

Source Water Assessment for Dubuque (PWS# 3126052) Cambrian-Ordovician & Alluvial Aquifer



Source Water Protection

The purpose of this Source Water Protection (SWP) "Phase I" assessment is to:

- Define your source water area and susceptibility;
- locate, inventory, and rank potential contaminant sources within your source water area;
- provide the results to the public for improved protection of your drinking water.

Introduction

This Source Water Protection (SWP) "Phase I" assessment is meant to provide information and be used as a tool to help protect the quality and quantity of your drinking water. Within it you will find an inventory of your wells, tables showing potential contamination sources within your source water area, and maps showing your system's source water information.

The source water area defined in this report is the region directly linked to your water supply, and where land use changes have the greatest influence on your drinking water quality. Your source water area was defined based on scientific information available to the Iowa Department of Natural Resources (IDNR – Source Water Protection Program).

This "Phase 1" source water assessment by no means protects your drinking water. To protect your drinking water your system should develop

and implement a Source Water Protection Plan. Protection measures are different for each system, but commonly include reserving areas for future wells, cleaning up contaminants, and converting portions of your source water area to native vegetation. Further information on how to protect your drinking water, including a [guidebook](#), [workbook](#) and [GIS resources](#), can be found at www.iowasourcewater.org.

This SWP assessment includes the following sections:

1. Defining Your Source Water Area
2. Susceptibility of Your Source Water Area
3. Contaminant Sources within Your Source Water Area
4. Ranking Contaminant Sources
5. How to Protect Your Drinking Water
6. Consumer Confidence Report

Section 1: Defining Your Source Water Area

Accurate well, aquifer, and pumping information is critical to providing the best estimate of your source water area. According to our records, Dubuque has four active public wells open in the sandstone and dolomite of the Cambrian-Ordovician aquifer and five active public wells open in the sand and gravel of the Mississippi River Alluvial aquifer. The table below shows your well and aquifer information. If you believe the table is wrong, please contact the Source Water Protection Program at www.iowasourcewater.org or 515-725-8332.

W#	Local Name	Depth (ft.)	Const. date	Status	Aquifer	Aquifer thick. (ft.)	SWL (ft.)	PWL (ft.)	Rate (gpm)
7467	#1	136	12/1/1955	Plugged	Alluvial	122	13	27	2333
7468	#2	196	1/1/1956	Active	Alluvial	171	13	27	2240

39379	#3	200	1/1/1956	Active	Alluvial	174	13	18	2496
39382	#10	142	1/1/1981	Active	Alluvial	117	25	40	2083
39380	#4	190	6/1/1956	Active	Alluvial	165	13	14	2433
39381	#9	125	1/1/1969	Active	Alluvial	104	21	44	972
87	#6	1504	8/27/1935	Active	Cambrian-Ordovician	1287	34	253	1313
974	#7	1560	4/27/1939	Active	Cambrian-Ordovician	1345	22	140	2351
121	#5	1810	5/21/1924	Active	Cambrian-Ordovician	1606	27	66	680
2363	#8	1782	9/30/1946	Active	Cambrian-Ordovician	1537	28	152	1975
39386	Old 4	1460	1/1/1919	Not Used	Cambrian-Ordovician, Cambrian (blw St. Lawrence)	0	34	105	0
39385	Old 3	1458	1/1/1919	Not Used	Cambrian (blw St. Lawrence)	0	36	105	0
39384	Old 2	1300	1/1/1899	Not Used	Cambrian (blw St. Lawrence)	0	36	119	0
39383	Old 1	1308	1/1/1899	Not Used	Cambrian (blw St. Lawrence)	0	35	116	0
37718	#1	300	1/1/1970	Plugged	Ordovician (abv St. Peter)	0	0	0	0
37719	#2	300	1/1/1992	Plugged	Ordovician (abv St. Peter)	374	50	109	154

Source Water Glossary

Aquifer: An underground water-bearing layer that provides a usable quantity of water.

Source Water Area: An estimation of the area contributing water to your public wells.

Capture zone: A computer modeled source water area, typically using 2-5-and 10 year time of travel periods.

Time of travel: A duration of time specified to determine the distance and area that water will travel.

Susceptibility: A measure of an aquifer's potential to become contaminated. Does not imply either good or poor water quality.

Confining layer: A layer of material which slows the movement of water.

Cambrian-Ordovician Aquifer

Sufficient information was available concerning your wells, aquifer and pumping conditions to produce a computer modeled estimate of your source water area. For your water supply, the source area was divided and prioritized to show where we estimate groundwater to flow during "time of travel" periods; typically 2, 5, and 10-years. These source areas for your facility were estimated using an analytical element model for the purpose of delineating source water protection areas. The model requires certain input data for your aquifer, wells, and pumping rate, described below:

- Gradient: 0.001 ft./ft.
- Flow Direction: unknown
- Porosity: 0.1
- Transmissivity: 3,996 ft.²/day
- Aquifer Thickness: 1443 ft.
- Average Gallons per Day: 3,464,808.

Alluvial Aquifer

Your source water area is defined by hydrologic boundaries (i.e. an alluvial aquifer limited by landscape features). The source water protection area for your wells was modified based on the physical and hydrologic characteristics of the area. Features used to limit the extent of the hydrologic boundary typically include rivers, streams, and non-porous glacial till. Water within the boundary is projected to travel to your active wells in a short period of time.

