City of Vincent, IA
Source Water Protection Plan

November 24, 2020

Prepared for the City of Vincent PWS #9486052
By: Aaron Schroeder
Source Water Protection Specialist – Iowa Rural Water Association

Vincent City Hall
103 S 1st St
Vincent, IA 50594
(515) 356-4365

This page left intentionally blank.

Contents

Figures

Maps

Tables

Other Figures

Source Water Protection Background

In 1974 the United States Congress passed the Safe Drinking Water Act (SDWA) to provide safe drinking water for public water supply systems and their users. The SDWA granted the United States Environmental Protection Agency (EPA) the authority to develop a uniform national drinking water protection program and establish standards for known or suspected drinking water contaminants. In 1996, Congress amended the SDWA to reflect increased documentation and understanding of drinking water susceptibility, changes in biological and chemical threats as well as changes in available funding. The amendment to the SDWA outlines a plan for small communities to be proactive in protecting their source water.

In 1998 and 1999, the Iowa Department of Natural Resources (IDNR) and the Iowa Geological Survey Bureau (IGSB) developed a Source Water Protection Program for the State of Iowa. In October 1999, the EPA approved the IDNR Source Water Protection Program that included the already active Wellhead Protection Program. At this time, Iowa legislators indicated that the state would maintain a voluntary approach to source water protection planning. Voluntary implementation, as opposed to regulatory, was deemed appropriate for Iowa due to the unique nature of each public water supply system.

Iowa Rural Water Association (IRWA) takes an active role in developing source water protection plans for small communities with a mission to provide technical assistance to these communities in developing Source Water Protection Plans to protect their drinking water supplies.

Currently, IRWA's Source Water Protection Program is serviced through a USDA-Farm Service Agency (FSA) grant.

Source Water Work Plan

Table 1: Source Water Work Plan.

Vincent Water Supply Source Water Protection Action Plan					
Activity	**Start Date**	**Completion Date**	**Responsible Party**	**Completion Status**	**Comments**
Initiate Source Water Protection Meeting	3/24/2020	3/24/2020	City of Vincent	**100%**	Initiated by Sarah Geisinger, City of Vincent.
Conduct initial meeting with system.	6/24/2020	6/24/2020	IRWA, City of Vincent	**100%**	Performed initial contaminant source inventory.
Source Water Team Meeting, contaminant source inventory	9/17/2020	9/17/2020	IRWA, City of Vincent	**100%**	Confirmed location of potential contaminant sources with help of operator.
Source water team meeting	11/23/2020	11/23/2020	IRWA, City of Vincent	**100%**	Reviewed Draft of source water protection plan.
Create a water supply emergency response plan	6/24/2020	7/3/2020	IRWA, City of Vincent	**100%**	Initiated during 6/24/2020 source water team meeting.
Review the rough draft of the source water plan	11/23/2020	11/23/2020	IRWA, City of Vincent	**100%**	Initial draft of source water plan delivered to source water team.
Create a well maintenance plan	11/23/2020	11/23/2020	City of Vincent	**25%**	Discussed
Install source water protection area signs.	11/23/2020		IRWA, City of Vincent	**50%**	Raise awareness of well location and sensitive areas in the community. Signs delivered 11/23/2020.
Public Education Campaign	11/23/2020		IRWA		IRWA will hold an educational field day in 2021. Will coordinate with other communities in Webster County.
Monitor water distribution infrastructure to prevent water loss.	11/23/2020		City of Vincent		Unchecked water loss of over 15% can have a significant impact on city finances and availability of supply.

Monitor Wastewater infrastructure for leaks.	11/23/2020		IRWA, City of Vincent		IRWA can provide methods such as smoke blowing to detect leaks in wastewater infrastructure.
Update ordinances to limit future potential contaminant sources near active wells	9/17/2020		City Of Vincent	**50%**	Samples have been provided. The City of Vincent will add them during the next scheduled ordinance update.

Purpose

The purpose of the Source Water Protection (SWP) plan is to provide an organized approach to effectively protect public water supplies from contamination. There are many reasons to protect Vincent's drinking water.

- Safeguard the health of community residents
- Prevent and reduce drinking water contamination and associated financial burdens
- Educate and promote community awareness on drinking water contamination
- Develop a contingency plan in the event Vincent's drinking water supply becomes contaminated
- Increased grant availability

