Massachusetts Department of Environmental Protection

Source Water Assessment and Protection (SWAP) Report

for

Palmer Water District #1

What is SWAP?

The Source Water Assessment Program (SWAP), 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	Palmer Water District #1
PWS Address	10 Walnut Street
City/Town	Palmer
PWS ID Number	1227000
Local Contact	Mr. James Ammann, Superintendent
Phone Number	413-283-8411

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
4. Appendices

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.

Zone A: is the most critical for protection efforts. It is the area 400 feet from the edge of the reservoir and 200 feet from the edge of the tributaries (rivers and/or streams) draining into it.

Zone B: is the area one-half mile from the edge of the reservoir but does not go beyond the outer edge of the watershed.

Zone C: is the remaining area in the watershed not designated as Zones A or B.

The attached map shows Zone A and your watershed boundary.

Section 1: Description of the Water System

System Susceptibility: ***High***

Groundwater Sources

Zone II # 237

Source Name	***Susceptibility: High***
Galaxy Wellfield	1227000-01G
GP Well #2	1227000-02G

Surface Water Sources

Source Name	***Susceptibility: Moderate***
Upper Reservoir, Graves Brook	1227000-01S
Lower Reservoir, Graves Brook	1227000-02S

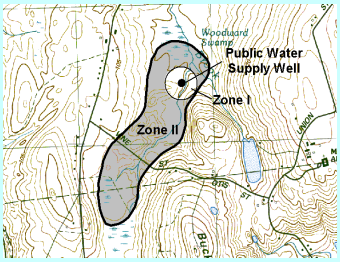
Palmer is a medium sized, industrial community in west, central Massachusetts. Palmer, established in the early 1700's, initially developed as an industrial community along the numerous brooks and rivers that flow through the area. Palmer consists of four villages: Bondsville, Three Rivers, Thorndike and Depot Village. The Swift River flows into the Ware River and the Ware and Quaboag Rivers join to form the Chicopee River. The area east of the confluence is know as Three Rivers. The Quaboag River forms part of the Eastern and southern boundaries of the Town.

There are four community public water supply systems in Palmer: Thorndike, Palmer, Bondsville and Three Rivers Fire Districts. The Bondsville District currently supplies water to the Thorndike system with the Three Rivers District supplying a portion due to previous water quality problems with the Thorndike Fire District's source. Palmer Water District #1 maintains four active water supplies: two surface water sources, Upper (1227000-01S) and Lower (1227000-02S) Graves Brook Reservoirs) and two groundwater sources, Galaxy Wellfield (1227000-01G) and the Gravel Packed well (1227000-02G). The surface water supplies are located in the south, central section of town off of Reservoir Street. Water from the surface water supplies is treated through the Graves Brook Water Treatment Plant, a Trident microfloc filtration system using alum nonionic polymer as a flocculent, sodium hydroxide and trimatalic phosphate for corrosion control and finally sodium hypochlorite for disinfection prior to distribution. The surficial geology is mixed, consisting locally of sand and gravel associated with glacial outwash and in some areas, thin till over bedrock. The watersheds are underlain primarily by gneiss, as can be seen at the outcrops surrounding and gravel pit near the reservoir.

The groundwater supplies are located in the deep sand and gravel, glacial outwash and alluvial deposits along the Quaboag River valley south of an industrial area along Route 20. The Galaxy wellfield consists of 19, 2½-inch diameter, shallow (20-25 feet deep), closely located wellpoints. The Zone I for the wellfield is delineated as an oval approximately 250 feet radial distance from the outer wellpoints. The Gravel Packed well, installed in 1970, is a 65-foot deep, 18 by 48-inch diameter, gravel packed well located southeast of the Galaxy wellfield and has a Zone I radius of 400 feet. Water from both sources is treated through a granular activated carbon to remove volatile organic compounds, has trimatalic phosphate and sodium hydroxide added for corrosion control and is disinfected with sodium hypochlorite prior to distribution. The Department has identified several responsible parties for the release of

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 I I protection area.



hazardous materials. Additional information regarding the current water quality and status of confirmed release sites may be obtained from the Department's Bureau of Waste Site Cleanup and Drinking Water Program at the Springfield Regional Office.

The Quaboag River valley, where the groundwater supplies are located, is a glacially deepened, buried bedrock valley. The valley was filled with stratified, sand and gravel deposits during the recession (melting) of the glaciers some 10,000 to 12,000 years before present. The Quaboag valley trends primarily east west and is joined by the Chicopee Brook valley trending south to north, just south of the well sites. The bedrock geology of the area of the area is mapped as layers of gneiss, amphibolite, and augen gneiss.

