CEM Drinking Water Source Protection

Tier 2 Worksheet

Community Environmental Management

Acknowledgements

The New York State Department of Health and Soil and Water Conservation Committee are grateful to the following people and organizations for their assistance with this project:

Thanks go to Ed Hoxsie and Julie Melançon who conducted the original Dutchess County pilot during which the CEM worksheets were developed. Thanks also go to Jim Curatolo who field-tested the worksheet with the Hector Water District in the Town of Hector in Schuyler County.

We also would like to thank the Source Water Protection Coordinating Committee for their review and comments.

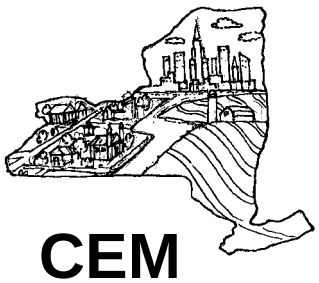
Additionally we appreciate the helpful feedback from Ron Entringer, Rich Lewis, Steve Winkley, Steve Gould and Kim Evans.

The CEM Logo was designed by Oan Somboonlakana. Additional thanks go to Barbara Silvestri for her and assistance in editing and design of the Worksheet Template.

We also appreciate the support from the New York State Departments of Agriculture and Markets, State and Environmental Conservation.

Special thanks go to Donna Somboonlakana and the US Environmental Protection Agency for Clean Water Act – Section 319 funding support.

Unending gratitude goes to Phil DeGaetano, Lois New, Gerry Chartier, Bill Morton, Rich Lewis, John Wildeman and Ron Kaplewicz without whom CEM would never have become a reality.



CEM

CEM

Community Environmental Management

Drinking Water Source Protection

Assessment Worksheet

Overview

Source Water is the water from rivers, streams, lakes and ground water that is used to supply communities with drinking water. Source water protection involves taking positive steps to manage potential sources of contamination and to prevent pollutants from reaching or contaminating sources of drinking water. Wellhead protection, for example, seeks to prevent the contamination of ground water that supplies public and private drinking water wells.

Protecting the water source from contamination is often more efficient and cost-effective than treating drinking water later to make it safe to drink. The types of protection measures that a community can implement include local land use controls such as land acquisition and ordinances and other management tools such as contingency plans and public education initiatives. The protection activities that a community pursues will depend on the how susceptible to different types of contamination the water source is, as well as the resources identified or available for use in protection as specified in the source water protection plan.

Source water protection is essential to preserve public health and sustain the local economy in many communities. In New York State, over 6 million citizens use public or private wells for their drinking water, and over 15 million drink water coming from surface water sources. The federal Safe Drinking Water Act Amendments of 1996 extended the focus of providing safe drinking to include source water protection for both surface water and ground water sources. Private wells are not regulated by either New York State or the federal government, but it may be relevant to include private wells in protection planning of a shared resource. In some cases, private wells are the sources for which protection is needed.

A community water system is what people typically think of as a public water system. Community systems serve people where they live at least six months of the year. The larger of these systems are run by or for municipalities, or private water companies. Some of the systems serve only a few apartments or mobile homes (at least 25 residents or 5 service connections to be regulated by New York State), while other systems are very large. There are also non-community water systems that include non-transient systems serving 25 or more people where they work or go to school, such as factories or schools. Transient non-community systems comprise the largest number of public water systems. These systems provide water service to customers who visit them on a transient basis, like hotels, motels, camps, stores and restaurants. All must meet extensive federal and state requirements to ensure that the water they serve is safe to drink. Other wells, located at homes and small businesses that do not meet the definition of a public water system, are considered private wells and are not regulated by either New York State or the federal government.

Some local governments have experience with water treatment and how to operate treatment plants or to contract with professionals to treat the water. Fewer have experience with how to meet the challenge of contamination prevention. Unless it becomes contaminated, drinking water has largely been out of sight and out of mind. This worksheet will help communities determine the appropriate questions to ask, and provide resources for how to find the answers.

A community may have a combination of public and private wells for which protection is desired and conditions for which a variety of legal and mechanical protection strategies may be needed. Several scenarios are described below:

A. Local government does not operate a public water system, most of the public uses private wells, with a few small community water systems like apartment buildings or other public systems like a school. Water may come from a single or multiple aquifers, which may be part of another source protection area.

B. A regional water authority or investor-owned utility serves the public, although some private wells use the same water resource. Development pressure may increase when water lines are extended. Water may come from surface water or wells tapping one or more aquifers. In order to protect water source, a lot of cooperation among government entities may be required.

