

# North Plains Water News



A Publication of the NORTH PLAINS GROUNDWATER CONSERVATION DISTRICT

VOLUME 57, NO. 1 "Maintaining our way of life through conservation, protection, and preservation of our groundwater resources."

Spring 2011

## First Year of 200-12 Yields Valuable Results

The North Plains Groundwater Conservation District's "200-12 Reduced Irrigation on Corn Demonstration Project" proposed that it could be possible to save 250,000 acre feet of groundwater by becoming more efficient in how and when irrigation is applied.

Whether you make your living on the farm, or you live in a city that relies on the Ogallala aquifer for its water supply, the idea of saving as much as 250,000 acre feet of water per year should be of

of irrigation water, many onlookers and admittedly the board members themselves, weren't sure if they could do it. Even if they could do it, many including the board members, were not sure if it could be done in an economically feasible manner. In other words, could they actually save water and maintain the same levels of profitability.

That was the question, and now with a year of demonstrations behind them, the answer appears to be



Cooperators met with producers during field days to exchange ideas and get an up-close look at the first-year demonstration sites.

utmost interest. That volume of water could supply the City of San Antonio for a year, or the City of Dumas for 80 years, and it could help buy time for the North Texas Panhandle to transition from its current reliance on groundwater for economic stability.

As aquifer levels steadily decline, this transition is necessary if there is to be a healthy economy in the Northern Panhandle in 80 years, or even 40 years for that matter. Any reasonable method for conserving the resource in the meantime is worthy of our attention. The District's desire to promote conservation while protecting the economic viability of the area drives the District's "200-12 Reduced Irrigation on Corn Demonstration Project".

In 2009, when members of the District's board of directors started talking about a demonstration project that would aim to produce 200 bushels of corn per acre using only 12 inches

unequivocally—yes...sometimes. The truth is, this is the first year of what was planned to be a 5-year program, so what has been learned is only as good as a year's worth of data will support.

"After one year you can make some observations. After three years you can see some trends. Only after 5 years will you be able to draw any reliable direction," said project coordinator and irrigation engineer, Leon New. That being said, what observations can be made after the first full season of the "200-12 Reduced Irrigation on Corn Demonstration Project"?

### The Good News and the Good Information

The cooperators observed that it is possible to save water and make as much, or more, net return as if they'd used traditional irrigation and management practices. Timely rainfall in 2010

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## TWDB Partners with District on 200-12 Project

The Texas Water Development Board (TWDB) has accepted an invitation from the District to participate in the District's "200-12 Project" through an Agriculture Conservation Grant targeted to demonstrations of irrigation efficiency improvements. The TWDB offered \$250,000 in funding for the grant that will assist the District's demonstration project in 2011, 2012 and 2013. The Grant should cover approximately a third of the total costs of the District's five-year initiative. The project demonstrates how water conservation technologies and irrigation management practices can reduce groundwater use and allow irrigators to remain profitable with restricted and diminishing groundwater resources. The project is designed to demonstrate the profitability and feasibility of producing 200 bushels of corn utilizing 12 inches of irrigation water, combined with seasonal rainfall

and available water within the soil profile. In the "200-12 Project's" first year, three members of the District's board of directors dedicated their own irrigated acres to establish the program. In 2011, the District has expanded the project to nine demonstrations.

The TWDB will partner with the District to share costs related to site selection, equipment acquisition and installation, irrigation management technologies and practices application, monitoring and data collection, presentation of public field days to demonstrate project results, data analysis, review of the demonstration sites, and reporting.

With the TWDB's partnership, the District anticipates reaching more of the public and producers in the area and across the state, showing new technologies that can be used to promote groundwater conservation.

## Water Festivals Reach Record Number

The North Plains Groundwater Conservation District's Annual Water Festivals should reach over 700 Panhandle fourth graders, making this the biggest year ever for the Water Festivals. Attendance in the first two events of the year has already exceeded 400, with the final festival in Dumas scheduled for April 29<sup>th</sup>. The Dumas festival routinely

attracts well over 350 students.

