

Irrigation Association 2014 Irrigation Show & Education Conference Technical Sessions

How Can Agricultural Producers Organize to Stretch Limited Aquifer Supplies to Sustain Themselves and Their Rural Communities?

MaryLou Smith

Policy and Collaboration Specialist, Colorado Water Institute, Colorado State University

Deb Daniel

General Manager, Republican River Water Conservation District

ABSTRACT

Most are aware that the Ogallala Aquifer is being seriously depleted as irrigated agriculture continues to be an important economic driver in those areas relying on this vast store of underground water. Some groups of farmers and ranchers, often part of groundwater management districts (GWMDs), are beginning to develop rules to control their own use of the aquifer in hopes of stretching out the resource. Presumably, such rules being proactively developed by a group of irrigators is preferable to a state mandate that may be inevitable otherwise. The author is facilitating the organization of such a group on the northeastern plains of Colorado. Here she shares some of the sociological and technological questions that are arising during the beginning stages of the conversation.

FACED WITH A CHALLENGE? ORGANIZE!

When agricultural producers are motivated, much can happen in just a few short months. This paper outlines the challenge and the response to that challenge that has been launched by a small group of committed groundwater users in northeast Colorado.

The Water Preservation Partnership of the Northern High Plains of Colorado was organized in September, 2013 and is made up of one representative from each of eight GWMDs. In addition to being located geographically in the Northern High Plains basin of the Ogallala aquifer, these districts are also geographically part of the Republican River Basin, though they use very little surface water in their operations.

A significant player in bringing these GWMDs together is the Republican River Water Conservation District (RRWCD), formed in 2004 by legislative statute to assist Colorado in achieving compliance with the interstate compact with Kansas and Nebraska over the sharing of waters from the Republican River. Those programs required a great deal of sacrifice from ag producers from the districts, including the voluntary permanent dry up of some irrigated ag lands and the building of a pipeline to transport groundwater to the river in an effort to meet compact requirements. Even a well-loved plains reservoir had to be drained as part of the efforts Colorado has had to carry out to attain compact compliance. These programs have been financed from an annual fee paid by all the well owners based on irrigated acreage and from commercial wells and municipal wells based on the annual amount of water pumped.

RRWCD has the responsibility of making sure Colorado complies with the interstate compact, but does not have authority to enact rules to reduce pumping otherwise. Now that the issue of compliance is mostly settled, several individuals on the board of the RRWCD along with community leaders and other ag producers, believe it is time to turn their attention to ways to arrest the ongoing depletion of the aquifer. Most are aware that current pumping rates cannot be sustained, and that at risk are the livelihoods not only of ag producers, but also the viability of the many small ag-based communities in which they live. Most of the economic strength of the region comes from irrigated ag production. A statewide water supply study published in 2010 shows that the region represents 16% of Colorado's irrigated acres.

Membership in the Water Preservation partnership, in addition to one member from each GWMD, includes one representative from the RRWCD and one representative from a group formed earlier during the compliance issues called Colorado Agricultural Preservation Association. The group of ten has met regularly since its formation, with attendance at meetings of other agricultural and community leaders including some of the GWMD managers and elected officials. The author of this paper, policy and collaboration specialist with the Colorado Water Institute at Colorado State University facilitates meetings.

Exemplary of the energy and focus of the group, they adopted at their very first meeting this very clear mission: To preserve, for as long as possible, the underground water resources we all rely on." They immediately focused on a study that shows that they are pumping 400,000 acre feet each year more than is being recharged.

Dialogue about various water conservation methods that could be employed, such as eliminating end guns from center pivot sprinklers quickly turned to the reality that voluntary water conservation methods alone will not reduce the pumping enough to turn things around. The group narrowed in on the belief that they need a policy or policies ag producers can all agree to that requires a reduction in pumping. Pumping less water could have a significant impact on everyone's pocketbook, but most want to preserve the farm and ranch life they now enjoy, and pass it along to future generations. Currently many young people from the area have come back to the farm and are working alongside their parents in their operations.

WHAT POLICY? HOW CAN WE GAIN COMPLIANCE WITH IT?

