INTRASTATE WATER SUPPLY, DEVELOPMENT AND PUBLIC SAFETY

2007 ANNUAL REPORT

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FOREWORD

With the appointment of the new State Engineer in November 2007, the Division of Water Resources (DWR) underwent a variety of changes. This report is a reflection of the work of the Water Supply, Engineering, and Investigations branches in 2007 and the new Intrastate Water Supply, Development and Public Safety branch that was organized in late 2007 and early 2008. Organizational charts from 2007 and 2008 are provided at the end of this report.

These branches are comprised of a multidisciplined staff of engineers, geologists, hydrologists, experts, technicians and support staff. We are an integral part of nearly every activity within the Division of Water Resources, spanning a broad spectrum of technical, engineering, and administrative responsibilities. The key resources and critical components of all that is discussed in this report are the highly skilled, dedicated and innovative staff, who work to foster teamwork and accomplish DWR's mission.

I want to take this opportunity to thank each member of the staff for the support, dedication and teamwork during 2007. With the vast staffing changes in the Denver office and the division offices, the employees have taken on additional workload with only my personal thanks, I am very proud to work with each of them.

The following report provides only the highlights of 2007; much of the day-to-day, routine, customer service and program accomplishments are too vast to include in the limited space of an annual report. Coordination with other local, state and federal agencies continues to be a key goal of our organization. In addition, DWR staff are leaders with many state and national professional organizations that reflect favorably on this office. This annual report was compiled with tremendous assistance from the staff.

WATER SUPPLY BRANCH

Introduction

The protection of Colorado's water resources is a complex and vital challenge to the employees that serve in the Division of Water Resources. Recognizing the importance and value of our responsibilities, the following highlights some of the activities and accomplishments achieved by the staff during 2007. The administrative and functional responsibilities performed include:

- Analyze and approve of Substitute Water Supply Plans (SWSPs).
- Review, analyze, and provide comments to Colorado counties regarding the water supply for proposed subdivisions.
- Perform well permitting and the associated analysis.
- Serve as technical staff for the Colorado Groundwater Commission.
- Manage the DWR's involvement with litigation in the water court process, including providing expert witness testimony. Coordinate activities with the seven Water Divisions, the seven Water Courts, opposing parties, counsel and consultants, and DWR's legal counsel from the Colorado Attorney General's Office.
- Conduct engineering and technical analyses to support all facets of water resource engineering, planning, and administration.
- Provide water resources training and education to attorneys, consulting engineers, federal, state, or county officials, schoolchildren and water users through a variety of formal and informal presentations.

Substitute Water Supply Plans

The authority to evaluate and issue substitute water supply plans (SWSPs) is vested exclusively to the State Engineer's Office. During 2007, the State Engineer's Office reviewed and acted upon 250 general SWSPs (including emergencies) and 72 SWSPs related to gravel pits. This includes thirteen Rule 14 replacement plans approved in Water Division 2, pursuant to the Arkansas River Use Rules.

Subdivision Review

Although subdivision water supply plans must be reviewed 21 days to meet statutory time restrictions, Denver Staff often acts on them in substantially less than 21 days. During 2007, the State Engineer's Office received and acted on a total of 326 subdivision referrals. This function requires continuous information sharing and communication with all Colorado counties.

Designated Ground Water Basins and Colorado Ground Water Commission

To perform their duties, the Designated Basins staff (i.e., the personnel of the State Engineer's office that acts as staff for the Colorado Ground Water Commission) issued 423 final permits, 546 small capacity well permits, 370 large capacity permits and Determination of Water Rights, 104 change application approvals, 13 replacement plans, and was involved in 38 enforcement actions. The staff continued evaluation of Final Permits in the Kiowa-Bijou, Southern High Plains, and Upper Big Sandy Basins.

The staff participated in a number of administrative hearings and court cases, including a hearing before the Ground Water Commission ("Commission") in August where the Town of Bennett requested a variance from the Commission's Rules. The staff participated in a nine-day hearing in January before the Hearing Officer that involved a petition to create a new Box Elder Creek Designated Basin, and the hearing in May before the Commission that appealed a decision of the Hearing Officer. The staff began processing and evaluating two petitions to amend the boundaries of the Kiowa-Bijou Designated Ground Water Basin; that hearing is scheduled before the Hearing Officer in August of 2008. The staff continued to participate in the on-going litigation of Pioneer Irrigation District seeking to de-designate portions of the Northern High Plains Designated Ground Water Basin. A hearing on this litigation is scheduled before the Hearing Officer in June of 2008.

The Designated Basin's staff continues to actively participate in designated basin ground water management through consultation with the Ground Water Management Districts and the Republican River Water Conservation District. To that end, the staff worked with the Attorney General's Office to develop ground water metering and use rules for the Republican River basin.

Ground Water Well Permitting

The well permitting staff received and acted upon 6,464 applications for well permits in 2007. Of that total, 782 were applications for replacement wells. In addition, the staff processed Monitoring-Hole Notices (567), Changes in Ownership/Address (6,099), Well Construction and Test Reports (4,265), and Pump Installation Reports (3,002).

Other Referrals

The Division of Water Resources receives referrals from other State and Federal agencies including the Colorado Division of Reclamation, Mining, and Safety, the Army Corps of Engineers, and the Colorado Department of Public Health and Environment and miscellaneous federal agencies regarding environmental assessments and environmental impact statements. The Water Supply staff acted on 161 referrals from these agencies.

Special Projects

- Assisted in the development and implementation AquaMap, a tool that replaces the paper maps used by well permit evaluators. This effort included arranging for the scanning of paper and Mylar maps in the Denver office.
- Answered numerous questions from the public that were submitted through "AskDWR" on the website
- Attended and participated various presentations on the Geothermal Rules.
- Presented topics at the SEO Forum.
- Staffed booth at the Colorado Farm Show in Greeley.
- Staffed booth and repaired the water model at the Colorado State Fair in Pueblo. Provided support to the Water Quality Control Commission
- Presented information on water rights to various groups of real estate agents and appraisers, well contractors, and governmental agencies.
- Assisted in developing the StateCU program used by the DWR and outside engineers to calculate historical consumptive use.

Litigation and Hearings

Litigation continues to consume a significant amount of time, effort, and expense for the Division of Water Resources. In particular, we continue to be actively involved in the adjudication of many large augmentation plans involving wells in Water Divisions 1 and 2. However, the State Engineer stipulated to all of the cases in which he was a party, thus avoiding a significant trial expenses. Additionally, Water Supply staff were involved in three hearings before the Hearing Officer regarding such matters as revocation of permits and 600-foot spacing for nonexempt permits.

Personnel Changes

- Shannon Johnson joined Team 1 as its Administrative Assistant in March 2007.
- Eric Thoman left the Designated Basins team in August 2007.
- Suzanne Sellers resigned her position as Team Leader in Team 1 in December 2007.

GEOTECHNICAL SERVICES BRANCH

The Geotechnical Services Branch provides expertise in the disciplines of geology, hydrogeology, engineering geology, geophysics, well construction, well testing and satellite-assisted surveying. The Branch responds to requests by internal and external customers for assistance in general investigations, supports the engineering sections in ground water litigation, collects and reports ground water data, and provides technical assistance to the Board of Examiners and Groundwater Commission.

The Branch is currently staffed by three geologists/hydrogeologists, four well inspectors, and a part-time data entry specialist. Dave McElhaney is Chief of the Branch, Michael Schaubs is the Branch senior geologist, and Elizabeth Pottorff is staff hydrogeologist. Jessie Dunbar assists the Geotechnical Services Branch and supports the Board of Examiners by reviewing and inputting data from more than 10,000 reports submitted annually for pump installation, well construction and well abandonment. Ivone Cruz has assisted the Branch with special projects associated with the Denver Basin aquifers

Enactment of Senate Bill 03-45 established a requirement for a well inspection program under the direction of the State Engineer. Because the program primarily supports the enforcement efforts of the Board of Examiners and is closely associated with the support activities of the Geotechnical Services Branch, the Well Inspection Program was assigned to the Geotechnical Services Branch. The administration structure is efficient and has been very effective.

Table 1 summarizes the work completed by the Geotechnical Services Branch in 2007.

Table 1
Geotechnical Services Branch
2007 Summary of Work

Well construction variance requests reviewed	179
Geophysical logs evaluated	155
Geophysical log waivers reviewed	159
Oil and Gas injection and cathodic protection well proposals reviewed	32
Well permit evaluation consultations	370
Designated Basins Final Permit aquifer evaluations	485
Well abandonment consultations	18
Water levels measured	1,116
Phone contacts and general evaluations	850

General Investigations

The Branch is involved in a variety of geologic, hydrogeologic and geotechnical studies and projects. The following provides a brief description of the key activities in 2007.

- Coal Bed Methane (CBM) – Due to an increased effort to model the location and extent of stream depletions resulting from CBM (and conventional oil and gas) produced water, the geologists of the Branch monitor and assist in the model development. Dave McElhaney functions as the lead geologist in questions related to coalbed methane and its relationship to the aquifer and ground water in the San Juan Basin; Elizabeth Pottorff is lead geologist in the Raton Basin and Michael Schaubs is assigned the Piceance Basin. In 2007, S.S. Papadopoulos and Associates, Inc. completed a study of the potential effects on surface waters from CBM well pumping in the Piceance and Raton Basins. The Branch provided technical review of the reports developed from the CBM projects. At least three additional modeling efforts assessing the location and amount of tributary ground water withdrawn by CBM wells are currently underway. The Branch provided geologic and hydrogeologic information and technical review of the projects.

Gas bubbling from a new well. (Photo by Larry Hakes, Well Inspector)

- SPDSS - The Branch provided water level data and geophysical log information to the state's ground water consultant, Camp, Dresser, and McKee, Inc., in their efforts to collect data and map aquifers for the South Platte Decision Support System. The Branch also provided technical assistance and review of the consultant's work to insure geologic and hydrogeologic accuracy.

- U.S.G.S. Modeling - The Branch provided geophysical log and water level information to the U.S. Geological Survey for its effort to produce a new Modflow ground water model for the Denver Basin. The Branch continues to work to resolve data issues and to verify data values. The Branch will provide technical review of the model's conceptual geologic features and model results.

- Colorado Geological Survey Cross-Section Construction - The CGS advanced its effort in describing the rocks of the structural Denver Basin that comprise the Denver Basin aquifers by constructing several cross-sections across the basin. The Branch

provides geophysical data and technical review and comment of the sections and consults with CGS to ensure that geologic interpretations by CGS that deviate from the aquifer boundaries of the Denver Basin Rules and existing nomenclature will not result in confusion about DWR administrative aquifer boundaries.

- Geothermal energy is becoming a prominent topic of interest and discussion that the Branch provides its input and expertise. The new governor and his administration seek to promote development of the state's renewable energy sources. Utilization of Colorado's geothermal resources currently includes direct uses from hot springs and wells and the installation of numerous geoexchange systems.

Ground Water Commission

The Branch assists the Groundwater Commission through the monitoring of groundwater levels and technical support to the Commission and staff. A few or the activities that warrant highlight are presented below.

- The Branch annually collects water level data from more than 1200 wells covering almost 75 percent of the state and publishes the data in a series of 10 annual reports. Many of these water level measurements are from wells in the designated basins.

- The staff provides technical support to Designated Basins well permitting staff. During 2007, Michael Schaubs and Elizabeth Pottorff evaluated well construction to determine aquifer intervals for approximately 485 final permits and determinations in the Designated Ground Water Basins. When needed, the Branch testifies regarding geological and hydrogeological issues at Ground Water Commission hearings

Denver Basin

Plugging and abandoning a well in the Laramie-Fox Hills aquifer

The Branch has provided extensive geophysical and water level information for modeling and mapping efforts in the Denver Basin. Modeling of the bedrock aquifers by the USGS is nearly complete. Based on geophysical information (much of which was provided by the Branch), CGS is currently subsurface mapping the Denver Basin aquifers.

- The Branch continues to compile information on the amount of ground water currently permitted for withdrawal from the bedrock aquifers of the Denver Basin. Permitted amounts and producing aquifers have been determined for all non-exempt wells of record and will be downloaded into the database in early 2008. Aquifer identification for as many as 40,000 exempt wells has yet to be completed. Elizabeth Pottorff compiled the well/aquifer/permitted production rate information in several formats as requested by Senator Looper to assist in drafting proposed legislation. The Colorado Foundation for Water Education also utilized this information in the Citizen's Guide to Denver Basin Groundwater publication.

- The Branch provided technical input and review for publications concerning the Denver Basin aquifers drafted as a result of the SPDSS project and performed final technical review and comment for a Citizen's Guide to the Denver Basin Aquifers published in 2007 by the Colorado Foundation for Water Education.

Division Support

- The Branch routinely addresses court actions through general review of findings and evaluating geophysical logs to provide site-specific information where water court applicants seek a determination of water rights.

- Well permitting and subdivision review assistance continues on a daily basis. The Geotechnical Services Branch routinely assists the permitting staff by reviewing the geology along the margins of the Denver Basin to determine aquifer boundaries and saturated sand thicknesses and to identify aquifer intervals at other locations throughout the state.

- Elizabeth Pottorff is monitoring issues and has compiled and provided well data to those interested in the exploration and proposed development of an in-situ uranium mining project in Weld County.

- Michael Schaubs provides ground water hydrology expertise for the Well Tester Certification training in Divisions 2 and 3.

A homemade drill rig at an unknown location

- Elizabeth Pottorff is the Branch and Division representative on the Colorado Ground Water Protection Council.

- The Branch evaluated several requests for nontributary ground water during the past year and, as indicated in the 2006 Annual Report, had expected to see more effort by persons seeking ground water supplies to identify nontributary sources. The Branch expects this trend to continue.

Board of Examiners

- Complaint Investigations for Rules Enforcement -- Dave McElhaney continued to spend much of his time working with the Well Inspection Group that now receives complaints and performs investigations to resolve complaints before the BOE. Dave also participates at Technical Action Committee meetings held bi-monthly with representatives of the Colorado Water Well Contractors Association (CWWCA), the Colorado Ground Water Association (CGWA) and various consultants. Nolan Lloyd is the primary contact and handles most of the day-to-day activities related to well construction, pump installation and unlicensed contractor complaints. Nolan processed 59 formal complaints filed with the BOE in 2007 and continues to conduct follow-up on those cases not resolved during the year.

- Variances – The Branch (primarily Michael Schaubs) processed 179 requests for variance from the well construction rules during the year. In addition, the Branch performed several evaluations for proper well abandonment.

Well Inspection Program

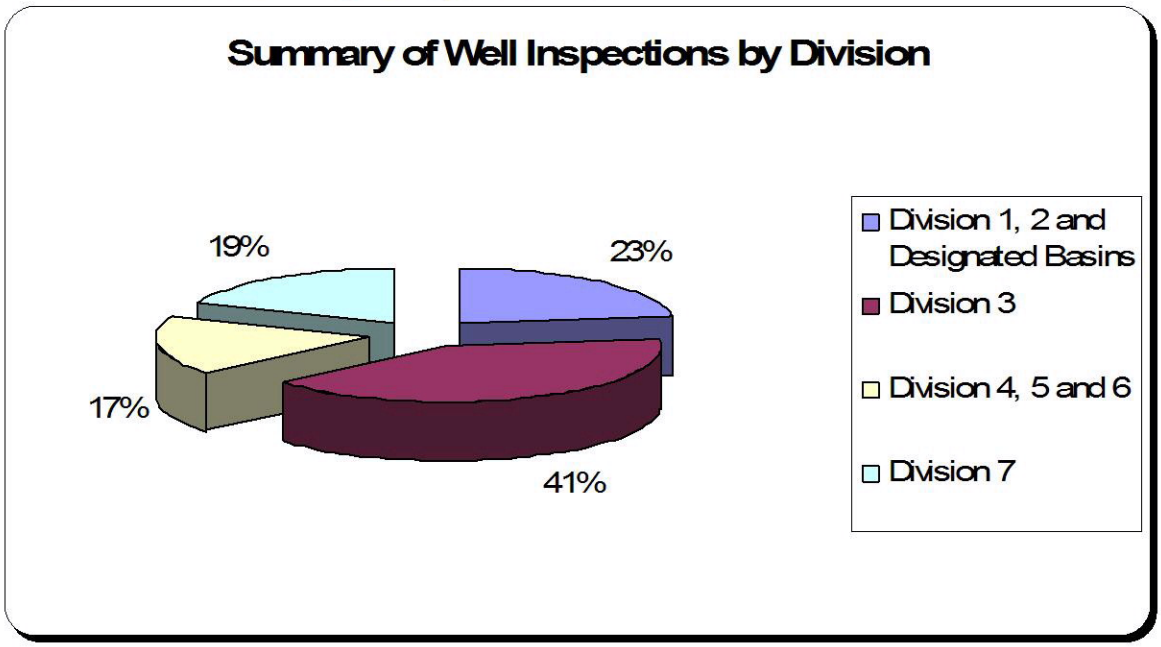
The well inspection program was instituted for the protection of groundwater resources and public health through enforcement of the *Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction, 2 C.C.R. 402-2*. The staff's duties in this program include inspecting: water well construction and pump installation, monitoring or observation hole/well construction, well plugging and abandonment, and investigating complaints, providing education and outreach, and generally supporting the State Engineer and Board of Examiners.

