



Summer 2019

Volume 33, Issue 3

Tri-Basin Topics

A quarterly publication of Tri-Basin Natural Resources District

Tri-Basin NRD Launches Water Conservation Incentive Program

Tri-Basin Natural Resources District (TBNRD) has established the Water Conservation Incentive Program (WCIP), which is designed to ensure sustainability of groundwater supplies in the district and protect streamflows from being diminished because of groundwater pumping. The goal of this voluntary program is to reduce groundwater pumping and increase irrigation water use efficiency in the district.

Tri-Basin NRD will allow a total of up to 8,000 NRD-certified irrigated acres to be enrolled in WCIP. During the enrollment period for the 2019 growing season, the board of directors approved the enrollment of 1,449 acres in WCIP. Since the enrollment limit was not reached, applications are now being taken for WCIP for the 2020 growing season. Once the 8,000-acre enrollment limit is reached, water savings to the district could reach 650 acre-feet per year.

Participants in the program sign a five-year agreement with TBNRD to voluntarily limit irrigation water use (accept an allocation) on the enrolled acres. The allocation is equal to the University of Nebraska-Lincoln average corn crop consumptive irrigation requirement, which is nine inches per acre per year in Kearney County, ten inches per acre per year in Phelps County, and eleven inches per acre per year

in Gosper County (allocation will be limited to current allocation of nine inches per acre per year in Union Township in Gosper County). WCIP participants are also required to have flowmeters installed on all wells serving participating parcels and to report water use annually to the NRD.

In exchange for their participation, landowners will be paid for the equivalent of one acre-inch of water credit up to \$5 per acre per year, with the opportunity to sell additional credits to the NRD at a set price. In addition to NRD purchases, landowners will have the opportunity to sell water credits on the open market at any agreed-upon price. (Private transactions require TBNRD board approval.) Tri-Basin NRD will maintain an "electronic bulletin board" to facilitate connections between buyers and sellers. Landowners will also be allowed to irrigate any acres within enrolled parcels and to share (or pool) allocations across the enrolled acres under their ownership. In order to share or pool allocations among parcels under different ownership, landowners will be required to establish pooling agreements.

Landowners and irrigators can find out more specific information about Tri-Basin NRD's Water Conservation Incentive Program by calling the district office at 1-877-995-6688 or by visiting the district's website: www.tribasinnr.org.



"Dedicated to Conservation of our Natural Resources"

<http://www.tribasinnr.org>



Manager's Message

by John Thorburn

How Old is Your Water?

Scientists estimate that the Earth is about 4.5 billion years old, give or take a couple hundred million years. A number of different techniques were used to arrive at that number, but a very important method for dating old rocks is radiometric dating.

This technique analyzes the rate of decay of certain radioactive elements. Some elements decay from higher to less radioactive states at known, measurable rates. For that reason, these isotopes act as natural atomic clocks, which provide geologists with approximate ages of rocks and soils. You wouldn't want to rely on these isotopes to tell you when its time to get up and go to work or school, however. Most elements used to date the age of rocks can provide dates that are accurate plus or minus hundreds or even thousands of years.

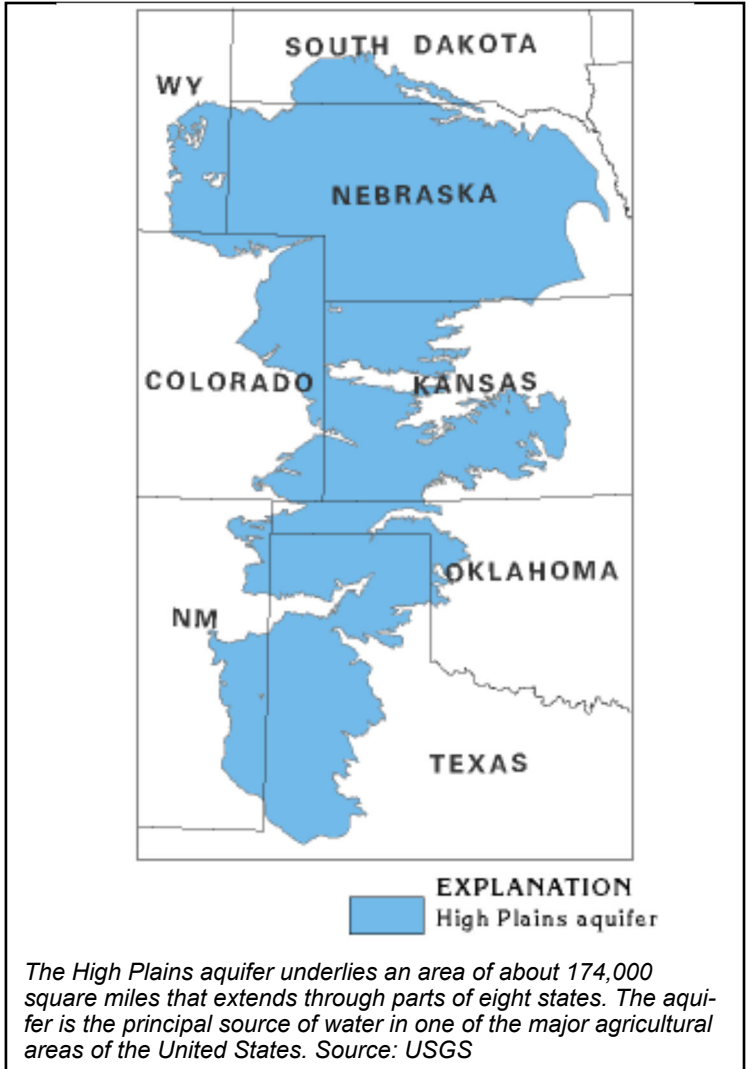
The most well-known isotopic time marker is carbon 14. This form of carbon is found in burned wood. It is very useful for archaeologists who want to date items or sites that are at least a few hundred years old, but no more than 40,000 years old. Carbon 14 dating techniques vary in accuracy, but results usually have error bandwidths of tens or hundreds of years.

