Iowa SOURCE WATER Protection

WORKBOOK

Iowa Department of Natural Resources

Wallace State Office Building
502 East 9th Street
Des Moines, IA 50319
phone: (712) 243-1934

The Source Water Protection (SWP) Workbook is meant to be used in conjunction with the Source Water Protection Guidebook to help your community protect its drinking water. The guidebook includes details on each of the steps, including contacts and funding sources, science behind your source water area, and checklist for your Source Water Plan approval. This workbook consists of form-fillable worksheets designed to help with meeting preparation, work assigned, schedules and deliverables. Of course there might be some sheets you wish to modify, leave out, or create. You are free to do so.

Worksheets

0.1 Source Water Essentials Checklist

There are a few basic fundamentals you need before starting a source water protection project. These include information on your community's wells (or intakes), aquifer, source water area, and potential contaminants. All of these essential items should be included in your community's source water information, and are available from the Source Water Protection Tracker and Source Water Mapper applications. If you can't find the information below, please contact the Iowa DNR at 515-725-8343 for assistance in retrieving the latest information.

☐ **"Phase 1" Source Water Assessments** are editable MS Word© documents that should include a map of your source water area, along with your aquifer's susceptibility, with maps and tables of contaminants, wells, and a ranking system for potential contaminants. Fill out the fields below for your system.

Your Aquifer(s) _____

Aquifer Susceptibility _____

Number of Active Wells _____

☐ **Most Recent Sanitary Survey** reports are completed roughly every 2-3 years by a regional field office of the Iowa Department of Natural Resources. These reports list the active wells, system production, and also note any deficiencies the system may have.

Number of Active Wells _____

Noted Deficiencies _____

☐ **Source Water Mapper** is an interactive online mapping site that has links to information regarding your source water area, wells, contaminants, and both historical and current system documentation.

☐ **Iowa's Groundwater Basics** is a book from the Iowa Geological Survey. If your drinking water comes from a groundwater source, (like most in Iowa), the book provides an excellent overview of what is known about groundwater in Iowa. This easy to understand publication details the sources, movements, and common issues with groundwater in Iowa. The book is available free of charge.

0.2 Source Water Optionals Checklist

Depending on your community, you might have the need or ability to use Geographic Information Systems (GIS) as a tool to help with contaminant and well inventories. Although not needed, we believe these resources are very helpful for community planning, including infrastructure areas, 100 and 500 year floodplain mapping, and determining resource potential in addition to source water protection efforts.

☐ **GIS Software** Either freeware or commercial software is needed to accurately interact with GIS 'layers' for correctly mapping source water, and other spatial information. There are many software options available online. Check which version your community may have:

Freeware

- ☐ **ArcExplorer** is a free program available to help explore, visualize and share GIS information. Although editing layers is not included, the program has a great user- interface.
- ☐ **Quantum GIS** is a free, open source GIS software tool that works with many operating systems (Mac, Linux, Windows). Quantum GIS has the ability to convert all AutoCAD files to GIS layers, display a wide variety of data types, and has an easy to use, helpful interface.
- ☐ **MapWindow** is another open source GIS desktop application that is free and has the ability to view and edit many types of GIS data.

Commercial Software

- ☐ **ArcMap** is a commercial (profit-oriented) product available from ESRI. This program can display, manipulate and edit almost all types of GIS information.

☐ **GIS Layers** are available to help you with source water protection. All of the layers below can be downloaded though Iowa GeoData. The major layers used for source water protection are listed below:

- ☐ **Source Water Wells** is a spatial coverage of public wells in Iowa, including depth, geology, and hydrology.
- ☐ **Source Water Areas** is a statewide two-dimensional coverage of areas contributing water to a public water supply.
- ☐ **All Contaminants** is a spatial coverage of all federal and state monitored potential contaminants as "point" coverages.
- ☐ **All Wells** is a statewide coverage of all known wells in Iowa, including links to information when available.

