VOLUME XVIII, ISSUE 3

October 2004

COLORADO DIVISION OF WATER RESOURCES

DEPARTMENT OF NATURAL RESOURCES

StreamLines

Quarterly Newsletter of the Office of the State Engineer

South Platte 2004 Water Supply Conditions Update

James R. Hall, Division Engineer, Water Division 1

Conditions from June through September were generally wet for the South Platte River basin. This was very fortunate after an extremely low snowpack year in which there was not adequate supply to fill many irrigation reservoirs. Even with the precipitation, flow in the South Platte and tributaries has been far below average.

The increased supply and reduced demand associated with the rain this summer has kept the calls on the mainstem and tributaries from becoming extremely senior, unlike those experienced last year and in 2002. For reference, the senior call along the mainstem above Kersey in August of 2004 was often junior to 1872, a call that allows all major irrigation rights above Kersey except the Burlington Ditch an adequate direct flow supply. This is in contrast to 2002 when the call was generally 1865; a call indicating most ditches did not have an adequate supply. Likewise, the senior call along the mainstem below Kersey in August 2002 and 2003 had either an 1881 or 1882 priority, while the call this year during August was junior to those dates much of the time. Calls on tributaries also reflected the wetter conditions. Because calls were not extremely senior, municipal and irrigation users who depend primarily on direct flow rights generally have had an adequate supply of water.

In fact, most if not all municipalities were and are in much better shape this year than the last two years due to the wetter than usual summer conditions, conservation efforts and obtaining additional supplies. Most of these users do not foresee near-term severe shortages. Emblematic of this, some major users, such as Denver Water, reduced their lawn watering restrictions.

Despite the calls not being extremely senior, agricultural users on the mainstem of the South Platte who are dependent on their reservoir supplies rather than direct flow rights for a major portion of their summer supply were in a difficult situation because mainstem reservoirs did not come close to filling for the first time since the 1970s. By the end of July, overall storage below Kersey for large reservoirs was only 90,000 acre-feet. Last year, at the end of July, there were over 142,000 acre-feet in storage below Kersey. Major irrigation suppliers who have had to limit their deliveries include North Sterling, Prewitt, Riverside, Farmers Reservoir and Irrigation Company and Empire. No additional releases were being made from Prewitt or Empire by the last week of August.

Because of the dry conditions in recent years and additional requirements concerning well augmentation, many users chose to switch crops this year, moving away from corn to crops requiring less water including beans and small grains such as wheat or barley. In addition, there has been a dry-up of acreage associated with well augmentation requirements.

The several rain events have

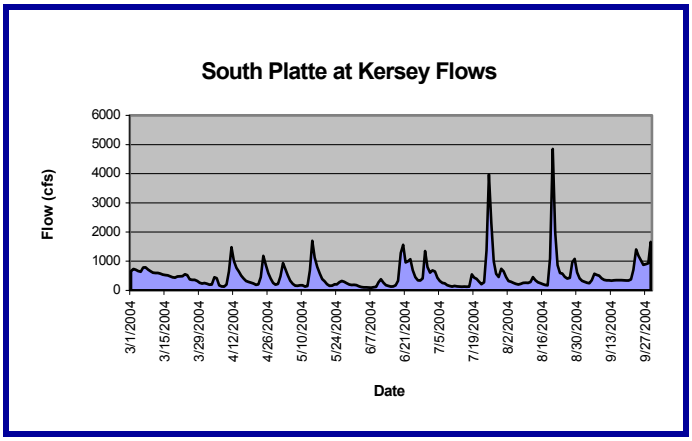
(Continued on page 2)

Inside this issue:

COLORADO DEPARTMENT OF NATURAL RESOURCES

South Platte Water Supply Conditions (cont.)

caused rapidly changing surface flow conditions in the South Platte. The graph shows these rapid changes at the Kersey gage, a key gage for determining overall supply. These rapid changes have required extensive efforts by Division 1 staff to make sure that the stream gages on the sand channels of the South Platte are accurate, and that we correctly administer the rapidly changing flows to the correct water users, many of whom are short of reservoir and other supplies from the last few years of drought. Illustrating the changing nature of the river, Division 1 had over 180 changes in call this water year through the end of September, compared to an average of 60 call changes through the whole irrigation season the previous twenty years.