C. Local government operates a public water system that serves the public within the municipality. The municipality may have the direct legal authority to adopt local zoning overlay zones or local ordinances to protect the water source in the municipality. Ordinances could also apply to private well source areas. Options can include land purchase or protection area easements can be bought from land owners.

D. Local government does not have jurisdiction over the source area because it is in another town or county. Cooperative agreements may serve to protect the water source.

Providing a safe supply of drinking water is accomplished through what is considered a multiple barrier approach. A barrier is provided by keeping the water safe at the source, using source water protection. Another barrier is provided by water treatment such as filtering or chlorination. Still another barrier is provided through monitoring, and ongoing evaluation of the quality of the water that is provided to people's homes and businesses. This worksheet focuses on Protection of the Drinking Water source through risk management, risk monitoring and compliance, as well as individual actions that can be taken to protect the water source.

Developing the Source Protection Plan

An effective source protection plan includes several steps. The area that the drinking water comes from must be defined, or delineated. An inventory of the known and potential sources of contamination within the watershed must be completed. The susceptibility of the source to contamination must be evaluated. The public must be involved in understanding the susceptibility of the source to contamination and identifying the management practices to implement to protect the drinking water resource. Management measures that address the particular situation of the local water source susceptibility, extent, and agency capabilities are evaluated, and drafted into a plan. Contingency planning for source protection includes evaluation of any contamination issues as well as how to address service interruptions. In addition to implementation of management practices, the protection plan should be periodically reviewed to ensure that it remains effective for protecting the source waters. Details about some of the protection planning steps are given below:

Delineating the source water area. In many parts of New York State, the source water areas that supply drinking water are not well characterized. In many cases, the details of well construction and sub-surface water bearing and confining layers are unknown or incomplete. For the purpose of completing an initial assessment for the Source Water Assessment Program (SWAP), an initial estimate of the source area was used. Before taking further steps, the accuracy of the delineated assessment area, and relevance to use as a protection area need to be confirmed. Steps to confirm the recharge area of the well include collecting additional information on the well and nearby wells, and may require additional borings to obtain information about the subsurface and aquifer. In some cases, there is enough available information to run a model to determine subsurface flow direction and the likely area that contributes recharge to the well. Still more information and sophisticated models are needed to distance the water will travel in a certain period of time. For example, a category for the distance the water may travel in two years can be used for the potential impact from microbiological contaminants. Different, longer times of travel would be used to evaluate potential impact from chemical contaminants.

Inventorying potential sources of contamination. An initial compilation of potential sources of contamination has been completed for public water systems in the SWAP assessments. The inventory is a list of possible contaminant sources within the delineated source water area(s). It is subject to change based on any changes in

the delineation of the source area, changes in prevalence of potential contaminants in the area, and refinement using details of actual rather than general practices in particular places or areas. For example, pesticides may be typically applied to a cornfield, but a particular cornfield may be pesticide-free.

The contaminant inventory includes a summary of land use practices in the assessment area which can impact water quality, discrete potential sources based on state or national Geographic Information Systems (GIS) coverages, and discrete sources identified during site inspections or sanitary surveys. The land use inventory of prevalence of potential sources of contamination is based on aerial images of land cover, with refinement based on local observations. Databases of regulated facilities such as factories or other permitted or registered facilities are queried to find out where the facilities are and what contaminants are present. The SWAP assessment considered potential contaminants of concern in categories that have been identified as a potential threat to drinking water quality, broken into groups based on common sources and similar fate and transport qualities in the environment. The prevalence of contaminants at the inventory of potential contaminant sources is used to develop prevalence ratings for each contaminant category.

Evaluating Source Sensitivity. Sensitivity is rated based on how easy it is for contaminants, if present, to reach a drinking water source. Surface waters bodies vary in sensitivity based on the type of water body and water flow at the intake. Ground water sensitivity is rated based on conditions of the aquifer and the integrity of the well itself as well as the types of soil, rocks, and vegetation in the recharge area, the section of land that receives precipitation and allows it to infiltrate an aquifer.

Determining the Source Susceptibility. The susceptibility of a drinking water source to contamination depends on the naturally occurring sensitivity of the source and the presence of contaminants in the source area that have the potential to deteriorate water quality. If no contaminant sources are present in the drinking water source area, then the susceptibility will be low, even for a sensitive source. If there is a high prevalence of potential sources of contamination in the drinking water source area, a medium susceptibility may be warranted, even if the source sensitivity is low because the water comes from a properly protected well in a confined aquifer.

