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COLORADO DIVISION OF WATER RESOURCES

DEPARTMENT OF NATURAL RESOURCES

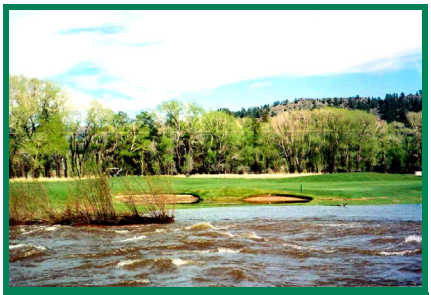
StreamLines

Quarterly Newsletter of the Office of the State Engineer

Rio Grande Basin Events, Spring 2005

Steven Vandiver, Division Engineer, Division 3

The Rio Grande Basin had excellent snowfall through the entire winter of 2004-05. January, which is normally a fairly dry month, produced incredible amounts of snow and snow-water equivalent in both the San Juan and Sangre de Cristo mountain ranges. Later in the season, several up-slope storms hammered the Sangre de Cristos throughout southern Colorado and northern New Mexico. At its peak, the snow-pack in the Rio Grande Basin reached levels at or above 150% of normal. Water users and administrators alike were looking forward to a large runoff that would help heal the wounds of the previous three years of drought. The month of April and the first half of May were relatively cool and did not allow much snow to melt. As a result, when an extremely warm period of weather occurred in mid-to-late May, it drove the resulting runoff to very high stages on virtually all streams in the basin. Thankfully, most all of the reservoir levels in the basin were very low and could accommodate the large inflows without fear of filling and spilling. Had it not been for Terrace Reservoir on the Alamosa River, Mountain Home on Trinchera Creek, Sanchez Reservoir in the Culebra Creek Drainage, Platoro Reservoir on the Conejos, and Rio Grande and Santa Maria Reservoir on the headwaters of the Rio Grande, extreme damage would have resulted to property and lives could have been threatened. As it has turned out so far into this runoff, cooler weather helped moderate the melt at the present time and the runoff is under control with reservoir storage and diversions. Thanks go out to all the reservoir companies and operators for their cooperation to help avert a crisis. The diversions and high river flows have been extremely helpful in starting to recharge the depleted aquifers and low water table conditions.



Sand traps becoming water hazards at the South Fork Golf course.

To complicate the matter, the state is required to deliver large amounts of water through the Rio Grande and Conejos systems to meet the Rio Grande Compact obligation to New Mexico. With the present streamflow forecasts for those streams, Colorado is required to pass in excess of 500,000 acre-feet through the system to meet the obligations to the down-stream states. Because of the drying of the system and deterioration of river channels that has occurred during the last three years of drought, great difficulty is being experienced in moving this water through the river corridors and is pushing out into low lying areas and not arriving at the stateline. Heavy curtailment of diversions to

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Rio Grande Canal diversion at 5000+ cfs.

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COLORADO DEPARTMENT OF NATURAL RESOURCES

Rio Grande Basin Events (cont.)

meet our obligations under the Compact are occurring at this time, with the Rio Grande sending 28 percent and the Conejos River sending approximately 40 percent of their flows to the stateline.

Preparations for the January 2006 trial concerning the protest by several parties to the rules and regulations for new uses of water from the confined aquifer are already taking place. Initial discovery is taking place and expert reports and opinions are due soon. This has taken much coordination by the State Engineer staff with the other parties in support of those rules. As the trial approaches, this workload will increase for all concerned.

ESA issues have snuck into the Rio Grande Basin in Colorado. After initially excluding the San Luis Valley from proposed Critical Habitat designation, the U.S. Fish and Wildlife Service has made an about-face after being sued by environmental groups chose to include significant portions of the Rio Grande and Conejos Rivers into their new proposal. These areas include the Rio Grande corridor from the Lobatos gaging station to Del Norte and on the Conejos River from its confluence with the Rio Grande to Highway 285 near Antonito. These areas are the most effected reaches of the river by diversions and Compact administration. Virtually one-half of the proposed area is native hay meadows that are harvested each year. Additionally, approximately ten miles of the lower reach of the area on the Rio Grande mainstem is completely devoid of any of the primary constituent elements required for the bird or any habitat that the bird could occupy. The Rio Grande Water Conservation District has proposed a valley-wide Habitat Conservation Plan (HCP) to substitute for any need to designate Critical Habitat in the valley. Comments on the proposal were due May 31, 2005 and it remains to be seen what will come of this issue in the final rule that will be out in September 2005. Both the Rio Grande and Conejos River representatives have come out strongly opposing the designation and supporting the HCP.

