Outside the Box: Yoder Vineyard

Groundwater is vital to agricultural production throughout the state of Texas, but especially here in the northern Panhandle. While water conservation is a challenge for agricultural producers, many welcome new practices as an opportunity to make a difference for future generations following in the agricultural lifestyle.

The real question for area farmers is how to diversify their operations and remain stewards of the Ogallala aquifer. Zac Yoder, a North Plains Groundwater Conservation District board member, thinks he might have found his answer in something a little unconventional for this area of the Panhandle: wine grapes.

“We have been trying different crops for a few years such as cotton and soybeans,” Yoder said. “Our family thought it was a great time to think outside the box and learn something new.”

Yoder, like many area agriculturalists, would like to prolong the ability to irrigate responsibly for as long as possible. Without irrigation, farmers are much more susceptible to drought and thus crop failures.

“Water is our most valuable asset,” Yoder said. “Without irrigation, the agriculture industry in this area would be drastically different.”

The vineyard, comprised of five acres, was established in 2015. Though the vineyard is doing well so far, the Yoder’s have chosen to evaluate the vineyard year by year and make management decisions at that time.

While water conservation practices such as strip till, no till and soil moisture probes were already being used on the operation prior to the addition of the vineyard, other technologies such as sub-surface irrigation will be added to the vineyard to better utilize the resources available.

The Yoder family relocated to Dalhart, Texas, from Ohio in the early 1980s in order to farm. Zac became involved with the family’s operation in 2007 and moved back to Dalhart the next year to begin farming full-time. Along with his parents, Steve and Pamela Yoder, Zac, his wife Rinnell and their two young sons, Elijah and Oliver, now make up the operation which involves managing 3,000 acres of farm and grassland. In addition to the vineyard, the Yoders also grow traditional crops such as corn and wheat while also grazing cattle. As part of their land and water management strategy they include other crops in their rotations including alfalfa, cotton, sunflowers and soybeans.

With the population increasing steadily, Yoder understands the need for continued conservation and he is looking to the future for how he can better conserve water in all the family’s endeavors.

“I would like my sons to have the same opportunity to farm that I have had,” Yoder said. “To ensure that, we need to take measures to safeguard their ability to grow the food their generation will need while being conservation minded.”

Desired Future Conditions

Water conservation is rooted in planning for the future and that begins with setting goals. North Plains Groundwater Conservation District board members are required to set goals, also known as Desired Future Conditions (DFCs) for the district’s groundwater. Periodically they analyze the DFCs to decide whether or not to amend current standards.

Desired Future Conditions are the desired, quantified conditions of groundwater resources (such as water levels, water quality, spring flows, or volumes) at a specified time or times in the future or in perpetuity. In essence, a desired future condition is a management goal that captures the philosophy and policies addressing how an aquifer will be managed.

On December 15, 2008, the North Plains Groundwater Conservation District recommended that the district representatives of Groundwater Management Area 1 adopt DFCs for the Ogallala aquifer in the counties that comprise the district. The Joint Planning Committee considered two DFCs, one for the eastern counties and one for the western counties. Two DFC’s were proposed because they reflected the stakeholder’s desires, and because the uses or conditions of the aquifer within the district differ substantially from one geographic area to another. The DFCs were adopted in 2009 and continue to be a vital tool in managing groundwater in the northern Panhandle.

In July 2015, district general manager Steve Walthour provided an assessment of the district’s status related to DFCs. His analysis was based on preliminary runs from the High Plains Aquifer System Groundwater Availability Model (GAM) produced by Texas Water Development Board subcontractor, Interia Geoscience and Engineering Solutions. The amount of water the model predicts to be available, while still meeting

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First Year of “3-4-5” Program Showcased During District Events

This year, much needed rain has been welcome despite making day-to-day operations a bit more challenging for district growers. The “3-4-5” project has benefited from excellent rainfall in this, the first year of the project, improving the opportunities to leave water in the ground for the future. Good yields and good data to support the project are expected. According to “3-4-5” project lead, Leon New, the project fields all received between 10-14 inches of rain during the growing season. “Out of the 17 fields in the project, 10 applied less than 12 inches of irrigation water,” said New.