While there has been considerable rain in parts of the basin, Division 1 has always been able to use all of the water for users in Colorado. Overall flow at Kersey and Julesburg, two key measures of flow conditions on the South Platte, remain far below average. Except for a few days in 2002 and 2003, this is the third year in a row during which flow at the state line has continuously been below 120 cfs between April 1 and October 15 (the measure at which we are required to curtail all unaugmented water rights junior to 1897 under the terms of the South Platte Compact) except for a few days in 2002 and 2003. During the compact season, the flow has averaged less than 60 cfs over the last three years. This small flow has been due mainly to return flows below our last point of diversion.

Great Sand Dunes National Park and the Baca Wildlife Refuge

Mike Sullivan, Assistant Division Engineer, Water Division 3

On September 13, 2004 a dedication ceremony was held at the Great Sand Dunes National Monument. At the conclusion of the ceremony, the Monument had become the nation's newest National Park, and the Baca Ranch became the Baca Wildlife Refuge.

Present for the ceremony were Senator Ben Nighthorse Campbell, Representative Scott McInnis, Secretary of the Interior Gail Norton, Director of the Nature Conservancy Mark Burget, Director of the Department of Natural Resources Russell George for Governor Bill Owens, and representatives for Senator Wayne Allard and Attorney General Ken Salazar. Also on the podium were Steve Cheney, Superintendent of the Great Sand Dunes, the regional director of the Park Service, and Mike Blenden, Superintendent of the Alamosa and Monte Vista Wildlife Refuges. In the crowd were hundreds of local folks who had spent time and effort in transforming the monument into a park.

The dignitaries gave speeches toasting the momentous occasion and recognizing, by name, many of those local folk who had been driving forces in the creation of the National Park.

Under the Great Sand Dunes National Park Act of 2000, Secretary Norton was authorized to change the Great Sand Dunes from a national monument to a national park. That law authorized the Secretary to establish the Great Sand Dunes National Park when she determined that "sufficient land having a sufficient diversity of resources" had

(Continued on page 3)

Dam Owners Training

Another class has been scheduled for dam owner and caretaker training for the Denver area. The class will be hosted by the Denver Water Dept., located at 1600 W. 12th Ave in Denver. The class will begin at 9 AM, and will concluded about 2PM, on December 14. Coffee, donuts, lunch and breaks are provided. Notices will be sent out to dam owners in the near future. For more information please contact Mr. Greg Hammer, 970-352-8712, at the Greeley office.

Great Sand Dunes National Park and the Baca Wildlife Refuge (cont.)

been acquired by the federal government. That goal was achieved with the acquisition of the Baca Ranch. Following the speeches, Secretary Norton signed the documents creating the Great Sand Dunes National Park and Baca Wildlife Refuge.

The Great Sand Dunes National Monument has long been a jewel in Colorado's mountains. First declared a monument in 1932 by President Herbert Hoover, many people have worked to transform the monument into a park. Many Coloradoans have childhood memories of visiting the "huge sandbox" with the pulsing creek.

The Baca Ranch will become a wildlife refuge managed by the Fish and Wildlife Service. According to

Mike Blenden, the ranch focus will be on migratory bird habitat, but will be managed for all species. The Nature Conservancy has been instrumental in the acquisition of the Baca Ranch, a 97,000-acre ranch lying north and west of the Great Sand Dunes. The Nature Conservancy acquired the ranch and will be turning it over to the federal government. The history of the Baca Ranch has been contentious with several attempts at massive water development/export schemes over the years. Turning the ranch into a wildlife refuge means the water on the ranch will stay on the ranch. The Nature Conservancy also operates the Medano Ranch, a vast spread lying west and south of the dunes.

New External Customer Survey Method to be Used

Jody Grantham

The Division of Water Resources will be asking external customers to complete the annual customer survey via the Internet this fall. This method of surveying will replace the traditional U.S. mail and paper method of surveying customer service issues used in the past. By employing this technology, it is believed that both the customers who fill out the survey and the Division will enjoy several improvements. First, for the customers who receive the survey, it will be much easier to complete. An e-mail will simply direct the customer to a web site where they can quickly fill out the form and press the send button to catalog their answers. This will also eliminate the customer having to take the time to re-route the survey back to the Division via mail. For the Division, postage and labor costs are saved in delivering the survey, while at the same time, the software will allow quick and easy compilation of results in multiple formats without having to enter all of the data into a database and then run computations.

