

Regulation of Water Versus Hydrologic Reality in New Mexico

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Groundwater and surface-water rights in New Mexico are regulated by the Office of the State Engineer (OSE). Historically, the need for regulation of surface water came first, as farmers, miners, and other water users appropriated almost all of the available surface water. Many surface-water rights date from the 18th and 19th centuries. Among New Mexico's oldest water rights are numerous acequias, or self-governing ditch irrigation associations, that distribute and share often-limited surface-water supplies, in accordance with internal rules and

customs. The state engineer (originally the territorial engineer) was made responsible for regulating transfers and changes of use of surface water, and to protect senior rights against impairment by junior uses. Most of the native surface waters of New Mexico are fully appropriated, and no new uses are permitted, only transfers (except for some new uses of "imported" water). The state engineer must also consider New Mexico's obligations to adjoining states under interstate compacts. New Mexico is an upstream state, and has an obligation to ensure water flows in sufficient quantity to supply the downstream state in accordance with each compact.

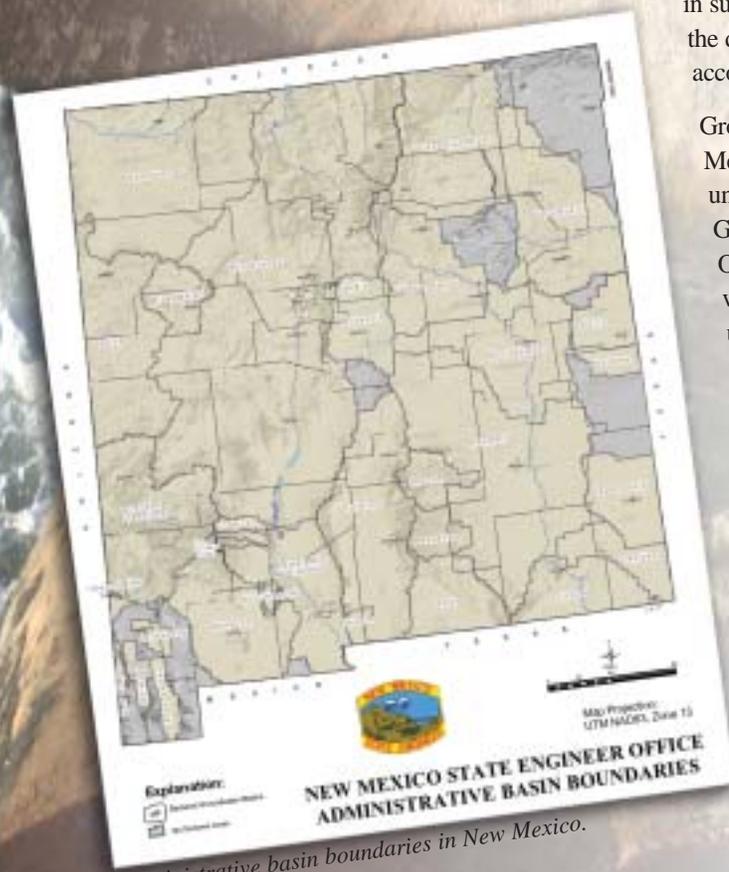
Groundwater use in New Mexico was relatively minor until the 20th century. Groundwater regulation by the OSE began in the 1930s, when it became evident that uncontrolled exploitation of the prolific Roswell Basin artesian aquifer for irrigation could imperil the groundwater supply, and thus the local economy. Groundwater regulation in New Mexico also recognizes that groundwater development can impact the flows in connected surface-water bodies. The state engineer has the power to "declare" groundwater basins where considerations such as excessive

drawdowns or impacts to surface water make it necessary to regulate groundwater use. Permits are required for any new use of groundwater in a declared basin. Existing uses at the time of the basin's declaration are "grandfathered" in. About 90 percent of the land in New Mexico is included in 33 declared groundwater basins.

Groundwater Permit Considerations

The OSE evaluates applications for groundwater permits – either for a new use, if any unappropriated water exists, or for transfer of an existing use – to ensure that 1) other groundwater users are not impaired, and 2) no additional depletions will occur on fully appropriated streams or streams whose flows are needed to fulfill interstate compact obligations. Other factors, including the availability of water, conservation of water, and public welfare concerns, are also evaluated. When local impairment is evaluated, the actual physical characteristics of nearby wells are considered, as well as likely water-level declines.

