Swaledale Water Supply

Source Water Protection Plan

PWS #1778008

Prepared For
Swaledale Water Supply

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Assistance Provided by
Swaledale City Council
Iowa DNR Field Office #2

Completed
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Table of Contents

Page#

1. Introduction 5
   a. Source Water Protection Background 5
   b. Purpose of the Source Water Protection Program 6
2. Details about the Swaledale Water Supply 7
   a. Location of the Swaledale Water Supply 7
   b. Public Water Supply System Detail 7
      i. Source/Wells 7
      ii. Customers 7
      iii. Water Treatment 8
      iv. Water Quality 8
   c. Hydrogeology of the Swaledale Water Supply 8
3. The Swaledale Water Supply Source Water Protection Plan 11
   a. Source Water Capture Zone 11
   b. Potential Contaminant Sources 11
      i. Nitrate/Non Point Contaminant Source 11
      ii. Point Source Contaminant Review 11
      iii. Ranking Criteria 12
      iv. Table of known sources of Point Source Contaminants 12
      v. Table of Potential Non-Point Source Contaminants 12
   c. Source Water Protection Committee 13
   d. Source Water Protection Focus Area 13
   e. Management Strategies for the Swaledale Water Supply 13
4. References 25

5. Appendix
   a. Iowa Department of Natural Resources Public Information Section
      i. 2012 Swaledale Alluvial Phase 1 Report A-3
      ii. 2009 Swaledale Water Supply Sanitary Survey A-13
      iii. Swaledale Public Well Inventory A-17
      iv. Swaledale Well #1 Drill Log A-18

   b. Maps
      i. Location of the Swaledale, Iowa B-3
      ii. Swaledale Water Supply Capture Zone B-5
      iii. Swaledale Water Supply Capture Zone (No Air Photo) B-6
      iv. Swaledale Water Supply Setback Distances B-7
      v. Swaledale Water Supply Potential Contaminants – Zoom In B-8
      vi. Swaledale Water Supply Potential Contaminants B-9
      vii. Swaledale Water Supply Potential Contaminants (No Air) B-10
      viii. Surficial Landform Regions of Iowa B-11
      ix. Bedrock Surface Geology of Iowa B-12

Page #

x. West Cedar River Watershed Map B-13

c. Educational Materials
i. Flash Drive Educational Material With Links C-11
ii. Drinking Water Fact Sheet - EPA C-15
iii. Good Wells for Safe Water – ISU Extension C-3
iv. Safe Farm – Abandoned Wells Pose Safety Hazards C-7

d. Source Water Protection Plan Quick Reference Section
i. Source Water Protection Work Plan D-3
ii. Table of Potential Point Source Contaminants D-5
iii. Table of Other Wells D-6
iv. Table of Potential Non-Point Sources of Contamination D-6
v. Committee Phone List D-6
vi. Definitions D-7
vii. Useful Informational Websites D-8
viii. Signed Emergency Response Plan Affidavit D-11

Note: Any blue underlined words will link to the online database location if one is available when using an electronically formatted version of the Source Water Protection Plan

Introduction

Background of Source Water Protection

In 1974 the United States Congress enacted the Safe Drinking Water Act (SDWA) with the goal of providing safe drinking water for public water supplies and their users. The SDWA gave the United States Environmental Protection Agency (EPA) the authority to develop a uniform national drinking water protection program, and to establish standards for known or suspected drinking water contaminants. In 1996, Congress amended the SDWA to reflect a growing awareness of potential biological and chemical threats to drinking water. The amendment to the SDWA outlines a plan for communities to protect their own source and keep program effectiveness at the local level.

During 1998-1999, the Iowa Department of Natural Resources (IDNR) and the Iowa Geological Survey Bureau (IGSB) started developing a Source Water Protection Program for the State of Iowa. In October 1999, EPA approved the IDNR Source Water Protection Program, including the already active program of Wellhead Protection.

At this time, legislators in the State of Iowa indicated that Iowa will maintain a voluntary approach to Source Water Protection planning. A voluntary implementation (as opposed to regulatory) is appropriate for Iowa due to the uniqueness of each public water supply system. The voluntary approach also conveys a positive image of the Source Water Protection Program

Iowa Rural Water Association (IRWA) has taken an active role in developing Source Water Protection Plans for small communities. IRWA's mission in this regard is to provide technical assistance to small communities in developing Source Water Protection Plans to protect their drinking water supplies.

Currently, IRWA's Source Water Protection Program is serviced by two grants. One supplies a program through a USDA-FSA grant and another through the Iowa Department of Natural Resources (IDNR). The Swaledale Water Supply Source Water Protection Plan has been developed through Iowa Rural Water Association's IDNR Source Water Protection Program

