



StreamLines

Quarterly Newsletter of the Office of the State Engineer

Independence Pass Transmountain Diversion System Tour

Wendy Bogard (Program Assistant) and Bill Richie (Decreed Augmentation Plan Coordinator), Division 2

The Independence Pass Transmountain Diversion System (IPTDS) was the destination for 22 Division 2 Water Resources personnel on September 13, 2006 as a training experience. The tour was arranged



as an internal training opportunity and coordinated with Allen Ringle, Superintendent of Twin Lakes Reservoir and Canal Company. The eager group of employees left the Division 2 office in Pueblo at 6:45 a.m. with the goal of learning and understanding one system and the structures that are utilized in transporting transmountain water into the Arkansas River Basin.

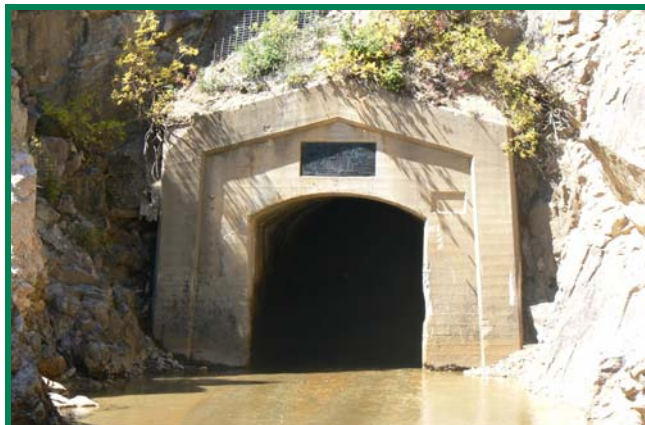
The story of IPTDS began when Colorado Canal water users realized about 75 years ago that their

water rights decreed in Twin Lakes Reservoir were not sufficient for irrigation of their lands. So, in 1930 the IPTDS was initiated to take water from the headwaters of the Roaring Fork River for direct flow and storage in Twin Lakes Reservoir. This expansion was decreed in 1936 in Garfield County Court and supplements the Arkansas River. At that time, Twin Lakes Reservoir was owned and operated by Twin Lakes Reservoir and Canal Company, but is now owned and operated by the Bureau of Reclamation as part of the Frying Pan-Arkansas Project with Twin Lakes Canal Company retaining ownership of 54,452 acre-feet of storage space within the reservoir.

The tour agenda included stops at Lost Man and Roaring Fork collection systems, Grizzly Reservoir, the Lincoln Creek Connection Canal and

the New York collection system, all west of the Continental Divide. The group learned how runoff water is collected from 45 square miles in the Roaring Fork River and Lincoln Creek drainages and transported through two collection canals into Grizzly Reservoir (or Lincoln Gulch Diversion Dam) and Lake Creek. To see Grizzly Reservoir, the group drove through the 3.85 mile-long Twin Lakes Tunnel—with the water releases from the reservoir curtailed for the visit! The tunnel is 9.2 feet in diameter and has an

(Continued on page 2)



Inside this issue:

Arkansas River Daily Reports	2
New Surface Water Website	5
Dam Safety Rules and Regulations Revisions	6
Human Resources	6
Calendar of Events (On back cover)	



Independence Pass Transmountain Diversion System Tour (cont.)

elevation grade of .25 percent. This made for a tight squeeze, careful drive, and several dark minutes for the passengers in the vans. Although the entire trip was informative, the drive through the tunnel was quite a talking point! The group saw structures for directing water for the IPTDS through diversion points when the Colorado Canal water rights are in priority and saw the structures



Lou Schultz, Hydrographer,
Division 2

that transport water when other water rights are in priority. The very comprehensive tour of structures that make up this IPTDS was very educational for all. The foresight of water users from the early 1900s and the need to establish water rights and build structures for then current and future needs is mind-boggling. To realize what was required in the engineering and planning of such structures and then to see the final result of building them without the technology we know today, is truly remarkable.

In addition to the information shared by Mr. Ringle, Division 2 employees also had opportunities to share their knowledge as well. Some of the notable instructors included Mike Graber for sharing what he might look for during a dam inspection with a brief onsite inspection of Lost Man Reservoir; Joe Flory for verbalizing questions as to which structures were decreed, what priorities they had and how

those decreed points affect other Division 2 water rights; and Lou Schultz for addressing how stream measurements are made in the headwaters of the Arkansas Basin.

