

JULY 2022 | Southern Iowa Rural Water Association

QUENCH

news by the glassful

AQUIFERS OF IOWA

Part 2; Other Types of Aquifers



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on the cover

Enjoy Iowa's Lakes and Streams responsibly by cleaning, draining and drying off your boat, fishing gear and bait buckets.



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LOTS OF PROGRESS

AT THE *NEW*, WATER
TREATMENT PLANT
CONSTRUCTION SITE



1. View from the south. 12-Mile Lake is in the background.
2. Treatment Plant from the North.
3. Treatment Plant from the West.
4. 2-million-gallon ground storage; view from the north.

SOUTHERN IOWA RURAL WATER ASSOCIATION ANNUAL MEETING

Southern Iowa Rural Water Association (SIRWA) held their 47th annual meeting on Wednesday, May 18, 2022, at the Supertel Inn & Conference Center located in Creston. Coffee and cookies were served to the 25 members in attendance. Four members attended virtually.

Ben Winters with TD&T, CPAs & Advisors, P.C. presented the audit of the 2021 financial statements. An unmodified report was issued citing no significant deficiencies or material weakness.

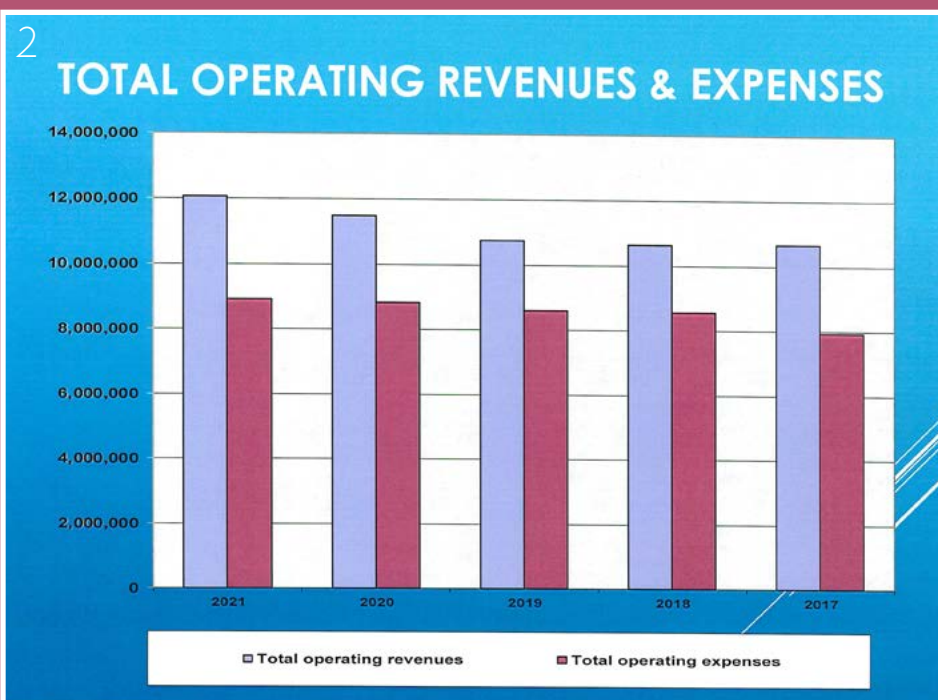
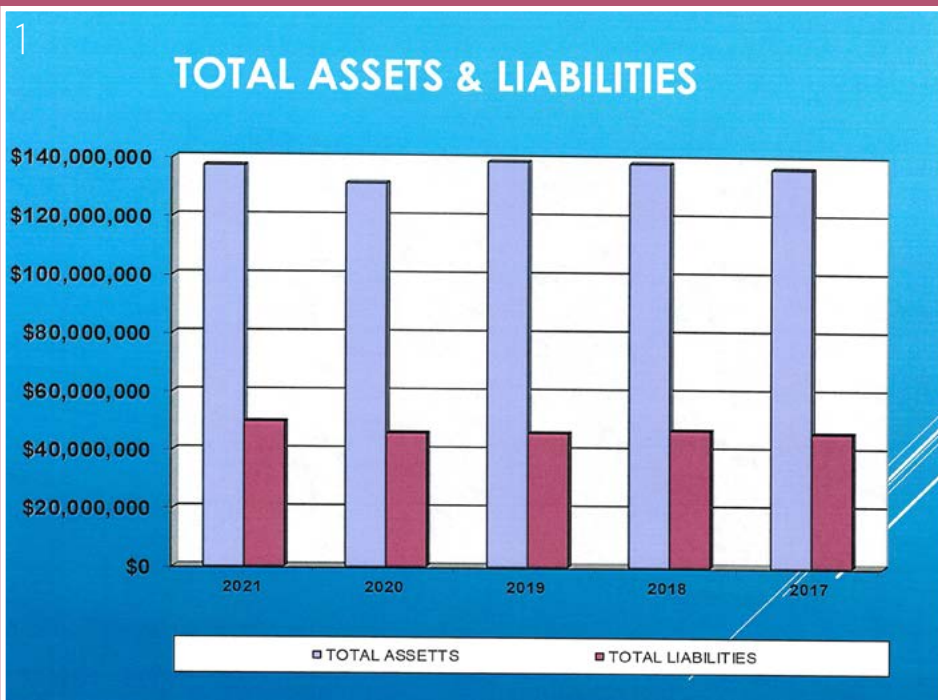
Brenda Standley, Co-General Manager reported that SIRWA concluded 2021 with assets of \$137,293,408 and liabilities of \$49,693,308. Operating revenues were \$12,056,902 with total expenses of \$8,926,435. The year end net position was \$87,566,938, an increase of just over \$2 million from the prior year. (1 – 2)

