IOWA ENVIRONMENTAL COUNCIL

SOURCE WATER PROTECTION IN IOWA

EXECUTIVE SUMMARY

Drinking water contamination from agricultural and point sources of pollution continues to be a concern in Iowa. Water treatment technology and testing have advanced over the past century to more easily and reliably provide clean drinking water to Iowans. Despite new technology and tools, it is wiser to invest to protect drinking water at the source. Source water protection is a relatively inexpensive way to ensure communities have clean, reliable drinking water. By contrast, advanced treatment technologies can be expensive to implement, especially in rural Iowa communities where the cost is spread over smaller customer bases. New policies that focus on source water protection would help to combat threats to the health and safety of all Iowans who rely on clean drinking water.

WHAT IS SOURCE WATER PROTECTION?

"Source water" refers to surface water (a lake, river, or stream) or groundwater (underground aquifer) that serves as a source of drinking water. Some groundwater sources are under the direct influence of surface water; influenced groundwater shows a presence of insects, bacteria, algae, pathogens, or significant or relatively rapid shifts in physical or chemical characteristics of the water.[1]

Public water utilities treat source water before distributing it as drinking water. Water that feeds a private well is also considered source water.

In Iowa, public water systems serve more than 92% of the population.[2] Of the population served by public utilities, 55% is served by a groundwater source, 36% is served by a surface water source, and 9% is served by an influenced groundwater source.[3] The other 8% of Iowans rely on private wells for their drinking water. Private wells are not subject to the same regulations as public water systems and owners are responsible for any treatment.

Contaminated source water threatens public health and is more expensive to treat than uncontaminated source water, and water users ultimately pay the costs of water treatment. The less polluted water is when it reaches a treatment plant or private well, the less extensive and expensive it is to treat and protect public health. Costs of treatment are on average 30-40 times greater (and sometimes as much as 200 times greater) than preventing contamination of source water.[4]

---

1 Iowa Department of Natural Resources. "State of Iowa Public Drinking Water Program 2017 Annual Compliance Report." Jun. 2018. *Available at* http://publications.iowa.gov/27888/1/SAR2017.pdf.

2 *Id.* at 8.

3 *Id.* at 10.

4 United States Environmental Protection Agency. "Source Water Protection: Best Management Practices and Other Measures for Protecting Drinking Water Supplies." Drinking Water Academy, Aug. 2002. *Available at* https://cfpub.epa.gov/watertrain/pdf/swpbmp.pdf.