In addition to the delineated groundwater area, surface runoff areas from streams that contribute to the groundwater capture zone were also delineated. Spills and other uncontrolled runoff have the potential to migrate through gullies, tributaries, or drainage tiles and infiltrate into the aquifer in the floodplain.

Section 2: Susceptibility of Your Source Water Area

Research by the [Iowa Geological Survey](#) has determined that thickness of confining layers such as till, clay, and shale between the aquifer and the land surface is inversely related to aquifer susceptibility. Aquifers overlain by thicker confining beds are less susceptible to contamination than aquifers overlain by thin confining beds. The table below summarizes susceptibility by confining layer thickness.

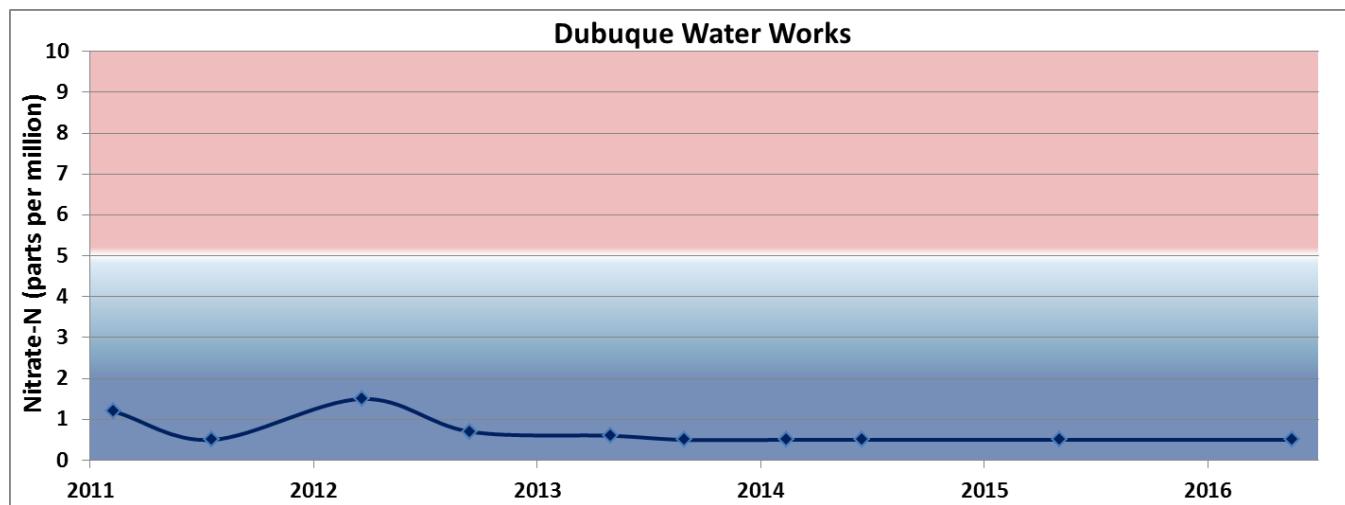
Confining layer thickness	Susceptibility designation
<25 feet	Highly susceptible
25 to 50 feet	Susceptible
50 to 100 feet	Slightly susceptible
>100 feet	Low susceptibility

Based on our data, your wells in the Cambrian-Ordovician aquifer have a cumulative confining layer thickness of 50 to 100 feet. Your aquifer was therefore determined to be slightly susceptible to contamination from the land surface. Your source water area may be influenced by highly fractured bedrock near the land surface, commonly called karst. Karst areas typically have groundwater in direct connection with the land surface. The map at the end of this report may show known sinkholes in your area. You may need to more accurately inventory sinkholes in your capture zone.

Your wells in the Alluvial aquifer have a cumulative confining layer thickness of less than 25 feet. This aquifer was therefore determined to be highly susceptible to surface contamination.

Another method for determining the susceptibility of your aquifer is by using nitrate concentrations in well water to evaluate the potential for contamination from the land surface. Wells that are less protected from contamination near the land surface typically have higher nitrate concentrations than wells that are more protected from contamination near the land surface. Based on our records, finished water at Dubuque has a six-year average nitrate-N concentration of <1.0 parts per million (ppm), based on 10 total samples.

Nitrate concentrations in your public water supply are generally low. Elevated nitrate concentrations can disrupt the electron transport system and cause methemoglobinemia, or blue baby syndrome, in infants.



Section 3: Contaminant Sources within Your Source Water Area

To identify potential contaminant sources we searched electronic databases for facilities and land uses that fell inside your source water area. The databases used for the inventory are described in step 3 of the Iowa Source Water Protection [Guidebook](#). The contaminant source inventory includes facilities and land uses that have been known to contaminate groundwater.

Table 1 lists the potential contaminant sources we found in your source water area. The map numbers correspond to the contaminant source list in Table 1. The potential contaminant sources are derived from databases that have varying degrees of locational accuracy, and therefore could be located in the wrong area or omitted from the map entirely. For this reason, locational accuracy is noted at the end of the table. You or other

residents may be aware of additional contaminant sources that should be included, feel free to modify this report to reflect your knowledge.

For many aquifers, particularly those overlain by thick confining layers, the greatest threat of contamination to the aquifer is through existing wells that penetrate the confining layers. For this reason, Table 2 lists all known wells, owners, and locations identified in your source water area. A numbered symbol shown on the map at the end of this report identifies well locations. Well locations are derived from databases that have varying degrees of accuracy, and therefore could be mapped in the wrong area or omitted from the map entirely. For this reason, locational accuracy is noted at the end of Table 2.