Determining Appropriate Regulatory Controls. There are a variety of options for regulating control and access to protect sources of drinking water. They can range from buying land and restricting activities on the land, to public education campaigns, to enacting Watershed Rules and Regulations, additions to New York State Law. Local ordinances may be enacted to address issues within a municipality more easily than adding to State Law. It may involve considerable effort to get leaders of neighboring municipalities to work together to protect a drinking water source, but the cooperative effort may be most effective at reducing the potential for a drinking water source to become contaminated. Each situation should be evaluated to determine the applicable types of regulatory controls and the level at which they should enacted for source protection.

Involving the Public. Throughout the source protection plan development and implementation process, public involvement and education are critical. Frequent updates and outreach activities can bolster support for the protection plan and motivate the public to assist with protection through their own activities. Mandatory and voluntary measures must be carried out by individuals, local government, agriculture, businesses and citizen organizations. Therefore, these efforts will only succeed when local elected leaders enlist the broadest possible range of community support.

Planning for Contingencies The source protection plan should include plans for contingencies such as accidental or other contamination, as well as loss of supply for various reasons. Drought, or pipe or

other system failures, may cause reduced water availability to customers. Emergency provision of water supply should also be considered.

Implementing and Updating the Source Protection Plan An effective Source Water Protection Plan must include a schedule for implementation of any physical changes included in the plan. Appropriate regulations must be enacted. Periodic inspections of the source area must be completed on schedule to confirm that the provisions of the plan are in force, and that no new contamination threats have been added to the source area, such as new facilities, new drainage patterns, or changes in land use. The plan should include a periodic review process, maybe one year for the first review, and then 2 or more years for subsequent reviews. Ideally, a water system, municipality or organization is responsible for the ongoing upkeep of the enforcement and plan maintenance process.

Summary of Management Practices

A combination of legal, physical, education, and management practices is typically used for Source Protection. Legal actions range from enacting legislation to acquiring property or easements, or enforcing existing laws pertaining to contaminant threats.

Towns, small cities, and counties may possess or share the legal authority for enacting and enforcing protection measures that include: zoning and other land use controls; ability to restrict or stipulate requirements or controls for fixed source facilities that emit contaminants at a point source such as waste processing plants; health regulations including sanitary setbacks for septic tanks and sewer lines from drinking water wells; or authority to acquire land that provides protective zones around water sources.

Protection of drinking water sources has been done through New York State law, for over 100 years. These laws, known as Watershed Rules & Regulations, are in place for numerous surface water sources and several ground water sources across New York State. In cases where a water source spans numerous municipalities, enacting a state law may be the only regulatory action possible. Enacting any state law is a cumbersome process.

Best Management Practices have been developed that can reduce the risks posed by some of the types of home owner and business activities that can contaminate drinking water sources. These include management of: Septic Systems; Lawn and Garden Fertilizer; Pet waste; Large Scale Pesticide Application; Turf grass or Agricultural Fertilizer Application; Livestock and Poultry Waste; Sanitary and Combined Sewer Overflows; Underground Injection Wells; Storm water runoff; Small Quantity Chemical use; Underground or Aboveground Storage Tanks; Fencing; Filling or capping abandoned wells; and construction of riparian buffers. Details about these are available from a number of sources. Many are referenced below.

Community Benefits from Management

What Happens on the Land Affects the Water

Every waterbody in New York State has been classified according to its "best use." Surface water bodies used for drinking water are Class A or AA (for international waters). All ground water is classified as GA, or suitable for drinking. Each use has a set of standards associated with it that limit the concentrations of various contaminants (pollutants) that can be present in the water. A water quality problem exists where a classified use is negatively impacted. The effects can range from precluding a use (e.g. water unfit for drinking, swimming, etc.) to situations where the best use of a waterbody is threatened (e.g. changing land use patterns). Some pollutants of concern for drinking water that can result from land use activities within a watershed. The primary pollutants include pathogens, toxic

substances (pesticides and petroleum products), nutrients (phosphorus and nitrogen), and sediment. In any given watershed there are a number of potential sources of these pollutants such as agricultural, forestry and construction activities; land disposal of waste; and modifications to stream banks or stream channels; storm water runoff; septic systems and other activities. In addition, facilities that use chemicals such as factories or businesses, may be sources of permitted or unregulated discharge of contaminants to surface water or ground water.

Why Should You be Concerned?

The type of activities in the drinking water source area, along with the soils, topography, and location within an aquifer recharge area or watershed, affect the potential for contamination of drinking water.

