Source Water in the Upper Iowa River Watershed

This story was made with <u>Esri's Story Map Journal</u>. <i>Read the interactive version on the web at <u>https://arcg.is/rrHba</u>.



Depending on the depth of the well the UIR, municipalities mainly draw water from the Galena, St. Peter, or Jordan Aquifers. Municipal water systems provide water to over 8,000 residents in Winneshiek County. There are also several locations that serve the public outside of municipal service.

City of Decorah



The City of Decorah, the largest community in the Upper Iowa River Watershed gets its municipal water supply from six shallow wells ranging from 56 to 82 feet in depth. (Decorah Comprehensive Plan, 2012) (Winneshiek County Hazard Mitigation plan, 2015) The connection between Decorah's wells and surface water is recognized. The Iowa State Geologist has confirmed that Decorah's wells are influenced by the water quality in the Upper Iowa River and the City of Decorah's Source Water Protection Plan notes that,

"The Decorah water supply obtains its water from the sand and gravel and sandstone of the Upper lowa River Alluvial-Ordovician aquifer. The Alluvial-Ordovician aquifer was determined to be highly susceptible to contamination because the characteristics of the aquifer and overlying materials provide little protection from contamination at the land surface. Decorah's Alluvial-Ordovician wells will be highly susceptible to contaminants near the land surface such as leaking underground storage tanks, contaminant spills, and excess fertilizer application."

The City of Decorah regularly tests their wells and files reports on water quality. Those reports can be accessed <u>here.</u>

The City of Decorah's Source Water Protection Plan is available here.

The City of Decorah happens to be located on a geologic anomaly, a Middle Ordovician meteorite impact crater, which limits the options of drilling new wells to deeper aquifers. Learn more <u>here</u>.



The City of Lime Springs in Howard County, the other main community in the UIR Watershed, also provides water to its residents through a municipal utility. Limes Springs has one elevated water tower. They utilize ground water from two active public wells that average a depth of 280 ft.

Rural Drinking Water Sources



Rural drinking water sources are private wells. According to 2018 Iowa DNR private well tracking system, there are over 1500 active drinking water private wells in the UIR Watershed that have been tested by Iowa DNR. These wells draw water from the Galena, St. Peter or Jordan Aquifers depending on the depth of well and location within the watershed. Average depth of private wells in the UIR Watershed is 250 feet. The high percentage of shallow wells in the UIR Watershed magnifies the importance of surface and ground water quality.

Several rural locations that serve the public outside of municipal service areas operate water systems regulated by the DNR as well. They are listed in the <u>2015 Winneshiek County Hazard</u> <u>Mitigation Plan</u>.

Protecting Upper Iowa River Watershed Water Quality



Conservation professionals working on improving surface water quality in the UIR Watershed have found that surface water quality influences and is reflected in the shallow groundwater quality. This has been documented in subwatersheds where nitrate and bacteria tests have been conducted on wells and in surface waters during Soil and Water Conservation District (SWCD) subwatershed projects. (See Bigalk Creek Subwatershed and Trout Run Subwatershed on the <u>Subwatershed</u> <u>Explorer Page</u>.)

Soil and Water Conservation Districts (SWCD) conservation professionals from Winneshiek County who have implemented sinkhole clean-out projects over the past few decades report helping landowners remove many types of trash from sinkholes, including *"disposable diapers, tires, chemical containers, old appliances, automobile parts, old TVs with mercury in them, and other general trash"*. One of the most obvious accounts of a direct connection between a sinkhole and a private well was reported by a conservation professional in Winneshiek County who worked with a landowner that had chicken feathers show up in the water from their kitchen faucet. The source of the feathers was tracked to a sinkhole across the road into which a neighbor had dumped a load of dead chickens. The sinkhole was surrounded by and took drainage from a crop field, so although the feathers were obvious, the pollutants in the drinking water that were not visible may have been just as harmful.

Groundwater Vulnerability Legend



Thin Drift Confinement: Less than 100 feet (30 meters) of glacial drift overlie regional aquifers; high potential for aquifer contamination; high potential for well contamination.

Moderate Drift Confinement: 100-300 feet (30-90 meters) of glacial drift overlie regional aquifers; low potential for aquifer contamination; low potential for well contamination.

Shale Confinement: Thin drift and <u>Brainard</u> Shale overlie Galena carbonate aquifer; moderate potential for aquifer contamination; moderate potential for well contamination.

Drift Groundwater Source: Bedrock aquifers are absent or overlain by greater than 300 feet (90 meters) of glacial drift; wells are completed in thin, discontinuous deposits of sand and gravel within the till or at the interface between overlying loess and till, natural water quality is highly variable. Low potential for bedrock aquifer contamination; high potential for well contamination.

Sinkholes: Naturally occurring depressions in the landscape caused by solution or the collapse of carbonate rocks; common where limestone is less than 30 feet (10 meters) below the surface. Contaminated surface water may enter the aquifer via the sinkholes, contaminating the aquifer in a localized area.

Alluvial Aquifers: Area underlain by sand and gravel, aquifers situated beneath flood plains along stream valleys and includes alluvial deposits associated with stream terraces and benches. Most wells are very shallow, with a high potential for aquifer contamination, and high potential for well contamination.

County Sanitarians help landowners test wells in each county. Allamakee, Winneshiek and Howard counties participate in the lowa Grants to Counties Program, which allows them to test private drinking water wells for free or a limited fee. The grant also allows them to pay cost share to plug abandoned wells to help protect groundwater. Some of the UIR Watershed SWCD have secured funding to encourage rural homeowners to complete well testing and in some cases provided cost share for septic replacements. State Revolving Loan Funds from Iowa are also available to landowners who want to replace septic systems. The County Sanitarians track the percentage of wells that test poorly in total coliform, E coli, or nitrate. All the sanitarians/Environmental Health offices also issue permits for on-site wastewater treatment/septic systems and conduct time-of-transfer inspections when properties transfer ownership. In 2009, the time-of-transfer law went into effect to help eliminate illegal discharges from private residences.

Additional information about source water protection in Iowa can be found <u>here</u>.

Information about how to test your well, how to access cost share fund for plugging an abandoned

well, or just to find out more information about service available at County Sanitarian/Environmental Health offices. Information about those offices and their services are available on these websites. <u>Winneshiek County</u> <u>Howard County</u> <u>Allamakee County</u>

In some areas of Iowa, when shallow wells become polluted, municipal and private well owners tap into deeper aquifers, in other areas, they join together to form a rural water authority that constructs a lake to provide source water. In Northeast Iowa, neither solution is as viable on option as protecting surface water and the shallow wells in the first place. Shallow wells may have increasingly higher levels of nitrates and bacteria but deeper wells can have different pollutants, such as iron, that can be expensive to remove from water and impossible to prevent through land use change and conservation. Unfortunately, a source water lake is not a viable option either because, even with clay liners and careful construction, the shallow depth to bedrock in the UIR Watershed frequently results in constructed ponds losing water to the subsurface and drying up. That is one of the reasons Soil and Water Conservation District personnel talk with rural landowners about building water and sediment control basins rather than ponds. They can't guarantee the structure will hold water.