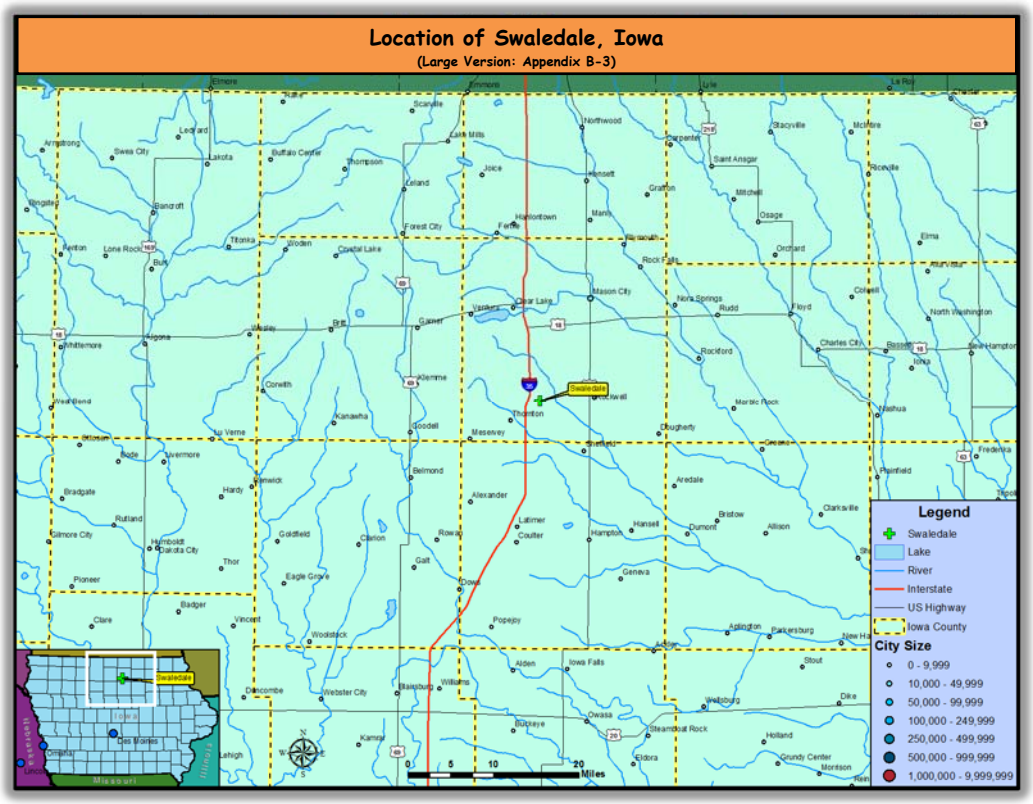
Purpose

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 important reasons for protecting the Swaledale Water Supply drinking water.

- Safeguard the health of community residents
- Prevent and reduce financial burdens caused by contaminated drinking water should it occur
- Educate and promote community awareness on drinking water contamination
- Safe drinking water is the life line of the community in the present and in the future
- Develop a contingency plan in the unlikely event that your drinking water supply would happen to become contaminated

Swaledale Water Supply #1778008

Location



Swaledale, IA is a small community nestled to the SE of Mason City just east of Interstate 35 in southern Cerro Gordo County. Swaledale is located in north central Iowa approximately 35 miles south of the Minnesota border. The utility operates a single water supply well located in the city park.

Water Supply Information

Source

Swaledale operates a single well drilled into the Devonian limestone to a depth of 450ft. The well produces an average of 140 gallons of water per minute. The well is located along Main St. in the City Park. The well is in a small treatment facility under the water tower.

Swaledale Public Water Supply Well Inventory												
GeoSAM	Tag ID	Local Name	Drill Date	Aquifer	Depth	Status	Elevation	Bedrock Depth	Pump Test Date	SWL	PWL	Yield
2742	1020476	Swaledale #1	1/1/1984	Devonian	450	Active	1152	22	6/1/1984	55	153	100
Source: www.iowasourcewater.org -> Source Water Tracker -> Swaledale												

Customers

Swaledale supplies water to 165 residents on 88 connections. The utility averages 12,000 gallons of water used per day (gpd) during the summer and an average of 8,000-9,000gpd during the winter. The utility has a storage capacity of 50,000 gallons in an elevated storage tank. The City currently has access to a portable generator in the event of power loss. Currently, well maintenance has been minimal. When major maintenance is done in the future, the plan is to fill

the tower and place restrictions on water usage. Iowa DNR Field Office #2 has strongly encouraged the utility to develop a second water source/well.

Treatment

Treatment is minimal for the water supplied in Swaledale. The utility currently only adds chlorine for disinfection.

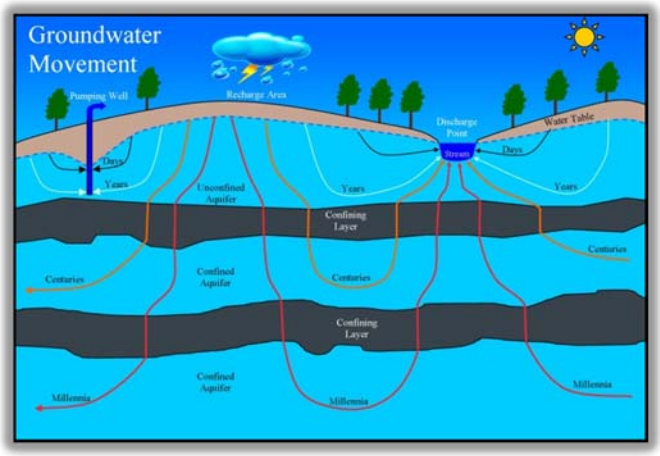
Known Water Quality Issues

The only known water quality issue is natural fluoride. Fluoride is naturally found in the aquifer in concentrations near two parts per million (ppm).

Hydrogeology

Over 80% of Iowan's obtain their drinking water from groundwater. Groundwater is found in aquifers that vary in depth, size and water quality. Many different aquifers are found and used in Iowa to supply quality drinking water to municipalities and private residences.

