Massachusetts Department of Environmental Protection

Source Water Assessment and Protection (SWAP) Report for

Westford Water Department

What is SWAP?

The Source Water Assessment and Protection (SWAP) program, established under the federal Safe Drinking Water Act, requires every state to:

- inventory land uses within the recharge areas of all public water supply sources;
- assess the susceptibility of drinking water sources to contamination from these land uses; and
- publicize the results to provide support for improved protection.

Susceptibility and Water Quality

Susceptibility is a measure of a water supply's potential to become contaminated due to land uses and activities within its recharge area.

A source's susceptibility to contamination does *not* imply poor water quality.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, disinfecting, filtering, or treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Actual water quality is best reflected by the results of regular water tests. To learn more about your water quality, refer to your water supplier's annual Consumer Confidence Reports.

Table 1: Public Water System Information

PWS Name	Westford Water Department
PWS Address	63 Forge Village Road
City/Town	Westford, Massachusetts
PWS ID Number	2330000
Local Contact	Warren Sweetser
Phone Number	(978) 692-5529

Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential contaminant sources, including storm runoff, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate Best Management Practices (BMPs) and drinking water source protection measures.

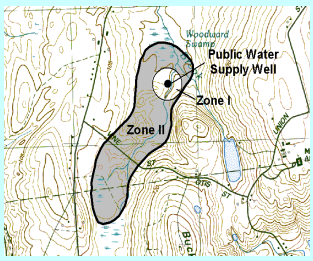
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes the following sections:

1. Description of the Water System
2. Land Uses within Protection Areas
3. Source Water Protection Conclusions and Recommendations
4. Appendices

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and a Zone II protection area.



Glossary

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material (i.e. clay) that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. This area should be owned or controlled by the water supplier and limited to water supply activities.

Zone II: The primary recharge area for the aquifer. This area is defined by hydrogeologic studies that must be approved by DEP. Refer to the attached map to determine the land within your Zone II.

Section 1: Description of the Water System

Zone II #: 115 ***Susceptibility:*** Moderate

Well Names	***Source IDs***
Cote GPW	2330000-07G

Zone II #: 128 ***Susceptibility:*** High

Well Names	***Source IDs***
Nutting Rd GPW	2330000-02G
Depot Rd GPW	2330000-03G

Zone II #: 278 ***Susceptibility:*** High

Well Names	***Source IDs***
Fletcher Well	2330000-08G

Zone II #: 434 ***Susceptibility:*** High

Well Names	***Source IDs***
Forge Village Wellfield 1.1	2330000-01G
Country Road GPW	2330000-04G
Forge Village Wellfield GPW #2	2330000-05G
Howard Road Wellfield 6.1	2330000-06G
Forge Village Wellfield 1.2	2330000-09G
Forge Village Wellfield 1.3	2330000-10G
Forge Village Wellfield 1.4	2330000-11G
Forge Village Wellfield 1.5	2330000-12G
Howard Road Wellfield 6.2	2330000-13G
Howard Road Wellfield 6.3	2330000-14G
Howard Road Wellfield 6.4	2330000-15G
Howard Road Wellfield 6.5	2330000-16G

The wells for the Westford Water Department are located in four Zone II largely on the western edge of the town. The Zone II #434 has a small portion that extends in to the town of Littleton. Each well has a Zone I of 400 feet. The wells are located in an aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barriers (i.e. clay) that can prevent contaminant migration. Please refer to the attached map to view the boundaries of the Zone II.

Water from the wells is disinfected, has iron and manganese removed, is treated for corrosion control, and is fluoridated for dental health. For current information on monitoring results and treatment, please contact the Public

Water System contact person listed above in Table 1 for a copy of the most recent Consumer Confidence Report. Drinking water monitoring reporting data are also available on the web at http://www.epa.gov/safewater/ccr1.html.

Section 2: Land Uses in the Protection Areas

The Zone II for Westford are a mixture of residential, wetland, and forested land uses, with small areas of commercial and light industrial land uses (refer to attached map for details). Land uses and activities that are potential sources of contamination are listed in Table 2.

Key Land Uses and Protection Issues include:

1. Zone I Protection
2. Residential land uses
3. Transportation corridors
4. Hazardous materials storage and use
5. Agricultural activities
6. Comprehensive wellhead protection planning

The overall ranking of susceptibility to contamination for the system is high, based on the presence of at least one high threat land use within the water supply protection areas, as seen in Table 2.