Planning Team

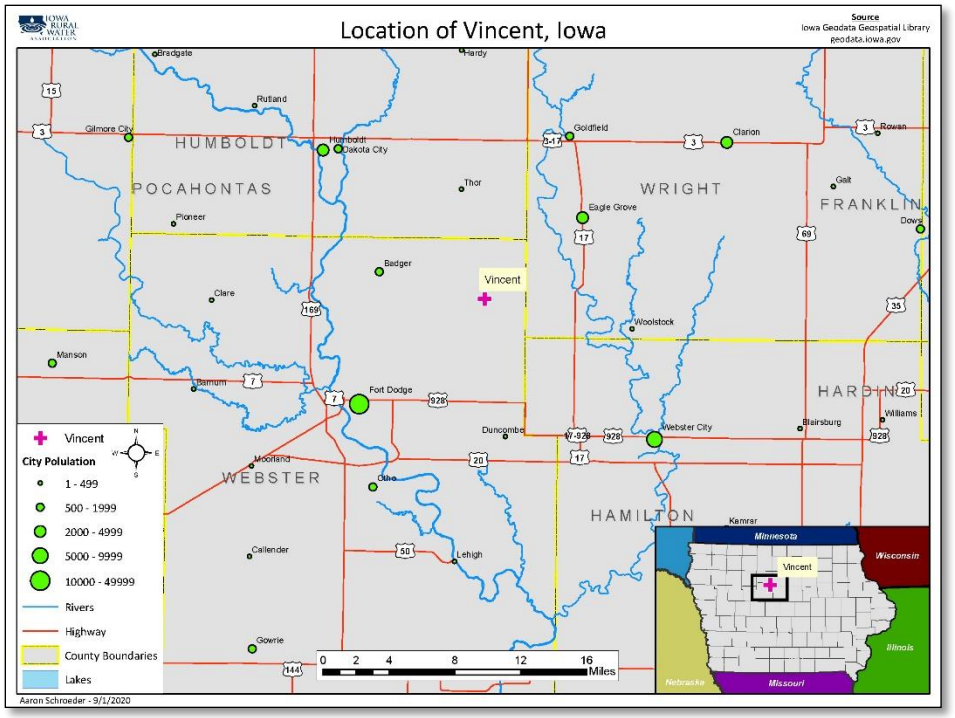
The following individuals served on the Planning Team or offered significant input in the plan assembly and data acquisition required to complete this source water plan.

Sarah Geisinger	City Clerk, Vincent
Craig Larson	Water Operator, Vincent
Aaron Schroeder	Source Water Specialist, Iowa Rural Water Association

Background

Location

The City of Vincent, Iowa is located in the northeast portion of Webster County. It is situated approximately thirteen miles northeast of Fort Dodge and thirteen miles northwest of Webster City. As of the 2010 Census, Vincent has a population of 174.



Map 1: Location of Vincent in Webster County, Iowa.

Water Supply

Vincent has two bedrock wells. Well #2 sources its water from the Devonian aquifer. Well #3 sources its water from the Mississippian aquifer and serves as a backup.

Table 2: Vincent Public Water Supply Well Inventory.

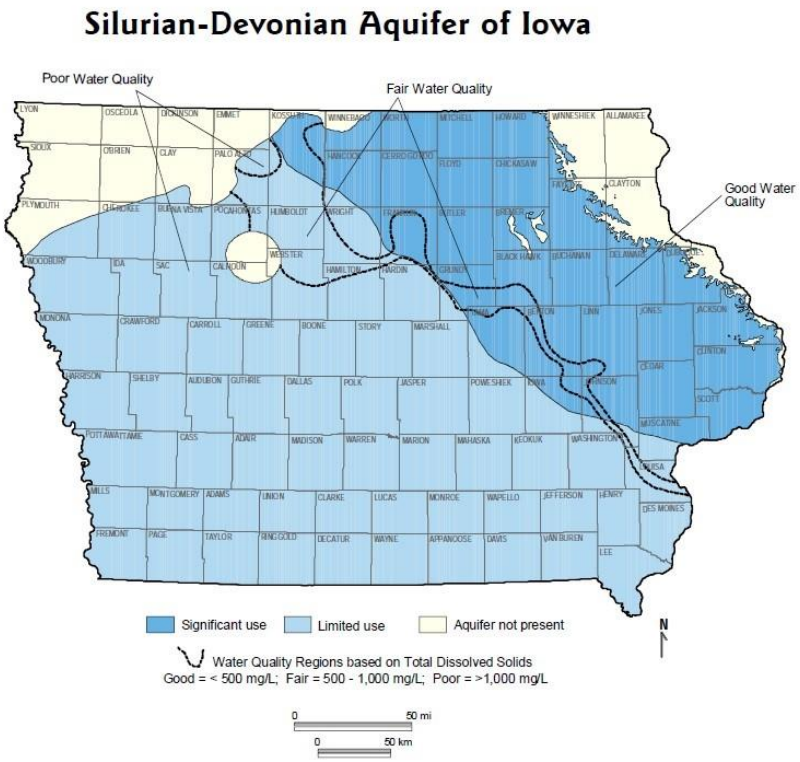
Vincent Public Water Supply Well Inventory									
GeoSAM ID	**Local Name**	**Drill Date**	**Aquifer**	**Depth (ft)**	**Status**	**Elevation (ft)**	**Bedrock Depth (ft)**	**Static Water Level (ft)**	**Yield (GPM)**
12537	Well #2 (South)	1/1/1960	Devonian	745	Active	1138	0	70	100 GPM
43008	Well #3 (North)	1/1/1978	Mississippian	100	Standby	1138	0	NA	NA
9703	Well #1	9/15/1956	Mississippian	130	Plugged	1138	0	NA	NA
Source: Iowa DNR Source Water Tracker									

Customers

Vincent serves a population of 174 residents on 88 service connections. On average Vincent's system provides 15,000 gallons per day, but is capable of providing up to 65,000 gallons per day (Iowa DNR, 2019).