How This Worksheet Can Assist Your Community in Protecting Public Health and Natural Resources

The purpose of this worksheet is to help the community identify the drinking water resources and activities in the source area that may be impacting or threatening the drinking water source. It further helps to identify specific activities and hydrologically sensitive areas on the landscape that may pose a potential concern to water quality.

This worksheet can be used to help your community to:

1. More fully understand the concepts of water and contaminant movement,
2. Assess the area(s) supplying drinking water to your community,
3. Identify management strategies to protect the water source area , and
4. Develop and implement a plan for protecting drinking water source area(s).

For help in filling out this worksheet and technical assistance on drinking water source protection, it is recommended that you contact your Local Health Department, County Soil and Water Conservation District, or other member of your local Water Quality Coordinating Committee. Other service providers such as New York Rural Water Association or consultants may be helpful in preparing a source protection plan.

Most communities do not currently have a formal drinking water source protection plan. This worksheet can help your community determine where the drinking water source area is, and how to plan and implement a protection program. For communities that already have implemented source water protection, the worksheet may show how residents can get more involved in source water protection, or to evaluate the existing plan for adequacy and effectiveness.

The worksheet is not a protection plan, but rather a process for evaluating the protection planning needs for a community's drinking water resources. The New York State Department of Health recommends the use of this worksheet by communities that are considering zoning changes, redevelopment, or who want to start implementing broad environmental management planning. The steps outlined for involving the community and making a source protection plan will help communities as they use a variety of management and regulatory controls to protect their drinking water. Consistent use of the worksheet process can ensure that the collected information and source protection plan will meet program requirements.

What this Worksheet does not cover

There are many aspects to management of Public Water Systems. These include repairs to existing facilities and pipes of the system, determinations as to whether any wells are under the direct influence of surface water, and whether the system can provide enough water and of good enough quality, to provide for proposed and possible future growth. These may be very important to the water system or municipality that is served by the water system, but are not adequately addressed by this Worksheet. The Local Health Department, whether the County Health Department or the District Office of the New York State Department of Health, can assist the water system or municipality with these issues.

Benefits of protection

In many cases, protection of the drinking water source has economic and environmental benefits in addition to maintaining or improving existing water quality issues. The assurance of a good, reliable source of drinking water is important to residents and businesses moving to a community, and for retaining current residents and businesses. Many source protection plans are done in conjunction with other environmental management goals such as wildlife habitat, stream bank protection, storm water management, on-site wastewater system management programs, and implementation of best management practices for homes, businesses, farms, and government agencies. These are addressed in other Community Environmental Management (CEM) Worksheets.

Technical References

Local Source Water Protection and Smart Growth In Rural New York: A Guide For Local Officials, New York Rural Water Association, http://www.nyruralwater.org

Groundwater Supply Source Protection: A Guide For Localities In Upstate New York, Schenectady County Planning Department in Cooperation with Capital District Regional Planning Commission and NYSDEC

NYSGIS data sharing cooperative, http://www.nysgis.state.ny.us

Preserving Natural Resources Through Local Environmental Laws: A Guidebook for Local Governments, Land Use Law Center, Pace University School of Law, Introduction by John R. Nolan.

Providing Safe Drinking Water: A Primer for Small Businesses and Organizations, Cornell Cooperative Extension, 2003

Various Guidance Documents for Source Water Assessments, New York State Department of Health

Protecting Drinking Water: A Workbook for Tribes, Water Education Foundation, available on-line at http://www.water-ed.org/specialprojects.asp#tribalbook.

Agricultural Environmental Management Guide, Watershed Site Evaluation Tier II Worksheet, available on line at http://www.agmkt.state.ny.us/SoilWater/home.html.

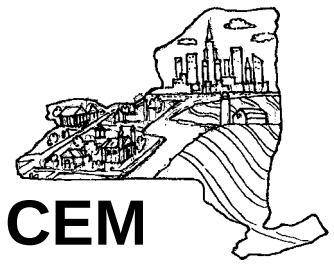
Consider the Source: A Pocket Guide to Protecting Your Drinking Water, United States Environmental Protection Agency, at http://www.epa.gov/safewater/protect/pdfs/swppocket.pdf.

Source Water Protection Reference Manual, American Water Works Association Research Foundation, Edition: 2002, CD-ROM, **ISBN 1-58321-228-0; AWWA Catalog Number 90907.** A compilation of experiences, planning and Best Management Practices for Source Water Protection.

Handbook: Ground Water and Wellhead Protection, EPA/625/R-94/001 September 1994.

Seminar Publication: Wellhead Protection: A Guide for Small Communities, EPA/625/R-93/002, January 1993.