In addition to the specific “point” sources listed in Table 1, nonpoint sources of contamination also exist in your source water area. In Iowa, a potentially significant nonpoint source of contamination is row crop agriculture. Land use percentages and acreages are presented in Table 3.

Section 4: Ranking Contaminant Sources

We have attempted to prioritize the relative risk to your source water based on a three component ranking system; 1) the location of the potential contaminant source in the source water area, 2) the susceptibility ranking of the aquifer to contamination, and 3) the type of contaminant source. Points are assigned for each category and a cumulative score calculated for each potential contaminant source using the scores for each of the three components. Higher numbers always correspond to higher risk in this report.

1) Location of potential contaminant sources

Your potential contaminant sources are ranked from 1-3 based on the capture zone they are located in, with greater weight given based on proximity to the well. Fixed radius capture zones also received greater risk as they represent unknown or poorly known hydrogeologic conditions. The table below shows the risk score assigned to each source water area.

Source Water Area	Risk score
2-year time of travel, hydrologic boundary, fixed radius, 1-mile, modified karst - high	3
5-year time of travel, modified karst – medium	2
10-year time of travel, aquifer retrieval area, surface runoff area	1

2) Aquifer susceptibility to contamination

Susceptibility rankings were given scores to give more priority to aquifers with less confining layer thickness. Aquifer susceptibilities were given ranks of 1-4, from low susceptibility to highly susceptible. If your well depth or confining layer thickness is unknown, the source water area was automatically designated as “highly susceptible” and ranked 4.

3) Land-use type

The land-use type combines the potential for different facility classes or land uses to release contaminants with an estimate of the toxicity of the contaminants that may be released. Land-use risks are assigned values from 1 to 5 (least to greatest risk).

The final “Risk Score” for the source water area is the result of summing the three components of relative risk. For a list of land-use types and additional information regarding the ranking classification, please refer to the Iowa Source Water Protection [Guidebook](#).

The goal for ranking potential contaminants is to provide your system with a list to help prioritize potential risks. These risks can only be addressed through local initiatives and strategies started by your community. To begin a SWP plan, it is up to your local community to decide which potential contaminant sources carry the most risk,

and to proactively engage problems you find that may affect your drinking water. The risk rankings provided in this report are only a guide; the final decision on the priority of potential contaminant sources rests with your local source water protection team.

Section 5: How to Protect Your Drinking Water

This Source Water Phase I assessment only provides information on your source water area and contaminants. Your community is responsible for taking the necessary action to ensure you have clean drinking water for future generations. To do this the Iowa Source Water Program strongly encourages you to start a Source Water Protection Plan. A SWP plan is different for each community, but the steps needed to complete one are the same for every system. Most steps have already been outlined and partially completed in the SWP “Phase 1” assessment:

Steps for completing a Source Water Protection plan

- Step 1:** Organize a source water team
- Step 2:** Identify your source water areas
- Step 3:** Inventory well and contaminant sources
- Step 4:** Assess and rank contaminant sources
- Step 5:** Develop an action plan
- Step 6:** Construct or update your emergency response plan
- Step 7:** Submit and Implement your SWP Plan

If your community is interested in protecting your drinking water, there are plenty of free resources available to help guide you through this process. www.iowasourcewater.org has many online resources available, including a detailed [guidebook](#) and [workbook](#) created for Iowa community water supplies. Please contact Rebecca Ohrman (515-725-8332) of the Source Water Program for further information.

Section 6: Consumer Confidence Report

As the agency responsible for conducting drinking water programs in the state of Iowa, IDNR must provide each public water supply with language to be included in their Consumer Confidence Report regarding source water protection. The following language, at a minimum, must be included in each Consumer Confidence Report you produce from now on:

“The Dubuque water supply obtains a portion of its water from the sandstone and dolomite of the Cambrian-Ordovician aquifer and a portion of its water from the sand and gravel of the Mississippi River Alluvial aquifer. The Cambrian-Ordovician aquifer was determined to be slightly susceptible to contamination because the characteristics of the aquifer and overlying materials provide moderate protection from contaminants at the land surface. The Alluvial 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. Dubuque’s Cambrian-Ordovician wells will be slightly susceptible to contaminants near the land surface such as leaking underground storage tanks, contaminant spills, and excess fertilizer application. The Alluvial wells will be highly susceptible to surface contaminants such as leaking underground storage tanks, contaminant spills, and excess fertilizer application. A detailed evaluation of your source water was completed by the Iowa Department of Natural Resources, and is available from the Water Operator at 563-589-4291.”

You may modify this language or include additional information if you so desire, but you must identify the source of your system’s drinking water and identify known sources of potential contamination.

Table 1a. Inventory and ranking of potential contaminant sources in the Cambrian-Ordovician aquifer.

