

PROTECTING YOUR WATERSHED THROUGH A SOURCE WATER ASSESSMENT AND PROTECTION PLAN



A "HOW-TO" WORKBOOK FOR COMMUNITIES AND WATERSHED GROUPS



Regional Center for Environmental Information
US EPA Region III
1650 Arch St
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4. <http://www.epa.gov/natlibra/olshelp.htm>

Protecting Your Watershed Through A Source Water Assessment and Protection Plan

A "How To" Workbook
For
Communities And Watershed Groups

**United States
Environmental Protection Agency**

Drinking Water Branch (3WP22)
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Philadelphia, PA 19103

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INTRODUCTION

This workbook was developed by the U.S. Environmental Protection Agency and Spotts Stevens and McCoy, Inc. (Reading, Pennsylvania) as a guide for communities and watershed groups, with limited financial resources, to develop and implement an assessment and protection plan for existing and new drinking watersheds. **This publication is meant as a workbook, it is meant for you to use, please write in it and mark it up.**

Groundwater protection is an important part of source water protection, but in most cases, groundwater fundamentals and groundwater protection are not covered in this workbook. It is recommended that readers refer to the state wellhead protection program for information regarding groundwater protection. Proper implementation of this workbook would include the implementation of a wellhead protection plan where applicable.

This workbook has been developed as a companion to The U.S. Environmental Protection Agency guidebook entitled "State Source Water Assessment and Protection Programs Guidance - Final Guidance".

Source water assessment is achieved through identifying the various components, influences and possible contamination areas for a water source. This workbook serves as a guide for assessing a water source and then providing the proper steps for protection of the source.

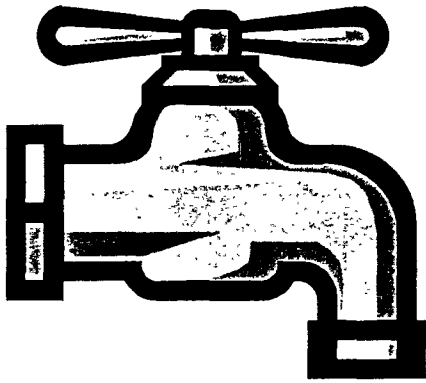
The Safe Drinking Water Act applies to all publicly or privately owned water systems having more than 15 or more service connections and/or serving at least 25 people. Water systems will be required to meet the 1996 Safe Drinking Water Act Amendments which have incorporated source water protection through the use of source water assessment and protection. The goal of the Environmental Protection Agency is that "by the year 2005, 50 percent of the population served by community water systems will receive their water from systems with Source Water Protection (SWP) programs in place under both Wellhead Protection (WHP) and watershed protection programs."

**AS A WATER PROVIDER OR WATER USER OF A WATERSHED
ARE YOU INTERESTED IN OR CONCERNED ABOUT...**

	YES	NO
• Serving good quality water	<input type="checkbox"/>	<input type="checkbox"/>
• Receiving good quality water	<input type="checkbox"/>	<input type="checkbox"/>
• Protecting your water supply	<input type="checkbox"/>	<input type="checkbox"/>
• Identifying where your water supply comes from	<input type="checkbox"/>	<input type="checkbox"/>
• Knowing sources of potential contamination	<input type="checkbox"/>	<input type="checkbox"/>
• Recognizing management tools for small drinking water systems	<input type="checkbox"/>	<input type="checkbox"/>
• Avoiding expensive source water treatment	<input type="checkbox"/>	<input type="checkbox"/>
• Providing low-impact public use for recreation and education	<input type="checkbox"/>	<input type="checkbox"/>
• Other: _____	<input type="checkbox"/>	<input type="checkbox"/>

**...AS THESE RELATE TO YOUR COMMUNITY
WATERSHED?**

**IF YOU ANSWERED ANY OF THESE QUESTIONS WITH
A
YES,
PLEASE READ ON.**



WE'RE INTERESTED BUT...

WHAT CAN WE DO?

WHAT SHOULD WE DO?

TO PROTECT THE SOURCE WATER WE USE FOR...

...drinking

...bathing

...cooking



...washing clothes

...recreation

ONE APPROACH IS TO DEVELOP A. . .

**SOURCE WATER ASSESSMENT
AND PROTECTION PROGRAM**

HOW DO WE DO THIS?

7

THERE ARE 7 BASIC STEPS TO SOURCE WATER ASSESSMENT AND PROTECTION.

STEP 1 - FORM A COMMUNITY PLANNING TEAM

STEP 2 - DELINEATE THE WATERSHED TO BE PROTECTED

STEP 3 - REVIEW THE ZONING SURROUNDING THE WATERSHED

STEP 4 - IDENTIFY CRITICAL AREAS

STEP 5 - IDENTIFY POTENTIAL SOURCES OF CONTAMINATION

STEP 6 - MANAGE THE SOURCE WATER PROTECTION AREA

STEP 7 - PLAN FOR THE FUTURE

ALL SEVEN STEPS REQUIRE PUBLIC EDUCATION FOR ALL PARTIES INVOLVED!! THIS IS THE MOST CRITICAL STEP TO THE IMPLEMENTATION OF A SOURCE WATER ASSESSMENT AND PROTECTION PLAN.

It may be easier to begin Step 2 first to gain support and awareness through education.

Completing this workbook will put you on the road to protecting your watershed for yourself and for future generations.

NOW IS THE TIME TO ACT!!



STEP 1:

GETTING STARTED WITH A COMMUNITY PLANNING TEAM

Implementation of a plan requires someone to take action - WHY NOT YOU!

Once a need for a watershed protection plan is realized, a few initial contacts and discussions can quickly locate others with similar interests. Using the following page, jot down names, phone numbers, and addresses of others you think may be interested in watershed protection through source water assessment and protection and... **CALL THEM NOW!!**

WHO SHOULD YOU CALL??

Any number of people and organizations may be interested in participating in this activity, including...

- local government
- planning/zoning
- state regulatory agencies
- water departments
- agricultural community
- industry
- conservation/environmental groups
- schools
- civic/community organizations
- developers
- watershed advisory groups
- lake associations
- teachers



IT IS VERY IMPORTANT TO...

If the watershed for your system is located in multiple municipalities, it is essential that you invite all municipalities. Even if there is little cooperation between the municipalities on other issues, a watershed protection plan will indirectly affect and benefit individually the municipalities surrounding the watershed as well as your own. This is a critical step in effectively organizing and implementing a plan of action.

INITIAL CONTACTS AND DISCUSSIONS



	WHO?	ORGANIZATION ADDRESS, PHONE, FAX AND EMAIL NUMBERS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

DEVELOP INTEREST

After making the initial telephone contacts, call for an informal meeting of all interested parties. Make this a broad-ranging meeting, which further develops interests in watershed protection planning for your community.

Use the following page as guide to organize your meeting.

SOME SUGGESTIONS FOR AGENDA ITEMS:

- Recent water quality problems
- Development in the surrounding watershed area
- Potential contamination threats
- How to organize
- Sources of assistance
- What information do we have
- Who else may be interested
 - include advocate peers with the group to offset opponents (e.g. a farmer who favors protection balanced with a farmer who opposes anti-protection)
- Budget
- Assignments
- Staff capabilities
- Volunteer capabilities
- Discussion of local water sources
- What are the perceived needs of the communities



INFORMAL MEETING TO DETERMINE INTEREST

INTEREST! ENTHUSIASM!
CONTINUE WITH NEXT PAGE

NO INTEREST! APATHY!
GO TO PAGE 37

ORGANIZER: _____

WHO IS ATTENDING?

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

TIME/DATE _____

LOCATION _____

AGENDA ITEMS:

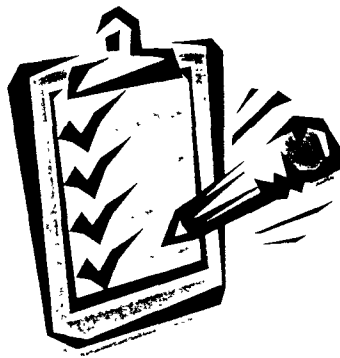
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

REFRESHMENTS: _____

ADDRESS THE BASIC ISSUES

If watershed protection is of interest, begin the meeting by discussing the basic issues. Don't get bogged down in the details at this point. Several meetings may be needed as the idea of watershed protection becomes more focused on your specific needs.

Solutions to the issues at hand will take time. Each situation will require specific attention due to the varied personalities, interests, problems, constraints, and opportunities. Take one step at a time.



**USE THE NEXT TWO PAGES TO
KEEP SIMPLE MINUTES OF YOUR
FIRST MEETING.**

DO WE NEED OUTSIDE RESOURCES?

POSSIBLY.

Experience elsewhere has shown that watershed protection planning must have a good technical and legal basis. There are many things your planning team can do, but two resources that can provide valuable assistance include a hydrologist to determine the watershed area delineation and a lawyer to provide direction on the management tools. The lawyer could very likely be your municipality's solicitor or a combination of solicitors from the various municipalities. The hydrologist may be a consultant from a local college or government agency.

MINUTES OF FIRST MEETING

KEY ITEMS DISCUSSED

OUR GOALS FOR SOURCE WATER PROTECTION

NOW, MOVE TO IMPLEMENTATION



THINGS TO DO NEXT

WHAT?	WHO?	WHEN?

[illegible][illegible]

STEP 2:

DEFINE THE WATERSHED PROTECTION AREA

A watershed is the topographic boundary area that is within the perimeter of a catchment area of a stream or the collection of streams, lakes, rivers. A watershed can be influenced by either groundwater and/or surface water.

The primary goal of source water protection (SWP) under the Safe Drinking Water Act (SDWA) is to:

“Prevent the contamination of and maintaining good quality drinking water supplies, by reducing or preventing chemical and microbiological contamination of source waters and avoiding costly treatment and monitoring requirements.”

Defining the watershed is the key technical step in watershed protection planning, and should be based on a reasonably sound approach in the event of challenges to the area defined for source water protection. This is the critical step where a hydrologist may be able to help you.



BASICS:

TO BEGIN DEFINING THE WATERSHED AREA

1. Do we have a U.S. Geological Survey (USGS) topographic map(s) that is likely to cover our watershed? If not, obtain one. (To buy maps look under Maps in the telephone book yellow pages; hunting and fishing stores may also have these.) A geographical information system (GIS) may be used in some cases in place of USGS maps.

☐ Yes ☐ No
2. Is there a drawing showing any previous studies?

☐ Yes ☐ No
3. Is hydrologic information for our area available through the USGS or a local college?

☐ Yes ☐ No
4. Can we accurately identify the drainage area for our watershed from the maps or GIS or we will have a hydrologist complete this?

☐ Yes ☐ No
5. Do we have zoning maps and ordinances for the area likely under consideration?