The participants of the tour listened, questioned, learned and enjoyed. The field experience was worth the time and money invested for the better understanding of transmountain diversions. In addition, the employees of Division 2 expressed their appreciation for the opportunity to share camaraderie, knowledge, laughs, meals, and the beauty of the mountains. ♦



Arkansas River Daily Reports—Faster, Cheaper, Smarter, Better

Steve Witte (Division Engineer) and Vivian Beal (Programmer Analyst), Division 2

Since at least 1904, the State Engineer's Office has compiled a Daily Report containing data describing the status of streamflow and diversions for the Arkansas River. The 1907-08 Biennial Report of the State Engineer, written by T.W. Jaycox contains the following description:

In Irrigation Division No. 2, daily bulletins were issued by John M. Jackson, irrigation division engineer, Division No. 2, with the assistance of water commissioners in Water Districts Nos. 11, 12, 14, 17, and 67, and with the

aid of information gathered from some private sources. These reports gave the amount of water carried each day by every canal taking water from the Arkansas River from Canon City to the state line.

The method of getting out the reports was as follows: About seven o'clock in the evening, the division engineer would call up by telephone one water commissioner after another and receive the daily report of the condition of canals and rivers as they

existed at the close of the day. These conditions were recorded upon the report. Copies of the report were mailed and in the canal owner's hands the next morning. The length of river covered was three hundred miles.

The past season (1908), which was short of water, demonstrated more clearly than ever the value of this report. The expense of obtaining reports, such as postage, blank forms, telephone tolls and clerk hire was paid for by the

(Continued on page 3)

Arkansas River Daily Reports (cont.)

Arkansas Valley Ditch Association. The expense was from five to six hundred dollars for each year.

The basic format of these reports has changed very little in over a century — the information is logically ordered by location from headwaters to the state line with inflows distinguished from outflows. This convenient and easily understood summary of information has withstood the test of time, providing both accountability and transparency to the process of water administration for generations.

It is apparent, however, that the limitations of these reports caused previous water administrators to struggle with some of the same issues of data collection, processing and distribution timeliness and appropriate interpretation that continue to pose challenges today. Through what appears today to be extraordinary efforts by Jackson and the water commissioners, use of cutting-edge communication technology as well as mail service apparently superior to that which is presently available, bulletins were reportedly delivered within 36 to 40 hours following collection of the data. It is not clear whether the data reported represented averaged values, instantaneous “spot” readings, or a combination of both, but in any event the data was static in that it did not represent rate of change in magnitude or velocity. Recognition of some of these limitations and perhaps some mistrust of modern technology is reflected by annotations:

Note: Owing to frequent and constant changing river conditions, river

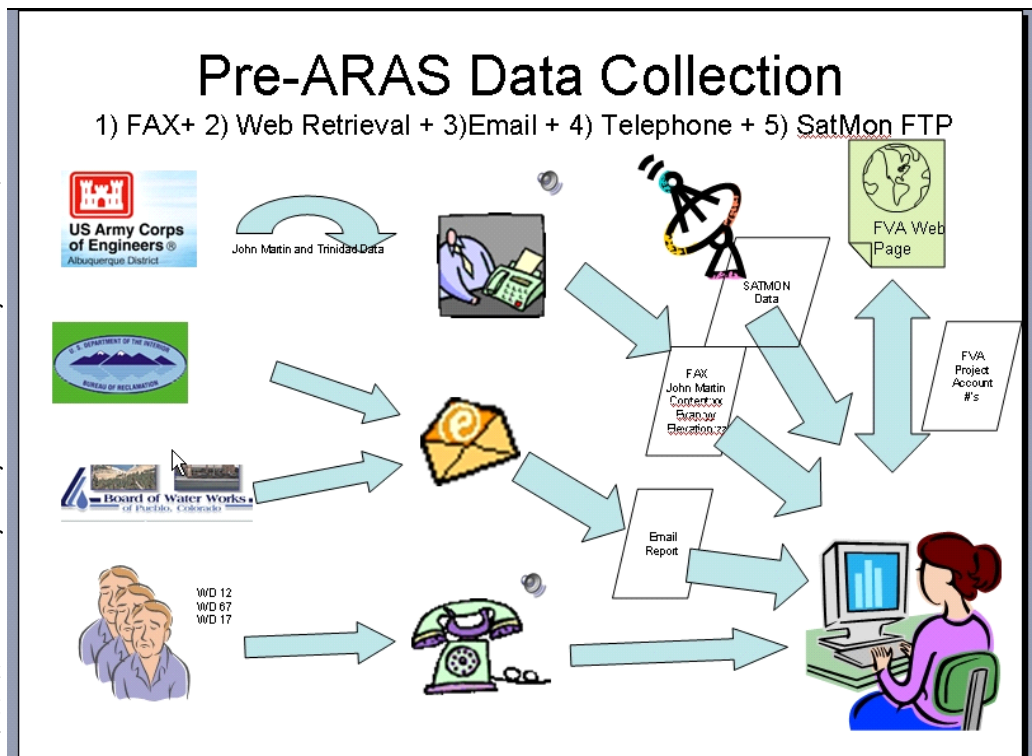
discharges are to be taken as comparative rather than exact...

