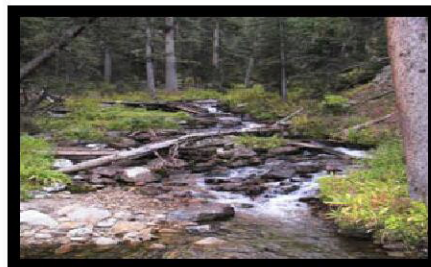
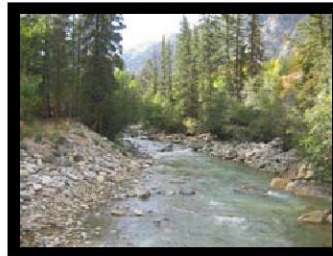




DIVISION 2

Annual Report 2006



Photos from Sept. 2006 Independence Pass Transmountain Diversion System Tour

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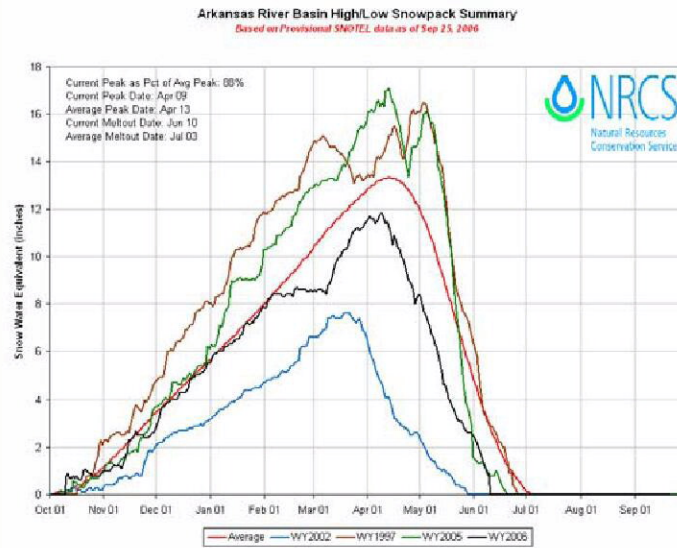
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ACTIVITIES and ACCOMPLISHMENTS in WATER YEAR 2006

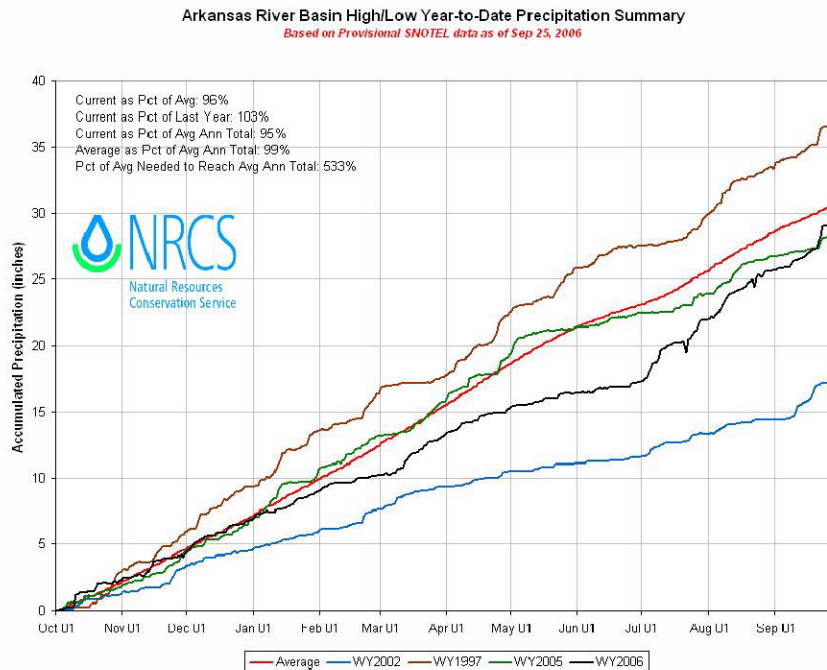
Surface Water Administration

Water Supply

The water supply within the Arkansas River Basin of Colorado in 2006 was below average in terms of snowpack but rebounded somewhat due to later season rainfall. The following graph produced by the Natural Resources Conservation Service compares last year's snowpack to that of previous years.



The following graph compares last year's overall precipitation to that of previous years.



The following table shows additional comparative statistics of water supply.

Indices	2005-2006	% Last Year	% Average
Peak Snowpack (SWE)	12 in	60	75
Transmountain Diversions (all)	141,209 af	146	111 ¹
Winter Water (all)	118,714 af	134	106 ²
Winter Compact Storage	20,553 af	191	157 ³
Tributary Ground Water Pumping	71,735 af ⁴	86 ⁵	68 ⁶

Submitted by Joe Flory

Diversions Predictions

It is difficult for farmers in the Arkansas Valley to collect on federally underwritten crop failure insurance because of non-substantiated and often conflicting information used to assess the risk of crop failure due to unforeseen water shortages. Reliable information needs to be available at planting time regarding the reasonable expectation of having a sufficient water supply to bring crops to harvest. This would be helpful to farmers, insurers, and the federal program overseer. To assist producers in documenting planting decisions, the Risk Management Agency (RMA) of the U.S. Department of Agriculture (USDA) worked with Colorado State University Extension (CSU-Ext), Natural Resource Conservation Service (NRCS), Colorado Division of Water Resources Div 2 (DWR), and the Farm Service Agency (FSA) to provide information on their website (<http://www.rma.usda.gov>) to assist producers in their documentation needs for crop insurance or other program purposes. This information is not all-inclusive but it provides much needed guidance. Many insurers reported using the documentation tool successfully in their client interviews.

Steve Witte met with representatives of the USDA RMA in March 2006 and explained the various components of irrigation supply and that information regarding the quantities of water ditches may divert becomes available at different times each spring. For example, the NRCS publishes daily Snow Water Equivalent (SWE) data for Snotel sites throughout the winter and produces streamflow forecasts for various watersheds around the first of each month from November through June. Each succeeding month's report becomes a more reliable predictor of streamflow volume; however, the June reports are available long after the final planting date for corn in the Arkansas valley.

Because ditches have different priorities, the amount of water available to shareholders will vary as some function of water supply in the river. Using a correlation of SWE to historical direct flow diversions, we can predict the direct-flow component of water supply for each ditch based

¹ Period 1980-2006

² Period 1991-2006

³ Period 1950-1975

⁴ YTD April 06-January 07

⁵ Period April 05-January 06

⁶ Period April 98-January 06, April-January only

on the SWE for the basin at the first of the month. Other components of water supply become available on various dates. Winter Water for each ditch is known as of March 15th and ditches below John Martin Reservoir know the amount of Compact Storage available to them as of April 1st. Rule 14 Replacement Plans are approved by April 1st as well, allowing well owners to pump a specific volume of water. Project Water Allocations are known by the third week of May each year, which is fairly late in the planting season, but it may be possible to develop correlations between west slope imports allocated to agriculture and SWE in the Roaring Fork Basin. One component that cannot be readily predicted is direct flow attributable to summer thunderstorms but that uncertainty provides an impetus to purchase crop insurance.

Initially DWR correlated various combinations of SWE from individual Snotel sites with historical ditch diversions and found the largest correlation coefficients resulted by using all Arkansas River Basin snotel sites combined. Other influences on water supply were also analyzed with respect to historical ditch diversions using paired samples tests, factor analysis, and correlation matrices. These influences include April and May percent of average snow amounts, off-channel storage, storage in John Martin Reservoir, John Martin Agreement Account Water, thirty-year average headgate deliveries, and NRCS 50% exceedance runoff forecasts for the Arkansas River at Salida and above Pueblo Reservoir, Chalk Creek near Nathrop, Grape Creek near Westcliffe, Cucharas River near La Veta, Huerfano River near Redwing, and Trinidad Reservoir inflow.

After the best correlations were determined for each ditch, individual equations were developed through linear regression analysis to determine the current prediction for water supply at the headgate. The thirty year average was used to predict diversions for the Buffalo and Hyde canals due to extremely poor correlations with any of the available water supply indicators. April and May SWE amounts were used to predict the Bessemer, Catlin, Fort Bent, Lamar, and Otero canal diversions. Runoff forecasts for the Arkansas River at Salida provided the predicted diversions for Oxford and Las Animas Consolidated canals, and runoff forecasts for Chalk Creek near Nathrop were used to predict diversions at Amity, Fort Lyon, Highline and Holbrook canals. Confidence levels were associated with these predictions and a range of diversion amounts that might be available for each ditch were tabulated.

DWR also developed a spreadsheet (see Appendices, page 57) using the various components of water supply to determine an amount of water available at each farm based on the predicted direct flow diversions for irrigation. The spreadsheet sums estimated direct flow supplies and estimated storage supplies to get total ditch headgate delivery amounts that are then divided by ditch company shares and multiplied by a ditch loss factor to get a ditch lateral yield per share. The farmer can then supply his own ditch share amounts and available surface and ground water supplies to determine a total farm supply for the season.

The initial results were presented to RMA in April. After further development by Janet Dash and Steve Witte, the predicted diversions were published on the RMA web site in May and June (see example in Appendices, page 58). A comparison of DWR predictions to actual direct flow diversions in the Arkansas Valley was published on the RMA website in November.

Comparisons of Actual 2006 Calendar Year Data to Estimated Headgate Diversions

		Ditches with data available in November 2006							
		Amity	Buffalo	Catlin	Fort Lyon	Holbrook	Lamar	Las Animas Consolidated	Rocky Ford Highline
2006 Calendar Year Data	Diversions at Headgate (AF)	79,833	26,570	85,313	165,045	22,150	39,106	25,967	64,286
	Upper	95,745		105,341	280,139	41,951	52,454	35,068	81,250
Estimates based on May 1 Indicators (AF)	Average		22,500						
	Lower	75,025		93,408	211,968	31,069	41,217	30,818	68,292
	%of upper	16.62 %		19.01 %	41.08 %	47.20%	25.45 %	25.95 %	20.88 %
Comparison of 2006 Calendar Year Data to Estimates (AF)	% of average		-18.09 %						
	%of lower	- 6.41%		8.67 %	22.14 %	28.71 %	5.12 %	15.74 %	5.87 %

Our predictions were generally within 5 to 20 percent of the lower estimate when compared to actual 2006 diversion data. We hope to improve on this with the 2007 estimates. Other factors such as soil moisture content, effective precipitation or departure from normal precipitation, Snow Water Supply Indices (SWSI), and historical land and ocean surface temperatures were not considered because of time constraints. The ditch priority system and its influence on available water supply will also be addressed in future predictions. In addition, historical correlations between West Slope SWE's and imported water supplies for agricultural use were not evaluated. We will include more of these factors in our water supply predictions for the 2007 irrigation season.

Submitted by Janet Dash

Livingston Transit Loss Study Below John Martin

As noted in the 2005 report, the Administration authorized Mr. Russ Livingston, d.b.a. Livingston Professional Services, Hydrologic Sciences, LLC, to conduct an investigation of the transit losses and travel times of reservoir releases along the Arkansas River from John Martin Reservoir to the Colorado-Kansas Stateline. A contract for a two phase investigation with an associated cost not to exceed \$66,500 was executed in February 2006. A delay was experienced at the end of Phase I when Colorado and Kansas experienced difficulty in reaching agreement concerning the period following a release during which flows at the Stateline should be recognized as creditable to the reservoir release. The study is scheduled to be completed by July 1, 2007.

Submitted by Steve Witte

Improved Effectiveness of Administering Decreed Plans for Augmentation

2006 saw continued improvements in the administration of augmentation plans. The effort put forth to contact plan users by mail proved to be effective, evidenced by numerous phone calls to and contacts with Water Commissioners and the Augmentation Plan

Coordinators. The issues are as numerous as the phone calls, but the intended results are well defined; better user supplied reporting resulting in better records of diversions, depletions and releases of replacement water.

Use reports received for the 2006 water year were encouraging, but fell far short of acceptable. In many cases, a report received from a given plan only contained use numbers from a small percentage of the plan participants. Because of this situation, well permits and lot numbers within each plan are being linked to addresses so that noncompliant home owners can be contacted individually.

For those users of a given plan who did comply with requests to report, it became obvious that some do not understand flow meter units and multipliers and so accuracy becomes an issue and just receiving a report is not enough. Instructional information on flow meters is being assembled and will be distributed to home or property owner associations and other plan participants.

We also recognized that some individual wells within subdivisions are covered by two separate augmentation plans; the original subdivision plan for the inside use and an additional plan for outside uses. The identification of these individuals is now in progress along with discussions on how reporting will need to be made by the users in order for each plan to be evaluated.

The analysis of augmentation plans led to enforcement efforts in Water Districts 10, 11, 13, 16, 17, 67 and 79. These efforts include an augmentation plan amended in water court to include a geographical location that was not part of the original plan; the installation of augmentation stations to measure replacement credits being returned to the stream; the assignment of additional acreage within a plan to avoid reducing the area beneath a pivot sprinkler; the release of replacement water to replace ground water depletions at a horse racing track and reporting by a subdivision plan that is allowed to pump water directly from Fountain Creek to supplement the community irrigation well.

Division 2 sponsored Water Commissioner training to emphasize the importance of plan administration and to clarify diversion record coding for the important elements of diversion, depletion and replacement. As part of this effort, Plans of Administration (POA) are being written for Augmentation Plans and Substitute Water Supply Plans (SWSP) by the Augmentation Coordinators or the Water Commissioners and approved by committee. The Plans assign responsibility for collection and processing of data and enforcement of other terms and conditions. One goal of developing POAs is to ensure that solid plan administration is established for CRS 37-92-308(4) type SWSPs, so that administration will continue after the plans are decreed. The highest priority for completion of POAs is newly decreed or approved plans. POAs for existing decrees and SWSPs will be developed as time allows or the need arises.

Our work continues.

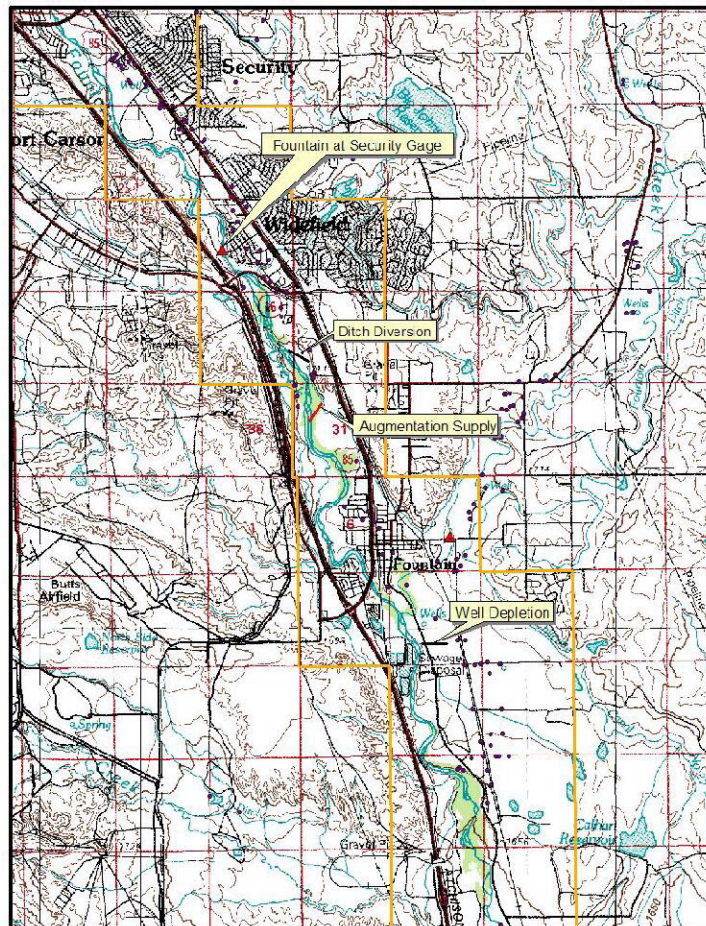
Submitted by Bill Richie & Kalsoum Abbasi

Efforts to Revise Fountain Creek Transit Loss Model

During 2006 development work continued on improvements and expansion of the Fountain Creek Transit Loss Model by United States Geological Survey (USGS) in cooperation with the Colorado Water Conservation Board, El Paso County Water Association and numerous water users and municipalities on Fountain Creek.

The model utilizes gage data from thirteen USGS stream gages and inputs for diversions from numerous ditches (many now on the DWR satellite gage system) and user-supplied inputs from a multitude of participants to determine not only the amount of transit loss on reusable water between gages, but also the amount of deliverable water for diversion or replacement of stream depletions. Staff from Division 2 are involved in cooperation with USGS to streamline the data input and output process to make the system more user-friendly and to reduce workload for the Water District 10 Water Commissioners in operating the computer model. In 2007 the emphasis will be on getting all participants fully engaged in use of the model and use of the model data and results for accounting and planning purposes.

Use of the new model will allow Division 2 staff to better document replacement of stream depletions in time, place and amount on Fountain Creek and will provide better documentation of water delivered down Fountain Creek to the Arkansas River.



Submitted by Bill Tyner

Efforts to Improve Support Provided to Field Personnel Through the Standing Orders Committee

Standing Orders Committee

The standing Orders Committee continued to meet throughout 2006 and dealt with a number of issues – some relatively simple, some very complex; some to completion, some that remain outstanding. 2006 saw the City of Rocky Ford make application to Water Court for a change of water right on their ownership of Rocky Ford and Catlin ditch shares as a result of issues discussed by the Orders Committee. Gravel pits in Districts 10, 14, 19 and 67 were brought into compliance via Substitute Water Supply Plans, Water Court applications or backfilling. Augmentation plan issues for subdivisions in Districts 10, 11 and 79 were pursued with some success, as were several pond and reservoir issues in Districts 10, 13, 14, and 16.