Dubuque Public Water Supply (3126052)
Phase I - Contaminant Source Inventory and Assessment

Aquifer: Cambrian-Ordovician

Slightly Susceptible (risk factor = 2)

Map No.	Site Name	Site Type	Site Link ¹	Program ID	Site Address	Loc'n Acc ²	Land Use Risk ³	Risk Score ⁴
Capture zone: 2-year time of travel (risk factor = 3)								
1	Park Maintenance Building	Underground storage tank	310482578	198607132	2241 Lincoln Avenue, Dubuque, IA 52001	poor	5	10
2	Barnstead International	Air Permit - Minor	310975652	31-01-031	2555 Kerper Boulevard, Dubuque, IA 52001	poor	3	8
3	K & B Auto	Air Permit - PBR Spray Booth	312534488	31-01-165	, Dubuque, IA 52001	good	3	8
7	Tully's Dubuque Lumber	Leaking USTs	311381056	7LTI35	2655 Lincoln Ave, Dubuque, IA 52001	good	5	10
8	Tully's Dubuque Lumber	Hazardous Materials Spill	311381056	030100-DEC-1140	2655 Lincoln Ave, Dubuque, IA 52001	good	1	6
9	Tully's Dubuque Lumber	Underground storage tank	311381056	198609690	2655 Lincoln Ave, Dubuque, IA 52001	good	5	10
10	Tully's Dubuque Lumber	Hazardous Materials Spill	311381056	051997-DC-1015	2655 Lincoln Ave, Dubuque, IA 52001	good	1	6
11	Dubuque Water Works	Tier II Chemical Storage	310370926	FAIDSIT2A000014	1902 Hawthorne, Dubuque, IA 52001	good	3	8
Capture zone: 5-year time of travel (risk factor = 2)								
4	Mulgrew Oil	Underground storage tank	310507127	198604782	2501 Rhomberg Ave, Dubuque, IA 52001	poor	5	9
5	Public Wks Water Div/city Of Dubuque	Leaking USTs	310535529	8LTU98	1800 Hawthorne Street, Dubuque, IA 52001	good	5	9
6	Public Wks Water Div/city Of Dubuque	Underground storage tank	310535529	198607136	1800 Hawthorne Street, Dubuque, IA 52001	good	5	9

¹ID's are hyperlinked to detailed contaminant source information where available. Click once to open the spreadsheet, then click again to follow the link.

²Estimated horizontal accuracy: < 25m. = good; 25m. to 50m. = fair; >50m. = poor

³Score range: 1 to 5, see Table 3 of the Iowa Source Water Protection and Assessment plan

⁴Sum of land use, capture zone, and aquifer susceptibility risk factors

Table 1b. Inventory and ranking of potential contaminant sources in the Alluvial aquifer.

Dubuque Public Water Supply (3126052)
Phase I - Contaminant Source Inventory and Assessment

Aquifer: Alluvial

Highly Susceptible (risk factor = 4)

Map No.	Site Name	Site Type	Site Link ¹	Program ID	Site Address	Loc'n Acc ²	Land Use Risk ³	Risk Score ⁴
Capture zone: hydrologic boundary (risk factor = 3)								
5	Coca Cola Bottling Company	Leaking USTs	311381029	8LTG55	2435 Kerper Blvd, Dubuque, IA 52001	good	5	12
6	Coca Cola Bottling Company	Tier II Chemical Storage	311381029	FAIDSIT2A000054	2435 Kerper Blvd Boulevard, Dubuque, IA 52	good	3	10
7	Coca Cola Bottling Company	Underground storage tank	311381029	198601273	2435 Kerper Blvd Boulevard, Dubuque, IA 52	good	5	12
9	Aih Chrome	Underground storage tank	311254849	198601057	2400 Kerper Blvd, Dubuque, IA 52001	good	5	12
10	Aih Chrome	Air Permit - Minor	311254849	31-01-097	2400 Kerper Blvd, Dubuque, IA 52001	good	3	10

Map No.	Site Name	Site Type	Site Link ¹	Program ID	Site Address	Loc'n Acc ²	Land Use Risk ³	Risk Score ⁴
11	Advanced Urethane Technologies, Inc	Air Permit - Minor	311111701	31-01-066	2459 Kerper Blvd, Dubuque, IA 52001	poor	3	10
12	Barnstead International	Air Permit - Minor	310975652	31-01-031	2555 Kerper Boulevard, Dubuque, IA 52001	poor	3	10
13	K & B Auto	Air Permit - PBR Spray Booth	312534488	31-01-165	, Dubuque, IA 52001	good	3	10
14	Key City Plating	Air Permit - Minor	311116788	31-01-098	2500 Kerper Blvd, Dubuque, IA 52001	good	3	10
15	Key City Plating	Wastewater treatment facility	311116788	3126201	2500 Kerper Blvd, Dubuque, IA 52001	good	5	12
16	E.r. Carpenter Company	Air Permit - Minor	311116697	31-01-064	2525 Kerper Blvd, Dubuque, IA 52001	poor	3	10
17	Riverside Tractor-trailer Co	Underground storage tank	310584179	198601128	1190 Roosevelt Street, Dubuque, IA 52001	poor	5	12
18	Quebecor World Dubuque, Inc	Air Permit - Minor	311116833	31-01-117	2470 Kerper Blvd, Dubuque, IA 52001	good	3	10
19	Water Pollution Control Plant	Wastewater outfall	310201531	3126001	795 Julien Dubuque Drive, Dubuque, IA 5200	good	5	12
20	Mulgrew Oil	Underground storage tank	310507127	198604782	2501 Rhomberg Ave, Dubuque, IA 52001	poor	5	12
21	United Parcel Service	Leaking USTs	310565463	8LTL66	2550 Kerper Blvd, Dubuque, IA 52001	good	5	12
22	United Parcel Service	Tier II Chemical Storage	310565463	FAIDSIT2A000003	2550 Kerper Blvd, Dubuque, IA 52001	good	3	10
23	United Parcel Service	Underground storage tank	310565463	198606311	2550 Kerper Blvd, Dubuque, IA 52001	good	5	12
24	Public Wks Water Div/city Of Dubuque	Leaking USTs	310535529	8LTU98	1800 Hawthorne Street, Dubuque, IA 52001	good	5	12
25	Public Wks Water Div/city Of Dubuque	Underground storage tank	310535529	198607136	1800 Hawthorne Street, Dubuque, IA 52001	good	5	12
26	Tully's Dubuque Lumber	Hazardous Materials Spill	311381056	030100-DEC-1140	2655 Lincoln Ave, Dubuque, IA 52001	good	1	8
27	Tully's Dubuque Lumber	Leaking USTs	311381056	7LTI35	2655 Lincoln Ave, Dubuque, IA 52001	good	5	12
28	Tully's Dubuque Lumber	Hazardous Materials Spill	311381056	051997-DC-1015	2655 Lincoln Ave, Dubuque, IA 52001	good	1	8
29	Tully's Dubuque Lumber	Underground storage tank	311381056	198609690	2655 Lincoln Ave, Dubuque, IA 52001	good	5	12
30	Dubuque Water Works	Tier II Chemical Storage	310370926	FAIDSIT2A000014	1902 Hawthorne, Dubuque, IA 52001	good	3	10
31	Dubuque Marina	Underground storage tank	310583394	198914977	1201 Shiras Extension, Dubuque, IA 52001	good	5	12