It is acknowledged that getting e-mail addresses correct and current for customers who traditionally received the paper survey may prove to be a challenge. Those customers may expect to receive a call from the Division asking them for their addresses in the near future. If you would like to be included in the Division's annual customer survey, or have questions concerning the process, please feel free to contact Joseph (Jody) Grantham via e-mail at: jody.grantham@state.co.us

GPS Datum Switch – October 1, 2004

The new data standard for GPS well location information in UTM format will be zone 13, meters, NAD83. This change will be consistent with the data standards set forth by Executive Order to the Geographic Information Coordinating Committee for the State of Colorado. The datum switch will simplify interactions with other governmental agencies who share data. Although the previous standard was NAD27, continuing to do so could result in errors ranging up to 700 feet from the intended location. Please refer to your GPS User's Manual for instructions on resetting this parameter.

State Engineers Tour Proposed Long Hollow Reservoir Site

Marta Ahrens, Public Information Officer

On August 12, 2004, Colorado State Engineer Hal Simpson and New Mexico State Engineer John D'Antonio met in Durango to tour the proposed Long Hollow Reservoir site in the La Plata River Basin. Others present for the tour included staff and officials from both states and Brice Lee, President of the La Plata Water Conservancy District. In addition to touring the reservoir site, the field trip included stops at the new ramp flume at the Stateline Gage, the USBR wetland restoration area on the La Plata River, the La Plata River at the confluences of Cherry Creek and Hay Gulch Ditch, and the Hesperus Gage to view the new ramp flume.

Following the tour, the La Plata Water Conservancy District hosted a dinner and evening meeting at the old Ft. Lewis College grounds which was attended by the tour participants and water users from the La Plata River basin from both Colorado and New Mexico. Eric Bikis, of Wright Water Engineers, provided a presentation of the Long Hollow Feasibility Study that included a hydrologic river model and water quality assessment. Following the presentation, Colorado and New Mexico officials responded to concerns and issues raised by water users from both states.

The proposed Long Hollow Reservoir will be located in southwest La Plata County, approximately 22 miles southwest of Durango, Colorado. The dam embankment would be located on Long Hollow, approximately one-half mile upstream of the confluence of Long Hollow and the La Plata Rivers, and five miles upstream of the Colorado-New Mexico stateline.

From left — New Mexico State Engineer John D'Antonio, Colorado State Engineer Hal Simpson, Division 7 Engineer Ken Beegles

Long Hollow Reservoir would capture flows from the 43-square miles of the Long Hollow watershed, including ground water inflows resulting from irrigation return flows and surface water inflows derived from precipitation within the watershed. The proposed reservoir would have an estimated maximum reservoir storage of 5,432 acre-feet, cover approximately 160 surface acres at maximum pool, and will store winter water and high flow water for release during the irrigation season and carryover storage during some years. Most importantly, it will provide water during split river administration. The purpose of the project is to help Colorado meet its delivery obligations under the La Plata River Compact, and supplement the water supply to existing irrigated lands in Colorado through exchange of stored water from Long Hollow Reservoir.

Proposed reservoir site in the La Plata River basin near the Colorado-New Mexico stateline

The following day, a meeting was held at the La Plata Water Conservancy District office to address the concerns of New Mexico regarding the proposed Long Hollow Reservoir and administration of the La Plata River Compact. New Mexico expressed concern that this project is merely to provide increased irrigation water supply to the La Plata Water Conservancy District in Colorado, rather than to ensure that the state of Colorado meets its delivery obligations to New Mexico under the La Plata River Compact. In addition, New Mexico feels that new or increased irrigation uses in Colorado associated with the storage of water in the proposed reservoir will reduce the amount of water available for stock use, irrigation, and fish and wildlife uses in New Mexico.

Colorado users communicated their concerns that river operations to deliver flows across the dry reach were wasting supplies that could be used by ditches in Colorado. Colorado officials expressed that the proposed Long Hollow Reservoir will decrease disagreements related to compact compliance, and will help with compact delivery obligations, thus benefiting both states. When the compact pool is exhausted, the states will revert back to split river operations.

The meeting resulted in New Mexico stating that they are not completely satisfied that this is a "win/win" solution. However, they acknowledged that they are not the entity with authority over the construction of the proposed project and will not oppose the project. Colorado was given an opportunity to provide New Mexico with written comments to respond to their concerns.