Participation in the monthly meetings by field personnel was encouraged and helpful to the process. Rich Snyder and Brian Sutton from WD 10, Charlie Judge from WD 12, John Van Oort from WD 14-15, Doug Brgoch from WD 16 and Don Taylor from WD 17 all brought issues to the table.

Functional standards for automatic self-regulating diversion control structures and stage/area/capacity tables were developed and added to the “arsenal”. Copies of all current functional standards can be found in the appendices, page 62 of this report.

Examples of Orders the Committee issues:

Orders partially or fully satisfied:

- Cherry Creek Farms - WD10 - Orders issued to provide adequate subdivision - use reporting - requested complaint for failure to comply - averted by arbitration and agreement on reporting. Interesting issues re: who to issue orders to - HOA or individual owners
- Monks/Pioneer Sand - WD10 - Orders issued to R.E. Monks Construction re: gravel pit operations involving Denver basin groundwater issues, well permit issues, interception of surface flow, dam safety concerns. Well permit, water court case, SWSP applications submitted, dam safety concerns addressed. Orders are in abeyance pending completion of processes.
- Zacher - WD14 - Orders issued on illegal ponds - resulted in long-term lease of aug water, court application made and SWSP approved Fall 2006.

Orders pending:

- Mule Haven - WD 10 - Orders issued superseding previous orders regarding diversions and proof of availability/suitability of replacement sources
- Teaspoon Ranch - WD 12 - Order issued to remove dam from West Four Mile Creek. Former owner of a ranch property installed a driveway/dam across West Four Mile Creek several years ago. The property has changed ownership numerous times in the last five years making administrative actions difficult. An order is outstanding to the current owner - an out of state mortgage company. This company has indicated an intention to

comply with the order. Enforcement action held in abeyance pending action at the end of the winter snow conditions.

- Riss Reservoirs - WD 12 - A series of three fairly large undecreed reservoirs constructed near Cripple Creek on the Four Mile Creek drainage in the late 1960's. The three dams are of jurisdictional size. Previous administration from the early 1990's involved leasing evaporative replacement waters from main stem Arkansas River sources. This procedure was not continued by the current owners nor was deemed by the Division Engineers Office to be effective augmentation of these out of priority losses. In February of 2006 an order was issued to the two owners to either perfect some type of augmentation plan or breach the dams. This order was due in June of 2006 but was conditionally extended until the end of the year with provision that marked progress to be made during this extension period. Although the owners are seeking replacement water on this drainage, insufficient progress was made by the end of 2006 and a complaint is now being sought by the Division Engineers Office.

Orders resulting in Water Court enforcement action:

- Little Turkey Creek - WD10 - Order issued to remove on-stream dam under 37-92-502(7) resulted in no action - complaint filed - awaiting enforcement by the court

Major pending issues where orders are not yet involved:

- Fort Lyon Initiative - WD17 - progress made with Adobe Creek Reservoir content, Adobe Creek Outlet, Gageby Creek Wasteway gages up and running during 2006. Updated stage/area/capacity surveys provided by Ft Lyon Canal Co. Initial attempts at reservoir accounting leave much to be desired, but at least we have a start.
- City of Trinidad change case administration - WD19 - Dry-up verification completed September '06 - some discrepancies found - CoT will attempt to correct. Issue of when 500 af portion of Model reservation owned by CoT is available for use under Trinidad Project Operating Criteria resolved. Issue of whether 500 af is subject to reduction to consumptive use and issues regarding return flow routing remain.
- Black Hills Reservoir/Model Ditch WD - 19 - Principles of Operation developed and letter of administration sent to owners
- City of Pueblo Lake Minnequa Park development - WD14 - Issues regarding need for change of water right and/or plan for augmentation remain
- Beaver Creek Issues - WD 12 - Beaver Creek drains the Southside of Peaks Pike and joins the Arkansas River between Canon City and Pueblo. The Cities of Colorado Springs, Cripple Creek, Victor, and the Beaver Park Irrigation Company dominate the ownership of water rights on this stream. These rights are relatively senior and often operate independently of the main stem Arkansas River call. Unfortunately 100 years of ambiguous change decrees and independent agreements between the parties have created a complex and virtually un-administrable situation for the Division Engineers Office. Due to recent complaints by one of the four main water right owners, the Division Engineers Office began efforts in 2006 to bring the four parties together in an effort to negotiate some type of operating agreement for the administration of this stream system designed to make future administration clear and prevent injury to main stem water rights.

Submitted by Joe Flory

Water Bank Report

The Water Bank statute was enacted in 2001 whereby the Arkansas River Water Bank Pilot Program was established in CRS 37-80.5- 101 to 107. The rules establishing the Arkansas Pilot Water Bank were promulgated by the State Engineer effective July 1, 2002. The pilot water bank was operated by the Southeast Colorado Water Conservancy District but it chose not to continue to do so after 2003.

The Legislature enacted additional legislation in 2003 which established the opportunity for a water bank in each of the seven water divisions throughout the state, CRS 37-80.5-104.5. The Upper Arkansas River Water Conservancy District has agreed to be the operator of water bank as is required by the revised statute and so the Arkansas River Water Bank rules were promulgated on October 31, 2006 replacing the Arkansas River Water Pilot Bank rules, following an uncontested hearing on September 20, 2006.

However, permanent authorization for Water Banking is far from being assured. Judicial approval has not yet been secured and despite the lack of participation in the administrative rule hearing, additional opposition is anticipated in the water court venue.

These rules and the underlying statutes have a sunset provision in CRS 37-80.5-107 which states that Article 80.5 and any rules promulgated pursuant to this article are repealed effective July 1, 2007 unless the date is extended by an act of the Legislature. It would be unfortunate to have the water bank sunset just as the District begins operation of the new bank.

The water bank has not been utilized to any extent to date but it may be in the future as we hear more about potential crop fallowing programs in the Arkansas River basin which may place water into storage and then use the bank to market the water.

Submitted by Hal Simpson & Steve Witte

Ground Water Administration

Well Permits

Replacement wells in Division 2 increased from 163 in 2005 to 174 in 2006 for exempt wells, and from 29 in 2005 to 31 in 2006 for non-exempt wells.

Growth in Chaffee County and augmented residential wells is realized, as two of the original resources of the Upper Arkansas Water Conservancy District's blanket augmentation plan 92CW84 approach full commitment. Planning for the future, the District filed 06CW032 to supplement the existing plan with several additional resources including Fryingpan-Arkansas Project waters for existing customers, new uses and to augment off-stream ponds. The District has requested some flexibility until the case is approved and has submitted a request for a Substitute Water Supply Plan approval. In a separate action, the Cottonwood reach was approved for higher depletion factors to offset injury to water rights because of the recent placement of sewer lines up Cottonwood Creek delivering return flows to the Buena Vista Sanitation District which are delivered off-stream from Cottonwood to the main stem of the

Arkansas. Increased time is spent reviewing available balances and location of return flows before approval of each augmentation certificate prior to well permit approval.

Anticipation of growth in El Paso County is also seen in the filings for court approvals for plans of augmentation in the Denver Basin aquifers. This has caused an increase in field inspections for 600 foot spacing in El Paso County for new well permit evaluation and issuance pursuant to those decrees.

Exempt Well Enforcement

Enforcement and orders for exempt wells centered around issuance of orders for plugging wells and valid permit requirements including wells constructed in the past on the wrong lot. Resolution is often achieved either by parties agreeing to lot line adjustments, plugging, or repermitting upon letter by our office, if not, by order. Outreach continues in cooperation with Custer, Pueblo and El Paso County in reviewing at the county level zoning or special use reviews that have wells as the source of water in order to prevent misuse of groundwater and future enforcement. Plugged and abandoned wells as required by permit conditions increased from 169 in 2005 to 212 in 2006.

Public Assistance

Public inquiries for well permit information are encouraged to utilize the on-line resources, but often require assistance. The DWR on-line Mapping and CDSS continue to be popular with the public.

The Division is now using PLSS conversion software that has an overlay of several county subdivision lots. That is allowing more upfront review, and fewer returns for correct lot number, etc. This was provided by the State Engineer's staff for Division use.

Submitted by Janet Kuzmiak

Administration of Ground Water Use and Measurement Rules

Rule 14 Plans; Approval, Administration, and Enforcement

Review and Approval

Eleven Plans were submitted for the 2006 Plan Year. The three largest Well User Associations are Arkansas Ground Water Users Association (AGUA), Colorado Water Protective Development Association (CWPDPA) and Lower Arkansas Water Management Associations (LAWMA). The total number of Plans under this program has decreased since the beginning of the drought. In 2001, before the drought, there were 18 Plans. In 2005, there were 13 Plans and in 2006 there were 11 Plans. For the most part, Wells previously included in a Plan that became defunct merged into a larger Plan that could provide more reliable Replacement Sources. At this time, it is anticipated that two more Plans will cease operation with the 2007 Plan Year and merge into another Plan.

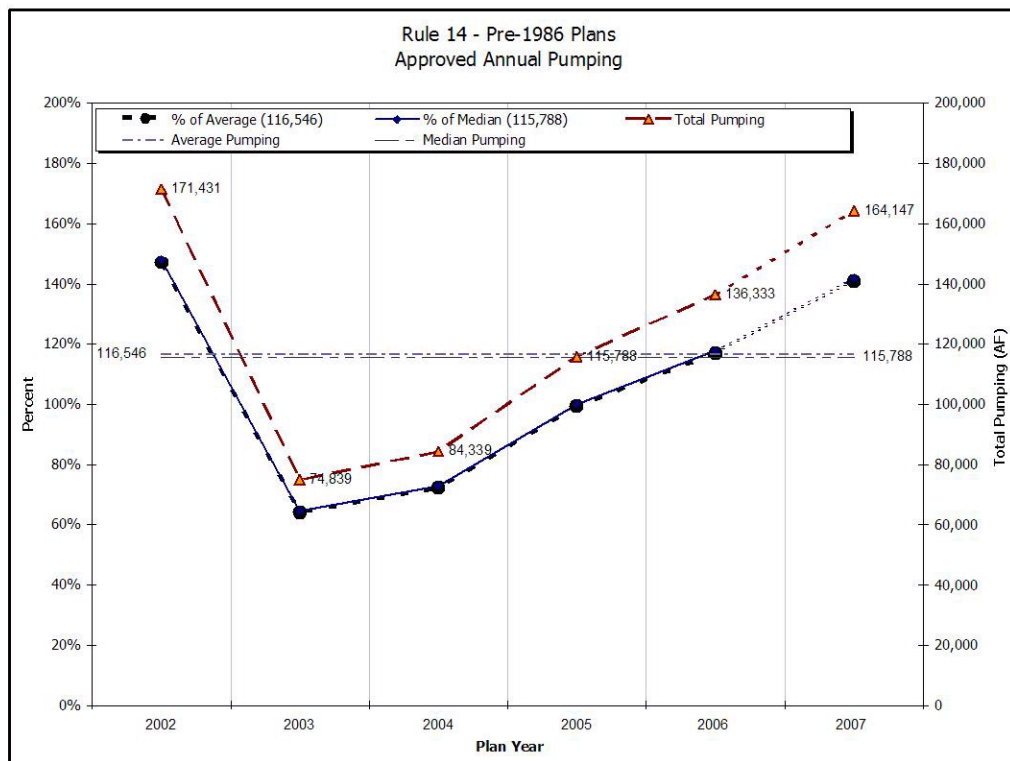
Administration:

The “drought condition procedures” implemented in 2002 continue to be used to maximize the use of limited Replacement Sources and to lessen the administrative burden on the Well User Associations and on Ground Water Operations.

For the 2006 Plan Year, Ground Water Operations processed 19 revisions to 5 of the 11 Plans; this represents a significant decrease from the 42 revisions to the 13 Plans administered in the 2005 Plan Year. In 2006, revisions included 9 Amendments, 7 Emergency Transfers and 3 Water Transfers. No “Seasonal Roll Overs” were executed in 2006; all such revisions were incorporated into standard revisions.

Improvements in data consistency with the CWPDA independent data system continued throughout 2006. Ground Water Operations continues to work with CWPDA to improve coordination of data and processing of Revisions. At this time, 8- to 16-hours of staff time is required to process monthly reporting; a similar amount of time is required to process revisions.

Final Approved Pumping Estimates for 2006 continued to increase above past years. The 2006 Plan Year Approved Pumping Estimates exceeded both the average and the median for the Five-Year Average (2002-2006). The 2006 Approved Pumping Level was approximately 80% of the 2002 Approved Pumping Level.



Based on the 2001-2005 Approved Pumping Levels, an estimated 15% increase had been predicted; actual Approved Pumping Levels were 18% higher than in 2005. The upward trend in Pumping Levels appears to be continuing and it is anticipated that the 2007 Plan Year will see continued increases in pumping.

Measurement and Use Rules Enforcement:

To date, Division 2 has identified 6,537 Wells that either are or were thought to be Non-Exempt. 5,608 Wells have been found and located, with the remaining 929 Wells having never been drilled or having been “lost” over time. 4,566 Wells are subject to either the Measurement Rules or the Use Rules or both: 378 are subject only to the Measurement Rules, 185 are subject only to the Use Rules and 4,003 are subject to both.

Wells Subject to the Measurement Rules:

For the 4,381 Wells subject to the Measurement Rules, 1,871 have current Measurement Tests and 2,239 have current Inactive Notifications. 328 Wells subject to the Measurement Rules have neither a Measurement Test nor an Inactive Notification on file. Ground Water Operations continues to work with the Well Owners to strive for 100% compliance.

Wells Subject to the Use Rules:

Of the 4,188 Wells subject to the Use Rules, more than half of the Wells (2,158) are in one or more Augmentation Plans. Approximately 75% of those Wells (1,590) have approved Measurement Methods. Those Wells subject to the use Rules that are not in Augmentation Plans are inactive, with Inactive Notifications on file for over 85% of the Wells.

Monthly and Annual Reporting:

1,590 Wells are required to submit usage reports each Month and an additional 121 Wells must report monthly usage once each Year. Ground Water Operations processes Monthly Reports directly from Well Users or Well Users Associations for 1,323 Wells. Collectively, these reports are called User Supplied Data (USD). Meter readings for another 1,435 Wells are reported by the Power Companies each month. Some of the meters reported by Power Companies are for Wells with Totaling Flow Meters; the Power Company readings for those Wells are used for Quality Control review of USD.

Enforcement Actions in 2006

Field Inspections and Enforcement Actions in 2006 include site visits and 1,446 Field Orders placed. In many cases, a specific Well was inspected more than once, particularly if a Field Order was placed.

Division 2 Well Inspections	
Type of Inspection	
Use Rules	2,419
General	791
Over Pumped	538
Measurement	1,024
Inventory	9
End of Season	263
End of Year	179
Test Completed	34
Test Not Completed	7
Downgraded	56
Total number of inspections	5,320
Total number of Well Head Orders	1,446

Office Enforcement Actions:

During the 2006 Water Year, Written Enforcement Actions were processed for 779 Wells. 768 Wells received Written Orders and 9 were the subject of Requests to the State Attorney General's to file a Complaint against the Owner for violations of State Statute, the Amended Measurement Rules and/or the Amended Use Rules Amended Measurement Rules. The number of Wells involved in the 2006 Written Enforcement Actions is more than twice than number as in the previous year (368).

One reason for this increase is the change in Division 2's policies for the use of the Power Consumption Coefficient method of measurement for Wells supplying complex systems. While the Policy Change occurred in the 2005 Water Year, the follow-up work to assure compliance took place in 2006. Approximately 138 Pumping Systems required modification or new meters in order to comply with the Policy Change.

The majority of the Written Orders result from the failure of the Well Owners to comply with the most basic requirements of the Amended Measurement Rules and Amended Use Rules. Beyond the anomaly event of the Policy Change:

- 40% of the Wells for which Written Orders were sent had not been retested or had not filed an updated temporary inactive form before the expiration of the previous Measurement Test or Inactive Notification.
 - As a convenience to the Well Owners, Ground Water Operations sends reminder letters about both renewal types 30- to 60-days in advance of the expiration dates.
- For over half of the Wells that were issued Written Orders, Ground Water had not received monthly reporting.
 - For those Wells not in Well Users Associations, Ground Water sends "Blue Cards" to the Well Owner/User to facilitate reporting. These forms are sent on a yearly basis, with one card for each month of the forthcoming year.
 - For those Wells that are in Well Users Associations, the Associations themselves send reporting forms each month.

Overall, the greatest obstacle to achieving a higher degree of compliance is the lack of accountability on the part of the regulated community. Proposed improvements to the reporting system may facilitate compliance but continued enforcement effort will still be needed.

Submitted by Christine Lytle

Well Tester Certification/Recertification

The Division of Water Resources began a Well Testers Training and Certification Program in 1994 in order to comply with the requirements of the Amendments to Rules Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin. The Amended Measurement Rules state:

3.1.2. As a minimum, totalizing flow meters shall be: properly verified in the field to be in accurate working condition under the supervision of an individual or entity approved annually by the State Engineer to do such tests ...

3.2 The State Engineer may adopt standards and specifications for power coefficient testing. As a minimum, power coefficients shall: be determined utilizing rating procedures approved by the State Engineer and conducted under the supervision of an individual or entity annually approved by the State Engineer to do such tests ...