Aquifer parameters were determined from multiple, extended duration pumping tests and the Zone II for the wells was delineated based on conceptual and analytical modeling in conjunction with geological mapping. Under various pumping scenarios, groundwater may be contributed from the Chicopee Brook valley and induced from the Quaboag River. Please refer to the attached map to view the boundaries of the Zone II. For current information on water quality monitoring results and treatment processes, please refer questions to the Public Water System contact person listed above in Table 1 for a copy of the most recent Consumer Confidence Report.

Section 2: Land Uses in the Protection Areas

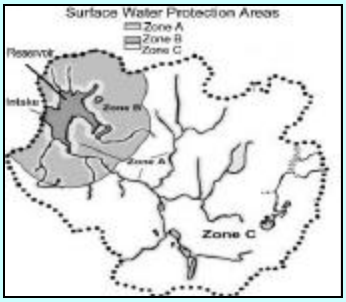
The Zone II for Palmer Water District's wells is a mixture of industrial, light commercial, residential and agricultural areas (refer to attached map for details). The land uses in the watersheds are forested water supply land and low density residential. The Palmer Water District owns almost the entire watershed for the reservoirs. The most significant threat to the surface water supplies is from natural, microbial threats, potentially from forestry and from beavers. Land uses and activities that are potential sources of contamination are listed in Table 2, with further detail provided in the Tables of Regulated Facilities attached in Appendix B.

Key Land Uses and Protection Issues include:

1. Nonconforming Zone I
2. Residential land uses
3. Transportation corridors
4. Hazardous materials storage and use
5. Oil or hazardous waste contamination sites
6. Protection Planning
7. Agricultural activities
8. Railroad/Pipeline Right of Way
9. Potential presence of Beavers in Surface Water Sources
10. Water Treatment Facility

What is a Watershed?

A watershed is the land area that catches and drains rainwater down-slope into a river, lake or reservoir. As water travels down from the watershed area it may carry contaminants from the watershed to the drinking water supply source. For protection purposes, watersheds are divided into protection Zones A, B and C.



The overall ranking of susceptibility to contamination for the system is high. The susceptibility to contamination of the surface water supplies is moderate while the groundwater supplies is high, based on the presence of numerous high ranking threat land uses within the Zone II. Please refer to Table 2.

1. Non-conforming Zone I – Massachusetts drinking water regulations (310 CMR 22.00 Drinking Water) requires public water suppliers to control the Zone I through ownership or some other mechanism such as a conservation restriction. 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. Palmer Fire District does not own the entire Zone I for either groundwater source. Within the Zone Is are a gas/oil pipeline right-of-way,

transportation corridors, and some residences.

Zone I Recommendations:

- ✓ Obtain a Right-of-First Refusal for acquiring additional land within the Zone I currently not owned by the District.
- ✓ Consider purchasing the land or acquiring a conservation restriction on the land to minimize potential threats.
- ✓ 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.
- ✓ Contact the property owners to be sure they are aware they are within the Zone I and Zone II of the wells. Provide information about BMPs.

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.

2. Residential Land Uses – Approximately 25% of the Zone II consists of residential areas. The reservoir watershed has less than 1% of the land use as residential. From this perspective, residential land uses are more of a potential threat within the Zone II than in the watershed areas. However, nearly the entire Zone II area is served by municipal sewer. There are a few residents in the watershed and Zone II that utilize on site septic disposal. If managed improperly, activities associated with residential areas can contribute to drinking water contamination. There are some residential uses within the Zone A of the reservoirs as well. Common potential sources of contamination include:

- **Septic Systems** – Improper maintenance and disposal of household hazardous chemicals to septic systems is a potential source of contamination to the groundwater because septic systems discharge directly to the ground. If septic systems fail or are not properly maintained they could be a potential source of microbial contamination.
- **Household Hazardous Materials** - Hazardous materials may include petroleum products for automotive and lawn care, 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.

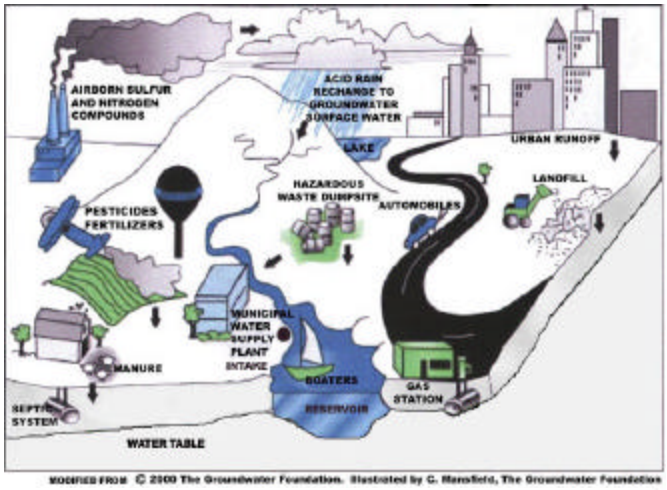


Figure 1: Sample watershed with examples of potential sources of contamination

- ✓ Work with planners to manage and control new residential developments in the water supply protection areas.
- ✓ Promote BMPs for stormwater management and pollution controls. Continue catch basin cleaning routines.

