The Waterline

Western Groundwater Management District No. 1

May 2016 Newsletter

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New Tool Gains Momentum

Water Conservation Areas (WCAs) provide water users with custom flexibilities

In April 2015, Kansas Governor Sam Brownback signed into law a bill allowing for Water Conservation Areas (WCAs), a simple, streamlined and flexible tool that allows any water right owner or group of owners the opportunity to develop a management plan to reduce withdrawals in an effort to extend the usable life of the Ogallala–High Plains Aquifer.

In the past, conserving Kansas groundwater resources has occurred through the establishment of Intensive Groundwater Use Control Areas (IGUCAs) and Local Enhanced Management Areas (LEMAs). While the underlying goals of WCAs, LEMAs and IGUCAs are similar — to conserve water resources and extend the usable life of the aquifer — WCAs allow an individual or group of water right owners to determine their own, personalized conservation plans.

There are many benefits to forming a WCA. Conserving water resources extends the usable lifetime of the water supply allowing for either a transition to limited irrigation or for continued beneficial use of the water for a greater length of time into the future. Participation within a WCA may also afford flexibilities that are not available to water right owners outside of a WCA. These flexibilities can be outlined in the WCA management plan and may include creating multi-year allocations, allowing the movement of allocations between enrolled water rights, or the allowing use of water for new uses. In addition, WCAs do not make any permanent change in enrolling water rights and can be limited in duration to allow water right owners to try out the controls.

To date, two WCAs have been completed with more under development. The first WCA was developed by the Franklin Family in Sherman County followed by the adoption of the second WCA by Syracuse Dairy LLC Westside Location in Hamilton County. Other individuals are evaluating their options to develop a WCA — ranging in use for irrigators to feedyards, northwest area of Kansas to the Equus Beds.

Learn more about WCAs on the Kansas Department of Agriculture website at agriculture.ks.gov/wca or call the KDA office at (785) 564-6700.

Local Enhanced Management Area (LEMA)

by Kyle Spencer (GMD1)

Legislation passed in 2012 gave groundwater management districts the authority to initiate a public hearing process to consider a specific conservation plan to meet local goals. The outcome of this policy is known as Local Enhanced Management Areas or LEMAs. To date, only one LEMA has been established in Sheridan County in GMD#4.

In 2014, GMD#1 presented a proposal to the stakeholders of the district for a six-year LEMA plan aimed at reducing decline rates and extending the life of the Ogallala Aquifer. Even though the overall vote count in 2014 was against forming the LEMA (158 in favor versus 173 against), three out of the five counties were in favor of the proposal, with Greeley County narrowly defeating the proposal (9 versus 10).

Using information and feedback from the first proposal, as well as data and findings from the recently completed groundwater model, GMD#1 is revisiting the development of a LEMA proposal. Public information and input meetings are planned throughout the district this fall to assist GMD#1 staff and the board of directors in developing an updated LEMA proposal. Plan to attend a board meeting this fall to learn more and share your feedback. Refer to the calendar on the GMD#1 website (www.gmd1.org) for meeting schedules.

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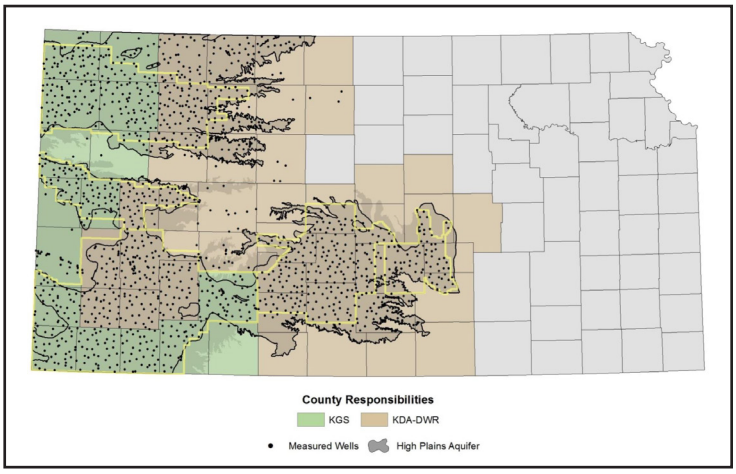
Water Level Trends

by Brownie Wilson (KGS)

Preliminary results from the annual groundwater level measurements are encouraging for GMD#1. Average water levels in the District saw a decline of 0.04 feet this past year compared to a decline of 0.67 feet from 2014 to 2015. Some of the improved conditions can be attributed to above average precipitation in the District with some areas receiving more than 150% of the annual normal rainfall.