Newly Created Republican River Water Conservation District

Scott Richrath, Project Coordinator

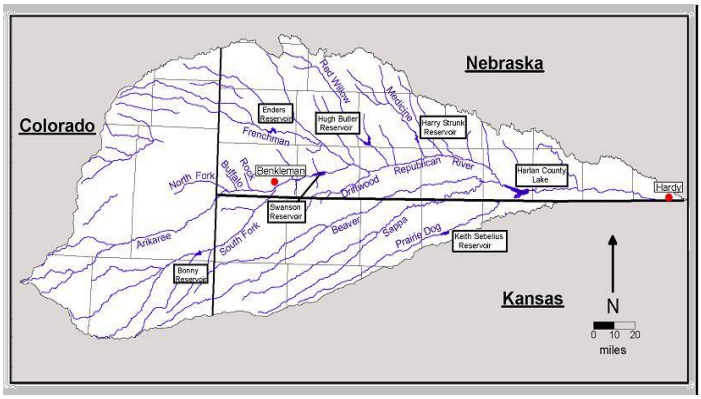
In May 1998, Kansas filed a complaint against Nebraska claiming that Nebraska had injured Kansas through overuse of ground water in the Republican River Basin. Nebraska countersued Kansas, naming Colorado as a formal party in November 2000.

The United States Supreme Court Special Master concurred that the compact included ground water use "to the extent it depletes Republican River Basin streamflows." Settlement efforts thus began between the three states in October 2001.

Affirmed by the Supreme Court on December 15, 2002, the Final Settlement Stipulation included the following points:

- all claims through December 15, 2002 were waived;
- moratorium on future ground water development;
- ground water depletions to streamflow will be calculated through a jointly developed model;
- 2003 represents the first accounting year for determining the 5-year running average of compact compliance;
- states may pursue their own compliance actions.

In a response to the settlement agreement, Governor Bill Owens signed into law Senate Bill 04-235, establishing a Republican River Water Conservation District in Phillips and Yuma counties, and those portions of Kit Carson, Lincoln, Logan, Sedwick, and Washington counties within the Republican River Basin. Since first convening in Wray on August 10, 2004, the newly formed Republican River Water Conservation District has been working diligently to establish operations.



The county commissioners of each of the seven counties, the seven ground water management districts, and the Colorado Ground Water Commission have appointed one member to serve on the composite 15-member board to the Republican River Water Conservation District Board of Directors. The legislation empowers the district to take such actions as are necessary to cooperate with and assist the state of Colorado to carry out the state's duty to comply with the Republican River Compact of 1942 and the United State Supreme Court Final Settlement Stipulation of December 15, 2002.

During 2003, Colorado exceeded its compact allocation by several thousand acre-feet of water due to ongoing drought conditions, improved tillage and other land conservation practices that reduce runoff, and continued well pumping from 3,967 wells within the Republican River Basin. Currently, more than 570,000 acres are irrigated by either surface water or ground water within Colorado's Republican River Basin. Returning to compact compliance will require a retirement of some amount of irrigated land. The Final Settlement Stipulation allows each state to pursue its own compliance actions.

Representatives from the Divison of Water Resources and district board members attended all seven county fairs in 2004 and have regularly hosted meetings in northeast Colorado in an effort to both educate and gather feedback from water users. Area residents will work with district, local, and state representatives to determine what measures must be taken to return to compliance and how to fund those measures.

The new law authorizes several funding mechanisms to enable the district to help comply with the compact:

- Revenue bonds
- Special assessments
- Sales and use tax
- Ad valorem property taxes
- Water fees

For the coming year, the board has eliminated the alternative of levying taxes and has instead aimed to obtain initial funding from federal and state grants, loans from local electrical utilities, water diversion assessments, and other sources. A preliminary budget will be established by October 15 in accordance with state statute.

Additional information regarding the Republican River Compact and the Republican River Water Conservation District may be obtained from DWR's Website at *http://www.water.state.co.us/wateradmin/RepublicanRiver.asp*.

Rio Grande Decision Support System

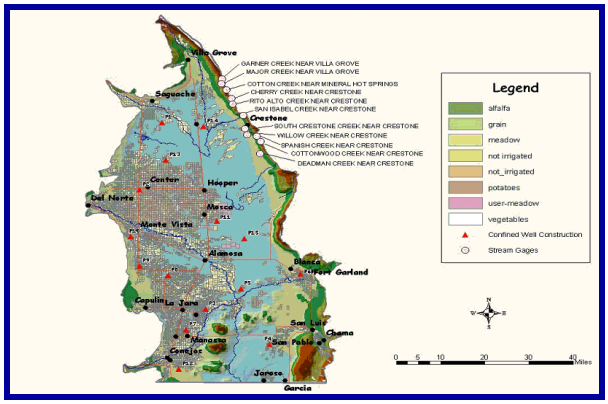
Ray Bennett, Ground Water Modeling Branch

From 1998 to 2004, the Colorado Water Conservation Board and the Colorado Division of Water Resources have been constructing a decision support system for the Rio Grande basin (RGDSS) to assist in planning, developing, and managing that areas water resources. Development occurred using a cooperative mixture of contractors, state personnel and water users. Slated to be complete in 2004, the main components of the system that were identified for development following a detailed feasibility study (April, 1998) include of the following.