3. Transportation Corridors - Route 20 and Route 32 run through part of the Zone II, and local roads are common throughout the Zone II and watershed. The transportation corridors are more heavily traveled in the Zone II than in the watershed, and are therefore a greater threat in the Zone II; however, it is equally important to use best management practices in both areas. 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

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 Watershed

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

Land Uses	Quantity	Threat	Zone II or Watershed	Potential Contaminant Sources*
Agricultural				
Fertilizer Storage or Use	2	M	Zone II	Fertilizers: leaks, spills, improper handling, or over-application
Forestry Operation	Selectively	L	Watershed	Herbicides or pesticides, equipment maintenance materials: leaks, spills, or improper handling; road building
Nurseries	1	M	Zone II	Fertilizers, pesticides, and other chemicals: leaks, spills, improper handling, or over-application
Pesticide Storage or	1	H	Zone II	Pesticides: leaks, spills, improper handling, or over-application
Commercial				
Car/Truck/ Bus Washes	1	L	Zone II	Vehicle wash water, soaps, oils, greases, metals, and salts: improper management
Gas Stations	1	H	Zone II	Automotive fluids and fuels: spills, leaks, or improper handling or storage
Service Stations/Auto Repair Shops	1	H	Zone II	Automotive fluids and solvents: spills, leaks, or improper handling
Bus and Truck Termi-	1	H	Zone II	Fuels and maintenance chemicals: spills, leaks, or improper handling
Golf Courses	1	M	Zone II	Fertilizers or pesticides: over-application or improper handling
Junk Yards	2	H	Zone II	Automotive chemicals, wastes, and batteries: spills, leaks, or improper handling
Medical Facilities	1	M	Zone II	Biological, chemical, and radioactive wastes: spills, leaks, or improper handling or storage
Paint Shops	1	H	Zone II	Paints, solvents, other chemicals: spills, leaks, or improper handling or storage
Photo Processors	1	H	Zone II	Photographic chemicals: spills, leaks, or improper handling or storage

Land Uses	Quantity	Threat	Zone II or Watershed	Potential Contaminant Sources*
Commercial (continued)				
Railroad Tracks And Yards	Numerous	H	Zone II	Herbicides: over-application or improper handling; fuel storage, transported chemicals, and maintenance chemicals: leaks or spills
Repair Shops (Engine, Appliances, Etc.)	1	H	Zone II	Engine fluids, lubricants, and solvents: spills, leaks, or improper handling or storage
Sand And Gravel Mining/Washing	2	M	Both	Heavy equipment, fuel storage, clandestine dumping: spills or leaks
Industrial				
Asphalt Plants	1	M	Zone II	Hazardous chemicals and wastes: spills, leaks, or improper handling or storage
Chemical Manufacture Or Storage	Numerous	H	Zone II	Chemicals and process wastes: spills, leaks, or improper handling or storage
Foundries or Metal Fabricators	1	H	Zone II	Solvents and other chemicals: spills, leaks, or improper handling or storage
Hazardous Materials Storage	2	H	Both	Hazardous materials: spills, leaks, or improper handling or storage (Water Treatment facility located in Zone A)
Hazardous Waste Storage, Treatment and Recycling	1	H	Zone II	Hazardous materials: spills, leaks, or improper handling or storage
Industrial Lagoons and Pits	1	H	Zone II	Liquid wastes: improper seepage or overflows
Industry/Industrial Parks	1	H	Zone II	Industrial chemicals and metals: spills, leaks, or improper handling or storage
Metal Plating	1	H	Zone II	Solvents, other chemicals, and process wastes: spills, leaks, or improper handling or storage
Machine/ Metalworking Shops	1	H	Zone II	Solvents and metal tailings: spills, leaks, or improper handling
Petroleum Storage Facilities	1	H	Zone II	Petroleum products and equipment maintenance chemicals: spills, leaks, or improper handling or storage
Residential				
Fuel Oil Storage	Numerous	M	Both	Fuel oil: spills, leaks, or improper handling
Lawn Care / Gardening	Numerous	M	Both	Pesticides: over-application or improper storage and disposal
Septic Systems / Cesspools	Numerous	M	Both	Hazardous chemicals: microbial contaminants, and improper disposal