Permits to use groundwater in stream-connected basins are conditioned so that the aquifer and stream are managed conjunctively. Typically, any new use of groundwater in a stream-connected basin will require offsets, or retirement of another use, so that the stream is kept whole. In some cases these offsets are required according to a schedule, based on numerical modeling or analytical analysis, so that offsets are made as the effects



Administrative basin boundaries in New Mexico.

of pumping are calculated to reach the stream. In other cases, offsets, or control of the rights that will be needed for offset, are required "up front," before groundwater use is permitted. In basins where excessive drawdowns or groundwater mining are at issue (which can occur in both stream-connected and non-stream-connected aquifers), criteria are developed, and critical areas defined, that limit groundwater withdrawals in order to prevent uncontrolled depletion of the aquifer water resource and to reduce the risk of land subsidence.

Evaluating Pumping Effects with Models

The OSE uses numerical groundwater models developed by the U.S. Geological Survey (USGS), OSE or other parties, where appropriate, to evaluate the potential effects of groundwater pumping on other groundwater users and on connected surface waters. Typically, these groundwater models are calibrated to historical and present groundwater-level data, and to stream-gauge data that provide measures of past and present discharge of groundwater into streams. The OSE collaborates with the USGS to collect much of the data needed for these models, and, in some cases, the OSE makes the collection of additional data a condition of permit approval.

Although well-calibrated numerical models have been developed for parts of New Mexico, there are many areas in which either no calibrated model has been created, or the data necessary to calibrate a model to any degree of reliability do not exist. There remains significant uncertainty in many model predictions, especially for areas of limited data and limited groundwater development. The OSE tends to address such uncertainty by employing methods that are conservative with respect to keeping the stream whole and protecting the aquifer. In cases where no numerical model is available, or if use of a numerical model is inappropriate, analytical solutions such as the Theis equation and Glover-Balmer solution, an offshoot of the Theis equation used to calculate stream depletions, are employed.

Rights Versus Hydrologic Reality

Regulation involving priority administration

can come into conflict with hydrologic reality. In general, New Mexico water rights are regulated by seniority, so that the oldest right has the highest priority. In case of shortage, the senior right can make a priority call against the junior to obtain water. This system is readily applicable among surface-water uses, but is more difficult when junior groundwater uses are involved. In cases where senior surface-water uses are downstream from junior groundwater uses, a priority call against the junior groundwater users may not produce additional surface water in a timely fashion. In the case of the Pecos River, the senior Carlsbad Irrigation District has complained of reduction in surface supply caused by junior groundwater uses in the Roswell Basin. The OSE is attempting to resolve the problem through the adjudication process. An adjudication settlement has been devised which, with considerable expenditure of state funds, should improve surface water supplies to Carlsbad, protect the Roswell Basin against priority call, and ensure interstate compact deliveries to Texas.

Other Challenges

Numerous challenges involving water resource management and regulation face New Mexico. Among them are:

- Endangered species water needs conflict with other existing uses and impact

water planning on the Rio Grande and the Pecos River. This issue has become acute during the ongoing drought and will likely continue to be contentious.

- The ongoing drought has created water-supply shortages and increased need for close and active administration of water.
- Water rights of New Mexico's 23 Native American pueblos and reservations are largely undefined and may have senior priority to other uses on fully appropriated streams. These, and the water rights of others, will need to be resolved by adjudication through the court system, a lengthy and often contentious process.
- Texas, which has already successfully sued New Mexico over the Pecos River Compact, has threatened litigation involving the waters of the Rio Grande.
- Although groundwater is fully regulated in New Mexico, permits for domestic wells are granted automatically by law, albeit with restrictions if set by local governments. Additional restrictions on the granting of domestic well permits are under consideration.

More information about New Mexico water-rights management, water-resource and interstate compact issues, and adjudication settlement on the Pecos River can be found on the OSE web site: www.seo.state.nm.us. Contact Peggy Barroll at pbarroll@ose.state.nm.us

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