Water Quality

Water sourced from wells #2 and #3 is of good quality. As of 2017, finished water in Vincent had a six-year average nitrate (NO_3) concentration of less than 1 part per million (ppm), based on 7 samples (IDNR, 2017).



Map 2: Illustration and quality of water in the Silurian-Devonian Aquifer in Iowa. From: Iowa's Groundwater Basics

Hydrogeology

Iowa sources over 80% of its drinking water from groundwater resources. Groundwater is found in aquifers that vary in depth, volume, and water quality. This variability necessitates the development of individualized source water protection plans that include assessments of local groundwater resources, land use patterns, and potential threats to water quality.

Iowa's groundwater is found in both surficial and bedrock aquifers. Surficial aquifers are composed of sand and gravel with minimal confining material present. Common types of surficial aquifers include buried channel aquifers, drift aquifers, and alluvial aquifers. Alluvial aquifers are found adjacent to many of Iowa's rivers, and their water is often used in agricultural and industrial practices. Bedrock aquifers provide good quality water for much of Central and Northeastern Iowa. As you move southwest across the state, bedrock aquifers are often deeper

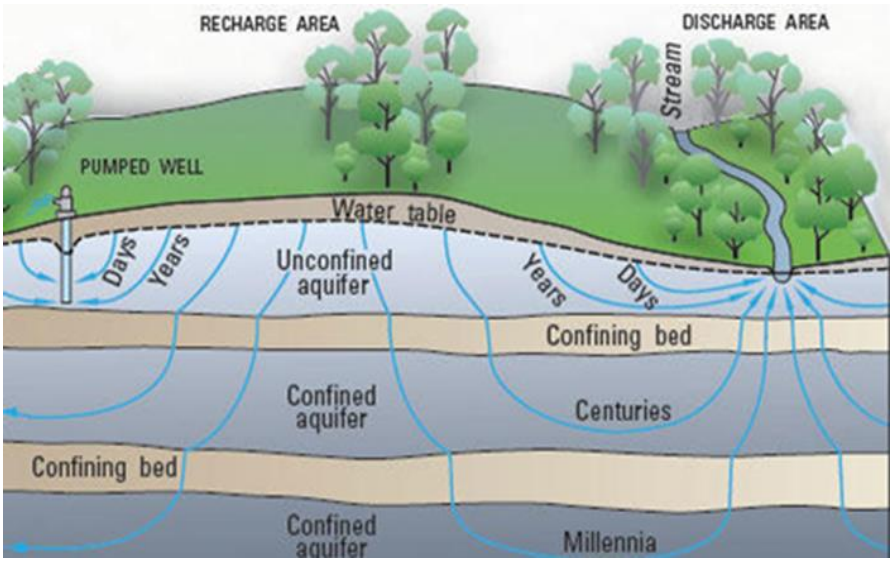


Figure 1: Conceptual Groundwater-Flow Diagram (USGS, 2020)

and often contain higher concentrations of dissolved minerals. In some instances, concentrations of harmful chemicals can be diluted as water passes through the ground. However, a long residence time can lead to dissolution of bedrock mineral constituents into groundwater, influencing water quality. Consequently, bedrock aquifers are used less frequently in southern and western Iowa.

Vincent's system is designated as "slightly susceptible," as both active wells have a confining layer thickness of between 50 and 100 feet.

Confining layer thickness	Susceptibility designation
<25 feet	Highly susceptible
25 to 50 feet	Susceptible
50 to 100 feet	Slightly susceptible
>100 feet	Low susceptibility

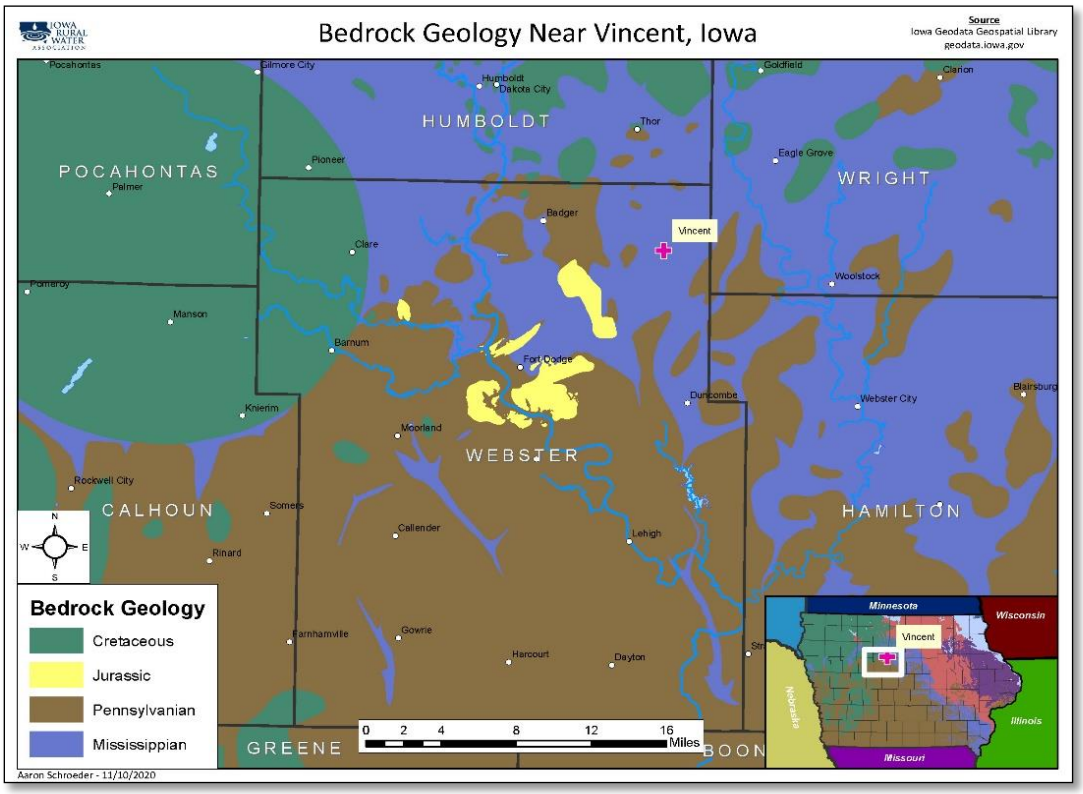
Figure 2: Aquifer susceptibility designation relative to confining layer thickness.

