colorado River west of Palisade for endangered fish for the next 15 years.

Source: *Grand Junction Daily Sentinel*, 6/23/95



WATER RATES

Palisades Subdivision Residents Left High and Dry by Developer

Residents of Palisade's Five Iron subdivision pay \$35 a month for trash pickup and water, but when they use more than 18,000 gallons of water the bill goes up. Residents don't receive irrigation water, so they are forced to use city water to maintain their yards, with water bills ranging from \$60 to \$120 per month. The responsibility for distribution of water within subdivisions lies with the developer, who sometimes fails to provide access to water or systems to distribute it. The Five Iron developer left the Five Iron Architectural Control Committee the "right to manage, distribute and control all irrigation water." A member of the Palisade Irrigation District says water is available, but the residents will have to pay for pipe to be laid and pavement to be cut. Early cost estimates were \$100-150 per resident. To prevent similar situations, the irrigation district asked the Palisade planning commission to make sure developers build irrigation reservoirs for subdivisions.

Source: *Grand Junction Daily Sentinel*, 6/10/95

Greeley Water and Sewer Board Approves New Rates

The Greeley Water and Sewer Board unanimously has approved new water rates for metered Greeley households. Starting July 1, residents will pay \$7.15 as a base rate plus \$1.38 for each 1,000 gallons. On Jan. 1, 1996, the base rate will increase to \$8.10 for the first 1,000 gallons plus \$1.43 for each 1,000 gallons. Based on average customer use of 20,000 gallons every two months, the average monthly bill was \$28.40 in 1994. That will increase to \$34.75 starting July 1, and \$36.70 in 1996.

Source: *Greeley Tribune*, 6/23/95



WATER ALLOCATION, SALES AND TRANSFERS

Nevada Wants More Colorado River Water

Southern Nevada officials plan to draw on Arizona's unused share of Colorado River water in the face of a growing water shortage. Officials say the water would help get the booming Las Vegas Valley by until the year 2030, with the hope that other sources of water could be found during that period. In addition, Nevada wants to draw surplus river water that flows downstream from the upper basin states of Colorado, Wyoming, Utah and New Mexico.

Source: *Montrose Daily Press*, 6/15/95

Developers Plan New Boom for California

Plans for 33 giant developments up and down California illustrate that its population boom, stalled during the past few years, is about to resume. None of the 33 new towns on the drawing board has yet secured a water supply, which has led to an attempt by a Central Valley legislator to ensure that sufficient water is available before new developments are approved. The California Building Industry Association is trying to kill the bill, arguing that it will limit growth and hurt business by giving water agencies power over development decisions. Governor Pete Wilson's administration opposes the bill. The California Farm Bureau Federation and the state's water agencies, the bill's leading supporters, say that approving development without a sure water supply will bring trouble to a state whose water resources are chronically stressed. Among the 33 new towns, 20 are counting on water from the State Water Project, which barely delivers enough water to supply its contractors in wet years, or the Central Valley Project, whose supply is fully committed.

Source: *San Francisco Examiner* (in *Denver Post*) 6/4/95

Water Rights Owners Polled in Arkansas Valley

Arkansas Valley water owners are being asked what water rights they would be willing to sell or lease and for how much in order to set guidelines for water transfers. A subcommittee of the Arkansas River Coordinating Committee will compile the answers and give them to organizations and people who want to buy water, particularly well-owners' associations. The subcommittee is creating the database and will list all water rights for sale or lease that yield more than 500 acre-feet of annual water, or at least 250 acre-feet of consumptive use water. The listings will not be confidential nor will they be binding.

Source: *Greeley Tribune*, 6/3/95

Arkansas River Committee Supports Water Trade

The Arkansas River Coordinating Committee voted on June 26 to support a trade that may put another 11,000 acre-feet of water in Trinidad Reservoir. The Colorado Division of Parks and Outdoor Recreation hopes to lease or buy water elsewhere to trade for water running into the reservoir, taking advantage of this year's conditions to expand the reservoir's 4,500 acre-feet permanent pool. The water would be "non-native" and probably come from the Western Slope.

Source: *Pueblo Chieftain*, 6/27/95



MISCELLANEOUS

Agreement Reached on Rocky Mountain Arsenal

Governor Roy Romer has announced a conceptual agreement for the cleanup of Rocky Mountain Arsenal that will transform the site into a wildlife refuge. The plan must undergo a six-month public review before being finalized sometime in 1996. It calls for customized cleanup techniques for every waste basin, contaminated building and trench containing unexploded bombs, including boundary treatment systems, excavation landfilling, capping, solidifying and dewatering contaminated soil. Incineration will not be used.