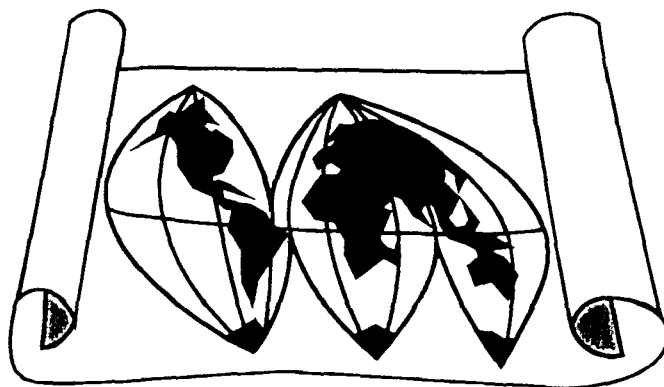
☐ Yes ☐ No

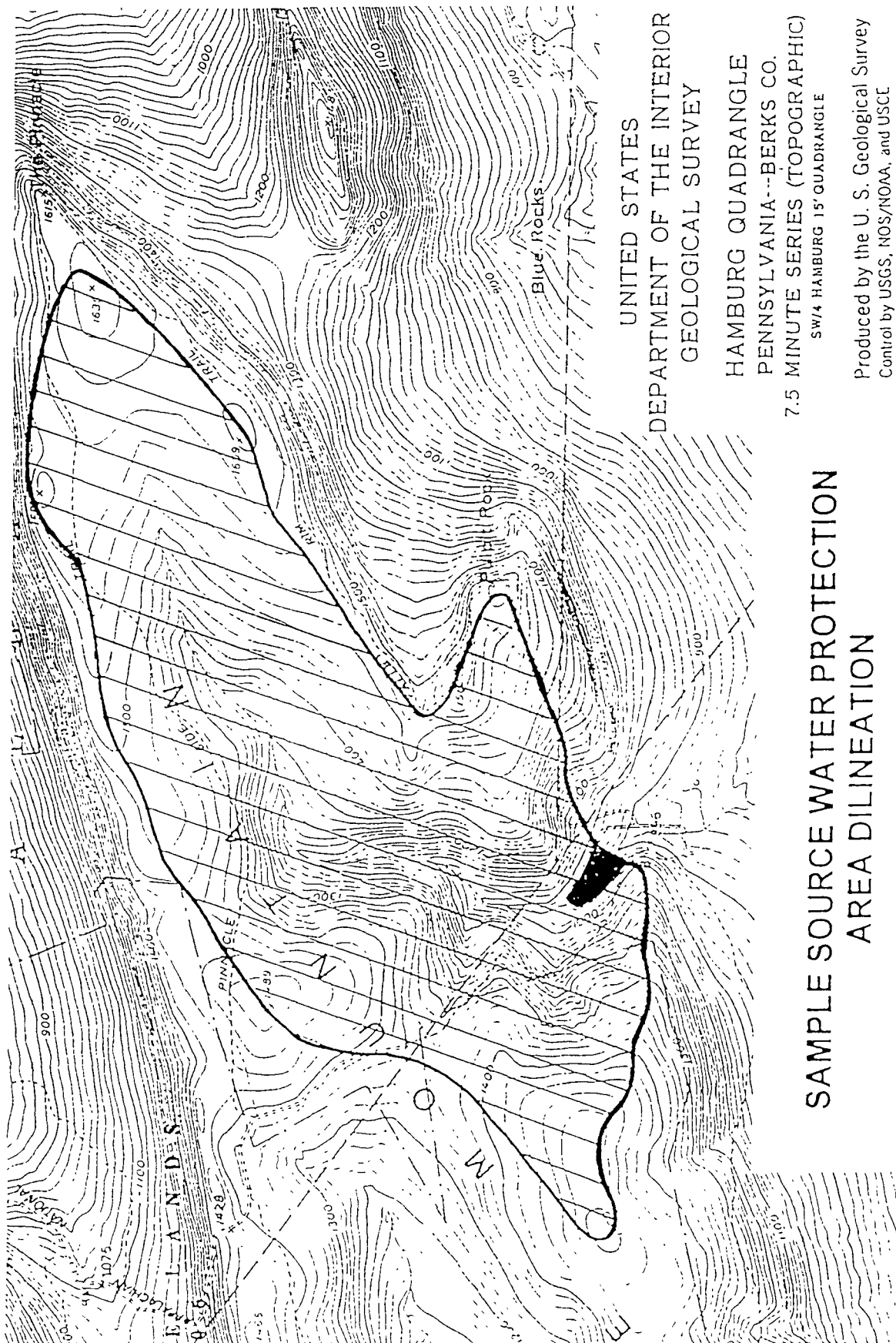
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IF DATA AND THE ABILITY TO DELINEATE OR FUNDS FOR A HYDROLOGIST ARE AVAILABLE...

1. Obtain the necessary maps or the GIS file.
2. Have a hydrologist delineate the watershed or complete this task using the following guidelines:
 - a. Find topographic high points surrounding your ground/surface water source and construct a line that connects these points (See Example).
 - b. The line created will identify the boundary of the watershed including any wells, where the slope of the land slopes into or away from the surface water source.
 - c. Field check your watershed delineation by driving/walking the area boundary.
3. For the use of a USGS map, obtain clear mylar drawing sheets from a drafting or artist's supply store. Place the mylar over the USGS map and trace the watershed as defined above. This will be the foundation for your watershed mapping.
4. If a GIS exists, maps will be able to be produced by using the computer.

THIS WILL PROVIDE YOU WITH THE BASIC MAPS, INCLUDING THE WATERSHED SOURCE WATER PROTECTION AREA.





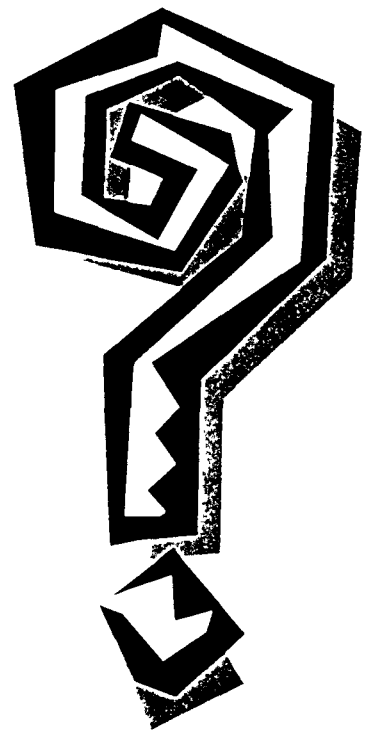
STEP 3:

REVIEW THE CURRENT PROVISIONS OF LOCAL GOVERNMENT

Review the local planning (zoning and related ordinances) and provisions of local government to evaluate what protection or potential hazards may already exist for your delineated watershed.

Address the following questions:

1. What are the current zoning requirements for the watershed? What zoning already exists to protect the watershed area?
2. What are the conditional land uses in the watershed? Are there any detrimental land uses already in practice.
3. What are the municipalities long-range plans for the area surrounding and including the watershed? Are there any future plans that may affect or be within the watershed delineation?
4. What other provisions already exist that support Source Water Protection, such as Wellhead Protection (WHP) and other regulatory issues?
5. What are the other options that exist for protection of the watershed, such as nutrient management, Wellhead Protection, Best Management Practice's (BMP's) and other voluntary issues?



CONTINUE ON THE NEXT PAGE WITH STEP 4

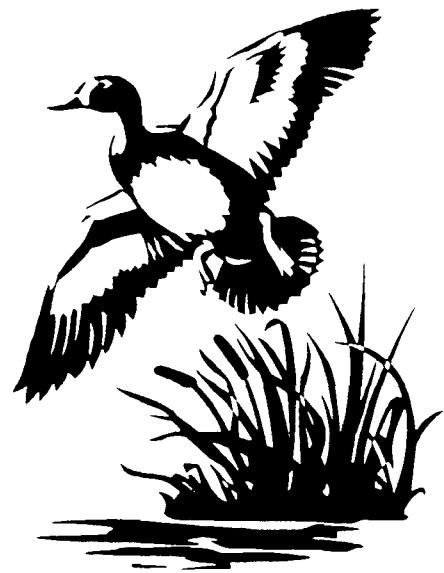


STEP 4:

HOW TO IDENTIFY CRITICAL AREAS

Once the watershed area has been delineated, the next step is to identify natural features that may need special attention. A list of natural features are as follows:

1. STEEP SLOPES WHERE EROSION MAY OCCUR. THIS MAY VARY DEPENDING ON THE AMOUNT OF VEGETATION.
2. UNVEGETATED OR DISTURBED AREAS
3. HIGHLY ERODABLE SOIL TYPES
4. SOILS WITH HIGH CLAY CONTENT
5. HIGHLY PERMEABLE SOILS
6. FORESTS
7. WILDLIFE AREAS
8. STREAMS AND RIVERBANKS
9. FLOODPLAINS
10. WETLANDS



Listed above are many of the features that may be found in a watershed.

It is important to realize that not every watershed will have all of the above-mentioned features, and that some features may have a larger affect on one watershed than another. Combinations of features may also be found. For example, relatively steep vegetated slopes may present no influence on a watershed, but the same slope unvegetated may allow for the passage of pesticides into the watershed.

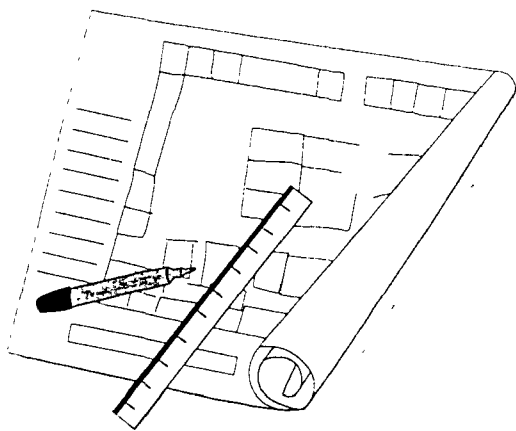
A personal walking tour of your watershed should provide the location of many of these features. Information regarding critical areas should be added to your map for future use.

Sources of information regarding critical areas include:

- Natural Resource Conservation Service
 - Cooperative Extension Service
 - Soil and Water Conservation Districts
 - U.S. Department of Agriculture
 - U.S. Fish and Wildlife Service
 - Local Governments
 - U.S. Geologic Survey

Precipitation data and stream records can be retrieved from the USGS for reviewing flooding and storm water concerns.

AN ON-SITE REVIEW OF THE
CONDITION OF CRITICAL AREAS DURING STORMS
PROVIDE A GREAT SOURCE OF INFORMATION
ON WHICH AREAS ARE MOST AFFECTED.
SEE PAGE 20 FOR A SAMPLE INVENTORY.

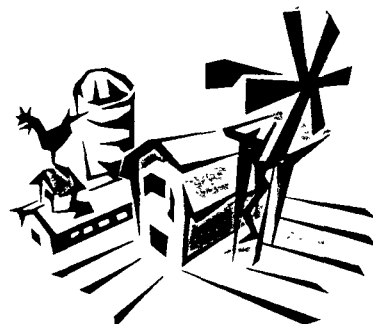


Using a copy of your USGS map (either buy extra copies or make photocopies), draw your source water protection area on the map and using the inventory sheet on the next page, prepare an inventory of critical areas for your watershed. Use a separate sheet to organize names, addresses, and phone numbers, where you can obtain these.

PROGRAM INVENTORY OF POTENTIAL CRITICAL AREAS

DIRECTIONS: Place an "X" next to each category that you identify in the watershed protection area. Delineate the feature on the map and place the corresponding number at the location of the feature. If there are more than one source for a category, label each site with the number and a letter (e.g. multiple wetlands would be 10A, 10B, 10C, etc.).

1. STEEP SLOPES
2. UNVEGETATED OR DISTURBED AREAS
3. HIGHLY ERODABLE SOIL TYPES
4. SOILS WITH HIGH CLAY CONTENT
5. HIGHLY PERMEABLE SOILS
6. FORESTS
7. WILDLIFE AREAS
8. STREAMS AND RIVERBANKS
9. FLOODPLAINS
(Typically 50 feet from the top of bank, if no other data are available).
10. WETLANDS
11. FARMLAND
12. OTHER (SPECIFY)



Once you have this field information, use the same labeling system and transfer it to a second sheet of mylar placed over the one with the source water protection area defined.