Aby Bauer, Office Manager, discussed the following changes being implemented that will affect customers.

- SIRWA will be doing away with the tiered rate system and will change to a flat rate of, \$10 per 1,000 gallons effective January 1, 2023. The minimum gallon charges for both rural and city customers will still apply.
- Effective January 1, 2023, SIRWA will no longer accept tax exemption certificates. It will then be up to customers to claim the tax refund.
- Effective August 1, 2022, when rental properties change occupancy, water accounts will be required to stay in the landlord's name for billing purposes.

Jeff Rice, Co-General Manager reviewed construction progress of SIRWA's 6.0 MGD water treatment plant. The project is currently on schedule for completion of construction in November of 2023 and operational by the end 2023.

SIRWA is also taking part in the rehabilitation project at 3-Mile Lake. Plans are to make improvements to watershed management, in lake restoration, shoreline armoring, wind/wave protection at the dock area, shoreline fishing access and fish habitat. The total cost of the project is \$3.3 million and SIRWA has contributed \$45,000 to date. Project completion is scheduled for March of 2024.



As a member of the Clarke County Reservoir Commission, Jeff reported that all of the land has been purchased and easements signed for construction of the new lake. Engineers are currently working on an updated design and are confident that funds will be available for construction.

Matt Schultz, Operations Manager, provided an overview of system totals. (3 – 4)

System upgrades in the upcoming year will be replumbing pump station piping from PVC to ductile in pressure zones affected by the construction of the new, 1-million-gallon tower. New flow detection equipment in sewer lift stations will also be upgraded for more accurate lagoon inflow readings.

Chad Mahan, Construction Manager, reported that SIRWA sold 1,304,229,818 gallons of water in 2021. This is up nearly 20 million gallons from 2020. SIRWA also tracks water loss according to gallons supplied, gallons billed and gallons for leaks and flushing to determine the unaccountable loss. That loss for 2021 roughly 9.63%.

Other system projects completed were moving the Southwest Taylor pump station above ground. This is the 4th pump station that has been moved above ground in the past few years. To conclude, we will be constructing a new pump station in the City of Davis City.

