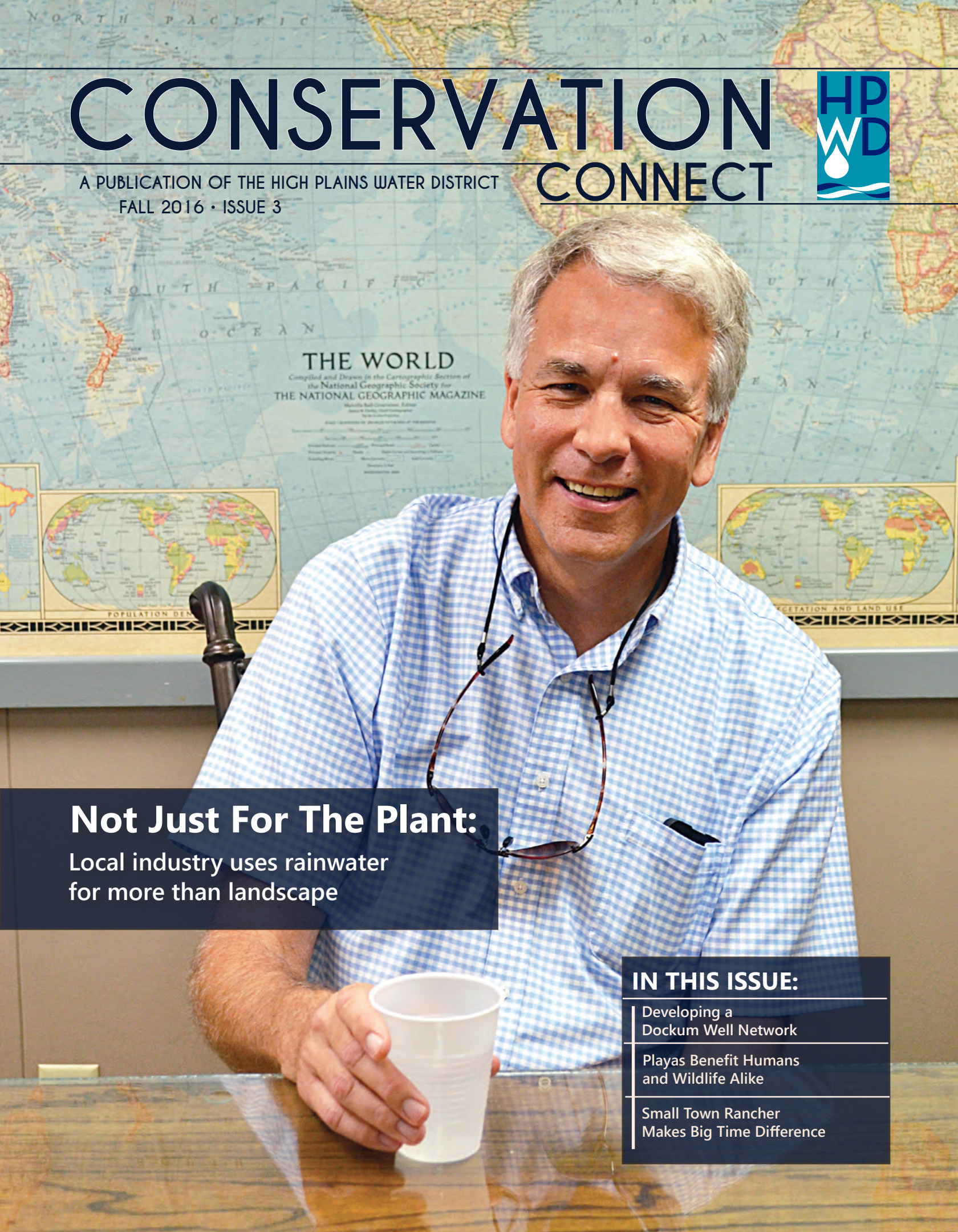
CONSERVATION CONNECT

A PUBLICATION OF THE HIGH PLAINS WATER DISTRICT
FALL 2016 • ISSUE 3



Not Just For The Plant:

Local industry uses rainwater for more than landscape

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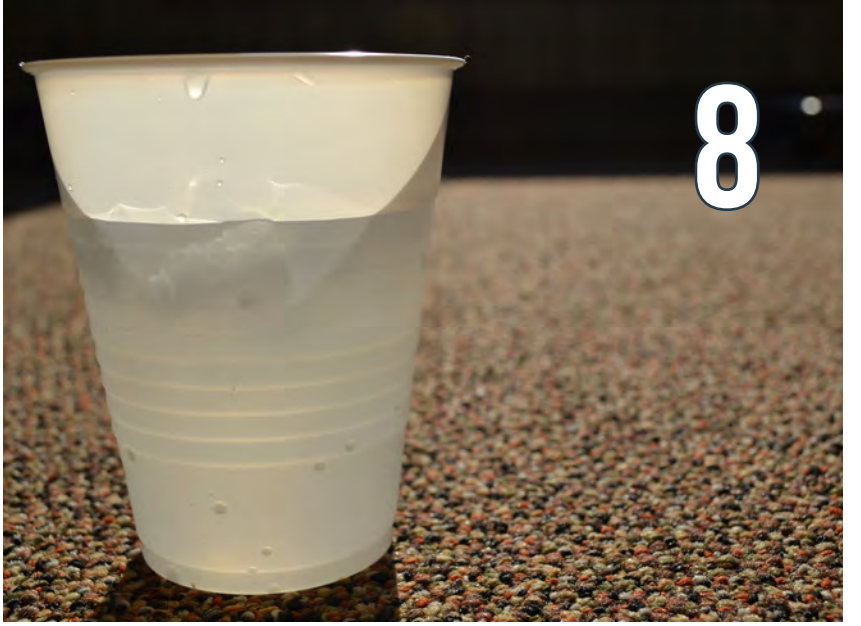
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Chris Jackson poses with a cup of filtered rainwater.

Photo by Adeline Fox

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LETTER FROM THE PRESIDENT

Water conservation is way of life and not simply an afterthought for many persons and businesses in the Panhandle-South Plains of Texas. Several of these individuals are profiled in this issue of Conservation Connect. We salute them for their innovative efforts to conserve and preserve our most precious resource -- water!

Since our last issue, the High Plains Water District (HPWD) Board of Directors and Staff continue refini g programs and activities to gain a better understanding of the available groundwater in aquifers within the district.

Th s information is shared with the public as part of the interactive map feature on the district website (map.hpwd.org). Visitors can obtain information about all permitted water wells in the district, daily and annual water level data from the observation well network, as well as view copies of drillers and geophysical well logs. Additional refinements are planned for the near future!

Th s is the second year that the HPWD Board has funded water related research and demonstration projects.

During the 2016 fiscal year, the Board approved $152,472 in funding requests. Most were for research concerning groundwater quality and quantity in the Dockum Aquifer.

Other funded research projects included installation of a native/xeric landscape garden at Bushland Elementary School; examination of alternate crops into cropping systems to extend the life of limited groundwater; review of the use of small and medium rainwater harvesting practices; and research into use of a soil endoscope to subsurface irrigation uniformity testing.