CONTINUE TO STEP 5 ON THE NEXT PAGE



STEP 5:

IDENTIFY POTENTIAL SOURCES OF CONTAMINATION

After the critical areas have been identified and delineated, the next step is to identify the potential sources of contamination. Remember these are potential threats to water quality. The best approach is to look at water quality data including pollutants and existing and projected land uses. Whether a potential threat becomes an actual one is determined in part by the type of activity. This includes whether it enters the watershed, its concentration and its duration.

There are many potential sources of source water contamination, including many routine activities that we may not necessarily think of as being possible sources of contamination.

THE FOLLOWING PAGE IDENTIFIES
SEVERAL TYPES OF SOURCES OF
SOURCE WATER CONTAMINATION AND
IS FROM EPA'S REGION III
WELLHEAD PROTECTION HANDBOOK



TABLE 1 - COMMON SOURCES OF SOURCE WATER CONTAMINATION

AGRICULTURAL

- Animal burial areas
- Animal feedlots
- Chemical storage areas
- Irrigation
- Manure spreading and pesticides
- Pesticides and fertilizers

COMMERCIAL

- Airport
- Auto repair shops
- Boat yard
- Construction Areas
- Car Washes
- Cemeteries
- Dry cleaning establishments
- Gas stations
- Golf courses (chemical application)
- Jewelry and metal plating
- Laundromats
- Medical institutions
- Paint shops
- Photography establishments/printers
- Railroad tracks and yard/maintenance
- Research laboratories
- Road deicing operations (e.g. road salt)
- Scarp and junkyards
- Storage tanks and pipe (i.e. above-ground, below-ground, underground)

INDUSTRIAL

- Asphalt plants
- Chemical manufacture, warehousing, and distribution activities
- Electrical and electronic products and manufacturing
- Electroplaters and metal fabricators
- Foundries
- Fire training facilities
- Machine and metal working shops
- Manufacturing and distribution for cleaning supplies
- Mining (surface and underground) and mine drainage
- Petroleum products production, storage and distribution centers
- Pipelines (e.g. oil, gas, coal, slurry)
- Septage lagoons and sludge
- Storage tanks (i.e. above ground, below-ground, underground)
- Toxic and hazardous spills
- Wells - Operating and abandoned (e.g. oil, gas, water supply, injection, monitoring, and exploration)
- Wood Preserving facilities

RESIDENTIAL

- Fuel storage systems
- Furniture and wood strippers and finishers
- Household hazardous products
- Residential lawns (chemical application)
- Septic systems, cesspools, water softeners
- Sewer lines
- Swimming Pools

WASTE MANAGEMENT

- Hazardous waste management units (e.g., landfills, land treatment areas, surface impoundment's, waste piles, incinerators, treatment tanks)
- Municipal incinerators
- Municipal landfills
- Municipal wastewater and sewer lines
- Open burning sites
- Recycling and reduction facilities
- Stormwater drains, retention basins, transfer stations

PREPARING YOUR INVENTORY

These are the likely sources of information, to begin the inventory for your source water protection plan.

1. **Contact the local department of environmental protection or health department for sources subject to certain federal and state laws.**

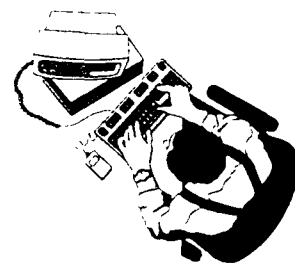
This may require contacting a number of different programs within an environmental department or health department as well as individuals time to review files.

2. **Surf the Internet**

Many internet sites now exist that provide information on a number of source water issues. Typical sites include local, state and federal, as well as private organizations. Two key source water sites developed by EPA include:

EPA site for Toxic Release Inventory (TRI)
www.epa.gov/enviro/html/tris/tris.query.java.html

EPA site for surfing a watershed
www.epa.gov/nwapsurf/text.html



3. **Utilize a Data Service**

There are a number of data services that compile information on facilities and sources where environmental problems have occurred or are subject to certain federal and state laws. These services can provide an extensive amount of data, including maps, usually within 7 to 10 days of a request. The cost of these services typically range from \$100 to \$150 depending on the amount and type of data requested. These services can be obtained through use of the internet.

4. **Your Planning Committee (and other helpers)**

Although a data service can provide you with some important information, there are many local activities you will have to identify yourself; for example, cemeteries. In addition to your committee, other organizations may be interested in assisting with the inventory. In other areas, senior citizen, civic, and environmental groups have helped prepare these inventories.

No special training is required. What is needed is enthusiasm, common sense and some general direction as to what to look for, such as the activities on the next page. Be sure to include long-time residents of an area who will know past land uses and possible sources of historical problems.

Using a copy of your USGS map (either buy extra copies or make photocopies), draw your source water protection area on the map and using the inventory sheet on the next page, prepare an inventory for your area. Use a separate sheet to organize names, addresses, and phone numbers, where you can obtain these.

Once you have this field information, use the same labeling system and transfer it to a second sheet of mylar placed over the one with the source water protection area defined.

**SEE SUGGESTED INVENTORY FORM ON PAGE 25 FOR
DEVELOPMENT OF A SOURCE WATER PROTECTION
INVENTORY OF POTENTIAL CONTAMINANT SOURCES.**

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

SOURCE WATER PROTECTION PROGRAM INVENTORY OF POTENTIAL CONTAMINANT SOURCES

SUGGESTED INVENTORY FORM

Inventory Person: _____

A. Landowners Name: _____

B. Address: _____

C. Phone Number: _____

D. City: _____

Zip Code: _____

E. County: _____

Description of Location: _____

Nature of Property

Residential _____

Commercial _____

Agricultural _____

Industrial _____

City Gov't Site _____

State Gov't Site _____

Rental _____

Other _____

DIRECTIONS: Place an "X" next to each category that you identify in the source water protection area. Place the corresponding number on the map at the location of the source. If there is more than one source for a category, label each site with the number and a letter (e.g., multiple cemeteries would be 7A, 7B, 7C, etc.)

1. __ Abandoned Wells

2. __ Aboveground Storage Tank

3. __ Airport

4. __ Animal Feedlot/Waste Storage

5. __ Asphalt Plant

6. __ Auto Repair/Body Shop/Salvage Washes

7. __ Cemetery

8. __ Cesspool

9. __ Chemical Production/Mixing/Storage

10. __ Dry Cleaners

11. __ Electroplaters/Metal Finishers

12. __ Farm/Private Dumps

13. __ Fertilizer/Pesticide Storage/ProductionMixing

14. __ Golf Course

15. __ Grain Storage Bin

16. __ Highway

17. __ Holding Pond/Lagoon

18. __ Industrial (other-Identify): _____

19. __ Injection Well

20. __ Irrigation Practices

21. __ Landfill

22. __ Laboratories

23. __ Machine Shop

24. __ Mining(Quarry)

25. __ Oil/Gas Pipelines

26. __ Photo Processors

27. __ Printers

28. __ Railroad

29. __ Refinishing

30. __ Road Salt Storage

31. __ Septic Systems

32. __ Service/Gas Stations

33. __ Sewage Plant

34. __ Underground Storage Tank

35. __ Waste Piles

36. __ Water Well

37. __ Wood Preserving

38. __ Other (specify) _____

STEP 6:

MANAGING THE SOURCE WATER PROTECTION AREA

Up to this point you have collected or created a lot of information. In this step, you will make an assessment on how you will use this information. You will likely need the advice and assistance of your attorney. You may also find the assistance of other professionals, such as planners, very useful.

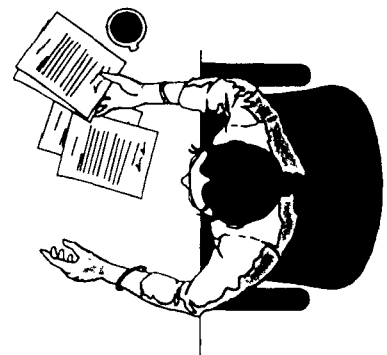
You will basically be making a decision on how to proceed with protecting the source water watershed area in this step. This decision may range from "Do Nothing" to a very aggressive protection program, as well as many variations in between.

TYPICAL MANAGEMENT TOOLS FOR SOURCE WATER PROTECTION FALL INTO TWO CATEGORIES: NON-REGULATORY AND REGULATORY TOOLS

**THE FIRST CATEGORY IS HIGHLY EFFECTIVE AT THE START OF A
SOURCE WATER PROTECTION PROGRAM AND IS RELATIVELY EASY
TO BEGIN!**

Non-regulatory

- Voluntary – school students and senior citizens provide an excellent source energy and resources for educating the public and the collection of information.
- Education – public education is an important part of the program and is covered in more detail on page 29.
- Monitoring – typical monitoring plans include emergency telephone number listings and emergency telephone chains for possible upstream contaminant sources. Other plans include sharing of industrial monitoring well data and the development of additional monitoring wells at possible contaminant locations.
- Adopting best management practices for critical areas listed previously
- Land Acquisition of critical areas of protection.
- Schools – contact local schools and aid in the development of school programs that involve students in source water protection programs. Students can provide almost a limitless supply of enthusiasm and energy for your project.



- Community Senior Citizens – involve local citizens of the community in the process. Older citizens of the community are aware of many of the past practices of the area and provide a valuable source of historical information.

Certain Legislative tools may also be available

Regulatory

- Health – guidelines are typically associated with regional health departments.
- Zoning and ordinances – local governing bodies may develop to enforce management practices.
- Subdivision control – a method of controlling size, location and type of subdivisions that may have adverse affects on the watershed including sewer and storm water issues.
- Buffer Zones - designate vegetated buffer zones and/or Water Supply Overlay Protection Zones.
- Performance-Based Zoning - holds individuals creating the drinking water impact responsible for addressing the problems.
- Urban Runoff Control - "Zero Runoff Ordinances" - provides treatment for runoff and limits the amount of impervious areas in watersheds.
- Wastewater Planning - coordinate wastewater planning within a watershed with the local governing agency to ensure protection from contamination.

SELECTION OF APPROPRIATE MANAGEMENT TOOLS FOR YOUR COMMUNITY SHOULD BE BASED ON SPECIFIC SITUATIONS INCLUDING HYDROGEOLOGIC SETTING, POLITICAL SITUATION, RELATIONS WITH OTHER POTENTIALLY INVOLVED MUNICIPALITIES, AND LEVEL OF INTEREST.

The following pages provide examples of a non-regulatory management tool in the form of public education and a regulatory management tool in the form of overlay zoning.

MANAGEMENT TOOLS:

A. NON-REGULATORY TOOL EXAMPLE: PUBLIC EDUCATION

Educating the public provides a critical non-regulatory management tool for source water protection. When people think about water, most think only in terms of what comes out of the tap.

They do not realize that the same areas in which they live, work, and play are frequently contributing to the water they drink and use.



Even a modest public education program can help people gain a greater understanding for your source water protection program. Remember that the cost of a potentially low-cost protection program can be much less than the cost of treatment or a new source.

Public education is critical to a successful program and should be started at the very beginning of a source water protection program and should be an on-going activity throughout the planning and should continue as part of a long-range program.

Some potential activities include:

- Providing signs along roadways and in housing areas to identify your source water protection area (PennDOT can help along state highways)
- Prepare "Best Management Practices" guidelines for distribution to the public including items such as:

- | | |
|---------------------------------|--------------------------|
| ▪ Urban Runoff | ▪ Lawncare and Gardening |
| ▪ Critical Areas | ▪ Septic Tanks |
| ▪ Household Hazardous Materials | |

- Conduct public meetings

Time: _____

Date: _____

Speaker: _____

- Provide speakers for civic/community groups:

Possible groups to speak to include:

PUBLIC EDUCATION



- Provide newsletter or water bill inserts about the program.
- Request coverage with your local newspaper and other media.