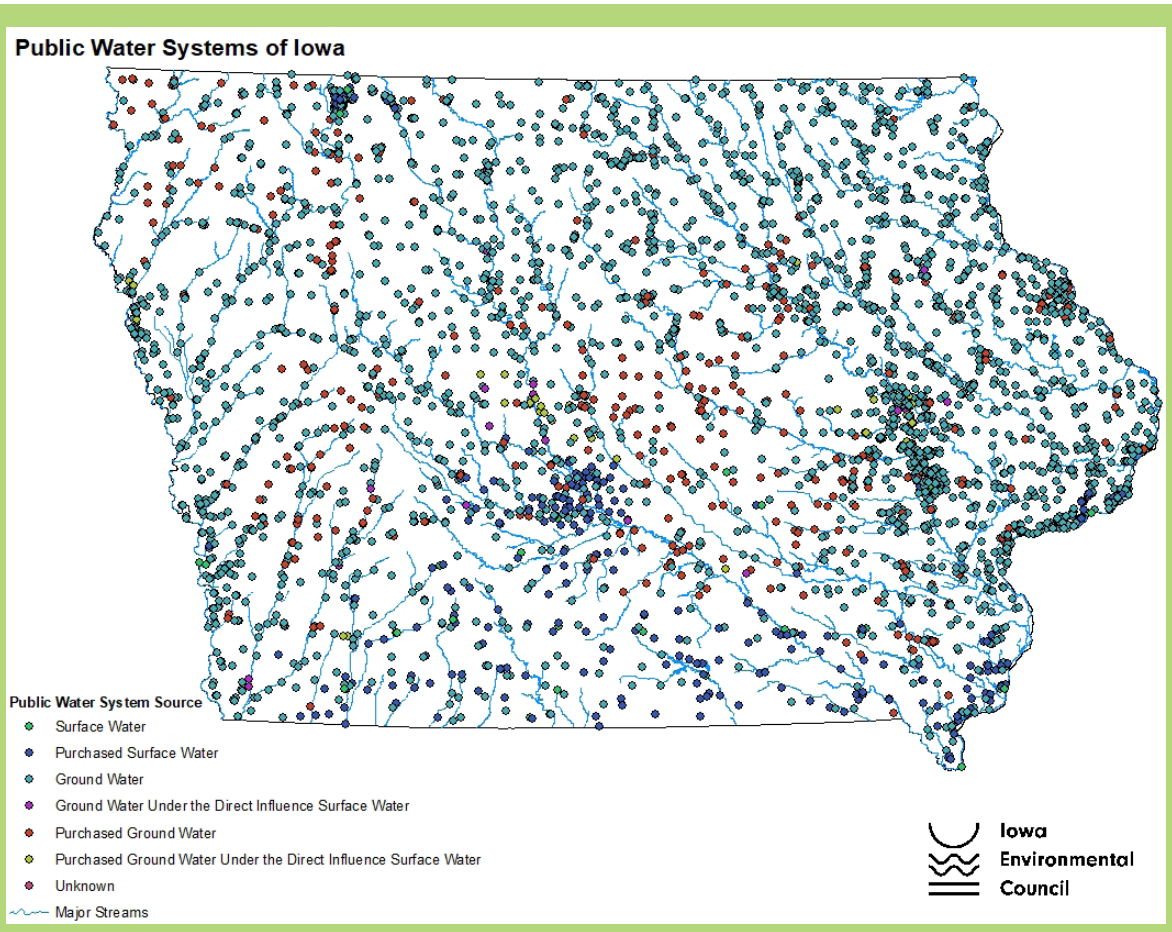

Figure 1: Map of public water systems in Iowa. *Data: Iowa Department of Natural Resources*

Source water protection (SWP) provides a number of benefits because it:[5]

1. **Protects public health:** Contaminated source water can contain bacteria or chemicals that cause illness or long-term health risks.

   The City of Cedar Rapids estimates expenses of more than $80 million to modernize its water treatment system.[6] Utility rates for customers are expected to increase annually to cover the cost.

   Des Moines Water Works spent an average of more than $500,000 per year to remove nitrate contamination from its source waters.[7] High nitrate levels in 2015 caused the removal expense to spike to more than $1.4 million, equivalent to 8.6% of the utility's annual operations and maintenance budget.[8]

2. **Reduces expense of treating water or replacing water supplies:** Removing pollutants to levels safe for human consumption is expensive, and the costs are passed to the consumers. Contaminated source water could even necessitate finding a new source water if treatment is too expensive or infeasible.

3. **Can reduce health care expenses:** Consumers of contaminated drinking water may be paying for health care costs to treat illness that would be preventable with uncontaminated source water.

   A study found that over 12,500 cases of cancer are linked to nitrate pollution in drinking water every year in the United States.[9] The estimated health care costs are up to $1.5 billion. Iowa has one of the highest estimated frequencies of cancer cases at greater than 10 cases per 100,000 people.[10]

4. **Protects property values:** Communities with contaminated source water can see drops in real estate valuation due to source water contamination.

   A study in Florida found that home values decreased in the years immediately following discovery of groundwater contamination.[11]

   In one example from the United State Environmental Protection Agency, a survey by the Freshwater Foundation found that five Minnesota cities reported a collective loss of $8 million in tax revenues because of real estate devaluation resulting from groundwater pollution.[12]

5. **Creates additional environmental benefits:** Many source water protection practices provide additional benefits beyond water quality improvement, including increased wildlife

5 *Id.*

6 Morelli, B.A. "Modernizing Cedar Rapids water plant one of many high-cost needs." The Gazette, 28 Mar. 2019. *Available at* https://www.thegazette.com/subject/news/government/modernizing-cedar-rapids-water-plant-one-of-many-high-cost-needs-annual-utility-rate-increases-20190328.

7 Vedachalam, S., et al. "Source Water Quality and the Cost of Nitrate Treatment in the Mississippi River Basin." Northeast-Midwest Institute, 2018. *Available at* https://www.nemw.org/wp-content/uploads/2018/05/NEMWI_WaterQuality_NitrateCost_2018.pdf.

8 *Id.*

9 Temkin, A., et al. "Exposure-based assessment and economic valuation of adverse birth outcomes and cancer risk due to nitrate in United States drinking water." *Environmental Research*, Sep. 2019. 176:108442.

10 Temkin, A., and S. Evans. "Nitrate in U.S. tap water may cause more than 12,500 cancers a year." Environmental Working Group, 11 Jun. 2019. *Available at* https://www.ewg.org/research/nitrate-us-tap-water-may-cause-more-12500-cancers-year.

11 Guignet, D., et al. "The Property Value Impacts of Groundwater Contamination: Agricultural Runoff and Private Wells." U.S. Environmental Protection Agency, National Center for Environmental Economics, Nov. 2015. *Available at* https://www.epa.gov/sites/production/files/2016-03/documents/2015-05.pdf.

12 United States Environmental Protection Agency. "Source Water Protection: Best Management Practices and Other Measures for Protecting Drinking Water Supplies." Drinking Water Academy, Aug. 2002. *Available at* https://cfpub.epa.gov/watertrain/pdf/swpbmp.pdf.

habitat, flood mitigation, and recreation opportunities.

6. **Increases public confidence and quality of life:** Communities that protect source water quality can anticipate benefits such as increased public confidence in drinking water quality, more job opportunities, increased tourism and recreation revenues, and aesthetic outdoor spaces.

   Iowa State University estimates that Iowa's recreational lakes bring $1 billion in direct spending to the state every year.[13] The number one consideration for those lake users when choosing where to recreate is water quality. Many of Iowa's recreational lakes are also source waters.[14]

LAWS AND AGENCIES OVERSEEING SOURCE WATER PROTECTION

Federal laws tend to focus on specific sources, pollutants, or land uses that may affect water quality; they do not address the need for an integrated, multidisciplinary approach to environmental management that protects source water.[15]

CLEAN WATER ACT

The Clean Water Act (CWA) was established in 1972. It is the primary law for protecting waters of the United States. The CWA restricts pollution from point sources and requires states to set standards. Point sources of pollution are defined as:

> "Any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture."[16]

The CWA regulates point sources of pollution through the National Pollutant Discharge Elimination System (NPDES), which requires permits for all discharges of pollutants to surface waters from point sources.

