

Colorado

Stream Lines

QUARTERLY NEWSLETTER OF THE OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES

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State Engineer's Office Enters World of GIS

by
Stephani Schupbach, Cartographer

The State Engineer's Office is about to embark on a technological endeavor that will increase water management efficiency and improve customer service through the implementation of a Geographic Information System (GIS). The GIS is an information management system which links tabular, non-graphic data with graphic map features. It can be used for display, map production, analysis, and modeling. Or, in extremely simplified terms, it will enable the state to view a "smart map," one which not only displays features, but gives us the ability to show data associated with that feature and related features.

Better Water Management

The most important benefit of the GIS is that water management will become more efficient due to increased data accuracy, increased information for decision making, and the addition of new capabilities. In the near future the state engineer's office will begin plotting many features including: wells, diversion structures, water rights, dams, floodplains, aquifers, water management districts, and other applicable information. The mapping of these features will enable the

state to more clearly see and correct errors in the databases. More importantly, the relationships between records will be shown. One will be able to quickly see that Jane Doe's well is within a mile of Carryall Dam, Judd's Ditch, and three other wells. The speed at which this information is available then allows a view of the "big picture" that is essential to proper water management.

Decision making within the State Engineer's Office will become more facile for several reasons. Staff will be able to retrieve information they need in a few seconds, and will be able to spend a greater percentage of time *analyzing* rather than accessing information. The GIS, used in conjunction with other systems, will also expedite decisions in the Colorado River and South Platte areas. Eventually, the relationships between drainage systems and water entities will be established in the GIS. The effects of calls, droughts, and floods on related water rights, drainage areas, and inhabited areas will then be more readily accessible.

Improved Customer Service

Customers will also reap the benefits of a successful GIS implementation. In a general sense, those applying for wells or water rights will benefit indirectly because the engineers will have more accurate information on which to base their decisions. Moreover, GIS maps can be drawn to aid in discussions with the

Mission: *To serve the needs of the public while conserving, protecting, developing and maximizing the beneficial use of the state's present and future water supplies.*



customer. And finally, the ever popular request for data selected spatially can be filled quickly. For instance, a customer can get answers to requests for all data within a four-mile radius of a well, all the diversion structures within a given township and range, all rights in a particular drainage area, or all wells located in a certain soil type. For an additional fee, a customer could get a printout and map of the area of interest.

The GIS will not be fully operational for at least three years, but at that time the State Engineer's Office will join many organizations which currently apply GIS technology to natural resource transactions. We will see, as others have, that a GIS is essential for effective natural resource management.

For more information on the GIS and the activities taking place at the department level, please stop by or call:

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What is the oldest ditch still being used in Colorado?

(See page 6 for the answer.)

Ground Water Quality Monitoring Program

by

Bahman Hatami
Water Resource Engineer

Through an agreement with the Colorado Department of Health, the Office of State Engineer (SEO) received a grant from the Environmental Protection Agency to initiate a ground water quality monitoring program for the West Slope of Colorado. The objectives of this study are to provide baseline data on ground water and determine the extent of ground water contamination attributable to

non-point source activities in the West Slope. This program is funded for one year (1992) and includes a two-part sample collection (summer and fall).

The project includes much of the Western Slope of Colorado and is made up of three distinct areas: the Yampa River Basin, the lower Colorado River Basin, and the San Juan Basin. There are 20 wells being sampled in each area.

The wells were selected based on their geographic locations, construction and use, and willingness of the owners. The selected aquifers are generally shallow and are located in the vicinity of the streams of interest or their tributaries. With the exception of a few, the sampled wells were normally not deeper than approximately 150 feet. Domestic wells were utilized as much as possible in order to keep the costs of the project low. The well owners were contacted and their consensus for testing their wells were obtained. In general, the well owners were receptive of the project and agreed to allow the SEO staff to conduct a two-part sampling program in 1992.

The first round of ground water sampling took place between June 29 and August 6, 1992. The fall sampling began on September 21 and was completed by mid-November 1992.

Prior to each sampling, the well owners were contacted again and a convenient time was set for sample collection. In all but a few instances, the wells were pumped for at least 20 minutes before the samples were taken. This time period, as checked by frequent measurement of specific conductance, was adequate for flushing the pressure and/or storage tanks in order to collect samples which were most representative of the ground water. In the remaining wells, the purged volume was limited due to physical restrictions, such as slow rates of recharge and/or insufficient water depth in the wells.

At each site, two sets of samples were taken for organic analysis and one set of samples was taken for inorganic analysis. Samples were labeled immediately after collection and placed in a cooler chilled with ice for delivery to the laboratory. Chain-of-custody procedures were used in handling samples. Due to budgetary limitations, only one duplicate set of samples in each basin was collected for inorganic analysis. During the course of sampling, the well owners were briefly interviewed to document site conditions.