The “3-4-5” project picks up where the district’s acclaimed “200-12” project left off. Participants in the “3-4-5” are using variable rate irrigation to simulate 3, 4, and 5 gallon per minute irrigation conditions in side-by-side, production-scale demonstrations. The “3-4-5” participants are applying many of the same techniques and technologies used in the “200-12” and demonstrating their applications under the selected levels of available irrigation. “We are currently compiling the data and looking forward to seeing the comparisons between water applied and return on investment,” said New.

The meeting featured a presentation by district board member Harold Grall about a demonstration comparing Precision Mobile Drip Irrigation (PMDI) to LEPA (Low Energy Precision Application). PMDI involves drip hoses being pulled across the field by the center pivot system, in order to reduce wind-loss and evaporation by applying the irrigation directly to the soil. LEPA, Low Energy Precision Application, applies the irrigation water with hoses no more than 18 inches above the soil and is reported to reach application efficiency levels of 95 percent and more. PMDI is projected to reach efficiencies approaching 98 to 99 percent. In general, Grall said the PMDI compared favorably with the LEPA systems. More information will be available in the final report.

The Perryton Fall Field Day was held the following day at the Ochiltree County Expo Center before participants moved to board member Danny Krienske’s “3-4-5” fields. Fall Field Days concluded on September 24, 2015, in Dalhart with participants viewing board member Zac Yoder’s “3-4-5” fields before returning to the Rita Blanca Coliseum for educational presentations. The data from the first year of the project is being compiled and analyzed and the final report will be presented in early 2016.

2015 District Water Levels

Annually the district monitors declines in water levels as an important part of its data collection efforts. The data contributes to the management of the area’s groundwater resources. The district tracks declines in groundwater by maintaining a network of over 436 water-level monitor wells. District monitor wells are measured in January and February after the majority of the season’s agricultural pumping is completed. Measuring is usually completed by mid-March. The information is analyzed and used to create maps that show average water level changes across the district. The data helps the district make reasonable, long-term management decisions based on accurate and current information.

The district began drilling its own dedicated monitor wells in 2007 and also began installing water level monitoring equipment in many of them. The equipment records measurements every 12 hours. So far, the district has drilled 52 dedicated monitor wells and installed monitoring equipment in 46 of those. These continuous measurements create a valuable record of the ongoing changes in water levels. These non-production wells are dedicated solely to data collection. Dedicated, non-production monitor wells provide information with a greater degree of accuracy, reliability and consistency than do the other types of wells the district may monitor. They are also available, if necessary, for conducting water quality analyses and other aquifer tests that cannot easily be conducted in other types of wells.

Changes in water levels in district monitor wells vary from rises in some instances, to declines that locally may exceed 8-10 feet per year. Each county in the district has areas of little to no decline, as well as areas of much greater decline. Changes in the water level of the aquifer averaged for all the monitor wells of any county, or calculated from groundwater production data, however, overall show declining water levels.

Declines in the water table are caused predominately by pumping and are influenced by surface recharge and lateral flows into and out of the aquifer. Recharge of the aquifer from the surface comes from rainfall and snowmelt. The Panhandle of Texas historically receives such modest amounts of rain and snow and has such a high evaporation rate that there is little opportunity for surface recharge to appreciably affect water levels.

The water level measurements resulting from the 2014 production season have been gathered, tabulated and published in the “2014-2015 Hydrology and Groundwater Resources” report. The full report is available in the district office and on the district’s website www.northplainsgcd.org/science-technology/hydrology-maps.html. A summary of the results are also presented in the following table and illustrations. For information on measurements in specific areas, please contact the district at 806-935-6401.

<table>
<thead>
<tr>
<th>County</th>
<th>Average Annual Feet of Decline</th>
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<tbody>
<tr>
<td>Dallam</td>
<td>2.29</td>
</tr>
<tr>
<td>Haysford</td>
<td>2.03</td>
</tr>
<tr>
<td>Hartley</td>
<td>2.58</td>
</tr>
<tr>
<td>Hutchinson</td>
<td>2.41</td>
</tr>
<tr>
<td>Lipscomb</td>
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</tr>
<tr>
<td>Moore</td>
<td>2.88</td>
</tr>
<tr>
<td>Ochiltree</td>
<td>1.02</td>
</tr>
<tr>
<td>Sherman</td>
<td>2.19</td>
</tr>
</tbody>
</table>

Average annual declines in water levels by county calculated from reported production.

