Iowa SOURCE WATER Protection

WORKBOOK

Iowa Department of Natural Resources

Wallace State Office Building
502 East 9th Street
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515-725-8343

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

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- **7. Step 7 (Submit SWP Plan)**
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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

- ☐ **ArcView and ArcMap** are commercial (profit-oriented) products available from ESRI. These programs 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's NRGIS library. 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.

Iowa Rural Water Association

The Iowa Rural Water Association (IRWA) provides training, education, and technical assistance to a wide variety of water and wastewater utilities, including small communities and rural water systems. IRWA has had a long relationship with the Iowa source water program and continues to provide SWP assistance to numerous communities every year.

Iowa Association of Municipal Utilities

The Iowa Association of Municipal Utilities (IAMU) provides members a wide range of educational services and programs. Drinking water concerns such as SWP is one of the cornerstones of IAMUs focus.

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.

U.S. 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/Role: _________________________ **E-mail:** ___________________________________

Mailing Address: ____

Name: ____ **Phone:** ___________________________________

Interest/Affiliation/Role: _________________________ **E-mail:** _________________________________

Mailing Address: ____

Name: ____ **Phone:** ___________________________________

Interest/Affiliation/Role: _________________________ **E-mail:** _________________________________

Mailing Address: ____

Name: ____ **Phone:** ___________________________________

Interest/Affiliation/Role: _________________________ **E-mail:** _________________________________

Mailing Address: ____

Name: ____ **Phone:** ___________________________________

Interest/Affiliation/Role: _________________________ **E-mail:** _________________________________

Mailing Address: ____

Name: ____ **Phone:** ___________________________________

Interest/Affiliation/Role: _________________________ **E-mail:** _________________________________

Mailing Address: ____

Name: ____ **Phone:** ___________________________________

Interest/Affiliation/Role: _________________________ **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, 2015

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 Source Water Advisory Group (SWAG) is charged with approving SWP Plans in Iowa**

1.5. Source Water Meeting Attendees

	Name	Agency, email
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		

1.6. Source Water Issues and Concerns

Issue or Concern	Category			
	Quality	Quantity	Security	Education
High Nitrates	*X*			*X*
Increased Pumping		*X*		

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 dependant 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)
Wellhouse floor drains (point discharges)	5 ft.	5 ft.
Water treatment plant wastes (point discharges)	50 ft.	50 ft.
Sanitary and industrial point discharges	400 ft.	400 ft.
Wellhouse floor drains to surface	5, 10, 25 or 75 ft. depending on pipe materials	5, 10, 25 or 75 ft. depending on pipe materials
Wellhouse floor drains to sewers	25, 75 or 200 ft. depending on pipe materials	25, 75 or 200 ft. depending on pipe materials
Water plant wastes	25, 75 or 200 ft. depending on pipe materials	25, 75 or 200 ft. depending on pipe materials
Sanitary and storm sewers, drains	25, 75 or 200 ft. depending on pipe materials	25, 75 or 200 ft. depending on pipe materials
Sewer force mains	75 or 400 ft. depending on pipe materials	75 or 400 ft. depending on pipe materials
Land application of solid wastes	200 ft.	100 ft.
Irrigation of wastewater	200 ft.	100 ft.
Concrete vaults and septic tanks	200 ft.	100 ft.
Mechanical wastewater treatment plants	400 ft.	200 ft.
Cesspools and earth pit privies	400 ft.	200 ft.
Soil absorption fields	400 ft.	200 ft.
Chemical application to ground surface	200 ft.	100 ft.
Lagoons	1,000 ft.	400 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.
Animal pasturage	50 ft.	50 ft.
Animal enclosure	200 ft.	100 ft.
Animal wastes - land application of solids	200 ft.	100 ft.
Animal wastes - land application of liquid/slurry	200 ft.	100 ft.
Animal wastes - storage tank	200 ft.	100 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.
Flowing streams/other surface water bodies	50 ft.	50 ft.
Cisterns	100 ft.	50 ft.
Cemeteries	200 ft.	200 ft.
Private wells	400 ft.	200 ft.
Solid waste disposal site	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 designation
☐ <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 designation
☐ <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 moterials production, distribution, and 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:_____ Ph.:_____

Owners Name:_____ Ph.:_____

Site Address:_____

City:_____ State:_____ Zipcode:_____

Location Description:_____

GPS Coordinates: _____ºLat. _____ºLong.

Legal Description

_____1/4, of the _____1/4, of the _____1/4, of the _____1/4, of Section _____,
Township_____N, Range_____ W or E

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: ____

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 (IDNR) and attempts to prevent potential contaminants from entering source waters and prepare for situations in which drinking water may be impaired through contamination, power outage and treatment or distribution system interruptions. In order to ensure a public water supply's preparedness 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 IDNR is now allowing an affidavit in lieu of including a completed Contingency/Emergency Plan within the submitted SWPP/WHPP. Although public water supplies do not need to send IDNR completed plans, each must have an accessible and up-to-date plan in case a catastrophic event occurs within their system. It is necessary for the completed water supply Contingency/Emergency Plan to contain the following information, at a minimum:

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

I, _____, 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 IDNR upon request.

_____ _____

Signature Date

7.1. Source Water Advisory Group Contact Information

Iowa Source Water Advisory Group

1. Mike Anderson – Water Supply Engineering Section, IDNR
   Ph: (515-725-0336) Email: (Michael.Anderson@dnr.iowa.gov)
2. Bob Rowden – Contaminated Sites Section, IDNR
   Ph: (515-725-8343) Email: (Robert.Rowden@dnr.iowa.gov)
3. Rebecca Ohrtman – Contaminated Sites Section, IDNR
   Ph: (515-725-8332) Email: (Rebecca.Ohrtman@dnr.iowa.gov)
4. Cal Lundberg – Contaminated Sites Section, IDNR
   Ph: (515-725-8340) Email: (Cal.Lundberg@dnr.iowa.gov)
5. Jeff Vansteenburg - Field Services Bureau, IDNR
   Ph: (641-424-4073) Email: (Jeff.Vansteenburg@dnr.iowa.gov)
6. Ruth Hummel – LUST /UST Section, IDNR
   Ph: (515-725-8328) Email: (Ruth.Hummel@dnr.iowa.gov)
7. Vickie Friedow – Iowa USDA
   Ph: (515-331-8440) Email: (Vickie.Friedow@ia.usda.gov)
8. Jill Soenen – Iowa Groundwater Association
   Ph: (800-810-4268) Email: (JSoenen@iamu.org)
9. Lisa Walters – Iowa Rural Water Association
   Ph: (800-747-7782) Email: (LWalters@iowaruralwater.org)
10. Jared Wiklund – Pheasants Forever
    Ph: (515-423-4747) Email: (JWiklund@pheasantsforever.org)
11. John Whitaker – Farm Service Agency
    Ph: (515-254-1540) Email: (John.Whitaker@ia.usda.gov)
12. Greg Brennan – H.R. Green Consulting
    Ph: (319-841-4000) Email: (GBrennan@hrgreen.com)
13. Steve Hopkins – Iowa 319 Program Coordinator
    Ph: (515-725-8390) Email: (Stephen.Hopkins@dnr.iowa.gov)
14. Laurel Foreman – Natural Resource Conservation Service
    Ph: (515-284-4370) Email: (Laurel.Foreman@ia.usda.gov)