The inorganic samples are tested at the Colorado Department of Health (CDH) laboratory. The organic samples are analyzed in two different laboratories as a measure of analytical precision: Rocky Mountain Geo-Engineering Company in Grand Junction and CDS Laboratories in Durango. The inorganic duplicate samples are being analyzed by ACZ Laboratory, Inc. in Steamboat Springs.

The analytical results of ground water samples collected between June 29th and August 6th have already been processed, and processing of the fall samples will be completed by February 1993. The data will be stored in a database, readily accessible for use by other agencies and/or individuals. The analytical results and other findings will be compiled into a report and presented to the Water Quality Control Commission some time in mid-1993.

Workshop Makes Emergency Planning Easy for Dam Owners

An article in the October 1992 *Stream Lines* described the requirement that all Class 1 and Class 2 dams have Emergency Preparedness Plans. After checking the database, the Water

Division 1 Dam Safety Branch discovered that 73 additional plans needed to be written for the South Platte drainage geographical area. Since many of these plans would be very similar, a decision was made to offer workshops where dam owners could obtain assistance in completing their plan. The first workshop was held January 23 at the Greeley Recreation Center (651 10th Ave.), and was open to owners of dams in Boulder, Larimer, and Weld counties. Approximately 80 people were in attendance and 51 plans completed.

The workshop was sponsored by the Division of Water Resources and the City of Greeley to assist dam owners who do not currently have an Emergency Preparedness Plan for their dam. During the workshop the owners were able to complete their plan, as well as meet the local emergency coordinator for their county. They were provided with the necessary maps and notification lists to be included in their plan and given personal help in putting their plan together. All they needed to bring was a list of names and phone numbers for the following:

- * Names and phone numbers of people in their company that would need to be notified in an emergency,
- * Names and phone numbers of several contractors they would call to assist them in an emergency, and
- * Names and phone numbers of people who live immediately downstream of their dam.

The cost for such a workshop is only \$5.00 per person, including refreshments. This is an easy and quick way for a dam owner to complete the Emergency Preparedness plan for his or her dam.

A follow up workshop will be held in Denver with the date still to be determined.

For more information on the Denver workshop or if you would like a workshop conducted in your area, contact John Van Sciver, Greg Hammer, Mike Cola, or Jim Dubler at the Division 1 office in Greeley at (303) 352-8712.

Licensing of Well Construction and Pump Installation Contractors

by Rich Bell, Senior Geologist

If you contract a person or company to construct your well and/or install pumping equipment, be sure they are currently license or are authorized to perform the work you are requesting. Production wells must be constructed and pumps installed by a licensed contractor. Monitoring, observation and other types of wells may be constructed by, or under the supervision, of professional engineers or geologists or licensed well construction contractors.

The State Board of Examiners of Water Well Construction and Pump Installation Contractors was established by the Colorado General Assembly in 1967 to have general supervision and authority over the construction and abandonment of water wells and the installation of pumping equipment. To protect the public health, the Board may adopt and revise rules to provide for proper water well construction and pump installation. Amended rules were adopted in 1988 and the Board is currently reviewing the rules to determine if further amendment is needed.

The Board, under the Division of Water Resources in the Department of Natural Resources, consists of the State Engineer, a representative of the Colorado Department of Health, and three members appointed by the governor consisting of two well construction or pump installation contractors and an

engineer or geologist with experience in water supply and well construction. Current members are Hal Simpson, State Engineer and Secretary of the Board; Glenn A. Bodnar, Colorado Department of Health; Ken Rollin (Chairman of the Board), consulting engineer, Rocky Mountain Consultants, Inc.; Paul R. Berglund, well construction contractor, Arrow Drilling Company; and Raymond L. (Lynn) Twiss, well construction and pump installation contractor, Twiss and Wilson Drilling.

The Board is responsible for the licensing of well construction and pump installation contractors as well as the examination of applicants for licenses. Additionally, the Board conducts hearings with respect to the denial, revocation or suspension of a license in cases of alleged violations of rule or law. The staff of the Division of Water Resources provides the office support for the Board in examination and licensing processes and hearings.

Well construction and pump installation contractors must renew their licenses annually by the 31st of January. Renewal license packets were sent out to the contractors the second week of November. Many renewal applications will have been submitted to the Division of Water Resources at the time of this publication. Last year 83% of the contractors had submitted applications by January 31st. As of November 1992, 291 contractors had renewed their licenses for the 1992 license year, leaving only 15 who were licensed in 1991 that have not yet renewed. Of the 291 contractors licensed in 1992, 64 are well construction contractors only, 107 are pump installation contractors only and the other 120 hold both types of licenses. Prior to renewal, the contractor must submit evidence of financial responsibility in the form of a compliance bond or an alternate bond, which can be, as an example, a certificate of deposit. Colorado resident bonds are \$10,000 and non-residents are \$20,000. Bonds are obtained for individual licensees and not for

companies. If a contractor has not submitted proper fees, bond, and renewal application for the 1993 license year, and he continues to work after January 31, 1993, he is in violation of the law by working under a lapsed license.