So far, this year's Water Festivals have seen some schools participating that had not in the past and others returning after a year or two away. Increased enrollment in some schools also contributed to the larger numbers of students, but one of the main reasons is

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## First Year of 200-12 Yields Valuable Results

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certainly contributed to a successful first year, as two of the three demonstrations showed a net increase in financial return when comparing pumping costs, seed costs, fertilizer costs and harvesting costs. Though the rains helped, the crops also had to endure searing heat in August and hail damage before the harvest tallied the final results.

Both the Moore County and Ochiltree County demonstrations recorded increases in net return on investment. The Moore County demonstration achieved a \$10.47 increase in return per acre with approximately 10 inches of irrigation water savings. The Ochiltree County demonstration came in with a \$42.08 increase in return per acre with approximately 5 inches of irrigation water savings per acre. A three inch savings would result in the 250,000 acre foot savings over the 1,000,000 irrigated acres in the District.

The Hartley County demonstration was designed with a significantly different and more challenging objective. In addition to limiting the total irrigation to 12 inches, managers of the Hartley County site also attempted to simulate a 250 gallon per minute (gpm) irrigation capacity on a 120 acre field. This is half of the actual pumping capacity of the well. "We wanted to give the producer who's operating with weak water right now something to look at," said Hartley County cooperater, Phil Haaland. "Many farmers are there already, and if they are not there yet, they will be someday," said Haaland.

Since historic yield for this field is based on 500 gpm, comparison of 2010 yield to the past is inconclusive.

Nevertheless, this site depicted a condition that an increasing number of growers are facing throughout the District—not enough groundwater available to irrigate as usual. The purpose of the "200-12 Project" is to push the envelope and demonstrate what can, and cannot, be done under extreme low-water conditions, and the Hartley County demonstration did that. Under these extreme circumstances the system did not have the capacity to apply enough irrigation quickly enough to avoid significant yield reducing stress. Though this demonstration saved 11 inches of irrigation, it sustained a \$109.31 loss in return per acre. In this case, the demonstrators concluded that only half as many acres should have been irrigated with the limited pumping capacity available.

### Technology Can Make Us Better

Demonstrators observed that the application of new irrigation management technologies could improve their chances for success. From the irrigation scheduling perspective, the latest soil moisture probes, such as the AquaSpy® helped demonstrators make

irrigation decisions based on the plants' actual observed need for moisture, rather than theoretical models or guesswork. The probes use sensors every 3 inches, down to depths of 4-5 feet to record root activity. "Real-time information sent via telemetry to the internet and then to our computers helped us make more precise decisions," said Moore County cooperater, Harold Grall. Time tested gypsum block sensors confirmed the data of the new moisture probes.



In addition, remote irrigation control technology such as PivoTrac® provided a quick and accurate way to respond to the information being gathered by the probes. Specific directions can be transmitted directly to the pivot to tell it to start, stop, speed up or slow down. The irrigation control systems can also gather important information such as pivot location in the field and rainfall data.

### Working With the Crop

It appears the new technologies make it easier to strategically manage the root growth for optimal use of the available water. The idea that the plants need a deep root system to take advantage of all of the moisture in the depth of the soil is not new to most growers; however, how to get that deep root system is not so obvious. Strategically withholding moisture at certain times during the growth cycle will cause the roots to dive deeper in search of moisture, but the question is when and for how long can you deprive the crop without negative impact to yields? The new probes eliminate some of the guesswork in the process by providing a real-time look at what the roots are doing. As long as the roots are diving and using water from the profile, then the plant is growing and at the same time developing the deeper root system it will need to make it through the drier parts of the cycle. If the root intake slows significantly, it is time to give it some water.

### The More You Have, the More You Can Save

Finally, demonstrators observed that growers with more pumping capacity have the best chances for success. To make the best use of the information the

grower needs to react quickly and apply the necessary amount of water at just the right time. "Strategically managing to use less water sometimes means we're pushing the crop close to its limits, so it is critically important to supply what the crop needs in a timely manner," said Ochiltree County cooperater, Danny Krienke. Limited capacity may prevent a grower from applying enough water when the plant needs it. The program may be adjusted based on limited pumping capacity to help these operations be more efficient as well, but it appears these adjustments will reduce the positive outcomes of the program. This observation seems to indicate that those with adequate pumping capacity are in the best position to save water, make profits and extend the viability of their operations.