1. Zone I Protection – The Zone I for each of the wells is a 400 foot radius around the wellhead. Massachusetts drinking water regulations (310 CMR 22.00 Drinking Water) requires public water suppliers to own the Zone I, or control the Zone I through a conservation restriction. The Zone Is for the wells are owned or controlled by the public water system. Only water supply activities are allowed in the Zone I. However, many public water supplies were developed prior to the Department's regulations and contain non water supply activities such as homes and public roads. The following non water supply activities occur in the Zone Is of the system wells:
Well 04G - There is a local road that runs through the Zone I of the Country Road Gravel Pack Well.

Benefits of Source Protection

Source Protection helps protect public health and is also good for fiscal fitness:

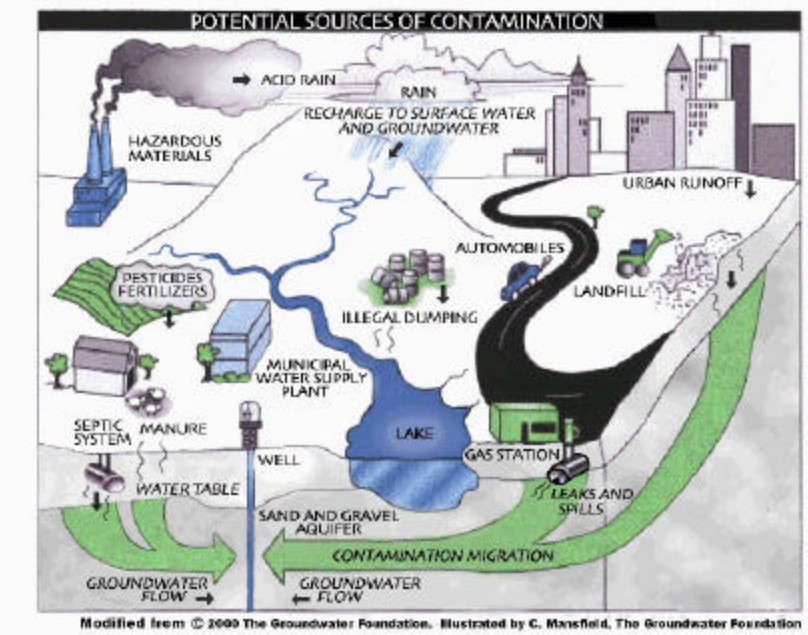
- Protects drinking water quality at the source
- Reduces monitoring costs through the DEP Waiver Program
- Treatment can be reduced or avoided entirely, saving treatment costs
- Prevents costly contamination clean-up
- Preventing contamination saves costs on water purchases, and expensive new source development

Contact your regional DEP office for more information on Source Protection and the Waiver Program.

Zone I Recommendations:

- ✓ To the extent possible, remove all non water supply activities from the Zone Is to comply with DEP's Zone I requirements.
- ✓ Use BMPs for the storage, use, and disposal of hazardous materials such as water supply chemicals and maintenance chemicals.
- ✓ Do not use or store pesticides, fertilizers or road salt within the Zone I.
- ✓ Keep any new non water supply activities out of the Zone I.

2. Residential Land Uses – The most common land use throughout the Zone II is residential areas. None of the areas have public sewers, and so all use septic systems. If managed improperly, activities associated



with residential areas can contribute to drinking water contamination. Common potential sources of contamination include:

- **Septic Systems** – Improper disposal of household hazardous chemicals to septic systems is a potential source of contamination to the groundwater because septic systems lead to the ground. If septic systems fail or are not properly maintained they can be a potential source of microbial contamination.
- **Household Hazardous Materials** - Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. Improper use, storage, and disposal of chemical products used in homes are potential sources of contamination.
- **Heating Oil Storage** - If managed improperly, Underground and Aboveground Storage Tanks (UST and AST) can be potential sources of contamination due to leaks or spills of the fuel oil they store.
- **Stormwater** – Catch basins transport stormwater from roadways and adjacent properties to the ground. As flowing stormwater travels, it picks up debris and contaminants from streets and lawns. Common potential contaminants include lawn chemicals, pet waste, and contaminants from automotive leaks, maintenance, washing, or accidents.

