

WATER UNITS

Acre-feet x 43560 = cubic feet
Acre-feet x 1613.3 = cubic yards
Acre-feet x 325851 = gallons
Acre-feet/day x 0.5 = acre-inches/hour
Acre-feet/day x 226.3 = gallons/minute
Acre-feet/day x 0.3259 = million gallons/day

Cubic feet x 1728 = cubic inches
Cubic feet x 0.03704 = cubic yards
Cubic feet x 7.481 = gallons
Cubic feet/second x 449 = gallons/minute
Cubic feet/second x 38.4 = Colorado miners' inches
Cubic feet/second x 0.02832 = cubic meters/second

Feet of water x .0295 = atmospheres
Feet of water x 62.43 = pounds/square foot
Feet of water x .4335 = pounds/square inch

Gallons x .1337 = cubic feet
Gallons x 3.785 = liters
Gallons of water x 8.33 = pounds of water

Liters x 61.02 = cubic inches
Liters x .001 = cubic meters
Liters x .001308 = cubic yards
Liters x .2642 = gallons

PRIOR APPROPRIATION

http://www.ose.state.nm.us/water-info/NMWaterPlanning/regions/jemezysangre/jys_sec6-ref.pdf

The Territorial Government of New Mexico adopted the Territorial Water Code in 1907, confirming the validity of all water rights in existence at that time. The Office of Territorial Engineer was created to supervise measuring, appropriating, and distributing New Mexico's waters. The courts were assigned the task of adjudicating water rights. When NM became a state in 1912, the 1907 Territorial Water Code was incorporated into the new constitution.

In New Mexico, as in most western states, water rights are determined by the prior appropriation system rather than by possession of property adjacent to surface water. According to prior appropriation, the person who first diverts water for a beneficial use has the senior right, superior to the right of subsequent users, so long as he continues to put the water to beneficial use. The senior priority holder is entitled to receive the full quantity of water that he can apply to beneficial use or the maximum quantity for which he has a permit, whichever is less. Junior priority holders must satisfy their needs with the remaining water, in order of their relative seniority.

Beneficial use has not been fully defined, but is generally considered to include agriculture; municipal and domestic uses; and commercial/industrial uses. Suspension of use can lead to loss of the right, hence the phrase "use it or lose it".

ADJUDICATION

http://www.giscafe.com/technical_papers/Papers/paper074/

Adjudication is the process used to determine who has senior rights in a given basin. Each judicial district now has a water court. So far about 20% of the state has been adjudicated. The first step in adjudication is for the State Engineer to perform a hydrographic survey of the basin. Among other things the study determines what types of crop are grown and how much water is needed for a crop in a specific zone. The second step is a lawsuit filed by the state that seeks to establish the date of first use, the quantity of water involved, the source and diversion point of the water, the ownership of the land where the water is used, and proof of beneficial use of the water. The SE sends out an interrogatory, a series of questions for discovery. The defendant has 30 days to respond or be charged with contempt. It can be difficult for small farmers to prove that their fields were irrigated in the past, nor can they prove usage since the ditches are rarely metered. The process is complicated by the need to take into account laws and regulations from pre-American governments, the thousands of defendants involved, and the need to protect the integrity of existing inter-state water compacts. The State Engineer recently estimated that it would take 15 years to complete the current adjudications and 35 to complete the process throughout the state.

Without adjudication, the State Engineer argues that he cannot make a priority call because the validity of the water rights is unclear, nor can there be an accurate quantification of demand. Two efforts are underway to improve the situation. The Administrative Office of the Courts has undertaken a study of the process in the hope of making improvements. For instance, they have learned that in some other states the role of the Office of the State Engineer is not adversarial, as it is here. The second approach has been the introduction of “licensing”, a procedure whereby the State Engineer takes the steps to determine the amount, point of diversion, and priority date of a water right. However, unlike the adjudication process, licensing does not offer other water users the opportunity to challenge the evidence. (Hume, 2007)

GROUNDWATER AND OFFSETS

During the 20th century groundwater became important to satisfy the increasing demand for a reliable source of water, especially for urban populations. The doctrine of prior appropriation did not originally apply to groundwater. In time it was recognized that pumping of groundwater in a basin causes a decrease in the flow of the surface water, and a set of rules was developed requiring new users of groundwater in stream-connected basins (i.e., most of New Mexico) to “offset” the depletion by retirement of another use, so that the stream is kept whole.

However, the rules are complex and have not been applied consistently. Groundwater permits have been issued based on a promise to obtain and retire surface water rights when the effect of the pumping reached the river, as predicted by numerical modeling or analytical analysis. But there are many areas in New Mexico where data for modeling or analysis are insufficient.

The offset requirements were designed to satisfy the requirements of the Rio Grande Compact. In practice no consideration was given to the impairment of senior water rights. Where senior surface-water users are downstream from junior groundwater users, a priority call against the latter may not produce additional surface water in a timely fashion.

The records are incomplete, but it may be that there are not sufficient water rights available to rectify the imbalance in the Middle Rio Grande Basin. Some hydrologists believe that even without taking not-yet-required offsets into account, the region is running a deficit of between

55,000 and 70,000 afy. Others believe that when the already-promised water rights are retired that will spell the end of all agriculture in the region.

In New Mexico, high yield wells are subject to extensive regulation and monitoring, but one need only fill out an application and pay a modest fee to drill a domestic well. The State Engineer is required to issue a permit. Until recently the fee was only \$5 and the permit enabled the applicant to withdraw up to 3 acre-feet a year (af/y). In the past rural household water consumption may not have been significant. But in 2000 there were about 137,000 domestic wells in the state and permits for 6000 to 8000 more are issued every year. Developers have been known to buy farmland, sell the water rights, subdivide the land, and then dig domestic wells to provide water for the new homes. In 2006 the State Engineer issued new regulations that raised the fee and lowered the allowable yield to one af/y, or less in some areas, after the Legislature failed to do so. Since most domestic wells are not metered, the rules have little effect.

A recent court case may bring about further changes in domestic well administration. In July Sixth District Judge J.C. Robinson ruled that the domestic well law was unconstitutional because it does not require proof that the proposed well won't affect senior water rights. If the judge's ruling stands, applicants in some areas will need to purchase water rights before drilling.