In addition, the Board adopted the lowest ad valorem tax rate in the past 20 years. Th ee years ago, we set a priority to achieve balanced annual budgets. Th s was accomplished by the efforts of District staff who reduced costs and improved services for our constituents.

If you have questions or need additional information about any HPWD program or activity, please contact our office t (806) 762-0181.

We value your comments and suggestions.

Lynn Tate
HPWD Board President



HIGH PLAINS WATER DISTRICT CELEBRATES 65 YEARS OF SERVICE

STORY BY KATHERINE DRURY

The High Plains Underground Water Conservation District No. 1 is excited to celebrate 65 years of service to its constituents. Since 1951, the Board of Directors and staff have been charged with protecting, preserving and conserving the aquifers that lie beneath our 16-county service area. To commemorate the anniversary, we highlight some of our activities and programs.

1951

Voters in 13 counties ratified the creation of the High Plains Underground Water Conservation District. The vote was 2,012 in favor and 925 against. One of the first activities of the District was to promote proper coverage and closure of abandoned wells.

1953

The District implements water well permits and spacing requirements to stop localized depletion of the Ogallala Aquifer caused by wells being drilled too close to each other. Th s is still a primary focus of the District today.

1954

The first issue of The Cross Section is published in June 1954. The monthly newsletter continues to provide valuable information and conservation stories to readers.

The District attempts its first artificial recharge test on the Ogallala Aquifer.

1957

The common practice of holding oilfield brine in open, unlined pits posed a groundwater contamination threat. One of the first rules of the district outlawed this practice.

1960s

Several key HPWD programs were implemented in the 1960s. Th s included publication of annual depth-to-water level measurements in the district newsletter; developing the cost-in-water income tax depletion allowance program; and efforts to reduce water waste caused by irrigation tailwater. All of these projects are still active today.

1976

Center pivot irrigation gains in popularity on the High Plains. Between 1986 and 1998, a total of 7,935 pivots were installed. Many were installed as part of the joint HPWD/ Texas Water Development Board agricultural water conservation equipment loan program. There are now approximately 13,000 center pivot systems in the HPWD.

1991

Interest in drip irrigation picks up across the region. HPWD, with grant funding from the Texas Water Development Board, installs drip irrigation demonstration plots in Hockley, Lubbock, and Lynn Counties.

1996

The WaterWise ™ curriculum provides water conservation education to area students. See Page 26 for more information about the program.

2010

Since its creation, additional acreage has been added to the district through annexation of territory. Voters approved addition of the Northwest quadrant of Hockley County, Southwest quadrant of Lamb County, and all of Swisher County on Nov. 2, 2010.

2014

The District launches interactive maps on its website that include well logs and permits, a well spacing guide and observation wells.

2015

HPWD supports research to determine groundwater quality and quantity in the Dockum Aquifer.

DATA FOR EVERY DEVICE

STORY BY ADELINE FOX

A lot has changed since the inception of HPWD in 1951. Sixty-five years after HPWD was created, office staff now issue electronic permits and the District has an interactive map on its website that features aerial imagery with detailed well information. From paper files to scanning all documents, technology has helped HPWD streamline data and distribute information to the public.

BACKGROUND

HPWD has an observation well network with about 1,400 sites. Data collected at the observation wells is later displayed in the interactive map on the HPWD website. The interactive map interface features annual water level measurements, well drilling reports and even a well spacing guide that helps landowners plot a potential drilling site before applying for a well permit. Water level data collection starts in the field with help of a cell phone and a customized app.

DATA

After the water level measurement has been captured, the app subtracts a measuring point from the land surface to ensure accuracy. Once the field technician submits the water level measurement, data travels back to the HPWD database. Information from the database is pulled to the interactive map in the form of an informational table.

BENEFITS

The data collection process is relatively simple, but the best part of the online interactive map is its access from any device. The interactive map will scale in size to whichever device a person might be using. Water level data can be accessed from anywhere on any kind of tablet, phone or computer.

Experience it yourself! Visit the interactive map site at map.hpwd.org. We'd love to hear your thoughts and any suggestions you might have for improvements.

DEVELOPING A WATER WELL NETWORK FOR THE DOCKUM AQUIFER

STORY BY JASON COLEMAN
PHOTO BY CARMON MC CAIN

The HPWD Board of Directors approved a scope of work for the Dockum Aquifer in April 2015. One of the top priorities of the study is establishing a water level monitoring network. Annual water level measurement data is one of the most basic and important aquifer monitoring components for data collection.

Classifi d as a minor aquifer by the Texas Water Development Board, the Dockum aquifer underlies all of HPWD, buried beneath the Ogallala and Edwards-Trinity (High Plains) aquifers.

It is confined by the overlying geologic units, and may serve as an alternate water source when practicable. The utility of the Dockum aquifer depends on the amount and quality of water needed for a particular application.

In certain areas of Deaf Smith, Randall, Potter and Swisher Counties the Dockum water quality is suitable for a variety of uses without further treatment. However, we also know that water quality in this aquifer degrades as you move further south.

In the central and southern portions of HPWD, we find the aquifer dipping downward, where the total dissolved solids (TDS) measurements are greater than 5000 mg/L.

After taking inventory of existing Dockum water well locations, HPWD staff began identifying well sites which are suitable for annual water level measurements. For instance, the well must be constructed and equipped in a manner that permits dependable access to the site. Sometimes the pump design is such that there is no access to insert a tape for measurement.

Also, it is most helpful if there is a record of construction for observation wells. Th s information helps district staff de ermine the casing diameter, date of drilling, and screened interval.

Installing screen in
Dockum Aquifer test well at Abernathy

Subsequently, HPWD identified about twenty Dockum wells and obtained water level data during the winter of 2015. The following measurements in 2016 provided the first comparative data for analysis.

Fortunately, we also located two locations appropriate for continuous monitoring using transducers. These two well sites also use telemetry which remotely sends us the daily readings. The corresponding chart is updated each morning on the District website.

Since HPWD began this monitoring program, there have been new Dockum water wells constructed in Hale County. Consequently, we anticipate adding two more wells to the annual measurements. Th s data will be available with the other existing data at map.hpwd.org.

NOT JUST FOR THE PLANT: LOCAL INDUSTRY USES RAINWATER INDOORS

STORY & PHOTOS BY ADELINE FOX

Rainwater collection system installer Mark Fullingim (L) and Sam Jackson owner, Chris Jackson, (R) stand in front of of one the 15,000 gallon tanks.

Water supply became an issue following the great drought of 2011 for a Lubbock manufacturing plant when their groundwater wells began pumping less water than the plant needed for operation.

Choosing rainwater as an alternate water source provided both the quantity required as well as a significantly increased water quality for improved operations.

Established in 1948, Samuel Jackson, Inc. manufactures moist air generators used in the cotton ginning process. Moist air generators optimize cotton moisture content to preserve yield and fiber properties while reducing the gin press cycle time for more profitable gin operations. The company has four locations nationwide and one in Paris, France.

Operating a manufacturing plant making and testing water evaporators requires a predictable supply of high quality water. However, water wells near the plant became less reliable last year. "We cannot function as a factory without high quality water," said Company President Chris Jackson. "We have a number of water supply options available, but nothing compares to the quality of filtered rainwater and it is certainly the most responsible choice when all things are considered."