Locally-led Education and Action for Protecting the Environment, Cornell Cooperative Extension and Sea Grant, Version 1.2, 2003



Community Environmental Management

CEM

- Source Water Protection Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to develop and implement source water protection and minimize pollution and other negative impacts on surface and ground water supplies used for drinking water. The more factors that apply to your community, the less likely you are to have adverse water quality impacts. Please rate all of those that pertain to your community.

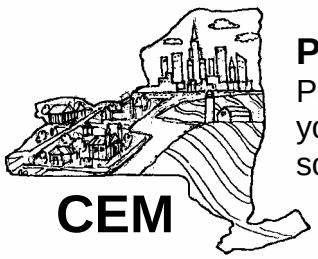
Please rate all that pertain to your community:

- ❑ Drinking water resources, including streams, rivers, ponds, lakes and aquifers and their recharge areas are actively protected to ensure best use, long into the future
- ❑ Drinking water is of acceptable quality
- ❑ Drinking water is available in sufficient quantity
- ❑ Drinking water is of sufficient quantity even after electric power loss
- ❑ To prevent contamination of aquifer recharge and watershed protection areas, potential sources of contamination are actively managed within those areas
- ❑ Drinking water watershed has been characterized to confirm the recharge area and determined whether ground water is under the direct influence of surface water
- ❑ Public in recharge areas and water service areas understand the need for and process of protecting their drinking water source areas
- ❑ Appropriate people (decision-makers) are involved in drinking water source protection
- ❑ Interested citizens are involved in drinking water source protection
- ❑ Citizens and regulators work together to protect drinking water and other water resources in the community
- ❑ The Water System infrastructure is adequate to meet current conditions and can meet probable demand changes proposed for the near future

- Homeowners are advised to test their well water and forward results to a clearinghouse for tracking

- Watershed protection rules, such as zoning ordinances, inspections, or other ordinances are administered by the community

- The community has an emergency response plan that includes drinking water sources



Part 2- Community Problem & Needs Assessment

Part 2 of this assessment will help to identify drinking water source status is in your community and evaluate your community's capacity for implementing a source protection plan.

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
1) Committee for Source Water Protection is needed but has not been organized. **___Yes ___No** **2) Existing programs do not effectively Coordinate Protection of Source Water Resources (aquifer protection, drinking water watershed protection).** **___Yes ___No**	1. Agencies have different missions even though water resource interests or responsibilities overlap 2. Management needs for drinking water delivery different from drinking water source protection 3. Drinking water protection not identified as a primary issue in source water area	**Check those impacts that apply:** Resources and information from other agencies not utilized. Any existing source water protection plan is not supported by public or community decision-makers. Source Water Protection Plan has been developed but interest or funds for implementation have not been located	**Strategy:** Invite County Water Quality Coordinating Committee, if existing, and other agencies and individuals to scoping meeting for Source Water Issue identification. **Strategy:** Consider a regional, watershed or aquifer (or part of aquifer) approach when determining scope of protection needs. Suggested List of Invitees: □ Local Health Departments □ County Agencies, i.e. planners, Environmental Management Councils, others as appropriate □ Other State and Federal Agencies, e.g. Environmental Conservation, Dept. of State, Transportation □ Non-governmental agencies such as New York Rural Water Association □ Regional Groups □ Environmental or Citizen's Groups □ Rural Community Assistance Program □ Environment Finance Center □ Service Groups

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers To Implementation[1]**	**Community Assistance Needs[2]**
Options: Recruit interested citizens, technical service providers, elected officials and government representatives to develop the Source Protection Plan, either stand-alone or as part of other water resource protection activities Identify conflicts in water resource use or goals for source water protection Identify other programs such as agricultural land uses, for which funding or management strategies may be available to address source protection. Publicize organization of committee and subsequent steps to keep the process open and informative to the public.		

[1]What are the financial, planning, political, educational, or other issues in your community that prevent you from addressing protection of your drinking water source(s)?

[2]What kinds of governmental or non-governmental organizational assistance would provide resources (professional assistance, references, materials or funds) to help the community address source water protection? This can be answered by brainstorming, or may be completed after investigating the possibilities.