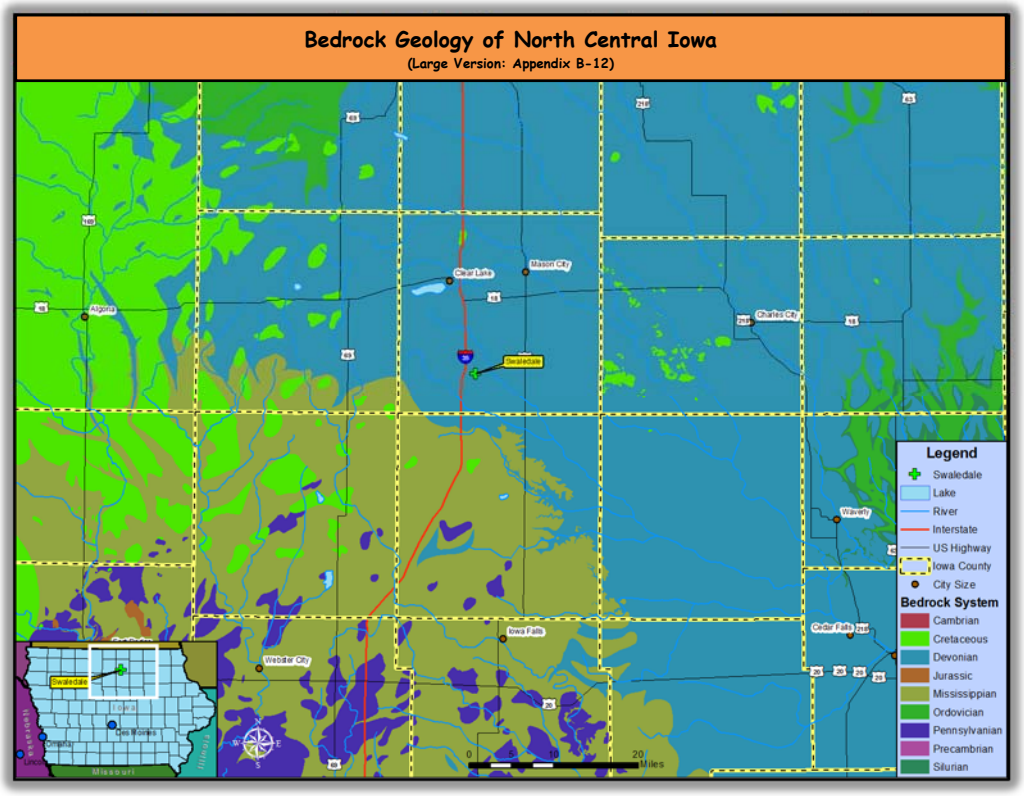
Along many of Iowa's Rivers we find surficial or unconfined aquifers. Surficial aquifers are generally made up of sand and gravel with little material overlying them. These are found in the modern river valleys, and are generally referred to as alluvial, drift, or buried channel aquifers. Alluvial aquifers are generally exposed to the surface and located next to modern day rivers. Drift aquifers are small rogue areas of sand and gravel that are generally small in nature and for the most part are only used for local or private wells, not community water supplies. Buried channel aquifers are very good sources of drinking water for all uses and mark out former river channels.



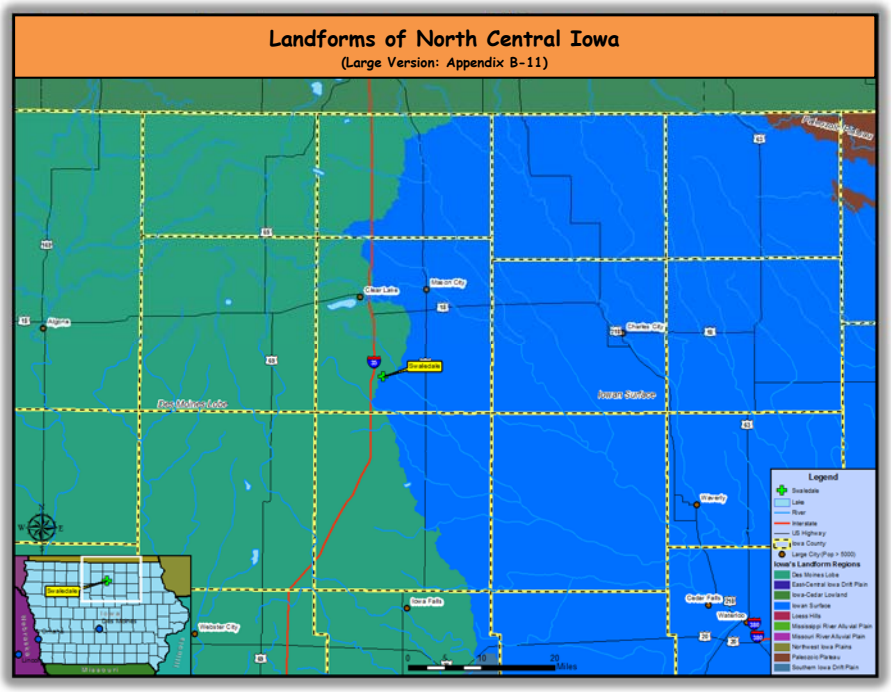
In most of Iowa we find confined aquifers located in the bedrock beneath the glacial till that makes Iowa well suited for farming activities. These aquifers provide a reliable source of good quality water in much of central and northeastern Iowa. From central Iowa southward, the bedrock aquifers are rarely used. These aquifers are deeper as you move southwest across the state and the water generally contains higher amounts of dissolved minerals. We like to see water stay in contact with the ground for extended periods of time because it tends to "clean" the water of harmful chemicals. If water stays in contact to long, it will dissolve minerals from the surrounding rock. This creates a very poor quality of water. These aquifers are still used in industries such as ethanol production because the wells produce plenty of water, and require little treatment to be used in these industries.

In Iowa, we are looking for aquifers that have good water quality, are easily recharged, and also have confining layers that are thick. Confining layers are layers of soil or rock that do not easily transmit water. These are generally made up of clay or shale and act as a confining unit depending on its thickness. This is very important when classifying a well as deep or shallow. Iowa's Administrative Code (IAC, Chapter 40.2) defines shallow and deep wells. If an aquifer has a continuous layer of low permeable rock at least 25 feet below the grounds surface and is a minimum of 5 feet thick, a well is considered a deep well. If a well does not meet these criteria, the well is considered shallow. Deep wells are less susceptible to contamination, thus they are given lower susceptibility designations. Swaledale Water Supply's well meet this criteria. Swaledale Water Supply's well is assigned a ranking of **slightly susceptible** due to the thickness of the confining layer being between 50 and 100 feet thick. This indicates that the wells have a slight potential to be impacted by surface contaminants such as underground storage tanks and agricultural chemicals.