So, these are the primary observations that can be made after the first year of the District's "200-12 Reduced Irrigation on Corn Demonstration Project". A full summary of the results is included in the project report for 2010 and is available at the District office or at [www.npwd.org/200-12](http://www.npwd.org/200-12). The demonstrators are satisfied with the first year's results, and the future of the "200-12 Project" appears bright. The project will expand in 2011 from three to nine demonstration sites. The Texas Water Development Board has accepted an invitation

from the District to become a part of the Project by providing \$250,000 in funding over the next three years. "The District's demonstration project can make a positive difference in water conservation and the future of farming in our area," says District General Manager, Steve Walthour. "However, for this project to make a significant difference, it must move from the demonstration phase to adoption phase, sooner rather than later," said Walthour.

It will take more than one year to fully understand the best application of these strategies for each situation, and it will take some time to spread the word about what has been, and can be, accomplished here. Nevertheless, the demonstrators believe these ideas are the seeds of a transformation of irrigated agriculture that can take this region and others like it to the next level of profitable sustainability.

The District will be busy telling the story over the next year to encourage more growers to adopt these ideas and adapt them to their own circumstances. If you want more information, or you are interested in having a District representative present a program explaining the "200-12 Reduced Irrigation on Corn Demonstration Project," call Kirk Welch at 806-935-6401 or email [welchk@npwd.org](mailto:welchk@npwd.org).



Board member and 200-12 cooperater, Harold Grall presents first-year results at the Annual Texas Agricultural Irrigators Association Conference in Amarillo.

*This report of the companion research of maximized yields on limited irrigation performed at the North Plains Research Field is provided by Texas AgriLife Research.*

## Potential to Produce 200 Bushels of Corn on 12 Inches of Irrigation Water

Thomas Marek, Wenwei Xu, Qingwu Xue, Jerry Michels and Brent Bean – Texas AgriLife Research-Amarillo

### BACKGROUND:

More than half of irrigation water (1.43 million acre-feet) (1 acre-foot = 325,851 gallons) is currently used for corn production each year in the northern Texas High Plains, one of the highest corn yield areas in the nation. However, the current level of irrigation is not sustainable because of the decline of the Ogallala Aquifer, the sole source of the irrigation water in the area. As a result, the reduction of current irrigation levels is inevitable and more limited irrigation will become the norm in the future.

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# Education

## Edible Aquifer Presentations at Farm Bureau Ag Days

There were happy and hopefully enlightened smiles on the faces of 4<sup>th</sup> graders across the District who participated in this year's Edible Aquifer activities. The District staff participated in three different Farm Bureau events, treating about 600 students to the unique experience of constructing an aquifer out of all edible materials. Crushed ice is used to represent the mineral layers of the aquifer, lemon-lime soda takes the place of the water, ice cream is substituted for the confining layer of clay and finally chocolate milk mix tops off the structure as top soil. Once the straw, which represents the well casing, is lowered into the formation, it's time to activate the pump and drink it down, dirt and all. The students are left with a satisfied sweet tooth and an experience that makes it easy to remember where their water comes from!



## Students Learn How Soil and Water Relate

With most of the water we use coming from under the ground, it is important to understand the dynamics of the interaction between soil and water. Staff from the North Plains Groundwater Conservation District helped illustrate that relationship to over 350 4<sup>th</sup> and 5<sup>th</sup> graders in Dumas through soil labs presented at Green Acres Elementary and the Dumas Intermediate School. The activities focused on the soil properties of porosity, the space between the particles of different types of soils, and permeability, the ability of different soil types to allow water to be moved through them. The labs require the students to use cognitive thinking skills



and reinforce principles that are being taught in the discipline areas of Science and Mathematics. Staff members from the District are available by request to make in-class presentations to students grades K-12 throughout the District. For more information on the District's educational programs call Kirk Welch at 806-935-6401 or email [welchk@npwd.org](mailto:welchk@npwd.org).