Time markers in sediments can be used to calculate the rates of erosion and sedimentation of rocks, which in turn provide clues about past precipitation and climate. If such time markers can be identified in water, we can calculate the rate at which water moves downward through soil to the aquifer. This data is critical to determining how much water can safely be removed from an aquifer without depleting it.

Estimating the age of solid objects like rocks or pottery shards is difficult. Dating liquids like groundwater was long thought to be impossible. Groundwater moves slowly, but it does move both horizontally and vertically through sand and gravel aquifers and even denser rock. When it moves, water from different sources and different ages gets mixed together.

As long as a century ago, using relative dating, geologists deduced from overlying rock formations that some aquifers contain "fossil" water that was trapped underground thousands, even millions of years ago. As nuclear physics and radiological studies advanced after World War II, scientists identified certain exotic elements, like Krypton, that remain stable in liquids and can be used to date water within certain age ranges.

Those of us who manage groundwater as a profession are usually most interested in relatively recently-deposited groundwater, which may be just a few decades old. This groundwater is in shallow aquifers, aquifers that are pumped for irrigation and which influence streamflows. Dating of relatively new groundwater can be accomplished, thanks to a rare hydrogen isotope that was literally blasted into the upper atmosphere during atomic bomb tests by the USA and Soviet Union from the 1940s to 1960s. This compound is called Tritium and it is composed of three hydrogen atoms that are bound together. The half-life of tritium is 12.32 years. Tritium decays into a form of helium, so we can learn the approxi-



mate age of groundwater by comparing the ratio of hydrogen to helium in groundwater samples. This technique can be used to date groundwater less than 75 years old.

Tri-Basin NRD, Little Blue NRD and the University of Nebraska Conservation and Survey Division are working together on a project that will help us to learn the age of groundwater, and therefore its rate of recharge, in eastern Kearney and western Adams counties. Radiometric dating using tritium will be a key component of this research. Even nuclear mushroom clouds have silver, or in this case, tritium-laced, linings.



Nebraska was only three percent forested at the time of settlement by European immigrants in the 1800s. But our state is home to relic boreal species such as birch and aspen brought here with the last ice age, more than 10,000 years ago.

Source: Nebraska Statewide Arboretum

Tri-Basin NRD Welcomes Summer Interns



Grant Edgcombe and Zach Temple are Tri-Basin NRD's 2019 summer interns.

Tri-Basin NRD has hired two interns to work out of the district office this summer: Grant Edgcombe and Zach Temple.

Grant is from Minden and is a student at Chadron State College, where he is studying Rangeland Wildlife Management. At Chadron, he is involved in track and field and is a member of the Chadron State College Wildlife Club. His interests include hunting, fishing, sports, and playing golf.

Zach, from Holdrege, attends the University of Nebraska-Lincoln and is studying agronomy and history. His activities include Alpha Gamma Rho Fraternity and Phelps County 4-H Council. Zach is also involved in Trinity Evangelical Free Church in Holdrege. In his free time, he enjoys sports, shooting sports, and NASCAR. This is Zach's second summer as a TBNRD intern.