1.1 Potential SWP Team Member List

A strong Source Water Protection Plan relies almost exclusively on a strong SWP Team. Every community's team will be different, depending on the local politics, infrastructure, and source water area. Depending on these circumstances you may wish to contact one or more of the below agencies to be included in your local SWP Team.

Conservation Districts of Iowa

The Conservation Districts of Iowa (CDI) may provide may provide source water consultation and assistance for developing SWP plans at no charge to the public water supply.

Iowa Rural Water Association

The Iowa Rural Water Association (IRWA) provides source water consultation and assistance for developing SWP plans at no charge to the public water supply.

Iowa Department of Natural Resources – Field Offices

The Iowa DNR Field Office Staff are a vital resource in knowing the water quality, infrastructure, and production history of your system. Many have records going back over 40 years.

US Department of Agriculture - Natural Resource Conservation Service (NRCS)

The Natural Resource Conservation Service works with landowners to conserve the soil, water, air, plant and animals for productive lands and healthy ecosystems. If your community's source water area is mostly outside of the city boundary, your local NRCS office is a valuable resource.

NRCS - Resource Conservation and Development Areas

The Resource Conservation and Development Areas are a subset of the NRCS offices, grouped by counties. They promote the conservation and improvement of land within their region.

Iowa Pheasants Forever Chapter Locator

Pheasants Forever (PF) is a nonprofit organization with the objective to increase bird and wildlife habitat.

Ducks Unlimited – State Contacts

Ducks Unlimited is a world leader in wetland and waterfowl conservation, with a simple mission of habitat conservation.

1.2 Source Water Team Member & Organization list

Source Water Lead Worker

Name: ______________________ Phone: ____________

Interest/Affiliation: ____________ E-mail: ______________

Mailing Address: ______________________________

Source Water Team

Name: ______________________ Phone: ____________

Interest/Affiliation: ____________ E-mail: ______________

Mailing Address: ______________________________

Name: ______________________ Phone: ____________

Interest/Affiliation: ____________ E-mail: ______________

Mailing Address: ______________________________

Name: ______________________ Phone: ____________

Interest/Affiliation: ____________ E-mail: ______________

Mailing Address: ______________________________

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Interest/Affiliation: ____________ E-mail: ______________

Mailing Address: ______________________________

Name: ______________________ Phone: ____________

Interest/Affiliation: ____________ E-mail: ______________

Mailing Address: ______________________________

1.3 Source Water Sample Agenda

City of Cleanwater Source Water Protection Team
Initiation Meeting
9:00 am - 1:00 pm, Tuesday, October 26th, 2018

5:00-5:30 pm - Team Member Introductions
5:30-6:00 pm - Purpose and Goals of Source Water Protection

Source Water Presentations
6:00-6:15 pm - Overview of Your Assessment and SWP – DNR rep.
6:15-6:30 pm - History of Cleanwater's Water
6:30-7:00 pm - Source Water Opportunities

SWP Team
7:00-7:30 pm - SWP Team Role and Vision Discussion
7:30-8:00 pm - SWP Timeline
8:00 pm - Meeting Wrap-up, Next Meeting Date

1.4 Sample Timeline

Start Date (First Meeting): ____________________ Anticipated Plan Submittal Date: ____________________

Task	Date
Form a Source Water Team	
Hold Initial Source Water Meeting	
Submit Final Source Water Plan to SWAG*	
Implement Source Water Plan	

*The DNR Source Water Protection (SWP) Program is charged with approving SWP Plans in Iowa.

1.5 Source Water Meeting Attendees

	Name	Agency, E-mail
1.		
2.		
3.		
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19.		
20.		
21.		