More than one use for a pump rig (Photo by Tom Neefe)

Nolan Lloyd assumed the responsibilities of Chief Well Inspector in late November 2005 and rapidly became an integral part of the inspection and enforcement team. Nolan supervises the activities of the well inspectors located in Division 1 and Denver (Doug Stephenson), Division 3 (Larry Hakes), Division 5 (vacant), and Division 7 (Doug Pickering). The well inspectors currently assigned to the field began their tenure with the Division in June 2004 and have become an irreplaceable asset to supporting the enforcement efforts of the BOE. Tom Neefe resigned his well inspector position in 2007 to pursue personal interests. Doug Stephenson transferred into the Denver position, creating the vacancy in Division 5 that has not been filled.

A key focus of the well inspectors and the inspection program is to locate and initiate action against unlicensed contractors working illegally in the state. With regard to licensed contractors, the most frequent violation continues to be contractors drilling outside the distance limits allowed by the permit (usually 200 feet).

The well inspectors conducted more than 2300 inspections in 2007. As in previous years, nearly half of the inspections were conducted in Division 3. Well inspections were distributed across the state generally as follows:



Where We Are Going

- The Branch will continue to cooperate with the CGS in support of its mapping and cross-section construction of parts of the Denver Basin. The Branch will also provide information pertinent to the Denver Basin bedrock aquifers in support of the ground water modeling effort by the USGS and will provide technical review of publications regarding the Denver Basin.

- Michael Schaubs will continue managing the water level monitoring programs and will continue modifying the programs as needed to replace monitoring sites that have been discontinued and to add new sites to provide better coverage. Maps showing the spatial distribution of five-year water level changes are being considered for addition to next year's water level reports. Expansion of the monitoring activities in the South Platte alluvium and Denver Basin aquifers may result from inheriting some wells associated with the SPDSS development program.

- The Branch will continue to review and compile permitted appropriations from the Denver Basin aquifers. The Branch's efforts to verify surface elevations and well locations in the geophysical log database are on-going. Updating and expanding working maps in the Dawson Butte and Castle Rock area is in progress.

- The Branch is exploring options for imaging the DWR's more than 4000 geophysical logs to preserve the geophysical information and to make the logs more readily available to the public.

BOARD OF EXAMINERS

Introduction

In Article 91 of Title 37 of the Colorado Revised Statutes, the General Assembly created the State Board of Examiners of Water Well Construction and Pump Installation Contractors under the Division of Water Resources in the Department of Natural Resources. The Board consists of five members, one of whom is the State Engineer who provides staff to support the activities of the Board and to assist the Board in the efficient and effective discharge of its duties and responsibilities. In 2003, the General Assembly passed Senate Bill 03-45 authorizing an increase in well permit fees and authorizing the creation of a well inspectors program (section 37-91-113, C.R.S.). During 2004, the State Engineer hired a Chief Well Inspector and four well inspectors to monitor compliance with applicable statutes and the Water Well Construction Rules adopted by the Board. In addition to the Well Inspectors, several DWR employees in Denver, as well as Water Commissioners and Division office staff, support the activities of the Board.

Drill rig and casing trailer at a new residential building site.

Jessie Dunbar, who shares his time supporting the permitting section, continues to enter data from well construction reports, pump installation reports, and well abandonment reports required by the Board. Jessie also identifies potential well construction and pump installation deficiencies and forwards his concerns to Chief Well Inspector Nolan Lloyd for further investigation.

General Support

Support staff focuses on three general areas: complaint and enforcement actions, variances from the requirements of the Water Well Construction Rules, and licensing of well construction and pump installation contractors. In addition to these functions, the Staff provides technical and professional assistance to the Board in the development of its administration rules, construction rules and associated policies. The Staff also reviews

and presents to the Board new technology developed in the well construction industry, coordinates the activities of the Board with the objectives and requirements of the DWR and other agencies, disseminates information to contractors, and provides education and general information concerning the Board's activities in a variety of public forums.

Drilling and support vehicles

License renewal for 2008 included a requirement that each contractor licensed by the Board of Examiners submit a Certificate of Completion listing the accredited continuing education (CE) courses or programs attended by the contractor between January 1, 2007 and December 31, 2007. Staff is actively reviewing and recommending accreditation of proposed CE courses for contractor's compliance with sec. 37-91-105(7), C.R.S. Criteria for accreditation were determined with the Colorado Water Well Contractors Association (CWWCA). The Board established an accreditation committee composed of staff, a CWWCA representative, and a Board member to ensure the timely review of applications for course accreditation. The committee accepted 46 courses or functions for a total of 218 accredited hours of continuing education during the 2007 CE period.

Complaints and Enforcement Actions

The State Engineer's well inspectors and staff supporting the Board of Examiners are responsible for investigating complaints that allege well construction or pump installation that violates Article 91 of Title 37, C.R.S., and/or the Water Well Construction Rules. The investigations often result in bringing the issues before the Board of Examiners for resolution, while other issues are resolved by actions authorized by the Board. The well inspectors and staff also conduct "follow-up" actions to ensure that contractors and well owners are complying with Orders of the Board, including pursuing judicial enforcement when necessary. The staff works closely with the Attorney General's Office to accomplish these tasks. Credit for successful judicial resolution of complaint issues during 2007 primarily goes to Beth Van Vurst of the Attorney General's Office. Beth has worked extremely diligently to represent the Staff and the Board in its legal matters and has been a great addition to the team.

The following table summarizes the complaints and enforcement actions brought before the Board and resolved by the Board or support staff during calendar year 2007.

2007 Board Complaint and Enforcement Summary

New Complaints Investigated			59
	Construction Violation	16	
	Permit Violation	24	
	Report Submittal	5	
	Unlicensed Contractor	7	
	Order to Fix or Plug	7	
Complaints Resolved			59
	2005/2006 Complaints Resolved in 2007	18	
	2007 Complaints Resolved	41	
Resolution/Action	Dismissed, withdrawn, discontinued, or resolved	17	
	Complied with Order	9	
	Fines	31	
	Letter of admonition/reprimand/fine	2	
	Suspension or revocation	0	

In addition, Staff reviewed and processed 179 requests for variance from the Water Well Construction Rules and plans for the construction of gallery-type wells. The staff (Jessie Dunbar) also reviewed and entered data into the Well Database from 4269 completion reports, 3006 pump installation reports and 1079 well abandonment reports.

Licensing

The Board licensed 271 contractors in 2007, including 9 new contractors. Gina DeArcos coordinates the licensing activity of the Board by scheduling and administering written examinations, assembling test scores, and scheduling oral examinations before the Board. Gina also provides licensing information to people interested in obtaining a contractor license. The license renewal process requires that Gina assemble, mail and subsequently process more than 300 packets of information annually for renewal of contractor licenses.

License renewal for 2007 marks the third year that each contractor is required to obtain a minimum of eight hours of continuing education (CE) for license renewal. Gina has been instrumental in tracking and providing information concerning the CE programs accredited by the Board and available to the contractors for meeting the CE requirement.

Education and Outreach

The staff continues to work with the Colorado Water Well Contractors Association (CWWCA) to provide information to the licensed contractors by individual outreach through mailings, CWWCA newsletter articles and examination preparation workshops. Staff participates at the annual conference of the CWWCA and is available for discussion and instruction on permitting issues and construction standards at the conference. Staff provided accredited instruction at three half-day programs in Gunnison, Glenwood Springs, and Berthoud during 2007.

The Technical Action Committee (formed during 2006 to discuss various topics of concern to the contractors association), the Colorado Ground Water Association, and area consultants, met and discussed several issues related to Board rules, State Engineer permitting procedures, and identified other concerns beyond the authorities of the Board and DWR. Jack Byers, Dave McElhaney and Nolan Lloyd attend the bi-monthly meetings of the committee to represent the BOE, Well Inspection Program, and DWR.

Well Inspection Program

Chief Well Inspector Nolan Lloyd is based in Denver. Tom Neefe resigned his position as Well Inspector in August 2007. Doug Stephenson relocated to Denver in early 2008 and covers well inspections in Divisions 1 and 2. Well Inspectors are also located in Alamosa (Larry Hakes), covering the south central and portions of the southeast, and Durango (Doug Pickering), covering the southwest. The Glenwood Springs position formerly occupied by Doug Stephenson, covering the northwest, is currently vacant. The well inspection program has proved to be a tremendous asset to the State Engineer and Board of Examiners' enforcement efforts. The well inspectors are doing an outstanding job as is described in the Geotechnical Services Branch section of this report.

As was anticipated, as the well inspection program continues to develop, the Staff sees a decrease in the proportion of violations discovered as a result of inspections. Since inception of the inspection program, it is evident that many licensed contractors are refining their well location and construction practices to ensure full compliance with the Board's Rules.

HYDROGRAPHIC AND SATELLITE MONITORING BRANCH

Introduction

The Hydrographic and Satellite Monitoring Branch provides accurate, high quality, "real time" stream flow data to support water rights administration. Hydrographers around the State operate and maintain a system of gaging stations on rivers, streams, canals, and reservoirs; perform streamflow measurements to maintain stage-discharge relationships at gaging stations; and maintain satellite-monitoring equipment with goals of improving the quantity and quality of data used to manage and administer water throughout the State of Colorado. The Branch also develops historic streamflow records in coordination with other State and federal entities and the water-user community.

The satellite-linked monitoring system (SMS) provides the Division of Water Resources, other State and federal entities, and the water-user community with access to real-time streamflow data from gaging stations across the State of Colorado. These data and software systems provide for more effective and efficient water rights administration, water resource management, computerized hydrologic record development, and high (flood) and low flow alerts. The SMS allows the Division of Water Resources to collect, process, store, and distribute any kind of environmental data transmitted from remote locations. The data set of interest to the Division is the water level at rivers, streams, diversion structures, and reservoirs. The SMS converts these raw water level values into several "products" of use to various "clients." The products range from raw data passed on to other computer systems to the official Hydrographic Records of mean daily streamflows. Clients include Division of Water Resources personnel and other water users wanting real-time flow data for water rights administration, computer systems performing other analyses, and the varied user community of State and federal agencies, municipalities, canal companies, attorneys, recreationists, and consulting engineers needing access to real-time stream flow data.

Staffing

Hydrographic staff is located in each of the seven Division offices and in Denver. Denver staff include Tom Ley, PE III, Chief Hydrographer; Jana Ash, PE I, who provides Statewide hydrographic program support as well as operates and prepares streamflow records at several gages in Division 1; Patrick Tyler, EPST II, who procures hydrographic equipment and supplies, repairs and maintains hydrographic equipment, helps compile the annual hydrographic streamflow record publication, and assists in gaging station measurements and operation in the Denver area (Patrick Tyler moved into a full-time hydrographer position in Division 1 in November 2007); and David Hutchens, Electronics Specialist IV, who specifies and procures all electronic equipment for the satellite monitoring system, installs satellite monitoring equipment at gages,

troubleshoots and diagnoses equipment problems, and performs electronic equipment repair (data collection platforms (DCPs), transducers, shaft encoders, etc.) and maintenance. Hutchens provides lead technical support for the hydrographic staff, and conducts training on new and existing equipment. He spends ten percent of his time providing technical support to the USGS Lakewood field office, including training staff on new and existing equipment; bench repair of USGS-owned DCPs, shaft encoders, and water quality equipment; and troubleshooting problems at USGS streamgaging stations. This year, he upgraded four USGS gages to high data rate DCPs, and installed new satellite telemetry in three USGS gages that previously were equipped with non-satellite recorders.

For most of 2007, **Division 1** was short two FTEs. By the end of the year, vacant positions had been filled, creating greater flexibility in the Hydrographic work group. To meet demands for a higher level of technical skills, we attempted to reclassify of one of the vacant positions as a Physical Science Research Scientist I. This was disallowed, but the position was upgraded to an Engineering/Physical Science Tech III. Russell Stroud successfully promoted into this position. Patrick Tyler applied for and moved into the vacancy created by Russell's promotion. Mike Wild, the former Superintendent of Aurora's Spinney Reservoir, filled the vacant Tech II position in South Park. The Division is fortunate to find an individual with Mike's depth of experience with water resources. A new water commissioner/hydrographer position was created in Wray to address the State's compliance issues with the Republican River Compact. This Tech I position was filled by Devin Ridnour who came to the State with extensive experience in well testing. Division 1 hydro staff includes 6½ FTE: Lead PE II, Bob Cooper; PE I, Lee Cunning; EPS Tech III, Russell Stroud; EPS Tech IIs, Steve Barrett, Patrick Tyler, and Mike Wild (South Park, ½ FTE); and EPS Tech Is Bob Erosky (Sterling, ½ FTE), and Devin Ridnour (Wray, ½ FTE).

The percentage of hydro work done by our part-time hydrographers varies with location. Mike Wild performs about 90% hydro work; Bob Erosky does about 80%, and Devin Ridnour currently does about 20%. These positions receive technical supervision from the lead hydro, and personnel supervision from their lead water commissioner. In addition to regular staff, Division 1 has received assistance from: Mark Simpson, deputy water commissioner in District 3, who has taken on some hydrographic responsibilities with the District 3 transmountain gages; and Jana Ash, from the Denver Office, who has operated the South Platte River gages involved in the Denver area. The Division 1 Hydrography group has used Flexplace very effectively to increase efficiency. The three part-time hydrographers work from their homes or district offices. Two full-time staff, Steve Barrett and Patrick Tyler, work mostly from their homes to service the Denver area gages. New office space for the hydrographic work group was developed on the first floor of the building housing the Division 1 office.

Assistant Division Engineer, Bill Tyner, PE III, provided overall program leadership of the **Division 2** Hydrographic work group during Water Year 2007. He was supported by Lead Hydrographer, Mark Perry, PE I; Hydrographic Engineer, Lou Schultz, EIT; and EPS Tech IIs, Anthony Gutierrez and Adam Adame. The Lead Hydrographer position

was vacant for the first 2½ months of WY07. Mark Perry became the Division 2 Lead Hydrographer on December 11, 2006. 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 WDs 10, 12, 14, 15, 16, 79, 18 and 19, with assistance from Mark Perry. Tom Ley is responsible for gages in WD 13 and provided other support as needed. Adam Adame is responsible for WDs 17 and 67. Additionally, hydrographers respond to requests of water commissioners for water measurement assistance in their respective districts.

Four hydrographers staffed the Hydrographic work group in **Division 3** for most of the year. Scott Veneman, Hydrographic EPST III, is performing the Lead Hydrographer duties while continuing to manage the satellite monitoring system for this division. The three other Division 3 hydrographers perform hydro duties as well as manage portions of the hydrographic program. Stan Ditmars, Hydrographic EPST II, is the Division 3 construction manager, and Lee Conner, EIT, is in charge of repair and maintenance of Division 3 hydrographic and construction equipment. Matt Hardesty, PE I, is in charge of construction design. A fifth hydrographer, Jesse Jaminet, began employment with the Division on November 13, 2007. The Hydrographic work group in Division 3 has the responsibility of providing accurate, real-time stream flow data and historic records for streams in and around the San Luis Valley. This includes the Rio Grande and its tributaries, the Conejos River and its tributaries, and those streams tributary to the Closed Basin Project. The Hydrographic Branch also supports the water commissioners and other DWR personnel by providing services such as ditch measurements, seepage investigations, and structure installations.

Jerry Thrush (EPST II) manages the **Division 4** hydrographic work group. Several water commissioners in Division 4 (Steve Tuck, Doug Wist, Bonnie Irby, and Paul Schmucker) are equipped with measuring equipment and make measurements at published record stream gages and administrative gages in their Districts.

The lead hydrographer in **Division 5** is James Kellogg (PE I), who also served as augmentation plan coordinator until April 2007. James supervises the full-time hydrographer position. For training purposes, that position was downgraded from PE I to EIT II and Craig Bruner was hired in June 2007 to serve as the Division's full-time hydrographer. Ultimately, this position will return to the PE I level. Both hydrographers operate and maintain gaging stations, perform measurements, and work streamflow records. Water Commissioners help with various satellite monitoring and gaging station maintenance duties. Commissioners and other staff occasionally assist with winter and high water stream flow measurements.

The **Division 6** hydrographic work group is staffed by one part-time hydrographer, Jean Ray, PE I, who also provides engineering support to the Division Engineer, as Water

Resources Engineer for Division 6. Three water commissioners have hydrographic equipment, however, this equipment is seldom used and these water commissioners and the other five water commissioners in the division often request that the hydrographer make measurements for them. There were no personnel changes in the Division 6 Hydrographic program in 2007.