Because it was the Amended Measurement Rules for the Arkansas Basin that created the need for Well Tester Certification Classes, all training took place in Division 2 from the implementation of the program in 1994 through 2002. In general, Well Tester Certification Classes were held on even numbered years with a recertification process on alternate years. The exception to that guideline was 2003 when a Certification Class was held in Division 1 (Platte Basin) in order to being a Well Testers program for that area and no recertification was required for previously-approved Well Testers.

Initially, a contracted individual conducted the Certification Classes. In 1996, DWR Staff became the sole organizers and instructors for Certification Classes under the direction of a member of the State Engineer's Office. That practice continued through 2004 when that individual retired. In 2005, Division 2 Staff became the principal organizers and instructors for both the Well Tester Certification Classes and the Recertification requirements. Involvement from the State Engineer's Office is now limited to one person who provides instruction and assistance with the Certification Classes.

Recertification of Previously-Certified Testers – February 15, 2006

On February 15, Division 2 Ground Water Operations conducted a Recertification Class for those Well Testers who had previously received certification to test meters in both Divisions 1 and 2. The Class was held in Colorado Springs to better accommodate the Division 1 Testers. Fifty-seven Testers attended the class and were recertified for an additional 2-years. Two Testers who were not able to attend the class were recertified after complying with alternate criteria.

The Recertification Class included:

- 1) A review of the statistics from the previous year's testing and discussion of problems that were encountered and how they were resolved.
- 2) A "refresher" on Complex and Compound systems and the special requirements for each and on the proper completion of Measurement Forms.
- 3) A discussion and explanation of the revision to Division 2's policy regarding the use of the PCC Method of Measurement on Complex Systems.
- 4) A discussion of the proposed revisions to the Amended Measurement Rules adopted in 1994.
- 5) A presentation of the proposed Division 3 Measurement Rules.

The 59 Certified Testers included 15 who are not available to test meters for Well Owners, either because they are DWR Staff (eight) or because they work for other agencies (seven).

In addition to the 59 Well Testers that were recertified in February, three members of Division 3 Staff (Craig Cotton, Rob Phillips and Joe McCann) became certified as Well Testers in anticipation of the final adoption of Measurement Rules for the Rio Grande Basin.

Well Testers Certification Class—May 17, 18 and 19, 2006

Division 2 Ground Water Operations participated in a Well Tester Certification Class in Division 3. The primary purpose of the Class was to assure a sufficient number of Well Testers would be available to allow Division 3 Well Owners/Users to comply with the proposed Rules Governing the Measurement of Ground Water Diversions Located in Water Division No. 3, The Rio Grande Basin. The proposed Rules were in Water Court at that time and it was expected that they would be finalized within a few months.

Because Well Testing was a new program in Division 3, the majority of Class development was performed by Division 2 Ground Water Operations. To develop the in-class material, Ground Water Operations conducted several conference calls to assure that the needs of Division 3 were met while maintaining consistency with previous Certification Classes. Selection of field test sites for the Certification Class required quite a bit of time for Division 2 Staff due to the need to travel to the San Luis Valley and inspect several sites to find enough Wells that would be suitable to demonstrations and testing by Class participants.

The Well Testers Certification Class was well-attended with most of the participants being from Division 3. 54 of the 60+ Class participants passed the written and field tests and were certified to test meters throughout Colorado. Of the 54 new Well Testers, almost three-quarters (39) stated that they intended to work only in Division 3. 13 indicated that they would work anywhere in Colorado, 4 limited their availability to Division 1 and only 2 choose to work only in Division 2.

The 54 new Well Testers included 15 who are not available to test meters for Well Owners, either because they are DWR Staff (five) or because they work for other agencies (nine).

At the end of the 2006 Water Year, there were 116 Certified Well Testers (59 previously certified, three Division 3 Staff and 54 from the Division 3 Class). This is almost twice as many Certified Well Testers as at the beginning of 2006. Division 2 Staff continues to coordinate the database that tracks the Certified Well Testers and continues to act as the lead agency in assuring that recertification requirements are met on an annual basis. Doubling the number of Well Testers directly affects the work load for Ground Water Operations with respect to this task.

Amendments of Measurement Rules and Policy Changes

Amended Measurement Rules

In 2005, two changes to the Amendments to Rules Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin implemented in 1994 (Amended Measurement Rules) were proposed. Both were based on the findings of USGS Studies conducted from 1998 through 2002. The conclusions from those studies showed that the Power Consumption Coefficient (PCC) method of estimating pumpage resulted in unacceptably high variability when compared to pumpage estimates measured by Totalizing Flow Meters (TFMs). In order to maintain an acceptable degree of accuracy, DWR developed a two-prong approach to limiting the deviation realized through use of the PCC Method:

Use of PCC on Complex Systems: Eliminate the Measurement Rule Policy that implemented a Standard Variance allowing Complex Systems to be rated for a PCC use one test at the point of Lowest Total Dynamic Head (TDH).

Accuracy of PCC Method: Revise the testing frequency for all PCCs to two-years. This frequency could be expected to limit deviation to an average of 4.4%.

Both of these changes in practice were presented to Kansas as part of the negotiations to resolve the lawsuit against Colorado. The first change was immediately implemented by revocation of the former Measurement Policy that allowed use of PCC ratings on Complex Systems. The revocation was issued in September 2006 and sent to all approved Well Testers and Well Users Associations. Two deadlines were stated: 1) no tests using the Lowest TDH method would be allowed as of November 1, 2006 and 2) all Complex Systems must comply with the Amended Measurement Rules as originally written (i.e. either reconfigure the system to not have varying TDH conditions or install TFMs) by June 1, 2007. See below for discussion of the implementation of this policy change.

To implement the second change, DWR developed revisions to the Amended Measurement Rules and filed with Water Court in late November of 2006. The revisions to the Amended Measurement Rules proposed a two-year testing frequency for all systems using the PCC Method. The Amended Rules Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin [Amended Measurement Rules - 2006] were approved in Division 2 Water Court on December 1, 2006.

Implementation and Enforcement of Policy and Rule Changes

Measures to notify affected Well Owners/Users, Well Testers and Well User Associations of the revisions in the Amended Measurement Rules – 2006 were undertaken immediately. Those Wells with the PCC Method of Measurement will transition into the two-year testing frequency during Water Years 2007 and 2008. 217 Wells will come into compliance with the two-year cycle in 2007 and the remaining Wells, estimated at 200, will come into compliance in 2008.

It is noteworthy that neither of these changes, either the use of PCCs on Complex Systems or the change to a two-year testing cycle for PCCs, required more than routine enforcement actions. The notifications sent to all affected parties provided ample warning of the changes. Ground Water Operations Staff did an outstanding job of working with the Well Owners/Users to assure that they understood the changes and the means to comply with the revised policies and rules.

Coordination and Training

- Ground Water Operations conducts monthly staff meetings with all members of the work group. Information is relayed from the other parts of the Division and DWR as a whole. Planned work activities and schedules are discussed. Problems and concerns are discussed with recommendations for resolution.
- In 2006, Ground Water Operations became involved in meetings with the Surface Water Group to discuss areas of common interest and of overlapping responsibilities. The specific meetings are the Orders Committee and the Plan of Administration Committee.
 - The Orders Committee deals primarily with Surface Water structures and operations. The committee members identify violations and develop a plan to attain compliance. Occasionally, a ground water structure that is not part of a Rule 14, Pre-1986, or a

SWSP is identified as being in violation. The Ground Water staff addresses those situations and processes Orders as may be needed.

- The Plan of Administration Committee develops plans for each SWSP and Decreed Augmentation Plan to identify the owner, contact, purpose, conditions of approval, reporting requirements and responsibility for administering the plan. This program is still in the development stage but should greatly improve consistency in administration and assure a higher level of compliance throughout the Division.

- **Coordination with Well Users Associations**

Ground Water Operations provides on-going assistance to the Well Users Associations as well as to individual Well Owners/Users. Occasionally, special assistance is provided to coordinate operations and data.

In 2005, CWPDA, the largest well users associations in the Arkansas River Basin, agreed to modify monthly reporting to be more consistent with Division 2 Ground Water Data Management System. This process continued through 2006 with Ground Water Operations providing additional tools for CWPDA to compare its independent data system to that of the Ground Water Data Management System (GWDMS).

- **“Ground Water 101” – June 19, 2006**

Early in the 2006 Plan Year, Ground Water Operations identified the need for more formal training for the staffs of the well users associations (particularly AGUA, CWPDA and LAWMA the largest of these groups). Collectively, the memberships of those three constitute 98% of the Wells in Rule 14 (Pre-1986) Plans. CWPDA alone has over half of the wells in these types of Plans.

In June, Division 2 staff presented “Ground Water 101” to the office staff of AGUA, CWPDA and LAWMA. The program addressed: the history of water law and ground water use in the Arkansas River Basin, monthly usage data collection and analysis, monthly stream depletion determination and replacement, submittal requirements and review process.

Submitted by Christine Lytle

Ground Water Data Management System (GWDMS)

The 2004 Annual Report details the need in Division 2 for a Ground Water Data Management System (GWDMS) and the process by which the current system was developed. Recognizing the limitations of the GWDMS, Division 2 Ground Water Operations Group and the Division’s Information Technology Professional began work in 2003 to document the current system and to identify a process to design a new system. At that time, the system was predominantly a series of Microsoft Access applications and it was envisioned that the new system would also be written in Microsoft Access.

Various issues and obstacles prevented completion of the redesign and by late 2005 it was determined that the redesign needed an infusion of new resources and energy. A request was made to the IT Staff in Denver to provide assistance.

In 2006, the IT Staff in Denver agreed to take on the design of a new Ground Water Data Management System (GWDMS) as an expansion of Hydrobase. The verbal agreement to accept the project was made in early 2006 and an initial meeting to discuss the scope of work took place in March 2006. At that time, it was expected that a new system could be completed, including beta-testing by the end of the 2006 calendar year. However, due to the IT workload and other issues, database development did not commence for several months.

One of the issues that delayed commencement of the design is that, like many staff activities, a formal submittal and approval process now exists for the development of any new IT products. This process includes training for the IT Sponsor and development of a Project Charter. The Project Charter must be approved by all sponsors and must include a statement of work that is mutually satisfactory to all parties.

As the Project Charter for the GWDMS Project was developed, it was acknowledged that the system needed to accommodate more than the current activities within Division 2's Ground Water Operations. The needs of Division 3 became integrated into the scope of work and the likelihood that other Divisions would have a need to use the same system was also recognized. In July of 2006, the Project Charter was developed and distributed to Divisions 2 and 3 for review. At a meeting the following month, the Charter was revised and accepted by the sponsors and other team members.

Several meetings, both group and individual, took place later that month and through the balance of 2006 Calendar Year as the IT Database Designer, Scott Neale, collected information to define the current tasks and activities of Ground Water Operations.

At this point, design of key components is well underway. The process has been greatly delayed by the need to complete other projects, to provide immediate products to facilitate implementation of the Measurement Rules in Division 3 and by the scale of the project. The current GWDMS is vast, both in complexity and in volume of data. Recently Division 2 has initiated operational policies that can be expected to require further expansion of the GWDMS.

Coordination With and Support for Division 3 Ground Water Measurement Program

In 2004, coordination between the Water Divisions that already had or expected to have Measurement Rule program in the near future began with the "Ground Water Well Measurement and Regulation Seminar" hosted by Division 2. At that time, Divisions 1 and 3 were expecting to have Measurement Rules in place within a short period of time. Various members of Division 2 and the USGS presented several topics derived from studies and experiences in the Arkansas River Basin.

Participants included staff from Divisions 1 and 3 and from the State Engineers Office

Topics included:

- Overview of Division 2 Rules and of Ground Water Operations
- Overview of Processes including:
 - Data Management System
 - Coordination with other entities (utilities, well users associations, etc.)
 - Types of information collected

- Technical Aspects of Measurement
 - USGS Briefing on TFM/PCC Methods
 - Types of Measurement Methods, standards, etc.)
 - Accuracy standards and accepted tolerances
- Compliance & Enforcement

For the over a year, little coordination or communication between the Divisions took place. Division 1 and some of the Designated Basins adopted Division 2's forms, with modifications to meet their own needs. Division 1 did not develop a final Well Measurement Program and Division 3 was in the process of developing Measurement Rules for that Basin.

The next effort towards inter-Divisional coordination came in early 2006 when the IT Staff in Denver agreed to take on the design of a new Ground Water Data Management System within the Hydrobase framework. This new system would build from the work done in Division 2 and would accommodate other Divisions as they adopted and implement Well Measurement Programs. (See "GWDMS" above)

By 2006, Division 2 had well-over ten-years of experience with Measurement Rules: development, implementation, inspections, enforcement and all other aspects of a Well Measurement Program. Therefore, Ground Water Operations became the de facto expert in developing programs in other Water Divisions.

Throughout 2006, Division 2 provided education, training and assistance to Division 3. Division 2 also provided standard test forms, public information documents and presentations and extensive "face time" to Division 3 Staff to allow them to benefit from the work already done in the Arkansas River Basin and carry that work into the Rio Grande Basin. The time involvement for Ground Water Operations staff was significant at times but was well worth the effort to assure consistency throughout the Division of Water Resources. (See "Well Tester Recertification/Certification" and "GWDMS" above)

As more areas of Colorado adopt Well Measurement Programs, either informally or formally, it becomes evermore critical that the coordination effort of the last few years grows beyond coordination to collaboration and that an organizational structure be established to guide the development of existing and new programs to assure consistency and to minimize redundancy. As the coordination endeavor now stands, Divisions 2 and 3 are already deviating from the original standards in certain practices. The GWDMS project is an excellent effort toward consistency in managing data but it does not address implementation policies.

Specific areas of mutual concern include:

- Assuring adequate qualified Well Meter Testers throughout Colorado through
 - A standardized training program,
 - Continuing education and recertification,
 - Maintaining a database of testers, including current contact information and
 - Establishing a central repository of all related training and contact information that is available to all parties needing to know who is certified to do what and where.

- Maintaining a central file of all policies related to Well Measurement, especially
 - Testing methodologies,
 - Meter standards,
 - Allowable variances and
 - Test equipment certification.
- Regularly scheduled discussions between the staff members responsible for implementing and administering Well Measurement Programs throughout the State so that:
 - Experiences can be shared and new programs avoid the pitfalls that other programs have already overcome and
 - Solutions to widespread problems and concerns can be dealt with by a larger group with more and more varied information towards solutions.

Strategy to Deal with Apparent Deficits

DWR staff and special counsel continued to work with Kansas throughout 2006 to resolve outstanding issues in settlement of the Kansas v Colorado lawsuit (see “Developments in Kansas vs. Colorado”). One of the most significant outstanding issues is the sufficiency of stateline deliveries for 1997 to 2005. A great deal of progress was made in 2006 but a final determination has not yet been realized.

The first ten-year compliance cycle ends with Calendar Year (CY) 2006. The modeling of 2006 pumping and depletions will take place in early CY 2007. At that time, a final determination of the sufficiency of deliveries may be possible. If so, another major issue can be resolved.

- Coordination with Pueblo, Conservancy Districts and Well Associations

For the past two years, preliminary runs of the HI Model have shown that cumulative deliveries to the Stateline have not been sufficient. Division 2 initiated a program with the Lower Arkansas Water Conservancy District (LAVWCD) and the Pueblo Board of Water Works (PBWW) to provide water to the stateline to reduce the deficit with a goal of having a plus balance by the end of the first compliance cycle.

The program has involved the LAVWCD purchasing fully consumable water from the PBWW at a manageable cost. In turn, the LAVWCD was reimbursed by the State of Colorado through the Drought Emergency Impact Assistance Grant Program. The Well Users Associations all agree to the use of this water to repay their portion of the deficit. The Division routes the water an account in John Martin Reservoir for delivery to Kansas.

- Meetings with Associations: LAWMA, CWPDA & AGUA

In 2006, Division staff met with the largest of the well user associations subject to the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado (Amended Use Rules) to discuss the status of state line deliveries and the negotiations taking place with Kansas at that time. Each Well User Association was reminded that the Division had assisted in developing the program with LAVWCD and PBWW to repay the estimated deficit for the first ten-year compliance cycle and that after that first compliance cycle it will be the responsibility of the Well User Associations themselves to make arrangements for any repayments identified by the HI Model.

- **Review of Presumptive Depletion Factors**
Although the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado (Amended Use Rules) allow the annual review of the presumptive depletion factors (PDFs) also contained in the Amended Use Rules, there has been no practical method to evaluate the information on an annual basis.

In 2004, a major effort was undertaken to compare ditch deliveries to well use. It was determined that the PDF for supplemental irrigation (i.e. both surface water and ground water are used) was not reflective of actual conditions. Because deliveries to irrigation ditches were unusually low, the proportionate share of ground water used was much more than the assumed 50% or less stated in the Amended Use Rules.

With the 2005 Plan Year, a Depletion Factor of 0.3900 was adopted for supplemental wells, a 30% increase over the 0.3000 stated in the Amended Use Rules. With use of that higher value, the cumulative balance at the stateline has improved enough that the new value was also used for the 2006 Plan Year.

There are no plans at this time to reevaluate either the PDFs or the modification discussed above. There are efforts to bring together all relevant data that describes the proportionate values of surface water and ground water sources. This information could then be used to evaluate PDFs on a more frequent basis.

Submitted by Christine Lytle

Arkansas River Compact

Developments in Kansas vs. Colorado

In a letter dated January 20, 2006, Special Master Arthur Littleworth wrote that it had been his intent to complete the decree by the end of 2005, but for obvious and valid reasons that was not possible. Additional unforeseen delays including health issues that befell the Master and his involvement in a major federal case, not to mention an inability of the states to reach agreement on a number of issues, all contributed to an incomplete decree at the end of 2006.