The terms of board members representing Decatur County and Union County were up for election. The incumbents for both counties were re-elected to fill those positions. Larry Griffin will remain on the Board representing Decatur County and Chad Malmanger will remain on the Board as representative for Union County. (5 – 6)

This year's recipient of SIRWA's Friend of Rural Water Award was Dan McIntosh. Dan retired from SIRWA at the end of 2021 after 32 years of service. He filled the role of General Manager from 2003-2021. Dan was always looking for ways to keep SIRWA on the forefront of expansion and system upgrades. Dan sat on the Board of Directors for Iowa Rural Water and was inducted into the Iowa Rural Water Hall of Fame in February of 2022. Many thanks to Dan for his dedication to rural water. (7)

3

SIRWA DISTRIBUTION SYSTEM

Water Towers	39
<i>Our 40th tower is currently under construction</i>	
Pump Stations	33
Sewer Lagoons	17
Sewer Lift Stations	18
Miles of Water Main	4,100

4

2021 END OF YEAR SYSTEM TOTALS

<u>2020</u>	<u>2021</u>	
8,490	9,241	Rural Customers
2,834	2,227	City Customers
7	7	Bulk Customers
11,331	11,475	Water Customers
1,393	1,386	Wastewater Customers



Larry Griffin



Chad Malmanger



Dan McIntosh

WHAT CAN YOU DO TO HELP WITH NUTRIENT REDUCTION?

LAWN CARE

- Apply fertilizers only when necessary and at the recommended amount.
- Don't apply fertilizer before windy or rainy days.
- Apply fertilizer as close as possible to the period of maximum uptake and growth for grass and other plants, which is usually spring and fall in cool climate, and early and late summer in warm climates.
- Avoid applying fertilizer close to waterways.
- Do not overwater lawns and gardens; use a soaker hose, a porous hose that releases water directly to the ground, which can reduce overwatering that carries away fertilizers that would otherwise enrich lawns and gardens.
- Fill fertilizer spreaders on a hard surface so that any spills can be easily cleaned up.
- Properly store unused fertilizers and properly dispose of empty containers.
- Maintain your lawn mowers, snow blowers, chain saws, leaf vacuums and similar outdoor power equipment to reduce nitrogen oxide emissions.



GARDEN CARE

- Plant a rain garden of native plants, shrubs and trees that reduce the amount of fertilizer needed and provide a way for water to soak into the ground.
- Install a rain barrel to collect rainwater; the rainwater can later be used to wash your car or water your plants and lawn.
- Adopt techniques that utilize natural processes to manage stormwater runoff and reduce the impact of impervious surfaces on water quality.
- Use pervious pavers for walkways and low traffic areas to allow water to soak into the ground.
- Install a green roof on your home or business.
- Incorporate best management practices, such as grassed swales, filter strips, or buffer strips on your property to control and temporarily store stormwater runoff.
- Use yard waste, which includes grass clippings and leaves, in mulch or compost for your garden. If this is not an option, prepare all clippings and leaves for community composting, or in barrels or secured paper bags for disposal, which keeps them from washing into streams.



CLEANING SUPPLIES- DETERGENTS AND SOAPS

- Choose phosphate-free detergents, soaps, and household cleaners.
- Select the proper load size for your washing machine.
- Only run your clothes or dish washer when you have a full load.
- Use the appropriate amount of detergent; more is not better.



PET WASTE

- Always pick up after your pet.
- Avoid walking your pet near streams and other waterways. Instead, walk them in grassy areas, parks or undeveloped areas.



- Inform other pet owners of why picking up pet waste is important and encourage them to do so.
- Take part in a storm drain marking program in your area to help make others aware of where pet waste and other runoff goes when not disposed of properly.

SEPTIC SYSTEMS

- Inspect your septic system annually.
- Pump out your septic system regularly. (Pumping out every two to five years is recommended for a three-bedroom house with a 1,000-gallon tank; smaller tanks should be pumped more often).
- Do not use septic system additives. There is no scientific evidence that biological and chemical additives aid or accelerate decomposition in septic tanks; some additives can in fact be detrimental to the septic system or contaminate ground water.
- Do not divert storm drains or basement pumps into septic systems.
- Avoid or reduce the use of your garbage disposal. Garbage disposals contribute unnecessary solids to your septic system and can also increase the frequency your tank needs to be pumped.
- Don't use toilets as trash cans. Excess solids can clog your drainfield and necessitate more frequent pumping.
- When installing a septic system, maintain a safe distance from drinking water sources to avoid potential contamination. Avoid areas with high water tables and shallow impermeable layers.
- Plant only grass in the drain field and avoid planting trees, bushes, or other plants with extensive root systems that could damage the system's tank or pipes.
- Visit EPA's Septic Smart website to learn more about how your septic system works and simple tips on how to properly maintain it. You can also find resources to launch a local septic education campaign.