The express exclusion of "agricultural storm water discharges and return flows from irrigated agriculture" from the point source definition is commonly referred to as the CWA agricultural exemption.[17] This exempts most agricultural pollutants from the point source definition. They are instead considered non-point source (NPS) pollution. The U.S. Environmental Protection Agency says that "NPS pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrologic modification."[18]

13 Jeon, H., et al. "A Report to the Iowa Department of Natural Resources: The Iowa Lake Valuation Project 2014 Summary and Findings." Iowa State University Center for Agricultural and Rural Development, Feb. 2016. *Available at* https://www.card.iastate.edu/lakes/report-to-the-iowa-department-of-natural-resources-2014.pdf.

14 Iowa Environmental Council. "Iowa Lakes: Drinking Water Sources." *Available at* https://www.iaenvironment.org/our-work/clean-water-and-land-stewardship/lake%20drinking%20water%20sources.

15 United States Environmental Protection Agency. "Source Water Protection: Best Management Practices and Other Measures for Protecting Drinking Water Supplies." Drinking Water Academy, Aug. 2002. *Available at* https://cfpub.epa.gov/watertrain/pdf/swpbmp.pdf.

16 33 U.S.C. § 1362(14), CWA § 502(14); see also 40 C.F.R. § 122.2.

17 Ryan, M.A. *The Clean Water Handbook.* Fourth Edition. Chicago, IL: American Bar Association, 2018. 39.

18 United States Environmental Protection Agency. "Basic Information about Nonpoint Source (NPS) Pollution: Overview." *Available at* https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution.

SAFE DRINKING WATER ACT

The Safe Drinking Water Act (SDWA) was passed in 1974 and most recently updated in 1996. It established public water system supervision and the program governing Source Water Assessment. Under the SDWA, the EPA sets regulatory limits for over 90 contaminants in drinking water provided by public water systems based on potential impacts to public health. Private wells are not regulated under the SDWA and do not have to comply with limits set by EPA.

Per the Source Water Assessment Program, the state of Iowa conducted source water assessments for all public water systems.[19] Also known as the Phase 1 Assessment, it is the basis for local SWP projects. It includes delineation of a source water protection (SWP) area, an inventory of potential sources of contamination in the SWP area, and a determination of susceptibility to contamination. The assessment must be distributed to the public.[20]

Delineation of the SWP area for a groundwater source is based on information about how water flows underground.[21] In some states, a circle of a certain radius is simply drawn on a map around the wellhead. For surface water sources, the SWP area is the watershed upstream of the water system intake.[22] A watershed is the area of land where all precipitation flows to the same point, which in this case is the point of the intake.[23]

Source water protection as outlined in the EPA's assessment program is described as a locally-led and implemented program.[24] Local jurisdictions bring stakeholders together to write and implement a SWP plan, while state and federal agencies can provide a support role. This approach is based on an assessment of the SWP area.

---

19 Brass, I., et al. "Source Water Assessment and Protection Programs Show Initial Promise, but Obstacles Remain." United States Environmental Protection Agency Office of Inspector General, 28 Mar. 2005. Evaluation Report No. 2005-P-00013. *Available at* https://www.epa.gov/sites/production/files/2015-12/documents/20050328-2005-p-00013.pdf.

20 United States Environmental Protection Agency. "Source Water Protection: Best Management Practices and Other Measures for Protecting Drinking Water Supplies." Drinking Water Academy, Aug. 2002. *Available at* https://cfpub.epa.gov/watertrain/pdf/swpbmp.pdf.

21 United States Environmental Protection Agency. "Conducting Source Water Assessments." *Available at* https://www.epa.gov/sourcewaterprotection/conducting-source-water-assessments.

22 *Id.*

23 *Id.*

24 *Id.*

OTHER FEDERAL LAWS

Other environmental laws help protect source water by restricting potential pollution:

- The Resource Conservation and Recovery Act controls the disposal of solid waste, reducing the potential contamination of groundwater.[25]
- The Comprehensive Environmental Response, Compensation, and Liability Act, which contains provisions commonly known as Superfund, addresses disposal of hazardous materials that could pollute surface and groundwater.[26]
- The Federal Insecticide, Fungicide, and Rodenticide Act restricts pesticide usage, including pesticides that may affect human health.[27]
- The National Environmental Policy Act requires consideration of environmental impacts of major federal actions, which can include effects of the actions on source water.[28]

STATE AND LOCAL LEVEL

There are differences between regulatory and non-regulatory approaches to source water protection, which often take place at the local or state level. Regulatory approaches include zoning ordinances and subdivision controls, construction and operating standards, health regulations such as storage tank and septic tank requirements, and permitting or inspections. Non-regulatory approaches include purchasing of property or development rights in strategic areas, encouraging the use of best management practices, public education, household hazardous waste collection programs, and economic incentives such as agricultural cost-share programs.