1.6 Source Water Issues and Concerns

Issue or Concern	Category			
	Quality	Quantity	Security	Education
High Nitrates	☒	☐	☐	☒
Increased Pumping	☐	☒	☐	☐
	☐	☐	☐	☐
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2.1 Checklist for Protection Areas

Having accurate maps of all of your protection areas is crucial to knowing where your community should focus its source water protection efforts. Please check over your Phase 1 Source Water Assessment to make sure that a) all of your active wells are correctly located, b) all well depths are correctly recorded, and c) all of your community's well pumping rates are accurately represented. Below is a checklist of commonly used protection areas dependent on the information above.

- ☐ **Source Water Area** Is your delineation a model, or a radial setback distance? If a setback distance, is there any more information that could be used to further refine your source water area? Information in driller's logs, geology, and pumping rates are generally needed to complete an accurate source water area.
- ☐ **200-ft. Zone of Control** The 200-ft. zone of control is required by the Iowa DNR for all public wells constructed after 1979. The 200-ft. zone of control is an area that the community should own, have absolute control over, and use best management practices in for improving water quality.
- ☐ **Public Well Setback Distances**

Sources of Contamination	Shallow Wells as defined in 567—40.2(455B)	Deep Wells as defined in 567—40.2(455B)
Sanitary and industrial point discharges	400 ft.	400 ft.
Sanitary and storm sewers, drains	25 or 75 ft. depending on pipe materials	25 or 75 ft. depending on pipe materials
Sewer force mains	75 or 400 ft. depending on pipe materials	75 or 400 ft. depending on pipe materials
Water treatment plant wastes (point discharges)	50 ft.	50 ft.
Water treatment plant wastes (to sewer)	25 or 75 ft. depending on pipe materials	25 or 75 ft. depending on pipe materials
Wellhouse floor drains to sewers	25 or 75 ft. depending on pipe materials	25 or 75 ft. depending on pipe materials
Wellhouse floor drains to surface	50 ft. depending on pipe materials	50 ft. depending on pipe materials
Irrigation of wastewater	400 ft.	200 ft.
Land application of solid wastes	400 ft.	200 ft.
Cesspools and earthen pit privies	400 ft.	200 ft.
Concrete vaults and septic tanks	200 ft.	100 ft.
Lagoons	1,000 ft.	400 ft.
Mechanical wastewater treatment plants	400 ft.	200 ft.
Soil absorption fields	400 ft.	200 ft.
Chemical application to ground surface	200 ft.	100 ft.
Chemical and mineral storage above ground	200 ft.	100 ft.
Chemical and mineral storage including underground storage tanks on or below ground	400 ft.	200 ft.
Transmission pipelines (e.g., fertilizer, liquid petroleum, anhydrous ammonia)	400 ft.	200 ft.
Animal pasturage	50 ft.	50 ft.
Animal enclosure	400 ft.	200 ft.
Animal wastes – land application of solids	400 ft.	200 ft.
Animal wastes – land application of liquid/slurry	400 ft.	200 ft.
Animal wastes – storage tank	400 ft.	200 ft.
Animal wastes – solids stockpile	400 ft.	200 ft.
Animal wastes – storage basin or lagoon	1,000 ft.	400 ft.
Earthen silage trench or pit	200 ft.	100 ft.
Basements, pits, sumps	10 ft.	10 ft.
Cemeteries	200 ft.	200 ft.
Cisterns	100 ft.	50 ft.
Flowing streams/other surface water bodies	50 ft.	50 ft.
GHEX loop boreholes	400 ft.	200 ft.
Railroads	200 ft.	100 ft.
Private wells	400 ft.	200 ft.
Solid waste landfills and disposal sites	1,000 ft.	1,000 ft.

2.2 Source Water Susceptibility

Your source water aquifer may be naturally protected by overlying confining units. If your community uses more than one aquifer, it is often best to focus on the aquifer with the least thickness of overlying confining units. Confining units are often till, shale, or clay. Check below which source water susceptibility applies to your community's water supply.

