

Significant Facts About Water and the Denver Basin

Compiled by the Black Forest Water & Wells Committee
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The Denver Basin is a giant bowl reaching from Greeley in the north to Colorado Springs in the south
The basin extends from the front range out to Limon
The basin is actually four bowls inside each other representing four separate aquifers
The aquifers are the Dawson (top,) Denver, Arapahoe and Laramie-Fox Hills (bottom.)
State water officials believe the four aquifers are sealed from each other
However, tests in one area from an Arapahoe well affected the adjacent Denver and Dawson aquifer
No one knows for sure how much the aquifers are sealed from each other
Drilling logs do not show a clear, impermeable boundary between aquifers
If these bowls are being recharged at all, it is a slow process over generations of time
Only a little over half of the Denver Basin water can be economically removed
Through continuous, long-term use, a well becomes less and less efficient
After several years, it is not economical to pump because of decreasing output
A local well-driller with 30 years of experience presented a program about wells in the Denver Basin
He said the geology of the Denver Basin is not unified or homogeneous
Basin has multiple interlocking and overlapping layers of sand, gravel, sandstone and claystone
Wells 1/4 mile apart can produce widely varying amounts of water
Wells only 200 feet apart can have widely different static levels
Having a water allocation or water right is no guarantee of predicted amount of water in that area
“Paper water does not equate to wet water”

Statewide, agriculture accounts for 86% of the water used in Colorado
Water use from Denver Basin is 62% agriculture, 20% municipal and 12% domestic (private wells)
Water rights all across the state have been sold to developers and municipalities
These water rights include both underground water and water from rain and snow runoff
The water in Colorado rivers all belongs to someone with water rights
Some of the water in the Colorado River belongs to states like Arizona and Utah
When water rights are sold, farm land is idle and unused because of arid conditions and no irrigation
Over 45,000 acres along the Arkansas River are now idle under the “buy and dry” principle
The water for these rights can be used upstream in Pueblo and beyond
For water use, the “use it or lose it” rule sometimes causes water waste
If water is not used, water not owned by a water right can be given to another user
Another user may claim he can put the water to better use
Water that is owned is sometimes “used” by pouring it out on the ground so no one else can claim it

For the water that falls out of the sky, 70% evaporates back into the atmosphere and 30% soaks into the ground and runs off into streams, rivers and the ocean.

For residential households in the Black Forest, the State of Colorado considers water use as follows

An acre foot of water is 326,500 gallons which is 1 acre (about a football field) 1 foot deep in water
The average household uses 0.35 acre-feet of water per year. This is 313 gallons per day.

90% of the water used in a household is returned into the ground via the septic system
Just 10% is actually consumed or evaporated into the air
15% of the water used for watering gardens and lawns is returned into the ground
85% of irrigation water is evaporated into the air and not soaked into the ground
100% of the water used for animal watering is consumed and none is returned into the ground

Colorado Springs gets water from the Arkansas River and from snow runoff on the Western Slope
Colorado Springs gets water that would otherwise run off into streams and then the Arkansas River
Water is piped from the Western Slope through Twin Lakes near Buena Vista and then into Arkansas River
A secondary pipeline comes over the front range just south of the Air Force Academy
The Southern Delivery System (SDS) is a 24-inch waterline from Pueblo Reservoir to Colorado Springs
At present, Colorado Springs Utilities has water rights and supplies above the current demand
CSU also has extensive Denver Basin water rights
CSU policy is not to use Denver Basin aquifer water except in an emergency
Annexed developments surrender their water rights to CSU except for golf courses and ponds
Flying Horse and Flying Horse North water their golf courses with aquifer water
Wolf Ranch created Wolf Lake (6 acres) with aquifer water
So far, Colorado Springs Utilities has not provided water to anyone outside the city limits
The city is considering providing water to entities outside the city limits
Providing water this way would be a revenue boost to Colorado Springs Utilities
Colorado Springs uses 40 million gallons per day in the winter and 100 million gpd in the summer

Thousands of homeowners rely on Denver Basin water for their homes
The Denver Basin has well over 100,000 wells, but the exact number is difficult to find in state documents
El Paso County alone has over 22,000 private wells
The suburb of Highlands Ranch in Denver (100,000 residents) uses Denver Basin water for 10% of its needs
70% of water used in the South Denver metro area is groundwater
Castle Rock, Parker and other municipalities use Denver Basin water

Water levels in the Denver basin are declining in several areas
Around the city of Castle Rock some wells have been declining up to 30 feet/year
The Denver basin is thinner in the Castle Rock area
The Castle Rock area has a huge number of Denver basin wells
Fortunately, according to a local well driller, Black Forest wells have been holding quite steady for many years
The Dawson aquifer is much thicker in the Black Forest area than further north

The State of Colorado Division of Water Resources allocates how much water anyone can pump
The state has models that tell the thickness of the aquifer at any given location
The decree takes the thickness of the aquifer (feet) times the acreage of the parcel = acre-feet
This is called the saturated thickness
The state considers 0.2 or 1/5 of each cubic foot to be water
Calculated volume of water allowed per year is divided by 100 for 100-year duration of aquifer
Figure is again divided by 3 for 300-year rule
Amount of water allocated for pumping is based on 1985 geological model
The amount is based on pumping the aquifers dry in 100 years
The 100-year rule was initiated in 1973
We are 46 years, almost halfway, into the 100 years toward "dry" wells in many parts of the state

