Source Protection Program Summaries

Source Water Assessment Program
Interstate Data Gathering Grant

New England and New York State

New England Interstate Water Pollution Control Commission
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Source Protection Program Summaries

In August 1998 the New England Interstate Water Pollution Control Commission (NEIWPCC) obtained EPA funding to assist the New England and New York states with their assessments of interstate source waters. The Interstate was to accomplish this by gathering data from and coordinating information exchange among the states. Initial NEIWPCC efforts included compilation of available SWAP-related GIS coverage metadata and the development of a document summarizing and outlining state Source Water Assessment Program (SWAP) contaminant inventory and susceptibility approaches into a reference document.

This document, *Source Protection Program Summaries* provides an overview of individual state programs, with a focus on groundwater protection by summarizing New England and New York states' wellhead protection programs. The document is organized to facilitate an easy comparison of state programs to further regional understanding of source protection efforts. States Wellhead Protection Programs are described according to the following programmatic pieces:

- *regulatory design and oversight*
- *applicability*
- *delineation*
- *inventory*
- *management*
- *contingency planning*
- *enforcement*
- *progress*

Other state program policies influencing source protection are also included. Although the focus of this document is groundwater protection, state summaries include information on watershed protection programs.

Questions regarding this document should be directed to Denise Springborg at (978) 323-7929.

Connecticut

Wellhead Protection

Connecticut's Wellhead Protection Program, approved by EPA in March 1990, is comprised of other state programs which have been in place for several years including: Groundwater Classification and Standards System, Water Supply Plans, and Public Health Code. A major new initiative is the Aquifer Protection Area (APA) Program, a comprehensive wellhead delineation and protection program for large stratified drift wells.

Regulatory Design and Oversight

The Department of Environmental Protection (DEP) and Department of Public Health (DPH) have a Memorandum of Understanding allocating responsibility for different programs to each department and establishing methods for coordinating on issues of mutual concern. DEP is the lead state agency for Wellhead Protection, Water Allocation Groundwater Classification, creating guidelines/regulations for aquifer mapping and Aquifer Protection Area land use controls, and administering a groundwater protection, assistance, and education program. DPH is charged with setting drinking water standards, reviewing utilities' long-term Water Supply Plans, approving sales of utility-owned lands, and may intervene in municipal zoning decisions.

Applicability

Basic wellhead protection measures apply to all wells. Bedrock wells comprise two-thirds of the State's wells, are generally low yielding, and are the source for TNC/NTNC/small community systems. The Aquifer Protection Area Program component of the Wellhead Protection Program applies to utilities serving greater than 1,000 people with wells in stratified drift and will require additional land use protection measures.

Delineation

Under the Aquifer Protection Area Program, DEP develops standards for and approves delineations. Utilities serving more than 1,000 people are required to delineate. There are two levels of Wellhead Protection Area delineation:

Level B delineations are preliminary delineations based on existing data and include the approximate areas of contribution and recharge of the wellfield.

Level A delineations are refinements of Level B delineations and often require additional data. Level A delineations apply additional field data and a 3-D numerical model of the aquifer to provide a more accurate delineation. These will be required three years from the State's adoption of Aquifer Protection Land Use Regulations.

Through the Source Water Assessment Program additional delineations will be completed for small community stratified drift wells using Level B mapping and a calculated radius will be used for bedrock wells.

Inventory

Regulations for Water Supply Plans require utilities, including those with bedrock wells, to conduct an inventory of existing and potential pollution sources around public wells serving greater than 1,000 people. Utilities serving fewer than 1,000 people must include an inventory and plan for controlling pollution in its application for a well permit and a 'certificate of necessity and convenience' for all new wells.

The Groundwater Classification System includes a basic statewide inventory of pollution sources (known releases and permitted wastewater discharges), and are used by water utilities to assess existing and potential wells.

Under the Aquifer Protection Area Program, once utilities have mapped Level B wellhead protection areas, municipalities must conduct a land use inventory per DEP guidelines, producing a general land use map and indication of exact locations of high risk facilities/businesses with an index giving the facility name, type, address.

Management

Under the Groundwater Classification System, a minimum separating distance of 500 ft from the well controls discharges to the ground, within which no wastewater sources are allowed (other than permitted domestic sewage).

As part of the required Water Supply Plans, utilities serving more than 1,000 people must analyze current sources, estimating 50-year demand and maximum safe yields, identify future sources to meet demand, analyze source protection needs, and provide conservation and contingency plans (identify alternative/emergency supply sources to meet shortfall through drought or supply contamination). Utilities must update these plans every five years. DPH may require utilities serving fewer than 1,000 people to complete a plan.

The Public Health Code requires utilities to maintain a Sanitary Radius or “separating distance” from the well within which no source of pollution is allowed, by owning or controlling/holding a development easement on lands: within a 200 ft radius of wells pumping greater than 50 gpm, within a 100 ft radius of wells pumping 10-50 gpm, and within a 75 ft radius of wells pumping less than 10 gpm.

Under the Aquifer Protection Area Program, DEP will promulgate land use regulations for existing/future land uses in APA areas, which municipalities will be required to adopt. Local land use regulations will be adopted in three phases:

Phase 1 Require municipalities to designate APAs, prohibit certain activities in APAs; implement prohibitions, and register existing regulated activities (which must comply with basic BMPs); require municipalities to create/designate an Aquifer Protection Board/ Commission.

Phase 2 Require more comprehensive BMPs; municipality could implement inspection/ enforcement programs.

Phase 3 Establish municipal aquifer protection programs, including regulations for local program administration and technical training for municipal officials; adopt regulations for monitoring.

Regulations for Resource Protection Management Plans addressing potential groundwater pollution sources from agriculture will be considered in Phase 2.

Enforcement

DEP and DPH have various pollution abatement authorities related to groundwater and water supply wells under state statutes. DEP can take over Municipal Aquifer Protection Area Programs not meeting DEP's regulations, and be reimbursed by the municipality for associated administrative costs. A municipality can levy penalties on parties violating the Aquifer Protection Plan. The Aquifer Protection Act allows utilities to inspect facilities in Aquifer Protection Area. The DPH's Commissioner can intercede in local land use decisions.

Progress

Level B delineation and mapping has been completed for all 131 relevant wellfields, and approximately 10 wellfields have completed Level A mapping. Nearly one-third of relevant municipalities have completed a land use inventory specified by the Aquifer Protection Area Program, and through SWAP the remainder will be completed. Even though state Aquifer Protection land use regulations have yet to be passed, some towns are following DEP's interim guidance and voluntarily adopting local controls.

Other State Groundwater Protection Policies

None.

Watershed Protection

Connecticut accomplishes watershed protection through several state regulations as described below. See Connecticut's SWAP for additional details.

Connecticut General Statutes

- Prohibits sewage discharge within a public water supply watershed area.
- Requires long term water supply plans for systems serving over 1,000 people.