Aquifer #1: _____

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

Aquifer #2 (if needed): _____

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

3.1 List of Common Potential Contaminants

Agricultural

Row crop acreage
Agricultural drainage wells
Animal burial areas
Animal feedlots
Animal research facilities
Chemical storage areas
Chemical application (e.g., pesticides, fungicides, and fertilizers)
Grain storage
Irrigation
Manure spreading and pits
Tank loading and rinsing areas

Commercial

Agricultural chemical dealers
Airports
Auto: repair, machinery, service shops
Boat yards / marinas
Car washes
Cemeteries / funeral services
Construction areas
Dry-cleaning establishments
Educational institutions (e.g. labs, lawns, and chemical storage)
Fuel pipelines
Gas stations
Golf courses (chemical applications and storage)
Grain storage
Degreasing operations
Hardware stores
Jewelry and metal plating
Junk yards
Laundromats
Lumber yards
Material transport (trucks and railroads)
Medical facilities
Paint shops
Photography establishments
Printing / copy shops
Railroad tracks and maintenance yards
Stormwater drains and retention basins
Road maintenance depots
Storage tanks and pipes (above and below ground)

Industrial

Asphalt plants
Chemical manufacturing, warehousing, and distribution activities
Construction activities
Degreasing operations
Electrical and electronic products and manufacturing
Electroplating and metal fabrication
Foundries
Former manufactured gas plants
Lagoons, pits, holding ponds
Machine and metalworking shops
Manufacturing and distribution sites for cleaning supplies
Mining (surface and underground), mine drainage, and waste piles
Petroleum products production, storage and distribution centers
Pipelines (e.g. oil, gas, coal, and slurry)
Radioactive materials production, distribution, and storage
Storage tanks (above and below ground)
Toxic and hazardous spills
Wells, operating and abandoned (e.g. oil, gas, water, injection, monitoring, exploration)
Wood preserving facilities

Residential

Cesspools
Fuel storage sites
Furniture and wood strippers and refinishers
Hazardous products (cleaners, paint, oil)
Lawns (chemical applications)
Septic systems
Sewer lines
Stormwater drains and retention basins
Swimming pools (e.g. chlorine)
Water softeners
Waste Management
Fire training facilities
Hazardous waste management units (e.g., landfills, land treatment areas, surface impoundments, waste piles, incinerators, treatment tanks)
Leaky sewers
Municipal incinerators
Municipal landfills
Municipal wastewater and sewer lines
Open burning sites
Recycling and waste-reduction facilities

Modified from US-EPA 1989, Wellhead Protection Programs: Tools for Local Governments. EPA 440/6-89-002

3.2 Local and Online Resources Checklist

The resources below represent some of the online databases you can use to help inventory your potential contaminants and pathways. Be sure to check each of them for a full inventory.

- ☐ **Iowa Source Water Mapper** is a mapping application designed to show spatially, an online version of your community's phase 1 report, including the inventory of wells and contaminants listed in the tables. The application also has direct links to many of the online databases listed below.
- ☐ **Facility Explorer** is a spatial data warehouse that contains a variety of information in one place for easy access by the public. Information in the Facility Explorer ranges from contaminant sources, wells, Field Offices, to parks and recreation areas.

Other online databases for specific potential contaminant sources in your source water area include:

- ☐ **Iowa DNR Contaminated Sites database** connects to online documents and historical information for many of Iowa's point sources of contamination. You can search by city, program, and county to find specific sources in your area.
- ☐ **Iowa DNR Underground Storage Tanks** and leaking underground storage tanks for gas and diesel fuels have been a major concern for potential contamination of drinking water supplies. Many of these sites can be found on the DNR's link.

Links for potential wells and pathways:

- ☐ **Geosam** houses well construction, geologic and hydrogeologic information from wells drilled in Iowa with well cutting samples that were submitted to the Iowa DNR – Iowa Geological Survey.
- ☐ **Private Well Tracking System** is an online database application that County Sanitarians enter private well construction, pump test, and geologic data into.