El Paso County initiated a 300-year rule in 1986 to extend available water for private wells in the county
El Paso County approves only 1/3 of the state allocation per year
Theoretically the 300-year rule should provide water for two more centuries
The 300-year rule was challenged in the Colorado Supreme Court but was upheld for El Paso County

In spite of the 300-year rule, all of the northern El Paso County water providers need more water
Water providers were told they had enough water for their developments
Continuous pumping is resulting in diminishing returns from well production
Manager of Woodmoor Water says well that formerly pumped 100 gpm only pumps 40 gpm now
Monument, Palmer Lake, Woodmoor, Tri-View, Meridian Ranch, Paint Brush Hills need more water
Several have purchased additional water rights on ranches south of Colorado Springs and Leadville
Access to that water not available at this time

Loop proposal suggested in late 2021 to pipe SDS water north through Cherokee Metro pipeline
Cherokee Metro would get SDS water in exchange for CSU using Cherokee pipeline
Cherokee wishes to be absorbed into CSU but high debt is stumbling block
Pipeline would be extended from Sundance Ranch to Monument and Palmer Lake
Renewable water would be provided to northern water providers to save Denver Basin water
Wastewater would be piped south to connect to CSU wastewater system along I-25
Estimated cost around \$134 million

Urban development south of Black Forest will potentially use huge amounts of Denver Basin water
Sterling Ranch, The Retreat at TimberRidge and The Ranch will total 7400 homes
The entire Black Forest has about 6600 homes with private wells by comparison
These developments are currently planning to use Denver Basin water from the Black Forest
Not enough groundwater exists under these developments to serve the high number of homes
Water rights on Sundance Ranch, Flying Horse North, Bar-X Ranch and McCune Ranch purchased to provide more water
A potential annexation plan may mean some of these developments will use city water
Unintended consequence of annexation may be that developments will redesign to all urban lots
More stringent development requirements in Colorado Springs city limits than for rural developments
Developers are leapfrogging over Banning-Lewis Ranch because of stringent city requirements
Resulting developments often use Denver Basin water instead of renewable city water

Cherokee Metropolitan District has obtained significant water rights in the Black Forest
Sundance Ranch, Flying Horse North, Shiloh Ranch and County Line Road water rights were purchased
State granted permission to pump 1246 acre-feet of Dawson water per year from 23 well sites
Cherokee has permission to pump a total of 3708 acre-feet of water per year from all 4 aquifers
Coupled with planned residential development, this is 10 times as much water use as for 5-acre lots
All the well sites are on the property boundaries so half of the water pumped belongs to neighbors
The water is being piped to supply 18,000 customers in southeast Colorado Springs
Cherokee Metro has committed 2025 af/yr of water to Sterling Ranch
This is 1.8 million gallons of water per day.

Cherokee Metro District wells already drilled are not producing significant water
Only 4 wells have been drilled to date
One Denver well drilled to 1970 feet (12-inch bore) and produced only 50 gpm
One Arapahoe well drilled to 2520 feet (12-inch bore) and produced 450 gpm
One Dawson well drilled to 1044 feet (12-inch bore) and produced 68 gpm
A second Dawson well drilled to 1030 feet (12-inch bore) and produced 65 gpm
The two Dawson wells do not even have a pump installed and are not producing
These wells cost around \$750,000 to drill
Three of these four wells are producing very poorly
These wells suggest that commercial extraction may not be productive or economical
Transmissivity or flow of water back and forth underground may not be very rapid
Clay and sandstone don't allow water to flow laterally very easily
Water seems to be located in "pockets" within clay and sandstone layers

“Pockets” of water sufficient for private wells but not for commercial extraction
Water seems to not flow back into large wells fast enough to produce profitable results
This is an excellent example of “paper water may not equal real water.”

Falcon Area Water Authority (FAWA) is planning a huge water project in Black Forest
Project will pipe water from 27 sites to Falcon and Sterling Ranch area
Water coming from High Forest Ranch (7), Bar-X Ranch (16) and Winsome (4) sites
Water rights granted for 1270 acre-feet/year to be pumped
FAWA officials say more water rights are for sale in the Black Forest
Remains to be seen if “paper water equals wet water”

Future Potential Uses of Denver Basin Water

A developer has obtained rights to 39,000 acre-feet of water per year from Greenland Ranch
Greenland Ranch is a conservation easement on thousands of acres between Monument and Castle Rock
This conservation easement will not be developed but remain as open space
Front Range Water Company (Sun Resources) is proposing a 24-inch pipeline to Denver
To put this in perspective, this is 35 million gallons of water per day they are allotted.
This water would be pumped to an eastern Denver suburb

A water developer in Denver is proposing to pipe San Luis Valley water (Alamosa) to Denver
The San Luis Valley is very arid, gets only a few inches of rain per year and is heavily irrigated
All the water is appropriated so developer would have to buy water and dry up farm land
Sean Tonner is leading a group that proposes to spend \$118 million dollars for water
They propose to buy 22,000 acre-feet of water that would dry up 10,000 acres of farm fields
They propose to pay farmers to not plant crops and save another 30,000 acre-feet of water from irrigation
That would dry up another 15,000 acres of farmland and leave it idle
They want to sweeten the pie with a \$50 million gift to the San Luis Valley farmers
Plan involves a 200-mile pipeline to transport the water to Eleven Mile Reservoir and South Platte River

Common Sense Principles That SHOULD Logically Govern Water Use in the Denver Basin

The Dawson aquifer should only be used for private wells

Denver Basin water should not be pumped from one area of the basin to another

All wells, including commercial wells, should be sited well away from property boundaries

All urban density developments should be required to use renewable water only

Paper water does not equal real water