- Allows DPH to review and comment on proposed development projects within the public water supply watershed areas.
- Requires municipalities to consider the impact of proposed developments on public water supply watersheds.
- Requires applicants to notify the water company of the proposed development if the proposal is within the water company's watershed area.
- Prohibits (i.e. bathing, aircraft, and general pollution) and regulates specific activities (i.e., fishing from boats with electric motors, fishing from shoreline) on public water supply reservoirs and associated watershed. Allows passive recreation through a permitting process.
- Allows DPH to issue an order to abate or correct an immediate threat to a water supply source.
- Authorizes a fine for leaving a carcass of an animal in a public water supply reservoir.
- Authorizes a fine for intentionally polluting a drinking water supply.
- Requires the notification of the presence or elimination of hazardous materials to a water company.

Public Health Code Regulations

- Requires a water company to conduct a sanitary survey of the watershed and report results to the DPH.
- Mandates separating distances from potential sources of pollution to the edge of an established watercourse, separating distance for accumulation of manure and restrictions of use of sodium and fertilizers within a public water supply watershed or aquifer recharge area.

Policy on Interstate Source Protection Areas

As of 1990, seven Connecticut wells have protection areas extending into other states (RI, MA, NY). All are small community, bedrock wells with the exception of Enfield (CT Water Co.). Connecticut pursues MOAs with other states when a WHPA extends beyond the Connecticut state line, as well as protecting WHPAs for neighboring state wells extending into Connecticut.

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Maine

Wellhead Protection

Regulatory Design and Oversight

Maine's Wellhead Protection Program, approved by EPA in 1990, is a voluntary, incentive-based program administered by the Drinking Water Program located in the Department of Human Services (DHS), Division of Health Engineering. DHS provides guidance and technical assistance to PWSs, and reviews Self-Evaluation Forms (as described below).

While DHS is the primary lead agency for the program, the responsibility for management lies with the public water suppliers. To be approved by DHS, the wellhead protection plan submitted by a PWS must include the following elements:

- **Self-Evaluation Form**, which includes a *wellhead protection area delineation* and *inventory of potential contaminant sources*. The PWS must also establish communication with the town by informing it of the well's location and enlisting the town's cooperation by participating its Comprehensive Planning Process.
- DHS then determines the level of risk for contamination to the well and makes specific recommendations to the PWS regarding development of the protection plan. These management recommendations are based on the threat level and PWS protection category (described below).
- The PWS negotiates with DHS an appropriate **Management Plan** and **Contingency Plan**

As it is a voluntary program, incentives are provided to encourage participation. DHS-approved wellhead protection plans qualify PWSs for waivers from Phase II and V monitoring requirements, as well as financial assistance from existing programs such as USDA Cost Sharing, state-assisted gas tank removal, or Community Development Block Grant (CDBG) funds for delineation or management.

Applicability

Program development effort varies by PWS Protection Category:

Category I	Transient Non-Community (TNC) systems
Category II	Community and Non-Transient Non-Community (NTNC) systems serving fewer than 250 people or pumping less than 15,000 gallons per day (gpd)
Category III	Community and Non-Transient Non-Community systems serving between 250-1,200 people or pumping between 15,000 and 72,000 gpd
Category IV	Large Community systems serving more than 1,200 people or pumping greater than 72,000 gpd

Delineation

The minimum delineation method acceptable in an approved wellhead protection plan for Maine public water suppliers is an arbitrary fixed radius of between 300 and 2,500 feet, depending on system type and size.

Category I	300 ft
Category II	300 ft
Category III	300-2,500 ft, based on pumping rate ($r = (0.38)(Q) - 247$; where r is the radius and Q is the pumping rate in gpd)
Category IV	2,500 ft

After reviewing the initial delineation and contamination source inventory, DHS may ask systems found to be significantly threatened to submit a plan detailing a more rigorous delineation method in order to more accurately identify threats. Unlike some states, Maine does not require multiple protective zones, but will accept them as a means of providing increased levels of protection near the well.

Inventory

Guided by the Self-Evaluation Form, PWSs consider an extensive list of potential contamination sources, as well as questions concerning the physical characteristics of the site. After forms are reviewed by DHS, PWSs identifying potentially contaminant sources may be asked to further characterize the threat by noting the following: the history of the use, any known accidents, size of operations, condition of tanks, floor drains, and chemical storage. In cases of complex, multiple sources, DHS may visit the site to determine additional hydrogeologic or testing requirements to determine the nature and extent of the threat.

Management

Based on information provided in the Self-Evaluation Forms, DHS will offer appropriate management options which are “packaged" as follows:

Option 1- Information and Educational Tools

Educate supplier on hydrogeology, pollution prevention; educate public on how to help protect the source; hazardous waste disposal days; BMP information to landowners in WHPA; notify Town/DEP of WHPA location; MOU between landowner and supplier; cooperate with Town Comprehensive Plan; post WHPA signs.

Option 2- Use of Existing Regulatory Tools

Require extra monitoring for potential contaminants; attach special conditions to state/local permits; target enforcement of laws to WHPA; participate in public hearings on development in the area; refine existing local ordinances; adopt wellhead protection overlay ordinance.

Option 3- Capital Intensive Methods

Extend sewer lines; remove hazardous chemicals from soil; WHPA land purchase/easements.

Management expectations vary by PWS Protection Category as follows:

Category I	Unless severely threatened, will not need to submit Management Plan; May want to select activities from Options 1 or 2.
Category II	Unless severely threatened, will not need to submit Management Plan; May want to select activities from Options 1 or 2.
Category III	Must prepare a Management Plan, selecting activities from Options 1 and 2; If DHS determines the well is at risk, then the PWS is encouraged to complete a more accurate wellhead area delineation and in-depth inventory to further characterize the nature of threats, their history, and their probable extent; A Management Plan is completed with the assistance of a Technical Assistance Team
Category IV	Expectations are similar to those for Category III, but if well is determined to be at risk, the PWS follows a more sophisticated process.

Contingency Planning

A Contingency Plan is required of threatened Category II, Category III and all Category IV systems. Required elements include the following:

- Completed "generic Contingency Plan" form
- Map outlining the delineated wellhead protection area
- Mailing of plan and map to the state Drinking Water Program, County Emergency Preparedness Agency, and the local Fire Department with a cover letter explaining the importance of responding promptly to emergencies that occur in the WHPA.
- Completed "Notice" form, to be mailed to the Maine DEP Emergency Response Team, State Police, and County Sheriff's Department.

Enforcement

The WHPP is voluntary therefore no enforcement procedures are established. Monitoring relief and waivers are used as incentives for systems to participate in the program. Waivers and relief are not granted to systems who do not participate.

Progress

Nearly 100% of Maine's NTNC and Community systems are participating in the Wellhead Protection Program. Although Maine originally planned on implementing management and contingency plans beginning in 1998, the SWAP requirements of the 1996 SDWA amendments resulted in these being delayed until completion of each system's assessment. Management planning should be considerably easier for systems after they receive the completed source assessments.