ADVANCING

Inspired by Richard Heinichen of Tank Town, a popular rainwater harvesting company in Dripping Springs, TX, Chris Jackson pursued the concept of rainwater harvesting to supply the industrial plant with an adequate water supply. The company installed two 15,000 gallon fiberglass tanks in September 2015. Lubbock recorded several inches of rain soon after installation. Because of the amount of rainfall collected, the plant did not need to pump groundwater from their wells until early 2016. In February, four additional 15,000 gallon tanks were installed, increasing total capacity to 90,000 gallons.

"We can now sustain our operations on a total annual rainfall of only six inches," said Jackson.

Rain is collected from the 48,000 ft^2 roof surface area of the industrial plant. Water flows from the gutters into three 550-gallon "eliminator" tanks, which collect any undesirable particles from the roof surface. Once these smaller tanks are filled, water begins flowing into the fiberglass tanks.

Collected rainwater is used indoors, which requires a more advanced filtration system than landscape use.

"WE CAN NOW SUSTAIN OUR OPERATIONS ON A TOTAL ANNUAL RAINFALL OF ONLY SIX INCHES."

After collecting in the tanks, rainwater is pumped through a five micron filter to remove any fine particles. From there, the filtered rainwater travels through an ultraviolet Sanitron treatment, which purifies he water for safe consumption.

Rainwater is naturally more pure than groundwater. The water evaporators that Jackson manufactures are benefited by the high purity water, which leaves no scale or water spots during the extensive testing process. In fact, water from the wells near the plant contain more than 1,000 parts per million total dissolved solids (TDS) in comparison to collected rainwater with only five parts per million TDS.

"We don't even have to wipe the glass viewing windows to the spray chamber following testing," said Jackson. "Our customers receive products that have been thoroughly tested but appear completely pristine because the water we are using is about ten times more pure than reverse osmosis could provide from our traditional raw water sources." Additional benefits include sustainability and efficiency.

"We know exactly how much water we are using because we can monitor our tanks carefully," said Jackson. "We know we reduced water use by 30 percent and when we can use 100 percent rainwater, nothing is wasted in a purification process, saving even more. There are also no harmful chemicals involved."

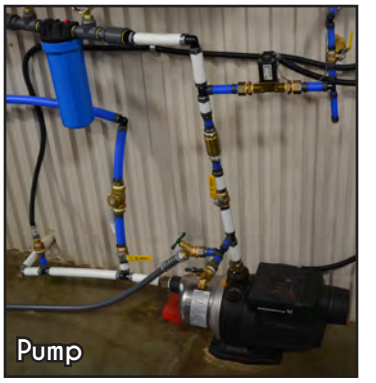
System installer Mark Fullingim of Llano Estacado Construction mentions design challenges when building such a large collection system.

"The sheer volume of water running off of the roof is a challenge because we have to design a system that controls flow of the water while not overwhelming the storage tanks or collapsing the gutters," said Fullingim. "In a strong West Texas downpour, we must manage gravity water flow of up to 7,200 gallons per minute into the tanks."

As for encouraging others to invest in rainwater harvesting practices, Jackson believes collaboration is important.

"Rainwater collection is not a complete solution to the water challenges that face West Texas residents, but it is definitely one important component toward making our traditional water sources stretch farther than we can presently imagine. If we can start the discussion and show how the process works, then we can lead by example to help others get started," said Jackson.

Rainwater Harvesting Process



IRRIGATORS MAKE THE MOST OF TECHNOLOGY

STORY BY KATHERINE DRURY

Producers on the Texas High Plains are maximizing irrigation efficie cy by increasing their use of advanced high efficie cy irrigation application technologies, soil moisture monitoring equipment, and irrigation management software. These advancements help producers conserve water, increase crop yields, and maintain or increase crop quality while controlling input costs.

ADVANCED HIGH EFFICIENCY IRRIGATION APPLICATION TECHNOLOGIES

Early center pivot systems sprayed water into the air under high pressure. These systems had water application efficie cies of about 60 percent. Losses associated with wind drift nd evaporation equaled about 40 percent.

During the past 30 years, LEPA center pivot systems and subsurface drip irrigation systems have helped improve irrigation application efficie cies to about 95 percent.

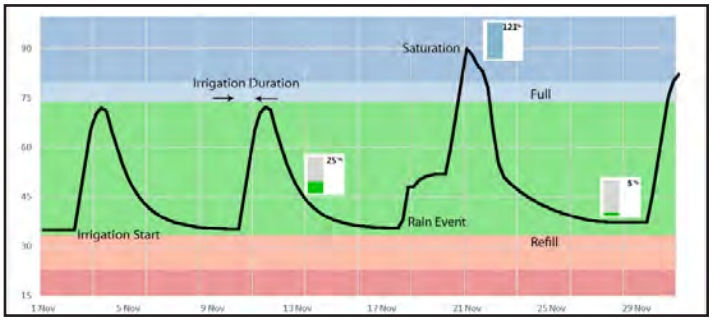
USDA-ARS researchers are currently evaluating Precision Mobile Drip Irrigation (PMDI) which combines elements of LEPA and subsurface drip. A long hose with emitters is dragged behind the pivot.

SOIL MOISTURE MONITORING TOOLS HELP WITH IRRIGATION SCHEDULING

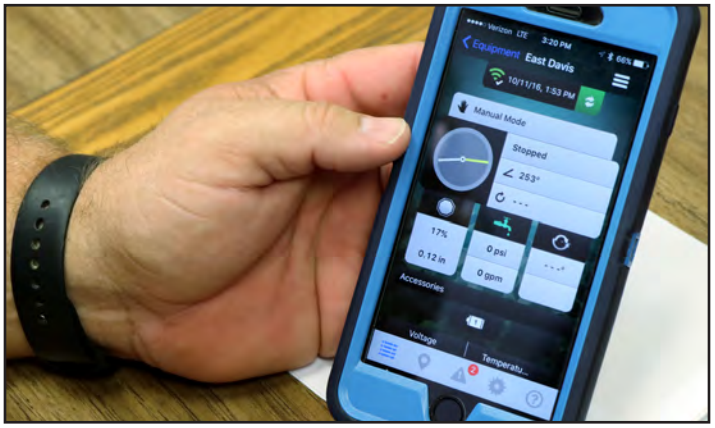
Knowing the amount of moisture stored in the soil profile is an important part of irrigation management.

Use of soil moisture monitoring tools help producers determine when to irrigate and the amount of water to be applied to the crop.

Th s helps reduce water use, pumping costs, and maintenance of irrigation equipment.



IRRIGATION SOFTWARE BRINGS SMARTPHONE TECHNOLOGY TO THE FARM



Many producers use apps installed on their mobile devices to control and monitor their center pivot systems from any location. Previously, producers had to drive to each pivot site to start, stop, or correct any problems with the irrigation system.

Depending upon the software, producers are able to remotely monitor pivot start, stop, system speed, amount of water/chemical applied, pressure, and voltage.

Use of this technology results in real-time management of the system, better data on which to base irrigation decisions, and energy/water savings.