Newspaper

Contact: _____

Phone/Fax Number: _____

Radio

Contact: _____

Phone/Fax Number: _____

Television

Contact: _____

Phone/Fax Number: _____

- Contact your local school districts to determine interest in participating in activities related to source water protection.

For Example:

- Help develop curriculum including projects and field trips
- Participating in any Earth Day or scheduled environmental activity
- Designing a slogan or logo for the source water protection area
- Art or essay contests related to water resource protection

You can get started by answering a few simple questions

Your School District _____

Contact Person _____

Phone/Fax Number _____

Areas of Interest _____

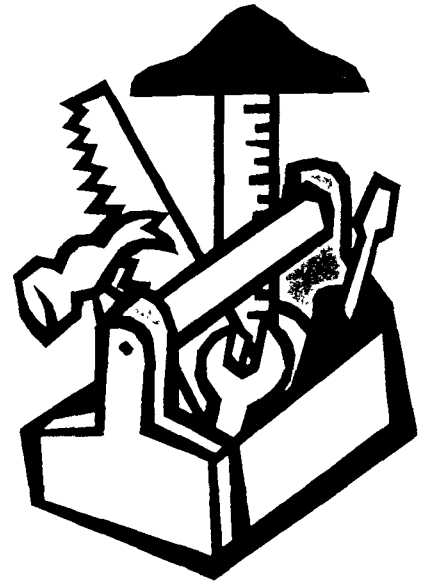
MANAGEMENT TOOLS

B. REGULATORY TOOL EXAMPLE: OVERLAY ZONING

For communities of watershed groups, one management tool to consider that may involve the least disruption and be simpler to implement and be accepted is the concept of a watershed zone.

Watershed Zone:

- Accepts current zoning that may already exist.
- “Overlays” the source water protection zoning on top of the existing zoning.
- Recognizes existing activities of the existing zoning.
- Recognizes existing activities that could impact on source water protection but with a minimum of disruption to them.
- Prohibits or provides certain limitations on future activities that can affect source water protection.



If you consider the use of an overlay zone for your system:

Compare current zoning and planning documents for the protection area you have mapped. As a result of this comparison, identify:

- **Current planning of concern to source water protection:**

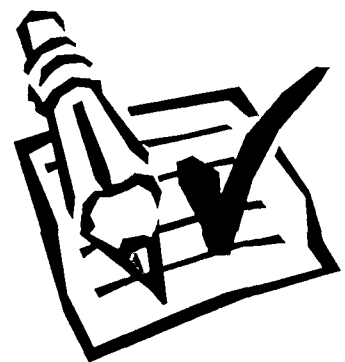
- Uses or concern to source water protection that are currently allowed in the source water protection area.

- Specific provisions of local government that may have an affect on source water protection issues.

MANAGEMENT TOOLS

Key Elements of overlay watershed zoning:

1. Define regulated land uses
2. Define regulated substances
3. Variances for existing uses/activities
4. Special exceptions for new sources
5. Consider requirements for design standards
6. Consider requirements for operating permits



Samples of other types of source water protection management tools may be obtained from:

USEPA Region III:

Drinking Water Branch 3WP22
Water Protection Division
1650 Arch Street
Philadelphia, PA 19103-2029

Delaware:

Delaware Department of Natural
Resources and Environmental Control
Division of Water Resources
PO Box 1401
Dover, DE 19903

Maryland:

Water Management Administration
2500 Broening Highway
Baltimore, MD 21224

Pennsylvania:

Bureau of Water Supply Management
PA Department of Environmental Protection
11th Floor, RCSOB
PO Box 8467
Harrisburg, PA 17105-8467

Virginia:

Division of Water Supply Engineering
Virginia Department of Health
1500 East Main Street
PO Box 2448
Richmond, VA 23218

West Virginia:

West Virginia Department of Health
815 Quarrier Street
Charleston, WV 25301

STEP 7:

PLANNING FOR THE FUTURE

Review your source water protection plan yearly!

This will allow you to

- Keep up-to-date on regulations
- Review trends and activities in the protection area
- Act on new information about potential contaminant sources



Next Meeting:

Date: _____

Time: _____

Place: _____

**Identify future critical areas and take action to include them
in your source water protection planning.**

Possible areas to be considered:

DEVELOP A CONTINGENCY PLAN TO:

ONCE POTENTIAL THREATS TO A COMMUNITY SOURCE WATER ARE IDENTIFIED:

- **Develop an Emergency Management Plan**

- What are the steps involved to address identified potential threats?

- Identify who is responsible for each step including who will coordinate efforts.

- What are sources of technical, logistical and financial resources for handling potential threats?

- **Provide for alternate water supply or treatment should yours become contaminated**

For possible sources for assistance, please refer to the agencies listed on Page 32.

- **Deal with hazardous materials and accident spills.**

A good place to start with, is your community or county hazardous materials (HAZMAT) response coordinator. Have a copy of their program on hand for reference and for inclusion into your emergency management plan.

Community/county HAZMAT coordinator: _____

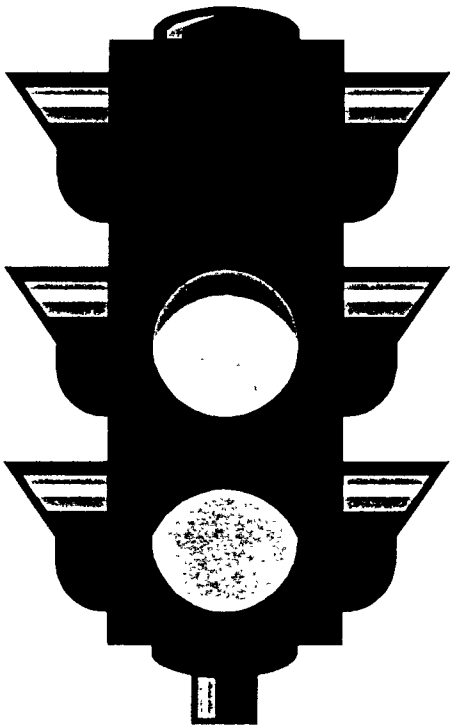
Telephone/Fax Number: _____

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



WHAT IF THERE IS LITTLE INTEREST?

DON'T STOP!



Find out why others don't see a benefit. Identify the barriers that stop cooperation.

- *Do they understand the "cost" of an unprotected water source?*

Some possibilities are listed on the next page.

- *Are you addressing the wrong issues?*
- *Are the participants frustrated because everybody has a different approach?*
- *What are the problems you are running into?*
List them on the next page and then try to find ways to overcome them.

Many people still live with the misconception that since water did not present a problem in the past, it will not present any problem now. This is not true today with the large amount of population growth, more intense use of land, and increased use of chemicals that threaten most water supplies.

Some of the costs of contaminated water can include cost to clean up the water, adverse health effects, extra monitoring costs, treatment costs, and finding a new source of supply.

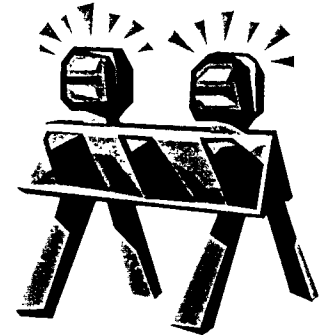
ISSUES?

WHAT ARE THE BARRIERS AND WHY IS THERE LITTLE INTEREST?

- ☐ Lack of understanding of the SDWA
- ☐ Legal Concern
- ☐ Economic Conditions
- ☐ Lack of Leadership
- ☐ Costs
- ☐ Timing Wrong
- ☐ Group Too Large
- ☐ Group Too Small
- ☐ Municipal Differences
- ☐ Other

LOOK FOR POSSIBLE SOLUTIONS TO CREATE INTEREST

Look for ways to eliminate barriers and create interest in source water protection efforts and list them on the next page. These will vary from situation to situation depending on the barriers encountered. Two typical problems can be the “cost” of developing a source water protection program and in many cases, the required cooperation when more than one municipality must be involved.



When the costs of cleaning up a contaminated water service are understood, the barrier should disappear. The source of water for one community may be located in numerous municipalities and the areas to be protected may be in yet other municipalities. It is important to stress the health and safety factor to the neighboring municipalities to gain cooperation in the implementation of a plan.

Once you have identified ways to overcome the barriers, list the actions needed to make it happen. Don't forget to select a specific person who will be responsible for each step of your plan.

As problems are overcome and interest is developed, go back to page 9 to continue with the planning to protect the drinking water in your area.

Remember, the cost of source water protection is cheap compared to the many costs of coping with a source once it is contaminated.

Possible Ways To Eliminate Barriers And Create Interest	Actions Required To Make It Happen Solutions	Who is in Charge?
1.	1A. 1B. 1C.	1A. 1B. 1C.
2.	2A. 2B. 2C.	2A. 2B. 2C.
3.	3A. 3B. 3C.	3A. 3B. 3C.
4.	4A. 4B. 4C.	4A. 4B. 4C.
5.	5A. 5B. 5C.	5A. 5B. 5C.

GLOSSARY

BEST MANAGEMENT PRACTICES (BMP'S) – Protective measures for preventing or controlling threats of water quality that have worked best over time.

COMMUNITY WATER SYSTEM - A public water system that serves at least 15 service connections used by year-round residents of the area served by the system or regularly serves at least 25 year-round residents.

MAXIMUM CONTAMINANT LEVEL (MCL) – In the SDWA, an MCL is defined as “the maximum permissible level of a contaminant in water which is delivered to any user of a public water systems.”

NON-COMMUNITY WATER SYSTEM – A public water system that is not a community water system. There are two types of NCWSs: transient (serve 25 non-resident persons per day for 6 months or less per year) and non-transient (serve at least 25 of the same non-resident persons per day for more than 6 months per year).

SOURCE WATER PROTECTION AREA (SWAP) – The area delineated by the state for a public water system (PWS) or including numerous PWSs, whether the source is ground water or surface water or both, as part of the state SWAP approved by EPA under section 1453 of the SDWA.

SURFACE WATER TREATMENT RULE (SWTR) – The rule specified maximum contaminant level goals for *Giardia lamblia*, viruses and *Legionella*, and promulgated filtration and disinfection requirements for PWSs using surface water sources under the direct influence of surface water. The regulations also specified water quality, treatment, and watershed protection criteria under which filtration may be avoided.

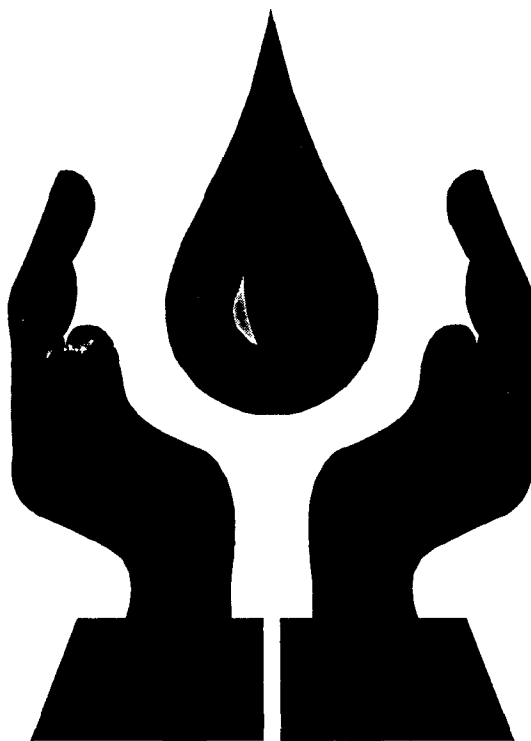
WATERSHED – A topographic boundary area that is the perimeter of the catchment area of a stream.

WATERSHED AREA – A topographic area that is within a line drawn connecting the highest points uphill of a drinking water intake, from which overland flow drains to the intake.