Residential Land Use Recommendations:

- ✓ Educate residents on best management practices (BMPs) for protecting water supplies. Distribute the fact sheet "Residents Protect Drinking Water" available in Appendix A and on www.mass.gov/dep/brp/dws/protect.htm, which provides BMPs for common residential issues.
- ✓ Work with planners to control new residential developments in the water supply protection areas.
- ✓ Promote BMPs for stormwater management and pollution controls. Visit DEP's web site for additional information and assistance at http://www.state.ma.us/dep/brp/wm/nonpoint.htm.

What are "BMPs?"

Best Management Practices (BMPs) are measures that are used to protect and improve surface water and groundwater quality. BMPs can be structural, such as oil & grease trap catch basins, nonstructural, such as hazardous waste collection days or managerial, such as employee training on proper disposal procedures.

For More Information

Contact Josephine Yemoh-Ndi in DEP's Worcester Office at (508) 849-4030 for more information and assistance on improving current protection measures.

Copies of this report have been provided to the public water supplier, board of health, and the town.

3. Transportation Corridors - Route 40 runs through the Zone II #115 and Route 225 runs through Zone II #434 and #278. Local roads are common throughout the Zone II. Roadway construction, maintenance, and typical highway use can all be potential sources of contamination. Accidents can lead to spills of gasoline and other potentially dangerous transported chemicals. Roadways are frequent sites for illegal dumping of hazardous or other potentially harmful wastes. De-icing salt, automotive chemicals and other debris on roads are picked up by stormwater and wash in to catchbasins.

Railroad tracks run through the southern edge of Zone II #128 and along the northern edge of Zone II #434. Rail corridors serving passenger or freight trains are potential sources of contamination due to chemicals released during normal use, track maintenance, and accidents. Accidents can release spills of train engine fluids and commercially transported chemicals.

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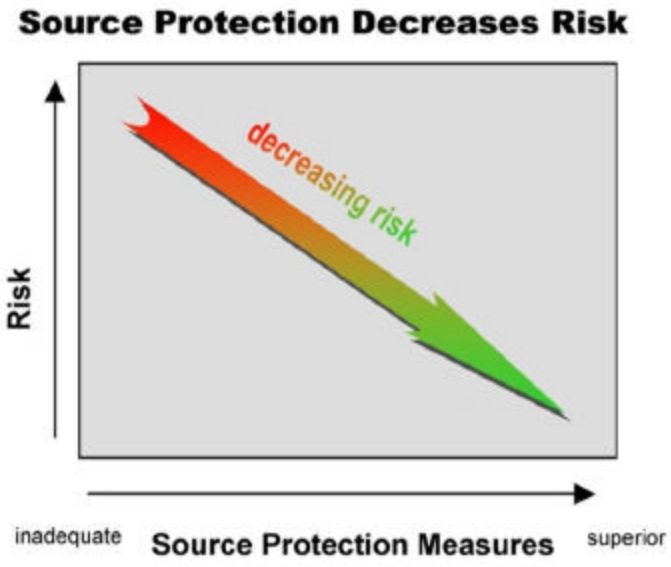

Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

Potential Source of Contamination vs. Actual Contamination

The activities listed in Table 2 are those that typically use, produce, or store contaminants of concern, which, if managed improperly, are potential sources of contamination (PSC).

It is important to understand that a release may never occur from the potential source of contamination provided facilities are using best management practices (BMPs). If BMPs are in place, the actual risk may be lower than the threat ranking identified in Table 2. Many potential sources of contamination are regulated at the federal, state and/or local levels, to further reduce the risk.

Table 2: Land Use in the Protection Areas (Zones I and II)

Land Uses	Quantity	Threat	Zone II #	Potential Contaminant Sources*
Agricultural				
Livestock Operations	2	M	#434, #278	Manure (microbial contaminants): improper handling
Commercial				
Cemeteries	2	M	#115, #128	Over-application of pesticides: leaks, spills, improper handling; historic embalming fluids
Railroad Tracks And Yards	1	H	#434, #128	Herbicides: over-application or improper handling; fuel storage, transported chemicals, and maintenance chemicals: leaks or spills
Sand And Gravel Mining/ Washing	1	M	#115	Heavy equipment, fuel storage, clandestine dumping: spills or leaks
Industrial				
Foundries Or Metal Fabricators	1	H	#434	Solvents and other chemicals: spills, leaks, or improper handling or storage
Residential				
Fuel Oil Storage (at residences)	170+	M	All	Fuel oil: spills, leaks, or improper handling
Lawn Care / Gardening	450+	M	All	Pesticides: over-application or improper storage and disposal
Septic Systems / Cesspools	450+	M	All	Hazardous chemicals: microbial contaminants, and improper disposal