Source: *Grand Junction Daily Sentinel*, 6/14/95

Governors Will Continue to Negotiate

The Governors of Colorado, Wyoming and Nebraska will try for at least six more months to negotiate instead of going to court over management differences of the Platte River.

Source: *Montrose Daily Press*, 6/28/95



PEOPLE

Denver Mayor Wellington Webb has appointed Former state senator Joe Shoemaker and environmental lawyer Denise Maes to the Denver Water Board. They began their terms on July 10. They replace Monte Pascoe, who served 12 years on the water board, and Romaine Pacheco, who served six years.

Source: *Denver Post*, 6/30/95

Governor Roy Romer has appointed Thomas R. Sharp of Steamboat Springs to serve on the Colorado Water Resources and Power Development Authority. Sharp, director of the Upper Yampa Water Conservation District since 1977, replaces John R. Fletcher, who has resigned. The appointment requires Colorado Senate confirmation.

Source: *Fort Collins Coloradoan*, 6/23/95

Daniel Beard, Bureau of Reclamation Commissioner, has announced his resignation effective September 1. As head of the agency for the past two years, he has overseen its restructuring with a 20 percent reduction in its work force and a significant reduction in spending.

Source: *Western States Water*, 6/23/95

CALLS FOR PAPERS

ASCE North American Water and Environment Congress, June 22-28, 1996, Anaheim, CA. To receive Call for Papers and program brochure, contact: Headquarters, American Society for Civil Engineers, Attn: Ms. Andrea Simon, Conference and Convention Department, 345 East 47th St., New York, NY 10017. FAX: 212/705-7975. Deadline: August 25, 1995.

American Geophysical Union 1995 Fall Meeting, San Francisco, CA. Contact: Meeting Chairman, Ron Zwickl, U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, Environmental Research Laboratories, 325 Broadway, Boulder, CO 80303-3328; Phone 303/497-3029, FAX 303/497-3645, e-mail rzwickl@sel.noaa.gov.

Third USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology, Sept. 22-27, 1996, Tashkent, Uzbekistan. For registration form and abstract instructions contact: American Institute of Hydrology, 3416 University Ave., S.E., Minneapolis, MN 55414-3328 USA. PHONE 612/379-1030; FAX 612/379-0169; e-mail: ALHydro@aol.com. Deadline: Sept. 19, 1995.

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.

MEETINGS

ENDANGERED SPECIES MANAGEMENT: PLANNING OUR FUTURE October 25 - 26, The Ramkota Inn, Greeley, Colorado

The South Platte River binds together diverse ecological and social communities. Rapid growth in the South Platte Basin threatens the integrity of both communities, but current legislation may be inadequate to properly address the complex interrelations between water management, biodiversity and economic prosperity.

The 6th Annual South Platte Forum will address declining, threatened and endangered species concerns in the South Platte Basin. Presentations will identify biological issues of concern, and

keeping in mind the integrative framework developed in previous South Platte forums, investigate the political, economic and social implications of sensitive species management. How can protection and recovery of declining, threatened, and endangered species be balanced with preserving historic ways of life and planning for inevitable growth? How has our use of water since settlement altered the ecological setting, and what is our vision for the ecology of the future? How will changes in Washington affect our ability to resolve endangered species issues?

Sessions

- Status of South Platte Ecological System
- Threats to South Platte Species
- Implications of Reauthorizing The Endangered Species Act
- Endangered Species Management on the Mainstem Platte
- Impacts and Possibilities for Water Resources Management
- Economics of Endangered Species Management
- Ecological Integrity: What Does It Mean?
- Social Changes and Planning for the Future

For information or registration contact:

David Graf, Conference Coordinator
CWRR, 410 University Services Center
Colorado State University
Fort Collins, CO, 80523
Phone: (970) 491-6308 FAX: (970) 491-2293

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

CONFERENCE ON TAILINGS AND MINE WASTE '96
January 16-19, 1996
Colorado State University, Fort Collins, Colorado

This event provides a forum for members of the mining community, engineers and scientists serving the mining industry, regulatory groups, and other interest groups concerned with environmental issues related to tailings and mine waste management. The conference has proven to be an exciting place for attendees to present ideas, learn of new developments, make contacts in their professional fields, and discuss problems of mutual interest. Issues of mining, milling, environmental geotechnics, mining engineering, tailings management, geohydrology, geochemistry and other related topics will be covered in focused sessions. For information contact: Linda Hinshaw, Department of Civil Engineering, Colorado State University, Fort Collins, CO 80523. Phone: 970/491-6081; FAX: 970/491-7727.