3.3 Field Survey Form

Field Survey Form for: _____

Date: _____ Time: _____ Name of person conducting survey: _____

Map Identification Number: _____ Program Identification Number: _____

Business Name: _____ Phone: _____

Owners Name: _____ Phone: _____

Site Address: _____

City: _____ State: _____ Zip: _____

Location Description: _____

GPS Coordinates: _____ °Lat. _____ °Long.

Legal Description

_____ ¼, of the _____ ¼, of the _____ ¼, of the _____ ¼, of Section _____ ,

Township _____ N, Range _____ ☐ E / ☐ W

Description of Site:

3.4 Potential Contaminant Source Stakeholders

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

Name: ______________________ Phone: ______________
Interest/Affiliation: ______________ E-mail: ______________
Mailing Address: ______________________________

4.1 Iowa Contaminant Risk Guide

Least Risk	Risk Score	Land Use Type
↑	1	Land surrounding a well or reservoir owned by a water company
	1	Permanent open space dedicated to recreation
	1	Federal, state, municipal, or private parks
	1	Woodlands managed for forest products
	2	Field crops: pasture, hay, grains, vegetables
	2	Low-density residential: lots larger than 2 acres
	2	Churches, municipal offices
	3	Agricultural production: dairy, livestock, poultry, nurseries, orchards, berries
	3	Golf courses, quarries
	3	Medium-density residential: lots from 1/2 - 1 acre
	4	Institutional uses: schools, hospitals, nursing homes, prisons, garages, salt storage, sewage treatment facilities
	4	High-density housing: lots smaller than 1/2 acre
	4	Commercial uses: limited hazardous material storage, only sewage disposal, confined animal feeding operations
	5	Improperly abandoned wells in the same aquifer as the supply well
	5	Retail commercial: gasoline, farm equipment, automotive, sales and services, dry cleaners, photo processor, medical arts, furniture strippers, machine shops, radiator repair, printers, fuel oil distributors
	5	Industrial: all forms of manufacturing and processing, research facilities
↓	5	Underground storage of chemicals, petroleum
Greatest Risk	5	Waste disposal: pits, ponds, lagoons; injection wells used for waste disposal; landfills; hazardous waste treatment, storage, and disposal sites; agricultural drainage wells

4.2 Contaminant Risk Form

Issue	Priority	Plan

4.3 Final Ranking Form

Priority	Contaminant/Issue	Comment

5.1 Action Plan Template

Issue	Strategy	Target Completion

6.1. Emergency Response Plan Affidavit

The Safe Drinking Water Act amendments of 1986 and 1996 established the concept of wellhead protection, and subsequently the Source Water Protection Program. The program is currently overseen by the Iowa Department of Natural Resources (DNR) and attempts to prevent potential contaminants from entering source waters and prepare for situations in which drinking water may be impaired through contamination, power outage and treatment or distribution system interruptions. In order to ensure a public water supply's preparedness in such events, a Contingency/Emergency Plan has been required in every approved Source Water Protection Plan (SWPP) or Wellhead Protection Plan (WHPP). Due to recent and growing concerns over water system security and due to many systems having previously prepared such a plan under the provisions of the 2002 Bioterrorism Act, the DNR is now allowing an affidavit in lieu of including a completed Contingency/Emergency Plan within the submitted SWPP/WHPP. Although public water supplies do not need to send DNR completed plans, each must have an accessible and up-to-date plan in case a catastrophic event occurs within their system. It is necessary for the completed water supply Contingency/Emergency Plan to contain the following information, at a minimum:

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

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

_____ _____

Signature Date

7.1. Contact Information for Source Water Plans

Iowa Source Water Coordinator

Jessica Montana – Supervsor, DNR Field Office 4
Ph: (712) 243-1934 Email: Jessica.Montana@dnr.iowa.gov