Land Uses	Quantity	Threat	Zone I or Watershed	Potential Contaminant Sources*
Miscellaneous				
Aboveground Storage Tanks	Numerous	M	Both	Materials stored in tanks: spills, leaks, or improper handling
Aquatic Wildlife	Periodic	L	Watershed	Microbial contaminants
Combined Sewer Overflows	1	L	Zone II	Microbial and non-microbial contaminants including industrial wastewater; improper disposal of hazardous wastes
Large Quantity Hazardous Waste Generators	3	H	Zone II	Hazardous materials and waste: spills, leaks, or improper handling or storage
Oil or Hazardous Material Sites	7	--	Zone II	Tier Classified Oil or Hazardous Materials Sites are not ranked due to their site-specific character. Individual sites are identified in Appendix B. Contact DEP BWSC for additional information.
Pipeline (Oil and sewer)	1	M	Zone II	Oil or sewage: spills or leaks
Road and Maintenance Depots	1	M	Zone II	Deicing materials, automotive fluids, fuel storage, and other chemicals: spills, leaks, or improper handling or storage
Small Quantity Hazardous Waste Generators	1	M	Zone II	Hazardous materials and waste: spills, leaks, or improper handling or storage
Stormwater Drains/ Retention Basins	Numerous	L	Zone II	Debris, pet waste, and chemicals in stormwater from roads, parking lots, and lawns
Tire Dumps	1	M	Zone II	Tires: improper handling or management
Transmission Line Rights-of-Way (Oil/Electric)	2	L	Zone II	Corridor maintenance pesticides: over-application or improper handling; construction
Transportation Corridors	Numerous	M	Zone II	Fuels and other hazardous materials: accidental leaks or spills; pesticides: over-application or improper handling
Utility Substation Transformers	1	L	Zone II	Chemicals and other materials including PCBs: spills, leaks, or improper handling
Very Small Quantity Hazardous Waste	12	L	Zone II	Hazardous materials and waste: spills, leaks, or improper handling or storage

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.

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 into catch basins.

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.

4. Hazardous Materials Storage and Use – About 11% of the land area within the Zone II is commercial or industrial land uses. Many businesses and industries use hazardous materials, produce hazardous waste products, and/or store large quantities of hazardous materials in UST/AST. As Palmer is well aware, 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:

- ✓ **Hazardous Materials Program Best Management Practices** - Support the development and implementation of a hazardous materials program that includes a By law or Health Regulation. Such a program educates businesses on hazardous material management requirements, explicitly informs the business community what is expected of them, and decreases the potential future liability businesses may be unknowingly creating for themselves. A local program lets the town serve as a consultant, helping businesses protect themselves. See DEP's website for additional information on developing a program for hazardous materials management at http://www.state.ma.us/dep/brp/dws/files/hazmat.doc. 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.
- ✓ **Register Hazardous Waste Generators** - Work with local businesses and the Board of Health 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.
- ✓ **Floor Drains** - Work with the local Board of Health to educate local businesses on Massachusetts' floordrain requirements. See brochure "Industrial Floor Drains" for more information.
- ✓ **Storage Tanks** - Support your local fire department in upgrading all above and below ground oil/hazardous material storage tanks in order to meet current construction standards. Funding for replacing of non-residential underground storage tanks is available through the MA Department of Revenue. For more information, refer to http://www.dor.state.ma.us/ust/ust_home.htm
- ✓ **Inspection Program** - Coordinate efforts with local officials and the other water districts in Palmer to develop and implement an Inspection Program that is usually conducted by the local Board of Health to prevent hazardous substances from entering water supplies. Inspections target facilities that generate, use, store, or disposal of hazardous/toxic materials. Programs can also include floor drain inspections and underground storage tanks. Local inspection programs often provide educational material and technical assistance on Best Management Practices.

Building Inspectors are often involved in local inspection programs.