THE IOWA DEPARTMENT OF NATURAL RESOURCES SOURCE WATER PROTECTION PROGRAM

The Iowa Department of Natural Resources (DNR) administers the Iowa Source Water Protection Program. The program is voluntary and is comprised of three stages:

1. **Phase 1 Assessment**, as required by the EPA's Source Water Assessment Program under the SDWA. These assessments are prepared by the DNR, provided to all public water supplies in Iowa, and are available online.[29]
2. **Source Water Protection Plan**, developed through a local stakeholder effort. These are sometimes called Phase 2 plans.
3. **Implementation** of the SWP Plan.

The DNR provides a guidebook and workbook to assist communities with SWP planning.[30] Conservation Districts of Iowa and the Iowa Rural Water Association currently provide consultation and assistance to communities to develop a SWP plan.[31] The ideal SWP planning process identifies solutions for potential problems based on local land use while creating community buy-in for SWP. Plans that are created without community input or a stakeholder process are less likely to be implemented and successful.

25 42 U.S.C. § 6901 et seq.
26 42 U.S.C. § 9601 et seq.
27 7 U.S.C. § 136 et seq.
28 42 U.S.C. § 4321 et seq.
29 Iowa Department of Natural Resources. "Iowa Source Water Protection Program." *Available at* https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Source-Water-Protection.
30 *Id.*
31 *Id.*

Set-aside portions of the EPA's Drinking Water State Revolving Fund (DWSRF) can be used by states to administer and coordinate SWP Programs.[32] States have the option to use the funding as financial assistance for communities to develop SWP plans or as low-interest loans for SWP implementation.[33]

As of 2015, Iowa used the Local Assistance and Other State Programs set-aside of the DWSRF for source water protection activities.[34] These activities included managing the online Source Water Mapper and Tracker, technical assistance with well siting, and SWP planning and management.[35] The DNR does not currently dedicate funding for implementation of SWP plans. Implementation of the SWP plan is often where communities drop out of participation with the program. Reasons for not continuing include lack of funding for implementation, change in leadership, or change in operations or direction.[36]

Some communities have found alternative sources of funding for implementation. The Cedar Lake Watershed and the Big Spirit Lake Watershed, which serve as source waters for the communities of Winterset and Spirit Lake respectively, received National Water Quality Initiative (NWQI) funding to implement SWP practices. These two projects were the first NWQI projects in the nation to target SWP.[37]

The Iowa Source Water Agricultural Collaborative was initiated by the Iowa DNR SWP Program in 2014. The collaborative is made up of commodity groups, agri-business representatives, state agencies, and others. Its purpose is to provide SWP information, education, and outreach to agricultural producers, operators, retailers, agencies, and groups. The collaborative meets once or twice a year. Every May, the collaborative promotes Iowa Source Water Protection Week to raise awareness of SWP.

32 United States Environmental Protection Agency. "Analysis of the Use of Drinking Water State Revolving Fund Set-Asides: Building the Capacity of Drinking Water Systems." Office of Water (4606M), EPA 816-R-17-004, Oct. 2017. 3.

33 *Id.* at 6.

34 *Id.* at 20 and "Appendix A: Matrix of Set-Aside Use."

35 *Id.*

36 Jessica Montana, personal communication, January 13, 2020.

37 United States Department of Agriculture. "Iowa NRCS Adds Two NWQI Projects to Help Protect Sources Water." Natural Resources Conservation Service, 18 Dec. 2018. *Available at* https://www.nrcs.usda.gov/wps/portal/nrcs/ia/newsroom/releases/426de1d8-d947-4fd8-ae7a-268435ceacba/.