(continued on page 3)
2015 District Water Levels

Average annual declines in water level are calculated values created by using reported groundwater production and an estimated specific yield of 18 percent. The entire area of each county was used in the calculations except for Moore and Hutchinson Counties in which only the area that falls within the district was used. Average county declines and average declines in monitor wells differ because district monitor wells are typically located near areas of intense pumping. This tends to over-represent declines resulting in higher values than averages calculated by other methods.

Average Depth to Water and Comparisons of Average Declines in Select District Water Level Monitor Wells.

<table>
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<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dallam</td>
<td>271</td>
<td>3.9</td>
<td>3.9</td>
<td>4.0</td>
<td>3.1</td>
<td>3.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Hansford</td>
<td>298</td>
<td>2.5</td>
<td>2.4</td>
<td>2.3</td>
<td>1.9</td>
<td>2.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Hartley</td>
<td>355</td>
<td>4.5</td>
<td>4.5</td>
<td>4.4</td>
<td>4.1</td>
<td>4.6</td>
<td>3.1</td>
</tr>
<tr>
<td>Hutchinson</td>
<td>348</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
<td>1.9</td>
<td>2.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Lipscomb</td>
<td>162</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
<td>0.8</td>
<td>1.0</td>
<td>0.3</td>
</tr>
<tr>
<td>Moore</td>
<td>347</td>
<td>2.7</td>
<td>2.6</td>
<td>2.5</td>
<td>2.2</td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Ochiltree</td>
<td>335</td>
<td>1.7</td>
<td>1.7</td>
<td>1.6</td>
<td>1.2</td>
<td>1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Sherman</td>
<td>298</td>
<td>3.2</td>
<td>3.0</td>
<td>2.9</td>
<td>2.4</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>District-wide</strong></td>
<td><strong>345</strong></td>
<td><strong>3.1</strong></td>
<td><strong>3.0</strong></td>
<td><strong>3.0</strong></td>
<td><strong>2.5</strong></td>
<td><strong>2.9</strong></td>
<td><strong>2.1</strong></td>
</tr>
</tbody>
</table>

The information in the above table was derived from an analysis of monitor wells. The data from some monitor wells, indicating both rises and declines, are not sufficiently consistent to insure accuracy and reliability in their use. Such data may be excluded during the calculations of declines, depth to water or saturated aquifer formation.

2016 Water Conservation Artwork Contest Winners Announced

Leticia Barraza of Dalhart was this year’s grand prize winner in the Water Conservation Artwork Contest sponsored by the North Plains Groundwater Conservation District. The annual contest is open to all fourth, fifth, and sixth grade students who reside within the district.

Leticia’s artwork titled “Every Drop Counts” features smiling water drops sharing bits of wisdom including a reminder to turn off faucets.

The desired future condition is called the modeled available groundwater (MAG). The figure illustrates that the district as a whole has pumped well below the MAG since the DFCs were established in 2009, producing 18 percent below the MAG from 2010-2014. While the western counties have produced 5 percent more than the MAG during the period, the eastern counties have produced 54 percent less than the MAG.

Walthour recommended that the board direct its representative to propose DFCs to include a combined 40 percent of the total volume in storage remaining in 50 years for the Ogallala, Dockum and Rita Blanca aquifers in Dallam, Hartley, Moore and Sherman Counties; and 50 percent of the total volume in storage for the Ogallala aquifer in Hansford, Hutchinson, Lipscomb, and Ochiltree Counties, providing that there is no substantial change in the GAM. The board voted in favor of the measure.

The tables show below the average production from 2010-2014 and the district’s combined current MAG amounts for the Ogallala, Rita Blanca and Dockum aquifers.