Other State Groundwater Protection Policies

During the new well approval process, the "preliminary approval form" requires completion of a well location map which includes delineating a wellhead protection area and identifying potential contamination sources within the wellhead protection area. In addition, the Maine Department of Environmental Protection regulates activities that could contaminate groundwater, with special emphasis being placed on activities near public water supplies.

Watershed Protection

Watershed protection plans are required only for systems with filtration waivers.

Policy on Interstate Source Protection Areas

None.

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Massachusetts

Wellhead Protection

Regulatory Design and Oversight

Approved by EPA in 1990, the Massachusetts Wellhead Protection (WHP) Program is administered through the Department of Environmental Protection (DEP). Under the MA Drinking Water Regulations (310 CMR 22.00), systems developing a large new public drinking water well or expanding an existing well must adopt local measures meeting DEP criteria. In addition, voluntary implementation of wellhead protection activities is encouraged by financial incentives offered through the Monitoring Waiver Program.

Applicability

Public water suppliers proposing new wells that will pump 100,000 gallons per day or more must undertake the Source Approval process, and systems proposing to increase withdrawals of 100,000 gallons per day or more must apply for a water withdrawal permit under the Water Management Act. As part of these processes, such systems are required to delineate a wellhead protection area and adopt municipal land use controls meeting DEP criteria.

Existing community and non-transient non-community systems that meet water quality, source protection and land use criteria are eligible for cost saving monitoring waivers under the Safe Drinking Water Act Monitoring Waiver Program.

Delineation

DEP wellhead protection areas are defined as follows:

- Zone I: 100-400 ft radius from well, proportional to pumping rate
- Zone II: the entire extent of the aquifer deposits which would fall within, and upgradient from, the production well's capture zone based upon the predicted drawdown after 180-day drought conditions at the approved pumping rate
- Interim Wellhead Protection Area (IWPA): for wells lacking Zone II; 400 foot to one half-mile radius from well, proportional to pumping rate
- Zone III: the entire watershed upgradient of Zone II

Under the WHP program, a map is required to show the wellhead protection areas within a community where land uses are regulated, unless the entire city or town is covered by the regulations. A city or town may decide to adopt a wellhead protection district through zoning that is larger, but not smaller, than the Zone II.

To receive a monitoring waiver, a map is required to show the Zone I and or Zone II/ IWPA and land uses.

Inventory

Annual statistical reporting forms require some wellhead protection inventory information.

To apply for a Monitoring Waiver, systems must submit a source protection form that includes a completed checklist noting Zone I and Zone II/IWPA land uses and activities. These include septic systems and underground storage tanks (USTs) in Zone I, automotive related activities, industry, and landfills in Zone II/IWPA. VOC waivers will not be granted if there are septic systems or USTs in Zone I or any automotive related activities or industry in the IWPA/Zone II.

Management

For all public wells, water suppliers must own or control the Zone I and land uses are restricted to water supply-related activities.

To meet WHP requirements, certain threatening land uses must either be prohibited or restricted within the Zone II via local zoning bylaw/ordinance, general bylaws/ ordinance, or health regulation. Communities may be more restrictive, both in terms of the area covered and in the controls adopted. These land uses are:

Prohibited

- non-sanitary wastewater disposal to the ground
- landfills and open dumps
- automobile graveyards/junkyards
- stockpiling/disposal of snow or ice that contains deicing chemicals
- facilities that generate, treat, store, or dispose of hazardous waste (Note: Very Small Quantity Generators are exempt.)
- petroleum, fuel oil and heating oil bulk stations and terminals
- wastewater residual landfills

Restricted

- storage of sludge, septage, deicing chemicals, animal manure
- commercial fertilizers, hazardous materials, and petroleum products
- earth removal activities
- impervious surfaces greater than 15% or 2,500 square feet

In addition, as part of the Source Approval requirements, municipalities must implement controls prohibiting any floor drain which discharges to the ground when the drain is located in an area where pollutants may enter the drain. Existing floor drains must either be sealed in accordance with the state plumbing code (248 CMR 2.00), connected to a municipal sewer system (including permits and pretreatment, as appropriate), or connected to a holding tank that meets all DEP regulations and policies.

When the public water supply is privately-owned (water district, water company) or the Zone II of the groundwater supply extends into other cities or towns, the Drinking Water Regulations offer a modified compliance standard. A water supplier or municipality must

show that it has taken steps and used its "best effort" to have all cities and towns (where the Zone II is located) adopt zoning and non-zoning controls.

As part of the Monitoring Waiver program, systems must post signs in WHPAs, educate land users, develop a map, and note additional management measures, if any.

Contingency Planning

The Annual Statistical Reporting program requires systems to include information on their contingency plan.

Enforcement

Enforcement can be taken against systems failing to meet WHP requirements as part of a Water Management Act permit.

Progress

All sources have wellhead protection areas delineated.

Other State Groundwater Protection Policies

Other DEP programs also regulate certain threatening land uses, such as septic systems and landfill siting. Many state programs provide more stringent requirements within the Zone II or IWPA. These include: stricter cleanup standards for hazardous waste sites, prohibitions on landfill siting, and limitations on septic system density within Zone II and on siting septic systems within Zone I. Below is a table of referenced regulations for wellhead protection regulatory controls within Zone II:

Massachusetts Regulatory Controls in Zone II

CMR CITED	TITLE OF REGULATION	SPECIFIC SECTION CITED
310 CMR 22.00	Drinking Water Regulations	310 CMR 22.21
310 CMR 16.00	Site Assignment Regulations for Solid Waste Facilities	310 CMR 16.40
310 CMR 19.00	Solid Waste Management Regulations	310 CMR 19.021 310 CMR 19.038
990 CMR 5.00	Council Determination Whether a Proposal is Feasible and Deserving of State Assistance	990 CMR 5.04
310 CMR 30.00	Hazardous Waste	310 CMR 30.667
310 CMR 27.00	Underground Water Source Protection	310 CMR 27.06

Draft 310 CMR 41.00	Low-level Radioactive Waste Facility Site Selection Criteria Regulations	310 CMR 41.10 310 CMR 41.20
314 CMR 5.00	Ground Water Discharge Permit Program	314 CMR 5.03 314 CMR 5.06 314 CMR 5.07
310 CMR 40.00	Massachusetts Contingency Plan	310 CMR 40.031
314 CMR 6.00	Ground Water Quality Standards	314 CMR 6.06 314 CMR 6.07
310 CMR 15.00	State Environmental Code (Title V)	310 CMR 15.211 310 CMR 15.303 310 CMR 15.304
333 CMR 11.00	Rights of Way Management	333 CMR 11.03 333 CMR 11.04
333 CMR 12.00	Protection of Groundwater Sources for Public Drinking Water Supplies From Non-point Source Pesticide Contamination	333 CMR 12.03
314 CMR 15.00	The Prevention and Control of Oil Pollution in the Waters of the Commonwealth	314 CMR 15.03 314 CMR 15.05 314 CMR 15.06
310 CMR 10.00	Wetlands Protection Act Regulations	310 CMR 10. 53
310 CMR 11.00	Massachusetts Environmental Policy Act	310 CMR 11.26
350 CMR 11.00	Watershed Protection Act Regulations	350 CMR 11.04
314.CMR 6.00	Groundwater Classification	
310 CMR 36.00	Water Management Act	

Generally speaking the above regulations protect both surface water sources and groundwater sources. However, some regulations apply only to surface water sources including the Rivers Act which established a riverfront protection area (no build zone) of 100 – 200 ft from rivers, the Wetlands Protection Act 310 (CMR 10.00), the 401 Water Quality Certification Regulations (314 CMR 9), and the Surface Water Quality Standards (314 CMR 4). Also, 350 CMR 11.00 protects the Metropolitan District Commission watersheds.