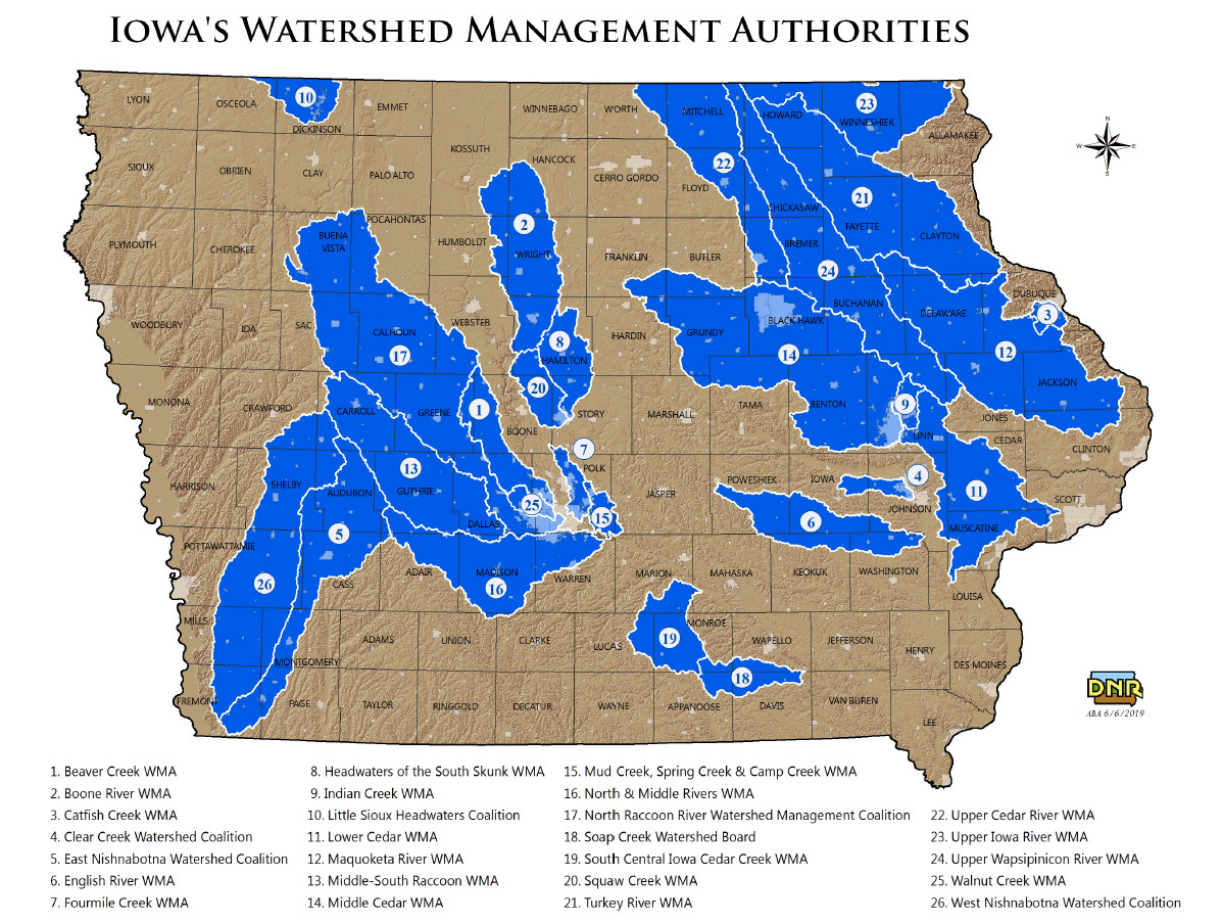

Figure 2: Map of Watershed Management Authorities in Iowa as of 2019. Image courtesy of Iowa DNR.

WATERSHED MANAGEMENT AUTHORITIES

In 2010, Iowa lawmakers passed legislation authorizing the creation of Watershed Management Authorities. A Watershed Management Authority (WMA) is a voluntary, intergovernmental agreement between counties, cities, Soil and Water Conservation Districts (SWCDs), and stakeholders to cooperatively conduct local watershed-based planning and management.[38] This includes assessing and reducing flood risk, assessing and improving water quality, monitoring federal flood risk planning and activities, educating watershed residents regarding flood risks and water quality, and allocating funding for the purposes of water quality and flood mitigation.

Cities, counties, and other units of local government within an eight-digit hydrologic unit code (HUC8) watershed can form a WMA by entering into a joint powers agreement.[39] The joint powers agreement, commonly referred to as a Chapter 28E agreement, must be filed with the Secretary of State. All eligible political subdivisions in the watershed must be invited to participate in the WMA although none of them are required to participate. The WMA is governed by a board of directors comprised of appointees from the participating political subdivisions. As of 2019, 26 WMAs are recognized by the state of Iowa.[40]

A Watershed Management Authority is a promising mechanism for source water protection. Untreated drinking water quality is affected by land use and activities upstream, particularly for surface water sources. Watershed-level planning and management can have a significant impact on water quality, ultimately reducing the amount of treatment necessary for drinking water. Locally-led stakeholder involvement and multijurisdictional cooperation in watershed planning increase the likelihood of success and level of water quality improvement.

38 Iowa Code § 466B.22.
39 *Id.*
40 Iowa Department of Natural Resources. "Current Iowa Watershed Management Authorities." *Available at* https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Management-Authorities/Current-Iowa-WMAs.

Like the DNR's SWP Program, WMAs have no dedicated funding source. The first WMAs in Iowa were formed with support from supplemental disaster funding in 2010 following record flooding in 2008.[41] Other funding sources were tapped to support those WMAs, including a 2016 grant from the U.S. Department of Housing and Urban Development that supports the Iowa Watershed Approach project for resilient communities.[42] This grant funding ends in 2021.

Some WMAs have obtained funding through various other grant programs, but the cyclical, short-term nature of grants and limited funding availability make it difficult for WMAs to maintain financial stability. Although some WMAs, such as the Upper Cedar Watershed Management Improvement Authority, have functioned since their inception without a paid staff person, most of the successful WMAs have had watershed coordination staff. Relationships between watershed coordinators and private landowners within the watershed, which take time to develop, are key to the success of the watershed plan implementation. The loss of a staff member due to the financial instability can set back implementation. Additional sources of funding are necessary to make the WMA model viable in the long-term.

At the state level, the Iowa DNR Watershed Improvement Program administers watershed planning sub-awards from the EPA nonpoint source and water quality planning grants. The DNR currently awards up to three $100,000 grants each year for watershed plan development through a competitive grant application process. The Iowa Department of Agriculture and Land Stewardship (IDALS) awards grants to WMAs that have been targeted through the Water Quality Initiative.

In the case of the Walnut; Fourmile; and Mud, Camp, and Spring Creek Watershed Management Authorities, the participating communities pay proportionally to support their watershed coordinator staff position. They contract with the Polk County SWCD to support a staff member. These communities recognize the value of watershed management and are willing to fund their watershed coordinator position collectively.