Early in January 2006, the Special Master issued an order in which he wrote: "...having chosen a compliance system that allows pumping to continue so long as adequate replacement water is provided, Colorado has a continuing obligation to provide make-up water, in the right amounts and at the right times. No one doubts the good faith of the Colorado officials or counsel who have appeared before this Court, but there needs to be a judicial order that assures continued and proper implementation of the replacement water approach... It is my conclusion, therefore, that the Decree should include injunctive relief."

During January through March, the states attempted to reach agreement on HI model results for the 1997-2004 period. Changes were made to the model to implement agreements between the states and the arbitrator's decision concerning representation of the Graham ditch, but encountered a problem when the Kansas recalibration altered the previous results dramatically.

The Kansas and Colorado recalibrations of the model produced similar results, except for the year 1997 for which Kansas shows a depletion to usable Stateline flows of about 10,000 acre-feet instead of a small accretion.

On April 25, 2006 the Colorado State Engineer and the Kansas Chief Engineer reached agreement regarding a limitation on the accumulation of credits that might otherwise exceed 3,000 acre-feet per year if certain “special waters” are included in the HI model without such limitations.

A status conference was held on May 1, 2006, in which resulted in a scheduling order. Among the most significant deadlines were a requirement for the states to submit stipulated costs or identify issues regarding such costs for determination by the Court by May 23, 2006; the states were to submit the proposed Judgment and Decree, or alternatively, briefs on such issues for determination by the Court on or before June 16, 2006. Colorado paid Kansas \$1,109,946.73 for costs on June 29, 2006. Colorado’s June 23, 2006 Response to Kansas’ Brief on Decree Issues noted that Kansas listed 22 issues of disagreement.

In a letter dated September 8, 2006 the Master indicated that he was working on “non-Appendix Decree issues” and that he would be issuing a single order on these matters. An order deciding some, but not all such issues was received on January 29, 2007 which directed appropriate revisions be made to the next draft Judgment and Decree and to incorporate any agreements reached in the interim. Two particularly significant rulings are included in this order: First; “The compact protects Kansas from all Colorado post-compact pumping (in excess of 15,000 acre feet per year) that would deplete usable Stateline flows.” Thus, the effect of the Court’s ruling goes beyond Kansas’ initial complaint which was limited to pumping for irrigation uses. Secondly, the scope of the Court’s retained jurisdiction should “...retain the authority to examine the sufficiency of the Use Rules over time, as well as their implementation.”

The Master’s determination concerning the appropriate calibration of the H I model will likely determine whether Colorado was able to achieve compliance for the first ten year compliance period (1997-2006). Agreements have been reached concerning how depletions should be represented for the 2000-2005 period, the appropriate observed diversion data input to be used and a needed correction of transmountain diversion data. When all of these details are properly taken into account and combined with input data for 2005 and 2006, Colorado’s preliminary estimate for the first compliance period shows a net accretion to usable stateline flows of 7,303 acre feet, whereas the Kansas estimate shows a net depletion of about 2,000 acre feet.

Special Engineering Committee

The Arkansas River Compact Administration (ARCA) created a Special Engineering Committee by means of Resolution No. 2005-1 and directed the committee to develop recommendations to ARCA which will reduce or eliminate disputes between the States, including those that have been identified in a Special Report of the Operations Secretary dated December 8, 2003. The Special Engineering Committee, which consisted of Colorado State Engineer, Hal Simpson, Kansas Chief Engineer David Pope and ARCA members Rod Kuharich and David Brenn met on three occasions during 2006 (June 27 & 28, 2006; August 28-30, 2006; October 18 & 19, 2006). The Committee reached agreement on four recommendations and proposed corresponding

resolutions to be considered and acted upon by ARCA on December 12, 2006. These included; 1) an agreement to resolve that evaporation from the Permanent Pool should be charged on a pro-rata basis by content, 2) an agreement that created two sub-accounts for the proper handling of water stored in John Martin Reservoir under pursuant to Section III of the 1980 Operating Resolution and resolved the issue of timely distribution of storage charge water, 3) an agreement clarifying procedures for transferring water from Conservation Storage into Section II accounts in certain circumstances, and 4) an agreement confirming the past practice of limiting spills from Section II accounts to the content in those accounts at the inception of spills. The Colorado State Engineer and the Kansas Chief Engineer also reached agreement on a procedure for crediting deliver of releases of Kansas Section II account water from John Martin Reservoir.

Recognition of Improvements to Irrigation Efficiency as a Potential Compact Issue

Among the objectives of the Division for 2006 was to open a dialogue concerning potential regulation of practices to improve irrigation efficiencies as may be necessary to prevent future violations of Article IV D of the Arkansas River Compact. This effort began with a meeting between State Engineer, Hal Simpson, and the NRCS State Conservationist, Alan Green along with their respective staff members on January 23, 2006 in order to inform them of the possibility that federal EQUIP programs which subsidize the cost of irrigation systems in the name of water conservation and water quality may work at cross purposes with the provisions of federal law in the case of the Arkansas River Compact. A second meeting was held on July 28, 2006. Additionally, the issue was introduced in several public forums during the course of the year including the Southeastern Colorado Water Conservancy District meeting on February 16, 2006, special purpose outreach meetings held in Lamar, Colorado on April 4, 2006 and May 4, 2006 and the Arkansas Basin Roundtable meeting held on August 9, 2006.

The particular challenge associated with this issue is that the general public is predisposed to think of efficiency as an absolute virtue. The thought of “doing more with the same or less” is rarely, if ever questioned. Therefore, when asked to consider that an improved irrigation efficiency in conjunction with a constant diversion and corresponding reduction of return flows might have equal potential for injury to other water users as would be caused by a change of use, most people will only reluctantly agree. Acceptance is made even more difficult by the fact that current water law in Colorado, except for the Arkansas River Compact, does not seem to recognize this potential for injury. Since the law doesn’t recognize the issue there is no universally established procedure to deal with it, however, the Arkansas Ground Water Use Rules do provide for adjustment of presumptive depletion factors corresponding to different irrigation application methods that have the effect of require more replacement water for diversions applied by more efficient methods.

But the adoption of more efficient irrigation methods is not confined to only those instances where ground water is the source of supply. In an investigation completed in May 2006 based on interpretation of 2005 aerial photographs and supplemented by field observations, Division 2 staff found that of the 187 sprinkler systems identified east of Pueblo, 75 systems irrigating 8,445 acres relied upon surface water for some portion of the water supply. While this represents less than 4% of the surface water irrigated acreage at the present time, there is evidence that simulations of relatively small increases of irrigation efficiency represented in the HI model can produce results indicating significant increases to depletions in usable Stateline flow.

Consequently, efforts have begun to draft rules that might be promulgated pursuant to compact authority following additional public input to address this concern. Because it is acknowledged that there are significant benefits that may be realized through improving irrigation efficiencies, including labor savings and salinity management which can result in greater crop yields without increased consumption or reduced return flows, the challenge before us is to how to properly regulate the practice while also advocating for it within appropriate limits.

Submitted by Steve Witte

Trinidad 10-Year Review

The initial meeting for the 10-Year Review of the Trinidad Dam and Reservoir Project Operating Principles was held in Trinidad on October 5, 2005. The period of review will span the years 1995 through 2004. A technical meeting was conducted on February 22, 2006 for the purpose of reviewing the purpose and process to be followed, to examine the details of the proposed issues and to prioritize data collection efforts. On April 27, 2006 the United States Bureau of Reclamation issued a letter preliminarily identifying the issues that will be considered. No other public meetings were held in 2006, however, it is anticipated that there will be additional time commitments related to this review in 2007.

Submitted by Steve Witte

Legal and Litigation

2000 Abandonment List Status (01CW157)

Although a goal for 2006 was to obtain a final decree for the Division Two Revised Abandonment list, this list has still not yet been decreed. Fourteen protest cases involving fourteen water rights were originally filed during 2002. During 2006 the final four of these protest cases have been closed. The results of these fourteen protest cases were that three of these rights remain on the revised abandonment list, two partially remain, and the other nine rights have been removed via their associated protest cases. Of these nine removed rights, ultimately four were abandoned in their protest cases, one partially abandoned, and the remaining four not abandoned.

All final exhibits and a draft final decree have been prepared and plans were to file this material in March 2007. In February of 2007 however a new protest case has been filed motioning the court to remove from the revised abandonment list portions of two rights already abandoned during 2006 as a result of one of the original 2002 protest cases. This new action is being taken by a new protestor and not any of the original entities from 2002. This new protest motion will most likely delay the filing of the proposed final abandonment decree.

Submitted by Steve Kastner

Division Two Water Court Activity

One hundred and twenty nine individual applications were filed with the court during 2006. This was an increase of twenty two cases from 2005. A summary of the types of claims being made can be found on page 59. Written consultations are made to the

court for all new applications and as appropriate for amended applications. The Division Engineers Office participates in the majority of referee hearings including the participation of water commissioners when appropriate. There has been a noticeable decrease in the number of these hearings however over the last several years. No particular reason is specifically known for this decrease. The scheduling of hearings now seems to be mostly used as a tactic to force opposers to take some type of action. The Division Engineers Office did not participate in any trials during the year. Disclosures of Expert Testimony (26(a)(2) filings were made in two cases however prior to stipulated settlements.

Cases of Interest

Empire Lodge Homeowners Association (97CW083)

After several years in the 1990s of operating under a substitute water supply plan (SWSP) to exchange leased water from the Arkansas River up Empire Creek to fill and maintain two recreational lakes and a related court action concerning the authority of the State Engineer to authorize SWSPs, the Empire Lodge Homeowners Association (Empire) applied in 1997 for new junior storage rights, an exchange and a plan for augmentation designed to allow Empire to continue this exchange practice. One intervening water right exists in this intervening reach, the Empire Creek Ditch (Moyers). The State and Division Engineers reached a stipulated settlement with Empire prior to trial. Empire was not able to reach an agreement with Moyers however. A trial was held in November and December of 2005 with the court denying the application entirely in May 2006. The Water Court has since denied a motion to reconsider this ruling but has granted the parties time to reach a settlement on an acceptable decree.

Lower Arkansas Water Management Association (LAWMA 02CW181)

In December the State and Division Engineers stipulated to a proposed decree with LAWMA. An unopposed proposed decree is now in front of the court. This case involves changes from irrigation use to augmentation use of several large water rights decreed to large canals below or near John Martin Reservoir. An associated plan for augmentation will allow post 1985 depletions resultant of LAWMA's members out of priority diversions to be augmented using these changed irrigation rights and also using "Article II Storage Account" compact water stored in John Martin Reservoir. This case is the first large change case to be pursued as a result of the State Engineers 1996 rules governing the use of non-exempt tributary wells in the Arkansas Basin.

Chaffee County (04CW129) & City of Pueblo (01CW160) RICD Rights

Two Recreational In Channel Diversion (RICD) rights were decreed in Water Division Two during 2006. These two cases have been the only such cases filed in the division to date.

The City of Pueblo RICD right is a conditional right for a reach of the Arkansas River extending from approximately the 4th Street Bridge downstream to the Moffat Street USGS stream gage location. The stream reach is located within the City of Pueblo and is approximately 1.5 miles in length and containing nine boating drop structures. The right is decreed for year round use and includes differing flow rates for eleven periods of the year ranging from 100 cfs up to 500 cfs and additionally includes alternate reduced flow rates for dry year conditions. The right additionally can not be exercised from 10:00 pm through 06:00 am. The administrative

significance of this right will be minimal except against future rights for exchange through this reach.

The Chaffee County RICD right relates to boating parks on the Arkansas River within the Town of Buena Vista and the City of the Salida. The right more specifically involves two point structures with the City of Salida and one existing and three proposed point structures with the Town of Buena Vista. This right is specifically limited to these six points and does not involve the stream reaches between the points. The right is decreed for year round use with flow rates for the majority of the year being 250 cfs but peaking at 1,800 cfs for a brief period. The right also consists of alternative lower flow rates for dry year exchange recovery conditions and a limited subordination for future exchanges. This decree was designed to correspond to the existing voluntary flow program on the Arkansas River so that its administrative significance will be minimal except against future exchanges during the May and June period.

Droz Creek Reservoir (01CW001 & 01CW114)

Applicant Tom Smith applied for a 120 acre-foot absolute storage right for a recently constructed reservoir located on Droz Creek within the South Arkansas River drainage near Poncha Springs. A small right of exchange from Twin Lakes Reservoir was also requested. The right of exchange was designed to essentially be an augmentation supply to offset out of priority evaporation losses.

Following construction, the reservoir was filled out of priority using leased consumable waters. The significance of the case was the State and Division Engineers motion for a determination of question of law on whether an absolute storage right should be granted when the reservoir was actually filled by an exchange. The court agreed with the State's motion in determining an absolute water right can only be created through the appropriation and use of unappropriated waters. This decision should substantiate the State Engineers parallel opinion that conditional water rights can also not be made absolute through augmentation.

Submitted by Steve Kastner

Safety of Dams

Mike Graber and Bill McCormick divide the Division 2 Dam Safety work load geographically; Bill having dam safety responsibilities for the northern portion of Division 2 (and also the southern portions of Division 1), while Mike has responsibilities for the southern portion of Division 2.

The primary objective for the water year 2005-2006 was to complete all scheduled dam safety evaluations and determine the safe storage level for each dam evaluated. All Class 1 (High Hazard) and all scheduled Class 2 (Significant Hazard) dams in Division 2 were inspected this year. A similar number of Class 3 (Low Hazard) dams were also inspected. The table shown below summarizes the Division 2 Dam Safety Program activities.

**Dam Safety Engineer's
2005-2006 Summary**

**Dam Safety Engineers: Mike Graber & Bill
McCormick
Division: 2**

**From: Nov 2005
To: Oct 2006**

Activity	Dam Hazard Classification					Total
	Class 1	Class 2	Class 3	Class 4	Other	
Inspections/Site Visits						
Dam Safety	30	23	28	3	0	84
Interim Dam Safety	0	11	4	0	0	15
Construction	11	15	4	1	0	31
Follow-up	9	5	7	0	0	21
Outlet Works	1	0	0	0	0	1
Federal Dams (non-FERC)	0	0	1	0	0	1
FERC Dams	1	0	2	0	0	3
Other	1	0	1	0	0	2
Reviews						
Hydrologic Studies	0	2	0	0	0	2
Design (new/enlarge)	0	0	1	2	0	3
Design (repair/modification)	2	3	0	0	0	5
NJ Dam Applications	0	0	1	5	0	6
Monitoring Reports	16	6	0	0	0	22
Monitoring Data Evaluations	16	1	0	0	0	17
EPP's (new and updated)	13	6	0	0	0	19
Final Construction Acceptance	1	2	0	0	0	3
Other	2	2	2	0	0	6
Hazard Classification Evaluation	0	1	0	0	0	1

As is shown on the table above, the Division 2 dam safety engineers performed engineering reviews of designs, plans and specifications for several dam rehabilitation and improvements projects this year. Project's included; (1) Canon Watershed Detention Dam C-4 in Canon City. This important flood control dam received major dam safety improvements and construction was completed and approved in May 2006. This timing enabling the dam to be ready for the summer monsoon season; (2) Plans and specification for



Keeton Dam - Spillway Construction 2006

outlet rehabilitation and other dam safety improvements were reviewed and approved for North Fork Dam located in Chaffee County (Water District 11). Construction started late in the summer and was largely complete before construction was suspended due to snow at this high altitude site; (3) At Keeton Dam work began to allow removal of a reservoir restriction that had been in place for nearly 10 years. Improvements to the emergency spillway, outlet and dam crest were approved with construction beginning in Mid October.

This year, with the support of the Division Engineer, dam safety engineers initiated a dialog with storm water managers from the City of Pueblo, Pueblo West and Pueblo County, as well as the City of Colorado Springs and El Paso County. Two meetings were held, one in Pueblo and one in Colorado Springs. The intent of this activity was to establish communication between the storm water management, water rights management, and dam safety communities in these areas. The discussions at the meetings helped each group understand the others roles and responsibilities with regard to overall surface water management practices. It is hoped that this discussion has opened communication between the groups so that potentially conflicting goals of the groups can be resolved without impacting any group's objectives.

Starting around July 4, 2006 several Division 2 watersheds were affected by intense periods of rainfall. In the Little Fountain Creek drainage a sustained period of heavy rain resulted in Keeton Dam reservoir filling well above the restricted level and spilling through damaged spillways. On July 6, 2006, a dam safety Emergency Level 2 situation was initiated with the El Paso County Sheriff and Office of Emergency Management, and City of Fountain (dam owner) being notified of a potentially hazardous situation. The dam owner also notified residents in the low lying areas below the dam of the potential for increased flooding. The spillways withstood the stream flows and the emergency level 2 alert was lifted on July 20, 2006 without damage to downstream property.



Gillett Reservoir Dam - September 2006

On September 1, 2006, the dam safety engineers were notified of a "sunny day" flooding event that had occurred on August 18, 2006. In Water District 12, a dam had apparently failed and caused minor flash flooding of a short section of State Highway 67 north of Cripple Creek. A dam safety investigation revealed that the breach of the previously failed Gillett Reservoir Dam had been illegally filled. The extended period of rain in July and August likely caused the fill material plugging the breach to fail. A report detailing the findings was generated and distributed to the

dam owner, CDOT and State Engineer. Orders from the State Engineer instructing the dam owner to maintain the dam in the breached condition were issued.

