

Surface Water and Ground Water Administration in Colorado

“Water 101.5”
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Presented by
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1) **DWR Organization** (see attached organizational chart)

For over 125 years, Colorado has used a system of water allocation known as the prior appropriation doctrine. Under this doctrine, the first appropriator of water has a senior right to that water, and that right must be satisfied before any subsequent rights junior to that right can receive water. The Colorado Division of Water Resources (DWR) is empowered to administer all surface and ground water rights throughout the state and ensure that this doctrine is enforced.

DWR employs approximately 257 professional engineers and geologists, information technology professionals, technicians, and support staff to administer water rights, to evaluate and issue water well permits, monitor stream flow and water use, inspect dams and wells for construction and safety, maintain databases of Colorado water information, represent Colorado in interstate water compact proceedings, evaluate impacts of and necessary mitigation for various water use activities, educate the public, and numerous other responsibilities.

Most of the day-to-day administration of these water rights is accomplished through the field offices, known as the Division Engineers’ Offices. The seven division offices are located throughout the state in each major river basin (see attached map showing water divisions). The division offices, in turn, employ approximately 120 water commissioners who are actually out in the field allocating water, issuing shut-down orders, collecting water use and/or diversion data, and enforcing the decrees and water laws of the State of Colorado.

2) **Roles of Water Administration Officials**

a) **State Engineer**

Colorado holds the unique distinction of being the first state to provide for the distribution water by public officials. In 1879, the legislature created a part of the present administrative system. It provided for the division of the state into ten water districts, nine of these in the South Platte valley and one in the Arkansas

drainage. In 1881, the Colorado legislature established the Office of the State Irrigation Engineer, referred to today as the State Engineer's Office, also known as the Colorado Division of Water Resources. The agency's primary responsibility is the administration of the appropriation doctrine, "First in time, first in right," by maintaining a list of water rights, on each stream, in order of priority. The priority of each water right was determined by the district courts based upon the date the structure for the water right was constructed and the water placed to beneficial use. The statute as passed by the legislature in 1879 did not provide for stream measurement.

Within six years, the remaining four water divisions as they exist today were created. In 1887, the state created a superintendent of irrigation, who is known today as the division engineer, to supervise water commissioners within each division.

By the beginning of the 1890's, many stream systems were over appropriated. Ditch companies were actively constructing reservoirs to store winter and spring runoff. In addition, new sources of water were being pursued, which included transmountain diversions and ground water. Changes of water rights, exchanges, transfer of water rights and "loan statutes" were issues that had to be addressed by the office of the state engineer by the turn of the century.

In 1899, the state engineer was given the responsibility of approving all plans and specifications for dams designed over ten feet in height and covering more than twenty acres, or having a capacity of more than 1,721 acre-feet. In addition, the statutes required that the construction had to be approved by the state engineer. That same year the state engineer was given authority to have water levels lowered in any reservoir that were deemed unsafe.

Over a hundred years after water was first appropriated ground water laws were codified. Ground water was not managed or allocated by the state, simply because so little was known about it, particularly its interrelationship and interdependence with surface sources. Prior to 1957, no permit was required to construct a well. Wells that diverted non-tributary water were not subject to the jurisdiction of the district courts nor to administration by the state engineer. Tributary well owners were governed by prior appropriation among themselves, in accordance with Supreme Court cases, but were not required to adjudicate their water right and obtain a decree. At that time surface and ground water were not administered as an integrated unit.

When there became an understanding of the principles of ground water movement, there were soon regulations protecting prior appropriations. In 1957, Colorado enacted the Ground Water Law, which required a permit from the state engineer as a prerequisite to drilling a new well and obtaining new ground water rights. It also made provisions for the registration of existing wells. Further, the act called for the establishment of a ground water commission to designate

districts where the rate of withdrawal from an aquifer exceeds the rate of recharge.

Also in 1965, the legislature directed the state engineer to “administer the laws of the State, relative to the distribution of the surface waters, including the underground water tributary thereto, in accordance with the rights of prior appropriation....”. From this, through integrated administration of surface and ground water (also known as conjunctive use), junior right holders appropriating water (i.e., tributary wells) in such a manner as to injure the vested rights of a senior appropriator, were subject to injunction by the state engineer through the attorney general. A presumption of lack of material injury extended to wells in existence prior to this act.

The administration of the law, as well as its constitutionality was challenged three years later in the Colorado Supreme Court. In *Fellhauer v. People*, 167 Colo. 320,447 p.2d 986 (1968), the court ruled that regulation of tributary wells to protect senior surface rights, is constitutional. In addition, the court directed the state engineer to promulgate reasonable rules, regulations and standards to maximize the beneficial use of ground water, while preventing material injury to senior water users. Here, the court made a strong statement emphasizing the need to make maximum utilization of the water of the state while protecting vested rights.

In response to the Supreme Court's findings regarding tributary wells and surface water, the Water Rights Determination and Administration Act of 1969 was passed. Besides changing the name of the State Engineer's Office to the Division of Water Resources, the act required that surface and ground water rights be administered together, as an integrated unit. The adjudication of ground water rights is necessary to protect their priority. At the time of enactment, existing wells were given until July 1, 1972, to apply for a water right. “Plans of Augmentation” allow junior water rights to divert water out of priority as long as new water is added to the system in sufficient quantities at the proper time and place to prevent material injury to senior water rights.