Table 2 Notes:

1. When specific potential contaminants are not known, typical potential contaminants or activities for that type of land use are listed. Facilities within the watershed may not contain all of these potential contaminant sources, may contain other potential contaminant sources, or may use Best Management Practices to prevent contaminants from reaching drinking water supplies.
2. For more information on regulated facilities, refer to Appendix B: Regulated Facilities within the Water Supply Protection Area information about these potential sources of contamination.
3. For information about Oil or Hazardous Materials Sites in your protection areas, refer to Appendix C: Tier Classified Oil and/or Hazardous Material Sites.

*** THREAT RANKING** - The rankings (high, moderate or low) represent the relative threat of each land use compared to other PSCs. The ranking of a particular PSC is based on a number of factors, including: the type and quantity of chemicals typically used or generated by the PSC; the characteristics of the contaminants (such as toxicity, environmental fate and transport); and the behavior and mobility of the pollutants in soils and groundwater.

Table 2 Continued on Page 6

Table 2 (Continued): Land Use in the Protection Areas (Zones I and II)

For more information, refer to Appendix A: Regulated Facilities within the Water Supply Protection Area

Land Uses	Quantity	Threat	Zone II #	Potential Contaminant Sources*
Miscellaneous				
Aboveground Storage Tanks	2	M	#434	Materials stored in tanks: spills, leaks, or improper handling
Aquatic Wildlife	4	L	All	Microbial contaminants
Fishing/Boating	4	L	All	Fuel and other chemical spills, microbial contaminants
Landfills and Dumps	1	H	#434	Seepage of leachate. Note: Landfill is now closed.
Schools, Colleges, and Universities	2	M	#434, #278	Fuel oil, laboratory, art, photographic, machine shop, and other chemicals: spills, leaks, or improper handling or storage
Small Quantity Hazardous Waste Generators	1	M	#434, #278	Hazardous materials and waste: spills, leaks, or improper handling or storage
Stormwater Drains/ Retention Basins	5	L	#434, #278	Debris, pet waste, and chemicals in stormwater from roads, parking lots, and lawns
Tire Dumps	1	M	#115	Tires: improper handling or management
Transmission Line Rights-of-Way	1	L	#434, #278	Corridor maintenance pesticides: over-application or improper handling; construction
Transportation Corridors	2	M	#434, #278, #115	Fuels and other hazardous materials: accidental leaks or spills; pesticides: over-application or improper handling
Underground Storage Tanks	3	H	#434, #278	Stored materials: spills, leaks, or improper handling
Very Small Quantity Hazardous Waste Generator	1	L	#434, #278	Hazardous materials and waste: spills, leaks, or improper handling or storage
Waste Transfer/Recycling Station	1	M	#434, #278	Water contacting waste materials: improper management, seepage, and runoff
Wastewater Treatment Plant/ Collection Facility/ Lagoon	1	M	#434, #278	Treatment chemicals or equipment maintenance materials: improper handling or storage; wastewater: improper management

Transportation Corridor Recommendations:

- ✓ Identify stormwater drains and the drainage system along transportation corridors. Wherever possible, ensure that drains discharge stormwater outside of the Zone II.
- ✓ Work with the Town and State to have catch basins inspected, maintained, and cleaned on a regular schedule. Street sweeping reduces the amount of potential contaminants in runoff.
- ✓ Work with local emergency response teams to ensure that any spills within the Zone II can be effectively contained.
- ✓ If storm drainage maps are available, review the maps with emergency response teams. If maps aren't yet available, work with town officials to investigate mapping options such as the upcoming Phase II Stormwater Rule requiring some communities to complete stormwater mapping.
- ✓ Work with local officials during their review of the railroad right of way Yearly Operating Plans to ensure that water supplies are protected during vegetation control.

4. Hazardous Materials Storage and Use – One percent of the land area within the Zone II are commercial or industrial land uses. Many small businesses and industries use hazardous materials, produce hazardous waste products, and/or store large quantities of hazardous materials in UST/AST. If hazardous materials are improperly stored, used, or disposed, they become potential sources of contamination. Hazardous materials should never be disposed of to a septic system or floor drain leading directly to the ground.