An emphasis of dam safety engineers for 2007 will be in the use of the new risk based profiling tool to evaluate the condition of each high and significant hazard dam. This information will be used to focus efforts on those dams that are at highest risk of unsafe operation or failure. Use of this tool may move the dam safety evaluation and inspection program from the currently deterministic one towards a more probabilistic based program. It is hoped that the use of the risk based profiling tool results will also allow the dam safety engineers to better utilize limited resources.

The Denver office of the dam safety branch, working with an outside consultant completed work in 2006 on an Extreme Precipitation Analysis Tool (EPAT). The EPAT tool will allow the Division dam safety engineers to perform analysis of Probably Maximum Precipitation (PMP) events at dams with drainage basins above 7500 feet in elevation. The EPAT tool is currently only available for dams west of the continental divide. Once available for dams east of the continental divide, Division 2 dam safety engineers will be able to utilize the EPAT tool, in conjunction with runoff models, to evaluate the adequacy of spillways at Division 2 dams with drainage basins above 7500 feet in elevation.

Submitted by Mike Graber & Bill McCormick

Hydrography

Assistant Division Engineer, Bill Tyner, PE III, provided overall program leadership of the Division 2 Hydrographic Program during water year 2006. He was supported by Lead Hydrographer, Brian Boughton, PE I; Hydrographic Engineer, Lou Schultz, EIT; and Hydrographic Technicians, Anthony Gutierrez and Adam Adame. Brian Boughton was promoted to a PEII position in Division 7 and left Division 2 on 7 August, 2006. The Lead Hydrographer position remained vacant for the remainder of the water year. Mark Perry became the Division 2 Lead Hydrographer on December 11, 2006. Bill Tyner provided overall coordination of the records preparation and review schedule for DWR.

Each of the Division 2 hydrographers continued their assigned work with specific gaging stations and geographic areas. Routine work includes responsibility for regular streamflow measurements, gaging station operation and maintenance, satellite monitoring equipment operation and maintenance and the complete development and computation of streamflow records for specific gaging stations. Lou Schultz is responsible for gaging stations in WD 11. Tony Gutierrez is primarily responsible for gages in WD's 10, 12, 14, 15, 16, 79, 18 and 19, with assistance from Brian Boughton (now Mark Perry). Tom Ley is responsible for gages in WD 13 and provided support for WD's 11, 12, 14, 15, 16 and 79. Adam Adame is responsible for WD's 17 and 67. Additionally, hydrographers respond to requests of water commissioners for water measurement assistance in their respective districts.

Streamflow Records and Measurements

Division 2 hydrographic staff will complete 48 streamflow records for WY2006 for publication in the DWR Annual Streamflow report. Seven of these streamflow records are also published by the US Geological Survey in their Annual Water Resources for Colorado Data Report.

During WY2006, Division 2 hydrographers made 517 discharge measurements at stream gages and 46 discharge measurements on canals and diversion structures. In addition, Hydros made numerous visits to reservoirs and to 7 Coagmet weather stations.

Stream Gage Improvements

During the water year, Division 2 hydrographers completed the following stream gage projects:

Stream Gage Refurbishment

- Amity Canal: New shelter was installed to replace a dilapidated old shelter in April 2006.
- Arkansas River at Catlin Canal: Cableway A-frames were painted and new platforms were installed in May 2006.
- Arkansas River at La Junta: New orifice line was run to replace failed EMT line in March/April 2006. New line is pipe conduit with expansion joints and has performed well since then.
- Arkansas River below Pueblo Dam: Did major repair work to satellite equipment, including replacing solar panel, antenna, wiring and battery.
- Highline Canal: New satellite equipment and shelter installed on or around March/April 2006.
- Homestake Tunnel: Colorado Springs Utilities installed a new footbridge around October/November 2006.
- Muddy Creek near Toonerville: Gage was installed and brought on-line in WY2005. In WY2006 (Feb. 2006), an embankment was constructed (by others) downstream of DWR gage, which affected the flow regime at our gage. Hydro staff coordinated to have the dam removed.
- Purgatoire River at Nine Mile Canal: Installed a new orifice line and muffler in July 2006.
- Rain gages, paid for by National Weather Service, were installed at numerous DWR stream gages.

New Stream Gages

- Abobe Reservoir: Gage installed at dam in May 2006 and brought on to Satellite Monitoring System. Gage was relocated in November 2006 so that dead pool storage could be monitored. Approximately 2000-ft orifice line was laid.
- Adobe Creek Outflow: Installed satellite equipment and brought on to Satellite Monitoring System in February 2006. An improved rating was developed for the existing concrete control.
- Cascade Creek: Satellite equipment installed and Data Collection Platform (DCP) replaced. Gage brought on-line in Satellite Monitoring System in November 2006. Satellite equipment was pulled and reinstalled at another location in May 2006.
- Fort Bent Aug Station: Flume, stilling well, shaft encoder and satellite equipment installed. Gage was brought on to Satellite Monitoring System in September 2006.
- Gageby Creek: New gage installed to measure discharge from Fort Lyon Canal into Gageby Creek. Sheetpile weir, stilling well, shaft encoder and satellite equipment were installed in April 2006.
- Holbrook Aug Station: A Parshsall flume and measuring equipment were installed around April 2006.

- Lake Creek above Twin Lakes: Major construction was performed including new concrete control, metal footbridge, stairs and railing, and measuring and satellite equipment.
- Minnequa Canal: Satellite monitoring equipment installed in September 2006, and gage brought on to Satellite Monitoring System in October 2006.
- Rule Creek: New gage installed in April 2006 with Division of Wildlife as cooperator. Gage consists of Sutron Accububbler with Satlink radio. Gage was brought on to Satellite Monitoring System in June 2006.
- Skaguay Reservoir: New gage installed in December 2005. New water level monitoring equipment, satellite equipment and shelter were installed to monitor reservoir stage. Gage was brought on to the Satellite Monitoring System on or around February 2006.

High Data Rate DCPs

- Two gaging stations in Division 2 were upgraded with SatLink DCPs and high data rate GOES radio transmitters (300 baud rate, hourly transmissions). These gages are now updated hourly on the DWR real-time streamflow web site.
- The upgrades at all of these sites required installation of SDI shaft encoders and upgraded grounding equipment.

Other activities conducted by Division 2 hydrographic staff during WY2006 include:

- On July 5-6 2006, a major rainfall-runoff event on the Arkansas River above Pueblo Dam swamped the shaft encoder and chart recorder at the Portland gage. Estimated peak discharge was 15,900 cfs. Division 2 Hydro staff cleaned-up debris, replaced the shaft encoder and chart recorder, ran levels, etc. The flood peak was estimated to occur at 00:00 on July 6. Hydro staff had the gage back on-line by 13:30 the same day. After the flood, Division 2 and Denver Hydro staff did channel surveys and a HEC-RAS analysis to model the event and extend the rating curve.
- A set of measurements were performed by Division 2 Hydro staff to verify the rating at Highline Canal's 15-ft Parshall flume. As a result of extensive analysis by Division 2, a private consultant, and the Bureau of Reclamation, a new rating was developed for the flume by Division Hydro staff.
- A theoretical rating curve was developed for the new Rule Creek gaging station. Division 2 and Denver Hydro staff surveyed channel sections and developed a HEC-RAS model.
- Continued routine coordination of stream and reservoir gaging activities with the USGS Pueblo Subdistrict office, the US Bureau of Reclamation, and the US Army Corps of Engineers and other State and federal agencies during WY2006.
- Participation in lysimeter construction at the CSU Rocky Ford Experiment station.
- Operation and maintenance of CoAgMet weather stations.
- NOAA provided rain gage sensors to Division 2, which Hydro staff installed and operate at numerous gages.



Submitted by Mark Perry

Information Technology

Arkansas River Accounting System (ARAS)

The ARAS project continued to be a high priority item in 2006. The intent of the ARAS project was to automate the data collection, processing and reporting of river operations data from external and internal reporters. The ARAS team contacted numerous entities to provide data electronically to the DWR FTP site on a daily basis. These reporters included Albuquerque Corp of Engineers for John Martin Reservoir and Trinidad Reservoir accounting, Fountain Valley Authority (FVA) and the US Bureau of Reclamation for Pueblo Reservoir. The Pueblo Board of Water Works was also contacted and their automation procedures are currently being designed. The Division 2 water commissioners for districts 12, 67, 19 and 17 were provided with a spreadsheet that would allow them daily data entry and transmission for data that is necessary for the publishing of the Arkansas Daily Report.

An additional requirement of the ARAS system was to publish the Arkansas Daily Report earlier in the morning (before 10 am) and on weekends to help irrigators set their gates appropriately. These requirements were gathered from the Arkansas Valley Ditch Association members. To satisfy these requirements, a script is launched twice each morning, once at 8 am and once at 9:45 am that gathers all data currently available from the FTP site, populates essential databases and then publishes the Arkansas Daily Report to the web. Estimates for stream flow and reservoir elevations are used in cases where actual values are not available. The river operations personnel then review and finalize the Arkansas Daily Report by checking the automated values and providing any missing data for the report.

In the fall, the emphasis for the ARAS project changed directions away from the Arkansas River to the Fountain Creek. A new Fountain Transit Loss model was being prepared by the USGS which now included entities above the Nevada Street stations. These new entities were mandated that they would need to start reporting daily discharges from their waste water treatment facilities, especially water that would be used for augmentation by buyers downstream. Division 2 personnel introduced these entities to the ARAS project and agreed to help them to prepare spreadsheets that would collect their information daily and transmit it to the DWR FTP site for retrieval by the District 10 water commissioner. Ultimately, these discharges and transit losses would be reported to the Division 2 augmentation coordinator to insure that depletions to the river were being made up by the waste water treatment facility discharges.

Submitted by Vivian Beal

Organization/Personnel/Workload Issues

Personnel

2006 brought some changes to Division 2 relating to our staffing. We had some employees make career changes which resulted in losing them as employees in our division. Doug Montgomery (Deputy Water Commissioner in Water District 17) resigned on April 27, 2006 to take a position with City of Lamar. Brian Boughton (Lead Hydrographer) accepted a position in Division 7 as a career advancement opportunity, effective August 18, 2006. Danny Marques (Water Commissioner in Water District 19) retired on December 31, 2006 from DWR

after 34 years of service. On a happier note, we were able to hire some new staff members during the year. Jeanette Bryan joined our staff on June 1, 2006 as the newest member of our Groundwater Team. Lonnie Spady was hired as the new Water District 17 Deputy Water Commissioner on June 26, 2006 and Mark Perry began his employment with us on December 11, 2006 as our new Lead Hydrographer. Ina Bernard's responsibility changed from Groundwater Technician to GIS Technician when she returned from maternity leave and asked to become a permanent part-time employee instead of a full time employee. We had several people work for the groundwater group as temporary employees during the year. These people were Aron Jones, Cody Long, Drew Pritchard, and Russ Dash. As a division we were able to promote several employees during the year. These promotions were approved for Wendy Bogard (Program Assistant I to PA II), Mike Reed (Engineering/Physical Science Assistant I to EPSA II) and Audrey Sartin (Engineering/Physical Science Technician I to EPST II). With sadness we report the deaths of three former employees. Bill Howland (Compact Administration) passed away on March 11, 2006, Tony Pantano (Deputy Water Commissioner in Water District 19) passed away August 12, 2006 and Walt Clotworthy (Deputy Water Commissioner in Water District 11) passed away on October 10, 2006. See Organization Chart in the Appendices, page 65.

Budget

The operating budget had the potential to be impacted by the cost of vehicles. Although Fleet Management had the opportunity to pass on increased fuel costs our actual variable cost per mile generally decreased for our division. This may have resulted from of us receiving seven new vehicles and the overall cost for upkeep on the fleet of vehicles assigned to the agency decreased. The reimbursement rate for private miles increased June 1, 2006 which was a welcome increase for those employees using their own vehicle to perform the duties of their job. We received two supplement budget allocations to offset those higher costs. With careful planning we were able to use some of our budget to replace computers for Don Taylor, Ina Bernard, Joe Flory, Kim Pulis, Jeanette Bryan and Monique Morey. We also developed an Internet Reimbursement policy early in 2006 and began reimbursing field staff for their high speed internet expenses. To date those employees who signed the policy to participate are Doug Brgoch, Ray Garcia, Gary Hanks, Dave Jones, Charlie Judge, Jerry Livengood, Jeff Montoya, Bruce Smith and John Van Oort.

We saw a slight increase to the overtime budget for Division 2 (which had been significantly reduced in the previous fiscal year). This slight increase allowed managers the opportunity to better allocate dollars to work groups for additional compensation at busy times during the year. However, we were still unable to significantly increase work time for our permanent part-time employees to extend their time after their normal season ended through a conversion of some of our overtime funds into additional straight-time hours.

Training

The opportunities for training this year were more individualized or group oriented rather than being geared toward the entire staff. However, there were two general In-house training sessions in the early part of the year. They were computer training (by Tim

Farris) and PERA presentations in February and DWR web-based tools discussion (by Phil DeArcos and Scott Neale) in April 2006. We had two sessions specific to water commissioners in January and December. They addressed enforcement/diversion records/Hydrobase/efficiency improvement inventory project in January and diversion records/Hydrobase/administration of augmentation and substitute water supply plans in December (see detailed report in next paragraph). Our groundwater group participated in a Conjunctive Administration discussion with Imogene Fullager (an Australian PhD candidate) in November. Individuals or small groups were involved in other educational situations. These included Defensive Driving, LexisNexis, Swift Water Responder, Leadership seminar, GIS seminar, Hydrology course, Colorado Water Officials annual meeting, and the annual Hydrographer, Program Assistant and Dam Safety Engineers training/meetings. The highlight of the year was the Independence Pass Transmountain Diversion System tour in September which provided a fun learning experience for 22 staff members. A report of this tour was published in the December 2006 Streamlines which can be accessed at <http://www.water.state.co.us/pubs/streamlines/streamlinesDec06.pdf>.

Submitted by Wendy Bogard

Augmentation Administration Training (December 15, 2006)

Senior water right holders have long suspected that despite assurances from engineers, attorneys, the court and the bureaucrats, that in terms of the wet version of water, new junior appropriations of water meant that their interests would suffer injury.

On December 15, 2006, Division 2 hosted a training session with augmentation plan administration and diversion record development for those plans as the subject.

Initially conceived as a how-to workshop on augmentation diversion record coding, it became apparent that there was first a need to make a fundamental shift in the way Division 2 staff regarded augmentation plans. Historically, administration of plans for augmentation was seen as a very low priority by water commissioners, who regarded them as too complex, too time-consuming, involving too small amounts of water to be of significance, and probably just not much fun to administer to boot.

Steve Witte frankly laid it on the line that going forward, administration of ALL decrees and especially plans for augmentation is a very high priority for Division 2, and that in his eyes, administration has not occurred until the operations are properly captured in the annual diversion records. He presented a listing by District of the number of plans for augmentation and Substitute Water Supply Plans to bring home the point that individual plans may *not* involve large volumes of water, but cumulatively, they do. He likened an un-administered plan of augmentation effectively to a “state issued license to steal” that he was not willing to accept as the practice of Division of Water Resources. Steve’s stance is that it is of the utmost importance to allay the suspicions of senior water rights holders regarding the effectiveness of augmentation plans, and to do so, Division 2 must not only diligently administer all plans, but must also find ways to record and report plan operations in a manner that clearly demonstrates that injury did not occur.

As a means to reach this goal, Bill Richie, Decreed Plan Coordinator, and Kalsoum Abbasi, Augmentation Coordinator (all plans other than those decreed – Ark Rules & Regulation Plans

and Substitute Water Supply Plans) presented a recently developed concept of Plans for Administration as more fully described on page 9.

In attempting to devise meaningful coding schema for reporting augmentation plan operations in the annual diversion records, it was discovered (or re-discovered) that current coding options in HydroBase do not offer a means to accurately describe these operations. Originally developed for use under DOS-driven dBase-powered WISP/WISPR programs, the SFUT ([S]ource, [F]rom, [U]se, [T]ype coding combinations currently available were apparently last revised/defined circa 1988 and are outdated, too limited and in dire need of revamping, improvement and overall better definition.

In conversations with Doug Stenzel, Denver IT, and Les Dalby⁷ from Division 1, it became very apparent that each Division has it's own unique operational situations to be described on the data input side, as well as vastly differing end-user data reporting needs that will need to be addressed in revamping/adding to SFUT. Each Division has of necessity resorted to a bastardization of the existing codes in an attempt to describe operations, with the predictable result that data describing similar operations take widely divergent formats between Divisions, and sometimes even between Districts within a Division.

Joe Flory presented Division 2 personnel with augmentation coding examples within the current system that while not adequate, and not necessarily consistent with Division 1, at least provided a means to report some augmentation operations as consistently across District lines as possible with the idea of being able to globally modify the data as more options are hopefully developed and implemented by the HydroBase steering committee.

The focus of the training program may be changing as the leadership of the division recognizes specific technological skills they want individuals or work groups to be educated in. Time will tell how this change is implemented.

Submitted by Joe Flory

Pay for Performance

Again this year there was no funding for the Pay for Performance program. Even though employees did receive approximately a 2% salary adjustment increase (the actual increase was based on job class categories and minimum ranges for those classes) and additional State contribution towards health and dental benefits, employees and supervisors are still quite disappointed in the Pay for Performance program.