**FALL SPECIALTY SEMINAR
 EVAPOTRANSPIRATION AND IRRIGATION
 EFFICIENCY FOR USE IN
 WATER TRANSFERS**

The American Consulting Engineers Council will sponsor this seminar, to be held October 10-11, 1995 at the Arvada Center for the Arts and Humanities.

Featured speakers will be:

Judge Robert Behrman, Former Water Court Judge, Division One

Dr. Marvin Jensen, Senior Author and Private Consultant

Dr. Richard Allen, Professor, Biological and Irrigation Engineering, Utah State University

Dr. James Wright, Soil Scientist, Soil and Water Management Resources Unit, USDA/ARS

Dr. Terry Podmore, Professor, Chemical and Bioresource Engineering, Colorado State University

Dr. Harold Duke, USDA Agricultural Research Service, Fort Collins

Dr. Luis Garcia, Assistant Professor, Chemical and Bioresource Engineering, Colorado State University

Besides Judge Behrman, Bill Paddock, Water Attorney for Carlson, Hammond and Paddock, will speak at one of the luncheons. Both will speak on what the Water Court looks for when an expert witness presents new technology.

For engineers or attorneys, this seminar will qualify for Professional Development Hours (PDH) accreditation. Continuing Legal Education (CLE) accreditation is pending.

For more information, contact ACEC/CO at 303/832-2200.

**American Water Resources Association
 1995 & 1996
 Conference and Symposia Schedule**

September 18-20, 1995/ Tampa, Florida
 National Conference Jointly Sponsored by AWRA & ASAE
Versatility of Wetlands in the Agricultural Landscape

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, 1996/ 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
 E-Mail: awrahq@aol.com

CALENDAR

1995

- Aug. 24-25 THE ENDANGERED SPECIES ACT--2ND ANNUAL NATIONAL CONFERENCE ON THE LAW AND POLICY OF ESA AND ITS IMPACT ON GROWTH AND DEVELOPMENT, Denver, CO. Contact: CLE International, 1541 Race St., Suite 100, Denver, CO 80206. Phone 800/873-7130.
- Sept. 6-8 SYMPOSIUM ON THE SETTLEMENT OF INDIAN RESERVED WATER RIGHTS CLAIMS, Portland, OR. Contact: Western States Water Council, Phone 801/561-5300; FAX 801/255-9642.
- Sept. 10-13 1995 ANNUAL CONFERENCE, ROCKY MOUNTAIN SECTION OF THE AMERICAN WATER WORKS ASSOCIATION AND THE ROCKY MOUNTAIN WATER POLLUTION CONTROL ASSOCIATION, Sheridan, WY. Contact: Al Kinter, 307/674-9833; or David Hill, 307/235-8213.
- Sept. 10-13 SEWERS OF THE FUTURE, Houston, TX. Contact: Water Environment Federation, 601 Wythe St., Alexandria, VA 22314-1994. Phone 1/800/666/0206; FAX 1/703/684-2471.
- Sept. 15-20 ASDSO ANNUAL CONFERENCE, Atlanta, GA. Association of State Dam Safety Officials. Contact: ASDSO, 450 Old East Vine St., 2nd Floor, Lexington, KY 40507. Phone 606/247-5140; FAX 606/323-1958.
- Sept. 18-20 VERSATILITY OF WETLANDS IN THE AGRICULTURAL LANDSCAPE, Tampa, FL. Contact American Water Resources Association, Phone 703/904-1225; FAX 703/904-1228.
- Oct. 4-5 SCIENCE AND POLICY: WHO'S DRIVING GROUNDWATER MANAGEMENT? Jackson Hole, WY. Contact the University of Wyoming Office of Conferences and Institutes: 1/800-448-7801 or 307/766-2124.
- Oct. 5-7 IRRIGATION WATER CONSERVATION - OPPORTUNITIES AND LIMITATIONS, Sacramento, CA. Contact: U.S. Committee on Irrigation and Drainage, 1616 Seventeenth St., Suite 483, Denver, CO 80202, Phone 303/628-5430; FAX 303/628-5431.
- Oct. 21-25 WATER ENVIRONMENT FEDERATION 68TH ANNUAL CONFERENCE & EXPOSITION, Miami Beach, FL. Contact: Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314-1994. Phone 800/444-2933.
- Nov. 5-9 1995 NATIONAL CONFERENCE OF THE AMERICAN WATER RESOURCES ASSOCIATION, Houston, Texas and Reconvened Conference Nov. 10-12, 1995, Cancun, Mexico, General Chairperson, Bechtel, 3000 Post Oak, Houston, TX 77252-2166, Phone 713/235-4921.
- 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.