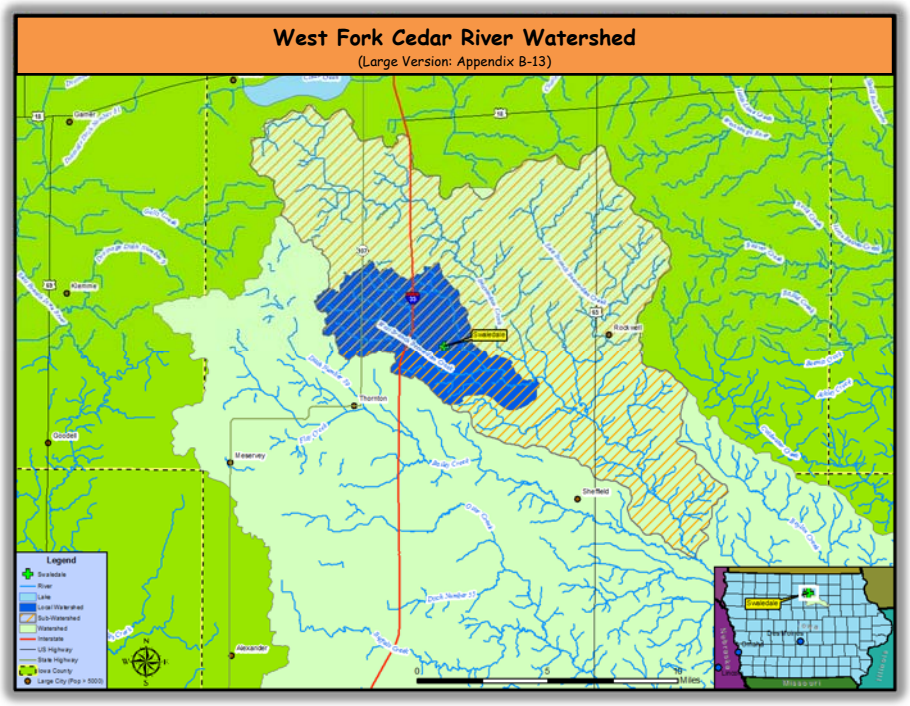
Swaledale's wells are drilled in to the Devonian aqufier, specifcally the Juniper Hill formation. The Devonian aquifer is the bedrock surface in much of far eastern and northeast Iowa. Seepage to the depth of the aquifer in Swaledale is slow, but does occur with primary recharge being where the bedrock is exposed and close to the surface. The Devonian aquifer is well protected due to the overlying glacial till, but also by a thick layer of shale. This considerbly slows the downward movement of water from the surface, thus protecting the aquifer. The aquifer slopes downward from the northeast, and as it gets deeper, the water quality begins to degrade due to mineralization. This is the source of the natural fluoride in the aquifer. Mineralization occurs as the naturally acidic water dissolves the minerals in the rock creating a chemical reaction making the minerals water soluble.



The dominating surface landform in Swaledale is the Des Moines Lobe glacial formation. The Des Moines Lobe was formed during the last ice age as glaciers retreated across Iowa. This left behind a very flat landscape. What it also left was a thick layer of glacial till. This glacial till is a fined grained material that holds water and is well drained, but it also slows the vertical movement of water, which protects the drinking water source. The shale layer of the Devonian era and the glacial till that sits on top of the Devonian aqufier provide an excellent layer of protection for the drinking water source.



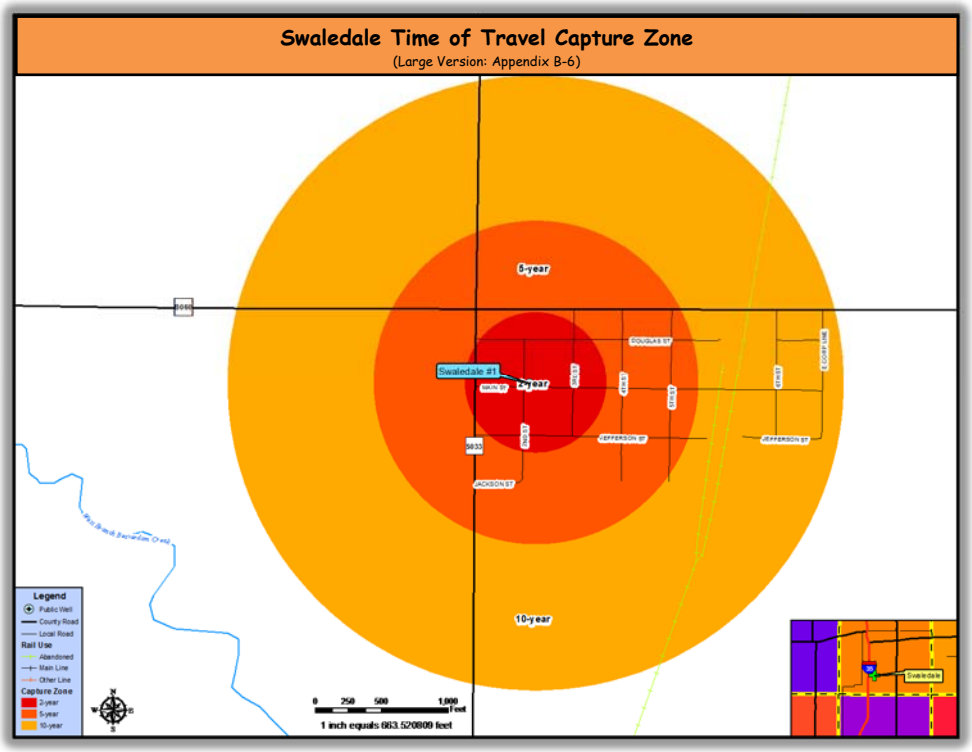
Given the information provided above, it is highly unlikely that surface water will have an impact on the drinking water source. Swaledale lies in the West Fork Cedar watershed and specifically in the Beaverdam Creek sub-watershed. Swaledale lies on the norhtwest edge of the West Fork Ceder and the Center of the Beaverdam Creek watersheds. As the map indicates, there is not a major waterway located near Swaledale or the drinking water well. A quarry is located at the edge of the deliniated capture zone, but due to the thickness of the glacial till, should not impact the water source.



Swaledale Water Supply Source Water Protection Plan

Capture Zone

Swaledale's capture zone is a defined 2-year, 5-year, and 10-year time of travel capture zone. The capture zone is a simple model of concentric circles that radiate outward from the only well the utility uses. The capture zone encompasses all of Swaledale and agricultural areas to the west, south, and north of Swaledale.