Submitted by Wendy Bogard

Development of a Geographical Information System (Innovative Administration Processes)

By utilizing GIS technology Division 2 personnel have developed several applications that have advanced the administrative capabilities of our office significantly in the past decade and it is becoming more apparent that we are just scratching the surface of what is possible. The power of organizing information geographically is in the broad inclusiveness of

⁷ A special note of thanks from Division 2 to these two gentlemen for their patient assistance over the years with Hydrobase, tabulation and diversion record issues

location as a common attribute and in the ability to represent and communicate complex spatial and conceptual relationships by visual means.

Our initial involvement was due to a need to improve on assumptions made in relation to irrigated acreage used in modeling efforts that are to be used in determining past and future compliance with the Arkansas River Compact. This need coupled with the initiative of several personnel, in particular Bill Tyner and Ina Bernard, led to the acquisition of the skills, software, and data that proved sufficiently convincing to cause special Master Arthur Littleworth to determine in October 2003, that Colorado's irrigated acreage study shall be used in the H-I model. From that point forward, we are now committed to maintain a program. ArcGIS software has been used effectively for managing this complex data set and ERDAS Imagine software has been used to analyze spectral signatures from satellite images in order to determine irrigation status and crop types.

Additional applications have evolved to include documentation of dry-up acreage as a means of justification for consumptive use credit that may be utilized in temporary and permanent changes of water rights and plans for augmentation. Mapping with precise, easily recorded and reproducible coordinate descriptions made possible with GPS devices and especially when combined with digital photo-documentation provides a vastly superior and credible means of verifying to anyone the integrity of our administration in comparison to former attempts with field monuments and fuzzy Polaroid snapshots. GIS technology and access to imagery has enabled certain ad hoc investigations such as the investigation of the number and acreage irrigated by improved efficiency systems described in the Compact section of this report and enabled more credible analysis and description of certain enforcement actions. For example, ArcGIS software has been used with digital aerial photography to determine pond surface areas and monitor approval conditions for gravel mining operations and storage water rights.

Lower cost software such as Delorme's XMap has been demonstrated to have impressive capabilities to relate a variety of information pertaining to any point of interest on the earth surface: structure information, water rights information, pictures, real-time stream flow data, etc. In a business where information is power and timeliness is critical, harnessing the potential of effectively organizing and displaying information is an extremely appealing prospect and the Delorme software has made distribution of GIS information affordable for Water Commissioners and Ground Water Commissioners and other Division 2 staff.

In an attempt to capitalize on current personnel assets and to take advantage of future opportunities, we have attempted to reorganize and refocus on the fundamentals of acquiring good GPS data. Ina Bernard, a half time employee is teamed with Jeanette Bryan who is tasked with, in addition to other duties, assuming a lead role in demonstrating, developing, and promoting applications of Delorme software among other staff members and facilitating the capture and processing of GPS location data as needed. As a team, data-naming conventions and attribute identification for GPS collected data, as well as download and quality control procedures were developed and delivered to all field staff through training events. If other work groups outside of Division 2 have an interest in taking advantage of these efforts, we invite their inquiries.

Most of the non-exempt wells in Division 2 have location data established by GPS and many of the surface structures do as well. Additional work to GPS the remaining structures is planned to be accomplished in the near future. Additional work to relate the location data for structures to additional attributes related to each structure will enhance future administration of water rights in Division 2. The potential of advanced Delorme software versions including XMap 5.0 Editor and Enterprise will be evaluated.

Submitted by Steve Witte

Agency Meetings

The staff of Division 2 are involved in a variety of agency meetings. These include the Program Assistants' annual meeting, the Dam Safety Engineers' annual meeting, the Hydrographers' annual meeting, and two State Engineer's meetings. Also, Steve Witte attended the scheduled Leadership Team meetings either in person or by teleconference. Division 2 did not have a Spring Meeting and the Fall Meeting was held October 10, 2006. Several Division 2 employees (and families) took part in the State Engineer's picnic in Canon City at the Royal Gorge on Saturday, July 8. Steve Witte, Wendy Bogard, Brian Boughton, Steve Kastner, Ina Bernard, Tony Gutierrez, Janet Kuzmiak, Janet Dash, Bruce Smith and Bill Tyner enjoyed the opportunity to visit with other DWR employees from around the state.

Employee Recognition

John Van Oort was selected as our Water Commissioner of the Year award at the Fall Staff Meeting. John is the water commissioner in Water Districts 14 & 15. Hal Simpson and Steve Witte presented John with the Water Commissioner of the Year plaque and CWOA trip plus the traditional Division 2 "Water Commissioner of the Year" jacket. Hal Simpson received an honorary Water Commissioner of the Year jacket as well. Wendy Bogard was selected as the State's Support Staff of the Year and received her award in March 2006 at the State Engineer's Spring meeting.



Submitted by Wendy Bogard

Employee Council

The Employee council survey was distributed at the 2005 Fall meeting as well as by email prior to the meeting. It had a number of questions allowing for essay type comments from participants. This made the tabulation of results very time consuming. Consequently, the results of the survey were not available until later than normal. The results were graphically represented and available on the Outlook public folder titled "Employee Council" by May 2006. The essay comments were available in this folder just prior to the 2006 Fall meeting. Division 2's participation dropped from that in the previous year. There was a 40% response to the survey in 2005 as compared to 76% participation in 2004. The concerns addressed in 2005 included a need for improved communication at all levels as well as lack of advancement opportunities. The 2006 survey was distributed at the Fall 2006 meeting and it was also distributed by email to staff in Division 2.

Colorado Water Officials Association

The Colorado Water Officials annual meeting was September 27-29, 2006 and hosted by Division 6. It was held in Steamboat Springs and three employees were able to attend (Joe Flory, Janet Kuzmiak and Bruce Smith). The conference included the Water Rodeo which continued the competitions between DWR employees and included new teaching events and speakers. Everyone enjoyed the conference as well as the beautiful weather and location. Next year's conference will be held in or around Durango.

Submitted by Bruce Smith

Involvement in the Water Community

In addition to attending meetings of the five water conservancy districts held within the Arkansas River basin each month, and meetings with various water users associations Division 2 personnel were provided with a number of different opportunities to address wider audiences on a number of water related topics. Steve Witte delivered a speech on the key provisions of the Winter Storage Program to those who attended the Southeastern Colorado Water Conservancy District's Second Annual Water Users Meeting, held March 9, 2006. Additionally, Steve was asked to address the participants in the Southeastern District's Lower Arkansas Tour held on June 6th, which afforded an opportunity to describe water administration practices and the prospective uses of information to be derived from the weighing lysimeter installed at the Colorado State University Research Station at Rocky Ford. (A description of this project was included in last year's report.) On July 18th, Steve and several staff members were invited to attend a meeting of the Arkansas Valley Ditch Association for the purpose of discussing ways in which the venerable old "Arkansas Daily Report" might be made to provide more useful information and on a timely basis to meet the changing needs of water managers within the Division. Background and results of this meeting were summarized in an article published in the winter 2006 issue of *Streamlines*. On August 9th, Steve addressed the Arkansas Basin Roundtable on the subjects of Water Administration in the Arkansas Basin and Salvage. Steve Witte and Bill Tyner made presentations at the State Engineer's Forum on September 9th on Water Use Efficiency Concerns in the Arkansas River Basin and Administration of Wells in the Arkansas Basin, respectively. Steve also made "Water 101" presentations at a meeting of Action 22 held on October 13th and a Water Education Seminar sponsored by the Upper Arkansas Water Conservancy District on November 30th. Finally, numerous Division 2 personnel helped staff the Division of Water Resources booth during the Colorado State Fair held August 26 through September 3, 2006.

Submitted by Steve Witte

OBJECTIVES FOR 2007

Personnel Issues

Once again, top among our priorities in Division 2 is to recruit and retain a highly competent and motivated work force. A particular emphasis must be to continue to improve communications among all levels within the Division. Effective communication promotes clarity and alignment of purpose; it often involves diplomacy and sometimes discipline, but generally makes for greater job satisfaction to know that one's efforts are appreciated by others. Significant progress was made in this area within the past year and is continuing to occur. Never the less, more improvements can and will be made.

One of the challenges of the coming year undoubtedly will be to facilitate the changes that will occur under the administration of a different State Engineer, following the prospective retirement of Hal Simpson in May 2007. During his 15 year tenure, Hal changed the culture of the organization and enjoyed a high level of credibility statewide. This benefited the entire organization. It will be our duty to support his successor and do all within our power to make the next State Engineer as successful as the last.

At present several key positions, including the lead water commissioner position for the Purgatoire River and the reservoir accounting position for Pueblo, John Martin and Trinidad Reservoirs. Making good hiring decisions is a force multiplier. Both of these positions report directly to Joe Flory, River Operations Coordinator, who fully appreciates the importance associated with finding the best possible prospects to fill these jobs and is doing a superb job in recruiting. We continue to be frustrated in the extreme by the time requirements needed to complete personnel actions of any kind. It makes it more difficult to attract promising job candidates when their first experience with state government validates every negative stereotype they have ever heard. Additional, even extraordinary efforts need to be made to try to improve this process for the welfare of the agency.

A decision item proposal should be considered to address the increased workload in the Grape Creek and Texas Creek drainages (Water District 13) as recognized by the local water users.

It is our intention to strive to improve the skills and job related knowledge of our employees through training in the areas identified by supervisors, to a greater extent than in the past, and areas self-identified by employees.

Water Administration

Specific water administration objectives to be undertaken in addition to routine priority distribution for each water district are listed below, however, a description of some of these efforts that have previously been initiated may appear in greater detail elsewhere in this report.

- WD 10 Implement the new Fountain Transit Loss Model into daily water distribution and monthly well depletion augmentation activities.

- WD 11 Promote construction of a new South Arkansas gauge to facilitate proper administration of transmountain diversions and exchanges.
- WD 12 Facilitate discussions regarding appropriate administration of the Beaver Creek drainage in light of various subordination agreements, ambiguous water court decrees and the relative difficulty of access to structures.
- WD 13 Continue having water users improve their measurement and control structures. Refine augmentation administration procedures.
- WD 14/15 Institute administrative accounting and regulation of Lake Minnequa.
- WD 16 Continue to make existing plans for augmentations operate as approved and motivate pending plans to be completed.
- WD 17 Implement continuous diversion record development for mainstem ditches for WD 14-67. Work with Fort Lyon Canal Company regarding remaining improvements to control and measurement structures as well as accounting procedures.
- WD 18 Prompt the town of Aguilar to begin dry-up of acreage corresponding to currently pending court case in order to achieve at least seasonal replacement of out of priority depletions.
- WD 19 Continue efforts to establish a more effective means of appropriately accounting for and controlling Model Reservoir operations. Improve structures used to administer delivery of return flow as required by decrees changing Model and Johns Flood Ditches. Reconcile Trinidad Reservoir accounting reports, to the extent possible.
- WD 67 Monitor efforts to comply with order issued for improved measurement and control structures to the Buffalo Canal. Perform reconnaissance concerning need for additional measurement and control structures for the Amity and Buffalo Canals.
- WD 79 Inventory ditches in need of improved measurement and control structures and initiate actions to secure them.

The procedure of holding monthly meetings with staff to review the status of administrative orders that have been issued and situations that have been brought to our attention and that may require such orders to be issued in the future has proven effective in terms of promoting accountability and bringing closure to these cases. For these reasons we intend to continue holding these “Orders Committee” meetings. In an attempt to build on this success, the idea of developing plans of administration for augmentation plans which will also be reviewed at monthly meetings, has been conceived. Additional emphasis will be placed on improving data capture, recording, and review of all aspects of administration of plans for augmentation. This represents a continuing effort to institute meaningful administration of these plans.

As we move from the era of interstate compact litigation, it will remain extremely important to maintain vigilance in our efforts to maintain compact compliance. Thus we will need to conduct the reviews and compile the tabulations and summaries of replacement plans as described in Rules 4.3 and 16 of the Amended Ground Water Use Rules and develop the capability of using the HI model in a predictive mode as steps toward development of a compliance strategy.

Finally, we are very optimistic concerning the potential to become more effective in performing our administrative responsibilities by using geographical information systems. Additional planning efforts will be undertaken to better define our future objectives and develop our capabilities.

Improve Information Systems

Transition all previously compiled data and data processing functions related to administration of the Arkansas Ground Water Measurement and Use Rules to a redesigned Ground Water Data System that is currently under development by Scott Neale.

Complete the data collection coordination phases of the Arkansas River Accounting System and begin planning for additional aspects to include various types of additional reports to meet various needs, such as a monthly augmentation availability report or a possible interface with the Hydrobase editor, etc. As it is currently conceived, this effort may help provide inspiration for applications that may ultimately become incorporated into a future Arkansas River decision support system.

Special Projects

Participate in continued negotiations with Kansas in an effort to resolve issues pertaining to the conduct of operations pursuant to the 1980 Operating Resolution for John Martin Reservoir through the Special Engineering Committee authorized by the Arkansas River Compact Administration in December 2005 and reauthorized in December 2006.

Support the investigation of transit losses between John Martin Reservoir and the Colorado-Kansas Stateline being conducted by Mr. Russell Livingston for the Arkansas River Compact Administration.

In the event that a final decree is entered in Kansas v. Colorado, implement the conditions of the decree.

Continue development of Rules to regulate improvements to irrigation structures that increase the efficiency of surface water irrigation systems in a manner that might reduce return flows and thereby result in a violation of Article IV D. of the Arkansas River Compact.

Strive to bring about improvements to the data recording schema utilized by the Hydrobase system to ensure adequate description of diversion practices and water right actions through participation in the Hydrobase Steering Committee.

Reduce the current backlog of consultation reports concerning water right applications filed with the water court.

Expand the current network of satellite monitored gauging stations to include the ditches within the Purgatoire River Water Conservancy District, as well as the Ft. Bent and Hyde Ditches in Water District 67.

Participate in the ongoing ten year review of the Trinidad Project conducted by the United States Bureau of Reclamation.

Use Risk based profiling results to re-establish appropriate dam inspection frequency.

Water Administration Data Summaries

Transmountain Diversion Summary

WY 2006 TRANSMOUNTAIN DIVERSION SUMMARY - INFLOWS

RECIPIENT					SOURCE	
DIV/WD	DIVERSION STRUCTURE	STREAM	ACRE-FEET	DAYS	DIV/WD	STREAM
2/11	COLUMBINE DITCH	ARKANSAS RIVER	1,940	106	5/37	EAGLE RIVER
2/11	EWING DITCH	TENNESSEE CREEK	963	115	5/37	EAGLE RIVER
2/11	WURTZ DITCH	TENNESSEE CREEK	2,920	111	5/37	EAGLE RIVER
2/11	HOMESTAKE TUNNEL	LAKE FORK CREEK	32,490	63	5/37	EAGLE RIVER
2/11	BOUSTEAD TUNNEL	LAKE FORK CREEK	62,340	365	5/38	FRYINGPAN RIVER
2/11	BUSK-IVANHOE TUNNEL	LAKE FORK CREEK	4,830	365	5/38	FRYINGPAN RIVER
2/11	TWIN LAKES TUNNEL	LAKE CREEK	54,670	365	5/38	ROARING FORK RIVER
2/11	LARKSPUR DITCH	PONCHA CREEK	221	141	4/28	TOMICHI CREEK
2/79	HUDSON DITCH	HUERFANO RIVER	126	73	3/35	MEDANO CREEK
2/79	MEDANO DITCH	HUERFANO RIVER	264	73	3/35	MEDANO CREEK
2/10	BLUE RIVER PIPELINE	FOUNTAIN CREEK	10,121	292	5/36	BLUE RIVER
	TOTAL:		170,885			

WY 2006 TRANSMOUNTAIN DIVERSION SUMMARY - OUTFLOWS

RECIPIENT					SOURCE	
DIV/WD	DIVERSION STRUCTURE	STREAM	ACRE-FEET	DAYS	DIV/WD	STREAM
5/36&37	STEVENS-LEITER WELL (AKA ARKANSAS WELL)	BLUE/EAGLE RIVERS	161	365	2/11	GROUNDWATER
	TOTAL:		161			

Water Diversion Summary Use Type by Water District

IRRIGATION YEAR 2006
(reported in ACRE-FEET)

USE TYPE	WD10	WD11	WD12	WD13	WD14	WD15	WD16	WD17	WD18	WD19	WD86	WD67	WD79	TOTAL
IRRIGATION	32,317	140,665	144,517	22,388	110,367	5,850	7,474	434,634	3,673	28,971	80	160,503	12,849	1,104,288
STORAGE	10,222	428,487	2,097	1,508	145,033	111	3,223	74,411	0	13,609	0	48,902	1410	729,013
MUNICIPAL	98,216	27,560	9,837	400	35,280	1,986	3,918	6,904	32	1,658	0	946	0	186,737
COMMERCIAL	175	360	47	26	304	7	16	241	0	4	0	1,518	0	2,697
DOMESTIC	39	78	79	0	19	82	25	1	0	0	0	0	15	340
STOCK	9	0	0	0	0	2	0	1	0	752	0	0	0	764
INDUSTRIAL	114	54	54,113	0	21	4,085	0	0	0	0	0	0	0	58,387
RECREATIONAL	0	0	468	0	0	0	0	0	0	0	0	0	0	468
FISHERY	0	0	0	0	0	0	0	831	0	0	0	0	0	831
AUGMENTATION	20,836	192	264	781	709	374	184	36,933	0	0	0	27,705	0	87,978
RECHARGE	0	0	0	0	0	0	0	0	0	0	0	2,872	0	2,872
OTHER	539	2980	0	0	766	0	0	0	0	0	0	0	0	4,285
	162,467	600,376	211,422	25,103	292,499	12,497	14,840	553,955	3,705	44,994	80	242,446	14,274	2,178,659