1

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Available Information about Drinking Water Sources Does not Provide Basis for Effective Protection	**Check Causes** 1. Need for detailed information not recognized 2. Limited resources to collect or analyze data 3. SWAP Assessment is only recently available and is limited in scope 4. Interest in protection for private wells in area so public well information is not sufficient	**Check those impacts that apply:** ___Source area is not well defined ___Potential Sources of Contamination in source area are not regulated ___Local agency does not have or does not know about their authority to enforce protection measures	**Strategy:** Use Committee Members, Source Water Assessment or other Resources to Obtain Additional Information on Drinking Water Resources to Begin Defining Protection Needs

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Use available maps (topographic, surficial geologic, soil, and hydrologic atlases) and well logs to estimate locations of aquifers and recharge areas, locate public and private wells within aquifers □ Map watershed and sub-watershed boundaries and locate all local water supply resources within those watersheds, pertinent to ground water source and recharge areas □ Identify potential for wells to be influenced by surface water induced recharge due to their proximity to a stream, river or lake □ Use well logs from nearby wells to model ground water flow to the well and use travel time estimates to delineate water source area □ Refine map of recharge areas of public water supply wells to further delineate zone of contribution, direction of groundwater flow and upgradient recharge areas for each well □ Develop preferential groundwater recharge area map for the community □ Hire consultant or explore potential for assistance from service providers (Local Health Department, Conservation District, New York Rural Water Association, Watershed Association, Cooperative Extension) or local university to map aquifers and recharge areas □ Identify present and future water quantity issues □ Use current or revise Priority Water Bodies List as appropriate to describe impacted or threatened water body		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Drinking Water Contamination Present ___Public and/or Private Water Sources Have Experienced Contamination or Contamination Seems Imminent **Describe Level of Contamination** ___Contamination Level Exceeds Maximum Contaminant Level ___Contamination Level > ½ of the Maximum Contaminant Level ___Contamination Level at Other Level of Concern ___Imminent Contaminant Threat has been Identified **Potential Contamination Threat Insufficiently Characterized** ___**Yes** ___**No**	1. Practices and associated potential for impact by contaminant sources have been insufficiently or incorrectly characterized or uncontrolled 2. Barriers to Contamination not found or implemented 3. Development changes may add contaminants to area	**Check those impacts that apply:** ___Drinking water may be or become contaminated ___Because of contamination potential, expense to treat water or lowered quality of drinking water may be incurred ___Knowledge of contaminant sources may help to control them using BMP ”s or other methods ___Need to extend public water lines because of contaminated private wells, but that could incite growth ___Need to clean up contaminated sites	**Strategy:** Look for trends in water quality degradation related to activities in source area that may be controlled. Evaluate any identified potential sources of contamination and or future sources of contamination to characterize susceptibility of source area to particular contaminants. Review existing Contaminant Inventories and compare to current conditions in protection area

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Use Source Water Assessments and state-wide and local data to identify potential sources of contamination, preferably using Geographic Information Systems (GIS) to map locations with respect to drinking water resource □ Prepare development potential map showing areas likely to be developed and considering areas not likely to be developed due to physical constraints such as proximity to wetlands and streams, flood zones, hydric soils and steep slopes □ Determine susceptibility of source water resources to impacts from future growth □ Evaluate effectiveness of existing controls, such as local, state or federal regulations □ Conduct local inspections of source water area to confirm type and locations of potential contaminant sources		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Delineation of Protection Area, whether ground water recharge area or surface water basin, is not sufficiently refined to implement protection plan	Previous studies not done or not at sufficient detail to provide protection area delineation Decision to protect area resource rather than specific Public Water Supply well(s) means that protection area is not complete for the purpose of this protection effort.	**Check those impacts that apply:** An overstatement of the watershed or recharge area may mean that activities are restricted with no potential to benefit the source water quality and unnecessarily limiting economic impact in the area. The wrong area may be protected so the actual recharge area may remain vulnerable to contamination	**Strategy:** Carefully evaluate existing delineation to determine: How it was developed? The scale it was done at? Has the protection goal changed? (Protection of additional source waters added or any subtracted) Has additional information about the soils, geology, well or aquifer become available to assist with the delineation?

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Use technical services to determine if assessment area is useful for protection, and refine if needed □ Finalize the protection goals and determine whether the delineation is consistent with those goals		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Inventory of Practices or Potential Sources of Contamination is not Complete, so Protection Needs have not Been Identified	Inventory is not sufficient to identify potential impacts on drinking water quality or quantity. Existing Inventory either overstates or under represents the actual threats to drinking water quality.	**Check those impacts that apply:** ____Actual Contamination of drinking water or source area ____Potential for Contamination of drinking water or source area	**Strategy:** Evaluate measures for control of Potential Contaminant Sources to Reduce Susceptibility of Water Source to Contamination. These include: existing State and Federal Regulatory Programs for regulated practices, or Best Management Practices for otherwise unregulated agricultural, urban, and other land uses.