Capture zone: surface runoff area (risk factor = 1)

1	Mount Calvary Cemetery	Cemeteries	-		T89n, R2e, Sec. 12, Se, Se, Livermore, IA	good	2	7
2	Sunnycrest Manor	Underground storage tank	311387201	200700006	2375 Roosevelt St, Dubuque, IA 52001	poor	5	10
3	Sunnycrest Manor	Air Permit - Minor	311387201	31-01-152	2375 Roosevelt St, Dubuque, IA 52001	poor	3	8
4	Transformer Spill	Hazardous Materials Spill	311639613	093005-RLT-1506	3135c Cedar Crest Rdg, Dubuque, IA 52003	poor	1	6
8	Park Maintenance Building	Underground storage tank	310482578	198607132	2241 Lincoln Avenue, Dubuque, IA 52001	poor	5	10

¹ID's are hyperlinked to detailed contaminant source information where available. Click once to open the spreadsheet, then click again to follow the link.

²Estimated horizontal accuracy: < 25m. = good; 25m. to 50m. = fair; >50m. = poor

³Score range: 1 to 5, see Table 3 of the Iowa Source Water Protection and Assessment plan

⁴Sum of land use, capture zone, and aquifer susceptibility risk factors

Table 2a. Inventory of water wells not used in the Cambrian-Ordovician source water area.

Dubuque Public Water Supply (3126052)

Phase I - Inventory of Wells

Aquifer: Cambrian-Ordovician Slightly Susceptible (risk factor = 2)

Map No.	Well ID ¹	Well Owner	Well ID Source	Depth (ft.)	Date Drilled/ permitted	Well Location	Locational Accuracy ²
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Capture zone: 2-year time of travel (risk factor = 3)

1	W3449	City Of Dubuque Water Plant	Water Use Permit Wells	1560	4/27/1939	T89N, R3E, Sec. 7	good
2	2410835	Dubuque Water Works	Public Water Supply well	1560	1/1/1939	T89N, R3E, Sec. 7	good
3	974	Dubuque, City Of	IGS well database	1560	4/27/1939	T89N, R3E, Sec. 7	good
5	2408290	Dubuque Water Works	Public Water Supply well	1810	1/1/1924	T89N, R3E, Sec. 7	good
6	121	Dubuque, City Of	IGS well database	1810	5/21/1924	T89N, R3E, Sec. 7	good
7	W3102	City Of Dubuque Water Plant	Water Use Permit Wells	1810	5/21/1924	T89N, R3E, Sec. 7	good
8	2409458	Dubuque Water Works	Public Water Supply well	1504	1/1/1935	T89N, R3E, Sec. 7	good
9	W5577	City Of Dubuque Water Plant	Water Use Permit Wells	1504	8/27/1935	T89N, R3E, Sec. 7	good
10	87	Dubuque, City Of	IGS well database	1504	8/27/1935	T89N, R3E, Sec. 7	good
15	W3431	City Of Dubuque Water Plant	Water Use Permit Wells	1782	9/30/1946	T89N, R3E, Sec. 7	good
16	2363	Dubuque, City Of	IGS well database	1782	9/30/1946	T89N, R3E, Sec. 7	good
17	2412579	Dubuque Water Works	Public Water Supply well	1782	1/1/1946	T89N, R3E, Sec. 7	good

Capture zone: 5-year time of travel (risk factor = 2)

4	2097044	Lilleskov, Dean	Private well tracking system	unkn	unkn	T89N, R3E, Sec. 7	good
11	39385	Dubuque, City Of	IGS well database	1458	1/1/1919	T89N, R3E, Sec. 7	poor
12	39386	Dubuque, City Of	IGS well database	1460	1/1/1919	T89N, R3E, Sec. 7	poor
13	39383	Dubuque, City Of	IGS well database	1308	1/1/1899	T89N, R3E, Sec. 7	poor
14	39384	Dubuque, City Of	IGS well database	1300	1/1/1899	T89N, R3E, Sec. 7	poor