Potential Contaminant Inventory

Swaledale's potential contaminant inventory is focused on private wells that are still located in the community. Swaledale's water supply began operation in the mid-1980s. Prior to this, wells were constructed to supply all homes and business with water at each property. These wells were not required to be plugged, but all were required to connect to city water. The city is inventorying and GPS locating each of the wells and developing a priority list for wells to be plugged or repaired.

Nitrate/Non-Point Source

Nitrate is not thought to be impacting the drinking water source in Swaledale. Annual sample results are below .5ppm. Depending on the lab that is used, this may be the sample detection limit for normal testing. The samples from the past six years indicate that there is little to no non-point source pollution impact on the drinking water source in Swaledale.

Potential Point-Source Contaminant Sites

Potential contaminants are very widespread due to the n of private wells that are still located in Swaledale. These wells were installed prior to the installation of the water supply in the mid-

1980's. Many of these were not plugged, and a few are still used for outdoor watering and cleaning. These threaten the water source because there is very little information about these wells, many are not properly capped or maintained, and the depths are not known.

Private Well found in Swaledale during the Contaminant Inventory

Chemical sources of contamination that are known are very few. Swaledale does not have an active gas station. The Coop has above ground storage tanks, but they are maintained in concrete basins. Other threats are from future spills or accidents that may occur in the capture zone.

Ranking Criteria

The potential contaminants are listed below alphabetically. The FieldID# links to the table of potential contaminants and numbers on the potential contaminant maps (Appendix B, pages B-8 – B-10). The potential contaminants were ranked on four scales. The first was a 1-5 scale based on the chemical type and storage threat with 5 being the highest. The second was on the basis of the aquifer susceptibility. In Swaledale, the aquifer being taken into consideration is a **Devonian aquifer** that is **Slightly Susceptible** to contamination. All potential contaminants were given a ranking of 2 for aquifer susceptibility. The third scale was the proximity to the well. If the contaminant was in the 2-year it was given a 3, 5-year was given a 2 and 10-year was assigned a value of 1. The fourth scale is based on proximity to the well based on IDNR standard setbacks. If a contaminant was within 200ft of the well, it received a risk value of 4, 400ft a value of 3, and if the contaminant was within 1000ft, it received a value of 1. The assigned risk assessment was developed using the total risk number. If a potential contaminant had a total risk value of 12 or larger, it was ranked as a High threat of contamination, 8-12 were ranked as a Moderate threat of contamination and 7 or lower is a Low threat of contamination.

Swaledale Water Supply Potential Point Source Contaminant and Well Inventory

Field ID	PCS Site	Address	State ID	Potential Contaminant	Capture Zone	Total Risk	Risk	Facility Status	Potential Contaminant
2	5 Star Cooperative			Air Permit – Group 1	5-Year	8	Moderate	Active	Grain Elevator
1	Former Long Haul Trucking Facility			Above Ground Storage Tank	10-Year	5	Low	Active	Fuel
28	North Iowa Coop – Swaledale	310 S. 5th St	FAIDSIT2A00001446	Tier II Chemical Storage	10-Year	8	Moderate	Active	Anhydrous Ammonia
25				Historic Gas Station	5-Year	6	Low	Inactive	Fuel
26	R & R Gas and Repair	Hwy B-60	198810989	Underground Storage Tank - Closed	10-Year	4	Low	Inactive	Fuel
27	AJ Bonner Inc	204 S. 2nd		Underground Storage Tank - Closed	5-Year	6	Low	Inactive	Fuel

Swaledale Water Supply Potential Non-Point Sources of Contamination				
Contaminant	**Location**	**Type**	**Size/Amount**	**Description**
Row Crop Agriculture	West, north and south of the wells	Agriculture	65% of the capture zone	Row crop agriculture land use threatens the water source through the use of widespread fertilizer and other chemical application. Much of the capture zone is covered by this land use.

Swaledale Water Supply Source Water Protection Committee							
Name	**Affiliation**	**Email**	**Phone**	**Mailing Address**	**City**	**State**	**Zip**
Brent Beste	IRWA	brentbeste@iowaruralwater.org	(515) 205-4026	4221 S. 22nd Ave E.	Newton	IA	50208
Greg Meier	City of Swaledale		(641) 512-2305	PO Box 7	Swaledale	IA	50477
John Drury	City of Swaledale – Mayor		(641) 995-2360	PO Box 7	Swaledale	IA	50477
Scott Wilson	Iowa DNR Field Office #2	Scott.wilson@dnr.iowa.gov	(641) 424-4073	2300 15th St SW	Mason City	IA	50401

Focus Area

The committee has decided the primary focus will be on the private wells that are located throughout the community and regulatory measures to protect the system. The committee feels inventorying the wells, and developing an action plan specifically for the wells based on existing use and well quality is the best route to long term protection of the water source.

The committee is also focused on relationship development with the city's neighbors. With the lack of existing chemical impacts on the water source, the committee felt that relationship development was the best course of action with chemical users near the well.

Management Strategies

Initial Projects Prepared: 4/30/2014
Small Committee Discussed and updated: 7/14/2015; updated: 7/15/2014
Project List Finalized by the Committee: 8/11/2014; updated 8/20/2014

1. **Work with homeowners to ensure that all wells that are not in use are plugged**
    a. Cost: Homeowner with county cost share
    b. Goal: Outlined in the project goals
    c. Timeline: Outlined in the project goals
    d. Contact:
        i. Greg Meier, Water Superintendent, City of Swaledale
    e. Implementation Status: Committee Discussed

Project Description

Plugging private wells will eliminate the potential pathways of contamination to the aquifer from wells that are no longer in use. These wells can act as conduits for contamination through failing casing, vandalism, or neglect in maintenance (i.e. missing or degraded well cap).

In most counties, the County Sanitarian's office may have discretionary funds to assist private homeowners with the plugging of these wells. This is a cost share initiative with the county covering a portion of the materials and/or labor.

The Iowa Administrative Code, Section 567, Chapter 39 contains the following regarding private wells:

"Abandoned well" - means a water well which is no longer in use or which is in such a state of disrepair that continued use for the purpose of accessing water is unsafe or impractical.