To help them design these policies the Water Preservation Partnership applied for and was recently awarded a grant from the Colorado Water Conservation Board. Professors of the Department of Ag and Resource Economics (DARE) at Colorado State University will analyze the likely economic effects of various potential policies and conduct a survey of producers to see which policy or policies they are most likely to agree to. The grant will also pay for facilitation of the many public meetings that will be required for the Water Preservation Partnership to educate irrigators and help them understand the necessity of this policy for reduced pumping.

In this case, it seems that the issue isn't so much an issue of what's technologically possible, but the sociological and economic issues. To illustrate the complexity, here are three difference approaches that have been discussed by the group for reducing pumping:

Approach: Education

Teach about the underlying problem and about the need for irrigation efficiencies to make better use of the water currently being applied, and then hope for the best. Issues with this approach include:

- Teaching farmers how to more efficiently use their water doesn't necessarily lead to their using less water. It could just as easily lead to using the same amount of water but getting a better yield, albeit with less input costs.
- Those who are convinced by education to use less water are at a disadvantage to those who do not choose to use less water; they might do it out of the goodness of their heart, but to no avail if everyone doesn't cut back.

Approach: Maximum Inches per Irrigated Acre

Adopt a hard line cap—such as 18 inches maximum per irrigated acre.

Background:

- As far back as 1937, the state of Colorado has given permits to high capacity wells, authorizing them to be pumped, and typically allowing up to 30 acre inches per acre (2.5 acre feet/acre.) This comes out to 400 acre feet applied annually to 160 acres or less.
- Some permits in the basin are for greater acreages (Expanded Acres Permit.) These permits allow the same amount of water to be pumped annually as the average of the last 10 years, which has implication of less water per acre.
- Some permits are “change of use” permits, filed for after the final permit was approved. Change of Use Permits are given when a well that has been approved for irrigation is changed to provide water for another use e.g. municipal, commercial use to sell water to another company, sell water to be used for drilling oil or gas wells, etc. The Change of Use permits are only allowed the average of the annual withdrawal over the last 10 years.
- Some permits are “under-appropriated permits.” At the time the permit was granted, a calculation was made to figure out how much groundwater was available at the time. If there was not enough for the typical 30 inches/acre, the state issued an “under or short-appropriated” permit.
- Each GWMD is allowed by Colorado statute to make rules pertinent to those who irrigate within that district's boundaries. Some GWMDs are more restrictive on how much water can be pumped from a commercial well than what the state allows. For example, the State allows 80 acre feet to be pumped from a commercial well annually while the Plains GWMD and the East Cheyenne GWMD allow 5 acre-feet annual appropriation. Central Yuma GWMD allows 25 acre-feet pumped from commercial wells per year.
- The amount of water actually being pumped is verified by a power conversion coefficient (PCC) method whereby every two years during the peak of the season, each well using a PCC is certified by an independent well tester-. This test tells the well owner how many gallons per minute the well is pumping and how many kilowatt hours it takes to pump one acre-foot of water. At the end of each year the well owner has to turn in an Annual Water Use Report to the state. The state verifies the number acre feet that were pumped based on the PCC and the Annual Water Use Report.

- Another way of verifying the amount of water being used is to install totalizing flow meters (TFM), which also have to be verified as to their accuracy. Approximately 50% of the growers in the Basin have installed totalizing flow meters. The TFM must be installed at the well prior to where the pipe goes underground to the pivot(s). In 2012, when it was really dry, many growers used 100% or more of the allotment that their permit allowed.

Issues:

- In the Plains GWMD and some portions of Frenchman and Central Yuma districts, the aquifer does not produce enough water to irrigate up to 18 inches per acre, so they would have to set a more stringent number for it to equate real conservation in this area.
- The Sandhills GWMD has mostly sugar-sand for soil—so 18 inches won't supply them enough to raise a good crop. Irrigation in the sandier soils recharges the aquifer faster than others so how do you balance against that?
- If you go to a hard cap of 18 inches, you may not be effecting either the “change of use” or “under-appropriated” permits. The 18 inch approach only hits the regular final permit irrigators, which would be the majority of the wells in the area.

Potential solution:

- Choose a basic hard line cap and then customize it for each well, factoring in consumptive use, soil type (for recharge calculation) and crop grown. This would be quite labor intensive, however. You could use a model, but models aren't trusted in the basin so that would be a hard sell. Soil textures can change within a 120 acre circle adding to the difficulty of using this potential solution.