Bedrock Geology

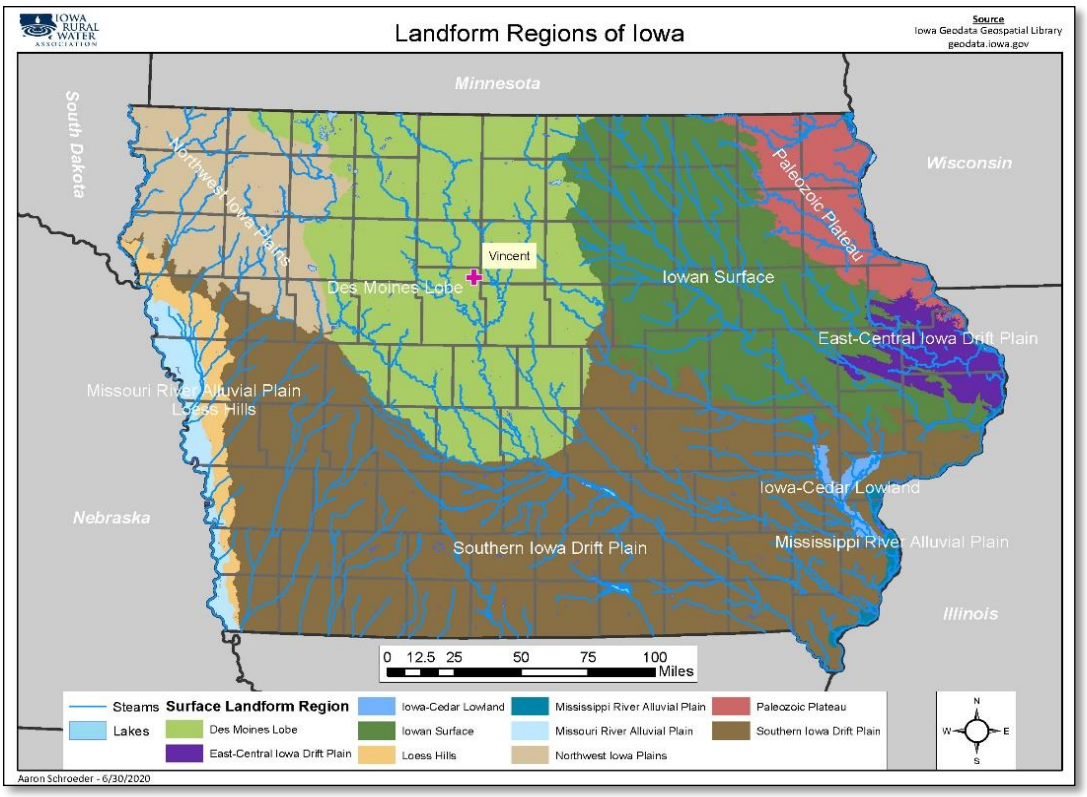
The bedrock geology of Webster County consists of Mississippian and Pennsylvanian age carbonates that are overlain by up to 100 feet of glacial material. Vincent Well #2 sources its water from the Devonian Aquifer. The backup well, Well #3 draws its water from the Mississippian Aquifer.

Surficial Geology

Vincent is situated in the Des Moines Lobe landform region. The Des Moines Lobe is characterized by relatively flat topography with poorly developed drainage networks. Because of this, the Des Moines Lobe is home to many of Iowa's naturally occurring sloughs bogs and lakes.