Water Diversion Summary Various Statistics by Water District

WD	STRUCTURES WITH RECORD			NO INFO AVAILABLE	STRUCTURE OBSERVATIONS	ESTIMATED TOTAL (AF)	DIVERSIONS			
	WITH RECORD	NO WATER AVAILABLE	NO WATER TAKEN				SURFACE (AF)	GROUNDWATER (AF)	TO STORAGE (AF)	TO IRRIGATION (AF)
10	470	2	678	48	16311	184392	167275	6895	10222	32,317
11	340	19	169	36	2927	608069	178601	981	428487	140665
12	162	47	112	112	8114	219526	216162	1267	2097	144517
13	203	171	246	54	719	24430	22614	308	1508	22388
14	381	10	585	8	4634	333623	176253	12337	145033	110367
15	136	6	172	17	2883	12027	11538	378	111	5850
16	105	72	90	0	2569	18381	15085	73	3223	7474
17	526	29	782	4	5084	621466	509948	37107	74411	434634
18	31	4	51	0	192	3832	3702	130	0	3673
19	116	110	69	5	1138	45111	31444	58	13609	28971
66	1	2	9	3	0	80	80	0	0	80
67	467	13	721	29	2723	262871	172764	41205	48902	160503
79	164	104	50	3	688	14278	14258	20	1410	12849
TOTAL	3102	589	3734	319	47982	2348086	1519724	100759	729013	1104287.77

Arkansas River Calls

River Call Date	Arkansas River Call	Priority Date
01-Nov-05	FORT LYON	03/01/1887
02-Nov-05	FORT LYON	03/01/1887
03-Nov-05	FORT LYON	03/01/1887
04-Nov-05	FORT LYON	03/01/1887
05-Nov-05	FORT LYON	03/01/1887
06-Nov-05	FORT LYON	03/01/1887
07-Nov-05	FORT LYON	03/01/1887
08-Nov-05	FORT LYON	03/01/1887
09-Nov-05	FORT LYON	03/01/1887
10-Nov-05	FORT LYON	03/01/1887
11-Nov-05	FORT LYON	03/01/1887
12-Nov-05	FORT LYON	03/01/1887
13-Nov-05	FORT LYON	03/01/1887
14-Nov-05	FORT LYON	03/01/1887
15-Nov-05	WINTER WATER	03/01/1910
16-Nov-05	WINTER WATER	03/01/1910
17-Nov-05	WINTER WATER	03/01/1910
18-Nov-05	WINTER WATER	03/01/1910
19-Nov-05	WINTER WATER	03/01/1910
20-Nov-05	WINTER WATER	03/01/1910
21-Nov-05	WINTER WATER	03/01/1910
22-Nov-05	WINTER WATER	03/01/1910
23-Nov-05	WINTER WATER	03/01/1910
24-Nov-05	WINTER WATER	03/01/1910
25-Nov-05	WINTER WATER	03/01/1910
26-Nov-05	WINTER WATER	03/01/1910
27-Nov-05	WINTER WATER	03/01/1910
28-Nov-05	WINTER WATER	03/01/1910
29-Nov-05	WINTER WATER	03/01/1910
30-Nov-05	WINTER WATER	03/01/1910
01-Dec-05	WINTER WATER	03/01/1910
02-Dec-05	WINTER WATER	03/01/1910
03-Dec-05	WINTER WATER	03/01/1910
04-Dec-05	WINTER WATER	03/01/1910
05-Dec-05	WINTER WATER	03/01/1910
06-Dec-05	WINTER WATER	03/01/1910
07-Dec-05	WINTER WATER	03/01/1910
08-Dec-05	WINTER WATER	03/01/1910
09-Dec-05	WINTER WATER	03/01/1910
10-Dec-05	WINTER WATER	03/01/1910
11-Dec-05	WINTER WATER	03/01/1910
12-Dec-05	WINTER WATER	03/01/1910

13-Dec-05	WINTER WATER	03/01/1910
14-Dec-05	WINTER WATER	03/01/1910
15-Dec-05	WINTER WATER	03/01/1910
16-Dec-05	WINTER WATER	03/01/1910
17-Dec-05	WINTER WATER	03/01/1910
18-Dec-05	WINTER WATER	03/01/1910
19-Dec-05	WINTER WATER	03/01/1910
20-Dec-05	WINTER WATER	03/01/1910
21-Dec-05	WINTER WATER	03/01/1910
22-Dec-05	WINTER WATER	03/01/1910
23-Dec-05	WINTER WATER	03/01/1910
24-Dec-05	WINTER WATER	03/01/1910
25-Dec-05	WINTER WATER	03/01/1910
26-Dec-05	WINTER WATER	03/01/1910
27-Dec-05	WINTER WATER	03/01/1910
28-Dec-05	WINTER WATER	03/01/1910
29-Dec-05	WINTER WATER	03/01/1910
30-Dec-05	WINTER WATER	03/01/1910
31-Dec-05	WINTER WATER	03/01/1910
01-Jan-06	WINTER WATER	03/01/1910
02-Jan-06	WINTER WATER	03/01/1910
03-Jan-06	WINTER WATER	03/01/1910
04-Jan-06	WINTER WATER	03/01/1910
05-Jan-06	WINTER WATER	03/01/1910
06-Jan-06	WINTER WATER	03/01/1910
07-Jan-06	WINTER WATER	03/01/1910
08-Jan-06	WINTER WATER	03/01/1910
09-Jan-06	WINTER WATER	03/01/1910
10-Jan-06	WINTER WATER	03/01/1910
11-Jan-06	WINTER WATER	03/01/1910
12-Jan-06	WINTER WATER	03/01/1910
13-Jan-06	WINTER WATER	03/01/1910
14-Jan-06	WINTER WATER	03/01/1910
15-Jan-06	WINTER WATER	03/01/1910
16-Jan-06	WINTER WATER	03/01/1910
17-Jan-06	WINTER WATER	03/01/1910
18-Jan-06	WINTER WATER	03/01/1910
19-Jan-06	WINTER WATER	03/01/1910
20-Jan-06	WINTER WATER	03/01/1910
21-Jan-06	WINTER WATER	03/01/1910
22-Jan-06	WINTER WATER	03/01/1910
23-Jan-06	WINTER WATER	03/01/1910
24-Jan-06	WINTER WATER	03/01/1910
25-Jan-06	WINTER WATER	03/01/1910
26-Jan-06	WINTER WATER	03/01/1910
27-Jan-06	WINTER WATER	03/01/1910

28-Jan-06	WINTER WATER	03/01/1910
29-Jan-06	WINTER WATER	03/01/1910
30-Jan-06	WINTER WATER	03/01/1910
31-Jan-06	WINTER WATER	03/01/1910
01-Feb-06	WINTER WATER	03/01/1910
02-Feb-06	WINTER WATER	03/01/1910
03-Feb-06	WINTER WATER	03/01/1910
04-Feb-06	WINTER WATER	03/01/1910
05-Feb-06	WINTER WATER	03/01/1910
06-Feb-06	WINTER WATER	03/01/1910
07-Feb-06	WINTER WATER	03/01/1910
08-Feb-06	WINTER WATER	03/01/1910
09-Feb-06	WINTER WATER	03/01/1910
10-Feb-06	WINTER WATER	03/01/1910
11-Feb-06	WINTER WATER	03/01/1910
12-Feb-06	WINTER WATER	03/01/1910
13-Feb-06	WINTER WATER	03/01/1910
14-Feb-06	WINTER WATER	03/01/1910
15-Feb-06	WINTER WATER	03/01/1910
16-Feb-06	WINTER WATER	03/01/1910
17-Feb-06	WINTER WATER	03/01/1910
18-Feb-06	WINTER WATER	03/01/1910
19-Feb-06	WINTER WATER	03/01/1910
20-Feb-06	WINTER WATER	03/01/1910
21-Feb-06	WINTER WATER	03/01/1910
22-Feb-06	WINTER WATER	03/01/1910
23-Feb-06	WINTER WATER	03/01/1910
24-Feb-06	WINTER WATER	03/01/1910
25-Feb-06	WINTER WATER	03/01/1910
26-Feb-06	WINTER WATER	03/01/1910
27-Feb-06	WINTER WATER	03/01/1910
28-Feb-06	WINTER WATER	03/01/1910
01-Mar-06	WINTER WATER	03/01/1910
02-Mar-06	WINTER WATER	03/01/1910
03-Mar-06	WINTER WATER	03/01/1910
04-Mar-06	WINTER WATER	03/01/1910
05-Mar-06	WINTER WATER	03/01/1910
06-Mar-06	WINTER WATER	03/01/1910
07-Mar-06	WINTER WATER	03/01/1910
08-Mar-06	WINTER WATER	03/01/1910
09-Mar-06	WINTER WATER	03/01/1910
10-Mar-06	WINTER WATER	03/01/1910
11-Mar-06	WINTER WATER	03/01/1910
12-Mar-06	WINTER WATER	03/01/1910
13-Mar-06	WINTER WATER	03/01/1910
14-Mar-06	WINTER WATER	03/01/1910

15-Mar-06	FORT LYON	04/15/1884
16-Mar-06	CATLIN	12/03/1884
17-Mar-06	CATLIN	12/03/1884
18-Mar-06	CATLIN	12/03/1884
19-Mar-06	CATLIN	12/03/1884
20-Mar-06	CATLIN	12/03/1884
21-Mar-06	CATLIN	12/03/1884
22-Mar-06	OXFORD	02/26/1887
23-Mar-06	OXFORD	02/26/1887
24-Mar-06	FORT LYON	03/01/1887
25-Mar-06	CATLIN	12/03/1884
26-Mar-06	CATLIN	12/03/1884
27-Mar-06	CATLIN	12/03/1884
28-Mar-06	CATLIN	12/03/1884
29-Mar-06	CATLIN	12/03/1884
30-Mar-06	CATLIN	12/03/1884
31-Mar-06	CATLIN	12/03/1884
01-Apr-06	CATLIN	12/03/1884
02-Apr-06	CATLIN	12/03/1884
03-Apr-06	CATLIN	12/03/1884
04-Apr-06	CATLIN	12/03/1884
05-Apr-06	CATLIN	12/03/1884
06-Apr-06	CATLIN	12/03/1884
07-Apr-06	CATLIN	12/03/1884
08-Apr-06	SPLIT CALL FORT LYON/CONSOLIDATED	04/15/1884; 12/03/1884
09-Apr-06	SPLIT CALL FORT LYON/CONSOLIDATED	04/15/1884; 12/03/1884
10-Apr-06	SPLIT CALL FORT LYON/CONSOLIDATED	04/15/1884; 12/03/1884
11-Apr-06	SPLIT CALL FORT LYON/CONSOLIDATED	04/15/1884; 12/03/1884
12-Apr-06	SPLIT CALL BESSEMER/FORT LYON/CONSOLIDATED	05/04/1881; 04/15/1884; 12/03/1884
13-Apr-06	SPLIT CALL BESSEMER/FORT LYON/CONSOLIDATED	05/04/1881; 04/15/1884; 12/03/1884
14-Apr-06	SPLIT CALL FORT LYON/CONSOLIDATED	04/15/1884; 12/03/1884
15-Apr-06	SPLIT CALL FORT LYON/CONSOLIDATED	04/15/1884; 12/03/1884
16-Apr-06	ROCKY FORD HIGHLINE	03/07/1884
17-Apr-06	ROCKY FORD HIGHLINE	03/07/1884
18-Apr-06	ROCKY FORD HIGHLINE	03/07/1884
19-Apr-06	ROCKY FORD HIGHLINE	03/07/1884
20-Apr-06	ROCKY FORD HIGHLINE	03/07/1884
21-Apr-06	FORT LYON	04/15/1884
22-Apr-06	FORT LYON	04/15/1884
23-Apr-06	FORT LYON	04/15/1884

24-Apr-06	FORT LYON	04/15/1884
25-Apr-06	FORT LYON	04/15/1884
26-Apr-06	HIGHLINE	03/07/1884
27-Apr-06	HIGHLINE	03/07/1884
28-Apr-06	HIGHLINE	03/07/1884
29-Apr-06	FORT LYON	04/15/1884
30-Apr-06	FORT LYON	04/15/1884
01-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
02-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
03-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
04-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
05-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
06-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
07-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
08-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
09-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
10-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
11-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
12-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
13-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
14-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
15-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
16-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
17-May-06	CATLIN/LAS ANIMAS CONSOLIDATED	12/03/1884
18-May-06	ROCKY FORD HIGHLINE	03/11/1886
19-May-06	LAMAR	11/04/1886
20-May-06	LAMAR	11/04/1886
21-May-06	OXFORD/LAMAR	02/26/1887; 11/04/1886
22-May-06	OXFORD/FORT LYON/LAMAR	02/26/1887; 03/01/1887; 11/04/1886
23-May-06	OXFORD/FORT LYON/LAMAR	02/26/1887; 03/01/1887; 11/04/1886
24-May-06	FORT LYON	03/01/1887
25-May-06	FORT LYON	03/01/1887
26-May-06	BESSEMER/EXCELSIOR/COLLIER	05/01/1887
27-May-06	CATLIN	11/14/1887
28-May-06	BESSEMER/EXCELSIOR/COLLIER	05/01/1887
29-May-06	BESSEMER/EXCELSIOR/COLLIER	05/01/1887
30-May-06	BESSEMER/EXCELSIOR/COLLIER	05/01/1887
31-May-06	FORT LYON	03/01/1887
01-Jun-06	LAS ANIMAS CONSOLIDATED	03/13/1888
02-Jun-06	FORT LYON	03/01/1887
03-Jun-06	FORT LYON	03/01/1887
04-Jun-06	FORT LYON	03/01/1887
05-Jun-06	FORT LYON	03/01/1887
06-Jun-06	FORT LYON	03/01/1887

07-Jun-06	BESSEMER/EXCELSIOR/COLLIER	05/01/1887
08-Jun-06	HOLBROOK	09/25/1889
09-Jun-06	HIGHLINE/EXCELSIOR	01/06/1890
10-Jun-06	HOLBROOK	09/25/1889
11-Jun-06	HIGHLINE/EXCELSIOR	01/06/1890
12-Jun-06	HOLBROOK	09/25/1889
13-Jun-06	FORT LYON	03/01/1887
14-Jun-06	FORT LYON	03/01/1887
15-Jun-06	FORT LYON	03/01/1887
16-Jun-06	FORT LYON	03/01/1887
17-Jun-06	FORT LYON	03/01/1887
18-Jun-06	FORT LYON	03/01/1887
19-Jun-06	FORT LYON	03/01/1887
20-Jun-06	FORT LYON	03/01/1887
21-Jun-06	FORT LYON	03/01/1887
22-Jun-06	FORT LYON	03/01/1887
23-Jun-06	FORT LYON	03/01/1887
24-Jun-06	AMITY	02/21/1887
25-Jun-06	AMITY	02/21/1887
26-Jun-06	AMITY	02/21/1887
27-Jun-06	AMITY	02/21/1887
28-Jun-06	AMITY	02/21/1887
29-Jun-06	AMITY	02/21/1887
30-Jun-06	AMITY	02/21/1887
01-Jul-06	AMITY	02/21/1887
02-Jul-06	AMITY	02/21/1887
03-Jul-06	AMITY	02/21/1887
04-Jul-06	AMITY	02/21/1887
05-Jul-06	AMITY	02/21/1887
06-Jul-06	SPLIT CALL: BESSEMER/OXFORD/AMITY	05/01/1887; 02/26/1887; 02/21/1887
07-Jul-06	COLORADO CANAL	06/09/1890
08-Jul-06	HOLBROOK RESERVOIR	03/02/1892
09-Jul-06	HOLBROOK RESERVOIR	03/02/1892
10-Jul-06	SPLIT CALL: COLORADO CANAL / FORT LYON	06/09/1890; 03/01/1887
11-Jul-06	SPLIT CALL: BESSEMER/FORT LYON STORAGE	05/01/1887; 01/25/1906
12-Jul-06	SPLIT CALL: BESSEMER/FORT LYON STORAGE	05/01/1887; 01/25/1906
13-Jul-06	SPLIT CALL: BESSEMER/HOLBROOK	05/01/1887; 09/25/1889
14-Jul-06	AMITY	02/21/1887
15-Jul-06	FORT LYON	03/01/1887
16-Jul-06	FORT LYON	03/01/1887
17-Jul-06	AMITY	02/21/1887
18-Jul-06	AMITY	02/21/1887
19-Jul-06	AMITY	02/21/1887

