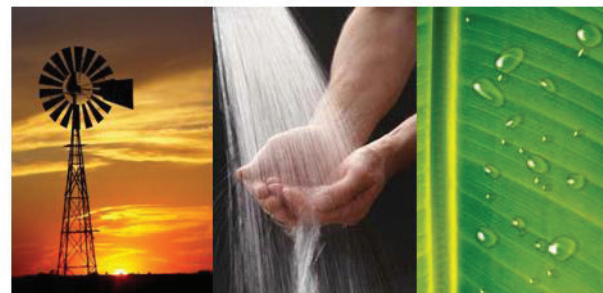


North Plains Water News



A Publication of the NORTH PLAINS GROUNDWATER CONSERVATION DISTRICT

VOLUME 65, NO. 2

SUMMER 2020

Management Considerations from the North Plains Water Conservation Center

By Nicholas Kenny, PE.

Demonstration work at the Water Conservation Center (WCC) in 2019 was focused on identifying details of a corn and cotton production system in the Texas North Plains. This rotation has proven to be highly effective at conserving water while sustaining on-farm revenue in a two-year rotation and the 2019 campaign brought a few new insights to light. Because we are on the leading edge on multiple of these topics, it is too early to categorize any of these findings as anything more than considerations; but they should certainly be considered.

The corn and cotton rotation is effective because of how complimentary the two crops are. One is a grass and one is a broadleaf which is helpful for soil health, biodiversity, and weed control. Corn is a high-yielding crop with higher fertilizer and water inputs while cotton is a scavenger that can make use of resources corn leaves behind. They are marketed to non-competitive sectors (food and fiber) yet utilize similar field equipment and configurations. Economically, both crops are viable but cannot be grown to maximum potential in isolation in the North Plains, primarily because of their unique water requirements. In rotation, however, they are quite symbiotic and have shown reciprocal benefits. Over a two-season span, a corn and cotton rotation can reduce water use by 10 acre-inches compared to back-to-back corn crops without reductions in on-farm income.

The first consideration is that in a corn and cotton rotation where irrigation system capacity is 4 Gallons Per Minute (GPM) / acre for corn and 3 GPM / acre for cotton, it is possible to bank water in the corn soil profile that can be extracted

from the profile during the subsequent cotton crop. In 2019, the net difference between soil moisture extraction between corn and cotton was 10-inches; corn following cotton banked 4-inches to the soil while cotton following corn extracted 6-inches. The rest of the story is that the corn received 19-inches of irrigation and the cotton received 9-inches of irrigation, a 10-inch difference in annual irrigation. There were 10-inches of in-season rainfall in the cotton and 6-inches in the corn.

The next consideration is that cotton variety classifications respond differently to irrigation inputs. The southern subsurface drip (SDI) blocks at the WCC were dedicated to Dr. Jourdan Bell's cotton RACE project which provides a look at early and mid-early cotton varieties in multiple locations across the North Plains. A unique overlay of this project at the WCC was two strategic irrigation management strategies: 1) early irrigation initiated at pinhead square and 2) late irrigation initiated at full bloom, simulating delayed cotton irrigation after irrigation in corn. In all varieties, delayed irrigation initiation and less total water lead to reduced yield, but the yield reduction was much less in the early-mid varieties where the plant was less determinant, meaning that the plant can extend growth later into the season. This 2019 finding is revelatory, and the effort is being repeated in 2020 on the north SDI blocks.

In 2020, the East center pivot at the WCC is committed to the second year of the cotton high-population demonstration. This project is looking at upland

(continued on page 2)

Table 1: 2019 WCC Yield and Water Summary - Cotton and Corn

				Water (Inches)			
	Hybrid / Variety	Population	Yield**	Irr.	Rain	Soil (4ft)	Total
West Pivot - Cotton	DynaGro 3385	65K*	2.87	9.01	10.34	5.29	24.64
South Drip - Cotton Limited	RACE Trials	65K	2.38	4.04	10.99	5.49	20.52
South Drip - Cotton Full	RACE Trials	65K	2.85	7.26	10.99	4.43	22.68
East Pivot - Corn North	DynaGro 58VC37	32K	237	19.01	6.44	6.06	31.51
East Pivot - Corn South	DynaGro 58VC37	32K	230	19.01	6.44	6.10	31.55
North Drip - Corn 32K	DynaGro 58VC37	32K	212	14.73	6.44	6.91	28.08

*Cotton population in the West Pivot is averaged across the population study.