San Antonio Bifurcation almost over-flowing

La Sauces bridge running pretty full.

Elhead Enlargement — Fish Recovery and Streamflows

John R. Blair, Dam Safety Engineer, Division 6

After many years of negotiations between the involved parties, the Elkhead Creek Dam enlargement is coming to fruition. As built in Moffat County just east of Craig, the original dam and reservoir was designed to contain a 3,000 acre-feet dead pool below the low level outlet with about 10,500 acre-feet of live storage up to the emergency spillway crest. The approved enlargement will bring the normal water level up another 20 feet while adding 12,000 acre-feet of additional storage.

One of the main water users for the new capacity is the Upper Colorado River Endangered Fish Recovery Program administered by the Federal government. Stored water is needed for the lower Yampa and Green Rivers to maintain stream flows during critical periods after the spring runoff.

Another aspect of the project involves DOW creating a sport fishery in the new reservoir with desirable non-native fish being removed from the Yampa River and stocked in the reservoir. To keep these fish and their fry from re-entering the Yampa River, fish screens are being designed for the multi-level gates of the new outlet tower and for the new emergency spillway channel.

Since fish removal is already happening in the Yampa River, a temporary fish screen was designed for the floor of the existing emergency spillway channel to keep any existing non-native fish in the reservoir during the construction phase of the project. Due to the fine screen needed to hold back fry, the temporary screen was designed as a folded fence to increase the surface area exposed to the flow of water and, thus, increase the screen's capacity (see Figure 1, below).

Figure 1

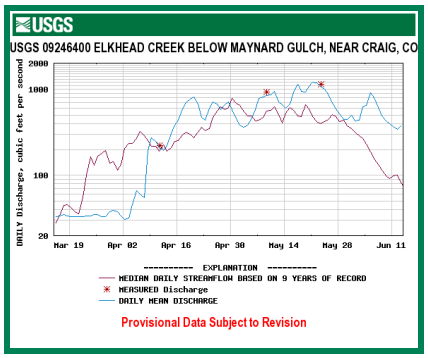
Elhead Enlargement—Fish Recovery and Streamflows (cont.)

Over this past winter, the low-level outlet gates in the reservoir were fully opened to bring the water level down to the dead pool. With only about 85 percent of average moisture reported in the Yampa River basin during March, a heavy runoff was not at all expected at the dam this year. Construction began in March with a crew demolishing the old weir wall for the emergency spillway channel to allow the coming spring flows to pass through without fully filling the reservoir, then the fish screen was installed.

Figure 2

With warm spring weather toward the end of March, flows began exceeding the low-level outlet's capacity causing reservoir levels to rise. Water soon reached the modified spillway channel and the fish screen began seeing flows on April 7, 2005 as seen in Figure 1. Because of the typically muddy nature of the runoff from the Elkhead Creek basin, significant head loss was seen in the fish screen with the first flows. When flows began peaking during the third week of April, the head loss became too much for the welded wire mess supporting the fine screen and the system failed in places as seen in Figure 2.

A period of cool, wet weather during April and the first part of May have further delayed the expected runoff and added additional moisture to the basin. As can be seen in the graph of daily flows, the runoff started late and is continuing late this year. Now, at the first of June, water is still flowing in the channel and the screen has almost been totally destroyed.



April through July stream flow volumes for the Elkhead Creek basin are now projected to be 127 percent of average. To the dismay of the design firm and the construction contractors for this project, this year was the wrong year for the drought to be broken in the Elkhead Creek basin. However, valuable information is now available for the design of the screens to be used when the enlargement of the dam and reservoir is finally completed.