WASHING YOUR CAR

- Use a commercial car wash; commercial car washes are required to properly dispose of wastewater and many filter and recycle their water.
- If washing your car at home wash your car on a pervious surface such as grass or gravel (not concrete or asphalt) so water is filtered before reaching a water body.
- Use nontoxic, phosphate-free soaps.
- Use soap sparingly.
- Minimize runoff by reducing water use, using a spray nozzle to restrict water flow.
- Wring out sponges and rags over the bucket or in a sink, not the ground.
- Empty wash water into the sink or toilet, or the grass if you wish to dispose of it outside.
- Use waterless car wash products for spot-cleaning or a car wash kit, which redirects water from storm drains.
- When conducting car wash fundraisers use a car wash kit; many cities will lend kits free of charge to groups conducting car washes for fundraising, or you can buy car wash kits.



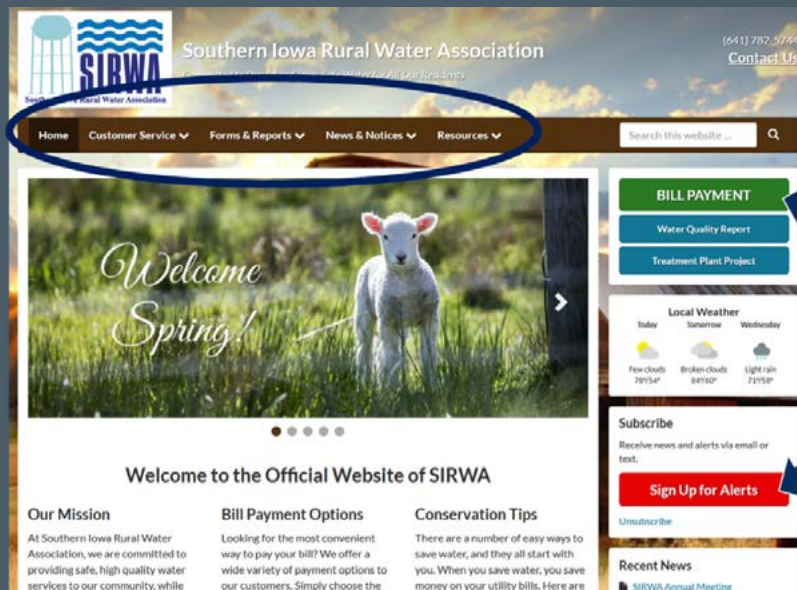
Consumer Confidence Report (CCR)

The United States Environmental Protection Agency (US EPA), requires public water supply systems to provide a yearly Consumer Confidence Report (CCR) to their customers. These reports provide consumers information about their drinking water and are a guide to the quality and safety of the water provided by Southern Iowa Rural Water Association (SIRWA). They also are meant to improve public health protection by providing educational material to allow consumers to make educated decisions regarding any potential health risks pertaining to the quality and treatment of their drinking water supply. Your water is thoroughly treated and has been tested for harmful and potentially harmful substances and has met or exceeded drinking water quality standards set by the US EPA and the State of Iowa Department of Natural Resources (IA DNR). The US EPA and IA DNR set drinking water standards to define the limits of contaminants considered safe for drinking water. These levels are based on studies of the health effects associated with each contaminant and include a sufficient safety margin to ensure that water meeting these standards is safe for nearly everyone to drink. SIRWA purchases and redistributes its water supply from five sources. Your June bill provides a web page link specifically for the supply source of your water which can be viewed and printed from our website at www.sirwa.org. CCR reports are also available at our office or customers may request a copy by mail if they are interested.



Check out our website!

www.sirwa.org



AQUIFERS OF IOWA

PART 2 | Other Types of Aquifers

Aaron Schroeder – Source Water Protection Specialist – Iowa Rural Water Association

As discussed in Part 1 of this article from the January 2022 issue of QUENCH Magazine, quality and availability of water can vary greatly across Iowa. In some areas, bedrock aquifers provide an adequate amount of good quality water. In many areas, other aquifers/water sources must be considered. Much of the material in this article is sourced from a publication called “Iowa’s Groundwater Basics” as well as a presentation by Iowa Department of Natural Resources Geologist Chad Fields at the Iowa Rural Water Association’s 2019 Annual Conference. A digital version of Iowa’s Groundwater Basics is available online and is a great resource for anyone interested in learning even more about groundwater and aquifers.