THREATS TO IOWA SOURCE WATER

Iowa source waters face a number of threats and barriers to source water protection efforts.

PUBLIC WATER SYSTEMS - SURFACE WATER SOURCES

Land use has a more immediate impact on surface waters than groundwater due to proximity. Because of the predominance of agriculture in Iowa, surface waters are particularly threatened by agricultural nonpoint source pollution. Commercial fertilizers, chemicals, and manure contaminate Iowa lakes, rivers, and streams.

Nonpoint sources contribute 92% of the total nitrogen that enters Iowa streams annually.[43] Nitrate, a highly soluble form of nitrogen, can cause blue baby syndrome (methemoglobinemia) and is linked to various types of cancers.[44] It is difficult and therefore expensive to remove, so preventing pollution from entering source water is most economical. Conservation practices such as cover cropping, saturated buffers, and wetlands are very effective at reducing nitrate loading.[45]

Bacterial and chemical contamination from nonpoint sources threaten surface waters as well. Fecal coliform bacteria from livestock manure is found in lakes, rivers, and streams across Iowa. High levels of indicator bacteria

41 Iowa Watershed Approach. "Exhibit C Capacity: State of Iowa." *Available at* http://iowawatershedapproach.iowa.gov/docs/APP_HUD2015_Phase2_ExhibitC.pdf.

42 Iowa Watershed Approach. "About." *Available at* https://iowawatershedapproach.org/about/.

43 Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources, Iowa State University College of Agriculture and Life Sciences. "Iowa Nutrient Reduction Strategy." Rev. Dec. 2017. Sec. 1 at 8.

44 Minnesota Department of Health. "Nitrate and Methemoglobinemia." Nov. 2018. *Available at* https://www.health.state.mn.us/communities/environment/water/docs/contaminants/nitratmethemog.pdf; Temkin, A., et al. "Exposure-based assessment and economic valuation of adverse birth outcomes and cancer risk due to nitrate in United States drinking water." *Environmental Research*, Sep. 2019. 176:108442.

45 Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources, Iowa State University College of Agriculture and Life Sciences. "Iowa Nutrient Reduction Strategy." Rev. Dec. 2017. Sec. 2.2 at 4-9.

(Escherichia coli) are the cause of more than half of all Iowa waterbody impairments listed on the DNR's draft 2018 Impaired Waters List.[46] Manure is produced in vast quantities at concentrated animal feeding operations (CAFOs) and is spread across or injected into farm fields as fertilizer. While manure is an effective fertilizer, improper application can increase bacteria and nitrate contamination of surface waters.

Urban stormwater runoff must also be managed to protect source water. Petroleum products, road salts, and chemicals are washed from urban areas into storm drains, which drain untreated directly into rivers and streams. More impervious surfaces reduce infiltration that can remove contaminants before the water flows into a stream. As development of urban areas continues across Iowa, these urban contaminants, as well as soil erosion from recently developed properties, become more of a concern.

Additionally, point sources of pollution continue to discharge into Iowa rivers, streams, and lakes. These discharges are regulated under the CWA through the NPDES permit program. Discharge permit applications and revisions must continue to be monitored for compliance with the CWA to prevent future source water contamination.

PUBLIC WATER SYSTEMS - GROUNDWATER SOURCES

Bacterial and chemical contamination threaten groundwater source waters and can present health risks. Coliform bacteria, both fecal and non-fecal, is the most commonly reported health-related groundwater contaminant in Iowa.[47] These bacteria come from human and animal sources, including livestock and wildlife. Nitrogen fertilizers, organic chemicals such as pesticides, and decayed radioactive elements can reach groundwater and cause serious illness and long-term health effects. As is the case with surface water protection, conservation practices reduce the risk of nitrate contamination in groundwater.

Some groundwater aquifers are better protected from contamination than others. Confining subsurface layers that impede the movement of water, such as clay or shale, protect aquifers from contaminants that originate at the surface. The thickness of the confining subsurface layers can be used to estimate the probability of contaminants entering the aquifer.

The DNR SWP Program designates four categories of susceptibility to contamination based on the thickness of the confining subsurface layer above the aquifer:

HIGHLY SUSCEPTIBLE	less than 25 feet confining layer thickness
SUSCEPTIBLE	25 to 50 feet confining layer thickness
SLIGHTLY SUSCEPTIBLE	51 to 100 feet confining layer thickness
LOW SUSCEPTIBILITY	more than 100 feet confining layer thickness

Sinkholes can provide a direct route for bacteria and chemicals to reach groundwater. Karst topography, as occurs in northeastern Iowa, is characterized by sinkholes, caves, and soluble rocks such as limestone that allow rapid drainage and movement of groundwater. Groundwater in this landscape may not be filtered by soils and bacteria that could remove harmful contaminants. Sinkholes should be buffered with permanent vegetation to reduce risk of groundwater contamination.

Underground storage tanks (UST) can be point sources of groundwater pollution. USTs lie near the water table and contain hazardous and toxic chemicals.[48] Leaks, spills, and overfills can contaminate groundwater and put human health at risk. One of the most common groundwater contaminants is gasoline from leaking service stations.[49] It is

46 Iowa Department of Natural Resources. "2018 305(b) Assessment Summary." ADBNet. *Available at* https://programs.iowadnr.gov/adbnet/Assessments/Summary/2018.