Central Colorado Water Conservancy District Well Augmentation Case

Jim Hall, Division Engineer, Division 1

On June 3, 2005, Judge Roger Klein, Water Judge for Division 1, approved the largest plan for augmentation ever applied for in the state of Colorado. The plan by the Central Colorado Water Conservancy District (Central) included 964 member wells, the great majority of them irrigation wells. These alluvial wells extend along the South Platte River starting at the north end of Denver to east of Wiggins. Additional wells extend along Box Elder Creek and Beebe Draw, two small tributaries of the South Platte River.

Central's application, Case No. 02CW335, was filed December 23, 2002 in response to Supreme Court decisions and legislation concerning wells discussed in previous articles. Prior to this time, Central had provided replacement for out-of-priority depletions as approved by the Division Engineer on an annual basis. Fifty-three parties filed statements of opposition to the application. Judge Klein set a twenty-day trial for the application starting on May 16, 2005.

Prior to the start of the trial, Central was able to settle with all of the parties. The majority of the stipulations were reached the last week prior to trial. Major issues in the case had included projections to determine allowable pumping each year, replacement requirements for Box Elder Creek well pumping, the metering of wells, the efficiency of flood irrigation, the use of CBT water as a replacement source, the use of water not decreed as an augmentation source in the plan, and the use of augmentation wells. In settlement, Central and the objectors agreed to the following:

- A six-year projection tool developed for the case to assure there would not be unreplaced out-of-priority post pumping depletions by the wells that could impact other senior water right users;
- To consider Box Elder Creek as a live stream in determining replacement requirements and phase in replacement requirements using this assumption;
- To meter all wells by 2008;
- To use an irrigation efficiency of 60 percent for flood and 80 percent for sprinkler in determining irrigation well consumptive use;
- To only use CBT as a source if the

Central Colorado Water Conservancy District Well Augmentation Case (cont.)

Northern Colorado Water Conservancy District changes their rules to allow such use;

- To allow the use of water not decreed as an augmentation source in the plan; and
- To allow the use of augmentation wells with certain restrictions.

On May 16, 2006, Mr. Kim Lawrence, Central's attorney, presented a summary of the plan for augmentation before the court. At this time, Central, the state, and some other parties argued on some very specific language in several of the stipulations concerning the State Engineer's curtailment authority outside of the decree. After considering the arguments, Judge Klein ruled on May 26, 2005 that there was no present conflict and used the statutory language concerning the State Engineer's authority in the decree. On May 16, 2006, the state, Englewood, and Denver also argued about the acceptability of Central's stipulation with Ducommun Business Trust (Ducommun) because of concerns that the stipulation might allow injury to other senior rights via "selective subordination" of senior rights. Judge Klein provided that Ducommun must submit possible language concerning how the stipulation might operate to not injure senior rights or the Court would consider this stipulation void. Ducommun subsequently withdrew its statement of opposition.

With these final details taken care of, Judge Klein signed the decree on June 3, 2005.

DWR Staff Earn Swiftwater First Responder Certification

Thomas Ley, Chief Hydrographer

Whether a prerequisite or a requisite, DWR hydrographers and water commissioners work in, above, or near the surface waters of the state on a daily basis. Often, this work is accomplished without a real significant perceived threat to one's health and safety. To be sure, however, there are definite hazards to be recognized in all water conditions. These become particularly important during periods of snowmelt runoff and precipitation-induced flooding events when surface streams and rivers around the state can literally change from peaceful flows to raging torrents. In such conditions, the perceived threats become real. Several needs are quickly identified, such as: how does one recognize and characterize water hazards; what proactive steps can be taken to perform self-rescue in case of an accident; how should one respond in water rescue situations involving others; and how does one acquire a minimum level of knowledge and skills?

Many of these questions were answered, and some first-hand experience was gained, when twenty-one DWR hydrographers and water commissioners participated in a one-day Swiftwater First Responder training course. The course was conducted on May 24, 2005 at the Arkansas Headwaters Recreation Area (AHRA) Visitor Center in Salida Colorado. The Swiftwater First Responder training course uses a curriculum developed by Rescue 3 International, a world leader in water and flood rescue.