** Cotton Yield based on 500 lb / bale and corn yield in moisture adjusted bushels / acre.

District Awarded \$250k Grant

The Texas Water Development Board (TWDB) approved \$1,195,098 in grants through the TWDB's Agricultural Water Conservation Grants program. The program offers grant funding to state agencies and political subdivisions for activities that further water conservation in the state.

The grant recipients are the Lower Colorado River Authority, El Paso County Water Improvement District No. 1, Texas A&M AgriLife Research, North Plains Groundwater Conservation District, and Bayview Irrigation District No. 11.

These grants will support the implementation of conservation strategies in the regional and state water plans and promote innovation and water conservation in agriculture throughout the state.

The North Plains Groundwater Conservation District received \$250,000 for the continuation of the Master Irrigator program. Graduates of the district's award-winning conservation program control 263,000 irrigated acres, approximately 25%

(continued on page 3)



North Plains GCD has been selected to receive a \$250k grant from the Texas Water Development Board to support the district's award-winning Master Irrigator program and other agricultural conservation projects. Every Master Irrigator session is concluded with a producer panel discussion like this one featuring local producers, Justin Crownover, Tom Moore and Harold Grall.

Management Considerations from the NPWCC

(continued from page 1)

cotton planted at 45K, 65K, 90K, and 110K seeds / acre. Indications are that higher populations in cotton promote more first position early bolls which leads to better maturity, more plants in the field to help prevent late-season run-away, and the potential to terminate the crop sooner to reduce exposure to early frost. In 2018 and 2019, cotton at the WCC produced better yield with higher fiber quality in the higher population areas, but early results are not conclusive. Irrigation water applied on cotton in 2019 ranged from 4-inches to 9-inches, which is what makes cotton vital for review in the Texas North Plains.

The 2020 subsurface drip irrigation (SDI) corn program has been designed based on two observations during the 2019 SDI work: 1) Out-of-pattern irrigation

events triggered a negative crop response and 2) Small, frequent irrigation events did not appear to reach far enough into the soil profile to promote a large root system. In 2020, SDI corn is being irrigated based on 4 GPM / acre system capacity with four consistent irrigation intervals: Daily, alternate day, every third day, and every fourth day. Each block will receive the same volume of irrigation water over the course of the season and all other variables will be kept constant. The goal is to work towards a management strategy that addresses the question of “Why can’t SDI corn yield match pivot corn yield?” while reducing the total water applied. The SDI work is formatted for direct comparison to a LEPA bubbler system with the same 4 GPM / acre capacity. The corn demonstration on the West center pivot will show popular hybrids under two fertility levels with goals of 230 bushels bu/ acre and 250 bu/acre, respectively.

In addition to these specific items of consideration, cover crops, cotton growth stages, cotton termination timing, corn fertilizer strategies, and soil moisture tools are under detailed review. 💧

Updates on 2020 WCC Demonstrations

So far, the 2020 growing season has had at least one unwelcome similarity to the 2019 season. An untimely occurrence of cool temperatures just after planting on May 4-6 caused a slow start to cotton crops at the WCC and across much of the district. Most notable is a low soil temperature of 49° F on May 11 and 5 consecutive days with zero Growing Degree Units (GDUs).

The delayed germination, combined with a day of intense winds with gusts reaching 65 miles per hour in mid June, have all worked together to reduce stands

to approximately 50 percent of seed drop. While these are certainly not ideal conditions, the cotton population demonstration will continue at the WCC, with much the same approach as in 2019. What was intended to be a comparison of mid-to-high population cotton has turned into a look at mid-to-low populations.