Pursuant to the act, the state engineer promulgated rules and regulations for the use of surface water and tributary wells in the South Platte River, Arkansas River, and Rio Grande basins. In 1972, the Colorado legislature adopted House Bill 1042 and Senate Bill 35 (see §37-92-602). This companion legislation pertains to wells for exempt uses and requests that the state engineer make comments concerning water availability to assist counties and planning commissions concerning subdivisions of lands into parcels smaller than 35 acres.

During the mid-1980's, new legislation was enacted concerning non-tributary and not non-tributary ground water and the permitting requirements that the Division of Water Resources must utilize in managing these resources. Gravel pit legislation was also enacted which required owners of any gravel pit constructed

after December 31, 1980, to obtain well permits and a court approved plan for augmentation plan of substitute supply to replace the evaporation losses that resulted from exposure of ground water.

In addition to the intrastate distribution of water, Colorado has also been faced with many interstate distribution issues, since seven of the major streams of the area arise in Colorado and flow into adjoining states (see attached map on historical average annual streamflows). In the interest of interstate comity, it has been found expedient to resolve the problems arising from interstate water distribution by interstate compacts. The compacts entered into between Colorado and her sister states are, in general, agreements as to the division of the waters of the several streams, entered into by the states affected, ratified by the state legislatures and the Congress of the United States, and approved by the President. Upon the consummation of such a compact, provisions thereof become the law of the land and are superior to any rights or rights granted by state authority. The Colorado state engineer has the responsibility of administration of seven interstate compacts and partial responsibility in two others. There are cases relative to division of the waters between states which could not be resolved by agreement or compact and, in such instances, were taken before the courts for decision. At the present time, the Division of Water Resources, under the terms of U.S. decrees, administers two interstate streams. Additionally, Colorado is party to an international treaty with the Republic of Mexico on the Colorado River and administers two water-user agreements.

Further, the state engineer has the power to promulgate policies, rules and regulations for the use of water and impose fines and damages for violations statutes, rules and regulations.

b) Division Engineer

A division engineer, who is assisted by and supervises one to three assistant division engineers, as well as water commissioners and other staff, manages each of the seven water divisions. The division engineers act under the state engineer's general supervision. In addition to staff supervision and water rights administration, division engineers are responsible for compiling annual reports of water diversions in their divisions, consulting with the water court referees as to the validity of claims in water court applications, participating in water court cases as objectors as appropriate, issuing enforcement orders, managing the movement of water for plans for augmentation, assessing whether diversions will cause injury to downstream senior water rights holders, preparing tabulations of all water rights in their divisions according to priority, generating the decennial abandonment lists for submission to the water court, and duties delegated to them by the state engineer.

c) **Water Commissioner**

Within a short time of gaining statehood in 1879, the legislature authorized the position of superintendent of irrigation (known today as the water commissioner). Appointed by the governor, upon recommendation of the board of county commissioners, the local superintendent of irrigation received pay by the counties of the water district location. Usually aligned to party politics, a change in the political composition could result in a change of superintendents.

As a result of this history and the complex and diversified role of the water commissioner, many water users were unaware of who employed the local water commissioner. As part of the public relations aspect of being a water commissioner, it was important to inform the public that the administrative duties and responsibilities were under the auspices of the State Engineer's Office, Department of Natural Resources, Division of Water Resources, State of Colorado. Some of the major responsibilities of water commissioners include:

i) Record keeping

- (1) Diversion Records. A primary responsibility of water commissioners is to keep records of daily diversions of decreed water rights of ditches, canals, wells, reservoirs and legal diversions from undecreed structures.
 - (a) Daily records may be derived from recorder charts, daily observations, reports from ditch companies, and pump power records using a Power Consumption Coefficient (PCC).
 - (b) Diversion records state the types of water diverted (e.g., river water, reservoir water, transmountain water, augmentation water, recharge water, exchange water).
 - (c) These records are official permanent public records of the State and are used by courts of law, and for research and studies.
- (2) River Calls. Water rights are administered according to relative priorities on the stream. Daily, the water commissioner determines "calls" on the river from water rights owners and fills as many as possible with the amount of water available in the stream. Interstate compact obligations must also be considered. Calls are written or verbal orders for river, reservoir, or transmountain water predicated on decreed water rights.
 - (a) Water commissioners maintain daily records of river calls or demands for diversions. Content will vary between districts depending upon site-specific needs.
 - (b) These records may include river index, diversions that are in priority, reservoir and transmountain deliveries, reservoir storage levels, weather data, and compact accounting.
 - (c) The call records are also official permanent public records of the State and used for court cases, study references, documentation, and determination of the abandonment list.

ii) Regulate headgates

This daily process includes adjustment of headgate settings to ensure delivery of the proper amount of water to a ditch. This process requires communications with appointed headgate personnel for each ditch or canal, or by the actual setting of the headgate by the water commissioner.

iii) Distribute storage water

This process of administering the release and proper distribution of reservoir or “storage” water to the reservoir owner or user involves daily calculations of river and reservoir water in the system for delivery and calculation of reservoir transportation charges (water lost during transit).

iv) Distribute transmountain water

Water commissioners are tasked with distributing transmountain water, managing water imported from another river basin so it is distributed to the proper water user’s ditch or reservoir. Transportation charges may need to be assessed to its delivery. See attached map showing locations of transmountain diversions in Colorado.

v) Delivery of augmentation and exchange water

Water commissioners are responsible for the accounting and administration of augmentation plans per court decree and exchanges. The commissioner must insure that the water subject to augmentation or exchange is delivered at the proper time and amount to prevent injury to other users.