Lead Hydrographer, Brian Boughton, PE II, provided overall program leadership of the **Division 7** Hydrographic work group during 2007. He was supported by Hydrographic Engineer, Cheston Hart (EIT I) and Water Commissioners Val Valentine (EPST II) and Sherry Schutz (EPST II). In January 2008, Jason Morrow filled the newly created ½ FTE hydrographer position (EIT II) in Division 7. Each of the Division 7 hydrographers and water commissioners worked with specific stream gage stations and geographic areas, and provided support outside of the assigned geographic area when needed. Cheston Hart supported District 29, upper end of 30, 31 and 77. Val Valentine (Water Commissioner District 29) provided measurements for the RIOMOUCO stream gage. Sherry Schutz (Water Commissioner District 77) provided measurements for the LITOSOCO stream gage. Brian Boughton maintained the lower end of District 30 and all of Districts 32, 33, 34 and 71. Routine hydrographer work included responsibility for regular streamflow measurements, gaging station operation and maintenance, satellite monitoring equipment operation and maintenance, supporting water commissioners with flow measurements on ditches and the complete development and computation of streamflow records. Routine water commissioner work includes responsibility for regular streamflow measurements and gage station operation and maintenance.

Gaging Station and Hydrographic Operations

Division 1 hydrographic staff monitors 249 satellite monitoring gaging stations, including 61 (primarily USGS) sites with only monitoring. At 188 gages, Division 1 hydrographers are responsible for reported data accuracy, making measurements, and updating the rating. Many cooperators are involved who maintain the gages, the telemetry equipment, or both. In some cases, gage operation involves only monitoring the data, and making an occasional measurement or calibration visit. Division 1 staff are responsible for maintaining the gage, maintaining the satellite equipment, working a published record, or conducting regular measurement and rating update activity at about 154 gages.

Division 2 hydrographic staff monitors 184 satellite monitoring gaging stations. Of these, 98 sites are gaging stations where Division 2 hydrographic staff have sole operation and maintenance responsibility. Of that 98, streamflow records are prepared at 48 sites. Gages operated solely by Division 2 require periodic visits to confirm that equipment is working correctly, using monitoring equipment diagnostics via WebHMS, streamflow measurements, stage-discharge rating development, normal maintenance, and periodic gage improvements. Normal maintenance includes pumping wells, purging bubbler lines, breaking ice, replacing floats, changing charts, changing float tape, downloading DCP log data, maintaining a gage log, replacing mufflers, and replacing malfunctioning DCPs, shaft encoders, antennas, GPS antennas, and batteries. Other

agencies, primarily the USGS, operate and maintain the remaining 86 sites. Division 2 staff monitor these sites, and as needs arise, perform gage operation and maintenance and check measurements.

Division 3 maintains 77 gages with satellite telemetry, including 53 stream-gage record stations. An additional stream-gage record station ties into the satellite telemetry network via a line-of-site radio-bridge to a station with satellite telemetry. There are currently only three stream-gage record stations with no satellite telemetry link; they are transmountain diversion stations owned by other entities. Other stations with satellite telemetry include six stream-gage administrative stations, eleven stream-gage diversion stations, and seven reservoir stations. One of the reservoir stations also transmits outflow data for an additional stream-gage administrative station. Of the 77 gages with satellite telemetry, two also have phone line telemetry. The Division maintains an additional stream-gage administrative station that uses only phone line telemetry. DWR owns the data logging and transmitting equipment at 66 of these stations.

Division 4 has 27 satellite monitoring stream gages and prepares streamflow records at seven of these locations. Division 4 cooperates with the USGS at four additional gages and has historically owned and maintained several DCPs in USGS gages. These staff attends to these gages in proportion to their administrative importance. Division 4 cooperates with the US-BOR at three additional sites, including two gages and one reservoir.

Division 5 operates and maintains 38 DWR satellite-monitoring stations and prepares streamflow records at 14 of these stations. The Division uses 24 gages to administer water and develop diversion records. In addition, other entities operate and actively monitor many of their 102 satellite monitoring stations in Division 5.

Division 6 operates 12 active stream gage sites in the Yampa, White, and North Platte River basins and prepares streamflow records at six of these locations. Ten of the sites are equipped with satellite monitoring. Two of these transmit reservoir surface elevation, six transmit stream gage height, and two transmit both parameters. The remaining two gages are equipped with chart recorders or DCP to record gage heights.

Division 7 operates and maintains 52 stream gages; 40 are satellite-monitoring gages. The Division upgraded 34 gages to high data rate (hourly) transmissions in 2007. It also prepares streamflow records at 23 of these sites.

Streamflow Records

A total of 241 streamflow records will be published in the DWR Annual Streamflow Publication for WY2007 (Table 1, below). The USGS Colorado Water Science Center will publish 34 of these records in their annual streamflow data report for WY07; the New Mexico office of the USGS will publish four of them. Divisions 1, 2, and 3 perform record development, checking, correction and final review within their respective

Divisions. Divisions 4, 5, 6 and 7 conduct record checking and review among those Division offices. Brian Boughton had oversight responsibilities for hydrographic streamflow record preparation (scheduling, checking, final reviews) in these Divisions during the water year. He and Tom Ley provided final reviews and signoff.

Table 1. Streamflow records for WY2007.

Div 1	Div 2	Div 3	Div 4	Div 5	Div 6	Div 7
78	49	63	7	14	7	23

A total of 85 WY2006 streamflow records (36% of the 234 prepared for publication) were submitted for quality assurance/quality control reviews by the USGS (41) or by the Hydro Branch (44).

Streamflow Measurements

Hydrographers and water commissioners across the State made nearly 3600 measurements in 2007 in streams, rivers, canals and ditches (Table 2, below). These measurements calibrate stage-discharge relationships at streamgaging stations, support of real-time water administration decision-making in canals and ditches, and support of historical streamflow record development.

Table 2. Streamflow measurements made in 2007.

Div 1	Div 2	Div 3	Div 4	Div 5	Div 6	Div 7
1253	545	1100	153	147	116	274

Hydrographic Tools

The DWR IT Branch developed and released several new tools in 2007 that support the collection, processing, and display of streamflow data. Primary among these is the new Surface Water Conditions website: http://www.dwr.state.co.us/SurfaceWater/default.aspx. The new website is available to the public and offers a number of new features and methods to obtain real-time streamflow data and hydrographs, includes links to both historical published streamflow record data and provisional administrative stream flow data, and links to streamflow data collected by other agencies, such as the USGS. For internal use by Hydrographic Branch staff, the web site includes a tool called webHMS, which allows staff to update station data (e.g., shifts, measurements, ratings, stage-shift relationships, and station descriptions).

DWR also developed and released a new version of HydroApp. This application allows a hydrographer to manually enter field current-meter measurement data to compute discharge. It will also import files from the AquaCalc Pro, the discharge measurement digitizer, and totalizer used by hydrographers across the State. The new version of HydroApp allows the use of breakpoint current meter ratings and employs the standard computation procedure adopted the Branch. Discharge measurements may be automatically synchronized with the new website allowing shift updates, updating of discharge measurement summaries, and display of measurement data on streamflow hydrographs.

Several new features were added to the Record spreadsheet used by the Branch to develop streamflow records.

New Gaging Stations

Several new gaging stations were added to the satellite monitoring system in 2007. Typically, gages are added as the result of the identification of a critical water administration need. Existing gaging stations, not previously on the SMS, are also candidates for adding satellite equipment where water administration needs have increased. Gage cooperators pay the capital costs associated with these new or upgraded stations and annual maintenance agreements.

Division 1 established two new gaging stations and satellite telemetry to five new sites:

- Fall River near Idaho Springs
  A new installation funded by the CWCB tracks minimum stream flows.

- South Platte River at Crook — The South Platte Decision Support project funded this new installation.
- Prewitt Reservoir Outlet, Prewitt Reservoir release to Highline Canal, Prewitt Reservoir delivery to the South Platte Ditch — A single DCP serves these three structures with the cooperation of the reservoir company, which ran buried cables for the project.
- Prewitt Reservoir Inlet Canal — Radio Link to Prewitt outlet DCP.

- Jackson Lake Outlet — Staff installed a DCP to support the South Platte Flow Monitoring project.

Division 1 also added 26 new ditch gages to the DWR website through the South Platte Flow Monitoring Project. This project is a cooperative venture between DWR, the Northern Colorado Water Conservancy District and the Lower South Platte Water Conservancy District. Sutron SDR recorders, purchased by the DWR Hydrographic program and Lower South Platte WCD, were installed by Division 1 staff. These units were connected to cell phone modems supplied and installed by Northern Colorado Water Conservancy District. The data are polled by Lower South Platte WCD and pushed to each of the three agencies' websites.

Division 2 added eleven gages to the satellite monitoring system in 2007 (two new and nine existing non-satellite gages):

- Six Purgatoire River Water Conservancy District gages in District 19 (CILDITCO, SOUDITCO, HOEDITCO, JOHDITCO, MODCANCO, PIKDITCO). Equipment housings were installed by the cooperator under close coordination and supervision of Division 2 staff. Electronic equipment was installed by Division 2 staff and SMS Electronics Specialist David Hutchens.
- Greenhorn Creek above Rye (GRECRKCO) stream gage and the adjacent Shurtz Ditch gage (SHRDITCO).
- Satellite telemetry equipment was installed at Comanche Power Plant return flow gage (COMRETCO).
- Satellite telemetry equipment was installed on the Bessemer Ditch gage (BESDITCO).

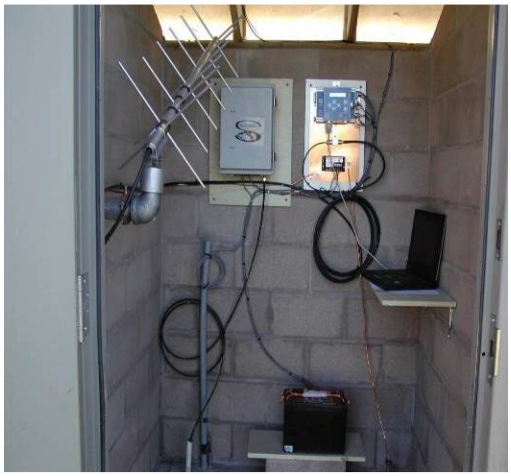
- Staff installed satellite telemetry equipment on the Doc Rodgers Ditch in Upper District 10 (DRGDITCO).

Division 3 did not add gaging stations to the satellite monitoring system in 2007.

Division 4 completed or nearly completed work to add two new gaging stations to the satellite monitoring system in 2007.

- Cow Creek. The construction of a new ramp flume for a cooperative gage on Cow Creek proceeded through the middle and end of the year. Construction was delayed by high water at the site and scheduling of a backhoe. The Cow Creek gage is a new SMS site with the USBR contributing the satellite equipment and the Uncompahgre Valley Water Users Association and Tri-County Conservancy District contributing the construction funds. Construction is complete, with the exception of hooking up the SMS equipment and the 2008 spring thaw.

- Buckeye Reservoir and Outflow Gage. Buckeye Reservoir is remote and prone to vandalism. Staff eventually obtained a special-use permit from the US Forest Service (Manti-Lasalle NF in Moab, UT). One of USFS's conditions was to have the least obtrusive structure for the gage house. A colored split block concrete block structure was designed and built. The antenna is inside the shelter and the solar panel is flat against the roof. An Accu-Bubble measures reservoir water level and a data cable connects to a shaft encoder in a stilling well installed at the outlet works 4-foot Parshall flume.



Division 5 began operating two satellite-monitoring stations that it had installed in late 2006 and funded by the CWCB.

- Crystal River at the DOW fish hatchery near Carbondale (CRYDOWCO);
- Roaring Fork River above the Fryingpan River near Basalt (ROAFRYCO).

Division 6 did not add gaging stations to the satellite monitoring system in 2007.

New stream gages added to the system in **Division 7** during 2007 are:

Red Mesa Ward Reservoir and Hay Gulch below Red Mesa Reservoir. Satellite telemetry equipment was added to the existing concrete Parshall flume and steel shelter at Hay Gulch below Red Mesa Reservoir. Staff ran 1" PVC conduit and electronic data cable in the conduit on the west edge of the access road to a 4'x 4' steel shelter located at the top of the dam. Two-inch galvanized pipe and 1¼" PVC provide protection to the orifice line to the reservoir pool. Data for reservoir releases and elevation are collected and transmitted from the DCP located in the shelter.

- DCP and shelter were installed at Hay Gulch Ditch near Hesperus. Satellite telemetry was installed at the site to help administer the Colorado-New Mexico compact.
- DCP and shelter were installed at La Plata Irrigation Ditch near Hesperus. Satellite telemetry was installed at the site to help administer the Colorado-New Mexico compact.

Gage Refurbishment Projects

The Hydrographic Branch continues to refurbish and maintain our existing streamgaging network sites. With $55,000 from CWCB and a portion of our General Fund appropriations, Staff carried out several refurbishment projects.

In **Division 1**:

- Lightning protection measures were installed at Hoosier Pass Tunnel, including a ground bed and new enclosures for the DCP and encoder.
- Sutron SDR datalogger encoders were installed on four transmountain gages. These were the last "chart-only" (non-DCP) published record gages in Division 1. This list included Straight Creek (water) Tunnel at the East Portal of Eisenhower (I-70) Tunnel. Straight Creek was a tricky project because the flume was in a vault. Due to confined space hazards, a truck hitch-mounted davit (tripod and winch personal safety line), and full harnesses were purchased. A special enclosure was built to withstand the wet environment.
- An SDR and an electric tape gage were installed on Chief Creek below the Wray Fish Hatchery. DOW purchased the equipment as a compliance measure for the Republican River Compact.

During WY07, **Division 2** hydrographers completed these stream-gage improvements:

- Constant Flow Bubbler was installed at Adobe Reservoir to correct a problem with diurnal fluctuation in gage readings.
- Drop-wire weight was installed for primary reference gage at Purgatoire River at Trinidad.
- Channel clearing and grubbing was performed at Raton Creek above Starkville, and a cleanout door was installed on the stilling well.
- Oil tubes were installed at Douglas Reservoir, Douglas Reservoir Outflow, Brett Gray Reservoir, and Purgatoire River at Nine Mile Dam to hold isopar for winter operation.
- A conduit extension and muffler were added and a crest-stage gage installed at the Rule Creek near Toonerville gage.

- New temperature sensors were installed at Grape Creek near Westcliffe, Arkansas River near Wellsville, Cucharas River at Boyd Ranch, Huerfano River near Redwing, and Arkansas River at Nepesta Road Bridge gages.
- A tipping bucket rain gage was installed at Muddy Creek near Toonerville.
- An SDR was installed at Arkansas River at Portland.
- Bubbler line was re-run at Arkansas River above Pueblo.
- Abandoned bank operated cableway was demolished and removed at Grape Creek near Westcliffe. Also, the stilling well was pumped and intakes cleaned.
- Major electronics repair was done at Purgatoire River at Nine Mile Dam including new DCP, new battery, new antenna and new antenna cable.
- The Accubar at Purgatoire River below Highland Dam was replaced by an Accububbler after an untrained deputy water commissioner damaged it. A new orifice line was also run.
- A vent was installed in the Arkansas River at Granite shelter, due to excessive moisture in the shelter.
- Constant Flow Bubblers were installed at the Arkansas River at La Junta and Arkansas River near Wellsville gages as part of field tests by the Denver Electronics Specialist. Division 2 staff coordinated to change programming and monitor performance, especially during ice conditions.
- A new muffler was installed at Arkansas River near Rocky Ford.

In **Division 3**:

- A cableway A-frame was built and installed at the South Fork Rio Grande near South Fork station.
- A cableway A-frame was built for the North Channel Conejos River near La Sauses, and is scheduled for installation in April 2008.
- The flume at Norton Drain near La Sauses was modified with a ramped insert in the throat of the flume to prevent the well from becoming isolated at low flows and improve low-flow sensitivity.
- A ramped insert was installed in the existing concrete rated section at Pinos Creek near Del Norte to better define the lower end of the rating curve.

In **Division 4**, gaging station maintenance included:

- Staff performed heavy maintenance on the floor of Razor Creek below Vouga Reservoir gage stilling well. The concrete floor leaked and the gage height transmitted was not reliable. Staff pulled out loose concrete, and then mixed and placed a new concrete for the floor. The floor drain was extended up and steel rebar was installed. The floor inside the four-foot diameter well was raised four inches.
- Cooperation with the USBR at the Redlands Canal continues. The old mount failed in July and we are discussing an improved mounting system for the ADVM. The ADVM was retrieved during full canal conditions. A new stainless steel mounting plate was designed, fabricated and installed.
- South Canal and the AB Lateral gages were set up with separate satellite telemetry systems by David Hutchens to help improve data quality. The SDI-12 radio bridge between the two gages did not operate reliably.

- Riprap material for repairs to the banks and downstream channel/exit of the Roubideau Creek near Delta ramp flume were delivered on site.