WASH, RINSE, AND REPEAT

STORY BY ADELINE FOX

Standard top loading clothes washers with vertical axis drums have changed very little from General Electric's design in 1947, according to the Alliance for Water Efficie cy. A large amount of water is needed to suspend clothes in soapy water while the agitator churns the clothes to remove dirt and stains.

Most of these washers use about 45 gallons of water per load. Newer models have reduced this to less than 40 gallons per load. New, high-effici cy washing machines (HEW) use from 14 to 25 gallons of water per load.

A family of four generates more than 300 loads of laundry per year. Washing them in a standard clothes washer uses 12,000 gallons of water annually, according to AWF. Most of this water is ultimately discharged to a city sewer or septic system. One alternative to this discharge is use of a graywater system.

The Texas Water Code defines graywater as water discharged from showers, bathtubs, handwashing lavatories, clothes washing machines, and sinks. In this definition, sinks are considered those not used for disposal of toxic/hazardous materials and/or food preparation and disposal.

It is important to note that graywater should not include wastewater from washing of materials, including diapers, which have been soiled with human waste. Also, it should not include wastewater that has come into contact with toilet waste.

One company in Lubbock is tapping into this readily available resource by installing and maintaining graywater systems.

SOUTHWEST WATER OF LUBBOCK

Southwest Water of Lubbock (SWL) is a water treatment company that has been in business for more than 30 years.

They specialize in water softening and reverse osmosis systems, but have recently been focusing on installing rainwater catchment and graywater systems.

This system collects regeneration backwash from a water softener for use in landscape irrigation.

Bruce Schuette and Erich Hardt are co-owners of the company. They started installing graywater systems because they wanted to provide a sustainable source of water that is not weather dependent, such as rainwater catchment.

"We have always been advocates of water conservation," Schuette says. "We know water treatment systems create a discharge stream, but we wanted to find a way to reuse that water and be as efficie t as possible."

SWL has installed multiple residential systems. The largest to date has included 30,000 gallon tanks to collect graywater from an entire home. Once filtered, the graywater can be used for landscape irrigation. SWL designs each system for the individual home.

While SWL has installed many graywater systems, they have also installed combined rainwater catchment and graywater systems.

"We have created systems that use rainwater, graywater, and also have access to a city water source," Hardt says. "We build them into one unit so people can diversify their supply."

CHALLENGES WITH GRAYWATER

While graywater is the only readily available and

renewable water supply originating inside a home, there are challenges with installing and maintaining a system. The biggest challenge is accessing water in existing homes. Water lines can be in the middle of the house or on a second story, which makes them nearly impossible to reach.

Another challenge concerns the storage time. If graywater is stored too long, it will become stagnant -- so graywater system owners must have a consistent plan for use of the reclaimed water.

In addition to system challenges, Hardt mentions a challenge with awareness.

"Some people are discouraged because they have little or no knowledge on the subject," Hardt says.

ADVANTAGES OF GRAYWATER

Every home produces graywater. If the water is not being reused, thousands of gallons a year will go to a wastewater treatment plant or into a septic tank. Owning a graywater system helps reduce the volume discharged to these systems.

Knowing this and being conscientious of her water use, Karen Porter of Lubbock is having a graywater system installed in her newly built home. Water from the home's bathtubs, showers, washer and the air conditioner condensate will have individual drain pipes that feed into the irrigation system for turf and trees.

Porter and her family have relied on groundwater from their private well for all water use in the past.

"We decided to do this because anytime you can use the water coming into your household more than once, you are reducing strain on the municipal water supply and/or your groundwater resources," Porter says. "You are saving money and taking care of your landscape automatically."

Building the graywater irrigation line into Porter's home only added $900 to the total construction cost.

CITY ORDINANCES AND STATE RULES

Use specifications for graywater vary by city. Currently, the City of Lubbock allows graywater systems to be installed, but water cannot be applied with a sprinkler spray system. Graywater must be applied through drip irrigation lines below the ground surface.

At the state level, graywater is regulated by the Texas Commission of Environmental Quality (TCEQ). According to TCEQ's Chapter 210 – Use of Graywater Systems, an authorization is not required for the domestic use of less than 400 gallons of water a day.

FUTURE PROJECTS

SWL is currently installing a system that utilizes rainwater catchment and graywater for the home's entire water supply. Th s is the first project of its kind for SWL.

To learn more about graywater in this area, call Schuette and Hardt at (806) 500-1328 or visit www.southwestwaterlubbock.com

"Water is one of our most precious resources, and just like any natural resource, it can be depleted," Hardt says. "It is our job to not waste a single drop."

A 2,500 gallon underground storage tank

Bruce Schuette and Erich Hardt

USING PRODUCED OILFIELD WATER TO IRRIGATE COTTON

STORY & PHOTO BY ADELINE FOX

The idea of water reuse is not a new one. After all, the water cycle guarantees that all water is recycled at some point. However, a unique type of water reuse is being studied in the Trans-Pecos area.

Texas A&M AgriLife Research and Texas Tech University Assistant Professor of Soil Chemistry and Fertility Katie Lewis is conducting research to determine if produced water from hydraulic fracturing can be used for cotton irrigation. The research is happening in Pecos, Texas, but if the method is effective, regions across the state could adopt a similar practice.

The goal is to evaluate a cotton crop's growth and test its response to treated produced water. Soil chemical properties are also monitored to record concentration levels at different depths.

Energy Water Solutions (EWS) is the company who created the innovative treatment technology being used for the irrigation research. EWS has a mission "to treat the world's Produced Water and make it an incremental water source available for use for energy, production, agriculture, and environmental consumption."

According to the EWS website, 70 billion barrels of produced water are used in energy exploration and production annually.

Conducting a project of this magnitude requires help from several entities. The Texas A&M AgriLife Research and Extension, EWS, Gibson Energy, and Anadarko partnered to obtain a permit from the Texas Railroad Commission (TRC) for beneficial reuse.

Anadarko supplies the locally produced water. It then travels to the test site for treatment and land

"I WAS SURPRISED THAT THE PRODUCED WATER WAS BETTER QUALITY THAN THE GROUNDWATER."

- DR. KATIE LEWIS

application.

From there, water is treated on-site in the mobilized EWS water recycling unit.

The project tests two different sources of irrigation water. The first irrigation treatment source is 100 percent groundwater, while the blended water is a 4:1 ratio with groundwater and recycled water. From June 6 to September 4 in 2015, 13.9 acre-inches of groundwater were used and 10.7 acre-inches of blended water were applied. The difference in water quality stunned the research team.

"I was surprised that the treated produced water was better quality than the groundwater," Lewis said.

Results from the 2015 project show little difference in overall lint yield when comparing the two irrigation methods. Additional findings included reduced soil salinity parameters when irrigating with the treated produced water.

Future research will include evaluating varying ratios of blended water and potentially testing this water on other types of crops like forage.

There is a possibility to use this type of water on crops for human consumption, but there must be evidence to ensure no risk for bioaccumulation of chemical constituents.

Subsurface drip irrigation installation is also proposed to test sources of irrigation and methods.

Working in uncharted territory can provide benefits, but also challenges.

"The interest from the media and the industry has been unbelievable," Lewis said. "However, when the price of oil dropped so did the interest to fund projects like this one."