The WCC corn crops got off to a much better start than the cotton in 2020. Corn was planted on May 20-21. While pre-plant irrigation is generally discouraged as a water conservation strategy, information from the district’s year-round soil moisture probes showed that the cotton from the 2019 season had left the profile seriously depleted. The WCC crew determined that pre-water was necessary to get ahead of any moisture deficit issues later in the season. A timely rain after planting helped with germination and the initial stands looked strong. Additional rains and irrigation since planting have helped to partially fill the profile and put the crop in a better position for the highest water demand through the summer. 💧



Water Quality Study Underway

The North Plains Groundwater Conservation District has been involved in monitoring and protecting groundwater quality since 1955. Since polluted or poor-quality water is no longer suitable for many purposes and essentially wasted, the district established an in-house water quality program and groundwater samples are taken throughout the district on an annual basis for analysis. As a major supplement to its own efforts the district has partnered with the United States Geological Survey (USGS) to gain a more comprehensive and highly accurate picture of the chemical and physical properties of the water in the aquifer. You can view the previous USGS report from 2014 on our website at www.northplainsgcd.org/waterquality.

The USGS team completed half of the sampling in March of 2019. The remaining wells are being sampled this summer, and a full report will be delivered in 2021. All samples come from the Ogallala aquifer formation. USGS staff test for a multitude of parameters such as pH, conductivity, temperature, major ions,

dissolved oxygen, turbidity, alkalinity, nutrients, metals, and inorganic compounds. Six of the 30 samples will be analyzed for pesticides. All samples collected will go to either the National Water Quality Laboratory in Denver, CO, or the Organic Geochemistry Research Laboratory in Lawrence, KS. 💧

Save Paper and Water by Choosing our E-Newsletter

North Plains GCD now offers our district newsletters by email. If you would like us to send you a digital copy of the newsletter, you can go online at www.northplainsgcd.org/sign-e-news/ and fill out the form, or just email info@northplainsgcd.org. You can also go online to download previous newsletters, and find us on Facebook, Twitter and Instagram.

Winter Water Level Measurements in Progress

Every January, the North Plains Groundwater Conservation District field crew embarks on a long journey to measure the level of 433 wells within the district's 8-county area. By recording data about these wells, district staff can determine aquifer decline and saturated thickness. While 62 of these wells are owned by the district, the other wells are privately owned, and they were chosen in order to provide an accurate representation of the aquifer throughout the district. You can view the wells and their annual measurements online at North Plains GCD's interactive map at map.northplainsgcd.org. The results of the measurements will also be displayed and interpreted in North Plains GCD's annual report, available at the district office in Dumas this summer.

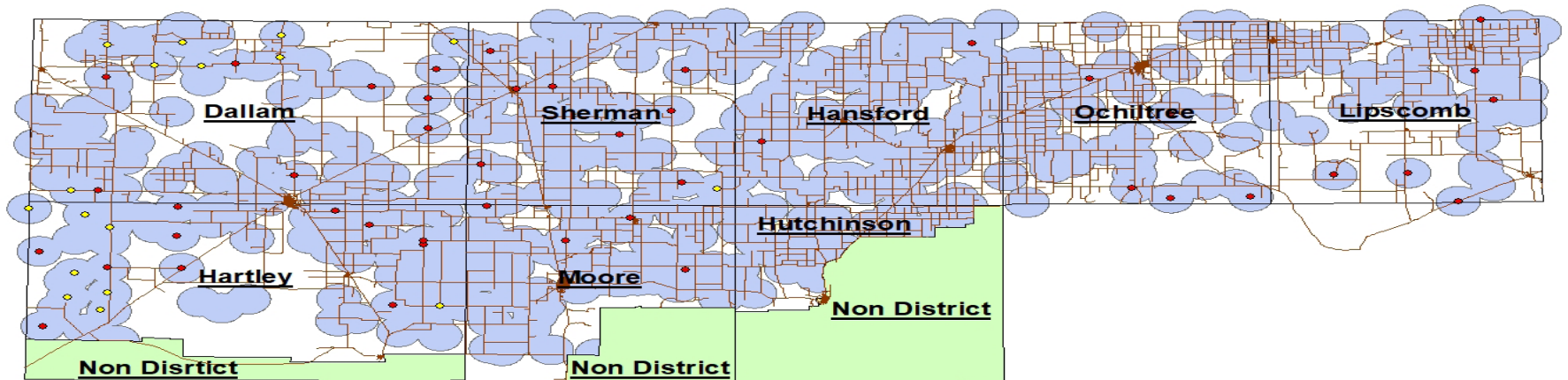
The shallowest measurement was well LI-0044 with a depth to water (DTW) of 11 feet below land surface. The deepest measurement was in well HA-2583 at 536 feet below land surface. The average DTW in each county are in the table listed below.