39.5(4) - Wells abandoned after April 25, 1990. All classes of wells which are abandoned on or after April 25, 1990, must be properly plugged within 90 days of the date of abandonment.

This requires owners of wells that are no longer in use or in disrepair to plug them within 90 days of abandoning.

Goal

- Determine well status (active inactive) and quality by Fall 2015
    - Conduct inspections to ensure that there are no cross connections between home water supplies and the public water supply system
- Plug abandoned wells in the 2-year capture zone by Fall 2016
- Plug ¾ of all abandoned wells in the capture zone by 2018
- Develop an ordinance requiring homeowners to plug wells on the property at the time of a home sale/title transfer
    - Add language allowing the council to approve the new resident to keep the well provided the well is inspected and in good working order, the water quality is tested yearly, and that the well will be properly maintained

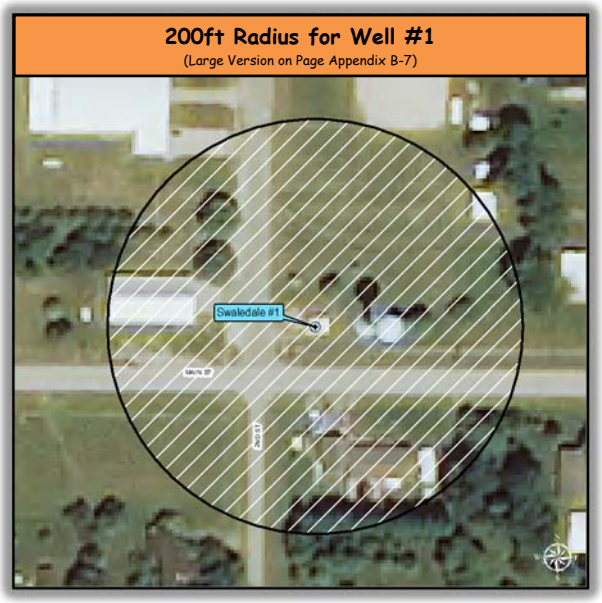
Results

The wells have been initially inventoried and GPS located by IRWA and the City. The City is developing a priority list. A timeline has been discussed by the committee.

2. **Enact an ordinance to gain control of the 200ft radius around the public well to meet IDNR Requirements**
    a. Cost: Ordinance Change Costs
    b. Goal: Ordinance
    c. Timeline: Complete
    d. Contact:
        i. John Drury, Mayor, City of Swaledale
        ii. Greg Meier, Water Superintendent, City of Swaledale
    e. Implementation Status: Ordinance approved by the Swaledale City Council in April of 2014

Project Description

The IAC requires that all wells drilled after 1979 are required to have 200ft of legal control. This can be established through land purchases, ordinances or easements. Swaledale's public well was drilled in 1984 (Well #1). Well #1 is required to have this protection.



When Swaledale began Source Water Protection Planning in December 2013, there was not an ordinance in place to meet the mandated IDNR set back distances. Updating the city code to include this ordinance will ensure the area immediately around the well is protected and any future wells that are deemed necessary are also protected.

Reference: Iowa Administrative Code, Environmental Protection Committee, 567, Chap. 43.3(7) Water Supplies - Design and Operation

Goal

- Implement an ordinance guiding the land use and chemical application within 200ft of public wells in the City of Swaledale

Results

In April of 2014, the City of Swaledale approved a new City ordinance to gain control of the area within 200ft of a public well in the City of Swaledale.

3. **Work with the land owner/operator near well #1 to ensure that they knows the location of the City well and discuss protection measures near that well.**
    a. Cost: Staff Time
    b. Goal: Relationship Development
    c. Timeline: Meet with the landowner by Spring 2015
    d. Contact:
        i. Greg Meier, Water Superintendent, City of Swaledale
    e. Implementation Status: Committee Discussed

Project Description

There are many benefits to developing a working relationship with the local landowners and operators. This will make the landowner/operator aware that they are farming in a community drinking water source. If a relationship exists, and an agricultural contaminant is found, the utility will then know who to call for more information to start determining the source. It is also beneficial if agricultural chemical concentrations start to slowly increase. This allows the utility time to work with the landowners/operators to improve management in conjunction with the

utility instead of on their own. The utility can also promote practices such as those listed below to protect the drinking water source before contaminants are found.

Row Crop Soil and Water Conservation Practices

- Conservation Reserve Program (CRP): Wellhead and General Sign Up Programs
  - Benefits
    - Guaranteed income
    - Long term contracts (10-15yrs)
    - Increased wildlife habitat
    - Increased infiltration
    - Increased nutrient up take
  - Downfalls
    - Annual Maintenance
    - Loss of Crop Land

- Nutrient Management: Fertilizer Timing (side dress nitrogen when needed), Spring Only Application, Follow IA State Application Recommendations
  - Benefits
    - Decreased application (lower fertilizer costs)
    - Decreased fertilizer loss
  - Downfalls
    - Proper timing is necessary
- Cover Crops
  - Cover Crop Benefits
    - Decrease soil loss
    - Increase soil organic matter
    - Increase wildlife
    - Increase infiltration
    - Sequester and scavenge residual nitrogen
  - Cover Crop Downfalls
    - Cost – Yearly seed and planting costs
    - Crop insurance timing issues
    - Initial increase in nutrient needs
    - Herbicide used to kill crop in the spring

- Install Buffers near streams and wellheads
  - Benefits
    - Increased infiltration
    - Decreased sediment loss to streams
    - Increased wildlife habitat
    - Increased infiltration at edge of field

    - Downfalls
        - Loss of crop ground
        - Cost of installation
- Prairie Strips (Newer Program)
    - Benefits
        - Only requires strategic placement of prairie strips in 10% of a field/watershed
            - Removes significant quantities of nitrogen and phosphorus
        - Eligible for General and Continuous CRP
        - Relatively low costs
    - Downfalls
        - Loss of Farmland
        - Costs
        - Maintenance – ensure not damaging during planting/harvest
- Other soil and water conservation practices that improve surface water/groundwater quality
    - Grassed Waterways
    - Conservation Crop Rotations
    - Terraces
    - Bioreactors/edge of field improvements