## Water Festivals Reach Record Number

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the first ever Water Festival in Dalhart. This is the sixth year for festivals in both Dumas and Perryton, but the District decided to offer the event in Dalhart this year to make the experience more accessible to the schools on the western side of the District.

Groundwater stewardship education is a main strategy for accomplishing the District's mission, and the "Make a Splash Water Festivals" are an important part of the District's educational outreach program. "These young people are the future decision makers who will determine the fate of our natural resources," said Steve Walthour, General Manager. "This early education helps them see why it is important to take care of our resources, particularly groundwater, and how they can have an impact."

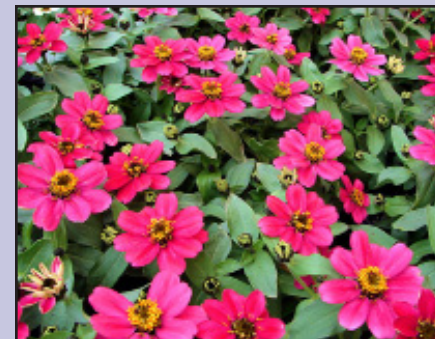
During the "Make a Splash Water Festivals" the students have a chance to learn more about their water resources and other natural resources at a fun filled day of hands-on learning. Students have the opportunity to attend multiple interactive presentations during the day to learn more about water and water conservation, as well as learning about aquatic organisms, Panhandle wildlife and Panhandle fisheries. By combining hands-on, interactive activities with messages relevant to their daily lives, students are able to gain knowledge on the properties, uses, and importance of water, and of all of the natural resources that surround them.

For more information on the "Make a Splash Water Festival", contact Kirk Welch at 806-935-6401 or [welchk@npwd.org](mailto:welchk@npwd.org), or visit our website at [www.npwd.org](http://www.npwd.org).

## Water Wise Gardening is Common Sense

In a semi-arid climate like the Texas Panhandle, using water wise gardening techniques just makes sense. That was the message at this year's Water Wise Gardening Class offered by North Plains Groundwater Conservation District. Former Texas Master Gardener Bob Hatton provided a framework of information that will allow attendees to customize their gardening experience to create a landscape that fits their lifestyle.

Hatton focused on the two most important aspects of gardening: soil preparation and watering practices, as well as the principles of xeriscaping. Hatton explained how xeric, water-friendly practices can and should be



applied as a natural part of responsible gardening in the Panhandle of Texas. "However, this was not a class about how to grow cactus and rocks," said Hatton. He presented information that was equally relevant for the person who wants the lowest maintenance and lowest water-use landscape, and the person who wants to spend more time working on their garden, or prefers a combination of low water-use and traditional plants. North Plains Groundwater Conservation District Education Manager, Kirk Welch, added, "Water conservation achieved through these practical techniques can result in savings of time and money for homeowners and businesses."

For more information about water wise gardening practices contact the District at 806-935-6401 or email [welchk@npwd.org](mailto:welchk@npwd.org).



## WaterWise Program Reaches Across District

North Plains Groundwater Conservation District is providing almost 1,000 5<sup>th</sup> graders across the District with valuable water-saving tools as a part of this year's Water Wise program. After offering a pilot program in Lipscomb County last year, the board of directors decided to expand the program to all of the schools in the District in 2011. The Water Wise program is a nationally acclaimed water conservation education program that aligns with Texas State testing requirements for Science and Math, while teaching the students the concepts of water conservation. But the program goes beyond the concepts, providing each student with water saving devices including a high-efficiency shower head, kitchen aerator, bathroom aerator and more tools to help the child and their family on the way to living water wise! The program includes incentives

for participation and detailed follow-up to insure that the ideas taught in class translate into measurable reductions of water use. "The Water Wise program fits perfectly within the mission of District, which is to maintain our way of life through the conservation, preservation and protection of our groundwater resources," said District Manager, Steve Walthour. For more information about water conservation or North Plains Groundwater Conservation District, call 806-935-6401 or look online at [www.npwd.org](http://www.npwd.org).