- ✓ **Lawn care and Landscaping** - Encourage local businesses to incorporate Best Management Practices (BMPs) for the use of fertilizer, herbicides and pesticides. For more information, refer to http://www.massdfa.org/pesticides/publications/IPM_kit_for_bldg_mgrs.pdf
- ✓ **Office of Technical Assistance** - For additional help regarding environmental requirements and toxic use reduction approaches to compliance contact the Office of Technical Assistance (OTA) for Toxic Use Reduction. The OTA is a non-regulatory agency within the Commonwealth's Executive Office of Environmental Affairs. OTA provides free, confidential assistance on toxic use reduction opportunities. http://www.state.ma.us/ota/

5. Presence of Oil or Hazardous Material Contamination Sites – The Zone II contains DEP Tier Classified Oil and/or Hazardous Material Release Sites indicated on the map as Release Tracking Numbers 1-0000593, 1-0000827, 1-0010792, 1-0000681, 1-0000716, 1-0000140 and 1-0000139. Refer to the attached map and Appendix C for more information.

Oil or Hazardous Material Contamination Sites Recommendation: .

- ✓ Continue your current practice of monitoring progress of ongoing remedial action conducted for the known oil or contamination sites.

6. Protection Planning – Currently, Palmer does not have a Wellhead Protection Plan, but the Town does have a Watershed Protection Districts and a zoning By law. The by law has not been approved by DEP for compliance with water supply protection control regulations 310 CMR 22.21(2). A Watershed Protection Plan has been submitted and approved by the Department's Boston office for content and procedures. These types of protection plans coordinate community efforts, identify protection strategies, establish a timeframe for implementation, and provide a forum for public education and outreach. The development of a successful Wellhead Protection Plan is outlined in five steps in DEP's "Developing a Local Wellhead Protection Plan" (see Appendix A for the full report) as:

- Establish a protection committee or team
- Define the Wellhead Protection Area
- Identify potential sources of contamination
- Protect and manage the wellhead protection area
- Conduct ongoing public education and outreach

Top 5 Reasons to Develop a Local Wellhead and Surface Water Protection Plan

❶ Reduces Risk to Human Health

❷ Cost Effective! Reduces or Eliminates Costs Associated With:

- Increased 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.

A Watershed Protection Plan was recently developed for the reservoirs. During the assessment it was determined that the watershed is incorrectly delineated along the northern border of the watershed. It appears that the watershed area identified in the plan is larger than the actual watershed area. The Department will coordinate and work with Palmer Fire District to rectify any inaccuracies and encourages you to correct any inaccuracies prior to implementing any activities within the area in question.

Protection Planning Recommendations:

- ✓ Develop a Wellhead Protection Plan. Work with the other Palmer water suppliers in a coordinated effort with the town of Palmer to protect all of Palmer's water supplies. Establish a protection team, and refer them 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 and other town water suppliers to compare local wellhead protection controls with current MA Wellhead Protection Regulations 310 CMR 22.21(2). If the local controls do not meet the current regulations, or the overlay District does not cover the entire recharge area, adopt controls that meet 310 CMR 22.21(2) and request modification of the District outlines. For more information on DEP land use controls see http://mass.gov /dep/brp/dws/protect.htm.
- ✓ If local Board of Health controls do not regulate floor drains, be sure to include floor drain controls that meet 310 CMR 22.21(2).

7. Agricultural Activites – Crop and pasture lands make up about 8% of the land use in 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.

8. Railroad/Pipeline Right-of-Way – The railroad runs through the entire Zone II. The pipeline runs through the Zone II and part of the Zone I. Rail corridors that serve passenger and/or freight trains are a potential source of contaminant due to chemicals released during normal use, track maintenance, and accidents. The pipeline carries refined petroleum products and therefore the risk is from a rupture in the line. Normal maintenance of a right-of-way can introduce contaminants to a water supply through herbicide application for vegetation control. The over-application or improper handling of herbicides on railroad right-of-way is a potential source of contamination. Leaks or spills of transported chemicals or train/track maintenance chemicals are also potential sources of contamination to the water supply.

Right of Way Recommendations:

- ✓ Review the right-of-way Yearly Operating Plan from both the railroad and the oil company to ensure Best Management Practices are implemented with regard to vegetation control in the Zone II, and that the utility has accurate information regarding the locations of the wells and the Zone I. Review the maps the utility uses.
- ✓ Work with your local fire department to review emergency response plans. Updates to this plan should include the rights-of-way including coordination with the owner/operator of the track and pipeline using the right-of-way. Request emergency response teams to coordinate Emergency Response Drills and practice containment of potential contaminants from accidents within the Zone I and Zone II, which should attempt to include representatives from the owner/operator of the rights-of-way.

9. Presence of Aquatic mammals in Surface Water Watershed – There is the potential for aquatic mammals (beavers and muskrats) living in and near the surface water supplies. Aquatic mammals pose a potential threat of microbial contamination of the source from *Giardia Lamblia* and *Cryptosporidium*, pathogens that are identified in the Surface Water Treatment Rule and Enhanced Surface Water Treatment Rule as posing an unacceptable risk to drinking water.