Records kept for an augmentation plan will include amounts and dates of water delivery, acreage taken out of production (“dried up”), number of wells covered within the augmentation plan, and amount and rate of pumping from the augmentation plans’ wells.

vi) Inspections (including authority to enter private property)

Water commissioners inspect dams, livestock water tanks, erosion control dams, small impoundments, headgate installations, measuring devices, wells, and structures and places of use associated with water court applications.

vii) Restriction Enforcement

(1) For wells, restriction enforcement is the enforcement of compliance with permitted or decreed restrictions for acreage, pumping rate, or volume pumped.

- (2) For ditches, water commissioners enforce compliance with proper headgate adjustments to control water deliveries. Enforcement may require locking a headgate to prevent illegal diversions.
- (3) For dams, this entails the enforcement of compliance to restrictions of storage set by the state engineer for structural and/or safety reasons.

3) Water Administration in Water Division 7 (see attached map showing water divisions)

Water Division 7 is located in the southwest corner of the state and is composed of the Dolores and the San Juan river basins. The San Miguel River in Division 4 is the major tributary to the Dolores River downstream of McPhee Reservoir. Major tributaries to the San Juan River include the Piedra, Los Pinos, Animas, Florida, La Plata, and Mancos rivers and McElmo Creek. In addition to McPhee Reservoir, the division's major reservoirs are Vallecito and Lemon reservoirs. The climate varies considerably across the division: from mountains receiving an annual average of 50 inches of precipitation to desert regions along the state line which receive an annual average of eight inches.

Some cities and towns in the division include Durango, Silverton, Cortez, Pagosa Springs, Bayfield, Mancos, Ignacio, Dolores, and Dove Creek. The division is also the home of Durango Mountain Resort (formerly Purgatory), Hesperus, and Silverton ski areas, Mesa Verde National Park, Hovenweep National Monument, and San Juan National Forest. The primary economic activities in the area are farming, recreation, and tourism.

The division saw a 38% increase in population between 1990 and 2000. This rapid population growth, and its associated challenges, is particularly centered in La Plata, Montezuma, and Archuleta counties.

Ninety percent of the division's water, or nearly a million acre-feet per year, is diverted for the irrigation of approximately 200,000 acres of agricultural lands. The primary crops grown are grass, alfalfa, beans, corn, and apples. Annually, approximately 300,000 acre-feet of water are used for power generation. Hydroelectric plants produce power at Electra Lake, Vallecito, Lemon, and Jackson Gulch reservoirs, and the Dolores River Project including McPhee Reservoir.

An average of approximately 2.3 million acre-feet of water leave the state via Division 7's rivers each year. This corresponds to about 22 percent of the total water flow out of the state. There are still some areas within the division where water is available for appropriation; the mainstems of the San Juan, Piedra, and Animas rivers are currently considered not overappropriated. However, the Colorado and Upper Colorado River Compacts limit in-state water development.

The La Plata River Compact can lead to curtailment of diversions in Colorado on the La Plata River to meet delivery obligations to New Mexico. This compact allows each state unrestricted use of all flow within its boundaries between December 1 and February 15. The remainder of the year, Colorado must deliver one-half of the river's flow as measured at the gauging station at Hesperus, Colorado the following day at the Colorado-New Mexico state line gauging station. The maximum required delivery to New Mexico is 100 cfs, and any flows in excess of this amount may be used in Colorado. In recent drought years, the river has dried up for up to 26 miles below Hesperus and the state line preventing delivery of one-half the flow at Hesperus to the state line and the Colorado state engineer has declared the efforts to deliver water to New Mexico futile. This has caused some expressions of concern from the New Mexico state engineer's staff but no resolution of this issue has been achieved. The construction of a reservoir near the state line to capture winter flows and surplus flows would improve the ability to comply with the compact and a feasibility study is underway at this time.

Since the early 1970's, the San Juan - Chama Project has exported an average of approximately 94,000 acre-feet per year from the San Juan River basin to the Rio Chama, which is tributary to the Rio Grande in New Mexico. This federal project provides some of New Mexico's Colorado River Compact entitlements by diverting them from the San Juan River basin's Blanco, Navajo, and Little Navajo rivers, through the Azotea Tunnel, and into their water-short Rio Grande basin.

The Animas-La Plata Project has been in the works since the 1960's. Attempts to initiate construction in the early 1990's were halted primarily by environmental concerns. The project was designed to pump water from the non-overappropriated Animas River for storage in Ridges Basin Reservoir and use in both the overappropriated La Plata River basin and the Animas River basin, to assist in meeting the obligations and requirements of the settlements with the Southern Ute and Ute Mountain tribes' reserved rights, as well as provide additional irrigation, municipal, and industrial water supplies in both basins. Due to opposition, and in an attempt to address environmental concerns, the final design has reduced the overall size of the project, cutting the storage amount approximately in half, has eliminated the irrigation component of the project, and has limited the use of the project water to municipal and industrial uses only. The primary, but limited benefit to water users in the La Plata River basin, is the possibility of a domestic water supply in the area as well as the settlement of the reserved rights claims by the tribes. Construction began in 2003 on the pumping plant and on the 120,000 acre-feet Ridges Basin Reservoir. The project is expected to take about 9 years to complete.