In **Division 5**:

- A new cantilever gage was constructed at the West Divide Creek near Raven station.

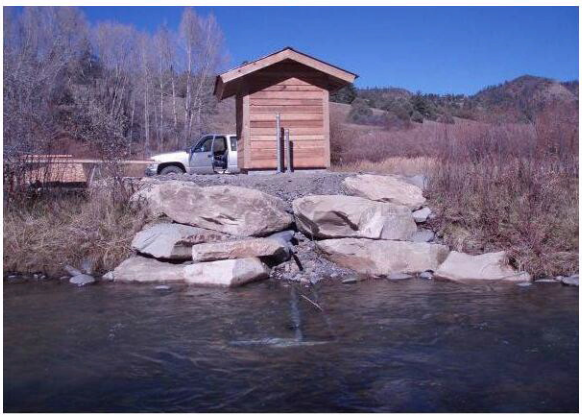
During 2007, **Division 6** inspected, maintained, and refurbished several sites:

- The existing 12-inch stilling well on Willow Creek below Steamboat Lake was replaced and a new doghouse shelter installed. The new well and shelter better accommodate the shaft encoder and other gage equipment. Two intake pipes were installed, extending from the well to the channel. In addition, new HDR DCPs were installed at the Willow Creek and Steamboat Lake gage stations and the existing SDI-12 radio connection between the two stations was removed due to unreliable operation.

- The Accubar bubbler at the Williams Fork at the Mouth near Hamilton gage station was fitted with a muffler and realigned to prevent sediment clogging of the orifice. The bubbler had been plagued with ice and sediment issues throughout much of WY07.
- A new stilling well, doghouse shelter, and intake pipes were installed at the Michigan River near Meadow Creek Reservoir gage station, completing the station upgrades that were initiated in 2006.
- The Illinois River near Rand gage station was totally refurbished and upgraded. Staff installed a new HDR DCP, encoder, stilling well, enclosure, and intake pipes.

In **Division 7**:

- Florida River above Lemon Reservoir: The installation of the bank-operated cableway was completed in the spring of 2007.



- Rio Blanco at the Mouth near Trujillo: The division seized the opportunity to rebuild and relocate the gage while river restoration construction was occurring at the gage site. A new 48" CMP well with intakes and concrete pad was installed along with a new gage house. In the spring of 2008, the existing gage site will be abandoned and the equipment will be relocated to the new gage location.

- Long Hollow Creek near Red Mesa: The existing stilling well and shelter is a wood structure. Part of the wood stilling well that faces the creek rotted away and was replaced with new pressure treated 2" x 6" lumber.

High Data Rate Data Collection Platform Upgrade Project

The high data rate (HDR) data collection platform upgrade project continued this year. The CWCB funded $248,000 in support of this ongoing activity. Included in this funding is the cost of the replacement data collection platforms plus upgraded shaft encoders and grounding systems. Often, gage power supply equipment (batteries, solar panels, charging regulators) and antennas also need upgrading along with the new DCP.

A total of 30 State of Colorado DWR-owned data collection platforms were upgraded in 2007. Upgrades result in satellite transmissions once every hour at 300 bps (compared to the older equipment that transmitted once every 4 hours at 100 bps). Currently, nearly 77 percent (339 out of 440) of the State of Colorado DWR data collection platforms have been upgraded to high data rate. David Hutchens also upgraded four USGS gages to HDR and installed new satellite telemetry in three USGS gages that only had non-satellite recorders.

Flood Hardening Projects

Flood hardening of gaging stations may involve moving gages to higher ground, installing redundant gage height sensors, stabilizing and protecting banks, rating extensions, improving high flow measurement capability, or some other means of fortifying gage stations to enhance data collection and processing during flood events. It continues to be one of our top priorities; the CWCB provided $50,000 this year to continue flood-hardening projects.

In 2007, **Division 1** built an earth and block platform on the left bank for the manned cableway at South Platte River below Chatfield Reservoir. The rented loader also removed rocks from beneath the cableway.

In cooperation with the USGS Nebraska Water Science Center, a new concrete weir control was built at the North Fork of the Republican River at the Colorado-Nebraska Stateline. This project stabilized the gage and controlled and improved data collection for the Republican River Compact.

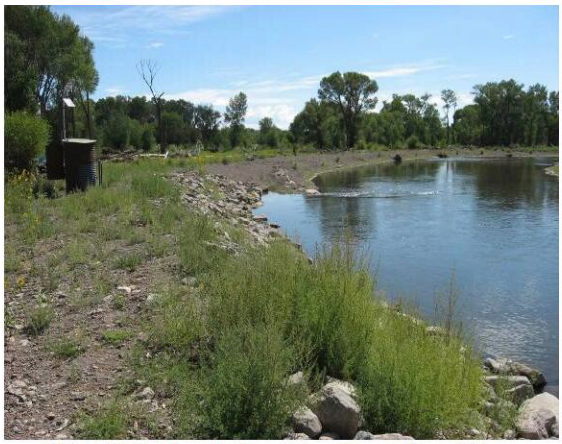
In **Division 2**, a floodwall was constructed at the Arkansas River at Salida gage to stabilize the bank at the gage. New intake pipes to the stilling well were installed at this time. Structural repair was done on the Arkansas River at Cañon City cableway frame on the right side of the river. A flood block was installed at the Arkansas River below Catlin Dam gage after ice heave caused the orifice line to move in the winter 2007. New conduit was run and a new muffler was installed. Major tree clearing was also done at the cableway for this gage and graduations were repainted on the cable.

Arkansas River at Salida flood wall

Arkansas River below Catlin Dam flood block

Three large flood hardening projects where completed by **Division 3** during 2007. The largest project was the installation of a J-hook vane in the channel and bank riprap at the Rio Grande at the Rio Grande-Alamosa County Line gage. This was needed to protect the gage from high flow and to stabilize the control section. The South Channel Conejos River near La Sauses gaging station was moved 300 feet upstream and a sheet piling control installed to provide more accurate measurement of flows. The gage at San Antonio River near Manassa was reset (at the same location) with a new concrete well and new inlet and flush pipes.

Rio Grande at the Rio Grande-Alamosa County Line before flood hardening



Rio Grande at the Rio Grande–Alamosa County Line after flood hardening

Division 4 is scheduled to install a bank-operated cableway at Surface Creek near Cedaredge as the final phase of the flood-hardening project, but access to the site during low flow periods has been problematic. The cableway apparatus has been purchased. The bank-operated cableway will be relocated upstream from the original planned location. Heavy construction was performed at this gage to repair high water damage to the bridge and banks upstream of the gage ramp flume. A track hoe was employed to place rock riprap on both sides of the bridge abutment and both sides above and around the wing walls of the ramp flume.

Alert System

The DWR Flow Alert System compares measured data (gage height, discharge, or any other parameter) from remote gaging sites against alert criteria (threshold values) set up by the DWR/CWCB users. Alert criteria choices include high flow alarm, low flow alarm, or rate of change alarm. The system then contacts the users of a current alarm via e-mail, phone, or pager. There are currently 39 users with 415 different alert criteria programmed. Users continue to be satisfied with the system and its functionalities.

Training

Twelve DWR hydrographers and water commissioners participated in a Swiftwater First Responder training course on May 22, 2007 at the Arkansas Headwaters Recreation Area (AHRA) Visitor Center in Salida CO. The Swiftwater First Responder training course uses a curriculum developed by Rescue 3 International, a world leader in water and flood rescue. Stew Pappenfort, AHRA Senior River Ranger and Rescue 3 International certified instructor, conducted the training. This one-day class was designed to acquaint participants with the dangerous conditions that can exist while measuring streamflow or while working in, above, or near water, and the steps to be taken to keep one safe.

Thirty DWR staff attended the Annual Hydro Branch Training Meeting, held at the Colorado Division of Wildlife in Colorado Springs, November 7-9, 2007. Topics included: transit loss issues in Division 2 (including overviews of new transit loss models developed for the Arkansas River between John Martin Reservoir and the CO-KS Stateline and the Fountain Creek watershed), Parshall flume installation to avoid submergence and effects of being out of level, field DCP operations and troubleshooting, update on hydro tools developed by the IT staff, results of the 2006 records QA/QC reviews, severe weather spotting, and several safety items including fall protection.

Jana Ash conducted flagger certification training for hydrographers and water commissioners in Divisions 1 and 2.

Mark Perry attended HEC-RAS hydraulic modeling training.

Jerry Thrush participated in several online classes covering various subjects concerning hydroacoustics methods, software and equipment.

Coordination with Federal, State and Local Agencies

The Hydrographic and Satellite Monitoring Branch continued coordinating streamgaging activities with the USGS Colorado Water Science Center and the CWCB. Coordination meetings were held in March and December 2007. Participants include the lead hydrographers, USGS data chiefs in the subdistrict offices, and the CWCB instream flow protection streamgaging coordinator. Several key gages in Division 2 (ARKCANCO, ARKPORCO, ARKPUECO and ARKCATCO) were changed from 30-minute to 15-minute transmission intervals to provide better backup data and assist in real time water administration as a result of this coordination with the USGS, since the original reason for 30-minute transmission was limitations of co-located USGS water quality labs.

Hydrographic staff around the State coordinate multiple activities with the USBR, including streamgage operation and maintenance on the Colorado-Big Thompson Project (Divisions 1 and 5), the Fryingpan-Arkansas Project (Divisions 2 and 5), the Closed Basin Project (Division 3), and the San Juan-Chama Project (Division 7).

- Notable USBR liaison activities in 2007 in Division 1 included assistance with installation of USBR-purchased SDR recorders at 8 sites, assistance with DCP rewiring to facilitate the USBR's SCADA system operation, and numerous levels conducted as the USBR rebuilds the flume on the Big Thompson River above Lake Estes. DWR conducted a day of cable measurements on a canal to assist with a USBR (Denver Lab) study comparing two types of acoustic Doppler instruments, the Teledyne RDI StreamPro, and the Ott QLiner. Both instruments showed about 5% less water than traditional current meter measurements. The USBR paper concluded that the StreamPro might measure velocity more accurately, while the Qliner does a better job with flow area.
- An HDR upgrade was completed at the Pueblo Reservoir gage operated by the USBR in Division 2. Staff invested considerable time and effort to coordinate the high data rate upgrade at Pueblo Reservoir (including the addition of a gage on the Bessemer Ditch). Although the Bureau of Reclamation operates the gage, Division 2 acts as the "first responder" to gage problems due to its close proximity and the paramount importance to water administration on the Arkansas River. Numerous problems plagued the Bureau's HDR upgrade and required involvement from Division 2 to be trained with the new equipment and setup (including tiny basic programming, radio bridges, and pressure tranducers). We were also involved with establishing gage calibration and datum correction protocols that the Division 2 Reservoir Operations Coordinator can accommodate into his storage accounting.
- The Hydrographic Branch in Division 3 is charged with fulfilling the terms and conditions of a contract between the State of Colorado and the USBR. This contract provides for streamflow measurement and data collection on the Closed Basin Project. It is the responsibility of the Hydrographic Branch to measure, record, and disseminate flow information to the USBR and to other public entities. In addition, the hydrographers are consulted on certain areas of concern regarding streamflow and measurement within the Project. Specifically, the DWR is responsible for operating the gaging station on the Closed Basin Canal, and developing monthly and yearly

streamflow records for this location. In addition, there are at least nine other locations on the Closed Basin Project area that are to be measured when the need arises. The current five-year contract agreement between the State of Colorado and the USBR regarding the Closed Basin Project went into effect in February of 2005.

- The USBR requested help from Jerry Thrush, Division 4, in calibrating a new ADVM on the Government Highline Canal in Division 5. The diversion from the Colorado River needed a velocity index developed. Jerry used the Rio Grande Work Horse on three days. The correlation between the two data sets was evaluated by the USBR.

DWR is continuing its support of NRCS (Natural Resource Conservation Service) by conducting snow surveys throughout the state. The sites are surveyed the last day of each month from January through April. The data are collected and disseminated by NRCS and published on their website for water users. DWR hydrographers and water commissioners are currently measuring seven sites across the state.

The Division 6 hydrographer worked closely with the District 44 water commissioners on the Elkhead Creek Reservoir fish release program during Water Year 2007. The Elkhead Creek Reservoir expansion was completed in 2007 and the first fish recovery release was successfully completed in August and September 2007. Approximately 5,000 acre-feet of water was released to support the recovery efforts for the endangered downstream fish species. Data collected during the release is still being compiled and reviewed by participating agencies and a transit loss study has been initiated. The Colorado River District, on behalf of the Recovery Program of the US Fish and Wildlife Service, directed the program and Division 6 was responsible for protecting the fish release water through the Yampa River critical habitat reach.

DWR Hydrographic Staff were active participants under the leadership of Deputy State Engineer Jack Byers in the Water Availability Task Force and the Flood Task Force in 2007. Leadership from the DWR and the CWCB head these multi-agency work groups, which focus on water availability/drought issues and local flooding issues, respectively.

Streamgaging Program Cost Study

In 2005, the Hydrographic Branch participated in a streamgaging cost study and comparison with the USGS Colorado Water Science Center. This study was finalized in WY2007. Details of the study are reported in USGS Open-File Report 2007-1426, which is available on line at: http://pubs.usgs.gov/of/2007/1426/ .

Two approaches determined the average cost to operate and maintain DWR gaging stations: 1) divide DWR total funding for the Hydro Branch by the number of gages operated, and 2) use a detailed cost spreadsheet developed by the USGS. An inventory of DWR satellite monitoring gages found 433 total streamflow and reservoir gages on the network (400 streamflow gages and 33 reservoir gages) at the time during 2005 when the study was initiated. Total DWR FY2005 funding to operate the 400-streamflow gage network was estimated to be $2,810,000. This includes costs of personal services for all

field staff, supervisory/administrative staff, and IT staff; vehicle O&M; vehicle lease cost; prorated office space costs; prorated office supplies costs; SM general fund allocation exclusive of personal services; SMS cash fund spending authority; CWCB DCP replacement and gage refurbishment allocation; and estimated IT infrastructure costs. The average cost per gage was determined to be $7000.

Table 3 presents the streamgaging costs results based on the USGS detailed cost spreadsheet. Average cost per gage is given in several subcategories and in total. The total DWR annual cost per gage estimated using this approach was $7300, and compares reasonably well with the above amount. Most of the difference between the two average per gage cost estimates is based on the fact that DWR does not spend the average of $1200 per gage per year (Table 3 average annual per gage costs for field equipment). For the 400 gage network, this equates to annual spending of $480,000. Actual FY2005 gage expenses from the SM cash fund, general fund and CWCB construction fund were approximately $405,000, or, $1010 per gage.

The USGS Colorado Water Science Center's average annual cost per streamgage for their network of 256 streamgages (in 2005) was $14,000. Most of the higher cost for the typical USGS gage compared to the DWR gage is due to significantly greater overhead:

1) administrative costs: the USGS has regional and national levels of program administration overhead costs in their cost estimate, which are absent in the State program ($4200 USGS vs. $570 DWR);
2) building and utilities costs: primarily related to high costs associated with the Federal Center building space ($1100 USGS vs. $130 DWR);
3) data management and delivery: again related to regional and national programs for data management and delivery which are considerably less in the State program ($1200 USGS vs. $440 DWR).

Table 3. Comparison of USGS and DWR annual streamgaging cost per gage using USGS spreadsheet using 2005 cost data.

Cost Category	**Cost/gage/yr ($)**	
	USGS	DWR
Administrative	4200	570
Building and utilities	1100	130
Field Equipment	1500	1,200
Labor for field and office	5300	4,600
Vehicles	490	310
Travel	190	54
Data Management and Delivery	1200	440
One-time installation-decommission	0	0
TOTAL	14,000	7,300

Miscellaneous Activities

Division 1: Measuring storm peaks has taken a higher priority. Ditch companies who want recharge water are looking closely at the Kersey gage figures whenever it storms in Denver. With traffic flagging, a bridge measurement requires a minimum of four people. Division 1 office staff are regularly drafted to assist hydrographers with measurements at Henderson and Kersey. Division 1 also developed a "Weekend Hydrographer on Call" list to coordinate weekend high water measurements.

Chatfield Reservoir accounting issues created a need for the best possible accuracy for streamflow data from river gages at Waterton, below Chatfield Reservoir, and below Strontia Springs Reservoir. The Chatfield spreadsheet has shown greatest inconsistencies when these gages require cable measurements. This could be due to flow timing, errors in the Chatfield capacity table, and problems with diversion figures, as well as the measurement errors inherent in cable measurements. To help eliminate our gages from the error investigation, Division 1 has taken steps to improve the accuracy of our high water measurements. First, we increased the frequency of high flow measurements. Next, rocks were removed beneath the cabling section at the Chatfield gage; similar work is planned at Waterton. A StreamPro ADCP will be procured early in 2008 to use at these sites as a check on standard current meter techniques. Finally, we are investigating the use of Denver's Conduit 20 diversion dam (below the Strontia gage), as a potential gaging site to verify flows recorded at the Strontia gage.