BACKGROUND

Over time, precipitation and runoff permeates the ground beneath the earth’s surface. Water slowly fills up pore spaces in sediment, sand, gravel, and bedrock. The resulting saturated material beneath the earth’s surface is known as an aquifer. In Iowa, water from aquifers has

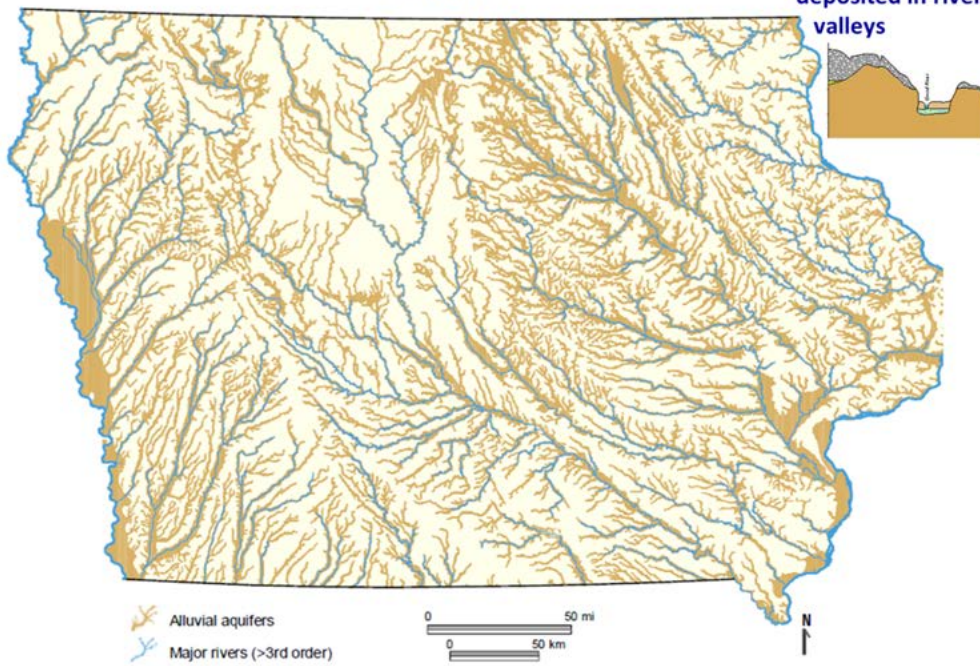
many purposes including irrigation, industrial use, and most importantly—drinking water. Properties including the type of rock or material that makes up the aquifer, age of the water, and aquifer depth can have an influence on the characteristics and accessibility of water in an aquifer. In Iowa, aquifers take many forms including porous and permeable bedrock, saturated material adjacent to rivers and streams, and buried sand and gravel deposited by ancient river channels. There are benefits and drawbacks associated with each type of aquifer. Part 1 of this article from the January 2022 issue of QUENCH Magazine focused on bedrock aquifers in Iowa. This article will focus on other types of aquifers and water sources in Iowa.

ALLUVIAL AQUIFERS

Water-bearing sand and gravel deposits along river valleys are known as alluvial aquifers. In Iowa, the sediment that makes up alluvial aquifers can vary from fine sand along rivers deposited during recent flooding events to large sediment left behind by glacial meltwater thousands of years ago. Wells in these alluvial aquifers are often less than 100 feet in depth, in contrast to bedrock wells can be over 2000 feet deep in parts of Iowa. Alluvial aquifers often

Alluvial Aquifers of Iowa

Sand and gravel deposited in river valleys



serve as water sources for some of the larger public water supplies in Iowa. When stream flow is normal, water in alluvial aquifers is plentiful and easily accessible. Alluvial aquifers are the thickest and most productive along the Mississippi and Missouri rivers, where they can reach up to 150 feet in thickness and yields can be as high as 2000 gallons per minute. In locations such as central and western Iowa, where accessing bedrock aquifers can be a bit more difficult, alluvial aquifers are particularly common as a drinking water source.