Funding Sources

- USDA
    - EQUIP (Federal Cost Share)
    - CRP Programs (Federal Rental Payments, possible city incentives)
    - Cost Share Programs (City, County, State, Watershed)
- WIRB (Watershed Improvement Review Board)
    - Dedicated project funding (land purchase, structures, wetlands)

Sources

- 2014 Continuous CRP Fact Sheet, June 2014 – USDA-FSA
- 2014 EQUIP Key Iowa Practices for General Funding, June 2014 – USDA-NRCS
- Cover Crops to Improve Soil Iowa Fact Sheet, June 2013, USDA-NRCS
- Small Changes, Big Impacts: Prairie Conservation Strips, March 2014 – STRIPS Program

Goal

- Develop relationship
- Raise awareness
- Encourage nutrient and chemical application adjustments within 200ft of the well
- Promote agricultural management practices
    - Eliminate fall fertilizer application
    - Decrease amounts of fertilizer needed
    - Wellhead CRP

- Cover Crops
- Enhanced buffers and for nutrient management and increased wildlife

Results

This project has been discussed with the committee.

4. **Complete Sewer Smoke Blowing for I & I to attempt to locate failure points in the sanitary sewer collection system**
    a. Cost: Liquid Smoke (~$50/gallon)
    b. Goal: Complete sanitary sewer inspections for all of Swaledale
    c. Timeline: Late Summer/Early Fall 2014
    d. Contact:
        i. Greg Meier, Water Superintendent, City of Swaledale
        ii. Contact: Scott Shover, Wastewater Tech, Iowa Rural Water Assn.
    e. Implementation Status: Committee Discussed

Project Description

Completing regular maintenance and inspections on the sanitary sewer system is good practice to ensure the system meets regulatory requirements. This also helps determine sources of I&I (infiltration and inflow). Any location where water can get into the system, water can also get out. Ensuring that water is not getting into the system will help make sure that the drinking water system is not compromised.

Sanitary sewers are also a source of one of the emerging contaminants in groundwater. Groundwater investigations in Ames, IA and Madison, WI have found traces of short living viruses, pharmaceuticals, and other traces of human activity in deep wells. The wells where these contaminants were found were thought to be well protected from surface activities. There currently is no guidance or confirmation to verify the source of the contaminants found. However, studies are leaning towards leaking sanitary sewers and other sources of raw sewage as the source of contamination.

Smoke blowing is a great starting point. When it is dry, it is possible that smoke will come out of the ground near locations where the sewer system is leaking. Iowa Rural Water Associations Wastewater Technicians are available to assist the City with this project at no cost to the city, with the exception of consumables such as the liquid smoke.

If areas of concern are found, it might be wise to use a sewer camera to complete a visual inspection of the area of concern. This could save time and money by determining how extensive the damage is, and what course of action will be needed. It could be as simple as

lining the sewer main, or as complicated as line replacement. Each bring their own challenges, but conducting the visual inspection can save time and money vs. digging first.

Goal

- Smoke blow the entire Swaledale Sewer System

Results

This project has been discussed by the committee.

5. **Develop and institute a backflow prevention program for larger water users in Swaledale**
    a. Cost: Ordinance development, enforcement
    b. Goal: Ordinance requiring a backflow prevention device with annual testing
    c. Timeline: Fall 2015
    d. Contact:
        i. Swaledale City Council
    e. Implementation Status: Committee Discussed

Project Description

Backflow prevention is becoming more and more important for community water supplies. Homeowners are now required to install outdoor faucets with self-contained backflow devices when they are replaced/upgraded. Many large users, such as the coop, already have air gaps on overhead filling stations. The goal of this is to prevent water that may be contaminated in some way (chemical fill tank/wash bucket with dirty water and hose in it) from being sucked back into the distribution system if negative pressure is created.

The simplest way to do this is to require large water users (schools, fertilizer mixing facilities, etc.) to install backflow prevention devices to ensure that water does not enter the distribution system. Negative pressure, which can draw water back into the system, occurs more often than we realize. This occurs during firefighting, hydrant flushing, or other large withdraws as water normally moves through the distribution system. For community health, it is necessary to ensure that water containing chemicals does not re-enter the distribution system.

It is also possible for homeowners to install basic backflow prevention. In most cases, backflow prevention is not important because basically, an air gap already exists. Where you have the ability to connect a hose however, this gap does not necessary exist. Since a hose can be left to fill/refill any container, it is possible that water could be sucked into the distribution system when negative pressure occurs. To prevent this, an anti-siphon hose bib can be installed instead of the former standard faucet hose bib. These faucets will prevent water from being sucked out

of a bucket or pool for example when negative pressure occurs. Encouraging homeowners to replace these faucets with the new type will help protect the water in the distribution system.

Backflow prevention programs are already required in large communities. To ensure compliance, the backflow devices must be tested annually with a report sent to the city and kept on file.

Goal

- Develop an ordinance and guidance for a backflow prevention program for the City of Swaledale with mandatory reporting
    - These reports must be sent to the Water Department to ensure compliance with the ordinance
- Encourage residents to install anti-siphon hose bibs on faucets that are used with a hose

Results

This project has been discussed with the committee.

6. **Promote storm water management strategies to protect surface and groundwater resources**
    a. Cost: Staff Time/Promotional Materials
    b. Goal: Promote through brochures
    c. Timeline: Ongoing education, demonstration project by Fall 2016
    d. Contact:
        i. Greg Meier, Water Superintendent, City of Swaledale
    e. Implementation Status: Committee Discussed

Project Description

Storm water is directly connected to groundwater and surface water bodies. Runoff from homes lawn and gardens and impervious surfaces (i.e. roads, roofs) will runoff to areas where water will infiltrate into the groundwater system or enter the storm sewer system.

A starting point is to encourage homeowners to install management strategies such as native turf grasses (i.e. buffalo grass, blue grama), rain barrels, or rain gardens. All of these measures benefit the water cycle. Some require less fertilizer for home lawns, improve infiltration of water, or store water for use later.