47 Prior, J.C., et al. "Iowa's Groundwater Basics." Iowa Department of Natural Resources, 2003. *Available at* http://s-iihr34.iihr.uiowa.edu/publications/uploads/2014-08-24_08-08-21_es-06.pdf.

48 United States Environmental Protection Agency. "Frequent Questions About Underground Storage Tanks." Underground Storage Tanks (USTs). *Available at* https://www.epa.gov/ust/frequent-questions-about-underground-storage-tanks.

49 *Id.*

vital to prevent UST releases from happening and to install a leak detection method on every UST to allow for rapid response in the event of a release.

Abandoned wells provide direct routes for groundwater contamination if not properly plugged and sealed. Properly closing these wells should be a priority for source water protection.

Agricultural drainage wells are designed to funnel excess surface water and tile-drained water deeper into the ground to increase agricultural production. As a result, fertilizers, chemicals, and soil are also directed to groundwater aquifers. Agricultural drainage wells should be properly closed and sealed. The State of Iowa established the Agricultural Drainage Well Closure Assistance Program in 1997. Cost-share funds have been used to close 170 agricultural drainage wells to date. Sixteen wells remain in operation with DNR permits.[50]

Groundwater contamination can take years to flush from an aquifer. Therefore, it is crucial to prevent contaminants from reaching the source water and resulting in costly treatments.

PRIVATE WELL SOURCE WATERS

Private wells are not subject to regulation under the Safe Drinking Water Act, and the state provides little regulatory oversight once a well has been installed. Private well testing and treatment is the responsibility of the well owner. The federal Source Water Assessment program and DNR's Source Water Protection Program are designed for public water systems and do not provide tools specifically for private well source water protection. The state's Grants to Counties program provides funding for private well testing, but this money cannot be used for source water protection or water treatment.

A recent study by the Environmental Working Group and the Iowa Environmental Council found that few well owners get their wells tested regularly.[51] Without knowing what contaminants might be in a well, and without a program to help private well owners delineate their well capture zone (the three-dimensional, volumetric portion of a groundwater flow field that contributes to a particular well) or identify contamination susceptibility, it is difficult to protect the source water from contamination.[52]

The report also found that many wells were contaminated with coliform, nitrate, or both. The area around the wellhead can be protected from these agriculture-related contaminants with conservation practices, such as cover crops, wetlands, or bioreactors that prevent them from reaching the wellhead.

Private wells can be at risk of contamination from other residential and agriculture implements, such as underground storage tanks, septic systems, or farm chemicals. These kinds of potential contaminants should be kept away from drinking water wells and handled carefully to reduce risk of spills and leaks.

Arsenic is a carcinogen found in certain soil types. Naturally occurring arsenic is difficult to prevent from contaminating source water, but treatment systems can remove it. Human activities such as agricultural practices, mining, coal burning, and smelting can also release arsenic into the environment.[53] These risks can be mitigated in the same way as other point and nonpoint sources.

Barriers to protecting private well source waters include a lack of expertise in identifying risks and contaminants, the fear of difficult conversations with neighbors whose activities could be contributing to well contamination, and the expense of protection practices.

50 Iowa Department of Agriculture and Land Stewardship. "Ag Drainage Well Closure Assistance Program." Water Resources Bureau. *Available at* https://iowaagriculture.gov/water-resources-bureau/ag-drainage-well-closure-assistance-program.

51 Schechinger, A. "Contamination of Iowa's private wells: Methods and detailed results." Environmental Working Group, 24 Apr. 2019. *Available at* https://www.ewg.org/interactive-maps/2019_iowa_wells/.

52 Barlow, P.M., et al. "Capture versus capture zones: Clarifying terminology related to sources of water to wells." *Groundwater*, 2018. 56(5): 694-704.

53 National Groundwater Association. "Arsenic: What you need to know." WellOwner.org. *Available at* https://wellowner.org/water-quality/arsenic/.

POLICY RECOMMENDATIONS

Source water protection could be supported by several policy changes at the state level. Due to the decline in participation of communities at the implementation stage of SWP, the policy recommendations below would primarily support the implementation of SWP practices.

Designate 10% of Water Quality Initiative funding, and any future water quality funding, for source water protection of vulnerable wells and watersheds.

SF 512 was signed into law in 2018. It created cost-share funding programs under the Water Quality Initiative to address nutrient pollution in Iowa and established the Nutrient Reduction Strategy as the state's official plan to address nutrient pollution. A portion of this cost-share funding, and any future water quality funds created by the state, should be designated for source water protection practices. One of the main impacts of nutrient pollution is nitrate contamination of drinking water sources and the subsequent treatment by public water systems to comply with the nitrate drinking water standard. Protecting drinking water at the source is a cost-effective way to prevent nitrate pollution, especially in smaller systems that do not have the tax base to pay for expensive nitrate removal technologies. The 10% rate matches a new Farm Bill rule that designates 10% of federal conservation program funds for source water protection.[54]

Formalize the watershed planning approach with state-level administration, fully funded watershed coordinator staff positions, and increased grant support through the DNR's Watershed Improvement Section.