Technology and innovation will bring solutions to the challenges in water management. Hopefully, many more industries and regions of Texas will look to technologies like this one to recycle water for the future.

SMALL TOWN RANCHER MAKES BIG TIME DIFFERENCE

STORY & PHOTOS BY JESSICA DUNBAR

BOB DURHAM STANDS PROUDLY NEXT TO FOUR OF SIX RAINWATER COLLECTION TANKS AT HIS RANCH NEAR ABERNATHY

When one thinks of water conservation, watering the yard less may come to mind. However, when Bob Durham of Abernathy thinks of water conservation, he thinks about his livelihood.

Durham grew up on a ranch in northeast Floyd County and graduated from Floydada High School. Showing and raising cattle has been a part of the Durham family for years. Being around livestock his entire life, working cattle and riding horses was an everyday job for him and his family.

Durham moved to Hale County in the mid-1990s where today he continues to raise cattle on his ranch. He learned at a young age that every cow and every drop of rain matters when trying to provide for a family. Every rancher knows that water in large or small amounts can mean a plentiful or desolate lifestyle.

About a year ago, Durham contacted the USDA-Natural Resources Conservation Services (NRCS) about his rainwater harvesting idea.

"They helped me both financially and with the design/installation of the system," Durham said. "I have no objection to anything they've done for me—they're great."

Robert Unterkircher is the NRCS District Conservationist in Plainview that helped Durham with his project. Unterkircher said his main focus was to make sure Durham had a long lasting, properly installed system.

Unterkircher said Durham has always been mindful of water saving and researched a lot before taking on the project. Several engineers and a contractor were involved with the project to make sure all material installed met the NRCS specifications.

There were six individuals from NRCS involved in the project. Greg Sokora was the head engineer, but several others helped on-site to check out the design.

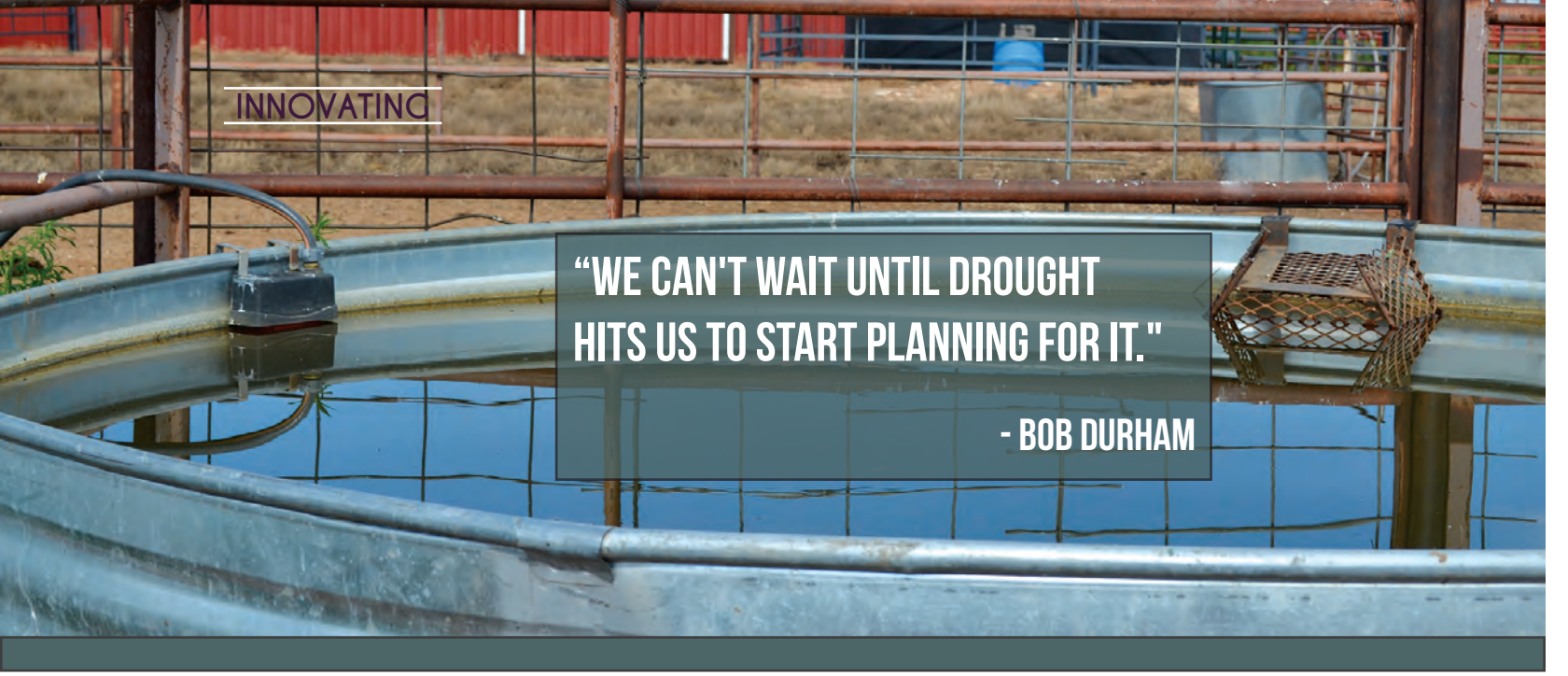
"It was Durham who came to us," Unterkircher commented. "He initiated the project."

Durham said he has had the idea of rainwater harvesting for years and at age 83, he thought he had better get to it.

The process took about three months to complete given some setbacks with heavy rainfall. The project was built in 2015 and finalized in 2016.

There are six rainwater collection tanks on the Durham ranch at Abernathy. Four tanks are filled with the runoff w ter from the largest barn measuring 10,000 ft^2, and the other two tanks are filled with water from a smaller barn measuring 8,450 ft^2.

Each polyethylene tank is designed to hold 5,000 gallons of water, but Durham had an elbow overfl w pipe added, which increases capacity to 5,500 gallons. All together, the six tanks will fill up on a little over four inches of rainfall.



"WE CAN'T WAIT UNTIL DROUGHT HITS US TO START PLANNING FOR IT."

- BOB DURHAM

Durham explained that the amount of water the cows drink depends completely on the weather and the moisture in the grass.

On average, one tank can provide water to 18-20 cows for about 20-25 days.

The water is delivered through an underground pipeline and feeds into six out of the 10 pastures where Durham's cattle graze.

Durham does not have dirt tanks on his ranch so all water is fed into metal and fiberglass tanks.

"No pump is used to deliver the water— it is all through gravity flow," Durham explained.

Unterkircher said everyone can do their part to save our groundwater. He said every gallon saved will add up over time whether the system is big or small.

He said Durham's tanks can catch over 200,000 gallons of water on a normal rainfall each year.

Durham reflected on how his rainwater collection system has positively affected his family. He said this system has helped financially as well as helped him become more of a conservationist.

Not only does Durham conserve water for agricultural needs, he also has other ways of conserving around the house.

Durham's home is built so when rain comes, the water runs off the concrete and onto his lawn.

Although a little rainfall goes a long way when watering his cattle, Durham said he will always be concerned about drought.

"I never give up on drought, but now we know how to handle it better," Durham said. "We can't wait till drought hits us to start planning for it."