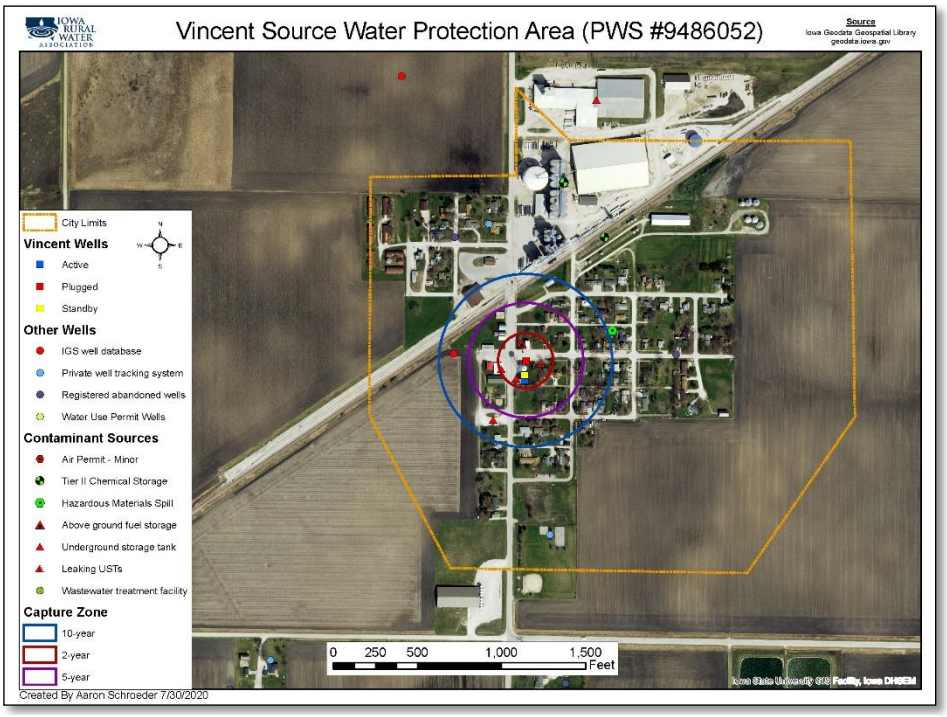
Map 3: Bedrock Geology near Vincent, Iowa.



Map 4: Landform regions of Iowa.

Capture Zone

For Vincent, parameters including aquifer geology, elevation, and water use were used to delineate 2-year, 5-year, and 10-year time of travel capture zones using the Visual Analytic Element groundwater flow model. The model was completed for the Devonian aquifer, utilized by Well #2. The Mississippian aquifer is utilized by a standby well. The modeled capture zones indicate the amount of time it would take for surface water introduced to those areas to begin influencing groundwater quality.



Map 5: Time of travel capture zones for Vincent Well #2

Potential Contaminant Inventory

Definition

Potential contaminants are categorized as “point source” and “nonpoint source.” Point source contaminants can be traced to a single identifiable source, such as effluent discharge from a wastewater treatment plant. Nonpoint source contaminants are those that are originate from diffuse sources such chemical as runoff from agricultural and mining operations.

Being classified as a potential source of contamination does not indicate that a facility or location is currently impacting groundwater quality or has impacted groundwater quality historically. The designation only indicates that a site has the potential to compromise groundwater quality.

Nitrate/Nonpoint Source Contaminants

Nitrate levels in finished water are low. The ten year average is currently well below 1 part per million (ppm). The EPA’s Maximum Contaminant Level (MCL) for nitrates in finished water 10 ppm.

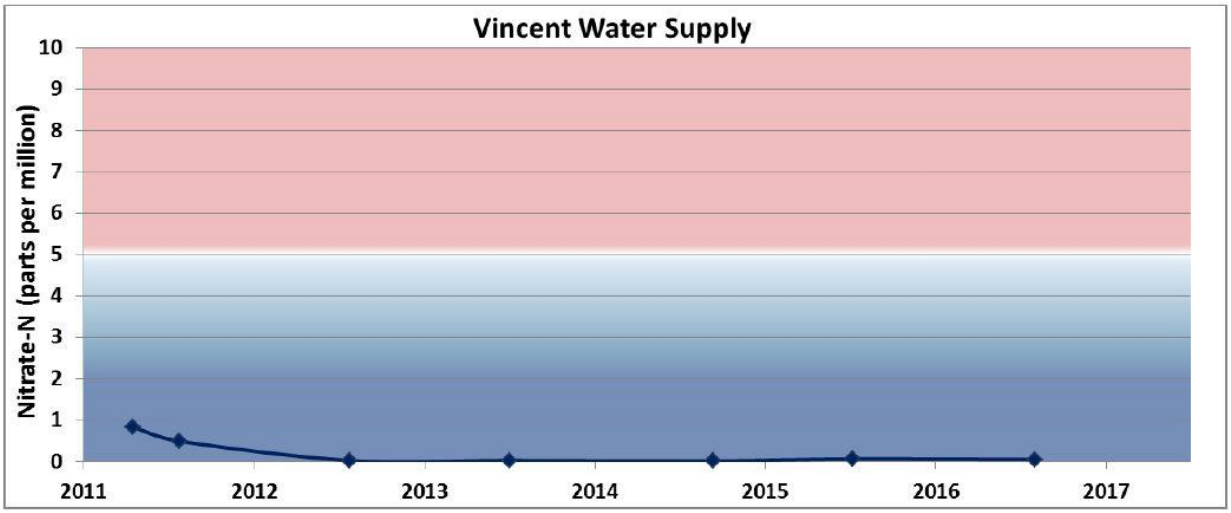


Figure 3: Nitrate concentrations in finished water.