Grant and Zach say that their favorite part (so far) about being an intern at TBNRD has been spending time outdoors and seeing wildlife. They have not been as fond of studying for groundwater technician training or rainy day projects.

Tri-Basin NRD has been employing interns during the summer for 21 years. The district's internships give college students an opportunity to gain natural resources management

experience. Interns collect and test groundwater quality samples, monitor wildlife habitat, test irrigation system efficiency, and help maintain drainage improvement project areas (IPAs). The interns also work with staff from Central Nebraska Public Power and Irrigation District, and the USDA Natural Resources Conservation Service.

Many of the district's former interns have pursued careers in agriculture and natural resources, taking jobs with agribusinesses, NRDs, NRCS and various state agencies. Dalton Refior, TBNRD's current Land Resources Technician, spent three summers working as a district intern.

Check Flowmeters Regularly

Check flowmeters on your wells periodically throughout the irrigation season. Making sure that your flowmeters are working properly benefits both Tri-Basin NRD and you, as an irrigator, so that you can keep accurate irrigation records. It is the responsibility of producers to make sure flowmeters function properly during the irrigation season.

Groundwater Management Area Reporting Reminders

Tri-Basin NRD Groundwater Management Rules have brought reporting requirements to additional areas of the district over the past year. Here are some reminders of which areas are affected and what is expected of landowners in these townships.

Groundwater Quantity Management (Water Use)

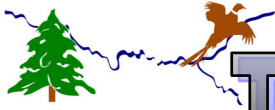
May Township, Kearney County (6N-13W): Flowmeters must be installed on all irrigation wells by December 2018 for the 2019 growing season

Grant Township, Kearney County (5N-13W): Flowmeters must be installed on all irrigation wells by December 2021

Groundwater Quality Management (Nitrogen Management/GMA)

Blaine Township, Kearney County (7N-16W): All sections are now included in the GMA area. Water and soil samples should have been taken in 2018. Results from those tests will be used on Nitrogen Management Reports in fall of 2019.

Anderson Township, Phelps County (7N-17W): All sections are now included in the GMA area. Water and soil samples must be taken in 2019 and results used on Nitrogen Management Reports in fall of 2020.



Summer 2019

Tri-Basin Topics



Tri-Basin Natural Resources District
1723 Burlington St. Holdrege, NE 68949
(308) 995-6688
email: tribasin@tribasinprd.org
www.tribasinprd.org

RETURN SERVICE REQUESTED

Nebraska's NRDs: Protecting Lives, Protecting Property, Protecting the Future

CALENDAR

July 4 NRD Closed for Independence Day
 July 9 NRD Board Meeting, 1:30 p.m.*
 July 20-25 Phelps County Fair
 July 25-27 Gosper County Fair
 August 9-11 Kearney County Fair
 August 13 NRD Board Meeting, 1:30 p.m.*
 August 23-September 2 Nebraska State Fair
 September 2 NRD Closed for Labor Day
 September 10 NRD Board Meeting, 7:30 p.m.*
 September 10-12 Husker Harvest Days
 September 19 Rainwater Basin Conservation Day

* Times are tentative. All meetings are at TBNRD office in Holdrege unless otherwise noted.

TRI-BASIN NRD BOARD OF DIRECTORS

Bradley Lundeen, Chairman	Wilcox
Todd Garrelts, Vice Chairman	Holdrege
Robin Hinrichs, Treasurer	Axtell
Joe Bilka, Secretary	Holdrege
Brian Bergstrom	Axtell
Mike Cavanaugh	Minden
Ed Harris	Loomis
Phyllis Johnson	Bertrand
Greg Jorgensen	Minden
Joe Larson	Loomis
David Olsen	Minden
David Raffety	Kearney
Larry Reynolds	Lexington

TRI-BASIN NRD STAFF

Amy Dutton	Minden Office Secretary
Tammy Fahrenbruch	Water Programs Coordinator
Lori Hagan	Elwood Office Secretary
Nolan Little	Water Resources Manager
Carie Lynch	Administrative Secretary
Nate Munter	Land Resources Coordinator
Patrick Nott	Water Resources Technician
Tami Reese	Holdrege Office Secretary
Dalton Refior	Land Resources Technician
Nicole Salisbury	Information & Education Coordinator
Esther Smith	Office Assistant
John Thorburn	General Manager
Jeff VanEperen	Field Technician

A mailing list is maintained and requests to be placed on the list should be sent to the above address. Comments and suggestions may be addressed to the General Manager.

Get Tri-Basin Topics in your inbox instead of your mailbox!

To request an electronic version of this newsletter, send an email nsalisbury@tribasinprd.org.