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## Texas AgriLife to Present Rainwater Harvesting Workshop

Nicholas Kenny, irrigation specialist for Texas AgriLife Extension Service, will present this year's rainwater harvesting workshop sponsored by North Plains Groundwater Conservation District. While the thought of getting a significant amount of water from rainwater harvesting is often met with skepticism from Panhandle residents, experts say .6 gallons of water can be obtained from every square foot of roof, during a 1-inch rain. This is sufficient to provide a supplemental source of water for landscaping. Larger roof surfaces, such as barns and gymnasiums can harvest significant amounts of water for various uses. Kenny will demonstrate how to build and use a rain barrel for irrigating your own residential landscape and he'll discuss the principals behind more elaborate rainwater harvesting systems.

The Workshop is scheduled for Saturday, May 21st at the District office, 603 East 1st Street in Dumas. Please pre-register by calling 806-935-6401 or emailing [welchk@npwd.org](mailto:welchk@npwd.org).



## District Hydrologist Recognized for Service

District Hydrologist and Assistant Manager, Dale Hallmark was recognized for 15 years of service to the District. During his employment with the District, Hallmark has provided valuable scientific expertise as a part of the ongoing mission of the District. He received his Bachelor of Science degree in Hydrology and Water Resources from Tarleton State University in 1996 and recently completed his certification as a Professional Geoscientist in Texas.

## Potential to Produce 200 Bushels of Corn on 12 Inches of Irrigation Water

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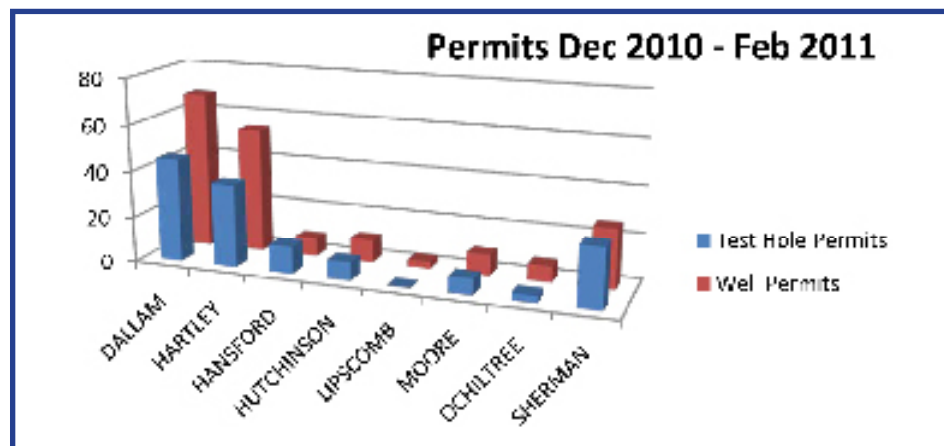
### RESEARCH:

Field experimentation has initiated starting in the 2010 growing season at the North Plains Research Field (NPRF) near Etter, TX. and will continue through 2012. Treatments consisted of three commercial hybrids and four planting densities under center pivot irrigation. With above-average seasonal precipitation occurring during the 2010 growing season, only 9.8 inches of irrigation water were pumped during the study. The science-based NPRF study has a targeted total water-use level of 24 to 25 inches per acre, as compared to the normal 34 to 36 inches for fully irrigated corn. Yields ranged from 171-211 bushels/acre, depending on the hybrid and planting density. High yields were associated with differing biomass and harvest index values indicating modern, high performance varieties.

### IMPACT:

The results of this research along with other NPRF studies are very valuable to corn producers in developing best irrigation management strategies and conserving irrigation water resources in the Texas High Plains. The economic return can be very significant. Typically, corn producers in the North Texas High Plains use 20 to 22 inches of irrigation per year. Using only up to 12 inches of irrigation results in an average of 8 to 10 inches of irrigation water savings. In the North Plains Groundwater Conservation District, 1 inch of water costs at least \$5 to get to the crop. A water savings of 10 inches/acre/year on all the regional corn acreage would result in a total water savings of nearly 400,000 acre-feet or 130 billion gallons per year. Pumping costs for producers would be reduced by more than \$24 million annually.

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