WELLHEAD PROTECTION AREA (WHPA) – The surface and subsurface area surrounding a well or well field, supplying a PWS, through which contaminants are reasonably likely to move toward and reach such water well or well field.

copy 2

PROTECTING YOUR WATERSHED THROUGH A SOURCE WATER ASSESSMENT AND PROTECTION PLAN



A "HOW-TO" WORKBOOK FOR COMMUNITIES AND WATERSHED GROUPS

Protecting Your Watershed Through A Source Water Assessment and Protection Plan

A "How To" Workbook
For
Communities And Watershed Groups

**United States
Environmental Protection Agency**

Drinking Water Branch (3WP22)
1650 Arch Street
Philadelphia, PA 19103

U.S. EPA Region III
Philadelphia Office for Environmental
Protection
1650 Arch Street, 3707
Philadelphia, PA 19103
TEL: 215-260-1300

INTRODUCTION

This workbook was developed by the U.S. Environmental Protection Agency and Spotts Stevens and McCoy, Inc. (Reading, Pennsylvania) as a guide for communities and watershed groups, with limited financial resources, to develop and implement an assessment and protection plan for existing and new drinking watersheds. **This publication is meant as a workbook, it is meant for you to use, please write in it and mark it up.**

Groundwater protection is an important part of source water protection, but in most cases, groundwater fundamentals and groundwater protection are not covered in this workbook. It is recommended that readers refer to the state wellhead protection program for information regarding groundwater protection. Proper implementation of this workbook would include the implementation of a wellhead protection plan where applicable.

This workbook has been developed as a companion to The U.S. Environmental Protection Agency guidebook entitled "State Source Water Assessment and Protection Programs Guidance - Final Guidance".

Source water assessment is achieved through identifying the various components, influences and possible contamination areas for a water source. This workbook serves as a guide for assessing a water source and then providing the proper steps for protection of the source.

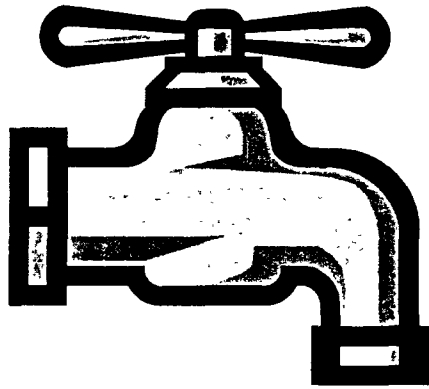
The Safe Drinking Water Act applies to all publicly or privately owned water systems having more than 15 or more service connections and/or serving at least 25 people. Water systems will be required to meet the 1996 Safe Drinking Water Act Amendments which have incorporated source water protection through the use of source water assessment and protection. The goal of the Environmental Protection Agency is that "by the year 2005, 50 percent of the population served by community water systems will receive their water from systems with Source Water Protection (SWP) programs in place under both Wellhead Protection (WHP) and watershed protection programs."

**AS A WATER PROVIDER OR WATER USER OF A WATERSHED
ARE YOU INTERESTED IN OR CONCERNED ABOUT...**

	YES	NO
• Serving good quality water	<input type="checkbox"/>	<input type="checkbox"/>
• Receiving good quality water	<input type="checkbox"/>	<input type="checkbox"/>
• Protecting your water supply	<input type="checkbox"/>	<input type="checkbox"/>
• Identifying where your water supply comes from	<input type="checkbox"/>	<input type="checkbox"/>
• Knowing sources of potential contamination	<input type="checkbox"/>	<input type="checkbox"/>
• Recognizing management tools for small drinking water systems	<input type="checkbox"/>	<input type="checkbox"/>
• Avoiding expensive source water treatment	<input type="checkbox"/>	<input type="checkbox"/>
• Providing low-impact public use for recreation and education	<input type="checkbox"/>	<input type="checkbox"/>
• Other: _____	<input type="checkbox"/>	<input type="checkbox"/>

**...AS THESE RELATE TO YOUR COMMUNITY
WATERSHED?**

**IF YOU ANSWERED ANY OF THESE QUESTIONS WITH
A
YES,
PLEASE READ ON.**



WE'RE INTERESTED BUT...

WHAT CAN WE DO?

WHAT SHOULD WE DO?

TO PROTECT THE SOURCE WATER WE USE FOR...

...drinking

...bathing

...cooking



...washing clothes

...recreation

ONE APPROACH IS TO DEVELOP A. . .

**SOURCE WATER ASSESSMENT
AND PROTECTION PROGRAM**

HOW DO WE DO THIS?

7

THERE ARE 7 BASIC STEPS TO SOURCE WATER ASSESSMENT AND PROTECTION.

STEP 1 - FORM A COMMUNITY PLANNING TEAM

STEP 2 - DELINEATE THE WATERSHED TO BE PROTECTED

STEP 3 - REVIEW THE ZONING SURROUNDING THE WATERSHED

STEP 4 - IDENTIFY CRITICAL AREAS

STEP 5 - IDENTIFY POTENTIAL SOURCES OF CONTAMINATION

STEP 6 - MANAGE THE SOURCE WATER PROTECTION AREA

STEP 7 - PLAN FOR THE FUTURE

ALL SEVEN STEPS REQUIRE PUBLIC EDUCATION FOR ALL PARTIES INVOLVED!! THIS IS THE MOST CRITICAL STEP TO THE IMPLEMENTATION OF A SOURCE WATER ASSESSMENT AND PROTECTION PLAN.

It may be easier to begin Step 2 first to gain support and awareness through education.

Completing this workbook will put you on the road to protecting your watershed for yourself and for future generations.

NOW IS THE TIME TO ACT!!



STEP 1:

GETTING STARTED WITH A COMMUNITY PLANNING TEAM

Implementation of a plan requires someone to take action - WHY NOT YOU!

Once a need for a watershed protection plan is realized, a few initial contacts and discussions can quickly locate others with similar interests. Using the following page, jot down names, phone numbers, and addresses of others you think may be interested in watershed protection through source water assessment and protection and... CALL THEM NOW!!

WHO SHOULD YOU CALL??

Any number of people and organizations may be interested in participating in this activity, including...

- local government
- planning/zoning
- state regulatory agencies
- water departments
- agricultural community
- industry
- conservation/environmental groups
- schools
- civic/community organizations
- developers
- watershed advisory groups
- lake associations
- teachers



IT IS VERY IMPORTANT TO...

If the watershed for your system is located in multiple municipalities, it is essential that you invite all municipalities. Even if there is little cooperation between the municipalities on other issues, a watershed protection plan will indirectly affect and benefit individually the municipalities surrounding the watershed as well as your own. This is a critical step in effectively organizing and implementing a plan of action.

INITIAL CONTACTS AND DISCUSSIONS



	WHO?	ORGANIZATION ADDRESS, PHONE, FAX AND EMAIL NUMBERS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

DEVELOP INTEREST

After making the initial telephone contacts, call for an informal meeting of all interested parties. Make this a broad-ranging meeting, which further develops interests in watershed protection planning for your community.

Use the following page as guide to organize your meeting.

SOME SUGGESTIONS FOR AGENDA ITEMS:

- Recent water quality problems
- Development in the surrounding watershed area
- Potential contamination threats
- How to organize
- Sources of assistance
- What information do we have
- Who else may be interested
 - include advocate peers with the group to offset opponents (e.g. a farmer who favors protection balanced with a farmer who opposes anti-protection)
- Budget
- Assignments
- Staff capabilities
- Volunteer capabilities
- Discussion of local water sources
- What are the perceived needs of the communities



INFORMAL MEETING TO DETERMINE INTEREST

INTEREST! ENTHUSIASM!
CONTINUE WITH NEXT PAGE

NO INTEREST! APATHY!
GO TO PAGE 37

ORGANIZER: _____

WHO IS ATTENDING?

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

TIME/DATE _____

LOCATION _____

AGENDA ITEMS:

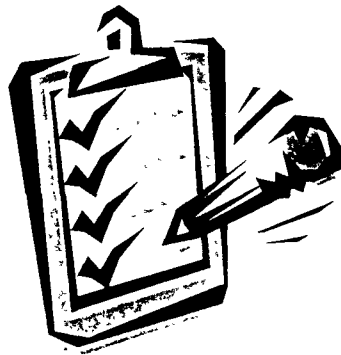
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

REFRESHMENTS: _____

ADDRESS THE BASIC ISSUES

If watershed protection is of interest, begin the meeting by discussing the basic issues. Don't get bogged down in the details at this point. Several meetings may be needed as the idea of watershed protection becomes more focused on your specific needs.

Solutions to the issues at hand will take time. Each situation will require specific attention due to the varied personalities, interests, problems, constraints, and opportunities. Take one step at a time.



**USE THE NEXT TWO PAGES TO
KEEP SIMPLE MINUTES OF YOUR
FIRST MEETING.**

DO WE NEED OUTSIDE RESOURCES?

POSSIBLY.

Experience elsewhere has shown that watershed protection planning must have a good technical and legal basis. There are many things your planning team can do, but two resources that can provide valuable assistance include a hydrologist to determine the watershed area delineation and a lawyer to provide direction on the management tools. The lawyer could very likely be your municipality's solicitor or a combination of solicitors from the various municipalities. The hydrologist may be a consultant from a local college or government agency.

MINUTES OF FIRST MEETING

KEY ITEMS DISCUSSED

OUR GOALS FOR SOURCE WATER PROTECTION

NOW, MOVE TO IMPLEMENTATION



THINGS TO DO NEXT

WHAT?	WHO?	WHEN?

THE WATERSHED PROTECTION COMMITTEE MEMBERS ARE:

[illegible]

STEP 2:

DEFINE THE WATERSHED PROTECTION AREA

A watershed is the topographic boundary area that is within the perimeter of a catchment area of a stream or the collection of streams, lakes, rivers. A watershed can be influenced by either groundwater and/or surface water.

The primary goal of source water protection (SWP) under the Safe Drinking Water Act (SDWA) is to:

“Prevent the contamination of and maintaining good quality drinking water supplies, by reducing or preventing chemical and microbiological contamination of source waters and avoiding costly treatment and monitoring requirements.”

Defining the watershed is the key technical step in watershed protection planning, and should be based on a reasonably sound approach in the event of challenges to the area defined for source water protection. This is the critical step where a hydrologist may be able to help you.



BASICS:

TO BEGIN DEFINING THE WATERSHED AREA

1. Do we have a U.S. Geological Survey (USGS) topographic map(s) that is likely to cover our watershed? If not, obtain one. (To buy maps look under Maps in the telephone book yellow pages; hunting and fishing stores may also have these.) A geographical information system (GIS) may be used in some cases in place of USGS maps.

☐ **Yes** ☐ **No**

2. Is there a drawing showing any previous studies?

☐ **Yes** ☐ **No**

3. Is hydrologic information for our area available through the USGS or a local college?

☐ **Yes** ☐ **No**

4. Can we accurately identify the drainage area for our watershed from the maps or GIS or we will have a hydrologist complete this?