In MA, many communities have local aquifer protection district bylaws, or watershed protection district bylaws and many have board of health regulations covering toxic and

hazardous materials and underground storage tanks. Local knowledge of and support for water supply protection is generally high. Cooperation between communities on protection of neighbor's sources varies. Some local officials cite problems addressing public access/dumping on large watershed areas in other communities or in seeking zoning changes that benefit another town's water supply.

Watershed Protection

DEP has incorporated definitions for surface water supply protection zones into state drinking water regulations:

Zone A: 200 feet from tributaries and 400 ft from reservoirs
Zone B: one-half mile from the bank of the reservoir
Zone C: area of the watershed that is not Zone A or B

As with groundwater systems, community and NTNC systems are eligible to receive SOC/VOC monitoring waivers if protection areas are zoned and protected.

DEP encourages the development of comprehensive local protection plans at surface sources, and released a guidance manual specifying minimum components for such a plan in order for it to receive DEP-approval. Required elements include the following:

- Delineation of the watershed;
- Submission of an inventory that summarizes and prioritizes private and public land uses and activities, as well as a watershed sampling plan;
- Development of protective actions and time-frames to address the prioritized land uses (including control of the watershed, municipal land use improvements, public access/recreation control, wildlife and in-lake management, staffing, regulatory controls, and emergency planning); and
- Education.

In addition, Massachusetts offers waivers from filtration or 0.5 log disinfection credit under the Surface Water Treatment Rule for surface water sources with approved protection plans.

Somewhat more comprehensive protection is required for the 14 surface water sources that have been granted a filtration waiver under the Surface Water Treatment Rule.

MA is currently revising its surface water regulations. These regulations, which complement the protection approach for groundwater sources, will provide much greater protection for existing and new surface water sources.

Policy on Interstate Source Protection Areas

None.

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New Hampshire

Wellhead Protection

Regulatory Design and Oversight

The New Hampshire Department of Environmental Services (DES) has been implementing a Source Protection Program since 1990. Since 1996, this Program has been administered by the Water Division's Water Supply Engineering Bureau.

The Wellhead Protection Program is established through the Drinking Water Rules and the Groundwater Protection Act (GPA). The Design Standards and Site Selection Criteria rules establish wellhead protection requirements for new community wells. The Monitoring for Organics rules establish the chemical monitoring waiver program, which provides an effective incentive for the vast majority of community and non-transient, non-community (NTNC) systems to participate in the source protection program. The GPA establishes the best management practices that apply to all wellhead protection programs and enables wellhead protection areas or other valuable groundwater to be reclassified, providing a local entity with the statutory authority to implement a protection program.

Applicability

In addition to land use restrictions that apply within the sanitary protective areas of all public wells, new community wells must develop a DES-approved wellhead protection program. There are no requirements for existing wells or other classes of new wells, but because the monitoring waiver program provides an incentive for community and NTNC systems, 75% have approved programs.

Wellhead Protection Program

System Type	Required?
TNC	
existing source	No
new source/increasing yield	No
NTNC	
existing source	No
new source/increasing yield	No
COM	
existing source	No
new source/increasing yield	Yes

Delineation

DES has delineated wellhead protection areas (WHPAs) for all wells used by community and NTNC systems. The majority of these delineations were developed using existing information. For overburden wells, in the absence of Phase II delineations (involving pumping tests and hydrogeologic modeling) the uniform flow equation was applied. Bedrock wells were delineated using volume-dependent circles that assumed water was coming from one major water-bearing fracture. A default maximum distance of 4,000 ft was used as a cut-off for both overburden and bedrock wells.

Refinements of these areas based on site-specific hydrogeologic investigations are required when siting new overburden wells regardless of size, and for new bedrock wells pumping 57,600 or more gallons per day.

The 1,192 Transient Non-Community (TNC) systems, nearly all of which are bedrock wells, use a sanitary protective radius ranging from 75 to 150 feet, but do not have delineated wellhead protection areas. For the Drinking Water Source Assessment Program, the land within 500 feet of the well will be surveyed.

Delineated Protection Areas

System Type	Bedrock	Overburden
TNC	*Sanitary Protective Area with 75-400 ft radius based on daily volume*	
existing source Increasing yield/new source	(no other delineation)	
NTNC	*Sanitary Protective Area with 75-400ft radius based on daily volume*	
existing source	Fixed radius based on volume; 4,000 ft maximum	Uniform flow equation with 4,000 ft maximum
increasing yield/new source	Fixed radius based on volume; 4,000 ft maximum	Uniform flow equation with 4,000 ft maximum
COM	*Sanitary Protective Area with 150-400 ft radius based on daily volume*	
existing source	Fixed radius based on volume	Uniform flow equation with 4,000 ft maximum
increasing yield/new source ≤57,600 gpd	Fixed radius based on volume	Uniform flow equation with 4,000 ft maximum or In unconfined aquifers: 4,000 foot radius or, when sufficient data is available, using the standard

		refinement method (an analytical model which identifies the zone of contribution of the well under 180 days of continuous pumping without recharge); In confined aquifers: fixed radius based on proposed permitted production volume (1,300-3,600 ft)
new source ≥57,600 gpd	Uniform flow equation with 4,000 ft maximum (or refinement based on contributing area analysis)	Refinement method is either a contributing area analysis, or analytical or numerical model based on hydrogeologic investigation

Inventory

For a DES-approved wellhead protection program, the inventory of known and potential contamination sources (PCS) must include sites listed in DES's GIS-based Groundwater Hazards Inventory plus the following land uses:

X Vehicle service and repair shops
X General service and repair shops
X Metalworking shops
X Manufacturing facilities
X Underground and aboveground storage tanks
X Waste and scrap processing and storage
X Transportation corridors
X Septic systems (at commercial and industrial facilities)
X Laboratories and certain professional offices (medical, dental, veterinary)
X Use of agricultural chemicals
X Salt storage and use
X Snow dumps
X Stormwater infiltration ponds or leaching catch basins
X Cleaning services
X Food processing plants
X Fueling and maintenance of earth moving equipment
X Concrete, asphalt, and tar manufacturers
X Cemeteries
X Hazardous waste facilities

Management

Well Siting

Wells must be sited at least 50 ft from surface waters and not be subject to flooding by floods with a 100-yr recurrence interval. The system is required to control land use within the sanitary protective area, and all activities not necessary for the maintenance and operation of the well are prohibited.