Durham expressed he has a passion for cattle and water conservation. He said his favorite thing to do is go out to the pasture and watch his cattle graze.

"If I had my way, I would go out there on that Polaris and sit and watch the cattle eat," Durham said with a smile.

Durham explained that in time, he would like to install four more tanks on his property and save more water. He said more people should consider installing their own rainwater harvesting system.

"It is so important that we have food and water," Durham said."You can't have food without water."

PLAYAS BENEFIT HUMANS & WILDLIFE ALIKE

STORY BY ADELINE FOX

Aerial wet playas in Amarillo with pitted playa in foreground. (Photo by Kevin Kraai TPWD)

After a big rain event, dry playa basins across the High Plains fill with water. Eventually, the clay bottom of the lake seals over, which keeps water in place.

These depressions in the land are called playa lakes or wetlands. Playa wetlands and agricultural crops add life to the land surface by providing food sources to birds passing through in each migration season, but playas are even more important to residents in this region.

WHY ARE PLAYAS IMPORTANT FOR BIRDS?

Texas is home to 18,000 - 20,000 playa wetlands. Floyd County, northeast of Lubbock, contains 1,707 playa basins -- more than any other place in the world. These wetlands can range from one quarter of an acre to over 800 acres in size. Kevin Kraai is a Waterfowl Program Leader with Texas Parks and Wildlife Department. He sees the benefits of playas fi st-hand.

"The Ogallala Aquifer is the only reason humans can live in the Southern High Plains," Kraai says. Without playas, recharge to the Ogallala is little to none, meaning these wetlands are just as important to humans as they are wildlife."

Kraai monitors migratory birds throughout the winter and summer seasons. Duck species like northern pintails, blue wing teal, green wing teal, mallards, and other birds rely on water collected in the playas in order to survive their travels. Organizations like the Playa Lake Joint Venture (PLJV) and Ogallala Commons strive to educate the public about the benefit playas give to wildlife and to the Ogallala Aquifer across The Great Plains.

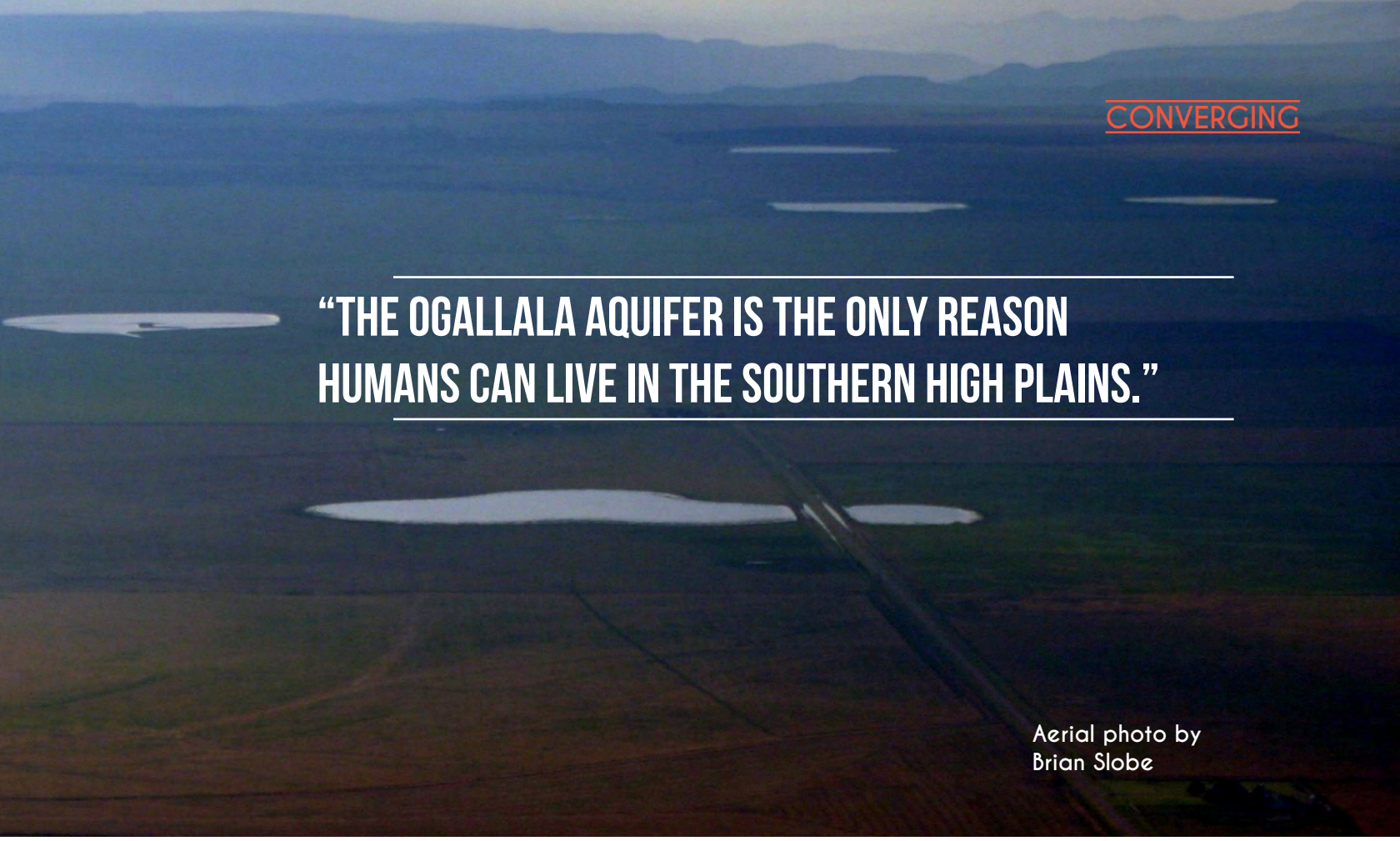
PLAYA LAKE JOINT VENTURE (PLJV)

Starting in 1989, PLJV began as part of the North American Waterfowl Management Plan. PLJV is self-directed, but managed by a board of directors who represent six states overlying the Ogallala Aquifer. Mike Carter serves as the PLJV Coordinator. His role is to oversee day-to-day operations, and maintain partnership relations across the United States.

"Our goal is to balance the importance of wildlife conservation with the interests of landowners," Carter says.

PLJV works to spread education and awareness about playa wetlands.

With support from several partnerships, PLJV



"THE OGALLALA AQUIFER IS THE ONLY REASON HUMANS CAN LIVE IN THE SOUTHERN HIGH PLAINS."

Aerial photo by Brian Slobe

focuses on maintaining playa existence and communicating their importance to rural and urban populations.

"There are about 70,000 playa wetlands out there. It's challenging to make them seem special when there are so many. That is why PLJV serves as a platform to discuss and solve playa wetland issues," Carter says.

One of the key issues Carter and PLJV address is the connection between playas and the Ogallala Aquifer.

PLAYAS AND THE OGALLALA AQUIFER

Playas are the primary recharge zones for the Ogallala Aquifer.

According to a study conducted by the United States Geological Survey (USGS), average playa recharge rates are about three inches per year. Water filters through the sandy outer edges of playa wetlands to travel below ground to the water table.