4) General Aspects of Water Supply Administration

a) Hydrographic Program

The mission of the hydrographic program is to conduct streamflow measurements at various sites along the state's natural rivers and creeks to determine the amount of water available for distribution to water users (see §37-80-102(h)). Flow measurements are also performed on major ditch and canal diversions to increase water administration accuracy and efficiency.

At the conclusion of each water year, the State Engineer's Office compiles all streamflow information and measurements conducted throughout the year for publication. Published streamflow records describe the mean daily discharge, the instantaneous maximum, lowest mean discharge, and monthly/ annual volumetric totals for a specific location on a river or stream. These annual streamflow records are computed using two critical sources of information. First, the aforementioned streamflow measurements provide a time-specific quantification of water available at a particular point. Streamflow measurements are also used as a calibration tool to adjust for changing streambed conditions that naturally occur due to seasonal flow fluctuations. Second, the State Engineer's Office maintains a series of gauging stations, which are located at important hydrologic locations throughout the state. These gauging stations contain data recorders that continuously monitor the change in river depth that is used to calculate the mean daily streamflow. These data are extremely valuable to support water management decisions and to provide current conditions and comparison with long-term data.

The State Engineer's Office maintains a comprehensive system of remote-sensing equipment that is housed in river gauging stations to provide near-instantaneous streamflow information via satellite relay (see §37-80-102(10)). The intent of this satellite monitoring system is twofold: electronic access to current streamflow information allows our water commissioners to monitor fluctuating water supply conditions which promotes efficiency in water administration and distribution. The remote monitoring system also serves as an advance warning system to alert officials of imminent flooding conditions. There are currently over 360 satellite monitoring stations including over 275 stream gauges. Water measurements are done for these stream gauges and over 700 ditch and canal gauges with over 3,150 measurements annually. The Division of Water Resources publishes over 225 streamflow records.

b) Substitute water supply and replacement plans

A substitute water supply plan is a plan approved by the State Engineer in place of a court-approved plan for augmentation, whereby a water user can use water for beneficial uses without injury or impairment to the vested water rights of others. Exposure of ground water in a pit due to sand and gravel mining (after December 31, 1980) is generally addressed pursuant to Section 37-90-137(11), C.R.S., and informally termed a “gravel pit plan.” Others are only eligible pursuant to the provisions of Section 37-92-308, C.R.S., and informally referred to as “general substitute water supply plans.” Guidelines are available at the DWR web site: <http://water.state.co.us/groundwater/groundwater.asp>

- (1) Policy 2003-2, Implementation of Section 37-92-308, C.R.S. (2003), Regarding Substitute Water Supply Plans [with *General Guidelines for Substitute Water Supply Plans Submitted to the State Engineer Pursuant to Section 37-92-308, C.R.S. (2003)* attached]
- (2) *General Guidelines for Substitute Water Supply Plans for Sand and Gravel Pits Submitted to the State Engineer Pursuant to SB 89-120 & SB 93-260*

c) Interruptible water supply agreements—§37-92-309

Interruptible water supply agreements can maximize the beneficial use of Colorado water resources without the need for adjudication and without injury to vested or decreed conditional water rights. An interruptible water supply agreement is an option agreement between 2 or more water right owners whereby, during the calendar year of a drought emergency declared by the governor and the following calendar year, the loaning water right owner agrees to stop its use of the water right if the option is exercised and the other water user may divert the loaned water right subject to the priority system and approval by the state engineer.

d) Water banks—§§37-80.5-101 – 107

The state engineer is required to promulgate rules to govern operation of a water bank to operate within a particular water division upon request by a water conservancy district or water conservation district located within such division that agrees to serve as the operator of the bank. These statutes prohibit the transfer of water through the banks between divisions.

e) State engineer authority to administer temporary instream flows—§37-83-105

This statute authorizes water right owners in any basin or county to loan water to the Colorado Water Conservation Board for use as instream flows, subject to

requirements that the state engineer determine that such temporary instream flows will not injure existing water rights of others.

f) Exchanges and Other Plans Allowed by Statute—§37-80-120(2), §37-83-104, -105, -106, §37-88-109(2), §37-92-501

Exchanges provide water to affected senior calling water rights so that junior water rights can take the same amount of water upstream. An exchange has its own priority and works when other junior water rights are out of priority.

g) Decision Support Systems (<http://cdss.state.co.us/>)

Colorado's Decision Support Systems (CDSS) is a water management system being developed by the Colorado Water Conservation Board (CWCB) and the Colorado Division of Water Resources (DWR). The goal of this system is to assist in making informed decisions regarding historic and future use of water.

Included river basins:

- (1) The Colorado River Decision Support System (CRDSS) includes Division 4 (Gunnison River basin), Division 5 (Colorado main stem), Division 6 (White and Yampa Rivers), and Division 7 (San Juan and tributaries).
- (2) The Rio Grande Decision Support System (RGDSS) includes Division 3 (Rio Grande basin)
- (3) The South Platte Decision Support System (SPDSS), currently under development, includes all of Division 1 except the Republican River basin (Water Districts 49 and 65). SPDSS has completed its first year of development and beginning its second. The emphasis in both years 1 and 2 is on data collection, primarily ground water parameters and irrigated acreage assessment.
- (4) Both Division 2 (Arkansas River) and Water Districts 49 and 65 of Division 1 (Republican River) are in the long-range plans of the CWCB and DWR. Since the schedule for the SPDSS is approximately 6 years, this puts these basins out around 2006-2007 unless something occurs to expedite the process.