Protection Program

An approvable wellhead protection program, although not required of systems other than those with new community wells, NTNC systems with Phase II/V chemical monitoring waivers, and those participating in the groundwater reclassification program, includes (at the minimum) a PCS inventory, with updates at least every three years; education of protection area occupants at least once every three years; and providing each municipality

in the protection area with a description of the program and a copy of the wellhead protection area map

As part of the approval process for a new large community well, DES requires the water supplier to submit a description of the PCS management program for the wellhead protection area and a schedule for implementation. The program description includes a description of what will be done, who will do it, and when. Specifically, each of the following items is included:

- **Inventory Update-** A statement as to how frequently the inventory of PCSs will be updated (must be at least once every three years).
- **Education-** A statement as to when educational materials will be sent to PCSs and all other businesses and residents, along with a copy of the material to be mailed. The educational mailing for PCSs should consist of a cover letter (a form letter is available from DES) and a copy of the BMP rules, Env-Ws 421. The mailing to residents and non-PCS businesses should include a cover letter, a "dos and don'ts" flier, and a gasoline handling flier (all available from DES). A schedule that ensures that materials are mailed or hand-delivered at least once every three years should be included.
- **Inspections-** A statement as to what authority, if any, the water supplier intends to rely on to conduct PCS inspections to ascertain compliance with best management practices for preventing groundwater contamination, a schedule for putting that authority in place, and a description of the process that will be followed if compliance is not achieved. A schedule for PCS inspections and identification of the persons responsible (name, title, affiliation) for the inspection program. Each PCS subject to local inspection must be inspected at least once every three years. There are three options for obtaining authority:

- *Local health regulation or health ordinance.* These can be adopted by the health officer and approved by municipal officials to enable the local health officer to conduct inspections and enforce the BMP rules.
- *Groundwater Reclassification.* A water supplier or municipality may apply to DES to reclassify certain local groundwater resources. If approved, this gives the local entity the authority to conduct inspections and enforce the BMP rules. (see below)
- *Voluntary Inspections.* If the wellhead protection area only contains a few PCSs, the water supplier could conduct the inspections only where the PCS owner voluntarily allows access. If the local inspector is denied access, the situation can be referred to DES. In either case, enforcement is handled by DES.

Groundwater Protection Act (GPA)

The GPA, passed in 1991, enables wellhead protection areas or other valuable groundwater to be reclassified if potential contamination sources are to be actively managed via periodic inspections to ensure compliance with Best Management Practices. Doing so provides a local entity with the statutory authority to implement a protection program, conduct inspections and enforce BMP Rules. DES places a higher priority on groundwater protection activities (e.g., oil spill remediation, RCRA and UST compliance, etc.) in reclassified areas.

In areas designated with the highest groundwater classification, GAA, state law prohibits the following six new land uses: hazardous waste disposal facilities, solid waste landfills, outdoor bulk storage of road salt, junkyards, snow dumps, and wastewater or septage lagoons. In addition, a release detection permit (including groundwater monitoring) is required for existing high-risk land uses. PCSs are actively managed to ensure compliance with BMPs. The local entity who obtains reclassification is empowered with investigation, inspection, and cease and desist authority. The municipality receives prior notice on State environmental permits, as well as technical and enforcement support provided by the State to the local entity who obtains reclassification.

Reclassification of "other locally important groundwater" (e.g. specific aquifers, water supply watersheds, or communities without public water systems) to GA1 results in the above, without prohibitions on land uses or release detection permits.

To obtain a GAA or GA1 classification, the local entity or the State must:

1. Delineate the area to be reclassified.
2. Prepare an inventory of potential contamination sources.
3. Formulate a management plan that includes notification to potential contamination sources and performance of periodic inspections to ensure compliance with Best Management Practices.
4. Submit a request for reclassification to DES.
5. Maintain the management program. If active management is not occurring, reclassification downward to GB or GA2 may result.

Contingency Planning

None required under the Source Protection Program. DES requires emergency planning for community systems serving populations of 500 or more. The plans must be updated every five years.

Enforcement

Groundwater reclassification provides a local entity (water supplier or municipal official) with the statutory authority to implement a protection program, conduct inspections, and enforce BMP Rules within the protected area. DES can also help with enforcement.

Progress

Wellhead protection areas and source water protection areas for surface sources have been delineated for 1,705 active sources. Seventy-five percent of all community and NTNC systems (representing 85% of all community and NTNC sources) have chemical monitoring waivers, meaning that they also have source protection programs. Six groundwater reclassification requests have been approved, five of which involve wellhead protection areas.

Other State Groundwater Protection Policies

Initially all groundwater in NH was classified as GB or GA2. GA2 areas, which includes stratified drift areas mapped by the USGS that are potentially valuable aquifers, are classified as digital information becomes available from the USGS stratified drift aquifer studies. GB includes all groundwater not assigned to a higher class, and, as in all classes, must meet drinking water quality standards.

Watershed Protection

State Drinking Water Regulations include Rules for Protecting the Purity of Regulated Watersheds (Part Env-Ws 386). This rule contains land use and water use restrictions specific to each water supply source.

Policy on Interstate Source Protection Areas

There is a compact with Vermont (Chapter 485Də1) that applies to public water systems that serve both states.

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New York

Wellhead Protection

Regulatory Design and Oversight

EPA approved New York's Wellhead Protection Program (WHPP) in September 1990. The New York State Department of Environmental Conservation (DEC) was initially delegated as the state agency to administer the WHPP, and in October 1999 administration was transferred to the NY Department of Health (DOH). The WHPP is a voluntary program that has focused on assisting municipal community water systems with developing protection plans for their groundwater supplies.

While DOH is the principal agency responsible for developing and implementing state-level aspects of the program, regional and county planning agencies and governments are responsible for county-level planning, management, and educational outreach elements of the program, in addition to any county-level ordinances developed for wellhead protection. Municipal governments are responsible for local land use controls and other local-level aspects of wellhead protection.

Applicability

For new wells, the institutional mechanism guiding the protection and management is the set of procedures outlined through the Public Water Supply Permit Program.

The Water Supply Permit Program enables, as part of the permit approval process, that new wells be required to adopt a groundwater or wellhead protection plan. The plan may include ownership of recharge areas, Watershed Rules and Regulations, local ordinances, or county ordinances. Permit conditions include direct control of the wellhead, a strict protection zone of a minimum 200-foot radius to be protected and controlled by direct ownership of the land, by the acquisition of protection easements, or other appropriate measures.

Delineation

For upstate New York, unconsolidated aquifer boundaries serve as the fundamental delineation of wellhead protection areas and a multiple zone approach is used within the total WHPA for varying management relative to risk. For upstate bedrock aquifers, the baseline delineation is a fixed radius of 1,500 ft from the wellhead. These delineations are the initial areas advocated by the state, and may be directly utilized in implementing management activities for groundwater protection. However, if site-specific conditions suggest that alternative delineations are appropriate -- including further subdivision -- those refined delineations may be accepted.