Presence of Beavers in Surface Water Sources Recommendations:

- ✓ Monitor the watershed and reservoirs for the presence of aquatic mammals and their proximity to the intake. Monitor raw water quality and assess potential impacts.

10. Water Treatment Facility - The Palmer water treatment facility is located within the Zone A of the upper reservoir. The facility is served by municipal sewer but has a lagoon in the event they need it. They have never used the lagoons. Activities associated with water treatment involve

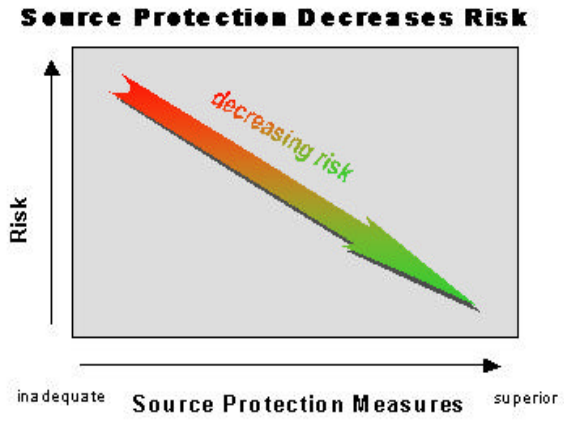


Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

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 the 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 to the Zone II.

2. The groundwater in this area probably discharges to surface water feature such as a river rather than discharging directly into the aquifer.

Land uses within the Zone III were not assessed for this report.

For More Information

Contact Catherine V. Skiba in DEP's Springfield Office at (413) 755-2119 for more information and assistance on improving current protection measures.

Copies of this report have been provided to the public water supplier, town boards, and the local media.

storage and use of hazardous materials such as chlorine, sodium hydroxide and fuel oil for the generator. All chemicals are stored above ground in secondary containment. The facility also has a garage for vehicle storage. According to the watershed protection plan, storm water from the facility discharges outside of the watershed. Spills or leaks of hazardous materials during handling and delivery and storm water are a potential source of contamination.

Water Treatment Facility Recommendations:

- ✓ Ensure water treatment facility is operated and maintained according to DEP requirements.
- ✓ Ensure stormwater drains and the drainage system around the treatment plant do drain outside of the watershed. Maintain catchbasins as necessary.
- ✓ Continue current use of best management practices for proper handling of materials and in containing spills and leaks.
- ✓ Update emergency plans as necessary.

Other land uses and activities within or immediately adjacent to the Zone II that have potential for contamination include repair shops, large equipment storage, a greenhouse, a former oil business and a large agricultural supply facility. Additionally, there are facilities that may not be registered as hazardous materials handlers or are presently vacant. Future use of these sites should be monitored.

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/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

Refer to Table 2 and Appendix 2 for more information about these land uses.

Section 3: Source Water Protection Conclusions and Recommendations

Current Land Uses and Source Protection:

Although the Zone II contains numerous existing and potential sources of contamination, awareness and source protection measures reduces the risk of actual contamination, as illustrated in Figure 2. Identifying additional 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 listed above and below should be used to better protect your water supply. Palmer's surface water supply is well protected through ownership of the nearly the entire watershed. Palmer is commended for the efforts taken to protect the reservoir and identifying additional threats to the groundwater supply. Palmer Fire District has been proactive in monitoring progress of remedial actions at the confirmed release sites.

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 watersheds when responding to spills or accidents.
- ✓ Partner with local businesses to ensure the proper storage, handling, and disposal of hazardous materials.
- ✓ Monitor progress on any ongoing remedial action conducted for the known oil or contamination sites.
- ✓ Communicate with owners/operators of the rights-of-way to be sure
- ✓ Develop and implement a Wellhead Protection Plan.
- ✓ Correct any inaccuracies in the Watershed Protection Plan and implement the plan. The Department can assist you in correcting the mapping.

➢ Partner with Local Businesses:

Since many businesses and industries, including small businesses, use hazardous materials and produce hazardous waste products, it is essential to educate the business community about drinking water protection. Encouraging partnerships between businesses, water suppliers, and communities will enhance successful public drinking water protection practices.

➢ Provide Outreach to the Community:

Public education and community outreach ensure the long-term protection of drinking water supplies. Awareness often generates community cooperation and support. Residents and business owners are more likely to change their behavior if they know where the wellhead protection recharge area is located; what types of land uses and activities pose threats; and how their efforts can enhance protection.

- **Plan for the Future:**

One of the most effective means of protecting water supplies is planning, such as the adoption of local controls to protect watersheds and ground water. These controls may include health regulations, general ordinances, and zoning bylaws that prohibit potential sources of contamination from wellhead protection areas.