Potential variation on hard line cap:

- Base it on 80% of your historic use.
 - Some wells would be shut off because 80% of their historic use wouldn't be enough to operate
 - This approach would discriminate against those who have already cut back on the amount of water they are using because their historic average will be lowered by those lower use years. (Example: Farmer A who has used 23 inches the past 20 years vs. Farmer B who used 23 inches the first 10 years but only 19 inches the past 10 years.) This could be considered a penalty to growers who have already tried to conserve water.

Approach: Fee Based System

Adopt a fee based system—to incentivize reduced pumping. The permutations could be simple or complex.

Flat fee: irrigator is charged a flat fee for up to 18". The fee for the additional inches pumped would be increased in increasing increments.

Incremental or tiered fee: Irrigator is charged increasingly more per acre-foot the closer he/she gets to the maximum allowed by state permit.

Issues:

- GWMDs currently do not have authority to collect fees.
- The state statute under which the RRWCD was formed seems to indicate that the RRWCD could not collect fees unrelated to compact compliance. The RRWCD cannot collect a fee that appears to be a penalty for pumping water i.e. a well that pumps 375 acre-feet of water gets charged a water use fee that is considerably more than a well that pumps 120 acre-feet.
- Fee collection would entail administrative costs, the extent of which is sometimes underestimated by farmers. Whoever collects the fee could add in coverage for the administration of the fee. If the RRWCD or the GWMDs collect the fees, additional help would have to be hired.
- If the state statute could be changed, and RRWCD could collect the fee, all the GWMDs could more easily all be put in the same boat. If all the GWMD boards are not on the same page on this, and each district does things differently, it will be a problem.
- The Northern Plains Groundwater Conservation District in Texas did something similar to this. Under their system, you can bank your allowed number of inches, such that you can save any not used in one year for subsequent years. On the other hand, if you use more than the allowed number of inches, you pay a fine. However, at this time, banking is not allowed in Colorado except on permits for expanded acres and on change of use final permits.
- Those using a similar system in Colorado's Rio Grande Basin say that "pay for what you pump" works well there except that it squeezes the small guy out because the big guys can pay, and they buy out the small guys. Also, they says it is expensive to administer, as reflected in the fact that they have 3-4 full time employees that continuously work year round on the administration of the water use fees.

Potential Approach:

- Develop a fee based plan under the assumption that the RRWCD would collect it. Work with RRWCD counsel to determine what in the statute would have to change for RRWCD to be able to collect the fee. Perhaps the statute could be changed so that the RRWCD could take on this water conservation/preservation role in addition to the compact compliance role. In regard to where that would leave East Cheyenne GWMD, which is not within the RRWCD boundary along with the southern part of the Plains GWMD, perhaps this would be a good time to bring them into the RRWCD. (There is some discussion of the State planning on changing the boundary of the Republican River drainage to include all of the Plains GWMD and the northeastern part of the East Cheyenne GWMD – but this area would not be subject to the water use fees that are paid by the well owners in the current boundaries of the RRWCD. There are also some wells south of Akron that are in the RRWCD but not in a GWMD.
- If the statute were changed and the RRWCD could assess the conservation fee they could handle it by expanding the current \$14.50/acre/year.

- Fees collected could go into a conservation bank. Every GWMD could apply for funds from this bank if they could prove the amount of water their district is conserving. Funds granted could be used to refund some of the fees collected. Could divide the funds granted among those conserving the most, for instance.
- The current RRWCD fee for compact compliance is levied through the various counties' treasurers' offices as part of their property tax bills. That gives the RRWCD great strength in getting the money because folks cannot pay only part of their property tax bill. It required a state statute for RRWCD to be allowed to assess irrigators through the counties in this way. GWMDs also assess a special assessment on the county tax roll for the amount of appropriation of each final permit in their district up to \$.15/acre foot of appropriation. Some GWMDS also have a mil-levy which has to be approved by the well owners in that GWMD.

CLOSING

GWMDs in other areas dependent on the Ogallala Aquifer, including some from Kansas, Nebraska, and Texas, have been working on the same issue. The Water Preservation Partnership will be learning from their experiences as well.

Whether or not the Water Preservation Partnership will be successful in reducing the draw on the aquifer is yet to be seen. They have already been successful grasping the problem, organizing a grassroots effort, and plowing into it head first.