Inventory

Where a locality has subdivided the overall wellhead protection area into higher priority and lower priority areas, source inventory activities may be phased to focus on the higher priority area. Typically, the lead responsible local authority obtains the location data for potential contaminant sources, and a general field survey is performed to confirm or revise collected information and to fill in information gaps.

Management

It was largely within the structure of the State's existing programs and institutions that the groundwater management program was developed and it is within this structure that the Wellhead Protection Program has evolved. Water suppliers and local officials may select a preferred "framework" and general plan for local wellhead protection. This may include Watershed Rules and Regulations, zoning controls, local or county ordinances, etc., or non-regulatory approaches including management practices, technical assistance and educational outreach.

The Public Health Law authorizes the state to promulgate rules and regulations for the protection of any public water supply from contamination. It is under this authority that DOH's Watershed Rules and Regulations Program is based, and under which DOH may protect a specific water supply upon request from the water supplier. Watershed Rules and Regulations for groundwater sources limit specific activities, set requirements for existing operations and facilities, and prohibit certain potential contaminant sources from locating within specifically defined areas and may include performance or design specifications for groundwater protection for new facilities allowed in the areas.

County health agencies may assist in administering major elements of state level programs for water pollution control and water supply regulation. County planning departments may also assume an important management role. Municipal governments may use land use controls and town ordinances to prescribe permitted uses and activities.

The DOH has, over the years, worked with many other programs as well as several state and federal agencies toward protecting drinking water sources. The DOH has actively participated on numerous committees, emphasizing the importance of considering those contaminants which may pose health threats when present in drinking water. The committees include the statewide Non-point Source Coordinating Committee and the New York State Soil and Water Conservation Committee. The Non-point Source Coordinating Committee focuses on coordination among state and local agencies and institutions to improve the management of non-point sources for watershed and aquifer protection. The New York State Soil and Water Conservation Committee developed the *Guide to Agricultural Environmental Management*. Agricultural Environmental Management is a voluntary program which assists farmers in evaluating their farming practices, especially those which may negatively affect drinking water sources. Once identified, best management practices can then be implemented, specifically those which are beneficial for source water protection.

Contingency Planning

Under the requirements of the State Sanitary Code, all community water systems with an annual gross operating revenue of more than $125,000 must develop and submit to DOH a water supply emergency plan. The plan must identify and outline the steps necessary to ensure that potable water is available during all phases of a water supply emergency.

Enforcement

As approved by the U.S. EPA, the New York Wellhead Protection Program refers to State laws and regulations. New York State Agencies can enforce state regulations, including watershed rules and regulations violations identified by public water systems. Local governments can enforce their regulations where they are not pre-empted by state or federal regulations.

Progress

Based on the 1999 Biennial Report 2,062 delineations have been completed, 199 potential contaminant source inventories have been conducted, and 212 water systems have implemented source management efforts.

Other State Groundwater Protection Policies

New York State's groundwater program classifies all fresh groundwaters in the state for best usage as a source of potable water supply (Class GA) regardless of location or current use.

Five major elements of NYS Groundwater Program:

1. Resource Management: includes standards, classification, mapping, monitoring, GIS, Groundwater Problem Inventory, and quantity management
2. Pollution Source Control Programs: includes hazardous materials storage and handling, wastewater discharge controls, solid waste management, hazardous waste management, pesticides and fertilizer management, onsite wastewater system management, mineral resource management, and agricultural waste management
3. Critical Area Protection Programs: sole source aquifer program, watershed rules, and primary and principal aquifer designation
4. Response and Remediation Programs: oil and hazardous materials response, and hazardous waste remediation
5. Public and Municipal Official Education and Outreach

Watershed Protection

In addition to the Wellhead Protection Program, several watershed programs have been established in New York State. These watershed programs are intended to protect surface

waters that are used for sources of public drinking. Detailed delineations and contaminant inventories have been completed. Most notable of these watershed protection programs are those addressing the Croton/Catskill/Delaware Reservoirs (New York City), Tomhannock Reservoir (City of Troy), Skaneateles Lake (City of Syracuse), and several other Finger Lakes' sources. Drinking water source protection will also be integrated into a multi-state/nation management plan for Lake Champlain. Source water assessment and protection activities have also been initiated in some areas by New York's County Water Quality Coordinating Committees, Environmental Management Councils and county health departments.

Policy on Interstate Source Protection Areas

"Interstate coordination has not been a problem with respect to groundwater. In the event that such coordination is needed, NY's interstate borders are covered by the following interstate compacts of which NY is a member.

New York State has watershed rules and regulations, including prohibitions on wastewater discharges in watersheds used by public water systems in Connecticut.

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Rhode Island

Wellhead Protection

Regulatory Design and Oversight

The Rhode Island Department of Environmental Management (DEM) developed the state's Wellhead Protection Program in 1990. The requirements of the WHP Program were incorporated into the DEM "Rules and Regulations for Groundwater Quality."

The DEM is responsible for protecting the state's water resources. The Water Resources Board is an executive board in state government charged with managing the proper development, utilization and conservation of the state's water resources. The Department of Health is responsible for ensuring proper operation and maintenance of the public water systems to ensure a safe drinking water supply and is responsible for the state's Source Water Assessment Program. All three agencies have worked closely together over the years so that the programs complement one another wherever possible.

Applicability

The Rhode Island program applies to all 671 public wells in the state. Municipalities with wellhead protection areas and those 15 large water suppliers dependent upon groundwater are required to comply with the inventory and protection planning requirements of the WHP Program.

Large water suppliers are those systems that obtain, transport, purchase, or sell more than 50 million gallons of water per year. These 15 groundwater dependent systems are required to address the WHP Program requirements in their "Water Supply Systems Management Plans" that are submitted to the Rhode Island Water Resources Board in accordance with the "Rules and Procedures for Water Supply System Management Planning." Municipalities submit their inventories and plans to DEM.

Delineation

WHPAs are delineated by DEM and provided to the municipalities and water suppliers. For the community wells and larger non-community wells (pumping rate greater than 10 gallons per minute), the WHPAs were delineated using a mathematical model in conjunction with hydrogeologic mapping. For wells in stratified drift, the uniform flow equation was used to generate a curve showing the portion of the stratified drift that is affected by the pumping well. In lieu of subsurface data, topographic contours were then used to determine groundwater that flows from upland hill areas into the curve. Due to the difficulty in determining groundwater flow direction in bedrock, WHPAs for the larger bedrock wells were determined using a circle generated by application of the Theis equation. Topographic contours were then used to determine groundwater that flows into the circle.

The WHPA for the smaller non-community wells (pumping less than 10 gpm), which account for approximately two-thirds of the public wells in the state, is a circle with a radius of 1,750 feet, which is based on a solution of the Theis equation.

Initial DEM WHPA delineations provide a basis for local protection efforts. However, it is expected that the delineations for the community wells and the larger non-community wells will be revised using more site-specific data and possibly employing more complex methods. No determination has been made regarding the responsibility and scheduling of these "refined" delineations. Once accepted by DEM, a refined WHPA delineation will replace the DEM WHPA in all groundwater programs affected by WHPA delineations.