The course was broken into two half-day sessions: the first four hours were spent in a classroom setting, while the second half was spent enjoying the 45 to 50°F, 1,520 cfs flow of the Arkansas River in downtown Salida.

Classroom instruction focused on rescue philosophy, how to evaluate or size-up an emergency swiftwater rescue situation, the 15 absolute rules of swiftwater rescues, self-rescue and personal safety, assessment of swiftwater hazards and river dynamics, and an overview of personal protective equipment.

In preparation for the "in the water" portion of the training, each participant was outfitted with a wetsuit, paddle jacket, helmet, water booties, and personal flotation device (PFD). Basic

swiftwater rescue philosophy recognizes that in any rescue situation the rescuer's first priority is that they can rescue themselves, that they can back up other rescuers or rescue each other as a second priority, and only then can rescue of the victim be undertaken. Successful rescues then become a mixture of training, experience, practice, and judgment. The purpose of the Swiftwater First Responder Training is to acquire some of this training, and a little bit of practice. Continued training, refreshers and on-going practice are necessary. The four components of a successful search and rescue use the acronym LAST, (L)ocate the victim,

DWR Staff Earn Swiftwater First Responder Certification (cont.)

determine (A)ccess to the victim, (S)tabilize the victim, and finally, (T)ransport the victim to safety.

DWR staff participating in the training learned the fifteen absolute rules of swiftwater rescue. While not all of those will be repeated here, a few are particularly relevant to those of us working in or above hazardous water situations. The first is always to wear a personal flotation device (PFD) when working within ten feet of a hazardous high water situation. The second is in the event that an accident occurs and one is swept downstream, never put your feet down while in the current, and do so only after successfully swimming into a safe eddy or catching a throw rope.

Self-rescue and personal safety in swiftwater situations requires knowing when to use defensive swimming and offensive swimming techniques. The basic defensive swimming position when moving downstream in the current is on one's back with feet pointed downstream. Keep feet off the bottom to avoid foot entrapment. Legs and feet extended out front in this position allows one to look for approaching water hazards and to use the legs and feet defensively to fend off water hazards. Offensive swimming is hard, aggressive swimming in the classic crawl position and is used to move quickly towards a goal, such as a safe eddy, the shore, etc.

Hands-on training began with "dry-land" practice with the throw bag ropes (lightweight, high visibility, water resistant, floating rope packed in a small bag). Everyone was given the chance to throw the bag, retrieve the rope in a clean coil and throw again, with the goal of making the two throws in less than 20 to 30 seconds. Many came close to passing this test, but there were more than a few crossed lines, spaghetti coils, and tangled ropes.

The group then descended on the

Arkansas River. Each learned how to properly adjust his/her PFD and then was "invited" to get acclimated in the cold water. It actually didn't feel too bad at that point, as everyone had been standing around in wetsuits in the bright sunshine for about 45 minutes.

To prepare for our first experience in the water and training on how to navigate through a few swiftwater hazards, and to further practice throw bag technique, the group was split in half. The first half stayed upstream and entered the river to get further "acclimated". Their plan was to swim aggressively towards the center of the channel, assume defensive swimming position,

navigate to one side or the other of a bridge pier, navigate across a hydraulic that extended laterally across the river channel and then swim aggressively to shore. The second group went downstream a few hundred yards and deployed to throw bag ropes to the upstream swimmers who either were too tired to swim out of the current or had not been able to catch their breath yet due to the cold water. The downstream "rescuers" were very much appreciated, especially when their throws were on target. The two groups switched positions, so that everyone had the opportunity to experience the swimming and the throwing and gain confidence in knowing they could do each. This exercise was repeated with a few additional activities, the most important being practicing the timing and execution of the roll from defensive swimming position to offensive swimming position to get out of the river's current, break the eddy/current line and swim into a safe eddy below a hydraulic feature in the river.