County	Dallam	Hansford	Hartley	Hutchinson	Lipscomb	Moore	Ochiltree	Sherman
Ave.DTW	-287.2	-294.3	-351.6	-336.2	-163.4	-351.6	-321.4	-312.2
Ave_Decline	-2.58	-1.71	-3.07	-1.47	-0.49	-2.34	-1.18	-2.48

In other news;

The NPGCD needs your help!!

In its ongoing efforts to better understand the Ogallala aquifer and make better management decisions, the district is looking to increase its observations well network. If you have a well in the white area that is not being used or is capped, we would like to discuss adding the well to the program. We are also looking to drill monitor wells for our telemetry program in these same areas. If interested, please contact Odell Ward, program coordinator. 💧



Grant Awarded

(continued from page 1)

of the district irrigated land. Four years of Master Irrigator graduates have yielded 90 producers trained in the latest conservation practices and given the opportunity to receive financial assistance to implement some of what they've learned.

Visit the [TWDB Agricultural Water Conservation webpage](#) to learn more about this program and read about [success stories](#) and examples of previously funded projects.

The TWDB is the state agency charged with collecting and disseminating water-related data, assisting with regional planning, and preparing the state water plan for the development of the state's water resources. The TWDB administers cost-effective financial assistance programs for the construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects. 💧

Save Water and Create Your Own Xeric Zone

The best place to start water conservation is your own backyard! Using native and water efficient plants is an excellent way to do this in a garden or flowerbed, but why not extend that to your whole yard? Xeriscaping is a more complete landscape design that minimizes water use overall using drought-tolerant plants along with hardscape items such as rocks and pavers.

Creating a successful xeriscape relies on seven principles you should keep in mind while designing your setup. All these steps can be easily achieved with the help of your local greenhouse and research!

- **Planning and Design:** Xeriscaping requires good planning throughout the process; keep things like water needs in mind when deciding what plants to put together.
- **Efficient Irrigation:** By placing plants with similar water needs together, you can optimize irrigation for each zone in your xeriscape. Look at what watering methods work best for the specimens you plan to use.
- **Use of Mulch:** Using mulch appropriately will complement sound irrigation practices by reducing evaporation.
- **Soil Preparation:** Properly preparing your soil helps ensure your plants can be successful in your xeriscape. Check out how to best supplement and prepare the soil in your area by looking online or asking your local greenhouse.
- **Appropriate Use of Turf:** Using the correct turf grass for your area benefits yards greatly, even if you are not xeriscaping. Native grasses like buffalo grass fare far better without the large water demand of cool season grasses. If you are looking into new turf, research native turf grasses.
- **Select and Group Plants Appropriately:** Grouping plants with similar water and light needs will help your xeriscape stay healthy and easier to manage. This portion of the design process is crucial and should play a big part in what plants you choose and where you decide to place them.
- **Appropriate Maintenance:** Now, you can enjoy one of the real benefits of your xeriscape! While xeriscapes are low maintenance, there will be some things like weeding to keep in mind depending on the design you choose. In addition, a xeriscape will require as much or more watering the first year when plants are

being established.