Education Program Request

Interested in getting a North Plains Groundwater Conservation District staff member into your classroom? The district offers a variety of conservation education programs appropriate for grade levels K-12 that we would love to share with your students. For more information, please contact Kirk Welch at 806-935-6401 or at kwelch@northplainsgcd.org.

Assistant General Manager-Outreach Kirk Welch conducts soils labs with students at the Hemphill County Water Festival in Canadian.
The North Plains Groundwater Conservation District board of directors is made up of a group of individuals who are very passionate about water conservation. While preserving our water resources is a big part of their lives, they also have other passions they devote their time and energy to outside of the board room.

While attending school at Texas Tech University in 1957, Lipscomb County director Gene Born learned to fly. Born, having always been fascinated by aviation, obtained his commercial license and joined the Army. After serving as an instructor for the Air Force ROTC program at Texas Tech, Born chose to return to the family farm located in Follett, Texas.

"After I was discharged from the Army, one thing led to another and I came back to Lipscomb County and went into the family farming operation with my father," Born said. "We put in our first irrigation well around 1960."

After the first well came a few more and by 1970 a group of people in Lipscomb County began growing concerned about conserving water. It wasn’t long before Born’s family, along with others in the county, pushed to see Lipscomb County become part of the North Plains Groundwater Conservation District.

By then Born’s flying career for the Farm Service Agency, mapping agricultural land in southwest Kansas, Oklahoma and part of the Texas panhandle was winding down.

“That’s when I started getting more interested in the model airplanes,” Born said. “I’m incredibly intrigued by the remote control aspect of it.”

Born began collecting and building detailed replicas of famous planes such as World War II Triple Ace C. E. ‘Bud’ Anderson’s P51 Mustang. World War II warbirds still remain some of Born’s favorite subjects, though he builds many different types of remote-controlled planes. Born builds some himself and trades for others while additional planes are acquired at auctions when a builder decides to move on from a project. Regardless of their origin, Born finds getting them flight worthy to be a welcome challenge just like that of water conservation.

“I think the moment that I became interested in water conservation was when my father turned to me and asked, ‘What are your grandkids going to do for water if you keep drilling all these irrigation wells?’"” Born said. “That’s when I got to thinking that maybe we needed to do a little more to conserve water here in the northern Panhandle. It’s something I’m proud to be a part of.”

Board Profile: Gene Born

North Plains Groundwater Conservation District
BOX 795
Dumas, Texas 79029

Conservation Calendar. Leticia was in Mrs. Smith’s class at Dalhart Intermediate School last school year when the entries were submitted. The calendars are free to the public.

Other winners in this year’s contest were:
Avery Stringer – artwork titled “Water Conservation”. Avery was in Mrs. McOmber’s class at Hillcrest Elementary in Dumas.
Natalie Carbajal – artwork titled “Don’t Waste Water”. Natalie was in Mrs. Henley’s class at Hillcrest Elementary in Dumas.
Kira Fierro – artwork titled “Save Water”. Kira was in Mrs. Mason and Mrs. McOmbers’ class at Hillcrest Elementary School in Dumas.
Balyon Keoshyuong – artwork titled “Save Our Planet’s Water”. Balyon was in Mrs. Mason’s class at Hillcrest Elementary School in Dumas.
Bailey Lewis – artwork titled “Water Is Being Wasted”. Bailey was in Mrs. Smith’s class at Dalhart Intermediate.
Luis Galvan – artwork titled “Collect Rain Water”. Luis was in Mrs. McOmber’s class at Hillcrest Elementary School in Dumas.
Jacob Long – artwork titled “Saving Water”. Jacob was in Mrs. Mason’s class at Hillcrest Elementary School in Dumas.
Gunnaar Willis – artwork titled “Collecting Rainwater”. Gunnar was in Mrs. McOmber’s class at Hillcrest Elementary School in Dumas.
Grayson McCurley – artwork titled “Full Loads”. Grayson was in Mrs. McOmber’s class at Hillcrest Elementary School in Dumas.
Braxton Cooksey – artwork titled “Save the Rain”. Braxton was in Mrs. McOmber’s class at Hillcrest Elementary School in Dumas.

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