One of the biggest barriers to developing locally-led watershed management plans is a lack of dedicated funding for staff positions. Watershed coordinator staff positions are crucial to the implementation and success of a watershed management plan. Without consistent funding for the staff position, there is a high turnover rate, difficulty establishing relationships with landowners, and an overall lack of progress toward watershed plan goals.

54 Bramblett, J. "National Bulletin 300-19-25 LTP – Preparing for Source Water Protection Activities in Fiscal Year (FY) 2019." United States Department of Agriculture Natural Resources Conservation Service, 6 May 2019. *Available at* https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=43499.

The state should provide salaried watershed coordinator staff positions with benefits for any sub-basin-size (HUC8) watershed that wants one.

Permanent state-level staff positions can be located in local SWCD offices with logistics and project support from DNR, IDALS, and the Natural Resources Conservation Service (NRCS). SWCDs have historically been a place for partnership between DNR, IDALS, and NRCS. By locating watershed coordinators in the field at SWCD offices, the staff would be able to work with DNR, IDALS, and NRCS to maximize funding opportunities and resources for watershed planning and projects.

Additionally, increasing the funding available for competitive watershed planning grants through the DNR Watershed Improvement Section is necessary to meet the need of interested watershed planning groups. DNR should prioritize grant applications that include a source water protection component.

The following are options for funding state-level administration, salaried watershed coordinator staff positions, and watershed planning grants:

1. Use existing funds that are available to the DNR.

2. A portion of a 1-cent sales tax increase.

3. Increased property taxes on agricultural landowners. Agricultural lands are currently taxed at a lower rate than residential or commercial investment properties. Agricultural landowners that lease land could be taxed at a rate comparable to rates on commercial investment properties. Landowners would be eligible for tax breaks if they implemented conservation practices on their land.

4. Budget appropriation from the Iowa legislature.

5. Watershed coordinator staff positions could be paid for on a per capita basis by local communities within the watershed.

6. WMAs could be granted taxing authority, similar to drainage districts in Iowa and watershed districts in Minnesota.[55] Funds raised through taxes would support the watershed coordinator staff position, conservation practices, and watershed improvements.

Adopt a universal riparian buffer law.

A riparian buffer is one of the most basic standards of care to protect water quality. Similar to Minnesota's universal buffer law, Iowa should require riparian buffers along all public waters at a 50-foot average width and 30-foot minimum.[56] The structure of the law should be flexible to allow for site specific adaptions when a wide buffer is not appropriate and another conservation practice would be more effective. However, a landowner will need to demonstrate that the suite of conservation practices they use have at least the same benefits as a 50-foot average width riparian buffer.

Require a fertilizer application plan.

All growers should file a fertilizer application plan with the state to ensure they have properly considered how to meet crop needs without needlessly overapplying fertilizer. All plans should include determination of the Maximum Return to Nitrogen rate, as recommended in the Iowa Nutrient Reduction Strategy. The plan should include details of the application of both manure and inorganic fertilizers. For any producer applying manure from a CAFO with a Manure Management Plan (MMP), the MMP must align with the fertilizer application plan. This will ensure that the

55 Minnesota Statutes 2019, section 103D.901.
56 Minnesota Statutes 2019, section 103F.48.

MMP does not assume application of manure at higher rates than what is accounted for in the fertilizer application plan.

Ban fall tillage.

Fall tillage leads to an immediate and noticeable reduction in water quality. Crop residue left on a field reduces erosion by stopping rain splash, slowing and trapping runoff, and allowing more infiltration.[57] Fall tillage exposes valuable, nutrient-rich topsoil to the air for the winter months and increases erosion, leading to stream sedimentation and pollution from farm chemicals.[58]

Reinstate four-inch topsoil replacement rule.

The Iowa DNR should reinstate its topsoil rule that required developers and homebuilders to replace four inches of topsoil on building sites after construction. Removal of topsoil creates conditions for greater urban erosion during rain events. Good topsoil increases the water holding capacity of the soil, allowing increased infiltration and reducing erosion. With no topsoil in place, new homeowners have difficulty establishing lawns, trees, and gardens, which prevent erosion and stormwater pollution.[59]

---

57 Al-Kaisi, M. "Why conservation systems are the right choice this fall." Iowa State University Extension and Outreach, 10 Oct. 2005. IC-494(24): 194-195. *Available at* https://crops.extension.iastate.edu/why-conservation-systems-are-right-choice-fall.

58 Hill, P.R., and J.V. Mannering. "Conservation Tillage and Water Quality." Purdue University Cooperative Extension Service. WQ-20: 1/95. *Available at* https://www.extension.purdue.edu/extmedia/WQ/WQ-20.html.

59 Sierra Club, Iowa Chapter. "Four-inch Topsoil Rule." Sierra Club. *Available at* https://www.sierraclub.org/iowa/four-inch-topsoil-rule.

ABOUT

The primary author of this paper is Alicia Vasto with the Iowa Environmental Council. We extend a special thanks to everyone that provided input, expertise, and background information as this paper was researched and drafted.

Iowa Environmental Council

505 Fifth Ave Suite 850
Des Moines, IA 50309
515.244.1194
www.iaenvironment.org