☐ **Yes** ☐ **No**

5. Do we have zoning maps and ordinances for the area likely under consideration?

☐ **Yes** ☐ **No**

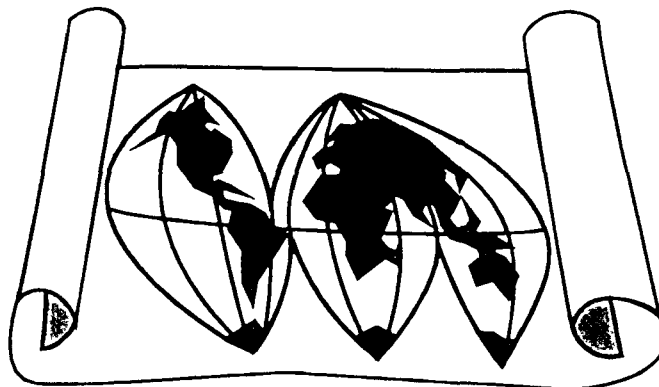
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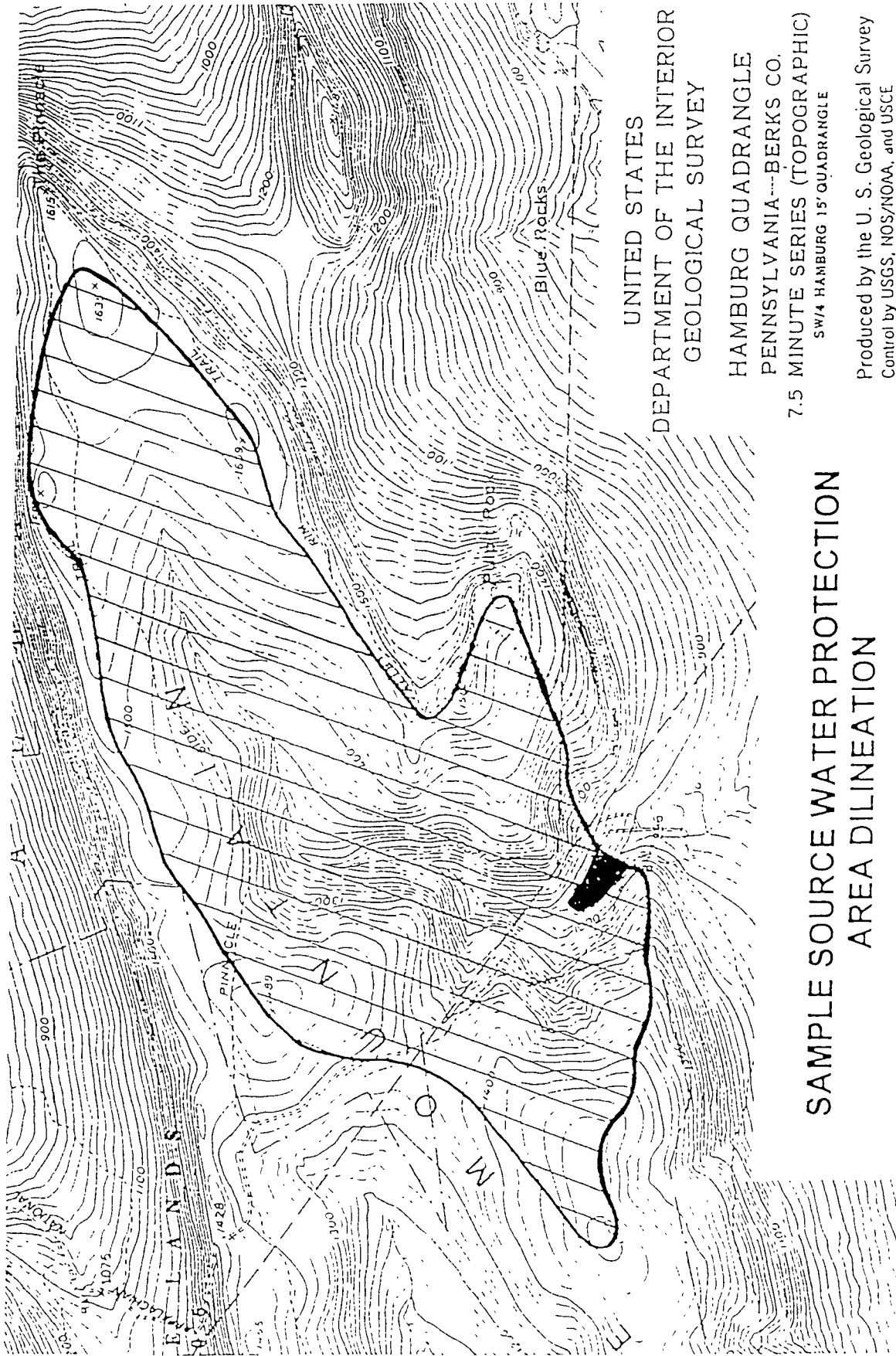


IF DATA AND THE ABILITY TO DELINEATE OR FUNDS FOR A HYDROLOGIST ARE AVAILABLE...

1. Obtain the necessary maps or the GIS file.
2. Have a hydrologist delineate the watershed or complete this task using the following guidelines:
 - a. Find topographic high points surrounding your ground/surface water source and construct a line that connects these points (See Example).
 - b. The line created will identify the boundary of the watershed including any wells, where the slope of the land slopes into or away from the surface water source.
 - c. Field check your watershed delineation by driving/walking the area boundary.
3. For the use of a USGS map, obtain clear mylar drawing sheets from a drafting or artist's supply store. Place the mylar over the USGS map and trace the watershed as defined above. This will be the foundation for your watershed mapping.
4. If a GIS exists, maps will be able to be produced by using the computer.

THIS WILL PROVIDE YOU WITH THE BASIC MAPS, INCLUDING THE WATERSHED SOURCE WATER PROTECTION AREA.





UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
HAMBURG QUADRANGLE
PENNSYLVANIA---BERKS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 HAMBURG 15' QUADRANGLE
Produced by the U. S. Geological Survey
Control by USGS, NOS/NOAA, and USCE

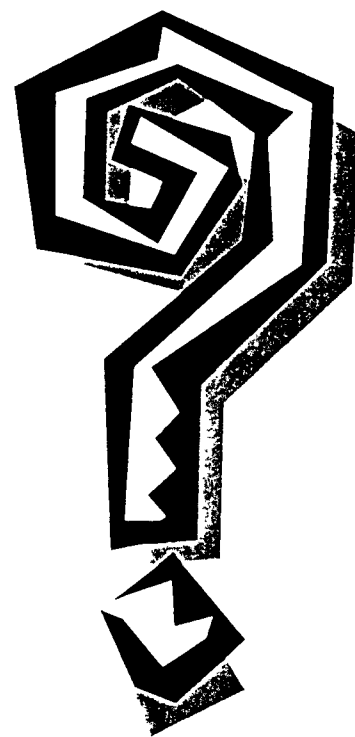
STEP 3:

REVIEW THE CURRENT PROVISIONS OF LOCAL GOVERNMENT

Review the local planning (zoning and related ordinances) and provisions of local government to evaluate what protection or potential hazards may already exist for your delineated watershed.

Address the following questions:

1. What are the current zoning requirements for the watershed? What zoning already exists to protect the watershed area?
2. What are the conditional land uses in the watershed? Are there any detrimental land uses already in practice.
3. What are the municipalities long-range plans for the area surrounding and including the watershed? Are there any future plans that may affect or be within the watershed delineation?
4. What other provisions already exist that support Source Water Protection, such as Wellhead Protection (WHP) and other regulatory issues?
5. What are the other options that exist for protection of the watershed, such as nutrient management, Wellhead Protection, Best Management Practice's (BMP's) and other voluntary issues?



CONTINUE ON THE NEXT PAGE WITH STEP 4



STEP 4:

HOW TO IDENTIFY CRITICAL AREAS

Once the watershed area has been delineated, the next step is to identify natural features that may need special attention. A list of natural features are as follows:

1. STEEP SLOPES WHERE EROSION MAY OCCUR. THIS MAY VARY DEPENDING ON THE AMOUNT OF VEGETATION.
2. UNVEGETATED OR DISTURBED AREAS
3. HIGHLY ERODABLE SOIL TYPES
4. SOILS WITH HIGH CLAY CONTENT
5. HIGHLY PERMEABLE SOILS
6. FORESTS
7. WILDLIFE AREAS
8. STREAMS AND RIVERBANKS
9. FLOODPLAINS
10. WETLANDS



Listed above are many of the features that may be found in a watershed.

It is important to realize that not every watershed will have all of the above-mentioned features, and that some features may have a larger affect on one watershed than another. Combinations of features may also be found. For example, relatively steep vegetated slopes may present no influence on a watershed, but the same slope unvegetated may allow for the passage of pesticides into the watershed.

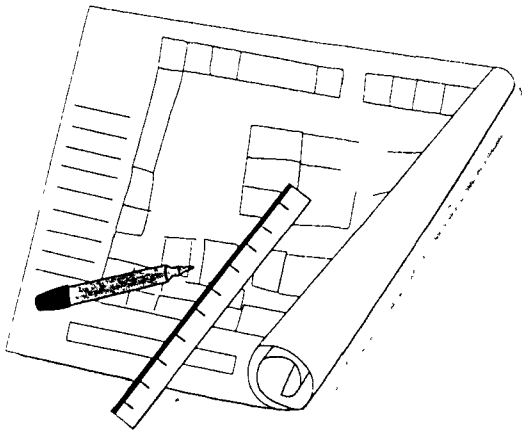
A personal walking tour of your watershed should provide the location of many of these features. Information regarding critical areas should be added to your map for future use.

Sources of information regarding critical areas include:

- Natural Resource Conservation Service
 - Cooperative Extension Service
 - Soil and Water Conservation Districts
 - U.S. Department of Agriculture
 - U.S. Fish and Wildlife Service
 - Local Governments
 - U.S. Geologic Survey

Precipitation data and stream records can be retrieved from the USGS for reviewing flooding and storm water concerns.

AN ON-SITE REVIEW OF THE
CONDITION OF CRITICAL AREAS DURING STORMS
PROVIDE A GREAT SOURCE OF INFORMATION
ON WHICH AREAS ARE MOST AFFECTED.
SEE PAGE 20 FOR A SAMPLE INVENTORY.

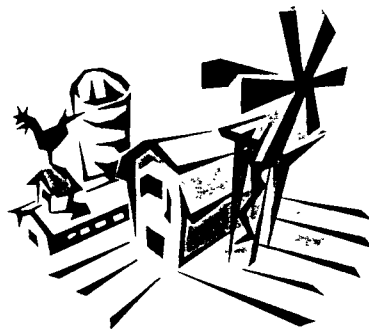


Using a copy of your USGS map (either buy extra copies or make photocopies), draw your source water protection area on the map and using the inventory sheet on the next page, prepare an inventory of critical areas for your watershed. Use a separate sheet to organize names, addresses, and phone numbers, where you can obtain these.

PROGRAM INVENTORY OF POTENTIAL CRITICAL AREAS

DIRECTIONS: Place an "X" next to each category that you identify in the watershed protection area. Delineate the feature on the map and place the corresponding number at the location of the feature. If there are more than one source for a category, label each site with the number and a letter (e.g. multiple wetlands would be 10A, 10B, 10C, etc.).

1. STEEP SLOPES
2. UNVEGETATED OR DISTURBED AREAS
3. HIGHLY ERODABLE SOIL TYPES
4. SOILS WITH HIGH CLAY CONTENT
5. HIGHLY PERMEABLE SOILS
6. FORESTS
7. WILDLIFE AREAS
8. STREAMS AND RIVERBANKS
9. FLOODPLAINS
(Typically 50 feet from the top of bank, if no other data are available).
10. WETLANDS
11. FARMLAND
12. OTHER (SPECIFY)



Once you have this field information, use the same labeling system and transfer it to a second sheet of mylar placed over the one with the source water protection area defined.

CONTINUE TO STEP 5 ON THE NEXT PAGE



STEP 5:

IDENTIFY POTENTIAL SOURCES OF CONTAMINATION

After the critical areas have been identified and delineated, the next step is to identify the potential sources of contamination. Remember these are potential threats to water quality. The best approach is to look at water quality data including pollutants and existing and projected land uses. Whether a potential threat becomes an actual one is determined in part by the type of activity. This includes whether it enters the watershed, its concentration and its duration.