However, recharge rates vary depending on the depth of the aquifer formation. For instance, if the depth of the aquifer formation is about 200 feet, recharge could take decades or longer.

Kraai explains that the connection between the playa wetlands and Ogallala Aquifer is dynamic and important to urban and rural interests. Together, both groups can help spread awareness.

TEXAS PLAYA CONSERVATION INITIATIVE

From a local perspective, agriculture is the lifeblood of the Texas Panhandle economy, but it also provides a food source to a range of wildlife. Grain crops are an additional food source to migratory birds.

Because of this connection, TPWD is partnering with other entities to directly work with landowners to restore playa wetlands. Additional partners include NRCS Floydada Service Center, Floyd County Texas A&M AgriLife Extension and U.S. Fish & Wildlife Service.

Partners in the Texas Playa Conservation Initiative (TPCI) will fund, educate and rehabilitate playas that have been tilled, pitted or filled over time.

According to the TPCI fact sheet, research shows recharge rates in playa basins to be 10 – 100 times higher than under other areas without playas. The project will begin in Castro and Floyd Counties, and hopefully expand from there, Kraai says.

"Protecting the playa wetlands does not only benefit wildlife, but it benefits every person relying on the Ogallala Aquifer for water," Kraai says.

STUDENTS MAKE A SPLASH TEACHING YOUTH ABOUT WATER CONSERVATION

STORY BY ADELINE FOX

Four young men from Crosbyton High School stand in the middle of the HPWD board room. They are nervous to pitch their water conservation proposal to the panel of judges, but they move through their presentation poised and ready for questions.

At the end of their speech presentation, they play a video for the audience. Faces of elementary students flash on the screen. Each student recites a water conservation tip for the camera with graphics surrounding their faces. As the video's credits start playing, the same students from the video start singing a water-saving song. From the moment the video finishes, everyone in the room knows this team has really made a difference in their community.

Elementary Principal Sharon West and Ag Science Teacher Ben Stokes were the catalysts for student involvement in Crosbyton. They both saw opportunity for their students.

"I cannot over emphasize the profound effect the HPWD H2YOU Contest has had on my students both years. Crosbyton is a very small community with great kids, people and school; however due to its size is very limited fi ancially," West says. "That being said, this is why an opportunity to reach out and experience a trip and resources provided by the contest is so important."

Sean Gonzales, Tyriece Mooring, Noah Rubalcaldo, and Hunter Silva formed their group after hearing about the previous 2015 team who were also from Crosbyton.

The theme for their proposal was "Waste Not… Want Not," and it was geared to urban residents in hopes of helping people better understand their daily water use.

"Th s year, the team's goal for the H2O water conservation campaign was to educate elementary students of the importance of conserving water," Stokes says. "Th s scenario allowed my students to become the teacher, which made a larger impact."

Known as "The Water Guys" to the elementary

Texas Water Development Board Member Kathleen Jackson (center), legislative staff members, and representatives of various water agencies are shown with the H2YOU team following their presentation in Austin.

The H2YOU team visits with Dan Hunter, assistant commissioner for water and rural affairs at the Texas Department of Agriculture in Austin.

students, the group quickly realized that they could really influence the younger generations. The team even had an assembly with the elementary school to debut the video and students were treated to popcorn for their participation.

"Each member of the team had an investment in the project and was able to take ownership in the final product. Th s year, the gentlemen on the team were further impacted by earning themselves the nickname… 'The Water Guys,' from working with the elementary students and learning about water conservation themselves," West says.

After the team won the HPWD H2YOU contest, they had the chance to visit Austin to present their ideas on a larger scale.

During their fi st day the students and sponsors toured the Bob Bullock State History Museum and the Darrell K. Royal Texas Memorial Stadium.

On the second day of the trip, H2YOU winners presented their water conservation campaign to several state leaders. The following guests attended presentations:

- Texas Water Development Board (TWDB)
- Texas Water Conservation Association (TWCA)
- Office f Senator Charles Perry
- Office f Senator Judith Zaffi ini
- Committee of Agriculture, Water and Rural Affairs
- Office f Speaker of the House Joe Straus
- Texas Department of Agriculture (TDA)

From being in the Lubbock Avalanche-Journal to presenting at many community functions in Crosbyton, the H2YOU team really did make a difference in their community.

West shared a story from their presentation at the Crosbyton Chamber of Commerce meeting this past April.

"The team was asked to be the entertainment at the Crosbyton Chamber of Commerce meeting. Following their presentation, it was an honor to hear the Mayor of Crosbyton commend them on doing what he was not able to do in his first term …teach others about conservation in a town that was very close to running out of water during the drought. 'All it takes is having a Chieftain Varsity football player come to your classroom and all of a sudden, water conservation is the coolest idea ever.'"

While many people listened to the water conservation proposal and many people were part of the project overall, H2YOU team members were also influenced by the work they had done.

In fact, one of the students commented about the high-effici cy toilet in the hotel room they had during the Austin trip.

"I wouldn't have noticed it at all without the water conservation knowledge gained through my H2YOU experience."

BLUE IDEAS FLOW AT WATTS CONFERENCE

STORY BY ADELINE FOX
PHOTOS BY CARMON MC CAIN

With the theme #thinkblue, the fi st-ever Water Advancement, Technology, Training & Solutions (WATTS) Conference highlighted the latest innovations in water conservation, water reuse, and water treatment.

Senator Charles Perry of Lubbock was the keynote speaker.

"The goal of the WATTS Conference was to share stories of water saving successes. There are many innovative water use technologies in use across the Panhandle-South Plains region. We are showcasing the various towns, cities, industries, and area residents who are using these new technologies to conserve and preserve our water resources," said HPWD Manager Jason Coleman.

WATER REUSE

Diamond Ethanol uses wastewater from the City of Levelland for the plant's boilers and cooling towers. Scott Johnson with Diamond Ethanol and Amy Northam with the City of Levelland discussed the process of bringing the treated wastewater to the plant. It supplies all the water for use in the boilers and 30-40 percent of the water for cooling towers.

Russell Schreiber gave an overview of the City of Wichita Falls' direct potable reuse project. Wastewater effluent was recycled to supply drinking water to more than 150,000 residents during the recent drought.

WATER TREATMENT

City Manager Darrell Newsom discussed construction of Wolfforth's new water treatment plant which features use of electrodialysis reversal technology to effectively reduce arsenic and fluoride levels in the city's groundwater supplies.

The plant is online and awaiting final approval from the Texas Commission on Environmental Quality (TCEQ) before becoming fully operational.

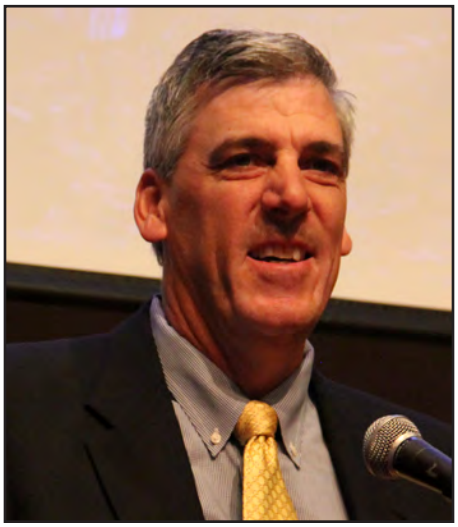
Scott Ahlstrom shared information about the City of Seminole's groundwater desalination plant that began operation in January 2016. The plant uses reverse osmosis technology to reduce the salinity of brackish groundwater. The treated water is then blended into the city's water supply.