Capture zone: 10-year time of travel (risk factor = 1)

18	7467	Dubuque, City Of	IGS well database	136	12/1/1955	T89N, R3E, Sec. 18, NE, NE, SE	good
19	2409076	Dubuque Water Works	Public Water Supply well	135	1/1/1955	T89N, R3E, Sec. 18, NE, NE, SE	good
20	2408719	Dubuque Water Works	Public Water Supply well	196	1/1/1956	T89N, R3E, Sec. 18, NE, NE, SE	good
21	W3033	City Of Dubuque Water Plant	Water Use Permit Wells	165	unkn	T89N, R3E, Sec. 18, NE, NE, SE	good
22	7468	Dubuque, City Of	IGS well database	196	1/1/1956	T89N, R3E, Sec. 18, NE, NE, SE	good

¹Well id's are hyperlinked to detailed well information where available.

Click once to open the spreadsheet, then click again to follow the link.

²Estimated horizontal accuracy: < 25m. = good; 25m. to 50m. = fair; >50m. = poor

Table 2b. Inventory of water wells not used in the Alluvial source water area.

Dubuque Public Water Supply (3126052)

Phase I - Inventory of Wells

Aquifer: Alluvial Highly Susceptible (risk factor = 4)

Map No.	Well ID ¹	Well Owner	Well ID Source	Depth (ft.)	Date Drilled/ permitted	Well Location	Locational Accuracy ²
Capture zone: hydrologic boundary (risk factor = 3)							
13	974	Dubuque, City Of	IGS well database	1560	4/27/1939	T89N, R3E, Sec. 7	good
14	2410835	Dubuque Water Works	Public Water Supply well	1560	1/1/1939	T89N, R3E, Sec. 7	good
15	W3449	City Of Dubuque Water Plant	Water Use Permit Wells	1560	4/27/1939	T89N, R3E, Sec. 7	good
16	54659	Miss. River Discovery Center	IGS well database	151	8/30/2001	T89N, R3E, Sec. 18, NE, SW, SW	poor
17	54658	Miss. River Discovery Center	IGS well database	101	8/16/2001	T89N, R3E, Sec. 18, NE, SW, SW	poor
18	2097044	Lilleskov, Dean	Private well tracking system	unkn	unkn	T89N, R3E, Sec. 7	good
19	121	Dubuque, City Of	IGS well database	1810	5/21/1924	T89N, R3E, Sec. 7	good
20	2408290	Dubuque Water Works	Public Water Supply well	1810	1/1/1924	T89N, R3E, Sec. 7	good
21	W3102	City Of Dubuque Water Plant	Water Use Permit Wells	1810	5/21/1924	T89N, R3E, Sec. 7	good
22	W5577	City Of Dubuque Water Plant	Water Use Permit Wells	1504	8/27/1935	T89N, R3E, Sec. 7	good
23	2409458	Dubuque Water Works	Public Water Supply well	1504	1/1/1935	T89N, R3E, Sec. 7	good
24	87	Dubuque, City Of	IGS well database	1504	8/27/1935	T89N, R3E, Sec. 7	good
25	17261	United Parcel, Service	Registered abandoned wells	20	n.a.	T89N, R3E, Sec. 18, NE, NW, SE	poor
26	17260	United Parcel, Service	Registered abandoned wells	20	n.a.	T89N, R3E, Sec. 18, NE, NW, SE	poor
27	39386	Dubuque, City Of	IGS well database	1460	1/1/1919	T89N, R3E, Sec. 7	poor
28	39385	Dubuque, City Of	IGS well database	1458	1/1/1919	T89N, R3E, Sec. 7	poor
29	39383	Dubuque, City Of	IGS well database	1308	1/1/1899	T89N, R3E, Sec. 7	poor
30	39384	Dubuque, City Of	IGS well database	1300	1/1/1899	T89N, R3E, Sec. 7	poor
31	17262	United Parcel, Service	Registered abandoned wells	20	n.a.	T89N, R3E, Sec. 18, NE, NW, SE	poor
32	17259	United Parcel, Service	Registered abandoned wells	25	n.a.	T89N, R3E, Sec. 18, NE, NW, SE	poor
33	W3431	City Of Dubuque Water Plant	Water Use Permit Wells	1782	9/30/1946	T89N, R3E, Sec. 7	good
34	2412579	Dubuque Water Works	Public Water Supply well	1782	1/1/1946	T89N, R3E, Sec. 7	good
35	2363	Dubuque, City Of	IGS well database	1782	9/30/1946	T89N, R3E, Sec. 7	good
36	7467	Dubuque, City Of	IGS well database	136	12/1/1955	T89N, R3E, Sec. 18, NE, NE, SE	good
37	2409076	Dubuque Water Works	Public Water Supply well	135	1/1/1955	T89N, R3E, Sec. 18, NE, NE, SE	good
38	2408719	Dubuque Water Works	Public Water Supply well	196	1/1/1956	T89N, R3E, Sec. 18, NE, NE, SE	good
39	W3033	City Of Dubuque Water Plant	Water Use Permit Wells	165	unkn	T89N, R3E, Sec. 18, NE, NE, SE	good
40	7468	Dubuque, City Of	IGS well database	196	1/1/1956	T89N, R3E, Sec. 18, NE, NE, SE	good
41	39379	Dubuque, City Of	IGS well database	200	1/1/1956	T89N, R3E, Sec. 18, NE, NE, SE	good
42	2408916	Dubuque Water Works	Public Water Supply well	200	1/1/1956	T89N, R3E, Sec. 18, NE, NE, SE	good
43	W3432	City Of Dubuque Water Plant	Water Use Permit Wells	165	unkn	T89N, R3E, Sec. 18, NE, NE, SE	good
44	2409459	Dubuque Water Works	Public Water Supply well	190	1/1/1956	T89N, R3E, Sec. 18, NE, SE, NE	good
45	W3433	City Of Dubuque Water Plant	Water Use Permit Wells	165	unkn	T89N, R3E, Sec. 18, NE, SE, NE	good