As part of an annual cooperative program, the Kansas Geological Survey measures more than 500 wells each year and the Kansas Department of Agriculture Division of Water Resources measures about 900 wells. The collective information gained by measuring the 1400 wells across the Ogallala aquifer is used to identify groundwater changes in western and central Kansas. According to the KGS, "Wells are monitored with the permission of the landowners, who can use the collected data to make decisions about drilling and water use. The data also are used by state agencies to determine water appropriations and by groundwater management districts, municipalities, businesses and the public. A compilation of the annual measurements shows how the aquifers behave over time under varying climatic and pumping conditions."

At the GMD#1 annual meeting held on March 8 in Horace, Brownie Wilson, water data manager at the KGS, shared the preliminary results of the annual water level measurements. In his presentation Brownie shared maps of the change in saturated thickness across the District, noting that some areas have experienced a 50% decline in saturated thickness while other areas have seen only a 10% decline since 2004. To view these maps and Brownie's full presentation, visit the GMD website at www.gmd1.org.



2016 Cooperative Well Network (Kansas Geological Survey)

Regional Conservation Partnership Program (RCPP) for Advanced Irrigation Water Management on the High Plains Aquifer in Kansas

by Scott County NCRS Office

The Regional Conservation Partnership Program (RCPP) promotes coordination between the Natural Resources Conservation Service (NRCS) and its partners to deliver conservation assistance to producers and landowners. Kansas was successful in bringing some of the first projects under the RCPP program to our state — ranging from a forestry initiative and water quality projects in eastern Kansas to an irrigation water management project on the High Plains aquifer.

Southwest Groundwater Management District No. 3 is the lead partner for this RCPP but all GMDs are eligible to participate in the cost-share project. This project provides producers and crop consultants with telemetry-enabled soil moisture probes, water metering, and evapotranspiration measurement for near real-time monitoring.

Applications for these RCPP funds are considered high priority if a pumping rate at least 4.5 gallons per minute per acre will be supplied to each center pivot and an NRCS irrigation water management plan is developed. Applications are ranked and additional points are awarded to applicants located within a Local Enhanced Management Area (LEMA), Intensive Groundwater Use Control Area (IGUCA), or Water Conservation Area (WCA).

Additional information about the Irrigation Management RCPP can be found on the Kansas NRCS website.

Upcoming Dates:

June 21
GMD1 Board Meeting
District Office, 9:00 AM

July 19
GMD1 Board Meeting
District Office, 9:00 AM

July 19
GMD1 Budget Hearing
District Office, 10:00 AM

August 16
GMD1 Board Meeting
District Office, 9:00 AM

September 20
GMD1 Board Meeting
District Office, 9:00 AM

October 18
GMD1 Board Meeting
District Office, 9:00 AM

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District Groundwater Model *by Brownie Wilson (KGS)*

Kansas has a wealth of data about the Ogallala aquifer including annual water level measurements, driller's logs and reported water use submitted by water right owners each year. In each of the GMDs, this data helps develop computer models that simulate, and in some cases predict, aquifer conditions.

The model developed by the Kansas Geological Survey for GMD#1 is one of the most sophisticated groundwater models in the state, capable of assessing delayed recharge and demonstrating high correlations between simulated and observed aquifer conditions. At the GMD#1 annual meeting held March 8 in Horace, Brownie Wilson, water data manager at the KGS, shared the results of five basic scenarios.