Note: Reports by Telegraph or Telephone come in advance of written report. Errors thus arising will be given on first report after discovery, and all errors of preceding week on Monday’s report.

At some point, the dedication of the data collectors diminished and the practice of polling personnel “after-hours” was discontinued, but the basic process continued with financing assistance from the Arkansas Valley Ditch Association (AVDA), until April of 1981. For a time thereafter, distribution continued on a subscription basis. Since September 1999, the Daily Report has been made available through the internet at a significantly reduced cost. A continuous record of these reports exists from 1914 to 2005 and is maintained in the offices of the Division Engineer located in Pueblo, Colorado.

With the advent of satellite monitored gaging stations beginning in the 1980s and widespread internet accessibility, near real-time data for many of the sites historically included in the Arkansas Daily Report have become increasingly available. The availability of real-time data for numerous data collection sites has overcome some of the limitations associated with the venerable Arkansas Daily Report, which caused some to speculate that perhaps the Report would soon pass into obsolescence. This has brought about a change of expectations regarding what constitutes acceptable precision and timeliness of water administration among water users. Coincidentally, water administration has become more complex which has created a demand for more types of information and more detailed information but, there continues to be a demand for an easily assimilated presentation

(Continued on page 4)



Arkansas River Daily Reports (cont.)

of the more numerous data that is available. That suggests the continuing need for something very much like the Arkansas Daily Report, but with even more types of relevant information and information that is more current.

In order to meet the present challenges, it is necessary to rethink and redesign our data collection, processing, presentation and distribution processes with the thought in mind of doing everything faster, cheaper, smarter and better. Division 2 is undertaking this effort under the project moniker of Arkansas River Accounting System (ARAS).

The first step has been to streamline the process used to collect the basic data included in the Arkansas Daily Report. The results of this may not be immediately obvious, except with respect to the speed or timeliness with which this task can be completed, which in turn allows other administrative tasks to be accomplished more expeditiously.

Although a good portion of the Arkansas Daily Report can be automatically filled in through the data acquired from the satellite monitoring system, a majority of the data is received in the Division 2

office by fax, e-mail messages or phone calls. To expedite the data collection process, outside reporting agencies (the Albuquerque Corps of Engineers, the Bureau of Reclamation, Pueblo Board of Water Works and the Fountain Valley Authority personnel) were contacted and asked if they could provide the required data directly from their databases, reformat it, and send it to a common FTP site. Each agency was very cooperative in this effort and quickly designed a method to send the data to a common FTP site electronically. To streamline the data collection from water commissioners, Doug Stenzel, of the Denver office IT Section, provided a generic spreadsheet that would allow the District 12, 17 and 67 water commissioners to enter their daily values and then press a button that would transmit their daily values to the same DNR FTP site.

Processing the data for the Arkansas Daily Report has evolved from a manual-based entry system to an automated system. Before ARAS, all data submitted via fax, e-mail and phone calls were written onto a form termed the "Daily Sheet". After the data was collected from all reporting parties, the data was then typed from the "Daily Sheet" into a database form that ultimately produced the Arkansas

Daily Report. ARAS revised the data handling process by automatically collecting the data from the common DNR FTP site. An electronic report termed the "Daily Sheet" is automatically updated as soon as new data is discovered on the FTP site and the database that produces the Arkansas Daily report is automatically populated as well.

The Arkansas Daily may be accessed at the following address: <http://www.water.state.co.us/flow/charts/div2/main2.asp>.

Recently, the AVDA requested that the Division 2 Engineer: 1) provide the Arkansas Daily Report earlier each day to help them evaluate how the available water supply is being administered and to determine how much water will be made available to them; 2) to provide the Arkansas Daily Report on weekends, and; 3) to provide more information regarding all types of operations (exchanges, reservoir releases, etc.) that may help them interpret administrative decisions and identify opportunities for cooperation among water users. A Preliminary Arkansas Daily Reporting process was created to respond to these needs.