There are many potential sources of source water contamination, including many routine activities that we may not necessarily think of as being possible sources of contamination.

THE FOLLOWING PAGE IDENTIFIES
SEVERAL TYPES OF SOURCES OF
SOURCE WATER CONTAMINATION AND
IS FROM EPA'S REGION III
WELLHEAD PROTECTION HANDBOOK

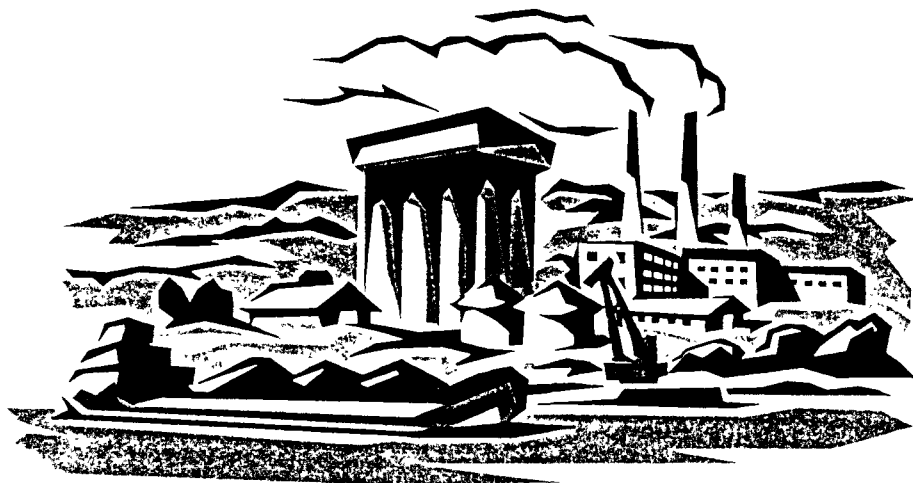


TABLE 1 - COMMON SOURCES OF SOURCE WATER CONTAMINATION

AGRICULTURAL

- Animal burial areas
- Animal feedlots
- Chemical storage areas
- Irrigation
- Manure spreading and pesticides
- Pesticides and fertilizers

COMMERCIAL

- Airport
- Auto repair shops
- Boat yard
- Construction Areas
- Car Washes
- Cemeteries
- Dry cleaning establishments
- Gas stations
- Golf courses (chemical application)
- Jewelry and metal plating
- Laundromats
- Medical institutions
- Paint shops
- Photography establishments/printers
- Railroad tracks and yard/maintenance
- Research laboratories
- Road deicing operations (e.g. road salt)
- Scarp and junkyards
- Storage tanks and pipe (i.e. above-ground, below-ground, underground)

INDUSTRIAL

- Asphalt plants
- Chemical manufacture, warehousing, and distribution activities
- Electrical and electronic products and manufacturing
- Electroplaters and metal fabricators
- Foundries
- Fire training facilities
- Machine and metal working shops
- Manufacturing and distribution for cleaning supplies
- Mining (surface and underground) and mine drainage
- Petroleum products production, storage and distribution centers
- Pipelines (e.g. oil, gas, coal, slurry)
- Septage lagoons and sludge
- Storage tanks (i.e. above ground, below-ground, underground)
- Toxic and hazardous spills
- Wells - Operating and abandoned (e.g. oil, gas, water supply, injection, monitoring, and exploration)
- Wood Preserving facilities

RESIDENTIAL

- Fuel storage systems
- Furniture and wood strippers and finishers
- Household hazardous products
- Residential lawns (chemical application)
- Septic systems, cesspools, water softeners
- Sewer lines
- Swimming Pools

WASTE MANAGEMENT

- Hazardous waste management units (e.g., landfills, land treatment areas, surface impoundment's, waste piles, incinerators, treatment tanks)
- Municipal incinerators
- Municipal landfills
- Municipal wastewater and sewer lines
- Open burning sites
- Recycling and reduction facilities
- Stormwater drains, retention basins, transfer stations

PREPARING YOUR INVENTORY

These are the likely sources of information, to begin the inventory for your source water protection plan.

1. **Contact the local department of environmental protection or health department for sources subject to certain federal and state laws.**

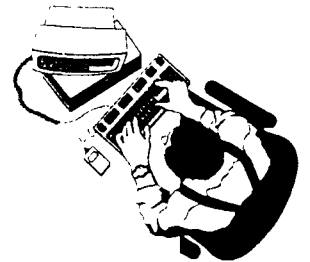
This may require contacting a number of different programs within an environmental department or health department as well as individuals time to review files.

2. **Surf the Internet**

Many internet sites now exist that provide information on a number of source water issues. Typical sites include local, state and federal, as well as private organizations. Two key source water sites developed by EPA include:

EPA site for Toxic Release Inventory (TRI)
www.epa.gov/enviro/html/tris/tris.query.java.html

EPA site for surfing a watershed
www.epa.gov/nwapsurf/text.html



3. **Utilize a Data Service**

There are a number of data services that compile information on facilities and sources where environmental problems have occurred or are subject to certain federal and state laws. These services can provide an extensive amount of data, including maps, usually within 7 to 10 days of a request. The cost of these services typically range from \$100 to \$150 depending on the amount and type of data requested. These services can be obtained through use of the internet.

4. **Your Planning Committee (and other helpers)**

Although a data service can provide you with some important information, there are many local activities you will have to identify yourself; for example, cemeteries. In addition to your committee, other organizations may be interested in assisting with the inventory. In other areas, senior citizen, civic, and environmental groups have helped prepare these inventories.

No special training is required. What is needed is enthusiasm, common sense and some general direction as to what to look for, such as the activities on the next page. Be sure to include long-time residents of an area who will know past land uses and possible sources of historical problems.

Using a copy of your USGS map (either buy extra copies or make photocopies), draw your source water protection area on the map and using the inventory sheet on the next page, prepare an inventory for your area. Use a separate sheet to organize names, addresses, and phone numbers, where you can obtain these.

Once you have this field information, use the same labeling system and transfer it to a second sheet of mylar placed over the one with the source water protection area defined.

**SEE SUGGESTED INVENTORY FORM ON PAGE 25 FOR
DEVELOPMENT OF A SOURCE WATER PROTECTION
INVENTORY OF POTENTIAL CONTAMINANT SOURCES.**

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

SOURCE WATER PROTECTION PROGRAM INVENTORY OF POTENTIAL CONTAMINANT SOURCES

SUGGESTED INVENTORY FORM

Inventory Person: _____

A. Landowners Name: _____

B. Address: _____

C. Phone Number: _____

D. City: _____

Zip Code: _____

E. County: _____

Description of Location: _____

Nature of Property

Residential _____

Commercial _____

Agricultural _____

Industrial _____

City Gov't Site _____

State Gov't Site _____

Rental _____

Other _____

DIRECTIONS: Place an "X" next to each category that you identify in the source water protection area. Place the corresponding number on the map at the location of the source. If there is more than one source for a category, label each site with the number and a letter (e.g., multiple cemeteries would be 7A, 7B, 7C, etc.)

1. __ Abandoned Wells

2. __ Aboveground Storage Tank

3. __ Airport

4. __ Animal Feedlot/Waste Storage

5. __ Asphalt Plant

6. __ Auto Repair/Body Shop/Salvage Washes

7. __ Cemetery

8. __ Cesspool

9. __ Chemical Production/Mixing/Storage

10. __ Dry Cleaners

11. __ Electroplaters/Metal Finishers

12. __ Farm/Private Dumps

13. __ Fertilizer/Pesticide Storage/Production/Mixing

14. __ Golf Course

15. __ Grain Storage Bin

16. __ Highway

17. __ Holding Pond/Lagoon

18. __ Industrial (other-Identify): _____

19. __ Injection Well

20. __ Irrigation Practices

21. __ Landfill

22. __ Laboratories

23. __ Machine Shop

24. __ Mining(Quarry)

25. __ Oil/Gas Pipelines

26. __ Photo Processors

27. __ Printers

28. __ Railroad

29. __ Refinishing

30. __ Road Salt Storage

31. __ Septic Systems

32. __ Service/Gas Stations

33. __ Sewage Plant

34. __ Underground Storage Tank

35. __ Waste Piles

36. __ Water Well

37. __ Wood Preserving

38. __ Other (specify) _____

STEP 6:

MANAGING THE SOURCE WATER PROTECTION AREA

Up to this point you have collected or created a lot of information. In this step, you will make an assessment on how you will use this information. You will likely need the advice and assistance of your attorney. You may also find the assistance of other professionals, such as planners, very useful.

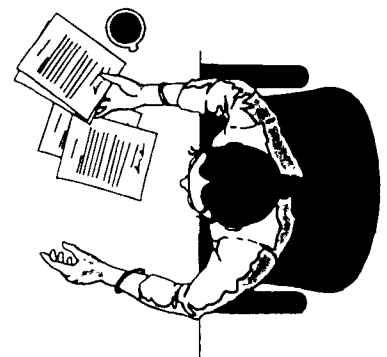
You will basically be making a decision on how to proceed with protecting the source water watershed area in this step. This decision may range from "Do Nothing" to a very aggressive protection program, as well as many variations in between.

TYPICAL MANAGEMENT TOOLS FOR SOURCE WATER PROTECTION FALL INTO TWO CATAGORIES: NON-REGULATORY AND REGULATORY TOOLS

**THE FIRST CATEGORY IS HIGHLY EFFECTIVE AT THE START OF A
SOURCE WATER PROTECTION PROGRAM AND IS RELATIVELY EASY
TO BEGIN!**

Non-regulatory

- Voluntary – school students and senior citizens provide an excellent source energy and resources for educating the public and the collection of information.
- Education – public education is an important part of the program and is covered in more detail on page 29.
- Monitoring – typical monitoring plans include emergency telephone number listings and emergency telephone chains for possible upstream contaminant sources. Other plans include sharing of industrial monitoring well data and the development of additional monitoring wells at possible contaminant locations.
- Adopting best management practices for critical areas listed previously
- Land Acquisition of critical areas of protection.
- Schools – contact local schools and aid in the development of school programs that involve students in source water protection programs. Students can provide almost a limitless supply of enthusiasm and energy for your project.



- Community Senior Citizens – involve local citizens of the community in the process. Older citizens of the community are aware of many of the past practices of the area and provide a valuable source of historical information.

Certain Legislative tools may also be available

Regulatory

- Health – guidelines are typically associated with regional health departments.
- Zoning and ordinances – local governing bodies may develop to enforce management practices.
- Subdivision control – a method of controlling size, location and type of subdivisions that may have adverse affects on the watershed including sewer and storm water issues.
- Buffer Zones - designate vegetated buffer zones and/or Water Supply Overlay Protection Zones.
- Performance-Based Zoning - holds individuals creating the drinking water impact responsible for addressing the problems.
- Urban Runoff Control - "Zero Runoff Ordinances" - provides treatment for runoff and limits the amount of impervious areas in watersheds.
- Wastewater Planning - coordinate wastewater planning within a watershed with the local governing agency to ensure protection from contamination.

SELECTION OF APPROPRIATE MANAGEMENT TOOLS FOR YOUR COMMUNITY SHOULD BE BASED ON SPECIFIC SITUATIONS INCLUDING HYDROGEOLOGIC SETTING, POLITICAL SITUATION, RELATIONS WITH OTHER POTENTIALLY INVOLVED MUNICIPALITIES, AND LEVEL OF INTEREST.

The following pages provide examples of a non-regulatory management tool in the form of public education and a regulatory management tool in the form of overlay zoning.