Land Use Review

The following table shows land cover types and area within the delineated capture zone for Vincent's wells.

Table 3: Land use near Vincent Well #2.

Vincent Well #2			
Capture Zone	**Row Crop**	**Developed Areas**	**Total Acres**
2-year	0%	100%	2
5-year	3.9%	96.1%	7
10-year	10.5%	89.5%	11
Source: Iowa DNR Source Water Tracker			

Potential Point Source Contamination Sites

Potential point source contaminants are ranked based on three criteria. They are given a score of 1-5 based on the chemical type and storage threat. A score of 5 would indicate the highest threat. Potential contaminants are also ranked on aquifer susceptibility. Vincent's wells are classified as slightly susceptible and have been assigned a susceptibility ranking of 2. Sites are also given a score of 5, 3, or 1 based on their location within the 2, 5, or 10 year capture zone respectively. The total risk score was calculated by adding together the ranking criteria. If a potential contaminant has a total risk value of 9 or larger, it is given a threat level of high, values of 6-8 indicate moderate threats, and values of 5 or lower are considered a low threats. The following table displays potential point source contaminant sites in the source water protection area for Vincent. A location map of potential point source contaminants can be found on page 14 (Map 5).

Table 4: Potential contaminant source inventory.

Vincent Potential Contaminant Source Inventory								
Rank	**Name**	**Site Type**	**Address**	**Site ID**	**Capture Zone**	**Land Use Risk**	**Total Risk Score**	**Status**
1	Long Products	Underground Storage Tank	Main St, P-71 Co. Rd. Vincent, IA 50594	310618947	2-year	5	10 (High)	Site Closed (Regulated)
1	Harold Schweppe	Underground Storage Tank	107 S 1st St, Vincent, IA 50594	310501947	2-year	5	10 (High)	Site Closed (Non-Regulated)
1	City of Vincent	Leaking USTs	2282 Arthur St, Vincent, IA 50594	310458881	2-year	5	10 (High)	Tank Removed (2011)
2	W & H Cooperative Oil	Underground Storage Tank	200 S 1st St, Vincent, IA 50594	310627973	5-year	5	9 (High)	Regulated Tank - Active
Ranking Criteria Aquifer Susceptibility = **4** Capture Zones: 2-year = **3**, 5-year = **3**, 10-year = **1**								
Source: Iowa DNR Source Water Tracker								

Other Wells

Other wells near the protection area can be found in the following table. For many, the location accuracy is "poor."

Table 5: Other wells

Vincent Public Water Supply – Other Wells					
ID	**Owner**	**Drill Date**	**Aquifer**	**Depth (ft)**	**Status**
9703	Vincent, City of	9/15/1956	Mississippian	130	Plugged
2965	Vincent Locker Plant	1/1/1947	Mississippian	121	Plugged
Source: Iowa DNR Source Water Tracker					

Organizations

City of Vincent

The City of Vincent is responsible for the final decision regarding implementation of management strategies designated in the source water protection plan. Technical assistance in completing any of the management strategies outlined in the plan can be provided by the Iowa Rural Water Association.

Contact: Sarah Geisinger, City Clerk
City Hall Address: 103 S 1st St, Vincent, IA 50594
Phone: (515) 356-4365
Email: cityofvincent@wccta.net

Contact: Craig Larson, Water Operator
Phone: (515) 570-6926

Iowa Rural Water Association

The Iowa Rural Water Association (IRWA) is responsible for writing and developing the source water protection plan. IRWA will complete background research and gather data and input from organizations and individuals for the City of Vincent. IRWA will also provide outreach materials and any technical assistance necessary to complete the designated management strategies during development and following the completion of the source water protection plan.

Contact: Aaron Schroeder, Source Water Protection Specialist
Address: 4221 South 22nd Ave East, Newton IA, 50209
Phone: (800) 747-7782
Cell: (515) 229-1200
Email: aschroeder@iowaruralwater.org

Iowa Department of Natural Resources

The Iowa Department of Natural Resources (IDNR) works with Vincent to ensure the drinking water system and drinking water quality meet state and federal drinking water standards. The IDNR also provides on-site technical assistance to complete sanitary surveys and phase 1 source water assessments.

Iowa DNR Field Office 2
Address: 2300 15th St SW, Mason City, IA 50401
Phone: (641) 424-4073

Webster County Environmental Health - Sanitarian

Webster County Environmental Health oversees permitting and plugging of private wells and septic systems in the county. Property owners with private wells can contact them for information about well maintenance and testing.

Contact: Trin Lewis, County Sanitarian
Address: 723 1st Ave. South Ste. 220, Fort Dodge, IA 50501
Phone: (515) 573-4107

USDA Natural Resources Conservation Service

The USDA Natural Resource Conservation Service (NRCS) is able to assist landowners with conservation of soil, water, nutrients and natural habitat. Any landowners interested in participating in NRCS programs are encouraged to contact the local NRCS office. The NRCS assists with the technical aspect of the program, conducting the field assessment, writing the seeding plan, and conducting follow-up visits to the enrolled property.