Thanks to telemetry installations made for the Lower South Platte Monitoring project (DWR, NCWCD, and LSPWCD), all ditches in Districts 1 and 64 are now on the DWR streamflow website. Telemetry installations on small tributary streams will continue in these districts to develop a point-flow model. DWR will install and operate a number of new stream gages as part of this effort. Funding is also being secured to extend new telemetry to other water districts within the NCWCD boundaries.

Russell Stroud developed a spreadsheet tool that compares the data from an SDR log with the reported DCP record. The program highlights days on which the two data sets have any significant difference in mean, maximum or minimum values. A hydrographer can easily facilitate the basic data check for records purposes on satellite gages with SDR encoders installed.

Division 2: Division 2 provides support for numerous gages that are not on the Satellite Monitoring System. Generally, water commissioners use such gages for administrative purposes, but hydrographic staff may be involved in trouble-shooting and repair of gage equipment problems and making flow measurements to verify gage accuracy. Activities included: installing an analog SDR on a flow meter for the City of La Veta, trouble-shooting and data-downloading support for SDRs at non-SMS gages, installing an SDR on the Brett Gray #1 Ditch at Smith Ranch for the Colorado State Land Board, inspecting flume construction at diversion to Clark and Orlando Reservoirs, and coordinating with the District 17 water commissioner to measure at several ungaged locations. Staff also provided SDR support for the Excelsior and Riverside Dairy ditches. Hydrographers ran

levels, inspected the flume, and measured flow at the Skaguay Reservoir outlet gage. Division 2 hydro staff also assisted with maintenance of 11 CoAgMet weather stations in the Arkansas Valley.

Division 4: Acoustic Doppler discharge measurement capability continues to grow. Jerry Thrush provides informal leadership to this program throughout the state. Jerry operates StreamPro and Rio Grande Workhorse ADCPs and a stationary ADVM at Redlands Canal. A StreamPro ADCP was procured for use in Division 3 this year. Jerry spent two days of Win River II training in Alamosa offering his expertise, along with the company sales agent, training the Division 3 staff on their new StreamPro. Jerry also spent a day in Division 1 evaluating several sites for potential StreamPro measurements.

Division 5: Levels were run at twelve streamflow gaging stations. Photos and maps were updated for all fourteen published record streamflow gages.

Division 7: A transit loss study was performed on the La Plata Irrigation Ditch this year.

DAM SAFETY BRANCH

Introduction

The mission of the DWR Dam Safety Branch is to mitigate the loss of life, damage to property, and loss of water supplies due to the failure of dams in Colorado. The Safety Evaluations of Existing Dams (SEED) program determines the safe storage levels of reservoirs within the state. Additional program tools include a comprehensive set of rules, regulations, policies, and procedures for the design, construction, and maintenance of dams, the safe operation of reservoirs, and emergency action planning.

The State Engineer manages the Dam Safety Program in accordance with sections 35-49-101, *et seq.*, (the Livestock Water Tank Act) and 37-87-101 *et seq.*, C.R.S. The Branch Staff are located in Denver and each Division office and consist of a branch chief, eleven dam safety engineers, and one design review engineer. The Branch oversees nearly 2,900 dams, including 1,928 dams of jurisdictional size. Of these, 1,802 are non-federal dams. Of the non-federal dams, 677 (38%) are dams that, in the event of a failure, would cause loss of life and/or significant property damage within the flood plain area below it

Dam Safety Branch tracks its records by water year; this report reflects the challenges and accomplishments from November 1, 2006 until October 31, 2007 ("WY06-07").

Through the diligent field observations of dam safety engineers statewide, several near-failure incidents were acted upon in time to diffuse potentially dangerous situations and possible loss of life. As a direct result of these actions, no loss of life or significant property damage occurred in Colorado during WY06-07. This is due to the increased awareness and responsibility of the dam owners for their dams, including emergency action planning, and to DWR's enforcement of its regulations, policies, and procedures.

During WY06-07, the Branch approved 5 plans for new dams and 37 plans for alteration, modification, or enlargement of existing dams. The Branch also approved hydrology studies for four dams to determine the inflow design flood for spillway design. The estimated cost of construction for the submitted plans was over $60 million.

During WY06-07, DWR engineers conducted 541 dam safety inspections and 265 construction inspections -- a total of 806 inspections. In addition, Staff performed 97 follow-up inspections. At the conclusion of this reporting period, 171 dams were restricted from full storage due to inadequate spillways and various structural deficiencies such as significant leakage, cracking and sliding of embankments. Staff restricted a total of 115,214 acre-feet of storage in the following 171 structures: 18 High Hazard, 32 Significant Hazard, 114 Low Hazard, and 7 No Public Hazard dams. The restrictions reduce the risk to the public and the environment until the deficiencies are corrected. Although many dams were repaired and removed from the restricted list, a number of dams were added during the same period. The change in the storage restrictions from the same time last year resulted in a slight decrease in the number of dams on the restricted list and the storage volume of the restrictions decreased approximately 2,300 acre-feet.

Federal Dam Safety Coordination

Routine inspections of federal dams by Dam Safety Engineers were curtailed according to a legislative audit recommendation. The Branch, however, will participate in the evaluation of the safety of some federal dams for special issues and performance problem evaluations, in accordance with the procedure for obtaining approval to participate in these inspections. The Branch spent about ten hours this water ear participating in these safety inspections at a cost of less than $450.

Memoranda of Understanding (MOU) were executed with the U.S. Bureau of Reclamation (USBR), the U.S. Bureau of Land Management, and the Air Force Academy relating to dam safety activities in Colorado. An MOU is also in development for the Fort Carson Army installation. The MOUs provide for the exchange of safety-related information of dams under each agency's jurisdiction. An MOU is also being updated with the U.S. Forest Service, Rocky Mountain Region, to provide coordination of mutual responsibilities for dam safety and their Travel Management Plan for the National Forests. This is necessary to provide access to private dams located within the forests. The Branch is pursuing MOUs with other federal agencies such as the U.S. Army Corps of Engineers (USCOE) and the Federal Energy Regulatory Commission (FERC) to assure that the dams under their jurisdiction are maintained in a safe condition and to coordinate activities and exchange of information and data.

In the past, the Branch has performed safety inspections of dams FERC also regulates. In accordance with an agreement (since a formal MOU was not completed) with them, they were to furnish copies of their reports for branch records. More recently, the branch had curtailed participation in FERC-regulated dams in accordance with a 1998 State of Colorado internal audit. However, during a recent review of the agreement and procedures for administration of FERC-regulated dams, the Branch identified a need for a change in the current policy; the Dam Safety Branch had not regularly received copies of FERC safety inspection reports. Further, unlike USBR and USCOE dams, the FERC does not own the dams they regulate and, in most cases, Colorado-based entities own the dams. To ensure the safety of the citizens of Colorado, the Dam Safety Branch engineers resumed performing dam safety inspections of FERC-regulated dams in Colorado. Policy Memorandum No. 06-02 modified Recommendation #3 of the 1998 legislative audit resuming inspections on non-federal dams that FERC regulates.

Extreme Precipitation Analysis Tool

Funded by the National Dam Safety Program grant and the CWCB, a final version of the Extreme Precipitation Analysis Tool (EPAT) for West of the Continental Divide and a beta version of EPAT was released for use within the Dam Safety Branch in the fall of 2007. The tool was initially developed for the western slope with drainage basins between 1 and 500 square miles.

EPAT is an objective, GIS-based analysis tool that utilizes existing National Weather Service storm databases as well as the Colorado extreme weather database developed by Colorado State University and modern meteorological techniques to analyze extreme precipitation events. EPAT provides dam owners an alternative to costly site-specific studies. The Branch will provide training sessions to the public on how to effectively use EPAT. The initial use of EPAT has shown that the tool emulates site-specific Probable Maximum Precipitation (PMP) and Hydrometeorological Report PMP events.

Hydrologic Basin Response Study

The Branch determines spillway adequacy based on the development of an Inflow Design Flood (IDF) for the watershed above a given dam. A second part of the development of an IDF has to do with how the watershed reacts to the extreme precipitation event. Many "Basin Response Factors" can effect how much precipitation (water) from a given magnitude event actually runs off and needs to be safely handled by the spillway and passed through the reservoir to prevent overtopping the dam.

As with the methodologies used for estimating extreme precipitation, the methods of estimating basin response factors used in determining the IDF are based on past research and have not been updated in over 40 years. Additionally, in many cases the empirically based response factors were based on studies performed in other states, making their application within Colorado questionable.

Through the efforts of a nationally recognized consulting hydrologist and a select group of dam safety engineers with an expertise in hydrology, Guidelines and Procedures for Estimating Basin Response Factors in Colorado has been finalized and the Branch is currently working on a supplement document to this study and will be presented in the spring of 2008.

National Dam Safety Program Assistance Grants

With the passage of the National Dam Safety Program Act (NDSP), PL 104-303, and its subsequent funding, Colorado has received assistance grants each year since 1998, including an additional grant for 2006. These funds provided advanced training to the Dam Safety Branch personnel in the fields of dam safety and risk analysis. The technical seminar provisions of the Act provided additional training. The Branch used grant funds to acquire emergency communication equipment, upgrade computers, and purchase engineering computer software programs and other equipment. Future grants may be available each year under the Act, subject to appropriations.

A critical element in the Dam Safety Program is the continued training of our personnel to maintain a high level of technical competency, to keep up with changing technology, to develop additional management and communication skills, and to keep abreast of changes in the development of dam safety programs across the country. The staff received training in the following manner this water year:

1. Jason Ward attended FEMA's HEC-RAS/HEC-HMS training in Emmitsburg, MD.
2. In November, Bill McCormick presented a paper titled "Angled Pressure Relief Wells Improve Stability at Spinney Mountain Dam" at the 2006 ASCE Biannual Colorado Geotechnical Seminar.
3. Greg Hammer attended a Pumped Storage Workshop by FERC in Lansdowne, VA.
4. John Redding, Paul Perri, and John Batka attended an in-house HEC-HMS workshop by Bill McCormick in the Denver Office.
5. A three-day branch meeting attended by all branch dam safety engineers, and dam safety officials with Division of Wildlife and U.S. Forest Service, and Deputy State Engineer Byers, was held in Pueblo in late January. These topics were discussed:
6. Risk Based Profiling Score and Allocation of Branch Resources
7. Design review process and key design elements to identify.
8. Roller Compacted Concrete (RCC) dam construction.
9. Developing a guidance document for developing Emergency Action Plans.
10. Review comments on the Basin Response Study by George Sabol.
11. Policy on flood control structures.
12. Short course on GIS and the EPAT tool.
13. In January, Jack Byers, Paul Perri, and Bill McCormick attended the ASDSO Western Regional Conference in Omaha, NE. Bill McCormick presented a paper on "Forensic Analyses on Dam Incidences in Colorado."
14. In February, Paul Perri, John Batka, and Mark Haynes, attended a workshop titled "Pitfalls of Embankment Dams" hosted by FEMA in Emmitsburg, MD. Mark participated on a panel discussion concerning filters, geotextiles, and spillway design and presented a paper on the accomplishments of the Dam Safety Branch.
15. In March, Mark Haynes represented the State of Colorado at the United States Society on Dams (USSD) Annual Conference in Philadelphia, PA.
16. In late April, all branch dam safety engineers and dam safety officials with the Colorado Division of Wildlife attended a three-day branch meeting in Greeley.
17. In May, Jason Ward attended a weeklong Safety Evaluation of Existing Dams training course presented by the US Bureau of Reclamation in Denver.
18. In June, Paul Perri, Bill McCormick, and John Redding attended HEC-RAS training by Urban Watersheds Research Institute in Denver.
19. In June, Jack Byers and Paul Perri attended the FERC Security Workshop in Denver.
20. In June, Jack Byers, Mark Haynes, Bill McCormick and Paul Perri attended the National Dam Safety Review Board meeting held in Denver.
21. In September, Mark Haynes attended the Association of State Dam Safety Officials (ASDSO) Annual Conference as state representative where he presented a paper on the Database Application Tool and participated in a presentation on the Extreme Precipitation Analysis Tool.
22. In October, Bill McCormick, Jason Ward, John Batka, Jeremy Franz, Paul Perri, and John Redding attended the ASDSO Advanced Technical Seminar on Slope Stability for Embankment Dams in Denver.

Integration of Risk Assessment

In the late 1990s, the Dam Safety Branch embarked on a program to utilized Risk-Based methods to rank dams according to potential failure modes and consequences. An Intergovernmental Agreement between the Bureau of Reclamation (USBR) and the Dam Safety Branch allowed the USBR to revise their Risk-Based Profiling System (RBPS) to meet the needs of the Colorado Dam Safety Branch. The goal of the Colorado RBPS program was to develop a software tool that was relatively simple for the user to quickly rank the relative condition of High Hazard and Significant Hazard dams in the state. The engineers use the rankings to more efficiently allocate resources to those dams determined to present the greatest risk to public safety.

After several iterations of evaluating prototype software, in the summer of 2005, the Dam Safety Branch received an RBPS software tool suitable for its use. Since the software was delivered at a time when safety evaluations of existing dams by the dam safety engineers were at their peak, the tool was temporarily shelved. Recently, the dam safety engineers calculated RBPS rankings for the High and Significant hazard dams in their areas of responsibility. Those rankings are an important tool for the dam safety engineers as they develop schedules and priorities for the future inspection season.

In December 2006, a committee of dam safety engineers assembled to establish the criteria to use to determine the inspection frequency of High and Significant Hazard dams based on the results of the RBPS tool rankings. As a result of the committee activity, a policy memorandum was drafted that set forth the standards and procedures for a pilot program to determine the inspection frequency of High and Significant Hazard dams. The reduction in the current inspection frequency of High and Significant hazard dams has allowed for the reallocation of resources and allowed the dam safety engineers to concentrate on other functions, such as: verifying the hydrologic adequacy of existing dams, developing and updating emergency action plans, coordinating National Weather Service and emergency response personnel, reevaluating hazard classification and inundation mapping, working with the public in safety-awareness activities, reducing restricted dams, and performing Probable Failure Modes Analyses for existing dams.

Based on the results of the RBPS tool rankings and the recommendation of the committee, the inspection frequency of all High and Significant Hazard dams was based on the summation of the Static and Operation and Maintenance scores, presented here:

INSPECTION FREQUENCIES FOR HIGH AND SIGNIFICANT HAZARD DAMS

RBPS Score	High Hazard	Significant Hazard	Restricted Dams
> 135	Each Year	Each Year	Each Year
76 to 135	Each Year	Every Two Years	Each Year
51 to 75	Every Two Years	Every Three Years	Each Year
0 to 50	Every Three Years	Every Three Years	Each Year

The effectiveness of the pilot program to look at the reallocation of resources is still under review and evaluation. Preliminary indications reveal that this approach could result in a significant imbalance of dam safety inspections from year to year for the dam safety engineers. Continued revisions to the program in WY07-08 may resolve the imbalance and result in an improved and more efficient program.

Upper Blue Dam, Summit County, Division 5. High Hazard

Coordination with National Dam Safety Officials

All of the dam safety engineers in the Dam Safety Branch are members of the Association of State Dam Safety Officials (ASDSO) and actively participate in its programs, present papers, serve on task groups and committees, and take advantage of ASDSO-sponsored training opportunities. The ASDSO provides a forum for the exchange of ideas and experiences on dam safety issues, fosters interstate cooperation, provides information and assistance to dam safety programs, provides representation of state interests before Congress and federal agencies for dam safety, and improves the efficiency and effectiveness of state dam safety programs. Jack Byers is Colorado's representative to the ASDSO, and is active on its Board of Directors.

The Branch has implemented procedures to begin the national reporting of incidents and the findings of dam safety inspections where it has issued orders to make modifications for safety reasons. Incidents are reported to the Center for the Performance of Dams at Stanford University, in Palo Alto, California. ASDSO developed this national program in association with the Federal Emergency Management Agency (FEMA) to accumulate data to improve design and safety evaluations of dams nationwide.

National Dam Safety Review Board

The National Dam Safety Review Board (NDSRB) advises the director of FEMA when setting national dam safety priorities and considers the effects of national policy issues affecting dam safety. NDSRB members include FEMA, representatives from four federal agencies that serve on the Interagency Committee on Dam Safety (ICODS), five state dam safety officials, and one member from the private sector. Jack Byers is heavily involved on the board of the NDSRB.

Jack, with the assistance of Paul Perri, has successfully implemented a schedule tracking system for the NDSRB, which enables the board to effectively track ongoing research, publications, trainings, and budgets. In July, the Dam Safety Branch hosted the summer meeting for the NDSRB. The meeting included two days of conference in Golden and a one-day site tour of on-going dam construction projects (Rueter-Hess Dam and Genesee Dam No. 2) and a recently completed dam project, Guanella Dam, which was the USSD Project of the Year in 2005.