Inventory

Municipalities with WHPAs and the state's 15 large water suppliers dependent on groundwater are required to identify existing contaminant sources, and -- to the extent possible -- the location of abandoned or inactive sources that are known or potential sources of groundwater contamination. The procedure involves a field survey of the WHPA and a review of state records to collect information about the facilities located in the WHPA.

Once the inventories are submitted to DEM and approved, they are forwarded to a DEM staff person who conducts on-site inspections of the facilities to ensure compliance with DEM regulations.

Management

Municipalities are required to develop and implement a municipal plan for wellhead protection that addresses all the WHPAs in their community, including those for the large water suppliers. The plan should, where appropriate, provide a framework for coordinating and encouraging a variety of local, state, and private actions designed to enhance groundwater protection. Large water suppliers are also required to prepare a separate WHP plan unless the supplier is part of the municipal government. A WHP plan must be approved by an appropriate governing body that has the authority to implement the plan (i.e., city or town council) in order for DEM to initiate its review.

Required plan elements include:

1. An evaluation of the groundwater quality within the WHPAs;
2. Description of present and past efforts to protect groundwater quality within the community or within the WHPAs;
3. Identification of the protection strategies determined to be most appropriate for protecting groundwater quality;
4. Implementation approach for the protection strategies and a five-year schedule of activities for implementation;
5. Efforts to coordinate implementation of the plan between municipal governments and water suppliers and between neighboring municipalities, where applicable.

Municipalities and water suppliers have flexibility in determining which protection strategies are appropriate for their community or WHPA. Strategies to be considered include zoning overlay ordinances, public education, wellfield maintenance and security, land acquisition, and groundwater monitoring, etc. Groundwater education is one approach that must be included in every plan.

The following are the major state-level prohibitions and regulatory requirements that apply within wellhead protection areas. The regulatory agency is included within parentheses.

Prohibitions

- The establishment of new underground storage tank facilities in community wellhead protection areas is prohibited. (Existing facilities may replace their tanks.) Abandonment of any size tank is prohibited. (DEM)
- The establishment of new solid waste landfills and facilities for the disposal of hazardous waste in areas where groundwater is classified as GAA, which includes all community wellhead protection areas, is prohibited. (DEM)
- The underground injection of hazardous or radioactive wastes is prohibited. (DEM)
- Sludge is not allowed to be land applied or composted within 1,000 ft of any private well or within a wellhead protection area of any public well. (DEM)
- New septic system discharges may not be located within 100 ft of a private well or 400 ft of a public well. (Variances may be granted in cases of hardship.) (DEM)

Regulatory Requirements

- New USTs, subject to DEM regulations must be double-walled. Leak detection on new motor fuel tanks must be continuous, e.g., 24-hour, interstitial monitoring. (DEM)
- Bare steel or metal as a construction material for new UST installations is prohibited in any location. Operation of single-wall USTs storing motor fuels or hazardous materials which are not protected against corrosion is prohibited beyond 12/21/98. (DEM)
- Spill containment is required for all above-ground tanks over 500 gallons. Tanks over 5,000 gallons located in areas where groundwater is classified as GAA must have in place a groundwater monitoring system. (DEM)
- No person shall release any hazardous material which may impact the classification or uses of groundwater.(DEM)
- The land within 400 ft of gravel packed wells and within 200 ft of bedrock wells must remain under the direct control of the water supplier by either ownership or recorded easement. The water supplier must maintain this area free from potential sources of contamination. (DOH)

Contingency Planning

The 15 large groundwater systems subject to the requirements of the WHP Program must submit contingency plans as part of the Water Supply System Management Planning process administered by the RI Water Resources Board. While smaller systems are not specifically required to prepare contingency plans, they are encouraged to pursue emergency planning as part of the administration of their system.

Enforcement

Within its jurisdiction at the state level, DEM has taken steps to insure that potentially polluting facilities in WHPAs are given high priority for inspection and enforcement action, and that WHPAs have been given the highest priority in the various regulatory programs that make decisions affecting groundwater quality.

Progress

DEM completed WHPA delineations in 1993 and provided maps of these delineations to the applicable municipalities and water suppliers. At present, DEM has adopted refined WHPA delineations for twenty wells. Most (82%) municipalities and large suppliers have conducted the required detailed inventories: 62 (95%) community systems, 64 NTNCs, and 278 TNCs (82% of the non-community systems); 27 (out of 31) municipalities, and 11 (out of 15) large suppliers. The following systems are addressed by a wellhead protection plan: 34 (52%) community; 25% non-community (14 NTNC, 90 TNC); 5 municipal, and 6 large suppliers.

Other State Groundwater Protection Policies

Comprehensive Planning and Land Use Regulation Act: This act requires each municipality to adopt a Municipal Comprehensive Plan and amend their zoning and subdivision regulations to be consistent with the plan. Groundwater protection, and in many cases wellhead protection, is addressed in many of the comprehensive plans.

State Classification System for Groundwater: Under regulations promulgated by DEM in 1992, the state's most productive aquifers are designated GAA and are provided the highest degree of protection. All community WHPAs are also designated GAA. Non-community WHPAs are classified either GA or GAA depending on their hydrogeologic setting. The goal in both GA and GAA areas is to preserve groundwater quality in a manner consistent with its purpose of providing a clean drinking water supply.

Watershed Protection

A plan for surface waters must also be developed pursuant to the RI Water Resources Board.

Policy on Interstate Source Protection Areas

WHPAs for several wells in Rhode Island extend across state boundaries into Connecticut and Massachusetts, resulting in 1,912 acres designated as a WHPA out-of-state. RI does not have a formal policy to address these sources but does encourage cooperation and coordination between municipalities across state lines.

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Vermont

Wellhead Protection

Vermont's formal approach to drinking water protection began in the early 80's with the delineation of Wellhead Protection Areas (then called Aquifer Protection Areas) for most municipal systems. The Vermont Wellhead Protection Program was first approved by EPA on September 13, 1990 and the Water Supply Rule integrated requirements for Source Protection Plans for all public community water systems in 1992, as well as construction, monitoring, and operational requirements on all public water systems. Since that time, the Source Water Protection Program was developed in Vermont based on the requirements of the Wellhead Protection Program and the state's Water Supply Rule.

Regulatory Design and Oversight

The Vermont Water Supply Rule, revised in 2000, includes a subchapter on Source Water Protection to consolidate this program's requirements and add federally approved requirements of Vermont's Source Water Assessment Program (SWAP). The Water Supply Division of the Department of Environmental Conservation (DEC) is responsible for implementing the Water Supply Rule along with the Wastewater Management Division, which oversees construction permits for non-community water systems. The Water Supply Division reviews and approves all Source Protection Plans to ensure that they meet the requirements outlined in the Water Supply Rule and *Protecting Public Water Sources in Vermont*, and requires plans to be updated as part of the systems' Permits to Operate.