(Continued on page 6)

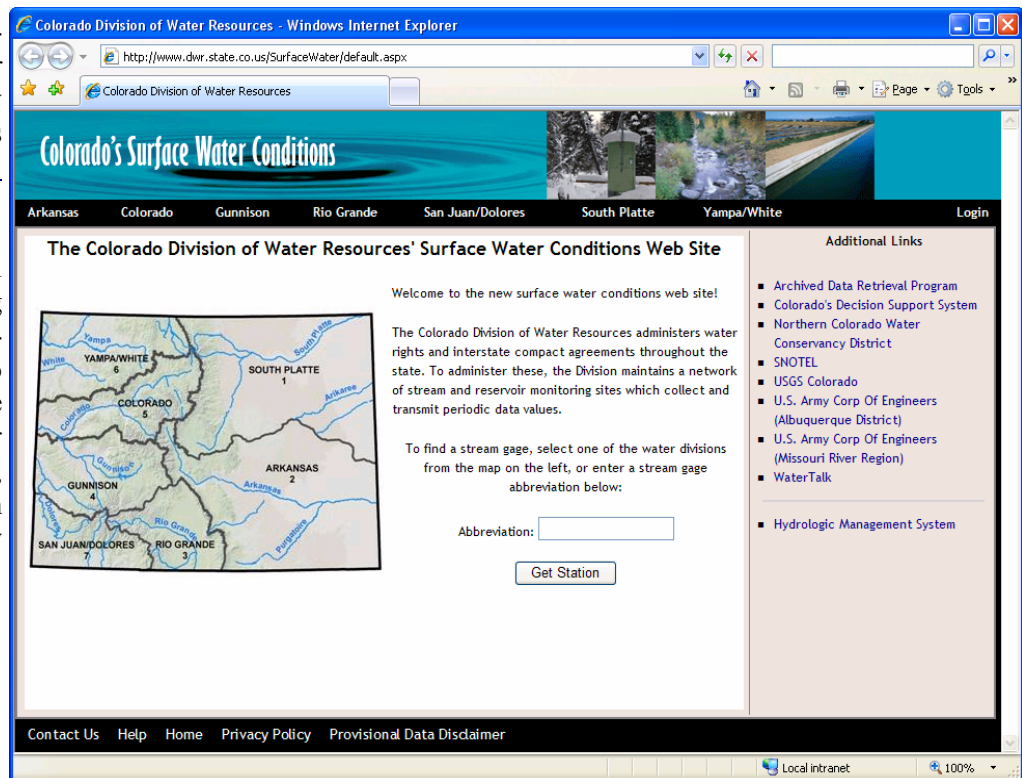
D	E	F	G	H	CZ	DA	DB	DC	DD
DATA VALUES	IDENTIFIER	MEAS TYPE	TIME STEP	UNITS					
					4-Aug	5-Aug	6-Aug	7-Aug	8-Aug
District 67 Data									
Fort Bent	6700610	PointFlow	Daily	cfs	28	28	28	28	28
Keesee	6700613	PointFlow	Daily	cfs	0	0	0	0	0
Amity	6700607	PointFlow	Daily	cfs	0	0	0	0	99
Lamar	6700614	PointFlow	Daily	cfs	85	82	83	92	92
Hyde	6700612	PointFlow	Daily	cfs	8	8	8	8	8
Buffalo	6700608	PointFlow	Daily	cfs	67	64	69	66	71
Great Plains Reservoir	6703824	Content	Daily	af					32000
Two Buttes Reservoir	6703596	Content	Daily	af					
Thurston	6703882	Content	Daily	af					600

New version of the Surface Water Conditions Website

On January 16, the Colorado Division of Water Resources released its new Surface Water Conditions web site (<http://www.dwr.state.co.us>).

In addition to a graphical redesign, several long awaited functionality upgrades have been added to the new site, including the ability to retrieve of longer periods of provisional data, change the time period on graph displays, and view station descriptions.