Personnel

- Jeremy Franz joined Division 1 in August 2007 as a PE II, Dam Safety Engineer. Jeremy brings a strong background in hydrology, hydraulics, and the use of GIS applications to the Dam Safety Branch. He has worked on several dam projects in Colorado ranging from dam break modeling to unsteady hydraulic flow modeling.

- Matthew Gavin was joined the Division 7 office in Durango in July 2007 as a PE II, Dam Safety Engineer Matthew brings a strong background in hydrology and hydraulics to the Dam Safety Branch. His dam safety related experience has ranged from hydrology and hydraulics and floodplain analysis to design and construction of civil works facilities.

Summary of WY 2007-2008 Dam Safety Branch Goals

In addition to yearly program goals of inspections and design reviews, the following are additional branch goals for WY 2007-2008:

1. Study reallocation of resources based on the results of the RBPS pilot program.
2. EPAT for the Front Range and San Luis Valley
3. Review and update current policy documents.
4. Update the EAP Guidelines and Design Review Guidelines.
5. Update the Owners Dam Safety Manual.
6. Continue to provide professional training of branch personnel.
7. Improve coordination and communication with Denver and the division offices.
8. Continue to perform dam owner training by conducting one-day workshops at various locations throughout the state.
9. Expand the Branch's involvement in National Dam Safety and Security activities.
10. Finalize the Basin Response Study.

LITIGATION

Volume and Trends

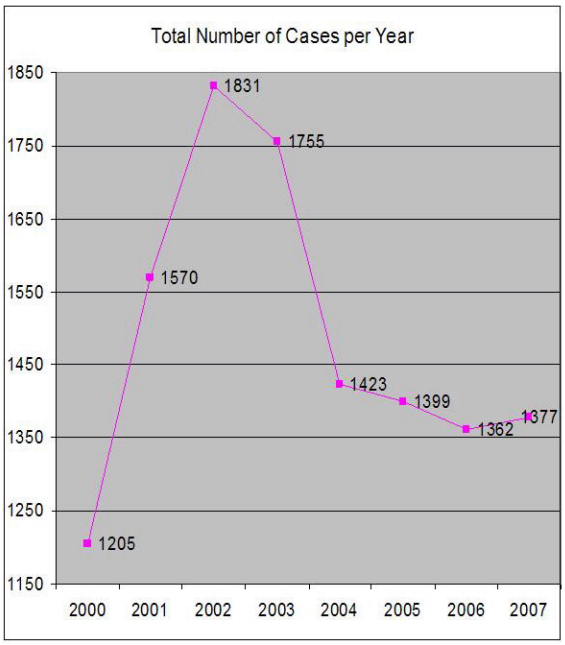
To perform our statutory responsibilities, litigation continues to consume a significant amount of time, effort, and expense for the Division of Water Resources. The following table describes the number of water court applications filed in 2007 and formal Statements of Opposition (including Motions to Intervene) filed on behalf of the DWR:

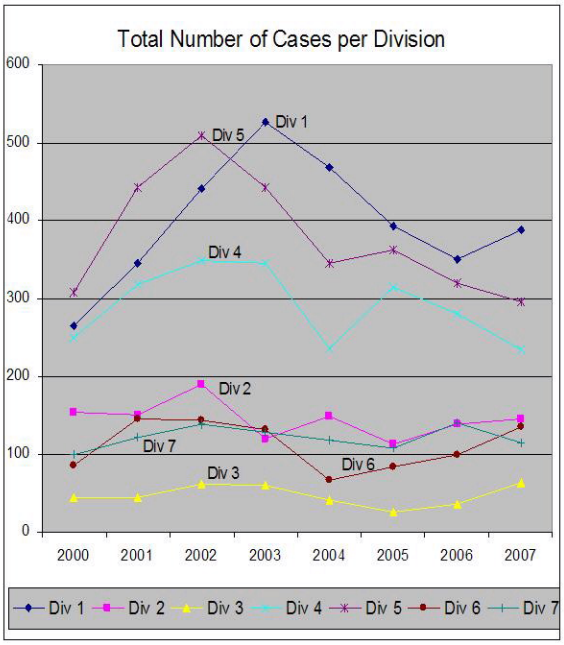
Division	Applications and Amendments	Stmts of Opp and Interventions	Percent Opposed
1	388	25	6.4%
2	146	12	8.2%
3	63	4	6.3%
4	235	1	0.4%
5	295	16	5.4%
6	135	3	2.2%
7	115	5	4.3%
Total	**1,377**	**66**	**4.8%**

When compared to previous years, the volume of cases continues to decline from the peak of 1831 applications in 2002 (due to the drought and the *Empire Lodge* opinion). There is a slight anomaly in Division 1, where well augmentation cases continue to seek final decrees. The DWR requires party status to ensure that these complicates decrees can be administered on the ground. The mean figure excludes 2002 and 2003 data.

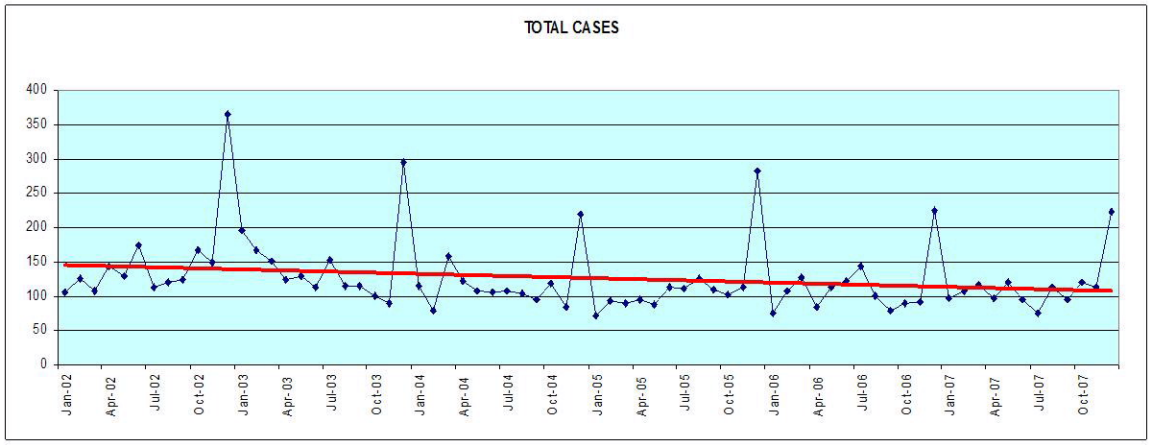
Div	2000	2001	2002	2003	2004	2005	2006	2007	Average	Mean
1	265	346	441	527	468	394	350	388	397.4	368.5
2	153	151	189	119	148	113	138	146	144.6	141.5
3	44	45	61	60	41	25	36	63	46.9	42.3
4	250	318	349	345	236	314	280	235	290.9	272.2
5	307	443	510	443	345	362	319	295	378.0	345.2
6	86	146	143	132	67	83	99	135	111.4	102.7
7	100	121	138	129	118	108	140	115	121.1	117.0
Total	**1205**	**1570**	**1831**	**1755**	**1423**	**1399**	**1362**	**1377**	**1490.3**	**1389.3**

These data are demonstrated graphically on the following page.

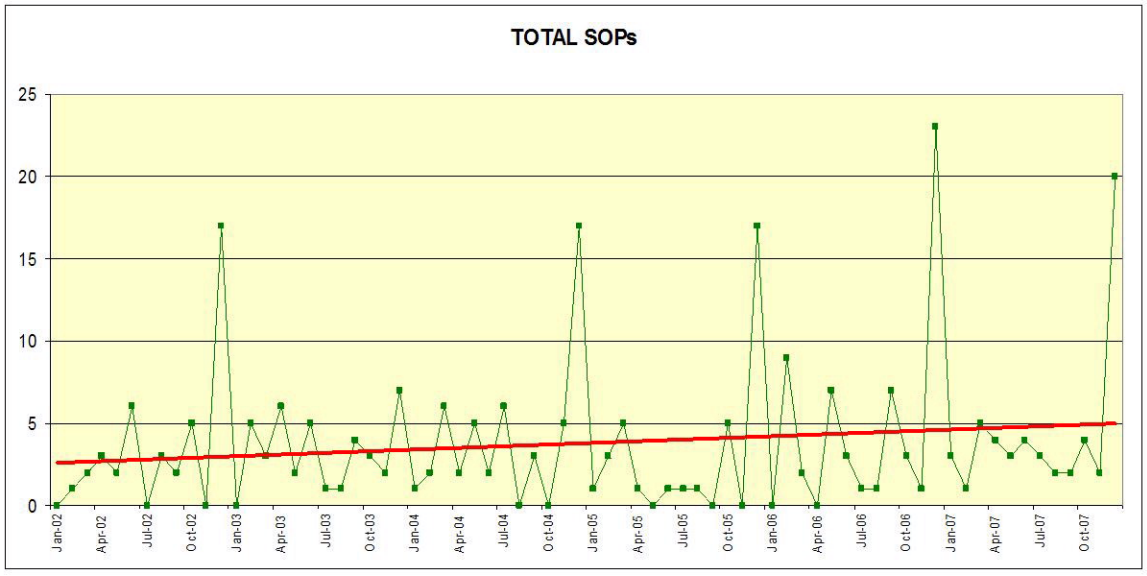




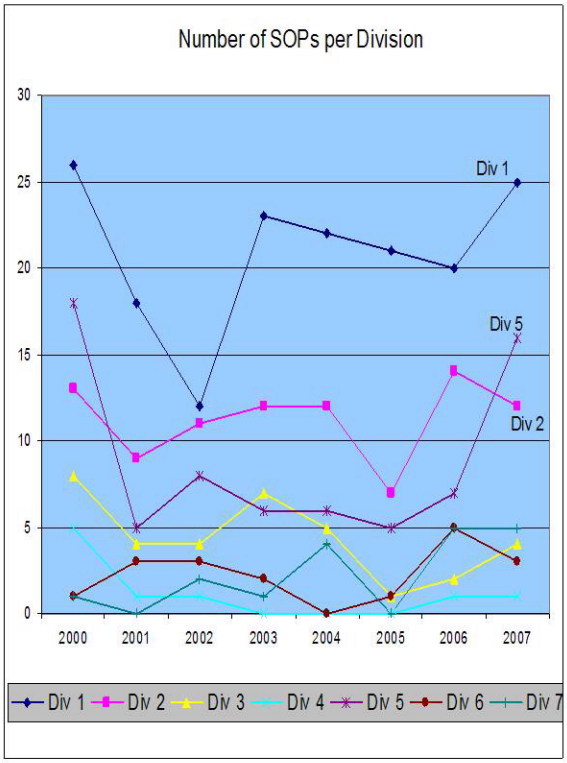
The graph below shows the volume of cases, statewide, filed each month since 2002 (not 2000, as shown in the yearly graphs, above). The peaks are, of course, the applications filed in December. The red trendline shows that, since the peak in 2002, the raw number of cases continues to decline.

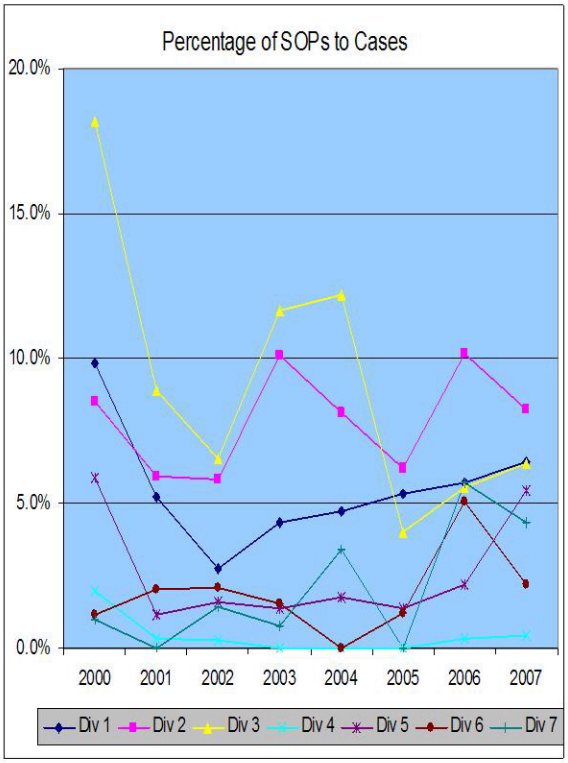


The graph on the following page demonstrates the number of statements of opposition that the DWR has filed, since 2002. It may seem more dramatic, but of course, the scale is smaller than the Total Cases (above). The red trendline here shows the increasing complexity of cases has required DWR party status in an increasing number of cases.



These graphs compare, by water division, the number of cases to the Statements of Oppositions (including interventions) filed on behalf of the DWR.





Abandonment List

The protests to the 2000 Decennial Abandonment List, as provided in section 37-92-401, C.R.S., are nearly complete. In Division 5, late-filed protests were severed from the umbrella case and the DWR is finalizing a final order to propose to the Court. Final judgments have been decreed in all other divisions.

Statewide, 2269 water rights were on the original abandonment lists. After resolving objections, the division engineers removed 16% of those rights, to create the final Revised Abandonment List. Of the remaining 1898 rights, 129 protests were filed, including 14 protests that were filed after the protest period had expired.

Div	Original Aban List	Revised Aban List	Orig vs. Rev Lists	Timely Protests	Late Protests	TOTAL Protests	% of Revised List protested
1	673	542	- 19.5 %	23	7	30	5.5 %
2	671	617	- 8.0 %	13	2	15	2.3 %
3	72	61	- 15.3 %	15	3	18	29.5 %
4	155	136	- 12.3 %	8	0	8	5.9 %
5	201	157	- 21.9 %	28	2	30	19.1 %
6*	110	88	- 20.0 %	8	0	8	9.1 %
7	387	297	- 23.3 %	20	0	20	6.7 %
Total	2269	1898	- 16.4 %	115	14	129	6.8 %

*The Division 6 totals include the WD 43 cases.

This table represents the results of the protests.

	Settled						Litigated/Trials						Removed from List by DWR						Protest Withdrawn by Protestant					
Div	**02**	**03**	**04**	**05**	**06**	**07**	**02**	**03**	**04**	**05**	**06**	**07**	**02**	**03**	**04**	**05**	**06**	**07**	**02**	**03**	**04**	**05**	**06**	**07**
1	4	8	11	13	14	**14**	11	9	4	1	0	**0**	6	6	6	6	6	**6**	3	5	8	10	10	**10**
2	4	4	3	5	2	**2**	1	2	2	0	0	**1**	4	4	4	4	7	**7**	4	4	5	5	5	**5**
3	13	16	16	16	16	**16**	1	1	1	1	1	**1**	0	0	0	0	0	**0**	1	1	1	1	1	**1**
4	6	7	7	7	7	**7**	2	0	0	0	0	**0**	0	0	0	0	0	**0**	0	1	1	1	1	**1**
5	17	21	25	23	24	**24**	4	1	0	0	0	**0**	4	3	3	4	3	**3**	0	1	2	3	3	**3**
6	8	8	8	8	8	**8**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**
7	17	17	17	17	17	**17**	1	0	0	0	0	**0**	1	1	1	1	1	**1**	1	2	2	2	2	**2**
Total	69	81	87	92	88	**88**	20	13	7	2	1	**2**	15	14	14	15	17	**17**	9	14	19	22	22	**22**

The majority of the protests settled: 88 cases representing 68.8% of all protests. Most settlements abandoned a portion of the water rights and require improvements to the structures or court-approved changes of location. As the cases resolved, the numbers have changed. Originally, DWR and Attorney General Staff predicted twenty cases going to trial. Only one case eventually went to trial, and was appealed by the protestant in 2003, *Hammel v. Simpson*, 83 P.3d 1122 (Colo. 2004). The Supreme Court affirmed the abandonment. In 2007, a case was dismissed upon the DWR's motion for an untimely protest.

The General Assembly allocated Legal Services funds for the Abandonment List for only FY 02-03 and FY 03-04. Through December 31, 2007, the DWR has absorbed over $116,000 in legal services expenses for the abandonment cases, as this table illustrates.

Cost of Abandonment

	Allocated		Spent		Difference	
	Dollars	Hours	Dollars	Hours	Dollars	Hours
FY 02-03	$ 72,334	1260.0	$ 132,421	2234.3	$ (60,087)	(974.3)
FY 03-04	$ 73,556	1210.0	$ 67,706	1131.5	$ 5,850	78.5
FY 04-05			$ 24,050	406.1	$ (24,050)	(406.1)
FY 05-06			$ 14,158	221.3	$ (14,158)	(221.3)
FY 06-07			$ 17,447	253.1	$ (17,447)	(253.1)
To Dec 07			$ 6,226	85.2	$ (6,226)	(85.2)
TOTAL	**$ 145,890**	**2470.0**	**$ 262,008**	**4331.5**	**$ (116,118)**	**(1861.5)**

The staffs of the Attorney General's Office, the Division Engineers' Offices, and the Denver Office should be commended for their diligence in managing and resolving these cases. Many of the protests required extensive research and field inspections. Resolution of the cases would not be possible without the extensive and irrefutable facts to counter the allegations of use.