Webster County Soil and Water Conservation District
Address: 1898 Kountry Ln, Fort Dodge, IA 50501
Phone: (515) 573-4411

Best Management Practices

1. **Create Ordinance Limiting Potential Contaminant Sources Near City Wells**

   Goal: Establish an ordinance limiting new private wells in source water protection area
   Potential Costs: Staff time
   Timeline: Ordinances provided in fall 2020, will be enacted during next change.
   Contact: City of Vincent, IRWA
   Status: Sample ordinances provided by IRWA

Project Description

This project aims to update Vincent City ordinances to limit construction of private wells within 200 feet of wells #2 and #3. Other potential contaminant sources, including tanks and chemical application will be addressed and given setback distances via ordinance.

Results

Sample ordinances have been provided. The City of Vincent will adopt them during their next scheduled ordinance update.

2. **Perform Maintenance on Well #2 and Well #3**

   Goal: Coordinate with well maintenance contractor to create maintenance plan for well #2 and #3.
   Potential Costs: Staff time- signs will be provided by IRWA
   Timeline: Spring 2021
   Contact: Craig Larson, Aaron Schroeder
   Status: Discussed

Project Description

This project is designed to increase efficiency and longevity of Vincent wells #2 and #3. Well #3 is currently being used as a standby well. The City would like to ensure this well, along with #2 are both reliable in the event of a failure.

Results

City is working with well maintenance contactor to develop maintenance plan.

3. **Install Water Supply Protection Area Signs in a Visible Area**

   Goal: Place signs in source water protection areas
   Potential Costs: Staff time- signs will be provided by IRWA
   Timeline: 2020
   Contact: IRWA, City of Vincent
   Status: Signs provided

Project Description

This project is designed to increase awareness of the location of the drinking water source area. Strategically placing signs indicating "water supply protection area" is designed to discourage illegal dumping and encourage the use of best management practices within the capture zone.

Results

Signs provided by IRWA 11/23/2020.

4. **Public Education**

   Goal: This project aims to provide information on conservation, groundwater and source water protection to residents.
   Potential Costs: Staff time, material cost
   Timeline: Summer 2021
   Contact: IRWA
   Status: In discussion

Project Description

Education materials can be an effective way to introduce the community to source water protection, educate community members about their drinking water source and system and introduce them to source water protection strategies they can enact at home.

Results

Links to educational resources have been provided in the text of the plan. Iowa Rural Water can provide brochures and other materials on groundwater and source water protection that will be placed in the public places for residents to review. IRWA was asked to coordinate with other communities and hold a field day sometime in 2021.

5. **Management strategies all communities can benefit from**

Description

There are number of broader management strategies that any community could undergo to help protect their source water:

- Properly plugging any abandoned wells.
- Proper use and disposal of harmful materials.
- Properly monitor and maintain septic systems.
- Monitor distribution infrastructure to prevent drinking water loss.

Emergency Response Affidavit

Public Water Supply Contingency / Emergency Plan Affidavit

The Safe Drinking Water Act amendments of 1986 and 1996 established the concept of wellhead protection, and subsequently the Source Water Protection program. The program is overseen by the Iowa Department of Natural Resources (IDNR) and attempts to prevent potential contaminants from entering source waters, and prepare for situations in which drinking water may be impaired through contamination, power outage and treatment or distribution system interruptions. In order to ensure a public water supply's preparedness, a Contingency/Emergency Plan has been required in every approved Source Water Protection Plan (SWPP) or Wellhead Protection Plan (WHPP). Due to recent and growing concerns over water system security and due to many systems having previously prepared such a plan under the provisions of the 2002 Bioterrorism Act, the IDNR is now allowing an affidavit in lieu of including a completed Contingency/Emergency Plan within the submitted SWPP/WHPP.

Although public water supplies do not need to send IDNR completed plans, each must have an accessible and up-to-date plan in case a catastrophic event occurs within their system. It is necessary for the completed water supply Contingency/Emergency Plan to contain the following information, at a minimum:

- Contact information for the city's mayor, city clerk, water/wastewater operator.
- Contact information for the city's power company, a professional electrician, a professional plumber and an equipment repair company.
- System's critical users must be identified and a plan for immediate notification must be created. (i.e. hospitals, nursing homes, schools, etc.)
- Contact information for local media, including newspaper, radio and television.
- Contact information for a certified laboratory, local emergency contacts, state and local public health departments and the National Guard.
- Contact information for the IDNR's 24 hour emergency contact and the local IDNR field office.

I, Sarah Geisinger, representing Vincent
certify that a Contingency / ~~Emergency~~ Plan has been created for our public water supply system and that this information can be presented to the IDNR upon request.