h) Water Allocation Statewide (Annually)

Over 173,000 water rights for over 105,000 structures
Over 390,000 observations of structures
Over 30,600 water diversions and storage records
Over 1,500 water court consultations
Over 500 substitute water supply plans and replacement plans

Ground Water Use (Over 250,000 production water wells)

<u>Aquifer</u>	<u>Average Annual Supply</u> (acre-feet)
Denver Basin	70,000
South Platte Alluvium	300,000
Arkansas River Alluvium	200,000
San Luis Valley Aquifers	380,000
High Plains – Ogallala ¹	1,000,000
Bedrock Aquifers - Mountains	50,000
Other Designated Basins & Nontributary	300,000
Total	2,300,000

¹High Plains- Ogallala is considered designated ground water

5) Daily Water Administration

In 1881, the Colorado legislature established the Office of the State Irrigation Engineer, referred to today as the State Engineer's Office, also known as the Colorado Division of Water Resources. The agency's primary responsibility is the administration of the appropriation doctrine, "first in time, first in right", by maintaining a list of water rights on each stream, in order of priority, and distributing water according to the priority. Further, the state engineer administers interstate compacts and has the power to promulgate rules and regulations for the use of water from a particular source. In most river basins, the flow in the river controls administration and typically a compact call or administration "acts" as the number one priority.

Historically, for the purpose of the execution of the decrees of the courts, it became necessary to employ personnel who, under the direction of the state engineer, saw that the orders of the court were properly executed. To carry out this duty in an orderly manner, the state was divided into seven water divisions, each division generally comprised of the lands lying within one of the major drainage basins. The water divisions, in turn, were ultimately divided into seventy-eight water districts. The statutes provide that there shall be a division engineer having supervision of each division and a water commissioner(s) in each water district who works under the

direction of the division engineer, all under the general supervision and direction of the state engineer.

Water officials have many responsibilities and duties that vary daily, seasonally, and annually. These responsibilities include administering river calls; regulating ditch headgates; distributing water to meet water user demands and compact obligations; inspecting dams and wells; enforcement of rules, permits and decrees; record keeping; water delivery measurement; streamflow measurements; public assistance; reservoir regulation; and administering decrees, including augmentation plans for wells.

Water commissioners have one of the most important duties of any employee within the Division of Water Resources, which is to properly distribute water according to the priority system. Many times, decisions on this distribution must be made with little assistance from other staff. To do this, water commissioners must act as diplomats, peace officers, politicians, and numerous other professionals. They must be available 24 hours a day, seven days a week, to respond to requests for water. Complete and accurate records must be kept of where they have been, what they have done, and what they have observed.

A typical day for a water commissioner begins between 5:00-6:00 am during the irrigation season. Most will check the river flow at key gauges using the satellite monitoring system that they can access via their computers and the Division of Water Resources data network. Depending on the flow, water users will be contacted and told whether they can divert and how much or whether they need to shut off, depending on the priority call on the stream. Some water users may be allowed to continue diverting if they are under a futile call. These settings will hold until the river changes due to rain, reservoir releases, transmountain deliveries, exchanges, and water user demand. There may be multiple calls on the stream system at once. For example, there may be a call on the mainstem and another call on a tributary, sometimes referred to as the "sub-priority" system. The rivers and streams fluctuate daily and annually and it takes many years of trial and error for a water commissioner to become experienced in a river basin. The water commissioner will usually check every ditch (except those with satellite monitoring equipment) at least once every week to verify flow. If a stream gauging station or water measurement device is found to be defective or inaccurate, a water commissioner will request the assistance of a hydrographer to fix or recalibrate the device. The accuracy of the measurement devices and gauging stations is very important for daily administration, especially during low flow conditions, such as during a drought.

The Colorado water officials rely heavily on the honor system. The use of charts and other data recording devices, and the satellite monitoring system help ensure that water users are in compliance. Additionally, the water users often police themselves by reporting a neighbor's noncompliance to the water officials. Since compliance is generally high, the number of administrative orders is minimal. Another reason

administrative orders are minimal is due to the high costs and huge resources to prepare, file, and issue orders and if necessary, file an injunction against a water user.

The trend of society and the growth of the population and developments in Colorado have created the need for many complex decrees. Water officials administer them as best they can to ensure water deliveries occur in time, place, and amount. However, the increasing numbers and complexity of decrees places a high demand on existing personnel. Today, water is not as much administered in Colorado as it is managed. Rather than what might appear to be a “cut-and-dry” task of administration, the reality of distributing water in Colorado involves much judgment. There are many cases decreed through the water courts, several involving very small amounts of water, that must be administered amongst the other larger complex augmentation plans, changes of water rights, and exchanges.