Hazardous Materials Storage and Use Recommendations:

- ✓ Educate local businesses on best management practices for protecting water supplies. Distribute the fact sheet "Businesses Protect Drinking Water" available in Appendix A and on www.mass.gov/dep/brp/dws/protect.htm, which provides BMP's for common business issues.
- ✓ Work with local businesses to register those facilities that are unregistered generators of hazardous waste or waste oil. Partnerships between businesses, water suppliers, and communities enhance successful public drinking water protection practices.
- ✓ Educate local businesses on Massachusetts floordrain requirements. See brochure "Industrial Floor Drains" for more information.

Top 5 Reasons to Develop a Local Wellhead Protection Plan

❶ Reduces Risk to Human Health

❷ Cost Effective! Reduces or Eliminates Costs Associated With:

- Increased groundwater monitoring and treatment
- Water supply clean up and remediation
- Replacing a water supply
- Purchasing water

❸ Supports municipal bylaws, making them less likely to be challenged

❹ Ensures clean drinking water supplies for future generations

❺ Enhances real estate values – clean drinking water is a local amenity. A community known for its great drinking water in a place people want to live and businesses want to locate.

5. Agricultural Activities – There is pastureland and small horse farms within the Zone II. Pesticides and fertilizers have the potential to contaminate a drinking water source if improperly stored, applied, or disposed. If not contained or applied properly, animal waste from barnyards, manure pits and field application are potential sources of contamination to ground and surface water.

Agricultural Activities Recommendation:

- ✓ Work with farmers in your protection areas to make them aware of your water supply and to encourage the use of a US Natural Resources Conservation Service farm plan to protect water supplies.

6. Protection Planning – Currently, the Town has water supply protection controls for Zone II #128, #115, and #278 that meet DEP's Wellhead Protection regulations 310 CMR 22.21(2). The controls were revised in 2002 to include Zone II #434, however DEP has not reviewed the controls to verify that they meet 310 CMR 22.21(2). Protection planning protects drinking water by managing the land area that supplies water to a well. A Wellhead Protection Plan

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Table 3: Current Protection and Recommendations

Protection Measures	Status	Recommendations
Zone I		
Does the Public Water Supplier (PWS) own or control the entire Zone I?	**YES**	Follow Best Management Practices (BMP's) that focus on good housekeeping, spill prevention, and operational practices to reduce the use and release of hazardous materials.
Is the Zone I posted with "Public Drinking Water Supply" Signs?	**YES**	Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988.
Is Zone I regularly inspected?	**YES**	Continue daily inspections of drinking water protection areas.
Are water supply-related activities the only activities within the Zone I?	**NO**	Continue monitoring roads and other non-water supply activities in Zone Is.
Municipal Controls (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	**YES**	The Town "Aquifer Protection District" bylaw meets DEP's requirements for wellhead protection, though a revised aquifer protection district map is not on file at DEP. Refer to www.state.ma.us/dep/brp/dws/ for model bylaws and health regulations, and current regulations.
Do neighboring communities protect the Zone II areas extending into their communities?	**NO**	Work with Littleton to include Zone II areas in their wellhead protection controls.
Planning		
Does the PWS have a Wellhead Protection Plan?	**YES**	Update, maintain, and implement your wellhead protection plan. Follow "Developing a Local Wellhead Protection Plan" available at: www.state.ma.us/dep/brp/dws/.
Does the PWS have a formal "Emergency Response Plan" to deal with spills or other emergencies?	**YES**	Augment plan by developing a joint emergency response plan with fire department, Board of Health, DPW, and local and state emergency officials. Coordinate emergency response drills with local teams.
Does the municipality have a wellhead protection committee?	**YES**	Include representatives from citizens' groups, neighboring communities, and the business community.
Does the Board of Health conduct inspections of commercial and industrial activities?	**YES**	For more guidance see "Hazardous Materials Management: A Community's Guide" at www.state.ma.us/dep/brp/dws/files/hazmat.doc
Does the PWS provide wellhead protection education?	**YES**	Aim additional efforts at commercial, industrial and residential uses within the Zone II.