Additional water training activity included practicing several types of relatively shallow, but swift water crossing techniques by wading alone or various group configurations. Shown is the Stokes Carry Method, in which seven to nine rescuers carry a backboard across swift shallow current to retrieve a victim and carry him back to

safety. The group also practiced setting up two point and four point tethered boat rope systems. Both systems can be quickly deployed and used to move the tethered boat across the channel in search of, or for access to a victim.

In summary, all participants felt the training was worthwhile and felt they had increased their confidence in swiftwater hazard situations simply by having been in the water and experienced first-hand a few basic self-rescue techniques. All had a good time, other than some uncontrollable shivering, and recognized the seriousness of the swiftwater accident situations and the need for further training and practice.

Water Commissioner receives the Governor's State Top Achievement Award

Steve Tuck, a Water Commissioner in District 40 for the past 34 years, was awarded the Governor's STAR Award for Outstanding Service. He was given the award during a presentation banquet in Denver on May 12, 2005. The Outstanding Service Award recognizes exemplary performance throughout an employee's career with the state. The major focus of the award is on superior performance, integrity and dedication.

The Commissioner of Agriculture, Don Ament, presented the award to Steve. In summarizing the award presentation, Commissioner Ament stated, "*Steve Tuck is the epitome of an honest, humble and hard-working employee. He is an enormous asset to the Division of Water Resources and to the people of the Gunnison Basin*". Steve has learned to become an accomplished hydrographer, measuring water flows in addition to his regular duties. He assumed the additional responsibilities in order to both better himself and provide better service to our water users. In addition, Steve has become the in-house expert in Division 4 at tabulating plans of augmentation. This involves interpreting very complex water court decrees and summarizing them for publication in tabular form. Steve has such a devotion to his job that he routinely starts his day at 4:00 a.m., walking his streams by flashlight so his users gain the maximum benefit of their limited water resources. Once Steve puts in his eight hours or more on his creeks, rather than call it a day, he assists his co-workers by measuring streams or ditches to help them more accurately do their jobs.

Russell George, Director , Department of Natural Resources (left); Steve Tuck (right)

Deputy State Engineer receives USSD 2005 Award of Excellence

Mr. Jack Byers, Deputy State Engineer, was among the recipients of the 2005 Award of Excellence in the Constructed Project submittal of Guanella Dam and Reservoir, near Empire, Colorado. The award was presented to Mr. Byers during the United States Society on Dams (USSD) Annual Meeting on June 9, 2005, in Salt Lake City, Utah. The USSD is a nation-wide professional organization dedicated to advancing the technology of dam engineering, construction, operation, maintenance and dam safety, and to promoting awareness of the role of dams in the beneficial and sustainable development of the nation's water resources. The other recipients who received this award included Dan Hartman, Public Works Director, City of Golden; Stephen L. Jamieson, P.E., Principal, W.W. Wheeler and Associates, Inc.; John W. France, P.E., Senior Principal, URS Corporation; and Stuart A. Nyland, Project Manager, Kiewit Western Company.

Guanella Dam is a new 34-foot high, embankment dam completed in November 2003 and put into service in March 2004. The dam is owned by the City of Golden, Colorado, a community of about 17,500 located 12 miles west of Denver. The dam was originally planned for completion in 2005, for initial filling in 2006. However, the effects of an historic drought in 2002 caused the Golden City Council to direct that the construction of the dam be completed for initial filling two years ahead of the original schedule. This allowed for only slightly more than one year for design, permitting, and construction of the facility.

Public Opinion Survey Now On-line

The DWR is proud to announce that an on-going public opinion survey is available for customers to fill out on-line at is website located at *www.water.state.co.us*. Customers are encouraged to fill out the survey and provide us with feedback at their convenience. The survey data is confidentially collected at a third-party site and is collected on a quarterly basis. The data is then published on our web site for our customers and employees to review. To take the public survey and/or review results from the year 2004, go directly to *www.state.state.co.us.publicsurvey.asp*. Your opinion greatly assists us in improving our service and setting goals to meet your needs in the future, and we thank you for your time in providing us with this feedback.