A Source Protection Plan contains a delineation of the Source Protection Area, an inventory of the potential sources of contamination and an assessment of their risks, as well as, a plan describing how to manage these risks and a contingency plan.

Applicability

New community sources or sources increasing the approved yield of an existing source must obtain Source Approval from the Water Supply Division, which includes delineation, public notice, and approval of a Source Protection Area. In addition, DEC requires all community and non-transient non-community (NTNC) water systems to have an approved Source Protection Plan. If a community system does not have a Plan, the requirement to have one becomes a condition of a Temporary Operating Permit issued for that system. In the past, NTNCs were not required to have a Plan, although more than half of them have developed one voluntarily as part of the Monitoring Waiver Program. These systems will need to complete new delineations to meet the federal requirements of the Source Water Assessment Program.

Wellhead Protection Program

System/Source	Aquifer (Bedrock & Unconsolidated)
TNC existing source new source/ increasing yield	not required
NTNC existing source new source/ increasing yield	will be required
CWS existing source new source/ increasing yield	required

Delineation

Systems previously assigned a "default" source protection area (SPA) of 3,000 ft are not required, but are strongly encouraged, to re-delineate their SPAs. However, systems with a default SPA must re-delineate in order to receive approval to increase their yield.

The required protective radii for Community Systems:

Zone 1 -- a 200 ft radius around the well, controlled by the PWS (can be reduced with approval from DEC).

Zone 2 -- the contributions from the monitoring radius established as part of the Source Interference Testing for new systems and outside Zone I.

Zone 3 -- remaining recharge area(s) or area of contribution to the well not delineated as Zone 2 and where there may be possible impacts from potential sources of contamination.

Two-year travel time zone -- used to identify a protection area to provide adequate protection from pathogen threats resulting form onsite disposal of sewage.

To determine these areas, community systems may use a calculated fixed radius, simplified variable shapes, analytical methods, hydrogeologic mapping, or flow models. An arbitrary fixed radius method is no longer an approved method for delineating community well SPAs.

It is recommended that NTNCs use a calculated fixed radius method. TNC delineations will be determined using “the shield” method, which determines the size and shape of the required minimum separation zone between sewage disposal fields and the well.

Delineation Requirements by System and Aquifer

System/ Source	Aquifer (Bedrock & Unconsolidated)
TNC	
Existing source Increasing yield/new source	not required; must identify the required minimum separation zone between sewage disposal fields and a well (this is an assessment not a protection area)
NTNC	
Existing source	calculated fixed radius method
increasing yield/new source	must re-delineate to increase yield; calculated method recommended
COM	
Existing source	default of 3,000 ft; some have delineated areas already, not required to re-delineate
increasing yield/new source	Zone 1- 200 ft Zone 2- contributions from the monitoring radius; does not include Zone 1 Zone 3- remaining recharge area; does not include Zone 2 2 yr travel time Zone- to provide protection from onsite systems -may use calculated fixed radius, simplified variable shapes, analytical methods, hydrogeologic mapping, or flow models; arbitrary fixed radius method not allowed

Inventory

All potential sources of contamination (PSOC) within Zones 1, 2 and 3 shall be identified. These include direct or indirect discharges permitted by the State or other known piped discharges to surface water; municipal wastewater or industrial storage lagoons and/or injection wells; pulp mills; active or closed solid waste landfills; mining operations or drainage; radioactive waste storage facilities or disposal sites; and hazardous waste storage or disposal sites. Inventories are carried out by the PWS, and a PSOC Inventory and Risk Evaluation Form is provided for completing the assessment of risks.

Inventories should be conducted:

a) when PWS is applying for new source approval or to increase yield from an existing source
b) when applying for monitoring waivers
c) when preparing source protection plans, and
d) according to schedules posted in operating permits

Management

Management plans are required of Community and NTNC systems preparing source protection plans, and are recommended for TNCs. They should identify how the PWS will manage the risks in conjunction with the potential contaminant sources' responsible parties.

Requirements for the content of a management plan are the same for community and NTNC systems. At a minimum systems must notify landowners and businesses located in source protection areas about the need to protect drinking water quality. Other techniques may include:

- educational efforts on protecting groundwater and surface water
- zoning ordinances
- purchase of land or conservation easements to protect the drinking water quality
- maintaining buffer zones for surface water sources
- educating the residents about proper septic systems and storage tank maintenance
- developing educational programs for schools, etc.

Contingency Planning

A source protection plan must contain a contingency plan addressing both short and long-term needs in the event of source contamination or disruption of service. Required components include notification of key contact people; alternate water supply to be made available, both short and long-term solutions; emergency procedure for non-scheduled sequenced system shut down and start-up; and notification or posting of any notice required to the water system customers for use of the emergency source. It is recommended that the plan contain a list of people to contact in case of emergencies.

Enforcement

The Water Supply Division has the authority to proceed with enforcement actions against any Public Water System that does not have a Source Protection Plan required by the Water Supply Rule.

Progress

Over half of the community systems and over forty percent of the NTNCs have approved Source Protection Plans.

Other State Groundwater Protection Policies

Vermont State Statutes:
Title 10 VSA Chapter 56 -- Public Water Supply
Title 10 VSA Chapter 48 -- Ground Water Protection
Environmental Protection Rules Chapter 21 – Water Supply Rule
Environmental Protection Rules Chapter 23 - Groundwater Protection Rule and Strategy

Watershed Protection

A source protection area must be delineated and a source protection plan shall be developed. The surface water source protection area delineation will be based on the following criteria:

(a) Zone 1 shall consist of an area 200 ft in radius around the intake or as otherwise determined by the Agency.
(b) Zone 2 shall consist of areas within the watershed located within 200 ft of perennial surface water and limited to 17,000 acres.
(c) Zone 3 shall consist of the remaining watershed area beyond Zones 1 and 2, except as may be reduced by the Agency on a case-by-case basis giving consideration to the size of the watershed and the likelihood of contamination of the source.

A surface water source protection plan must include a source protection area map, an inventory of the potential and actual sources of contamination in the SPA, a management plan for the risks from the identified potential and actual sources of contamination, and a contingency plan.

Lake Champlain

Public Water Systems served by Lake Champlain currently have a 3,000 ft fixed radius SPA. These SPAs were established prior to the Water Supply Rule requirements for delineating zones for surface water sources. Under SWAP and the proposed revisions to the Water Supply Rule, Public Water Systems using Lake Champlain as a source will be required to re-delineate their SPAs and create Source Protection Plans relevant to this area. Delineations will be based upon available information and USGS HUC-II watersheds and completed on a case-by case approach. DEC will coordinate Source Protection Plan issues for the Lake Champlain public water systems, including assisting in developing appropriate SPAs for approval, gathering existing data for use by the water systems, preventing duplication of efforts by the systems in inventorying and assessing risks, and aiding in the development of protection and management plans.

Policy on Interstate Source Protection Areas

VT DEC is working cooperatively with NEIWPCC on interstate source water protection and with the US EPA on international source water protection issues.

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