Sarah Geisinger
Signature

11/17/2020
Date

Available Resources

www.iowadnr.gov

- Contains information pertaining to public water supplies, the Iowa Department of Natural Resources Source Water Protection Program, and contact information for DNR personnel.

https://programs.iowadnr.gov/sourcewater/

- Iowa Source Water Tracker – Contains Phase 1 assessments, sanitary surveys and other water supply information.

https://programs.iowadnr.gov/sourcewater/maps/index.html

- Iowa Source Water Mapper – An online version of the Phase 1 assessment. Displays well location, protection areas and potential sources of contamination.

www.iowaruralwater.org

- Contains contact information and information about training events provided by Iowa Rural Water Association.

http://www.iihr.uiowa.edu/igs/

- The Iowa Geological Survey Webpage. Contains interactive maps and educational materials about Iowa geology and hydrology.

http://www.iihr.uiowa.edu/

- The Iowa Hydrologic Research lab conducts studies on water in Iowa. This includes operating the Iowa Flood Center. Learn what impacts flooding has on your community, mitigation techniques, and possible research activities in your area.

https://water.usgs.gov/edu/

- The USGS "Water Science School." Offers maps and educational materials.

http://www.epa.gov/

- The EPA's national website. Has information about water quality laws and regulations for many different types of contaminants.

https://www.epa.gov/aboutepa/organization-epas-region-7-office-kansas-city

- The EPA's Region 7 website (Kansas City). Contains information regarding EPA history, facilities, and contact information.

http://water.epa.gov/

- The EPA's water website contains information on water protection strategies, conservation efforts, and other water information.

http://www.usgs.gov/

- The United States Geologic Survey website. Contains information about geology and surface/groundwater.

http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/index.cfm

- USEPA Source Water Protection Resources. Includes information on local community initiatives, the basics of the Source Water Protection at the federal level and educational material that could be provided for the community.

https://facilityexplorer.iowadnr.gov/FacilityExplorer/Default.aspx

- IDNR database. Displays information and location of all known potential contaminant sites.

http://www.ia.nrcs.usda.gov/

- Iowa NRCS website. Contains information about conservation practices and other government programs for conservation.

http://www.epa.gov/enviro/facts/topicsearch.html#facility

- USEPA searchable database website for any facility that has a registered EPA permits. This database is searchable by city name.

www.nrwa.org

- Information from the National Rural Water Association and its programs.

http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/index.cfm

- North Carolina State University Storm water engineering website, provides designs and ideas for constructing rain gardens, swales, etc.

http://www.rainscapingiowa.org/

- Rainscaping Iowa provides management strategies for storm water.

https://www.epa.gov/sites/production/files/2015-04/documents/epa816f13002.pdf

- EPA resource on water loss.

https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Private-Septic-Systems

- IDNR private septic systems webpage.

https://www.iowadnr.gov/Environmental-Protection/Household-Hazardous-Materials

- IDNR household hazardous materials information.

https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Private-Well-Program/Well-Plugging

- IDNR private well plugging guidelines and resources.

Definitions *(Modified from "Iowa's Groundwater Basics")*

Aquifer: Geologic unit that can store and transmit groundwater

Anisotropic Aquifer: An aquifer in which hydraulic conductivity is not uniform in all groundwater flow directions

Attenuate: To weaken or reduce in force; diminish

Capture Zone: Area in which water is diverted to or captured by a well

Conductivity: The rate at which water moves through a porous material

Confined Aquifer: An aquifer below the land surface that is overlain by an impermeable layer of rock; bedrock aquifer

Delineate: To describe or portray; indicate the position of

Geology: The science of the physical structure of earth, its history and its processes

Hydrogeology: The science dealing with the occurrence and distribution of groundwater

Hydrology: The scientific study of the movement, distribution and quality of water

Isotropic Aquifer: An aquifer where hydraulic conductivity is uniform in all directions

Lithology: The physical characteristics of a rock

LUST = Leaking Underground Storage Tank

Nonpoint Source Pollution: Pollution that originates from diffuse sources. Not identifiable to a single source

Permeability: The measurement of a substances ability to allow liquids to pass through it

Point Source Pollution: Pollution from a single, identifiable point

Runoff: Movement of water across land surface. Occurs when the land surface has exceeded infiltration capacity; overland flow

Time of Travel: The distance water will travel through the aquifer over a specified duration of time

Unconfined Aquifer: An aquifer that is directly under the influence of surface water; surficial aquifer

UST = Underground Storage Tank

References

Anderson, W. I. (1998). *Iowa's Geological Past: Three Billion Years of Change.* Iowa City: University of Iowa Press.

Iowa Administrative Code, Environmental Protection, Chapter 40. https://www.legis.iowa.gov/docs/ACO/chapter/567.40.pdf. 4/11/2019

Iowa Department of Natural Resources. (2019). *Vincent Public Water Supply Sanitary Survey*. Mason City, IA: Iowa Department of Natural Resources.

Iowa Department of Natural Resources. (2017). *Source Water Assessment for* Vincent (PWS# 9486052)*).* Vincent IA: Iowa Department of Natural Resources.

Iowa Department of Natural Resources Source Water Program, Source Water Tracker and Source Water Mapper. https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Source-Water-Protection. November 2019.

Iowa GeoData. Various geospatial data. https://geodata.iowa.gov/ March 2019.

Prior, Jean C. (1991). *Landforms of Iowa*. Iowa City, Iowa: University of Iowa Press.

Prior, Jean C. (2003). *Iowa's Groundwater Basics*. Iowa City: Iowa Department of Natural Resources.

United States Environmental Protection Agency. Drinking Water Contaminants, National Primary Drinking Water Regulations, List of Contaminants and their MCLs. http://water.epa.gov/drink/contaminants/index.cfm. 8/21/2012.