Each scenario was run for 65 years starting in 2014 and repeated the climatic conditions experienced from 1947 to 2013. The selected years capture the drought of the 1950s and allow the model to evaluate how the aquifer may react to these drought conditions in the future. The five scenarios were evaluated in the model to identify how aquifer conditions may change in the future under these settings: no change in water policy (status quo), no irrigation pumping within GMD#1, irrigation reduced by 20%, irrigation reduced by 30%, and irrigation use capped at 12 and 16 inches per acre. The model is designed to shut off groundwater pumping when future local conditions show a water level that is 5% of the cell's thickness and if the transmissivity is less than 1000 cubic feet per day.

As presented by Wilson at the GMD#1 annual meeting, the greatest response in aquifer conditions as predicted from the model was under the "no pumping" scenario. Under this scenario, aquifer storage increased substantially for 20 years before gains became small and static. Wilson compared these results with the "status quo" scenario that simulated relatively static pumping in the next 10 years followed by declines in pumping as wells begin to meet the 5% thickness or 1000 cubic feet per day of transmissivity threshold. Under the "status quo" only about one-third of pumping could continue by 2080.

Simulating conditions that occur if pumping were to be reduced by 30% showed that future water level declines could be decreased 47% in the next 20 years (-5.62 feet decline compared to -3.47 feet in the reduced pumping scenario). Similar results were generated when future max pumping rates were limited to 12 inches per acre. Visit www.gmd1.org to view Wilson's presentation.

Western Kansas Weather Modification Program

by Walter Geiger, Meteorologist

The Western Kansas Weather Modification Program (WKWMP) began its 42nd consecutive season of operations this spring. The program will operate for roughly five months this year, April 16th through September 15th. The program's objectives remain unchanged: to reduce hail and optimize rainfall over a portion of western and southwestern Kansas. The sources of funding this year are from participating counties and the Western Kansas GMD #1 in Scott City. The District is the WKWMP administrator who owns all the equipment and hires the personnel. This year, the target area consists of two participating counties: Scott and Lane.

Walt Geiger, Program Meteorologist (15th year) will direct seeding operations from the office at the Kearny County Airport. Program Pilots this year include Kyle Spencer out of Scott City flying either cloud top or cloud base depending on storm severity and flight conditions and Scott Bryant (10th year) out of Lakin will fly cloud base.

Visit www.gmd1.org/index-3.html to learn more about the program and view the weekly newsletter.

Regional Vision Water Supply Goal

by Shane Mann (Upper Smoky Regional Advisory Committee) and Tracy Streeter (KWO)

The Vision for the Future of Water Supply in Kansas calls for the establishment of goals by local stakeholders in each region of the state to define their future water supply needs and provide a benchmark for determining success. Each of these 14 regions have developed and presented their local goals to the Kansas Water Authority and are working to create action plans to achieve them.

The Upper Smoky Hill regional planning area includes all of GMD#1 and the area between the GMD#1 northern boundary and the southern boundary of GMD#4. GMD#1 board member Danny Welsh serves on the Regional Advisory Committee (RAC) for this region. The following five goals were developed by the Upper Smoky Hill RAC to address conservation from a variety of water users:

1. By 2025, reduce irrigation use by 25 % based on recent average pumping history per water right. Allow water right transfers and other flexibilities as long as a net reduction is achieved. In addition, annual water use for all irrigation users will not exceed net irrigation requirement for that county.

2. Develop and implement water reduction plan by January 2016. Short term: Reduce the rate of depletion of the aquifer in five years to sustain the economy and begin implementation of conservation immediately. Long term: Evaluate success every five years, to determine if conservation measures are achieving a reduced rate of depletion. (Rationale: Within each five-year evaluation period new technologies and crop varieties as well as additional sources of supply will be more available.)

(Continued)

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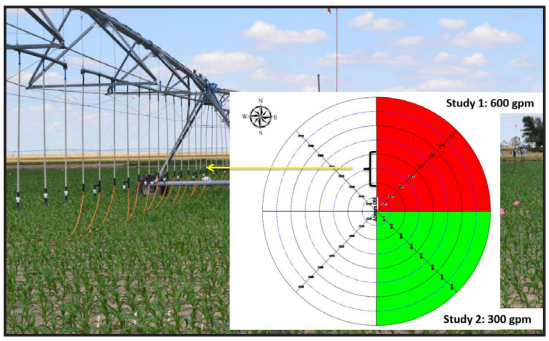
Mobile Drip Irrigation & Soil Moisture Sensors

by Jonathan Aguilar (K-State Research and Extension)

Promotion of irrigation efficiency technologies is an important strategy identified in The Vision for the Future of Water Supply in Kansas. Success with this strategy relies on coordination among technology manufacturers, university researchers and groundwater management districts — actions that are actively under way in GMD#1. At the GMD#1 annual meeting held on March 8 in Horace, Jonathan Aquilar, water resource engineer with K-State Southwest Research and Extension, shared research updates related to mobile drip irrigation and soil moisture sensors.