Human Resources

New Employees

Jerry Livengood started in Division 2 on March 17 as a Deputy Water Commissioner for Water District 13. Jerry comes to Division 2 from the Round Mountain Water District in Westcliffe, where he was the plant operator. He has a ranching background and a degree in Wildlife Management. Jerry served in this position last season as a temporary hire and successfully competed for this position in March.

Charles "Charlie" Sutter joined Division 1 on March 21 as a Deputy Water Commissioner for Water Districts 1 and 64 (South Platte mainstem from Kersey to the state line). Charlie is a long-time resident of the Sterling area. He came to Division 1 after working the last eight years as the ditch rider for the Farmers Pawnee Canal Company. Charlie's knowledge of Water District 64 and his rapport with the water users there have already proven to be a great asset.

Brian Sutton began employment on April 22 as a Deputy Water Commissioner for Water District 10. Brian has a B.S. in Watershed Science from Colorado State University. In addition, he brings significant practical experience to the position that he gained while working in conjunction with earning his degree.

Mike Mello joined Division 5 on May 2 as a part time water commissioner in Water Districts 39 and 45. Mike joined the DWR from the Department of Corrections where he was their augmentation plan administrator for RCC. Mike will be a great asset to Division 5.

Robert "Bob" Erosky joined Division 1 on May 16 as a Deputy Water Commissioner for Water Districts 1 and 64 (South Platte mainstem from Kersey to the state line). Bob is a long-time resident of Hillrose and has been involved in one aspect or another of farming his entire adult life. Prior to joining Division 1, Bob was the Canal Superintendent for the Lower Platte and Beaver Canal Company since 1993. Bob is a great addition to Division 1.

John Skinner joined the Division 3 office as the Well Commissioner. He started work on June 1. He has a degree in Earth Science from Adams State College and Electronic Technology from Trinidad State College. A lifelong resident of the valley, John has experience farming, was the computer technician for the SLV Board Of Cooperative Services, sold and serviced computer equipment for a private company, managed a rental store, and has extensive customer service experience.

Neal Misbach began working for Division 5 on June 8 as a full time Water Commissioner in the upper half of Water District 51. Neal holds a decree in Environmental Science from the University of Idaho. Neal previously worked as a GPS/GIS Technician and Surveyor developing DEM topographic maps from LIDAR data.

Jason Ward joined Division 4 in Montrose as their new Dam Safety Engineer on May 25. Jason was previously employed as a water resource engineer with Schmueser Gordon Meyer consulting engineers in Glenwood Springs. He has a Bachelors, Masters and Ph.D. in Civil Engineering from Colorado State University.

Retired Employees

Jim Horton retired at the end of March 2005 after 20 years with the Division of Water Resources. Jim worked as Water Commissioner in Water District 22 administering water rights and fulfilling the Compact on the Conejos, Los Pinos, and San Antonio Rivers. His easy-going manner helped to defuse a lot of confrontational situations in the district. Jim plans on taking is easy for a few months, doing some light welding, conducting a few auctions and then heading south of the border on a church mission with his wife Betty.

Steve Vandiver, Division Engineer for the Rio Grande Basin (Division 3), has announced that he will be retiring at the end of August after 32+ years with the Division of Water Resources. A native of Colorado, Steve grew up in La Junta. He received his engineering degree from the University of Colorado in 1972 and began working as a hydrographer in the Denver office in January 1973. An avid fisherman, hunter and outdoorsman, he quickly took the opportunity to move to the San Luis Valley. In 1975, he became the lead hydrographic engineer for Division 3. In 1981, he was selected to be the Division Engineer for Division 3, a position he has held for 24 exciting years. Idle retirement is not quite in Steve's plans as he has been selected to be the General Manager for the Rio Grande Water Conservation District.

CALENDAR OF EVENTS

July 26-27	Republican River Compact Administration Annual Meeting, Burlington, Colorado; for more information, contact Marta Ahrens at 303-866-3581
August 2	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
August 19	Colorado Ground Water Commission Meeting, Alamosa, Colorado, Colorado; for more information, contact Marta Ahrens at 303-866-3581
September 20-21	Colorado Water Conservation Board Meeting, Durango, Colorado; for more information, contact Tina Heltzel at 303-866-3441

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