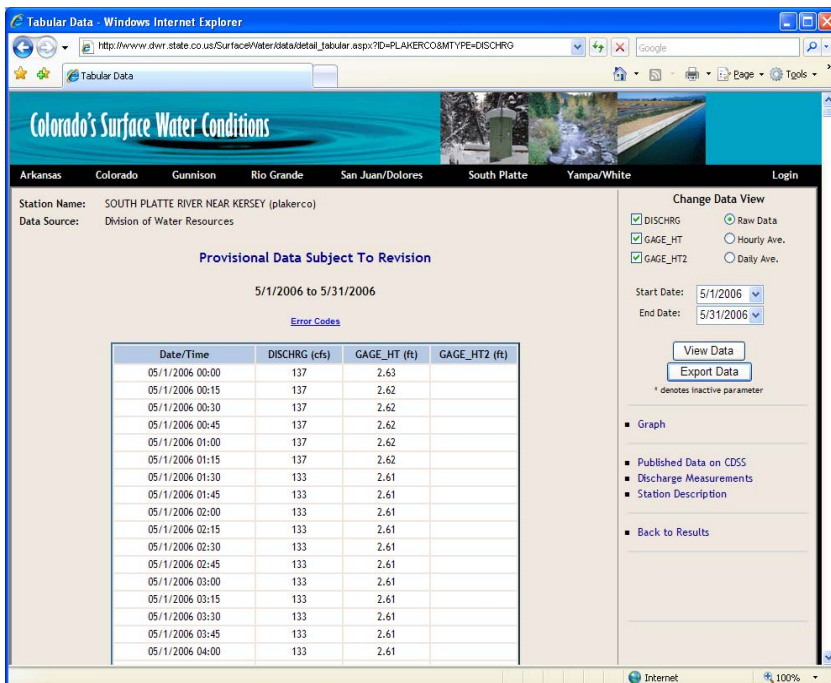
The new surface water web site boasts a new graphical interface and upgraded functionality.



Expanded Provisional Tabular Data Retrieval

Historically, the tabular data pages returned only the last three days for all parameters. The new site gives the user the ability to choose wider date ranges, up to two years ago, as well as customize the output parameters and time step.

The new site gives the user the option to choose wider date ranges and to modify the data parameters to fit their needs. This data is provisional data and subject to change.



Arkansas River Daily Reports *(cont.)*

A scheduled task initiates an ARAS run at 0800 hrs, 7 days a week. This run initially populates the Preliminary Arkansas Daily Report with the 0600 hour data from the satellite monitoring FTP site and extracts Pueblo Reservoir release data from a local accounting worksheet. Then, at 0945, another scheduled task initiates an ARAS run to further populate the report with any additional data discovered on the FTP site for that day. If current values

are not available from the FTP site, estimates for the missing data are provided from the last known good data. Office personnel perform a final quality check on all gage, reservoir and river call values before the final posting of the Arkansas Daily Report is completed. Having implemented these changes, the Division remains open to additional suggestions or ideas for improvements.

Although 100-plus years have gone by, the Arkansas Daily Report still provides necessary information required by the Arkansas River water users in a format that they find useful. The on-going challenge will be to report accurate real-time values as soon they as they are available and to strive to improve the presentation of information to help make sense of an increasingly complex administrative environment. ♦

Revisions to the Dam Safety Rules and Regulations

This year, the Dam Safety Branch was successful in revising the *Rules and Regulations for Dam Safety and Dam Construction* (Rules), and will be effective on January 1, 2007. The key changes to the Rules as described in the public presentations include:

1. Elimination of the Intermediate dam size.
2. Revision and updating the nomenclature to be consistent with National Standards (i.e. hazard classification, Emergency action plans).
3. Revisions to the methodology for determining the Inflow Design Flood and spillway sizing.
4. Reduction of Probable Maximum Precipitation (PMP) due to elevation effects.
5. Modifications to the Embankment and Concrete Dam Design Requirements to bring the Rules in line with state-of-the-practice.

The branch received several comments from consulting engineers and the consultant-lead committees assisted in providing critical information on updating specific sections of the rules including the areas of Geotechnical Engineering, Concrete Dam Engineering and Engineering Geology. This process of open review and comment proved to be beneficial and, as a result, nobody contested the Rules at the hearing held in November, 2006.

Human Resources

New Assistant Division Engineer

Starting in January 2007, **Pat McDermott** is assuming the role of Assistant Division Engineer in the Division 4 office in Montrose. Pat transferred from the Division 3 office in Alamosa where he has worked for the last 13 years. In that office, he handled many of the Water Court applications. Although the annual filings were few in number, many were very contentious. He also kept track of the Rio Grande Compact accounting and worked as advisor to the Division Engineer in Compact negotiations. His experience with these matters, as well as administrative situations/solutions will be a valuable asset to the staff and water users in Division 4.