During his presentation, Aquilar shared results comparing evaporation water losses under mobile drip irrigation (MDI (DragonLine)) with Low Elevation Spray Application (LESA). Results also included a comparison of yield, water productivity, irrigation water use efficiency and end of season soil water under the two different irrigation systems. In the first year of assessment, K-State found that average daily soil evaporation was less under the MDI (1.0 mm/day) compared to LESA (1.6 mm/day). Corn yield were compared under a 300 gallon per minute (gpm) well and a 600 gpm well, employing both irrigation technologies. Corn yield under the 600 gpm well for 2015 was 247 bushels per acre (bu/ac) for MDI and 255 bu/ac for LESA. Corn yield under the 300 gpm well for 2015 was 243 bu/ac for MDI and 220 bu/ac for LESA. Water productivity (an assessment of the economic yield versus water use) and irrigation water use efficiency was nearly the same under the 600 gpm well and was higher for MDI under the 300 gpm well. End of season soil water was found deeper in the soil profile for MDI under both capacity wells.



Experimental layout comparing mobile drip irrigation to low elevation spray application (K-State Research and Extension)

Aquilar also provided an update and findings for an on-farm soils moisture sensor demonstration. The purpose of the demonstration was to show various management tools that have been successful in a research environment, encourage other irrigators to consider these tools, and evaluate the effectiveness of soil moisture sensors as a cost effective irrigation water management tool. The demonstration was a cooperative project among the Kansas Department of Agriculture Division of Conservation and Division of Water Resources, Servi-Tech Laboratories and K-State. First-year results showed the soil moisture sensors corroborate closely with neutron probe readings indicating that the sensors are effective in assessment of soil moisture conditions.

Aquilar shared that in the demonstration, use of the sensors did not result in water conservation during the first year, possibly due to an irrigator's reluctance to make irrigation decisions based on the sensors. Aquilar shared the findings of another account where soil moisture sensors did result in conservation. This was from a farmer in Northwest Kansas who installed soil moisture sensors last year and was able to turn off his irrigation system for 30 days around July without yield loss. Key to his success, according to Aquilar, was that the soil sensor readings were used in conjunction with an evapotranspiration (ET) based scheduler.

Aquilar summarized a "take-home message" from the presentation by stating that soil moisture sensors are a great tool in irrigation management if installed properly, used in conjunction with an ET based scheduler, and the irrigator takes advantage of the information. To view the full presentation visit www.gmd1.org.

Regional Water Supply Goal (Cont.)

3. All municipal users within the planning region will be at or below the regional 2015 average gallons per capita per day (GPCD) within the next five years. All municipal users as defined by the Kansas Water Appropriation Act in planning area will follow best management practices and implement a conservation plan.

4. Maximum water use per head will be maintained as defined by the Kansas Water Appropriation Act. Stockwater allocations as defined by Kansas Water Appropriation Act will implement best management practices and be as efficient as possible. Measure the implementation of this goal by a 15% increase in the adoption of practices (overflow reuse, etc.) management practice plans within the next five years.

5. Industrial users and all other beneficial uses of water will develop best management practice plans to be as efficient as possible. By 2020, all industrial users will have a best management practice plan and the adoption of practices will increase by 15%.

At the April 4 meeting of the Upper Smoky Hill RAC in Scott City, members discussed several action items to achieve these goals, including encouragement of Water Conservation Areas (WCAs) and a Local Enhanced Management Area (LEMA). Key to success in meeting these goals, according to the discussion of the RAC members, is information and education. The RAC identified several possible actions such as newsletters and a town hall water educational event.