MANAGEMENT TOOLS:

A. NON-REGULATORY TOOL EXAMPLE: PUBLIC EDUCATION

Educating the public provides a critical non-regulatory management tool for source water protection. When people think about water, most think only in terms of what comes out of the tap.

They do not realize that the same areas in which they live, work, and play are frequently contributing to the water they drink and use.



Even a modest public education program can help people gain a greater understanding for your source water protection program. Remember that the cost of a potentially low-cost protection program can be much less than the cost of treatment or a new source.

Public education is critical to a successful program and should be started at the very beginning of a source water protection program and should be an on-going activity throughout the planning and should continue as part of a long-range program.

Some potential activities include:

- Providing signs along roadways and in housing areas to identify your source water protection area (PennDOT can help along state highways)
- Prepare "Best Management Practices" guidelines for distribution to the public including items such as:
 - Urban Runoff
 - Critical Areas
 - Household Hazardous Materials
 - Lawncare and Gardening
 - Septic Tanks
- Conduct public meetings
 - Time: _____
 - Date: _____
 - Speaker: _____
- Provide speakers for civic/community groups:
 - Possible groups to speak to include:

PUBLIC EDUCATION



- Provide newsletter or water bill inserts about the program.
- Request coverage with your local newspaper and other media.

Newspaper

Contact: _____
Phone/Fax Number: _____

Radio

Contact: _____
Phone/Fax Number: _____

Television

Contact: _____
Phone/Fax Number: _____

- Contact your local school districts to determine interest in participating in activities related to source water protection.

For Example:

- Help develop curriculum including projects and field trips
- Participating in any Earth Day or scheduled environmental activity
- Designing a slogan or logo for the source water protection area
- Art or essay contests related to water resource protection

You can get started by answering a few simple questions

Your School District _____
Contact Person _____
Phone/Fax Number _____
Areas of Interest _____

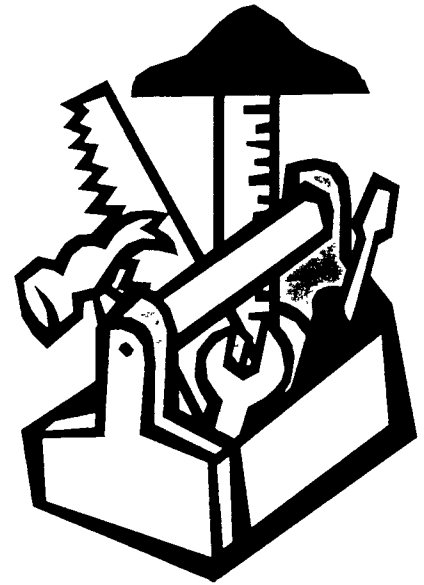
MANAGEMENT TOOLS

B. REGULATORY TOOL EXAMPLE: OVERLAY ZONING

For communities of watershed groups, one management tool to consider that may involve the least disruption and be simpler to implement and be accepted is the concept of a watershed zone.

Watershed Zone:

- Accepts current zoning that may already exist.
- “Overlays” the source water protection zoning on top of the existing zoning.
- Recognizes existing activities of the existing zoning.
- Recognizes existing activities that could impact on source water protection but with a minimum of disruption to them.
- Prohibits or provides certain limitations on future activities that can affect source water protection.



If you consider the use of an overlay zone for your system:

Compare current zoning and planning documents for the protection area you have mapped. As a result of this comparison, identify:

- **Current planning of concern to source water protection:**

- Uses or concern to source water protection that are currently allowed in the source water protection area.

- Specific provisions of local government that may have an affect on source water protection issues.

MANAGEMENT TOOLS

Key Elements of overlay watershed zoning:

1. Define regulated land uses
2. Define regulated substances
3. Variances for existing uses/activities
4. Special exceptions for new sources
5. Consider requirements for design standards
6. Consider requirements for operating permits



***Samples of other types of source water protection management tools
may be obtained from:***

USEPA Region III:

Drinking Water Branch 3WP22
Water Protection Division
1650 Arch Street
Philadelphia, PA 19103-2029

Delaware:

Delaware Department of Natural
Resources and Environmental Control
Division of Water Resources
PO Box 1401
Dover, DE 19903

Maryland:

Water Management Administration
2500 Broening Highway
Baltimore, MD 21224

Pennsylvania:

Bureau of Water Supply Management
PA Department of Environmental Protection
11th Floor, RCSOB
PO Box 8467
Harrisburg, PA 17105-8467

Virginia:

Division of Water Supply Engineering
Virginia Department of Health
1500 East Main Street
PO Box 2448
Richmond, VA 23218

West Virginia:

West Virginia Department of Health
815 Quarrier Street
Charleston, WV 25301

STEP 7:

PLANNING FOR THE FUTURE

Review your source water protection plan yearly!

This will allow you to

- Keep up-to-date on regulations
- Review trends and activities in the protection area
- Act on new information about potential contaminant sources



Next Meeting:

Date: _____

Time: _____

Place: _____

**Identify future critical areas and take action to include them
in your source water protection planning.**

Possible areas to be considered:

DEVELOP A CONTINGENCY PLAN TO:

ONCE POTENTIAL THREATS TO A COMMUNITY SOURCE WATER ARE IDENTIFIED:

- **Develop an Emergency Management Plan**

- What are the steps involved to address identified potential threats?

- Identify who is responsible for each step including who will coordinate efforts.

- What are sources of technical, logistical and financial resources for handling potential threats?

- **Provide for alternate water supply or treatment should yours become contaminated**

For possible sources for assistance, please refer to the agencies listed on Page 32.

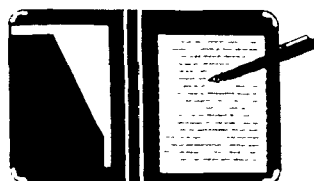
- **Deal with hazardous materials and accident spills.**

A good place to start with, is your community or county hazardous materials (HAZMAT) response coordinator. Have a copy of their program on hand for reference and for inclusion into your emergency management plan.

Community/county HAZMAT coordinator: _____

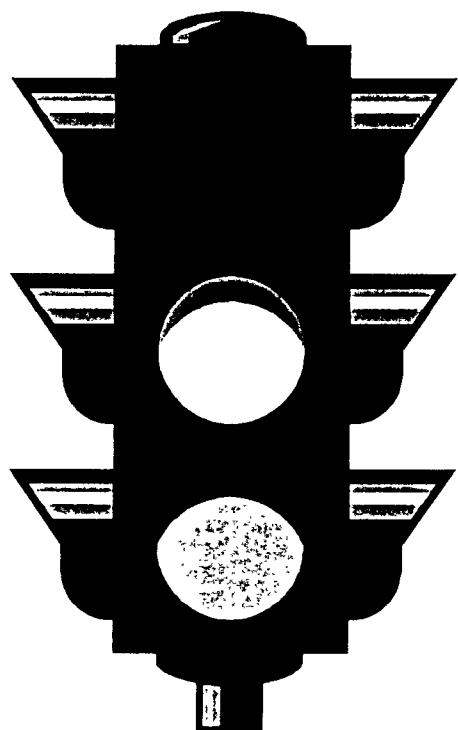
Telephone/Fax Number: _____

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WHAT IF THERE IS LITTLE INTEREST?

DON'T STOP!



Find out why others don't see a benefit. Identify the barriers that stop cooperation.

- *Do they understand the "cost" of an unprotected water source?*

Some possibilities are listed on the next page.

- *Are you addressing the wrong issues?*
- *Are the participants frustrated because everybody has a different approach?*
- *What are the problems you are running into?*
List them on the next page and then try to find ways to overcome them.

Many people still live with the misconception that since water did not present a problem in the past, it will not present any problem now. This is not true today with the large amount of population growth, more intense use of land, and increased use of chemicals that threaten most water supplies.

Some of the costs of contaminated water can include cost to clean up the water, adverse health effects, extra monitoring costs, treatment costs, and finding a new source of supply.

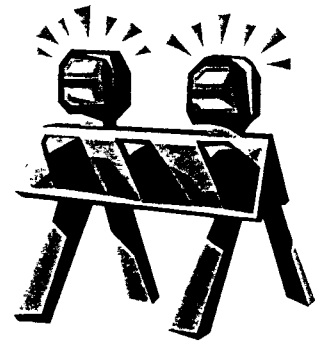
ISSUES?

WHAT ARE THE BARRIERS AND WHY IS THERE LITTLE INTEREST?

- ☐ Lack of understanding of the SDWA
- ☐ Legal Concern
- ☐ Economic Conditions
- ☐ Lack of Leadership
- ☐ Costs
- ☐ Timing Wrong
- ☐ Group Too Large
- ☐ Group Too Small
- ☐ Municipal Differences
- ☐ Other

LOOK FOR POSSIBLE SOLUTIONS TO CREATE INTEREST

Look for ways to eliminate barriers and create interest in source water protection efforts and list them on the next page. These will vary from situation to situation depending on the barriers encountered. Two typical problems can be the "cost" of developing a source water protection program and in many cases, the required cooperation when more than one municipality must be involved.



When the costs of cleaning up a contaminated water service are understood, the barrier should disappear. The source of water for one community may be located in numerous municipalities and the areas to be protected may be in yet other municipalities. It is important to stress the health and safety factor to the neighboring municipalities to gain cooperation in the implementation of a plan.

Once you have identified ways to overcome the barriers, list the actions needed to make it happen. Don't forget to select a specific person who will be responsible for each step of your plan.

As problems are overcome and interest is developed, go back to page 9 to continue with the planning to protect the drinking water in your area.

Remember, the cost of source water protection is cheap compared to the many costs of coping with a source once it is contaminated.

Possible Ways To Eliminate Barriers And Create Interest	Actions Required To Make It Happen Solutions	Who is in Charge?
1.	1A. 1B. 1C.	1A. 1B. 1C.
2.	2A. 2B. 2C.	2A. 2B. 2C.
3.	3A. 3B. 3C.	3A. 3B. 3C.
4.	4A. 4B. 4C.	4A. 4B. 4C.
5.	5A. 5B. 5C.	5A. 5B. 5C.

GLOSSARY

BEST MANAGEMENT PRACTICES (BMP'S) – Protective measures for preventing or controlling threats of water quality that have worked best over time.

COMMUNITY WATER SYSTEM - A public water system that serves at least 15 service connections used by year-round residents of the area served by the system or regularly serves at least 25 year-round residents.

MAXIMUM CONTAMINANT LEVEL (MCL) – In the SDWA, an MCL is defined as “the maximum permissible level of a contaminant in water which is delivered to any user of a public water systems.”

NON-COMMUNITY WATER SYSTEM – A public water system that is not a community water system. There are two types of NCWSs: transient (serve 25 non-resident persons per day for 6 months or less per year) and non-transient (serve at least 25 of the same non-resident persons per day for more than 6 months per year).

SOURCE WATER PROTECTION AREA (SWAP) – The area delineated by the state for a public water system (PWS) or including numerous PWSs, whether the source is ground water or surface water or both, as part of the state SWAP approved by EPA under section 1453 of the SDWA.

SURFACE WATER TREATMENT RULE (SWTR) – The rule specified maximum contaminant level goals for *Giardia lamblia*, viruses and *Legionella*, and promulgated filtration and disinfection requirements for PWSs using surface water sources under the direct influence of surface water. The regulations also specified water quality, treatment, and watershed protection criteria under which filtration may be avoided.

WATERSHED – A topographic boundary area that is the perimeter of the catchment area of a stream.

WATERSHED AREA – A topographic area that is within a line drawn connecting the highest points uphill of a drinking water intake, from which overland flow drains to the intake.

WELLHEAD PROTECTION AREA (WHPA) – The surface and subsurface area surrounding a well or well field, supplying a PWS, through which contaminants are reasonably likely to move toward and reach such water well or well field.