If you know of a business or residence that uses any water-friendly landscaping practices, please send us a tip to kmarkham@northplainsgcd.org or fill out the nomination form found at www.northplainsgcd.org/xericzone. When we receive your nomination, we will contact the homeowner or business owner and give them our special Xeric Zone sign to recognize their dedication to water conservation. 💧



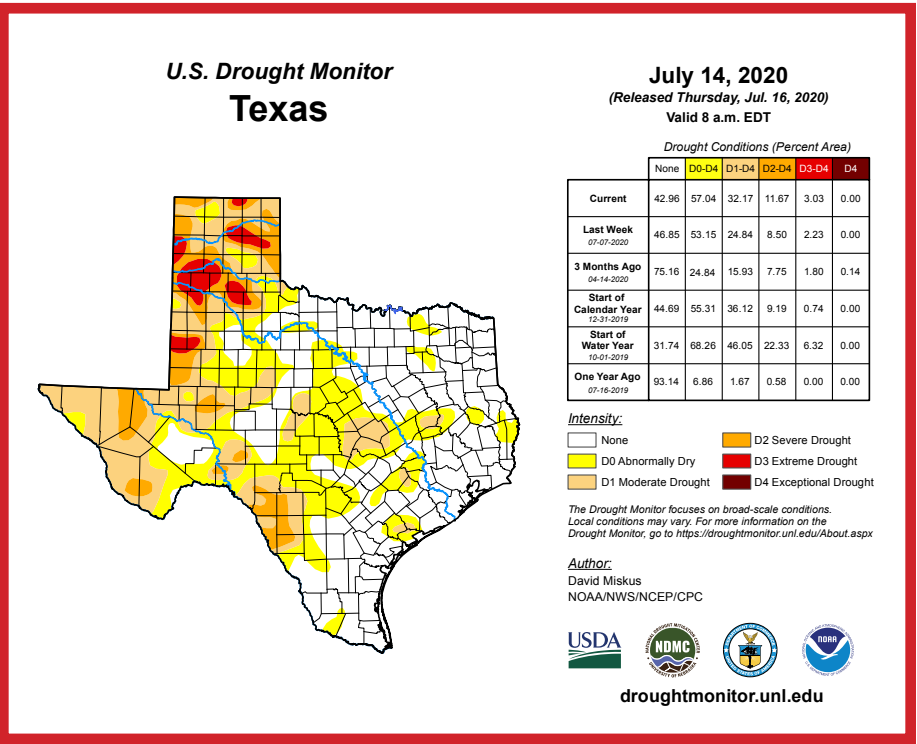
Xeriscaping minimizes water use overall using drought-tolerant plants and hardscape items such as rocks and pavers. See story for details on how to nominate a beautifully xeriscaped zone for recognition.

Best Wishes in Retirement

Jerry Green began working for the district in June of 2012 as a member of the science and technology team. He came into the role with over 22 years of experience in water systems as the former Public Works Director for the City of Cactus and Water & Wastewater Superintendent for the City of Dumas. Jerry has dedicated 30 years of service to ensuring the quality and conservation of water for the people of Moore County and the North Plains GCD. We wish him all the best as he phases into retirement and shifts his focus to his many hobbies including fishing, hunting, woodworking, metalworking and grilling. 💧



**NORTH PLAINS GROUNDWATER
CONSERVATION DISTRICT**
BOX 795
DUMAS, TEXAS 79029



PRESORTED
STANDARD
U.S. POSTAGE PAID
LUBBOCK, TX
PERMIT NO. 324

RETURN SERVICE REQUESTED

Low Interest Loans on Irrigation Equipment Available Through North Plains GCD

The North Plains Groundwater Conservation District has funding available for pivot replacements and conversions. Eligible properties must be located in the district, must have been irrigated three of the last five years, and the loan proceeds must be used to improve the efficiency of the current system. Funds are available at a rate of 2.59% interest, and subject to credit approval.

Full program guidelines and loan applications are available on our website, www.northplainsgcd.org or by contacting the district at 806-935-6401 and asking for Kirk Welch, or by e-mailing kwelch@northplainsgcd.org. 💧