INDUSTRY TECHNOLOGY (AG & OIL)

Dr. Susan O'Shaughnessy with USDA-ARS at Bushland shared research study fi dings comparing the effici cy of Precision Mobile Drip Irrigation (PDMI), Low Energy Sprinkler Application (LESA) center pivots, and Low Energy Precision Application (LEPA) center pivots.

Dr. Katie Lewis with Texas A&M AgriLife Extension discussed research relating to agricultural reuse of treated water produced in the oilfield. Additional information about the project is found on Page 14.

Other program highlights included presentations on water wise plant selection, rainwater harvesting, and water conservation audits.



Russell Schreiber

Senator Charles Perry

Darrell Newsom

The March 22, 2016 conference and trade show drew about 250 participants throughout the day long event at the Lubbock Memorial Civic Center.

Conference hosts included:

- City of Lubbock.
- Hemphill UWCD - Canadian.
- High Plains UWCD - Lubbock.
- Llano Estacado UWCD - Seminole.
- Mesa UWCD - Lamesa.
- Mesquite GCD - Wellington.
- North Plains GCD - Dumas.
- Panhandle GCD - White Deer.
- Permian Basin UWCD - Stanton.
- Sandy Land UWCD - Plains.
- South Plains UWCD - Brownfi ld.

20 YEARS OF WATER WISE STUDENTS

STORY BY CARMON MC CAIN

It has been a little more than 20 years since HPWD began its sponsorship of the WaterWise™ conservation education program in schools within the district. It has made a big difference in water savings within the district's service area.

Since the pilot program in 1995, more than 28,615 students and teachers have learned more about water and water conservation as a result of the program. An estimated 2,333,467,684 gallons of water is expected to be saved throughout the life of high-efficie cy fixtures installed by program participants.

The WaterWise™ conservation education program, developed by Resource Action Programs, begins with classroom presentations that teach the importance of using water wisely.

Participating students/teachers receive a kit containing a workbook/guide, high efficie cy showerhead, kitchen faucet aerator, bathroom faucet aerator, mini tape measure, digital thermometer, drip/rain gauge, flow rate test bag, natural resource fact chart, toilet leak detector tablets, and a GetWise™ wristband. There is no charge to the students or teachers for the program materials

"The program's hands-on activities allow students to calculate the average water use in their homes. Then, with parental guidance, they install the high-efficie cy fix ures provided in their student kits. Family water use information obtained from home water audits completed by the students allows Resource Action Programs to calculate the amount of water saved per household as a result of the retrofit," said HPWD Information/Education Supervisor Carmon McCain.

During the 2015-2016 academic year, the following statistics were noted:

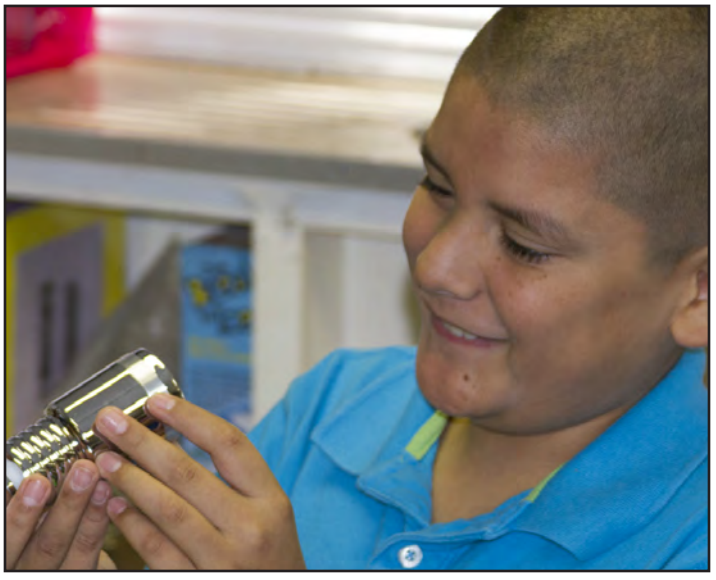
- The average student correctly answered 65 percent of the 10 question pre-program test questions.
- The average student correctly answered 81 percent of the 10 question post-program test questions.
- 72 percent of participants worked with their family on this program.
- 68 percent of participants said the program helped their family change the way they use water.
- 44 percent of participants said their family planned to change the way they used water outdoors.

The WaterWise™ program consistently gets passing grades from both teachers and parents each year.

One teacher said "the program materials were very thorough as was the reading material. Th s is something we could all enjoy—it is a very helpful topic."

A parent said the program "sparked the topic of water use in our home and the need for water conservation."

McCain said the program exemplifies he district's unoffic al motto that "water conservation is best accomplished through public education."



LOOKING AHEAD TO THE 85TH TEXAS LEGISLATURE

STORY BY VICTORIA MESSER WHITEHEAD

The 85th Texas Legislature will convene January 10, 2017, but state lawmakers have been busy for the past several months working through several interim charges from Speaker Joe Straus and Lieutenant Governor Dan Patrick.

MAJOR INTERIM CHARGE TOPICS

- Examination of the regional and state water planning processes.

- Monitoring the implementation of newly passed groundwater legislation.

- Monitoring the ongoing legal developments concerning ownership and access to groundwater and the impact of these developments on property rights and groundwater management.

- Conducting legislative oversight for agencies and programs under the committee's jurisdiction.

- Determining the sources of water used by Texans in agriculture production as well as the current delivery and conservation goals for such agriculture use.

Both House and Senate Committees extensively looked at groundwater management in Texas and how to effectively use policy to balance conservation, water management, and private property rights. The hearings offered big-picture analysis and instructive insight for legislators on the state of groundwater in Texas.

COMMITTEE HEARINGS

- House Committee on Natural Resources met February 2, 2016, April 26, 2016, and June 1, 2016.

- House Natural Resources Subcommittee on Special Issues met August 20, 2016 in Fort Stockton and August 21, 2016 in Del Rio.

- House Natural Resources Subcommittee Hearing on Private Property Rights in Water was held February 9, 2016 in Burleson.

- Senate Committee on Agriculture, Water & Rural Aff irs met December 8, 2015, May 23, 2016, June 20, 2016, and July 25, 2016

The committees will release interim reports detailing their fi dings in the upcoming months. These publications will shine a light on the important issues the Texas Legislature is likely to address this coming session.

HPWD staff a tively monitors all groundwater-related hearings and has been in communication with our representatives on the matters discussed.

STATE OFFICIALS IN HPWD SERVICE AREA

- Senator Kel Seliger, District 31.
- Senator Charles Perry, District 28.
- Representative Dustin Burrows, District 83 .
- Representative John Frullo, District 84.
- Representative John Smithee, District 86.
- Representative Four Price, District 87.
- Representative Drew Springer, District 68.
- Representative Ken King, District 88.

High Plains
Underground Water
Conservation District