Map No.	Well ID ¹	Well Owner	Well ID Source	Depth (ft.)	Date Drilled/ permitted	Well Location	Locational Accuracy ²
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46	39380	Dubuque, City Of	IGS well database	190	6/1/1956	T89N, R3E, Sec. 18, NE, SE, NE	good
47	26220	Dubuque, City Of	IGS well database	205	4/1/1981	T89N, R3E, Sec. 18, NE, NE, SE	poor
48	2408386	Dubuque Water Works	Public Water Supply well	142	1/1/1981	T89N, R3E, Sec. 18, NE, NE, SE	good
49	W3103	City Of Dubuque Water Plant	Water Use Permit Wells	165	unkn	T89N, R3E, Sec. 18, NE, NE, SE	good
50	39382	Dubuque, City Of	IGS well database	142	1/1/1981	T89N, R3E, Sec. 18, NE, NE, SE	good
51	2412675	Dubuque Water Works	Public Water Supply well	127	1/1/1970	T89N, R3E, Sec. 17	good
52	W3525	City Of Dubuque Water Plant	Water Use Permit Wells	165	unkn	T89N, R3E, Sec. 17	good
53	39381	Dubuque, City Of	IGS well database	125	1/1/1969	T89N, R3E, Sec. 17	good

Capture zone: surface runoff area (risk factor = 1)

1	2142595	Gassmann, Stan	Private well tracking system	unkn	unkn	T89N, R3E, Sec. 18, NW, NW, NE	good
2	1154	Peerless Service	Registered abandoned wells	66	n.a.	T89N, R3E, Sec. 7	poor
3	4490	Dubuque, City Of	Registered abandoned wells	145	n.a.	T89N, R3E, Sec. 7	poor
4	5516	Dubuque, City Of	IGS well database	188	7/1/1952	T89N, R3E, Sec. 7	poor
5	5515	Dubuque, City Of	IGS well database	136	7/1/1952	T89N, R3E, Sec. 7	poor
6	7276	Dubuque, City Of	IGS well database	140	5/3/1954	T89N, R3E, Sec. 7	poor
7	7281	Dubuque, City Of	IGS well database	130	1/1/1954	T89N, R3E, Sec. 7	poor
8	20191	Pepsi Cola Bottling Co.	IGS well database	840	11/20/1967	T89N, R3E, Sec. 7	poor
9	5514	Dubuque, City Of	IGS well database	146	7/1/1952	T89N, R3E, Sec. 7	poor
10	7270	Dubuque, City Of	IGS well database	241	3/11/1954	T89N, R3E, Sec. 7	poor
11	1153	Peerless Service	Registered abandoned wells	85	n.a.	T89N, R3E, Sec. 7	poor
12	34510	City Of Dubuque	Registered abandoned wells	29	n.a.	T89N, R3E, Sec. 7	poor

¹Well id's are hyperlinked to detailed well information where available.

Click once to open the spreadsheet, then click again to follow the link.

²Estimated horizontal accuracy: < 25m. = good; 25m. to 50m. = fair; >50m. = poor

Table 3a. Land cover within your Cambrian-Ordovician source water area.

Dubuque - Cambrian-Ordovician aquifer Slightly Susceptible

Summary of land cover types (2015) by percentage of total

Capture zone	Row Crop	Grassland	Water	Developed Areas	Forested Areas	Total Acres
2-year	0.0	3.4	0.0	77.3	19.3	20
2-year	0.0	0.4	4.9	90.7	4.0	50
5-year	0.2	1.2	13.2	56.6	28.9	96
10-year	0.0	0.2	29.1	54.4	16.3	121