If you wish to verify that a contractor is currently licensed, ask to see his license or contact the Division's Groundwater Information Desk at (303) 866-3587.

Egyptians Tour Surface Creek Area

by Jim Boyd
Water Commissioner
District 40, Division 4

On August 17, 1992, the Cedaredge field office in Division 4 (Gunnison River drainage) hosted a training and informational irrigation workshop for 16 Egyptians and their interpreters. This workshop was set up through Colorado State University by John Wilkins-Wells.

The Egyptian visitors are involved in a project called "Improvement Project of Egypt." With this program they hope to form a policy of private water users associations to improve their country's overall irrigation sector. In the past, their irrigation has been controlled mostly by a central irrigation bureaucracy. Now they are turning over irrigation responsibilities to private water users associations. The Egyptians were in Cedaredge to borrow ideas from local associations to assist in setting up Egyptian associations.

The morning session included discussions with local representatives from the Grand Mesa Water Users Association about the history of

the association, setting up bylaws, issuing stock certificates, record keeping, budgets, and assessing fees for services. Ken Knox, Assistant Division Engineer in Montrose, and I met with them to discuss the cooperation and roles taken by the State of Colorado with the local water users associations.

The afternoon was spent touring a local irrigation distribution system arranged by some of the area water commissioners. Many questions were asked and answered during the workshop. After the Egyptians viewed an overall picture of the irrigation water distribution system in the Surface Creek Valley, they spent the next two days with U.S. Soil Conservation Service representatives reviewing individual farm and ranch irrigation systems.

Satellite Monitoring System to be Updated

This is an extremely busy time of the year for the Hydrographic Branch of the Division of Water Resources. While still maintaining stations on a regular basis, the records for all stations that a permanent record is kept must be brought up to date and verified for accuracy and submitted for publication by the State Engineer's Office and the U.S. Geological Survey.

The annual status report for the Colorado Satellite-Linked Water Resources Monitoring System has just been completed. This system of key gaging stations across the state was made operational in 1985 with 82 sites. There are currently 210 operating sites, and the data from these sites are received and processed by a central computer in the State Engineer's Office in Denver via satellite. After processing, it is available on a real-time

***The Colorado
Satellite-Linked Water
Resources Monitoring
System Annual Status
Report is available for
\$7 through the
Records Section in
Denver.***

basis, via telephone communication to anyone interested in streamflows at a specific location. The cost for access to the real-time data is \$100 per month per water division.

An improved system is currently being purchased for receiving the data from the remote locations. Some loss of data has been experienced in the past with the current system due to satellite movement. With the new system, the initial transmissions will be received by large tracking dishes at Wallops, Virginia and retransmitted via more stable domestic satellites to our satellite dish for processing and distribution to end users.

The first gaging station in Colorado was constructed on the Cache la Poudre River near the canyon mouth in 1881 by the first state engineer, Eugene Stimson. Later that same year he constructed the state's second gaging station on the Big Thompson River.

Answer: Many people believe that the San Luis People's Ditch near the town of San Luis has the distinction of having the number one priority for a water right in Colorado. This is based upon its continuous use since April 10, 1852. However, the oldest ditch in Colorado still being used is the Hatcher Ditch, better known today as the Lewelling-McCormick Consolidated Ditch located on the Purgatoire River 20 miles south of Trinidad. This ditch was constructed in October 1846 by John Hatcher, who was forced off his land by Indians in 1848. In either 1862 or 1863 the land was resettled and the ditch subsequently used for irrigation of the original lands. Because there was no transfer of title and the ditch had been abandoned by Mr. Hatcher, the ditch was not granted the October 1846 priority date.

Water Rights Tabulation Available

The 1992 Water Rights Tabulation and associated Water Rights Reports are complete. The tabulation is printed by the State Engineer's Office and can be purchased for \$10.00. The Water Rights Reports can be purchased by either water division or water district. They are available in the following formats: alphabetical by division, alphabetical by water district, location, stream priority by water district, and seniority by water district. The costs of the reports on paper are \$0.20 per page or \$524.00 for the complete state, with the cost of each division determined by the number of pages. If an order is by water district, \$10.00 is added to the total charges to cover the breaking of the division report into water districts. The Water Rights Report file can be purchased in a computer readable format for the entire state or by water division for \$50.00 for the first megabyte of data and \$25.00 for each megabyte of data or fraction thereof. All orders must be by written request and will be filled on a first come, first served basis.