Colorado Supreme Court Cases of Interest

- **Tonko v. Mallow, 154 P.3d 397 (Colo. 2007).**

In this appeal from a judgment of the water court, the Tonkos argued the water court in Division 2 erred by granting summary judgment and dismissing their change of water right application with prejudice.

The Tonkos initially brought the condemnation action in Fremont County District Court, but that court held it lacked jurisdiction to determine the Tonkos' water use rights, which was necessary to sustain their condemnation action for a ditch right-of-way.

The Tonkos then filed an application for a change of water right in water court. The water court applied the doctrine of issue preclusion, concluding that the Tonkos had a full and fair opportunity to litigate their claimed water use right in Fremont County District Court. Accordingly, the water court dismissed the Tonkos' change application with prejudice.

The Supreme Court held that the district court properly ruled that it lacked subject matter jurisdiction to adjudicate the Tonkos' water use rights. The Court also concluded that the water court erred in granting summary judgment to the opposers and dismissing the Tonkos' water court application, based on issue preclusion. The Supreme Court ordered the water court to proceed with considering the change of water right application. Trial in the matter is set for April 2008.

- **Upper Eagle Regional Water Authority v. Simpson, 167 P.3d 729 (Colo. 2007).**

The Supreme Court affirmed the water court's approval of the Upper Eagle Regional Water Authority's augmentation plan for the replacement of 10.8 acre-feet of the Authority's depletions by exchange through releases from Wolford and Ruedi Reservoirs. The Court decided two issues in this case.

First, the Court affirmed the water court's approval of the Authority's use of a table of estimated monthly depletion rates to calculate out-of-priority depletions in six of its service areas. We opposed the use of the table because it was based on 20-year-old predictions of the Authority's future mix of uses, and it had not shown the actual mix of uses occurring today. The State argued that the Authority had failed provide strict proof of its actual mix of uses and depletions. The Court disagreed and found that the expert's pronouncement, in the absence of evidence to the contrary, was sufficient to satisfy the Authority's prima facie burden of proof. The expert testified that the table accurately replaced current depletions in time and amount, but "no other evidence was put forth to verify that the table accurately reflects depletion rates for outdoor irrigation, and more specifically, for sprinkler use." Despite the Court's "significant reservations about the Authority's use of the projected depletion table, which was never premised upon an actual mix of use or actual depletion rates but rather dated estimates of those figures," the Court affirmed the water court's approval of the table to calculate the Authority's replacement obligations. In doing so, the Court did not address the meaning of the term "strict proof." The Court also found that more definite answers regarding the Authority's use of the table "may hinge on the water court's retained jurisdiction, which will operate as a test period for the water court's findings by allowing for reconsideration of the depletion table if actual operation of the plan results in injury."

Second, the Court found that claim preclusion did not bar the CWCB from challenging the Authority's reliance on the depletion table in this case because, in a prior case to which the CWCB was party, the CWCB had failed to oppose use of the table. The Court found that the table at issue consisted of "dated estimates as to future depletion rates and potential mix of uses – hardly the stuff upon which to bar new information or data in later augmentation adjudications." The Court also found that "[j]ust as differences from one change of point of diversion action to another render claim preclusion inappropriate, so to do small differences between augmentation plans prevent operation of claim preclusion." "As each augmentation case, like each change case, must rest on circumstances as they are found to exist at the time that change is requested, *res judicata* cannot preclude consideration of the individual circumstances of each plan."

- **Pagosa Area Water and Sanitation Dist. and San Juan River Conservancy Dist. v. Trout Unlimited, 170 P.3d 307 (Colo. 2007)**

The Colorado Supreme Court clarified issues relating to the application of the anti-speculation doctrine to governmental water supply agencies. Applicants, the Pagosa Area Water and Sanitation District and the San Juan River Water Conservancy District

(the "Districts"), sought a conditional storage water right for a 29,000 acre-feet of water to fill and refill a reservoir continuously to achieve a total annual amount of stored water of 64,000 acre-feet. The Districts also sought an 80 cfs direct flow right independent of the storage right, and the right to use and reuse all of its water.

The water court granted the Districts' application. The Supreme Court reversed the water court's judgment. The Supreme Court held that the water court had failed to make sufficient findings of fact to establish that the District's proposed appropriation is non-speculative or that it satisfies the "can and will" test, and remanded the matter back to the water court to make such findings. In reaching its decision, the Supreme Court held that a governmental agency must satisfy three elements to demonstrate an appropriation is non-speculative. First, the governmental agency must demonstrate that it has relied upon a reasonable water supply planning period. The Court suggested that forecasted usage in fifty years should be generally acceptable.

Second, the governmental agency must demonstrate that its claimed appropriation is consistent with substantiated population projections based on a normal rate of growth for that period. The Supreme Court emphasized that such projects cannot be based on mere conjectural projections: "Municipalities must do more than represent to the water court that if they had water, they would be able to grow," (citing *City of Thornton v. Bijou Irrigation Co*., 926 P.2d at 39, n.25 (Colo. 1996)).

Third, the governmental agency must demonstrate that the claimed appropriation is reasonably necessary to serve the projected population for the claimed planning period. In determining the amount of water necessary to meet population needs, the Water Court should make findings concerning future land use mixes and per capita water usage requirements, taking into account implementation of water conservation measures. In addition, the water court must take into account the effect of reuse rights. The Supreme Court noted, "...the effect of decreeing reuse rights is to greatly increase an entity's usable water supply." *Pagosa*, 170 P.3d at 319. The Court also seemed to disfavor granting simple direct diversion rights without any volumetric limitation, noting that it had previously approved the imposition of volumetric limitations in *Thornton v. Bijou*.

Finally, the governmental agency must demonstrate, under the "can and will" test, that it has the ability to construct the facilities necessary for the appropriation and perfect the use of the water claimed under the appropriation.

In addition to setting forth the test for a non-speculative appropriation by a governmental agency, the Supreme Court made several other comments and observations that bear repeating. Most notably, the Supreme Court indicated that appropriations made by a governmental agency for sale or use outside of the agency's boundaries are "bound by the anti-speculation standards applicable to private appropriators." In addition, the Court noted that a desire to appropriate water before such water is tied up by virtue of an instream flow appropriation, a recreational in-channel diversion, or a federal permit condition is not a valid consideration for evaluating water availability.

There are two additional opinions that specifically concur with the Supreme Court's decision. Justices Eid and Rice agreed that the water court had failed to make sufficient findings to support granting the Districts' appropriation, but disagreed with the Supreme Court's imposition of a "narrow" construction on the governmental agency exception to the anti-speculation doctrine. In particular, these justices felt that imposition of a "de facto" fifty-year planning limit was inappropriate. Separately, Justice Coats agreed that the Supreme Court should reverse the water court's decision, but argued that the decision should be reversed for failing to satisfy the "can and will" statute. Justice Coats opined that the anti-speculation exception for governmental agencies does not relieve agencies from the "can and will" requirement that they show they could complete a proposed project within a reasonable time in light of the legal, engineering and economic circumstances of the project.

- **Well Augmentation Subdistrict of the Central Colo. Water Conservancy District and South Platte Well Users Association, Case Number 03CW99 (Consolidated 03CW99 and 03CW177), Water Division 1**

In February and May 2007, Judge Klein conducted a thirty-day trial in the so-called "Central WAS" case. In October 2007, the judge issued a 101-page order that resolved the questions of law, but he did not enter a decree. As of this writing, some six months later, the parties continue to work toward a final decree to propose to the judge.

Two specific decisions change the historic administration of the area. First, Central proposed that the Division Engineer determine if winter replacements were necessary, based on reservoir levels and other factors. The Court determined the wells must replace any time their depletions are out-of-priority, including during the winter.

Second, wells are required to replace depletions associated with all pumping since their construction. Other plans for augmentation, and the division engineer, had only required replacement of out-of-priority depletions associated with pumping since the enactment of the Amended South Platte Rules in March 1974. Senate Bill 08-136 and House Bill 08-1030 sought to reverse these issues and restore the historic practices, but both bills ultimately failed to win approval of the General Assembly.

Despite the efforts of all the parties to cooperatively craft a proposed decree, the DWR doubts this case will avoid final decision by the Colorado Supreme Court.

BUDGET, FINANCE, AND ACCOUNTING BRANCH

Introduction

The Budget, Finance, and Accounting Branch prepares the DWR annual budget, working closely with staff of the Department of Natural Resources, the Office of State Planning and Budgeting, and the Joint Budget Committee. The Branch also provides fiscal analysis of proposed legislation to the Legislative Council of the General Assembly.

Following approval of the annual budget, the Branch provides the financial, procurement, and accounting services required to ensure appropriate financial administration of the Division in accordance with Colorado statutes and fiscal rules.

Staffing

Cynthia Barker, Budget Officer, manages the Branch. Katie Radke provides part-time assistance in the preparation of budget documents and completion of special projects. Carol Quintana supervises the Accounting section, and coordinates accounting activities with seven Program Assistants in the Division offices. Ruby Gomez works with Carol as an Accounting Technician, and pays most expenses for the Denver Office.

The Budget Process

The budget process begins with the development of a strategic plan by all departments of the Executive Branch. It serves as a guide to the departments' core business and as a tool to evaluate performance over time. The DWR supports the Department of Natural Resources in updating these plans, and developing and updating specific quantifiable performance measures, used to evaluate the effectiveness of individual programs within the agency. The strategic plan becomes the basis for annual Budget Requests.

Each department submits a "base budget request" for the next fiscal year to the Office of State Planning and Budgeting (OSPB) in the spring. This request documents the funding required, assuming no change in the agency's programs, no inflation, and no change in salaries and benefits. In June, the OSPB provides an initial estimate of additional funding that may be available to the Department of Natural Resources for the coming year. After accounting for anticipated increases in salaries, employee benefits, and selected operating expenses, the department estimates the amount of additional spending authority that may be available to support new, essential needs of the individual agencies. During this period, our division will assess specific issues, needs, and trends that merit new appropriations. These needs are documented as "decision items" that are used to request budgetary changes required to continue the current level of services, expand an existing service, or provide a new service. Each decision item is presented as a detailed proposal

describing the need it would address, and fully justified with a cost/benefit analysis. All decision items that OSPB's funding guidelines can accommodate are prioritized, and the Executive Director's Office formally submits these proposals to OSPB on August 1. OSPB reviews these requests and makes their final recommendations for inclusion in the formal budget request submitted to the Joint Budget Committee of the General Assembly on November 1.

During the summer months, the Division prepares additional reports that will comprise the final budget package. The components of the budget package include, in addition to the decision items:

- A financial accounting of all expenses incurred during the last two years, and an estimate of expenditures for the current and next fiscal year. This information is presented by object of expenditure for all agency appropriations. These reports also identify all fund sources used to support the appropriations.
- A narrative description of all appropriations and financial reconciliation of all agency appropriations over a four-year period.
- Cash fund reports that provide revenue and expenditure data for all cash funds over a five-year period. The purpose of these reports is to demonstrate that the agency has sufficient cash funds to support anticipated expenses, and that fund reserve balances remaining at fiscal year-end do not exceed requirements established by TABOR. In most cases, surplus reserves cannot exceed two months of expenditures.
- Estimates of all salary increases and employee benefit costs for the Division, at the employee level.

Following submission of the budget on November 1, an analyst assigned by the Joint Budget Committee (JBC) reviews the DWR decision items, and presents them to the JBC, usually in December. The agency then formally appears before the JBC several weeks later to provide written and verbal responses to questions of the Committee.

In January, the JBC considers Supplemental Budget Requests, which are requests to change the budget for the current fiscal year, based upon new needs that the Division identified following approval of the budget during the last legislative session.

During February and March, the JBC staff reviews and makes recommendations to the Committee on funding levels, financing, FTE, and footnotes for each department for the upcoming fiscal year. Following this process, the JBC finalizes the Long Bill and introduces it to the General Assembly. After review, consideration, possible amendment, and passage by the General Assembly, the Long Bill is sent to the Governor, who usually signs it in May.

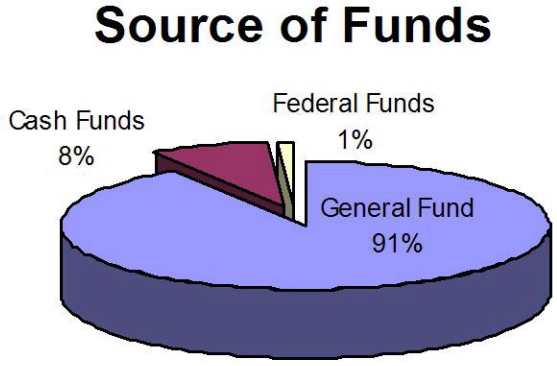
While the General Assembly is in session, new legislation may be introduced that has significant fiscal impact upon our agency. In those cases, the Division's budget office analyzes the legislation, determines if fiscal impact is present, and documents the fiscal impact. In a typical year, the Division analyzes 10-20 individual bills.

Financial Highlights for FY 2006-07

During the fiscal year ended June 30, 2007, the DWR expended $23.7 million to support a budgeted staff of 268.3 FTE, and all associated program and operating expenses.

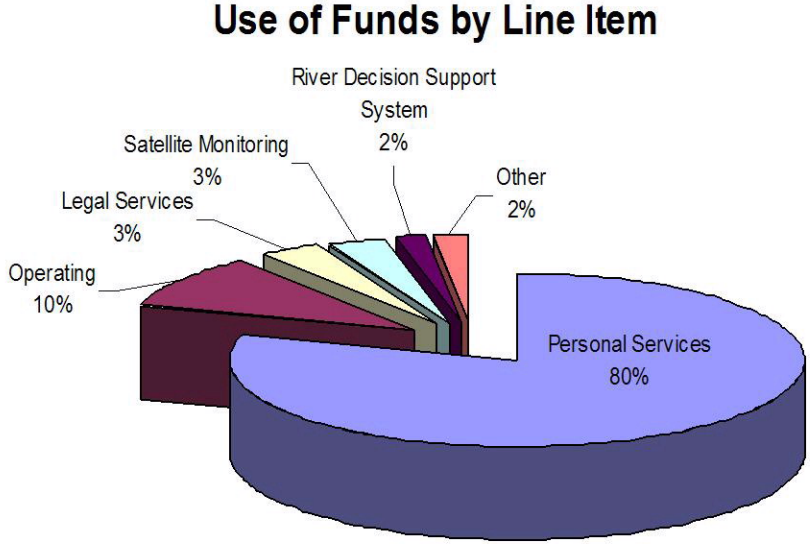
Source of Funds

As the chart below demonstrates, the General Fund provides 91% of the agency's funding. The agency also receives significant cash-funding support for its satellite monitoring and decision support systems from the Colorado Water Conservation Board Construction Fund. That support, coupled with eight Division cash funds provides a total of 8% of the agency's funding. The Division also received three federal grants during this period, with the major source of funds provided by the Federal Emergency Management Agency to support the Division's Dam Safety program.



Use of Funds

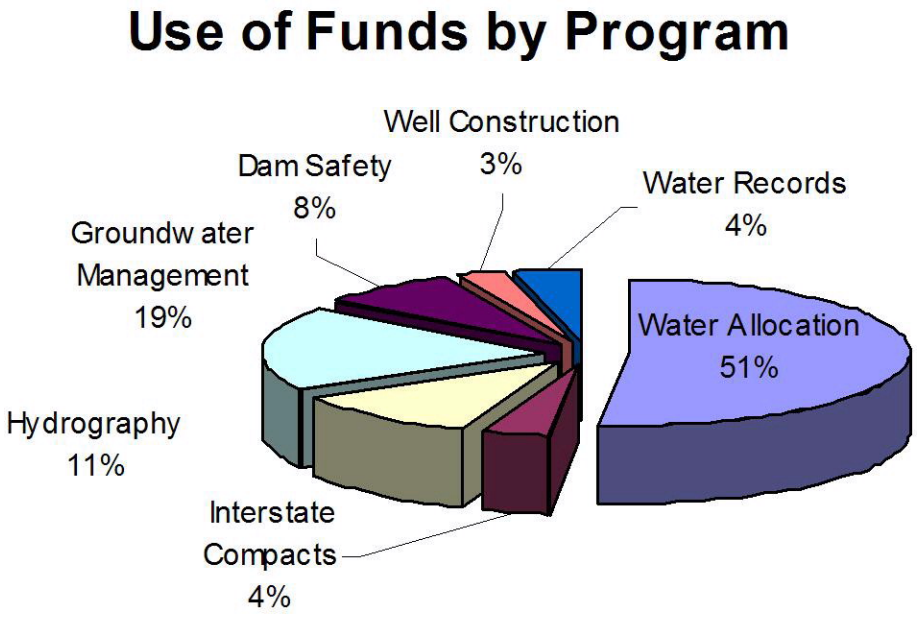
Although the DWR budget is comprised of 17 line items, the chart below demonstrates that 96% of expenditures are contained in four broad categories: personal services, operating, legal services, and satellite monitoring expense.