Table 3b. Land cover within the Alluvial source water area

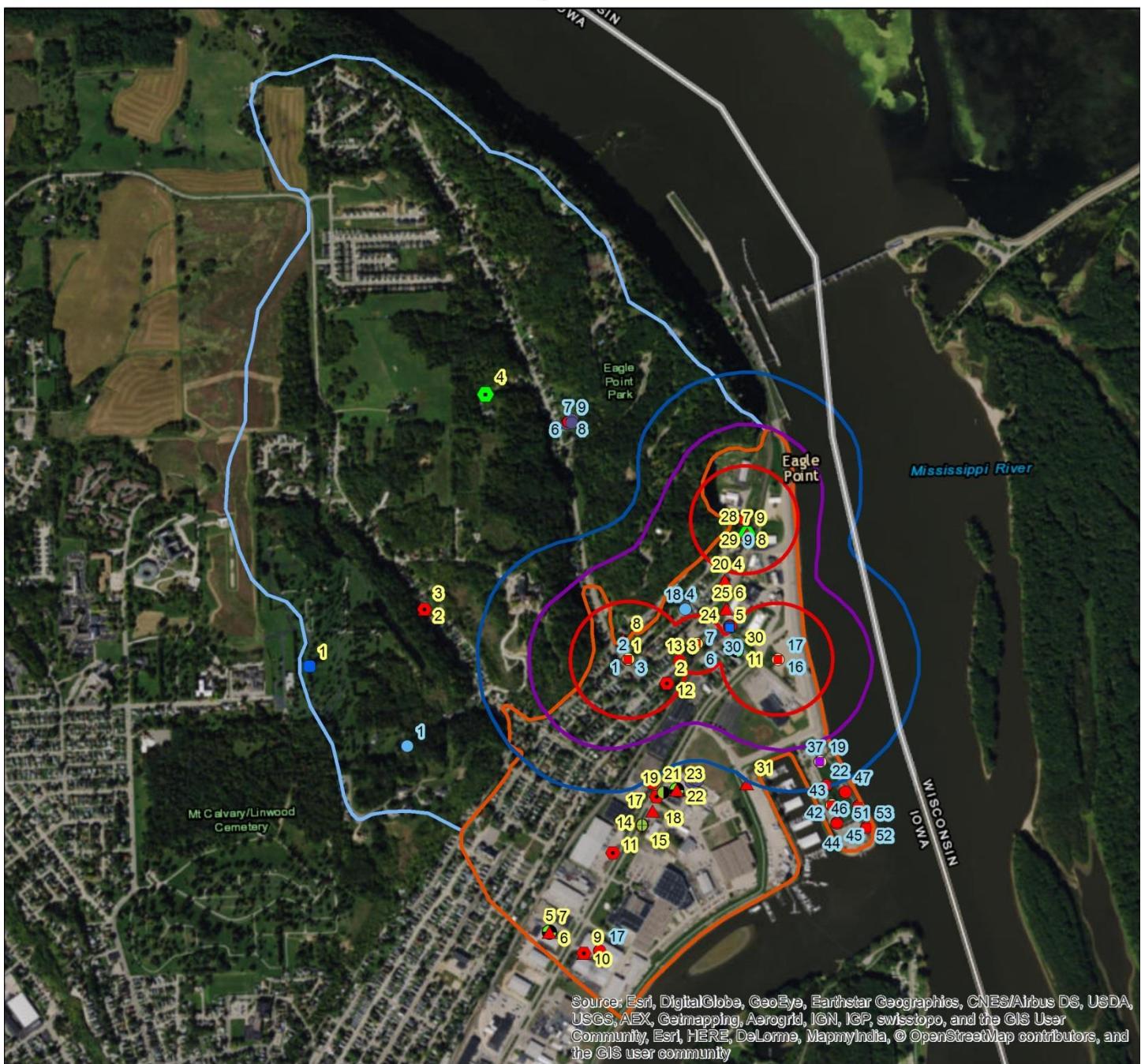
Dubuque - Alluvial aquifer Highly Susceptible

Summary of land cover types (2015) by percentage of total

Capture zone	Row Crop	Alfalfa	Grassland	Water	Developed Areas	Forested Areas	Total Acres
hydrologic boundary	0.1	0.0	0.6	0.2	98.0	1.1	254
surface runoff area	0.0	0.5	3.0	0.0	62.5	33.9	558

Dubuque 3126052

Alluvial & Cambrian-Ordovician Aquifers - Source Water Protection Area



Public Wells

- Active
- Not Used
- Plugged

Groundwater Capture Zones

- 2-Year Capture Zone
- 5-Year Capture Zone
- 10-Year Capture Zone
- Hydrologic Boundary
- Surface Runoff Area

Contaminant Sources

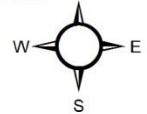
- Air Permit Minor
- Air Permit - PBR Spray Booth
- Tier II Chemical Storage
- Hazardous Materials Spill
- Cemeteries
- ▲ Underground storage tank
- ▲ Leaking USTs
- Wastewater outfall
- Wastewater treatment facility

Other Wells

- IGS well database
- Private well tracking system
- Public water supply well
- Registered abandoned wells
- Water use permit wells

0

2,000 Feet



Dubuque 3126052

Alluvial Aquifer - Source Water Protection Area



Public Wells

- Active
- Not Used
- Plugged

Groundwater Capture Zones

- Hydrologic Boundary
- Surface Runoff Area

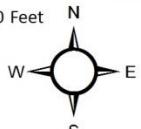
Contaminant Sources

- Air Permit Minor
- Air Permit - PBR Spray Booth
- Tier II Chemical Storage
- Hazardous Materials Spill
- Cemeteries
- ▲ Underground storage tank
- ▲ Leaking USTs
- Wastewater outfall
- Wastewater treatment facility

Other Wells

- IGS well database
- Private well tracking system
- Public water supply well
- Registered abandoned wells
- Water use permit wells

0 2,000 Feet



Report Created: 6/27/2016

Dubuque 3126052

Cambrian-Ordovician Aquifer - Source Water Protection Area



Public Wells

- Active
- Not Used
- Plugged

Groundwater Capture Zones

- 2-Year Capture Zone
- 5-Year Capture Zone
- 10-Year Capture Zone

Contaminant Sources

- Air Permit Minor
- Air Permit - PBR Spray Booth
- Tier II Chemical Storage
- Hazardous Materials Spill
- ▲ Underground storage tank
- ▲ Leaking USTs

Other Wells

- IGS well database
- Private well tracking system
- Public water supply well
- Water use permit wells

0

500 Feet