Alluvial aquifers have their set challenges as well. Being relatively shallow, alluvial aquifers don't have overlying impermeable rock or sediment to protect the aquifer from contamination at the earth's surface. Water quality in alluvial aquifers often closely reflects the water quality of the associated river or stream which in Iowa is often influenced by nonpoint source pollutants such as agricultural runoff. To protect water quality in alluvial aquifers, proper watershed management practices are particularly important. Being so closely tied to surface water, the productivity of wells in alluvial aquifers can be affected by seasonal weather patterns and drought.

Buried Valley Aquifers

Buried valley aquifers are aquifers carved from ancient river valleys that are now filled with water-bearing sand and gravel. In most cases, buried valley aquifers are overlain by more recent glacial material, confining them from the surface. Being confined from the surface has some interesting effects on the characteristics of water in these aquifers. The confining material can cause "artesian pressures", meaning the water in a tapped well will rise above the level it was first encountered. Additionally, the confining material above buried valley aquifers means they often don't recharge as quickly as shallower alluvial aquifers—but the confining material helps prevent infiltration of contaminants from the surface. Productivity of wells in buried valley aquifers can be highly

variable, but rates around 100 gallons per minute are common. As with productivity, water quality in these aquifers is quite variable as well. Compared to alluvial aquifers, water in buried valley aquifers has often been in the ground longer and has come into contact with bedrock aquifers. Consequently, elevated dissolved solids concentrations and ammonia levels can be common.

GLACIAL DRIFT AQUIFERS

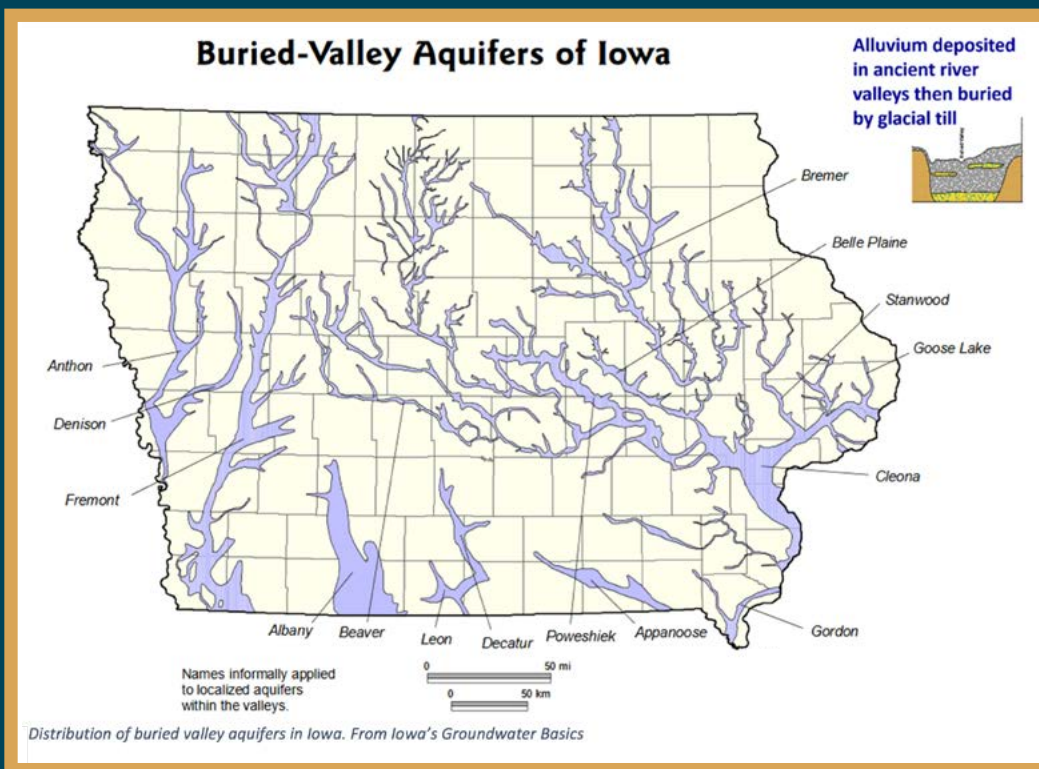
In some parts of Iowa, buried glacial drift (rock material transported and deposited by glacial ice) serves as an aquifer. The availability and productivity of these "glacial drift" aquifers varies statewide. Relatively productive glacial drift aquifers can be found in north-central Iowa, where yields can reach up to 90 gallons per minute, whereas in northeast Iowa, glacial drift isn't present. Glacial drift aquifers are important water sources in parts of rural