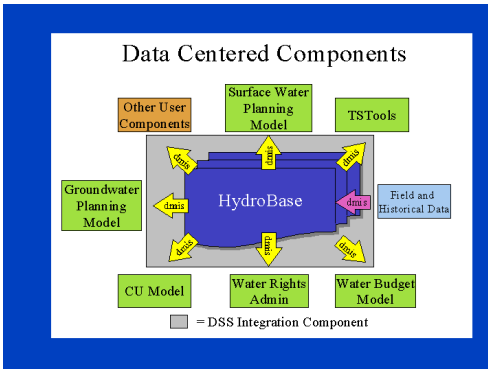
- New Data Collection
- Database Development
- Model and Tool Development

New Data Collection — New data collection performed by the RGDSS included the assessment of irrigated acreage and the collection of both tabular and spatial (map) based data.

Irrigated Acreage — The RGDSS development identified every irrigated field in 1993 by interpreting satellite photographs and conducting field interviews. For every irrigated field, the type of crop grown as well as the water source (ditch and/or well), were identified *(see figure below)*. Results indicate there were approximately 613,000 acres irrigated that include approximately 44 percent irrigated meadow, 23 percent alfalfa, 19 percent small grains and 13 percent potatoes and one percent vegetables.



Stream and Aquifer Data — The RGDSS development included the construction of 11 new stream gages, nine satellite-monitoring stations, 15 confined aquifer wells and 15 confined aquifer tests (see figure above). All of the new stream gages were located along the northeastern part of the valley to better define ungaged rim inflows. The satellite monitoring stations were located in critical administrative locations while the confined wells and confined aquifer tests were spread evenly throughout the valley in order to provide basic hydrogeologic data.



Models and Tools — To assist with assessing past, current and future water management strategies, the RGDSS developed consumptive use, surface water, and ground water models for the basin. Also, various other viewing tools and models were developed to allow data manipulation and the viewing of real-time and historic field data. Using a data centered approach (*see figure above*), various components of the system are connected a central database using data management interfaces that allow the selection, processing, formatting and sharing of data between applications. This modular design, which is the same as that used in the Colorado River and South Platte DSS developments, allow the system to rapidly include new information and easily add or subtract new tools.

Consumptive Use Model — The RGDSS consumptive use model, ***StateCU***, is used to analyze the historic irrigation water requirement and water supply limited consumptive use for every irrigated field in the San Luis Valley. Using a locally calibrated Blaney-Criddle method, the tool has also been used to provide water use estimates to the RGDSS surface and ground water models including well pumping, canal loss, and deep percolation from irrigation.

Surface Water Model — The RGDSS surface water model, ***StateMod***, was applied to the San Luis Valley in order to analyze past, current, and future water administration. Using a strict application of the prior appropriation doctrine, the surface water model is designed to operate using both a daily and monthly time step. It encompasses the entire San Luis valley and explicitly models over 400 ditches, nine reservoirs, 25 instream flows and 5,000 high capacity wells. Major outputs include simulated streamflows, the operation of ditches, reservoirs and instream flows, and compact demands and supplies.

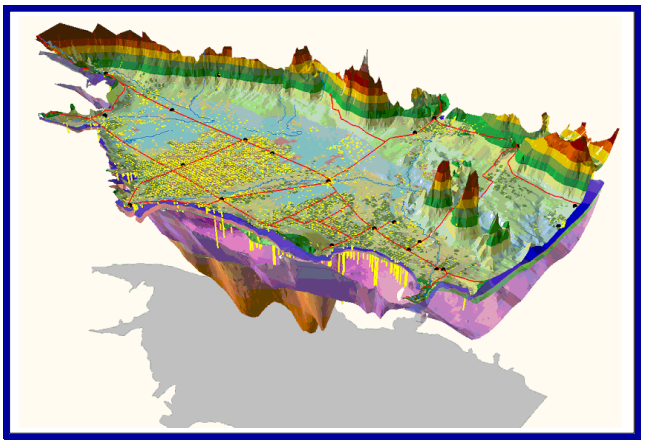
Ground Water Model — The RGDSS ground water model was developed by applying ***Modflow,*** the USGS's modular three-dimensional finite difference ground water flow model. The model encompasses the entire 3,100 square mile ground water basin of the San Luis Valley in Colorado (*see figure on next page*). It contains five layers that represent

(Continued on page 7)

Rio Grande Decision Support System (cont.)

each of the major geologic formations of the valley using a constant cell size of 0.5 miles by 0.5 miles.