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Assist farmers, homeowners and businesses (restaurants, gas stations, campgrounds mobile home parks),that have their own drinking water systems to identify threats to groundwater , surface water and drinking water on their property by using assessment tools such as AEM worksheets, Home*A*Syst and "Providing Safe Drinking Water A Primer for Small Businesses and Organizations" □ Evaluate need for stricter land use controls for the zone of contribution of a well □ Implement a farmland protection program to keep prime farmland in agriculture and implement pest and nutrient management plans on farms as needed in resource area □ Assess need for land acquisition, purchase of development rights or conservation easement program to protect those groundwater resources most susceptible to future growth □ Explore the creation of zoning overlay districts for wellhead or watershed protection or if a community lacks zoning use ordinances to restrict incompatible activities □ Find out how SEQRA can be used to help protect source water areas by designating these areas as critical environmental areas requiring the preparation of environmental impact statements for projects in those areas		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Proposed Land Use Changes (or specific proposed projects) may Increase Potential for Impact on Drinking Water Source	Land use not regulated in source area, drinking water concerns not considered for local regulation	**Check those impacts that apply:** ___Development is planned in source area or in aquifer area where water quality or quantity may be impacted by development ___ Other land use changes raise the potential for negative impact on drinking water at the source	**Strategy: Address Potential Impact on Source Water Resource for All Planned or Potential Changes in Land Use**
Public not aware of source protection needs or is unwilling to allocate resources toward protection of source area	Need for public involvement not known or understood. Role of citizens in protection unclear	**Check those impacts that apply:** ____Opposition to source protection planning ____Lack of interest in source protection ____Interested citizens don't know how to begin source protection activities	**Strategy:** **Implement Public Education Program to Improve Public Knowledge of Protection Needs and Activities**

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
Options: □ Identify locations within source protection areas where development is most likely to occur or where farm operations are planning to expand □ Plan for future water needs by identifying and protecting future water source sites. □ Conduct build out analysis of the watershed or recharge area to determine risk of contamination if current zoning is fully implemented.		
Options: □ Meet with local officials, town board, planning board, etc. □ Invite service providers to give informative presentations □ Media Campaign, public service announcements □ Involve Senior Citizen or Youth Groups □ Hold Classes to Inform Citizens □ Use materials available on internet for source protection campaign □ Home*A*Syst or have Businesses us the Cornell Cooperative Extension program "Providing Safe Drinking Water"		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Regulations or Existing Management Plans not Sufficient to Manage Source Water area **Ability to enforce existing regulations lacking or unclear**	Need for Source Protection not Recognized Source Protection Plan not Completed or Inadequate Public Not Informed of Role in Source Protection	Source Area Susceptible to Contamination	Complete and Implement Source Water Management Plan at Appropriate Scale
Water Supply Issues exist such as Insufficient Quantity of Water	Development exceeds water availability Water use changes in source area such as new businesses or residences Short term problems like drought	____Water use restrictions _____Bar to new development	Determine cause of quantity problem Evaluate alternate sources of water

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
□ Obtain sufficient information about the source area to target efforts appropriately, especially where multiple activities are addressed □ Identify potential sources of contamination within the source area and develop plans to appropriately manage them. Some are addressed in CEM worksheets. • Enhance the quality of stormwater runoff • Ensure proper siting, design, installation and maintenance of OWTSs • Provide for stream corridor protection • Address highway right of way maintenance and deicing material storage • Consider other nonpoint source impacts i.e. agriculture • Permitted facility management • Implement sustainable development to minimize impact on water quality and quantity • Manage impacts on other natural resources □ Use appropriate regulatory processes for drinking water source protection, such as watershed rules or local ordinances, to allow for management of the resources □ Implement wide-spread use of water-saving devices □ Implement water conservation program, including identification of water losses and loss prevention □ Increase public awareness of need and steps in protection activities Involve affected parties in Planning and Implementation Processes		
□ Use education campaign to change water use patterns □ Investigate connection to other existing water system □ Evaluate need for and potential location of new drinking water source □ Develop new source for regional public water supply		

Problems Associated with Drinking Water Source Areas	Causes	Impacts	Remedial & Preventative Strategies
Security or Emergency Response Plan for Source Area Protection is Missing, Incomplete, or Inadequate	No plan required by any government agency Source Protection Area Not for Public Water System with Emergency Planning Requirements Emergency Plan does not address water source	**Emergency Planning not sufficient for response needs**	Evaluate security and emergency response needs and prepare plan. Practice response actions with involved agencies.
Source Protection Plan needs revision or updating to reflect changes in local conditions	Plan does not include provisions for continual review and revision	**Plan may become obsolete**	Include provisions for ongoing review of effectiveness of the protection plan and include protocols for plan revision into original plan