southern and western Iowa where alluvial or buried valley aquifers aren't accessible, and the increased depth and poor water quality of bedrock aquifers in the area makes them less desirable. Yields from glacial drift aquifers in southern and western Iowa is often less than 20 gallons per minute.

WHAT DOES ALL THIS MEAN?

The aquifers discussed in this article as well as those from the previous issue of QUENCH Magazine each present benefits and challenges for delivering quality drinking water to consumers. For most public water supplies, location and amount of water needed for their customers ultimately determine what source their water comes from. Regardless of what water source your water is being delivered from, know that there is a whole list of considerations that went into bringing that water to your tap.

Sources: https://s-iihr34.iihr.uiowa.edu/publications/uploads/2014-08-24_08-08-21_es-06.pdf





Nutrient Reduction Efforts in Iowa

Cathy Law; Iowa Rural Water Association | Hunter Slifka; NRCS-CD, Cresco, Iowa

Iowa's Nutrient Reduction Strategy was implemented in 2013. Since that time farmers, private businesses, municipalities and homeowners are demonstrating and implementing more conservation practices than ever before. Iowa has projects located throughout the state to implement and demonstrate water quality practices. This includes targeted watershed projects and projects focused on expanding the use and innovative delivery of water quality practices. Farmers have signed up to use a water quality-focused practice through the Water Quality Initiative. These farmers have invested millions to try cover crops, no-till, strip-till or a nitrification inhibitor on their land. Iowa farmers are responding to the call to action.

Rathbun Regional Water Association (RRWA) is a founding member of the Rathbun Land and Water Alliance. For the past 25 years, RRWA and other Alliance members and partners have worked with hundreds of landowners to install conservation practices on thousands of acres of land in the Rathbun Lake watershed. Rathbun Lake is the only source of water for RRWA's two water treatment plants. To date, these practices have reduced the annual delivery of sediment and phosphorus to Rathbun Lake by an estimated 70,000 tons and 290,000 pounds respectively. RRWA with other Alliance members and partners including landowners in the watershed have invested and committed more than \$36 million for Rathbun Lake protection activities.

Lyon & Sioux Rural Water System (LSRWS), with the help of the Iowa Rural Water Association (IRWA), developed a Source Water Protection Plan in 2012 to protect their system's water drinking supply. The overall program involves identifying potential sources of contamination, delineation of the source water capture zones, establishing a contingency plan and promoting education and awareness.

Lyon and Sioux Rural Water Association owns a total of 470 acres for protection of their water supply:

- 244 acres at Doon
- 168 acres at George
- 38 acres at Otter Creek
- 20 acres near Beloit

Back in 2003, LSRWS entered into an agreement with the Lyon County Conservation Board to manage the Doon property, which is 244 acres. They have planted native grasses throughout and use this property as a wildlife management area. The Conservation Board has planted 2,000 trees in this area. This has been a very beneficial partnership – to both parties involved. In 2011, they began working with Lyon & Sioux at their George property, of 168 acres.

In addition, Lyon & Sioux worked with the Lyon County Zoning Board to adopt an ordinance restricting the land use within 4,000 feet of a public water supply, thereby eliminating potential sources of contamination.