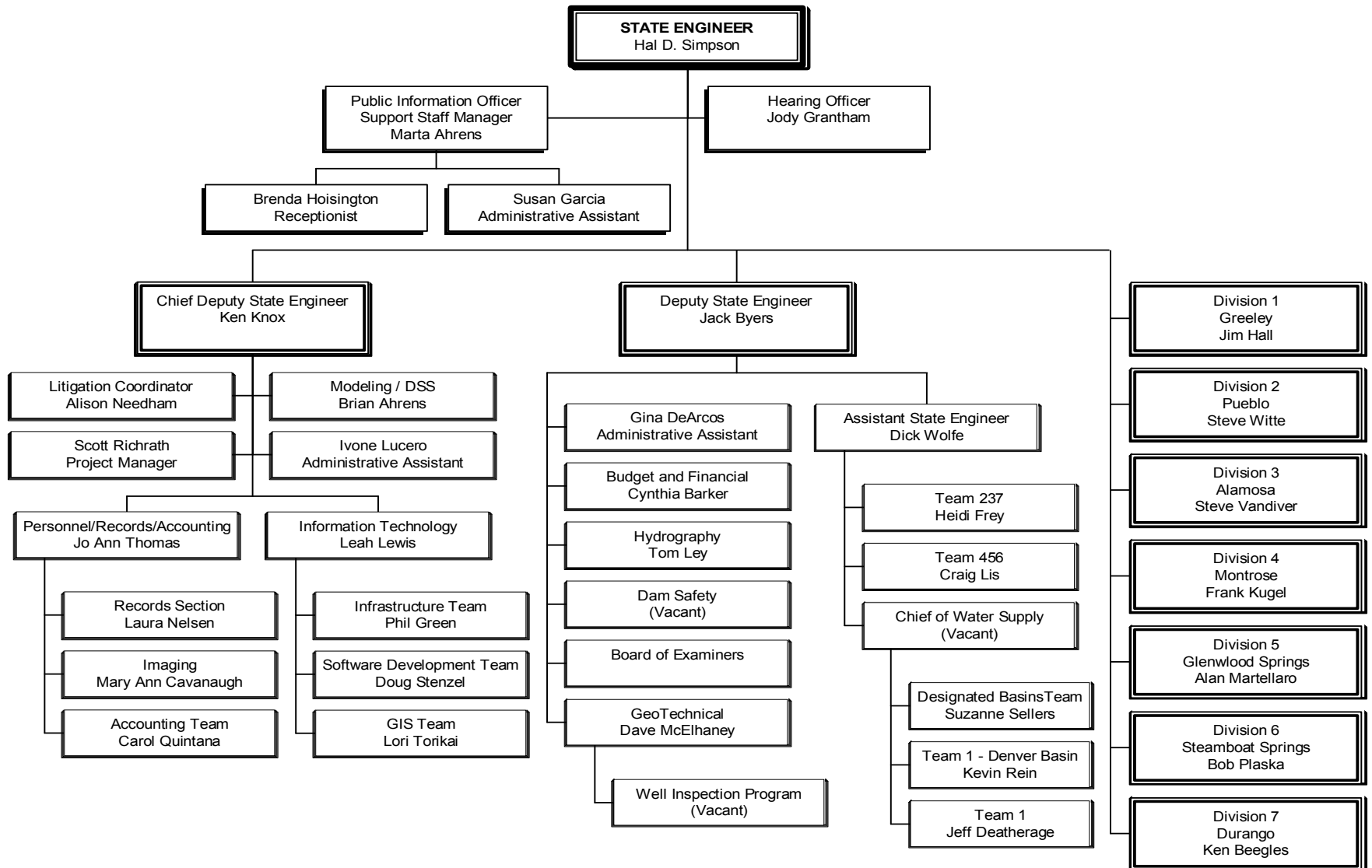
These decrees with small flow rates are making the administerability of decrees increasingly difficult. Most decrees are written under a microscope but are administered with a broadax. For example, small continuous releases of replacement water from a reservoir are seldom practical, so instead these releases are aggregated and released a few times a year. Oftentimes the same replacement water source that is associated with several different augmentation plans is combined in a release to maximize beneficial use and efficiency of deliveries.

Considerable time, effort, and money are spent upon the administration and management of our water resources, which is necessary if the most efficient and beneficial use of our limited water supply is to occur. As the population grows, the competition and value of the limited water resources continues to escalate. Consequently, water officials must administer and account accurately to maximize the beneficial use of our diminishing per capita water supply.