Rain Barrels in Denver, IA

Promoting water conservation activities to the residents of Swaledale will encourage practices that can improve water quality, water conservation, and decrease nutrient use in the city. Promotion can also be in the form of the City installing an example or demonstration project. Encouraging this as a community service project to local youth organizations is a great way to kick start the strategies.

Goal

- Rain Garden/Rain Barrel/Native Grass planting demonstration project
- Encourage the use of Rain Barrel's
- Encourage the installation of Rain Garden's
- Encourage Proper Lawn Care
- Encourage residents to examine the benefits of converting turf grass to native short grasses that are similar to Kentucky blue grass but require fewer chemicals

Results

The committee has discussed this project.

7. **Public Well Maintenance to ensure integrity of the well is not compromised**
    a. Cost: Staff time, well maintenance costs
    b. Goal: Development of a regular well maintenance schedule
    c. Timeline: Schedule developed by Spring 2015
    d. Contact:
        i. Greg Meier, Water Superintendent, City of Swaledale
    e. Implementation Status: Committee Discussed

Project Description

Completing regular well maintenance to ensure the integrity of the water supply system and source is imperative. Well maintenance goes beyond pulling the pump. When the pump is pulled, the well contractor can easily complete a well casing video. This video will provide the city with information about the integrity of the well, possible weak points, and if the well or casing requires repair. If the well casing were to be compromised, contamination of the water source could happen.

Other regular maintenance including casing replacement when necessary and chemical base testing so you know what the water quality should be (a snapshot) so when a sample comes back as elevated or a violation the background quality is known.

Regular Operations and Maintenance is good, but accurate record keeping is necessary. The well records are currently well kept, but can be taken to the next level. Plotting static water levels (SWL) and pumping water levels (PWL) can show trends. Changes in these trends can have multiple causes, but indicate changes in well performance. Changes in SWL can indicate more overall climatic changes at the surface, but it can also indicate that some of the fractures in the aquifer are being plugged by mineralization or debris. Changes in PWL could indicate changes in pump efficiency, changes in the bedrock fractures, or issues with the casing (failing casing could cause silt/clay to fall deeper and plug fractures). The change in PWL or SWL could also lead to changes in the well yield. If the yield decreasing significantly, it could change how the system is operated.

Goal

- Down hole video the well casing when the pump is pulled

- Use Microsoft Excel or similar program to track SWL, PWL, and well yield changes
    - IRWA can help get this set up

Results

Brent is going to work with Greg to develop an Xcel Spreadsheet to calculate and monitor static water levels, pumping water levels, drawdown, discharge and specific capacity. The project has been discussed with the committee.

8. **Development of a plan for a second source of water in the event of water loss**
    a. Cost: Staff Time
    b. Goal:
        a. Contact a water distributer or other communities to provide water
        b. Develop a plan to install a second water source
    c. Timeline: Spring 2015
    d. Contact:
        i. Greg Meier, Water Superintendent, City of Swaledale
        ii. Swaledale City Council
    e. Implementation Status: Committee Discussed

Project Description

The goal of this project is to determine where to drill a new well to provide backup in the event of pressure loss, well maintenance, or disaster. Basic well maintenance requires that wells be taken offline for a period of time. If something happens, such as an accidental loss of the pump down the well and needing to recover it, the water system may not have enough water in storage to meet basic demand.

A second well will alleviate this problem, and will help allow for other system maintenance to occur (i.e. well maintenance). This project will also provide a second source of water in the event of a natural disaster. If a second well is placed in a different location in the community, it is considered a second source. This benefits the community in the event of contamination of the primary well or loss of infrastructure to the primary well.

Goal

- Develop a backup source of water (bottled water, truck water in from another community [must be in food grade tankers])
- Determine a location and pursue funding for a new water supply well.

Results

The committee has discussed this project.

9. **Install Water Supply Protection Area Signs in a visible area**
    a. Cost: Staff Time to install – IRWA will supply the signs
    b. Goal: 2 or 3 signs in the capture zone
    c. Timeline: Fall 2014
    d. Contact:

i. Brent Beste, Source Water Specialist, Iowa Rural Water Association
ii. Greg Meier, Water Superintendent, City of Swaledale

e. Implementation Status: Committee Discussed

Project Description

Alerting residents and those passing by of the sensitive areas may reduce the chance of illegal dumping, vandalism, and raise awareness of the water source. IRWA Provides these signs at no cost to community's that are completing source water protection plans and will assist with locating them.

Goal

- Red federal offense for tampering stickers on water and wastewater infrastructure
- Two or three signs in visible locations in the capture zone.

Results

The Committee has discussed this project.

10. Public Education Campaign

a. Cost: Staff Time, Promotion Materials
b. Goal: Brochures made available to public, education event
c. Timeline: Fall 2014
d. Contact:
   i. City of Swaledale
   ii. Education Materials: Brent Beste, Source Water Specialist, Iowa Rural Water Assn.
e. Implementation Status: Committee Discussed

Project Description

Education materials are a great way to inform the community about the Source Water Protection Project, the source of Swaledale's drinking water, and management strategies that homeowners can enact at home. Education is one of the most important parts of a source water protection plan. Informing the customers of what the water supply is doing and why. It is imperative to implementing any part of the SWP. If money is spent or changes occur, it might decrease the number of calls or complaints about how money is being spent.

Students participating in classroom demonstrations

Brochures and newsletter articles are the most common and cost efficient ways to inform the customers of the project. Brochures and articles

can be developed by IRWA and given to the city. Brochures can also be made available at City hall and/or the public library. Posters that are designed and printed by IRWA can also be used to promote the program at these locations to supplement the brochures.

Educational events are also possible. There are multiple avenues that events can take. The events can be held at local festivals, a public event at city hall specifically for the source water program, or educational events at city hall.

Goal

- Brochures (What is Source Water Protection, Hazardous Material Disposal, Lawn Maintenance)
- Public Event at City Hall

Results

This project has been discussed by the committee.

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