Ryan Steffen water sampling in the Turkey River Headwaters

The Turkey River Headwaters & Chihak Creek Water Quality Project has documented and performed water sampling protocols since 2011. Overtime, there has been positive improvements, steady holdings, and some negative trends. Many of the parameters they test for are highly affected by rain events, air temperature or farming techniques adjacent to the streams. The two biggest improvements over time, especially in the last year, have been the flood reduction, turbidity levels and nitrate reductions within the watershed area. Every location they water sampled at this year had a lower nitrate level than the average levels that they have compiled since 2015. All locations had a nitrate reading of 8.6 mg/L or less, some as low as 4.4 mg/L. These levels all correspond and are below drinking water standards! Many of their sampling days landed right after a rain event or even during a rain event, which shows that Iowa streams are well protected and are keeping the sediment up on the landscape. Last September, the Turkey River & Chihak Creek area received a significant amount of rain. In years past this type of rain event would raise the streams to flood levels and sustain that for multiple days following. This particular event rose the streams above bankful and then subsided within 24 hours with minimal damage. After talking with fellow organizations downstream they incurred roughly \$3.2 million worth of damage, which kept them just short of receiving FEMA disaster funds. However, after talking further it was quite a blessing there was only this amount of damage. Years prior it would have been estimated to incur \$5 million or more worth of damage. The severity of this event was reduced due to the implementation of cover crops, wetlands, bioreactors & native seedings. The wetlands installed in the Turkey River Watershed can reduce peak discharge greatly while also providing huge nutrient reductions. Just in the Turkey River Headwaters they have installed 5 wetlands in the last year. Native seedings is also a very important statute to reduce flooding and keep the clean water clean. Just short of 6,000 acres of native seedings are established in the Turkey River Headwaters with a large majority of them along the stream corridor. The largest piece to the flooding puzzle is the increased amount of cover crops. In 2019, only about 1,200 acres of cover crops



Lyon and Sioux Wetlands

were seeded, this grew to 6,000 in 2020, then 12,000 in 2021 and they have already obligated 15,000 for this coming fall. This number of acres exponentially can increase infiltration rates and water holding capacity in crop fields while also providing nutrient holding benefits rather than letting them wash down the stream.

Not one practice will solve all Iowa's water quality problems, but collectively we can achieve the nutrient reduction strategy. Recent reports indicate that Iowa's efforts are beginning to show real results downstream. The National Oceanic and Atmospheric Administration (NOAA) recently reported that the Gulf of Mexico "Dead Zone" is smaller than originally forecasted and has in fact stopped growing. The Dead Zone is approximately 5,400 square miles of ocean in the Mississippi River watershed of the coast of Louisiana with low to no oxygen which in turn kills fish and other marine life. While this is great news, there is still much work to be done. There are many groups in Iowa continuing with plans and efforts to maintain "Quality on Tap" in your area.



Sediment Basin in Rathbun Lake Watershed



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Permit No. 30

Southern Iowa Rural Water Assoc
1391 190th St
Creston, IA 50801

WATER MATTERS:

AQUATIC INVASIVE SPECIES: ZEBRA MUSSELS

Over the last few years there have been several confirmed cases of an aquatic invasive species known as Zebra Mussels in many Iowa lakes. Zebra Mussels look like small, D-shaped clams that have alternating light and dark bands. Most are less than one inch long with sharp shells that can cut you if you walk on them. Aquatic Invasive Species (AIS) are organisms that invade ecosystems outside of their natural or historic ranges. They are also known as exotic, non-native, or non-indigenous. They have spread outside of their ranges due to intentional or unintentional introductions. Ways they are spread include emptying aquariums into lakes or streams, by way of watercraft and sea planes, or by recreational activities like fishing, diving, and hunting. Zebra mussels smother native mollusks as well as wreak havoc on irrigation intakes and boat motors. Cities that pull water from the lakes can also pull zebra mussels which then clog up pipes and cost money to control.

According to the Iowa Department of Natural Resources Zebra Mussels are an invasive species that can take over a lake in only a few years. There is currently no treatment available to kill them that wouldn't kill other invertebrates in the system. For now the most important thing is to stop the spread to other lakes. As we approach summer and the boating season it's important to recognize your role in keeping our lakes healthy for all aquatic life.

3 WAYS TO PREVENT THE SPREAD OF ZEBRA MUSSELS:

1. Do not release your aquarium pets into the wild.
2. Do not move water, animals, or plants from one water body to another.
3. Clean, Drain and Dry off your boat. Power wash your boat and drain the water from bilge wells, your ballast, etc. to prevent the transfer of AIS. Dry the boat off from top to bottom. It's also important to clean off fishing gear and bait buckets.