6) References

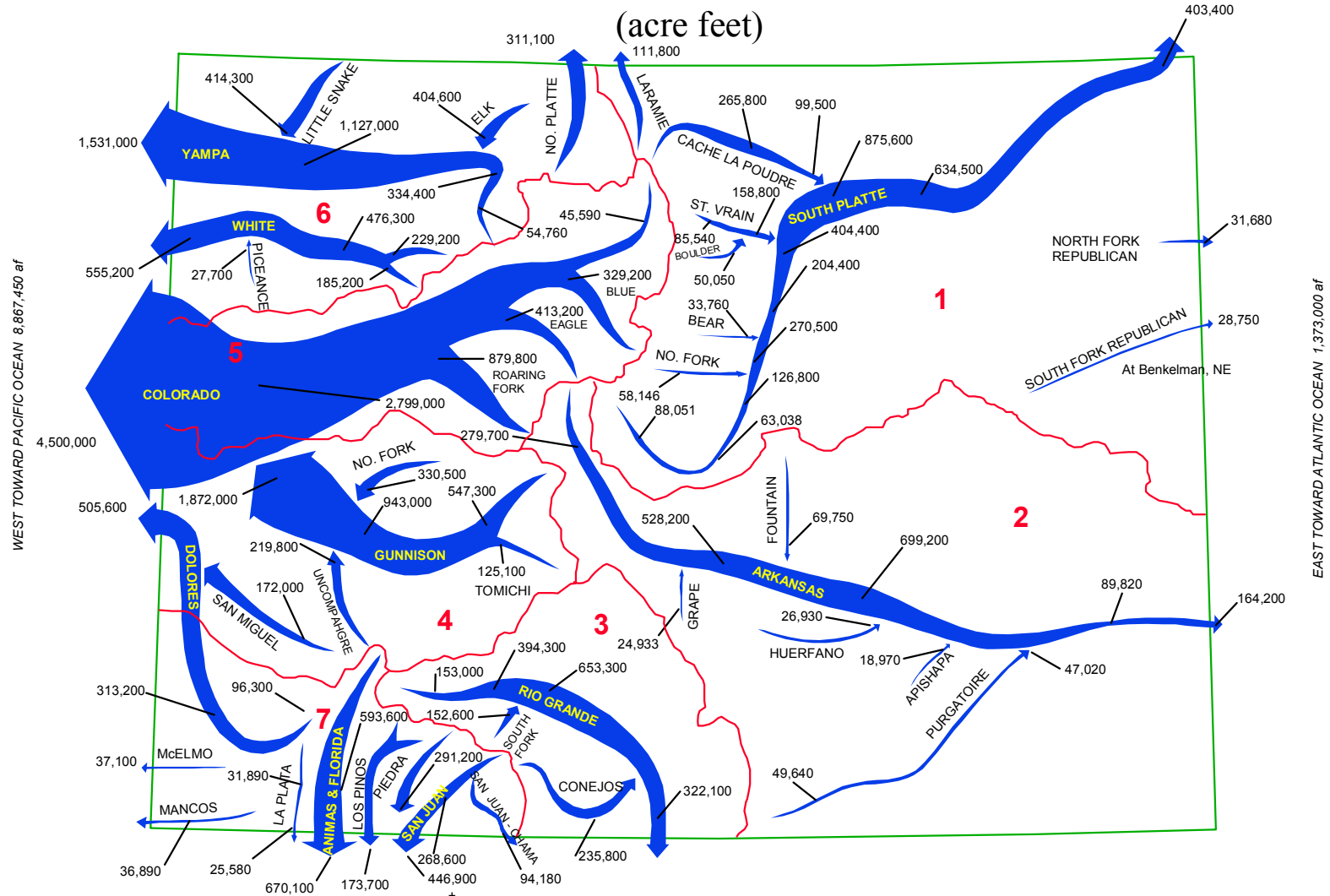
Personal knowledge and communication with DWR staff
Water Commissioner Manual (1996)
Guide to Colorado Well Permits, Water Rights, and Water Administration (June 2003)
Colorado Revised Statutes (2004)
Colorado Stream Lines (various years)

COLORADO DIVISION OF WATER RESOURCES



COLORADO

HISTORICAL AVERAGE ANNUAL STREAM FLOWS (acre feet)