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coordinates community efforts, identifies protection strategies, establishes a timeframe for implementation, and provides a forum for public participation. There are resources available to help communities develop a plan for protecting drinking water supply wells.

Protection Planning Recommendations:

- ✓ Update, maintain, and implement your Wellhead Protection Plan. Refer your protection team to http://mass.gov/dep/brp/dws/protect.htm for a copy of DEP's guidance, "Developing a Local Wellhead Protection Plan".
- ✓ Coordinate efforts with local officials to compare local wellhead protection controls with current MA Wellhead Protection Regulations 310 CMR 22.21 (2). If there are no local controls for Zone II #434, or they do not meet the current regulations, adopt controls that meet 310 CMR 22.21(2). For more information on DEP land use controls see http://mass.gov /dep/brp/dws/ protect.htm.
- ✓ Work with town boards to review and provide recommendations on proposed development within your water supply protection areas. To obtain information on build-out analyses for the town, see the Executive Office of Environmental Affairs' community preservation web site, http://commpres. env.state.ma.us/.

Other land uses and activities within the Zone II include a metal fabricator and schools. Refer to Table 2 for more information about these land uses.

Identifying potential sources of contamination is an important initial step in protecting your drinking water sources. Further local investigation will provide more in-depth information and may identify new land uses and activities that are potential sources of contamination. Once potential sources of contamination are identified, specific recommendations like those below should be used to better protect your water supply.

Section 3: Source Water Protection Conclusions and Recommendations

Current Land Uses and Source Protection:

As with many water supply protection areas, the system Zone IIs contain potential sources of contamination. However, source protection measures reduce the risk of actual contamination, as illustrated in Figure 2. The water supplier is commended for taking an active role in promoting source protection measures in the Water Supply Protection Areas through:

- Working with the Highway Department to ensure that highway runoff is directed away from the Zone II.
- Acquiring land to protect the wells within Zone II #434.
- Working with schools to improve management of athletic field runoff.

Source Protection Recommendations:

To better protect the sources for the future:

- ✓ Inspect the Zone I regularly, and when feasible, remove any non-water supply activities.
- ✓ Educate residents on ways they can help you to protect drinking water sources.
- ✓ Work with emergency response teams to ensure that they are aware of the stormwater drainage in your Zone II and to cooperate on responding to spills or accidents.
- ✓ Partner with local businesses to ensure the proper storage, handling, and disposal of hazardous materials.
- ✓ Work with farmers in your protection areas to make them aware of your water

What is a Zone III?

A Zone III (the secondary recharge area) is the land beyond the Zone II from which surface and ground water drain to the Zone II and is often coincident with a watershed boundary.

The Zone III is defined as a secondary recharge area for one or both of the following reasons:

1. The low permeability of underground water bearing materials in this area significantly reduces the rate of groundwater and potential contaminant flow into the Zone II.
2. The groundwater in this area discharges to a surface water feature such as a river, rather than discharging directly into the aquifer.

The land uses within the Zone III are assessed only for sources that are shown to be groundwater under the direct influence of surface water.

Additional Documents:

To help with source protection efforts, more information is available by request or online at mass.gov/dep/brp/dws including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

supply and to encourage the use of a NRCS farm plan to protect water supplies.
- ✓ Develop and implement a Wellhead Protection Plan.

Conclusions:
These recommendations are only part of your ongoing local drinking water source protection. Additional source protection recommendations are listed in Table 3 and the Key Issues above.

DEP staff, informational documents, and resources are available to help you build on this SWAP report as you continue to improve drinking water protection in your community. Grants and loans are available through the Drinking Water State Revolving Loan Fund, the Clean Water State Revolving Fund, and other sources. For more information on grants and loans, visit the Bureau of Resource Protection's Municipal Services web site at: http://mass.gov/dep/brp/mf/mfpubs.htm.

The assessment and protection recommendations in this SWAP report are provided as a tool to encourage community discussion, support ongoing source protection efforts, and help set local drinking water protection priorities. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures. The water supplier should supplement this SWAP report with local information on potential sources of contamination and land uses. Local information should be maintained and updated periodically to reflect land use changes in the Zone II. Use this information to set priorities, target inspections, focus education efforts, and to develop a long-term drinking water source protection plan.

Section 4: Appendices

A. Protection Recommendations
B. Regulated Facilities within the Water Supply Protection Area
C. Additional Documents on Source Protection