New Employees

Rick Hoffman started on October 2, 2006 as part of the Greeley Well Enforcement Team. Rick has a great deal of prior water experience, having served as the superintendent of the Farmers Highline Canal and Reservoir Company for over ten years as well as working for the City of Boulder and the Town of Cheyenne Wells. Rick will be a great asset to Division 1, not only in well administration but also in surface water administration.

Sam Riggbach joined Division 3, in Alamosa, on October 10, 2006 as a Lead Well Enforcement Commissioner. This

Human Resources (cont.)

position was created as part of Division 3's new well metering program and will focus on enforcement and compliance issues. Sam is a certified well tester and comes from an extensive agricultural background. He and his wife live near Monte Vista.

Dick Merrell began working for Division 3, in Alamosa, on November 20, 2006 as a Well Enforcement Technician. Dick's varied background includes electronics work, management, and over 20 years in the U.S. Navy. Dick is also a published author. He and his wife live near Fort Garland.

Chris Brown was hired in the Denver office on December 1, 2006 to provide GIS expertise to the Division. Chris comes to us from Wright Water Engineers, with seven years of experience in applying GIS technology to water resource projects. Some of his duties will include helping the Well Permitting Branch, the Dam Safety Branch and our water commissioners use GIS and GPS technology.

James Kellogg, P.E., started working for Division 5, in Glenwood Springs, on December 1, 2006. He was hired to serve as a hydrographer and augmentation plan coordinator. For the past ten years, James was with CTL/Thompson, Inc., a regional, geotechnical and materials engineering consulting firm headquartered in Denver. Based out of Glenwood Springs, he provided engineering consultation and design services on many challenging, mountain resort projects in western Colorado. Prior to his professional experience, James earned a B.S. degree in Biology and an M.S. degree in Civil Engineering (geotechnical specialty), both from Virginia Tech. James looks forward to translating his professional experience with client relations and project management to his new career.

Michelle Fite was hired December 5, 2006 as Administrative Assistant for Division 5, in Glenwood Springs. For the past six years, she worked for the Department of Labor and Employment as an Employment Specialist. Michelle will assume part-time duties with Water Resources and continue doing what she loves, teaching fitness classes for the City of Glenwood Springs and being able to spend more time with her dogs and family. Raised in San Diego, she has called Colorado "home" for the past 25 years.

Steve Rivera was hired December 4 as a Well Enforcement Technician in the Division 3 office in Alamosa. Previously, Steve was a frontline supervisor with UPS for 12 years. He is a native to the area and also has experience with surface and ground water irrigation. Steve, his wife, and their two daughters live in La Jara.

Mark Perry began work on December 11, 2006, as the new Lead Hydrographer in Division 2, in Pueblo, after recently completing his Master's Degree at Colorado State University (thesis involved examining the space-time dynamics of soil moisture) and a semester of credits towards a doctorate degree. Mark received a Bachelor's degree at Virginia Tech in Civil Engineering in 1995. He worked for the Army Corps of Engineers in Maryland for six years and for a consulting firm (Mildenberg Boender & Associates) in Maryland from 2001 through 2004 prior to coming to CSU for his Master's Degree. Mark is enthusiastic about coming to Division 2 and we are very excited to have him begin his career with our division.

Shanna Sandridge is the new Administrative Assistant in the Sterling office. She started with Division 1 on December 11, 2006. Shanna served as the Director for the Domestic Violence Program in Sterling for over eight years. She has also worked as an administrative assistant for the Sterling Police Department and 5th Judicial District Attorney's Office. Shanna is very eager to learn more about water issues. She is very capable and will be a great help setting up and managing our new Sterling Office.

Retirements

Perry Alspaugh retired in December 2006 after more than 30 years of service with the Division of Water Resources in Division 3. Perry began his career in 1976 as the Water Commissioner for District 27, which includes La Garita and Carnero Creeks. He later added administration of the upper end of the Rio Grande in District 20 to his duties. Perry will now have more time for hunting, fishing, and spending time at his mountain cabin with his wife Danae. We wish him all the best in his retirement!



CALENDAR OF EVENTS

- January 23-24** Colorado Water Conservation Board Meeting, Denver, Colorado; for more information, contact Dena Crist at 303-866-3441
- February 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
- February 16** Colorado Ground Water Commission Meeting, Parker Water and Sanitation District, Parker, Colorado; for more information, contact Marta Ahrens at 303-866-3581

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