Management Options (Indicate with a"√ " if community has implemented or use a "?" if community is interested)	**Barriers to Implementation**	**Community Assistance Needs**
Options: □ Develop contingency plans to deal with spills, water supply contamination or service disruption □ Outline emergency plans for short or long term drinking water supply replacement due to contamination or physical damage to the supply system □ Coordinate efforts of water purveyors with those of civil defense, local emergency response, hazardous materials/spill cleanup, and local area disaster response networks.		
Options: □ Process for updating plan included in source water protection plan □ Timetable for periodic review in plan □ Responsible agency designated to review and update plan as needed		

Community Environmental Management
TIER III: DRINKING WATER SOURCE PROTECTION

Protecting local drinking water sources can be a good investment in your community. Source Protection is one of the barriers to contamination of drinking water. Each community has to evaluate the threats, sensitivity, and local issues to determine which sources to protect and how best to protect them. In some cases, the water utility can provide impetus for source protection. In other areas, private wells must be protected along with public water sources. Some water is currently contaminated or changing regulations may have revealed greater sensitivity of the drinking water source than was previously known. The desire to obtain waivers from government mandated treatment or sampling can also drive efforts to protect a source. Existing information such as Source Water Assessments and other studies can provide a starting point for planning source protection. Implementing a source protection plan may be most effective when done in conjunction with addressing other urgent environmental needs of the community.

STRATEGY –Get all local interested parties involved in planning for source protection, whether regional, watershed or aquifer (or part of aquifer) approach can be considered when determining scope of protection needs.

- Invite all parties who may be affected by changing zoning, land use, permitting, development rules.
- Local, regional, state and national government officials, as well as members of non-profit groups may have an interest.
- Publicize your efforts early and often, so the process seems apparent.
- Coordinate with long-term plans for the water utility/ies and private well supplies.

STRATEGY-Use available information and determine what additional information will be needed to define protection needs.

- Review Source Water Assessment for susceptibility.
- Get local topographic maps, hydrogeology information, and aerial photos.
- Use Committee Members to obtain additional information on drinking water resources and protection needs

STRATEGY- Evaluate current water quality and potential threats to water quality.

- Look for trends in water quality degradation related to activities in source area that may be controlled.
- Evaluate any potential sources of contamination related to existing contamination.
- Inspect the source area to determine whether potential sources of contamination are present in the watershed.
- Characterize susceptibility of source area to particular contaminants.
- Evaluate measures for control of potential contaminant sources to minimize risk of release to the protection area.
- Consider the need to use existing State and Federal Regulatory Programs to reduce potential impacts from regulated sources.

STRATEGY- Consider other Water Supply Issues that must be addressed before or along with source protection issues.

- Determine whether a Ground Water Under the Direct Influence of Surface Water (GWUDI) evaluation is needed, and if already done, whether the results are conclusive.
- Is planned development related to new or changes in use of existing source(s)?
- Are other planned or needed changes in systems operation such as storage tanks or changes in distribution likely to effect source(s)?
- Are there chronic or sporadic issues of water shortage.
- Are alternative sources of drinking water appropriate to use.

STRATEGY- Evaluate whether Planned or Potential Changes in Land Use may impact Drinking Water Source.

- What is the time line for response to ensure that the Drinking Water Source is not affected.
- What kind of mitigating efforts could be incorporated into any development or land use changes to minimize potential impacts.
- Are potential future sources impacted by development.

STRATEGY- Evaluate security and emergency response needs and prepare plan.

- Contingency plans should include natural as human disasters.
- Source protection is a component of emergency planning.
- Incorporate practice of response actions with involved agencies.

STRATEGY- Evaluate regulatory options for source protection

- Watershed Rules and Regulations are New York State option for Source Protection, but implementation process is lengthy.
- Local Ordinances can be easy when within a single municipality.
- Cooperation among local towns, villages, etc, may be easier than enacting a Watershed Rule.

STRATEGY-Complete and Implement Source Water Management Plan at Appropriate Scale using actions appropriate for the geology, hydrology, and political situation of the source.

- Decide who will be responsible for enforcement.
- Evaluate whether expenses may be shared with other parties to accomplish mutually complementary goals.
- Develop an implementation and funding schedule.
- Periodically review Source Water Management Plan for effectiveness and revise as needed.