*A Short History of the Evolution
of the Accounting System in
John Martin Reservoir*

by Bill Howland, Engr. Tech
Division 2

The John Martin Reservoir Project on the Arkansas River near Las Animas, Colorado was authorized by Congress in the Flood Control Act of June 22, 1936. Construction of the project began in the fall of 1939, but work was suspended by World War II from the spring of 1943 to the spring of 1946. The project was finally completed in October 1948. The original reservoir capacity was 621,326 acre-feet, which included flood control storage of 270,375 acre-feet. On December 14, 1948, the states of Colorado and Kansas entered into the Arkansas River Compact, settling a dispute existing since 1901 over Arkansas River water by equitably dividing the waters of the river as well as the project benefits.

The John Martin Reservoir had been authorized as a flood control and irrigation project with no provision for a permanent recreation pool. It was generally assumed that any allocation of space in the reservoir was precluded by Article VE, paragraph 5 of the Compact, which states, "[t]here shall be no allowance or accumulation of credits or debits for or against either State." However, during the 1960s a concerted effort was made by recreational interests in Colorado to create such a permanent pool. In the late 1960s the Colorado Division of Wildlife acquired storage rights which existed on Muddy Creek southwest of the reservoir. The Colorado water court granted a decree to store up to 5,000 acre-feet of this right in John Martin Reservoir, but the Arkansas River Compact Administration had not granted its permission. There was a great deal of opposition from irrigators to the inclusion of a permanent recreation pool in any form as long as the irrigators were not allowed to " earmark "

water for future use. The prevailing interpretation of Article VE caused irrigators in both states to call for water conjunctively in order to maintain the 60/40 percent Colorado-Kansas split set up by the Compact.

In 1972, the United States Congress passed P.L. 89-298 allowing the invasion of the flood control portion of the reservoir. This did away with the argument that the recreation pool would diminish space available for irrigation storage, but the Compact Administration still did nothing to approve establishment of such a pool. In 1976, Pueblo Reservoir was about ready to go on line. Talks had been held for several years on the creation of a winter storage program for this reservoir. This became a factor to consider. In August 1976 at a special meeting in Aspen the Arkansas River Compact Administration finally decided that the language of Article VE was meant only to preclude the possibility that Colorado might incur a debt owed to Kansas by virtue of underdelivery and, conversely, that Kansas would not be faced with a carry-over credit by virtue of overdelivery in any year. The Administration then adopted a resolution allowing the accumulation of water in the reservoir for a permanent recreation pool. The Amity Mutual Irrigation Company immediately requested that the Administration consider its request for storage of 15,000 acre-feet of its Great Plains storage right in John Martin. This was granted in November 1976 and became the foundation for an accounting system in the reservoir which allowed both states to accumulate and retain water from year to year. The accounting system was modified several times using interim agreements until April 24, 1980, when the Administration adopted what is known as the 1980 Operating Plan for John Martin Reservoir. This document sets up accounts for various Colorado ditches and the State of Kansas, and spelled out how the system was to operate. The reservoir is still operated under this plan today.

CALENDAR OF EVENTS

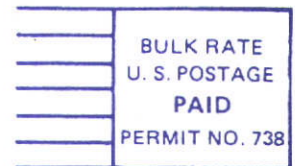
- March 14-18 Symposium of Geographic Information Systems and Water Resources, Mobile, AL. Contact AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192 at (301) 493-8600.
- March 25 54th Annual Meeting of the Rio Grande Compact Commission, Santa Fe, NM. Contact Marta Ahrens, DWR at (303) 866-3581.
- March 30 -
April 2 13th Annual Hydrology Days, Colorado State University, Fort Collins, CO. Contact Janet Lee Montera, Department of Civil Engineering, CSU, Fort Collins, CO 80523 at (303) 491-7425.
- April 6 Board of Examiners of Water Well Construction and Pump Installation Contractors meeting, 8:30 a.m., Room 719, 1313 Sherman Street, Denver, CO. Contact Paula Lacey, DWR at (303) 866-3581.
- April 16 Colorado Ground Water Association Annual Meeting, 3-8 p.m. at Baski, Inc., 4002 South Clay Street, Denver, CO. Contact Phil Burke, CH₂M Hill at (303) 771-0900 or Hank Baski at (303) 789-1200.
- May 6-7 Colorado Water Conservation Board meeting to be held in Pueblo, CO. Contact the CWCB office at (303) 866-3441.
- May 21 Colorado Ground Water Commission meeting, 9:00 a.m., Room 318, 1313 Sherman Street, Denver, CO. Contact Marta Ahrens, DWR at (303) 866-3581.

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