- **Plan as a community:**

Palmer currently has four different water districts. Review the consolidation feasibility studies, updating them as necessary and proceed in a manner that is beneficial to public health and safety and is fiscally responsive. The Department strongly encourages consolidation of systems when it assists in system compliance, is economically advantageous and enhances redundancy and water supply protection. This effort will require community leadership.

Resources for Drinking Water Source Protection:

These recommendations are only part of your ongoing local drinking water source protection. Additional source protection recommendations are listed in Table 3, the Key Issues above and Appendix A. 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. The Department's Wellhead Protection Grant Program and Source Protection Grant Program provide funds to assist public water suppliers in addressing water supply source protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the Grant Program. Please note: each spring DEP posts a new Request for Response for the grant program (RFR). Other 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.

Conclusions:

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 and watershed. 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. Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Areas
D. Additional Documents on Source Protection

Table 3: Current Protection and Recommendations

Protection Measures	Status	Recommendations
Zone A		
Does the Public Water Supplier (PWS) own or control the entire Zone I and/or Zone A?	**No**	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. To the extent possible, remove non-water supply activities from each Zone I and prohibited activities in Zone A to comply with DEP's Zone I and Zone A requirements. Investigate options for gaining ownership or control of the Zone I for groundwater sources.
Are the Zone 1 and Zone A posted with "Public Drinking Water Supply" Signs?	**Yes**	Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988.
Are the Zone 1 and Zone A regularly inspected?	**Yes**	Continue daily inspections of drinking water protection areas.
Are water supply-related activities the only activities within the Zone 1 and Zone A?	**No**	Monitor non-water supply activities in Zone I and prohibited activities in Zone A, and investigate options for removing these activities.
Municipal Controls (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Surface Water Protection Controls that meet 310 CMR 22.20C and Wellhead Protection Controls that meet 310 CMR 22.21(2)	**No**	While the town has bylaws, they have not been reviewed by DEP. Continue working with the Planning Board and the Board of Selectmen to adopt land use controls that meet 310 CMR 22.21(2) and 310 CMR 22.20C. Refer to www.state.ma.us/dep/brp/dws/ for model bylaws and health regulations, and current regulations.
Do neighboring communities protect the water supply protection areas extending into their communities?	**No**	Palmer Water District should request that Monson expand their Wellhead Protection to the Zone II that extends into Monson.
Planning		
Does the PWS have a local surface water and wellhead protection plan?	**Yes/No**	Work with the Department to correct the surface water supply protection plan. Develop a 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?	**No**	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 and other water suppliers.
Does the municipality have a watershed and wellhead protection committee?	**No**	Reconvene committee; include representatives from citizens' groups, other water/fire districts, neighboring communities, and the business community.
Does the Board of Health conduct inspections of commercial and industrial activities?	**Unknown**	For more guidance see "Hazardous Materials Management: A Community's Guide" at www.state.ma.us/dep/brp/dws/files/hazmat.doc. Work with Town and other water suppliers.
Does the PWS provide watershed protection education?	**Some**	Currently, the only outreach is through the annual Consumer Confidence Report. Increase residential outreach through bill stuffers, school programs, Drinking Water Week activities, and coordination with local groups. Aim additional efforts at commercial, industrial and municipal uses within the Zone II and watershed.

APPENDIX B:
REGULATED FACILITIES WITHIN THE WATER SUPPLY PROTECTION AREA

DEP Permitted Facilities

DEP Facility Number	Facility Name	Street Address	Town	Permitted Activity	Activity Class	Facility Description
131172	Rathbone Precision Metals, Inc.	1241 Park Street	PALMER	Toxic User	Large Quantity	Industrial
				Hazardous Waste Generator	Large Quantity	
				Oil Waste Generator	Small Quantity	
				Air Handler	Minor (BM150)	
32847	Massachusetts Electric Company	#503 Substation, Blanchard Street	PALMER	Hazardous Waste Generator	Very Small Quantity	Utility
				Oil Waste Generator	Large Quantity	
134293	Palmer Trailer Sales Company, Inc.	158 Park Street	PALMER	Hazardous Waste Generator	Very Small Quantity	Commercial
36726	Baker's Auto Body	702 Park Street	PALMER	Hazardous Waste Generator	Very Small Quantity	Auto Repair
37852	Buddy's Citgo	1150 Park Street	PALMER	Hazardous Waste Generator	Very Small Quantity	Service Station
131175	Palmer Paving Corporation	25 Blanchard Street	PALMER	Plant	RES Application Approved	Paving Company
				Plant	Emission Stack Tester	