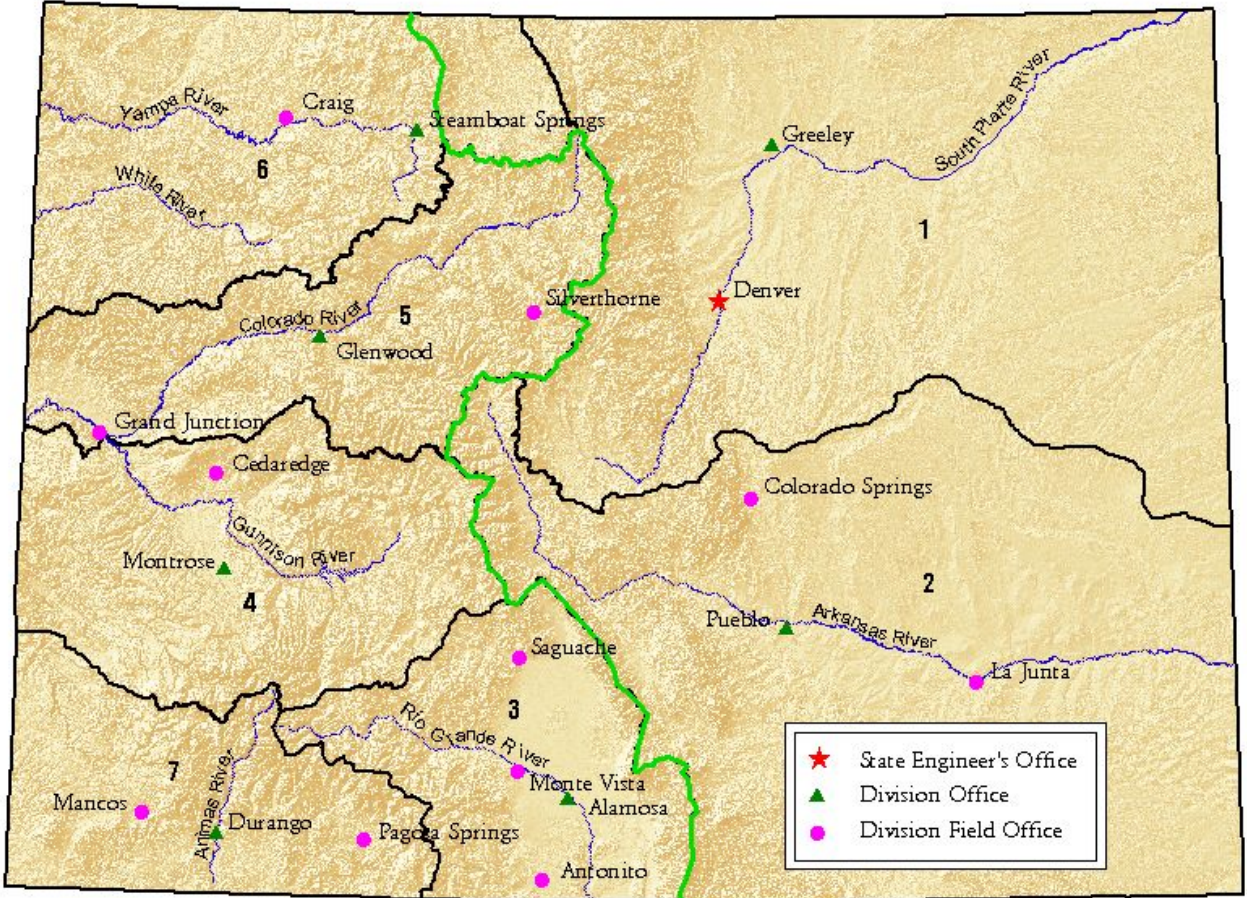


prepared by the Hydrographic Branch (2003 Revision)
 Historic averages obtained from USGS Water-Data Report CO-02

TOTAL LEAVING COLORADO 10,240,500 af

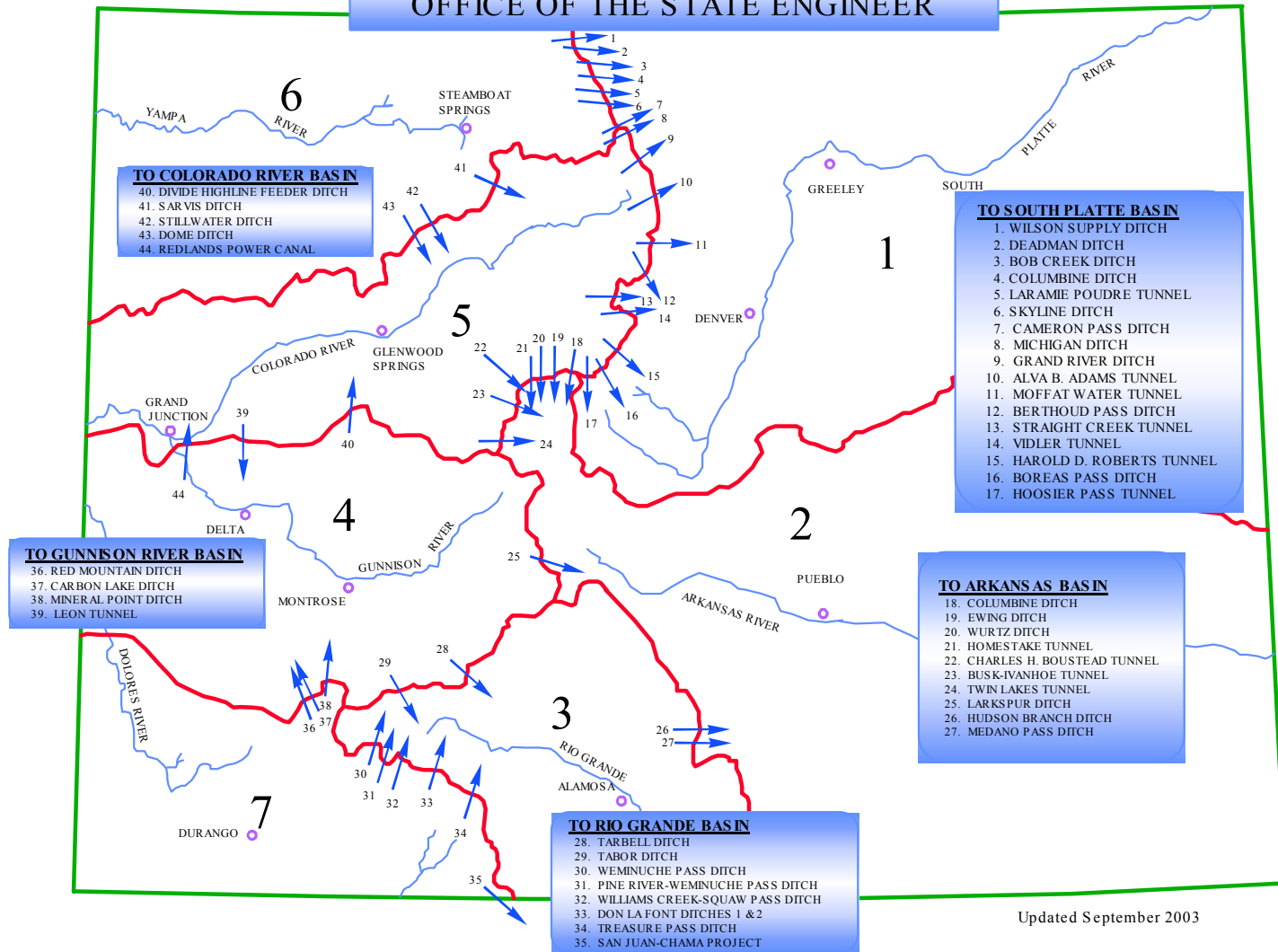
OFFICE OF THE STATE ENGINEER
 COLORADO DIVISION OF WATER RESOURCES

**OFFICE OF THE STATE ENGINEER
DIVISION and FIELD OFFICES**



TRANS MOUNTAIN DIVERSIONS

OFFICE OF THE STATE ENGINEER



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