Recharge was simulated for each of using the ***MODFLOW*** recharge package.



It contains the following components:

- leakage through canals and ditches,
- recharge from surface (rim) flows off the neighboring mountains,
- deep percolation of surface water applied to irrigated lands,
- deep percolation of ground water applied to irrigated lands,
- recharge from precipitation, and
- recharge from surface water returns.

Summary

Construction of the Rio Grande Decision Support System will be completed in 2004. Major deliverables include new data collection, data base development and model construction. Upon completion, all products will be available to the public for free from the system's Website (http://cdss.state.co.us) or for a nominal fee on compact disk.. Development occurred using a cooperative mixture of subcontractors, state personnel and water user involvement. A maintenance program that will allow the system to be enhanced and improved over time has been implemented through cooperative agreements between local water users and the state.

Human Resources

Appointment of Chief Hydrographer

Thomas Ley was appointed as Chief Hydrographer in July 2004. This position was held vacant for over two years to deal with appropriation and budget shortfall. The Division would like to thank the entire hydrographic staff for their cooperation and team effort to maintain the program during this period. Tom will continue to assist the DWR in accomplishing its mission with his leadership and management of the hydrographic program.

New Employees

Scott Neale joined the Information Technology team in the Denver office in September 2004, filling the vacant Database Administrator II position. His main focus will be learning HydroBase and supporting application development. Scott has a Masters degree in Computer Information Technology and teaches at Pikes Peak Community College as a member of the adjunct faculty.

Larry Hakes was selected in July 2004 as Well Inspector for the south-central part of the state. Larry has been with the DWR for over six years working in the Division 2 office in Pueblo. Larry will be based in Alamosa. He has over 15 years operating drilling equipment and was a tool pusher (supervisor). He has a degree from Montana State in Geohydrology. Larry will investigate well construction and pump installation issues.

Doug Stephenson was selected as Well Inspector for the northwestern part of the state on July 15, 2004. Doug will be based in Glenwood Springs. Doug comes to DWR with over 30 years of experience in the construction of water wells and pump installation and has worked in all phases of drilling and well construction. Doug is a licensed well construction and pump installation contractor.

Thomas Neefe joined the well inspection unit in July 2004 and will be based in Denver. Tom has a degree from Pennsylvania State University in Geological Science. He has over 15 years of field experience and has worked on such high profile jobs as the Exxon-Valdez oil spill as the public contact for Kodiak Island remediation. Tom has worked as a project manager for a national environmental cleanup firm with projects through out the United States. Tom will primarily inspect wells in the eastern part of the state.

Douglas Pickering also joined the well inspection program in July 2004. He has a degree from Mesa State College in Geology, has over 20 years of field experience, and has worked throughout the United States for Lockheed Martin Energy Research including the NRC Oak Ridge site. Doug has been a project manager working on environmental cleanup. He was also certified as a water well installer in Kentucky. Doug will primarily inspect wells in the southwestern part of the state.

CALENDAR OF EVENTS

November 16-17	Colorado Water Conservation Board Meeting, Denver, Colorado; for more information, contact Catherine Gonzales at 303-866-3441
November 19	Colorado Ground Water Commission Meeting, Parker Water & Sanitation District, North Reclamation Facility Administration Building, Parker, Colorado; for more information, contact Marta Ahrens at 303-866-3581
December 6	Colorado Board of Examiners of Water Well Construction and Pump Installation Contractors Meeting, Denver, Colorado; for more information, contact Gina DeArcos at 303-866-3581

Office of the State Engineer

Colorado Division of Water Resources
Department of Natural Resources
1313 Sherman Street, Room 818
Denver, CO 80203

Bill Owens, Governor
Russell George, Executive Director, DNR
Hal D. Simpson, State Engineer
Marta Ahrens, Editor

Phone: 303-866-3581
FAX: 303-866-3589
Records Section: 303-866-3447
Ground Water Information Desk: 303-866-3587

We're on the Web:
http://www.water.state.co.us

***STREAMLINES** is published by the Colorado Division of Water Resources on a quarterly basis. Subscriptions are available for $10 per year to cover the cost of printing and mailing.*