				Recycler	Class A Permit	
				Fuel Dispenser	Fuel Dispenser	
				Hazardous Waste Generator	Very Small Quantity	
				Oil Waste Generator	Very Small Quantity	
318144	Massachusetts Highway, Palmer	Blanchard St	PALMER	Fuel Dispenser	Fuel Dispenser	Maintenance Depot
118209	Jarvis and Jarvis	127 S. Main Street	PALMER	Toxic User		
				Hazardous Waste Generator	Very Small Quantity	
				Oil Waste Generator	Large Quantity	
223072	2000 Food & Fuel	1239 Park Street	PALMER	Fuel Dispenser	Fuel Dispenser	Service Station
2807	Palmer Santucci	1239 Park Street	PALMER	Hazardous Waste Generator	Very Small Quantity	
283651	Jackson's Auto Sales and Service	1307 Park Street	PALMER	Hazardous Waste Generator	Very Small Quantity	Auto Repair
132190	Contech Construction Products	Fenton Street	PALMER	Oil Waste Generator	Very Small Quantity	Construction Company
	Northern Tree Service	290 Park Street	PALMER	Hazardous Waste Generator	Very Small Quantity	Tree Service

Underground Storage Tanks:

Facility Name	Address	Town	Description	Tank Type	Tank Leak Detection	Capacity (gal)	Contents
2000 Food & Fuel	1239 Park St	Palmer	Convenience, Gas Station	1 Wall	Approved In Tank Monitor	10,000	Gasoline
				1 Wall	Approved In Tank Monitor	8,000	Gasoline
				1 Wall	Approved In Tank Monitor	8,000	Gasoline
Massachusetts Highway Palmer	Blanchard St	Palmer	Fuel Dispenser	?			
Palmer Paving Corporation	25 Blanchard Street	Palmer	Fuel Dispenser	?			

For more information on underground storage tanks, visit the Massachusetts Department of Fire Services web site: http://www.state.ma.us/dfs/ust/ustHome.htm

Note: This appendix includes only those facilities within the water supply protection area(s) that meet state reporting requirements and report to the appropriate agencies. Additional facilities may be located within the water supply protection area(s) that should be considered in local drinking water source protection planning.

APPENDIX C – Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Areas

DEP's datalayer depicting oil and/or hazardous material (OHM) sites is a statewide point data set that contains the approximate location of known sources of contamination that have been both reported and classified under Chapter 21E of the Massachusetts General Laws. Location types presented in the layer include the approximate center of the site, the center of the building on the property where the release occurred, the source of contamination, or the location of an on-site monitoring well. Although this assessment identifies OHM sites near the source of your drinking water, the risks to the source posed by each site may be different. The kind of contaminant and the local geology may have an effect on whether the site poses an actual or potential threat to the source.

The DEP's Chapter 21E program relies on licensed site professionals (LSPs) to oversee cleanups at most sites, while the DEP's Bureau of Waste Site Cleanup (BWSC) program retains oversight at the most serious sites. This privatized program obliges potentially responsible parties and LSPs to comply with DEP regulations (the Massachusetts Contingency Plan – MCP), which require that sites within drinking water source protection areas be cleaned up to drinking water standards.

For more information about the state's OHM site cleanup process to which these sites are subject and how this complements the drinking water protection program, please visit the BWSC web page at http://www.state.ma.us/dep/bwsc. You may obtain site -specific information two ways: by using the BWSC Searchable Sites database at http://:www.state.ma.us/dep/bwsc/sitellst.htm, or you may visit the DEP regional office and review the site file. These files contain more detailed information, including cleanup status, site history, contamination levels, maps, correspondence and investigation reports, however you must call the regional office in order to schedule an appointment to view the file.

The table below contains the list of Tier Classified oil and/or Hazardous Material Release Sites that are located within your drinking water source protection area.

Table 1: Bureau of Waste Site Cleanup Tier Classified Oil and/or Hazardous Material Release Sites (Chapter 21E Sites) - Listed by Release Tracking Number (RTN)

RTN	Release Site Address	Town	Contaminant Type
1-0000593	150 Park Street	Palmer	Hazardous Material
1-0000681	127 South Main Street	Palmer	Oil
1-0000140	Riverview Parkway	Palmer	Oil
1-0000716	239 Park Street	Palmer	Oil
1-0010792	184 Park Street	Palmer	Oil
1-0011079	241 Park Street	Palmer	Hazardous Materials
1-0010903	158 Park Street	Palmer	Oil

For more location information, please see the attached map. The map lists the release sites by RTN.