20-Jul-06	AMITY	02/21/1887
21-Jul-06	CATLIN	12/03/1884
22-Jul-06	CATLIN	12/03/1884
23-Jul-06	CATLIN	12/03/1884
24-Jul-06	CATLIN	12/03/1884
25-Jul-06	CATLIN	12/03/1884
26-Jul-06	CATLIN	12/03/1884
27-Jul-06	CATLIN	12/3/1884
28-Jul-06	CATLIN	12/03/1884
29-Jul-06	CATLIN	12/3/1884
30-Jul-06	CATLIN	12/3/1884
31-Jul-06	CATLIN	12/3/1884
01-Aug-06	CATLIN	12/03/1884
02-Aug-06	CATLIN	12/03/1884
03-Aug-06	CATLIN	12/03/1884
04-Aug-06	CATLIN	12/03/1884
05-Aug-06	CATLIN	12/03/1884
06-Aug-06	CATLIN	12/03/1884
07-Aug-06	CATLIN	12/03/1884
08-Aug-06	CATLIN	12/03/1884
09-Aug-06	CATLIN	12/03/1884
10-Aug-06	AMITY	02/21/1887
11-Aug-06	AMITY	02/21/1887
12-Aug-06	CATLIN	12/03/1884
13-Aug-06	CATLIN	12/03/1884
14-Aug-06	ROCKY FORD HIGHLINE	03/11/1886
15-Aug-06	AMITY	02/21/1887
16-Aug-06	AMITY	02/21/1887
17-Aug-06	AMITY	02/21/1887
18-Aug-06	AMITY	02/21/1887
19-Aug-06	BESSEMER/EXCELSIOR	05/01/1887
20-Aug-06	SPLIT CALL: BESSEMER/EXCELSIOR; AMITY	05/01/1887; 04/01/1893
21-Aug-06	FORT LYON	03/01/1887
22-Aug-06	FORT LYON	03/01/1887
23-Aug-06	FORT LYON	03/01/1887
24-Aug-06	AMITY	02/21/1887
25-Aug-06	AMITY	02/21/1887
26-Aug-06	AMITY	02/21/1887
27-Aug-06	AMITY	02/21/1887
28-Aug-06	GREAT PLAINS RESERVOIRS	08/01/1896
29-Aug-06	HIGHLINE	01/06/1890
30-Aug-06	AMITY	02/21/1887
31-Aug-06	AMITY	02/21/1887
01-Sep-06	Amity	2/21/1887
02-Sep-06	FORT LYON	3/1/1887

03-Sep-06	FORT LYON	3/1/1887
04-Sep-06	FORT LYON	3/1/1887
05-Sep-06	Fort Lyon II	3/1/1887
06-Sep-06	AMITY	02/21/1887
07-Sep-06	Amity	2/21/1887
08-Sep-06	Amity	2/21/1887
09-Sep-06	Amity	2/21/1887
10-Sep-06	Amity	2/21/1887
11-Sep-06	Amity	2/21/1887
12-Sep-06	Amity	2/21/1887
13-Sep-06	Amity	2/21/1887
14-Sep-06	Amity	2/21/1887
15-Sep-06	Amity	2/21/1887
16-Sep-06	Amity	2/21/1887
17-Sep-06	Amity	2/21/1887
18-Sep-06	Amity	2/21/1887
19-Sep-06	Amity	2/21/1887
20-Sep-06	AMITY	2/21/1887
21-Sep-06	AMITY	2/21/1887
22-Sep-06	AMITY	2/21/1887
23-Sep-06	AMITY	2/21/1887
24-Sep-06	AMITY	2/21/1887
25-Sep-06	AMITY	2/21/1887
26-Sep-06	AMITY	2/21/1887
27-Sep-06	AMITY	2/21/1887
28-Sep-06	AMITY	2/21/1887
29-Sep-06	AMITY	2/21/1887
30-Sep-06	AMITY	2/21/1887
01-Oct-06	AMITY	2/21/1887
02-Oct-06	AMITY	2/21/1887
03-Oct-06	AMITY	2/21/1887
04-Oct-06	Amity	2/21/1887
05-Oct-06	AMITY	2/21/1887
06-Oct-06	AMITY	2/21/1887
07-Oct-06	AMITY	2/21/1887
08-Oct-06	AMITY	2/21/1887
09-Oct-06	AMITY	2/21/1887
10-Oct-06	AMITY	2/21/1887
11-Oct-06	AMITY	2/21/1887
12-Oct-06	AMITY	2/21/1887
13-Oct-06	Amity	2/21/1887
14-Oct-06	Amity/Oxford	2/21/1887/2/26/1887
15-Oct-06	Amity/Oxford	2/21/1887-2/26/1887
16-Oct-06	Amity/Oxford	2/21/1887-2/26/1887
17-Oct-06	Fort Lyon II	3/1/1887
18-Oct-06	Fort Lyon II	3/1/1887

19-Oct-06	Fort Lyon II	3/1/1887
20-Oct-06	Fort Lyon II	3/1/1887
21-Oct-06	Fort Lyon II	3/1/1887
22-Oct-06	Fort Lyon II	3/1/1887
23-Oct-06	Fort Lyon II	3/1/1887
24-Oct-06	Fort Lyon II	3/1/1887
25-Oct-06	Fort Lyon II	3/1/1887
26-Oct-06	Fort Lyon II	3/1/1887
27-Oct-06	Holbrook	9/25/1889
28-Oct-06	Colorado Canal	6/8/1890
29-Oct-06	Colorado Canal	6/8/1890
30-Oct-06	Colorado Canal	6/8/1890
31-Oct-06	Fort Lyon II	3/1/1887

Water Court Activity

2006 WATER COURT ACTIVITY		
NUMBER OF APPLICATIONS	126	
NUMBER OF DECREES ISSUED	82	
TYPE	TYPES OF APPLICATIONS *	TYPES OF DECREES *
ALTERNATE POINT OF DIVERSION	0	1
AUGMENTATION PLAN	26	23
CHANGE OF EXISTING RIGHT	19	15
COMPLAINT/INJUNCTION	6	0
NEW SURFACE RIGHT	36	23
NEW STORAGE RIGHT	9	5
NEW UNDERGROUND RIGHT	33	17
CONTINUING DILIGENCE/ABSOLUTE	25	18
EXCHANGE	11	5
PROTEST TO ABANDONMENT LIST	0	0
OTHER	41	27
TOTAL	206	134
* SOME APPLICATIONS OR DECREES ARE OF MULTIPLE TYPES		

Appendices

Estimated Calendar Year 2006 Irrigation Water Supply Based on May 1 Indicators

Estimated Calendar Year 2006 Irrigation Water Supply Based on May 1 Indicators													
(Acre-Feet)													
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Bessemer	Highline	Oxford	Otero	Catlin	Holbrook	Fort Lyon	LA Consol	Fort Bent	Amity	Lamar	Hyde	Buffalo
1 Estimated Direct Flow Supplies	56739	63798	25759	7953	88208	29198	201742	29490					
Estimated Storage Supplies													
2 Pueblo Winter Water	6,600	8,862	2,136		9,737	9,696	44,886	2,938					
3 John Martin Article II													
4 Fry-Ark Project Carry Over	0	0	0	0	0	0	0	117					
5 Fry-Ark Project Current Year	2,563	3008	809	671	2,517	2,191	8,574	800					
6 Gross Storage Amount	9,163	11,870	2,945	671	12,254	11,887	53,460	3,855					
7 River Transit Loss Factor	0.0000	0.0752	0.0817	0.0813	0.0977	0.1210	0.1710	0.1290					
8 Net Stored Delivery	9,163	10,977	2,704	616	11,057	10,449	44,318	3,358					
9 Total Ditch Headgate Delivery	65,902	74,775	28,463	8,569	99,265	39,647	246,060	32,848	17,932	85,375	46,222	2,140	22,500
1976-2005 Average													
10 Ditch Headgate Delivery	63,600	93,500	27,700	7,560	89,700	48,800	243,000	29,000	17,300	75,900	44,600	2,140	22,500
11 Ditch Loss Factor	14.1%	29.3%	7.3%	18.4%	10.4%	11.9%	36.7%	8.1%	11.9%	30.5%	9.7%	3.3%	8.9%
12 Ditch Headgate Yield per Share	2.77	29.36	21.46	1.20	4.31	2.69	1.64	47.41	1.31	1.52	1.54	1.38	4.36
Ditch Factors													
13 Total Ditch Company Shares	19,739	2,250	1,196	5,144	18,660	16,000	93,989	562	11,651	34,662	26,127	1,500	4,706
14 Ditch Loss Factor	14.1%	29.3%	7.3%	18.4%	10.4%	11.9%	36.7%	8.1%	11.9%	30.5%	9.7%	3.3%	8.9%
15 Lateral Delivery Amount	56,579	52,829	26,373	6,992	88,911	34,914	155,709	30,179	15,792	59,304	41,753	2,069	20,498
16 Ditch Lateral Yield per Share	2.87	23.48	22.05	1.36	4.76	2.18	1.66	53.70	1.36	1.71	1.60	1.38	4.36
17 Ditch Shares Owned													
18 Ditch Shares Committed to Aug Plan													
Farm Supply Available													
19 Estimated Surface Water	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Estimated Groundwater													
21 Total Farm Supply	0	0	0	0	0	0	0	0	0	0	0	0	0

- 1) Estimates based on direct flow native water supplies using current snow water equivalent amounts for columns 1, 4 and 5; runoff forecasts for Arkansas River at Salida for columns 3 and 8; and runoff forecasts for Chalk Creek nr Nathrop for columns 2, 6, and 7.
- 2) Amount of Pueblo Winter Water Program water in storage March 15
- 3) Amount of John Martin Reservoir Article II water currently in storage in John Martin Reservoir
- 4) Amount of Fryngpan-Arkansas Project water carried over from the previous year
- 5) Fryngpan-Arkansas Project water allocation for 2006 (05/18/06)
- 6) Sum of Rows 2-5
- 7) Estimated river transit loss percent from Pueblo or John Martin Reservoir to ditch headgate
- 8) Row 6 - Row 7 river transit loss amount
- 9) Sum of Row 8 and Row 1, except columns 9 and 11 estimated using current snow water equivalent amounts, column 10 estimated using runoff forecasts for Chalk Creek nr Nathrop, and columns 12 and 13 based on 20-year average headgate delivery.
- 10) 1976-2005 Average ditch headgate diversion amounts
- 11) Estimated ditch transit loss factor
- 12) Row 10 divided by Row 12
- 13) Total ditch company shares
- 14) Estimated ditch transit loss factor
- 15) Row 9 minus Row 13 ditch transit loss amount
- 16) Row 14 divided by Row 12
- 17) Number of Shares owned/leased by farmer, *user supplied value*
- 18) Number of Shares owned/leased by farmer committed to a well association replacement plan, *user supplied value*
- 19) Row 15 times Row 16 except for Catlin, Holbrook, or Fort Lyon shareholders where shares have been committed to a replacement plan, individual cell formulas used
- 20) Groundwater supply estimate from farmer or well association
- 21) Row 18 + Row 19. This is the irrigation component estimated to be available to meet crop water requirements and does not include soil moisture content or effective precipitation

**Predicted Calendar Year 2006 Irrigation Water Supply Based on May 1 Indicators
(Information published on Risk Management Agency website)**

Predicted Calendar Year 2006 Irrigation Water Supply Based on May 1 Indicators													
(Acre-Feet)													
2006 Estimated Delivery	1	2	3	4	5	6	7	8	9	10	11	12	13
	Bessemer	Highline	Oxford	Otero	Catlin	Holbrook	Fort Lyon	LA Consol	Fort Bent	Amity	Lamar	Hyde	Buffalo
Range of estimated Headgate Delivery at the 95% Confidence Interval													
upper value	69,048	81,250	31,535	9,563	105,341	41,951	280,139	35,068	19,943	95,745	52,454		
lower value	62,796	68,292	25,622	8,123	93,408	31,069	211,968	30,818	15,672	75,025	41,217	2,140	22,500
Expected farm yield per share													
upper value	3.00	25.51	24.43	1.52	5.06	2.31	1.89	57.33	1.51	1.92	1.81		
lower value	2.73	21.44	19.85	1.29	4.48	1.71	1.43	50.38	1.18	1.50	1.43	1.38	4.36
1976-2005 Average													
Ditch Headgate Delivery	63,600	93,500	27,700	7,560	89,700	48,800	243,000	29,000	17,300	75,900	44,600	2,140	22,500
Farm Yield per share	2.77	29.36	21.46	1.20	4.31	2.69	1.64	47.41	1.31	1.52	1.54	1.38	4.36
Percent of Average													
upper	108.57%	86.90%	113.85%	126.50%	117.44%	85.96%	115.28%	120.92%	115.28%	126.15%	117.61%		
lower	98.74%	73.04%	92.50%	107.45%	104.13%	63.67%	87.23%	106.27%	90.59%	98.85%	92.41%	100	100

Functional Standards

These standards were developed by the staff of Division 2 of the Division of Water Resources to better define what is acceptable to the Division when installing structures and devices deemed necessary for the proper administration of the water resources within the Division pursuant to C.R.S. 37-84-112.

C.R.S. 37-84-112

Headgates - specifications - failure to maintain - penalty.

(1) The owners of any irrigation ditch, canal, flume, or reservoir in this state, taking water from any stream, shall erect where necessary and maintain in good repair, at the point of intake of such ditch, canal, flume, or reservoir, a suitable and proper headgate of height and strength and with embankments sufficient to control the water at all ordinary stages and suitable and proper measuring flumes, weirs, and devices and shall also erect and maintain in good repair suitable wastegates where necessary in connection with such ditch, canal, flume, or reservoir intake. The framework of such headgate shall be constructed of timber not less than four inches square, and the bottom, sides, and gate shall be of plank not less than two inches in thickness, or said gate may be made of other material of equal strength and durability or may be made and constructed upon plans and specifications approved by the state engineer. No such headgate shall be deemed complete until provided with suitable locks and fastenings (except when the division engineer deems such locks and fastenings unnecessary therefore) and keys therefore are delivered to the division engineer of the division who has control thereof during the seasons of the distribution of water.

(2) If the owners of any such irrigation ditch, canal, flume, or reservoir fail or neglect to erect or maintain in good repair said headgate, measuring flume, weir, or devices, in the manner and form provided in this section, then the state engineer or division engineer, upon ten days' previous notice in writing, duly served upon such owners, or upon any agent or employee representing them or controlling such ditch, canal, flume, or reservoir, shall refuse to deliver any water from such stream to such owners, or to such ditch, canal, flume, or reservoir, until such owners erect or repair the headgate, measuring flume, weirs, or devices of such ditch, canal, flume, or reservoir. The owners of all such ditches, canals, flumes, or reservoirs shall be liable for all damages resulting from their neglect or refusal to comply with the provisions of sections 37-84-112 to 37-84-117. Such owners who divert water from any such stream and into any such ditch, canal, flume, or reservoir contrary to the orders of the state engineer or division engineer are guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not more than five hundred dollars, and each day of violation shall be deemed a separate offense.

ORDINARY STAGES

For the purposes of 37-84-112, "ordinary stages" shall mean any stage of flow where a condition exists that downstream water rights are short of their entitlement and are calling for water and there exists a reasonable expectation that curtailment of a junior right will result in a material increase in supply to a calling senior right. Ordinary stages specifically include, but are not limited to, all stages of spring runoff and large precipitation/runoff events.

HEADGATE

For the purposes of 37-84-112, a controllable, lockable headgate shall be defined as any permanently installed combination of headgate, embankments, diversion dam, spillway, waste gate or sluice system or any other means that positively prevents ANY diversion of water, intentional or otherwise, when not in priority; and which allows the Water Commissioner to accurately adjust the flow of water with reasonable effort and within a reasonable amount of time and to secure the structure at the adjusted condition so as to prevent any unauthorized adjustment.

DWR typical is a Waterman Industries SR slide gate or Waterman C-10 canal gate installed in a concrete headwall which has sufficient freeboard to prevent overtopping into the ditch and which incorporates a lowered spillway section upstream of the headwall sized to waste all excess water back to the stream. (See DWR drawing “Typical Headgate/Flume Installation“)

MEASUREMENT DEVICE

Water measurement device shall mean any flow measurement device which can be demonstrated to accurately measure flows within $\pm 5\%$ throughout the full range of anticipated flows. This device must be co-located with the control structure to enable the water commissioner to promptly judge headgate adjustments, must be properly installed to engineering specifications to insure proper measurement, must be maintained in condition to provide accurate measurement throughout full anticipated range of flows and shall not be deemed complete until such time that a rating table accurately calibrated to the measuring device has been made available to the water commissioner.

DWR typical is the Parshall, Cutthroat, or Montana flume properly installed in a free-flow condition with sufficient upstream stilling basin to provide proper approach flow conditions, sufficient elevation to ensure hydraulic “jump” to prevent submergence at all anticipated stages. (See DWR drawing “Typical Headgate/Flume Installation“)

RECORDING DEVICE

Recording device shall mean any device acceptable to the Water Commissioner which is minimally capable of continuous recording of stage data at a resolution of .01 foot or other equivalent positive determinant of discharge at a resolution of comparable accuracy through an approved measurement device at no greater than 15-minute intervals over a period of time also acceptable to the Water Commissioner. Such recording device shall not be deemed to be complete and acceptable until all equipment and software necessary to download and process recorded data is supplied to the Water Commissioner and/or the Division Engineer.

DWR typical is the Sutron Model SDR-0001-1 Data Logging Shaft Encoder or equivalent properly installed in a lockable protective shelter.

Note: DWR may **require** replacement of existing chart-type recorders with data-logging technology as needed to control workload.

TELEMETRY

Telemetry shall mean any method of determining and transmitting discharge or streamflows on a real-time or near real-time basis (only as limited by technology) by satellite monitoring, dedicated land or cellular phone or any other means of communication that is accessible by DWR and the public at large. Such telemetry must include a means to transmit stage and discharge, plus other parameters as required and shall not be deemed complete until a suitable calibration of the telemetry and measurement method is accepted by the Division Engineer.

AUTOMATIC SELF-REGULATING DIVERSION CONTROL

The purpose of such controls is to regulate fluctuations to the rate of diversion that would otherwise occur as a result of changes in head pressure associated with variable rates of streamflow or obstructions to streamflow. An acceptable automatic self-regulating diversion control shall mean any system of flow rate sensors, connected to headgate and/or wastegate controls capable of autonomously re-regulating fluctuations in rate of diversion of up to 10% of the desired rate within a period of no more than 15 minutes.

Organizational Chart

Colorado Division of Water Resources Division 2 Organizational Chart December 31, 2006