Actual expenditures by Long Bill line item for the fiscal year ended June 30, 2007 were:

LINE ITEM	AMOUNT
Personal Services	$18,915,394
Operating Expenses	$1,506,838
Legal Services	$795,573
Leased Space	$438,590
Satellite Monitoring Maintenance	$414,068
River Decision Support System	$383,434
Satellite Monitoring System	$369,619
Vehicle Lease Payments	$215,444
Capitol Complex Leased Space	$188,343
Federal Grant	$120,404
Workers' Compensation	$111,883
Interstate Compacts	$76,002
Risk Management & Property Funds	$71,613
Indirect Cost Assessment	$49,500
Republican River Compact	$46,278
Aug Of Water/Sand & Gravel Ext	$40,720
Rio Grande Compact	$1,657
	$23,745,361

The next chart presents the distribution of expenditures by major program area. Water Administration programs (water allocation, groundwater management, hydrography, and interstate compact administration) account for 85% of expenditures.



Financial Highlights for FY 2007-08

The Division's budget for the fiscal year ending June 30, 2008 is $26 million and 273.4 FTE. This budget reflects approval during the 2007 legislative session of several decision items, valued at $612,000. They include:

- 7.1 new FTE for surface and ground water administration in the South Platte, Colorado, Yampa, Rio Grande, and Animas River basins.
- Procurement of contractors to provide scientific modeling services to support interstate compact compliance.
- Additional operating funds to compensate for recent increases in the IRS mileage rate. This rate is used to calculate reimbursement of mileage expenses paid to employees who are required to drive their personal vehicles to satisfy their job duties. Water administration field personnel incur most of this expense.
- Acquisition of five new field vehicles for well testing personnel in the Rio Grande Basin and hydrographers working in the Colorado River Basin.

Accounting and Financial Reporting

The primary duties of the accounting group are:

- Prepare or coordinate preparation of all agency contracts and purchase orders. During FY 2006-07, the Division processed 106 purchase orders and contracts. This includes collaboration with managers to prepare and manage leases costing approximately $500,000 to maintain 19 field offices, and associated storage facilities and parking spaces.
- Pay all expenses incurred by the Denver office, and coordinate payment of all expenses across the Division, working closely with Program Assistants in the field offices. During FY 2006-07, the Division paid 7,354 invoices. This includes management of the accounting for official functions, moving and relocation costs, travel and miscellaneous expense incurred by employees, petty cash disbursements, processing of cash receipts, refunds, journal vouchers, and 1099 statements. This section also manages the Procurement and Travel Card Programs for the Division.
- Maintain inventory and valuation statistics for all fixed assets to ensure proper insurance coverage, and compliance with generally accepted accounting standards for maintenance of fixed assets.
- Maintain inventory of over 100 leased vehicles assigned to the Division. This includes management of the rotation of fleet vehicles to balance utilization, and documentation of all specifications for new and replacement vehicles.
- Prepare monthly financial reports for management to allow appropriate tracking of all revenue and expenses, and take corrective action, when appropriate, to ensure the Division remains within budget with the funds available for use. Since the Division spends 80% of its budget for personal services, this area of expense is critical and is subject to continuous forecasting throughout the year.

The accounting section performs all of the above functions, while maintaining these controls:

- Compliance with all applicable State Fiscal, Procurement and Contracting Rules, and statutes related to the delegated functions.
- Conformance with all accounting and purchasing procedures, standards and directives prescribed by the Controller and Director.
- Pre-audit of payment vouchers for compliance with Statutes, Fiscal Rules, Procurement Rules, and all Department policies, standards and directives prior to entry into the Colorado Financial Reporting System and submission for approval.
- Maintenance of sufficient documentation to support payments or expenditure adjustments in accordance with Accounting Standards as developed by the Controller.
- Provision of a system of internal controls that adequately safeguards the assets of the State through segregation of duties, and other requirements of the Statement of Compliance with the State Department Financial Responsibility and Accountability Act (Section 24-17-1101, C.R.S., et seq.).
- Maintenance of complete files of all documents approved and retained by the Division; the Controller, Director or other authorized persons, in accordance with statewide record retention policy, may request access to such files.
- Regular review and monitoring of accounts receivable, restricted checking accounts, and deferred revenue; preparation of reconciliations and/or detailed schedules as requested by the Controller.
- Aging of accounts receivable, and submission of delinquent accounts to Central Collections in accordance with the Department of Personnel and Administration Accounts Receivable rule; reconciliation of Central Collections reports.

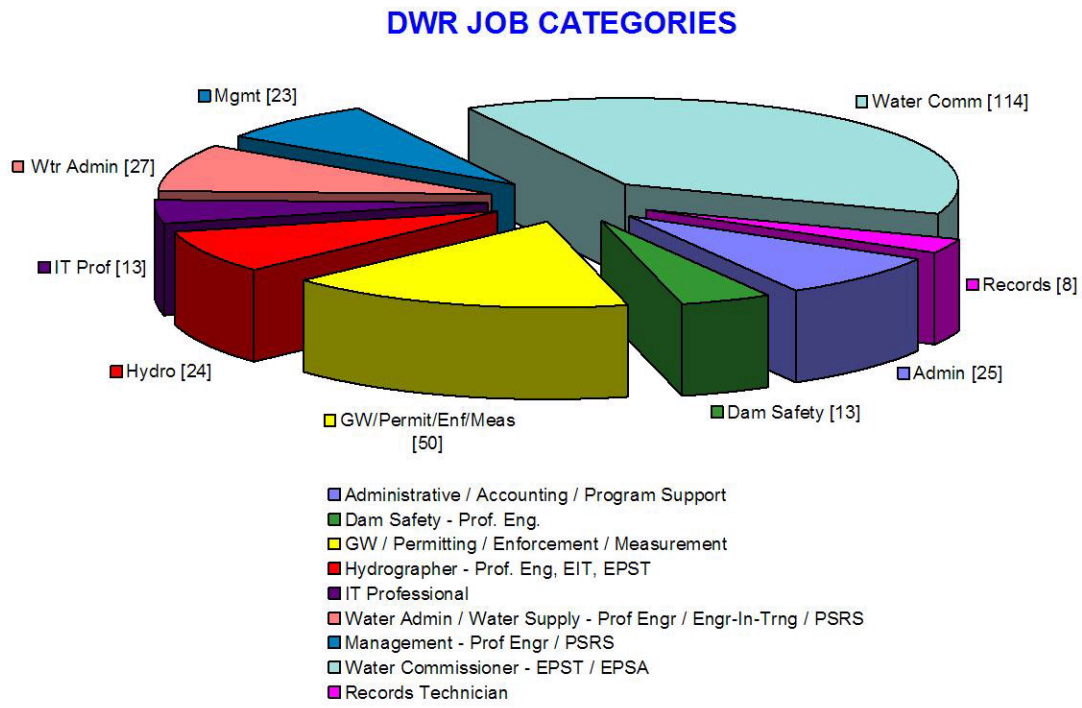
PERSONNEL AND HUMAN RESOURCES

The following provides an overview of the DWR's employment status and highlights from 2007. DWR strives to provide the highest level of service not only externally, but also internally, and reflects this by focusing on its mission to treat each other with dignity, respect, honesty and fairness and to foster continuous improvement, and shared leadership.

In that vein, the office strives to attract and retain superior staff, improve the personnel and human resource processes and procedures, and promote an open and honest communication environment that builds trust, respect and loyalty. DWR has implemented an employee recognition program and assessed employee satisfaction through employee council surveys.

In 2007, the DWR was budgeted 273.4 full-time equivalent (FTE) employees and a total staff of 297 full-time and part-time employees. The low employee turnover rate (7%) and high average years of service (10.43 years) are positive indicators that DWR is a quality place of employment. Of the 297 employees, 64 have more than 18 years of service with the organization, 40 are within three years of retirement eligibility, and 29 could retire today.

The following chart illustrates the number of DWR employees by job category



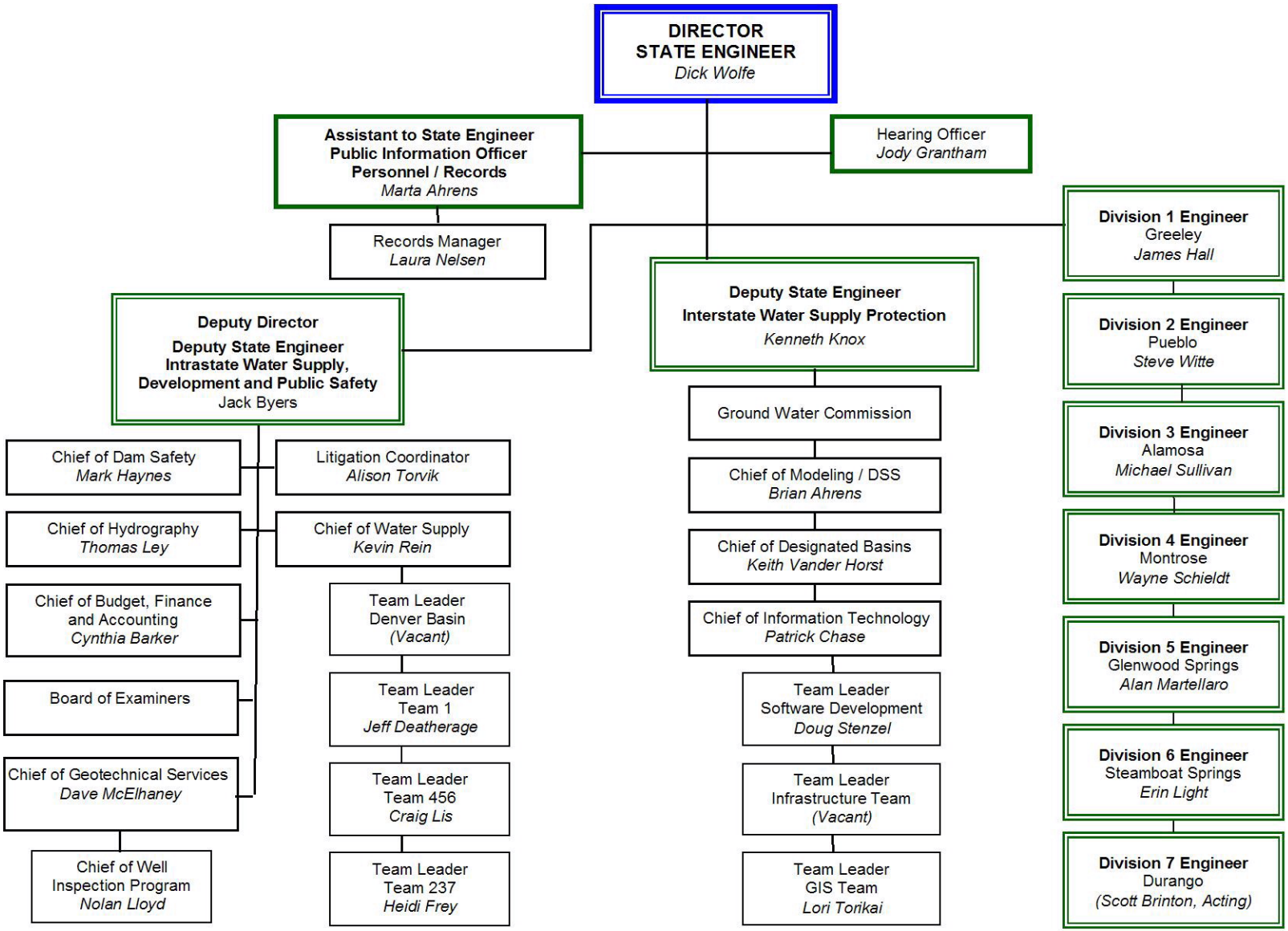
The Employee Council conducted the thirteenth annual survey of all DWR staff. The 2007 survey had a response rate of approximately 59%, similar to the response rate in 2006. The survey consisted of six essay and fourteen ranking questions, with an opportunity for additional comments. The State Engineer will use this feedback to make improvements and changes within DWR. Additionally, each Division Engineer receives the results of its office's survey.

The impact of an aging workforce is consistently in the forefront of human resources priorities. Based on the distribution in age of the employees, we anticipate a steady increase in the retirement rate. The average age of DWR employees is approximately 49 years old, which could result in a greater number of employees retiring in the next 10 years.

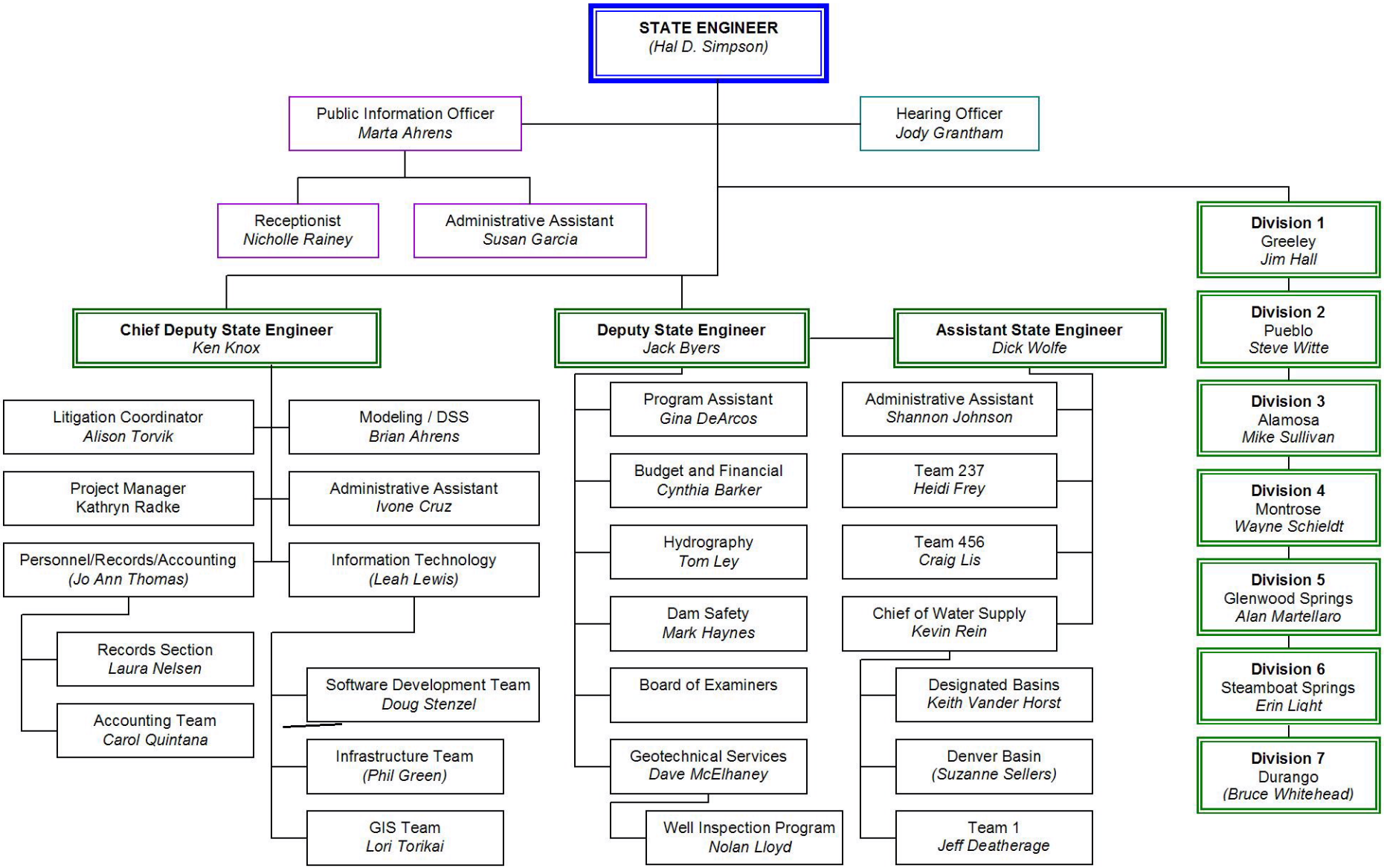
During 2007, ten employees retired, matching the number of employees who retired in the previous year. Among them was State Engineer Hal Simpson, who retired in May 2007 after almost 35 years of service with the Division. Governor Ritter appointed Assistant State Engineer Dick Wolfe as Division Director and State Engineer on November 26, 2007. Following are two Organizational Charts that illustrate office structure in 2007 and the changes implements by State Engineer Wolfe.

In 2008, the DWR will continue to attract, retain and motivate talented staff, developing and enhancing employees' skill sets, anticipating external trends, and continuing to assess and improve our internal systems and processes.

2008 Program Organizational Chart



2007 Program Organizational Chart



Appendix B