

West Branch Farmington River Aquifer Source Water Protection Plan



**Developed by: The Barkhamsted Source Water Protection Team
Prepared by: Atlantic States Rural Water and Wastewater Association
December 2010**

SOURCE WATER PROTECTION PLAN

for

West Branch Farmington River Aquifer
Barkhamsted, Connecticut

December 2010

Prepared by:

Barkhamsted Source Water Protection Team

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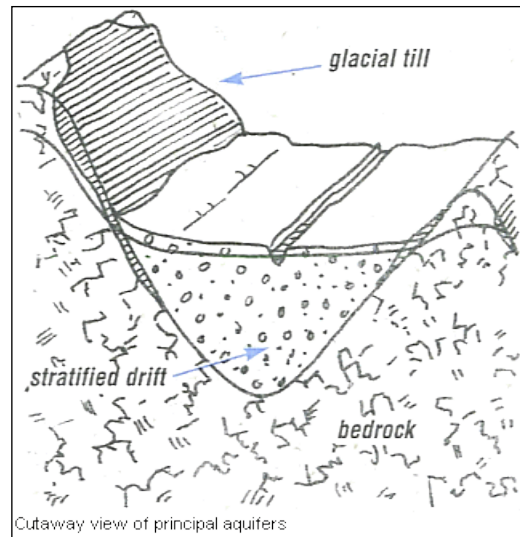
1. Introduction

1.1 Background

Atlantic States Rural Water & Wastewater Association (ASRWWA) is working with the CT DEP to assist rural communities in protecting stratified drift aquifers that may be used as drinking water sources in the future. These areas have been identified by the Connecticut Geological Survey (CGS) and are delineated on their *Surficial Aquifer Potential Map of Connecticut*.

That map was prepared by the CGS for statewide resource protection, water management, non-point source pollution prevention, and land use planning. The map identifies areas with greater potential for ground water supply based upon the texture and thickness of surficial aquifer deposits. The resulting hydrostratigraphic units define areas of coarse grained deposits, coarse overlying fine grained deposits, fine grained deposits, and areas where fine grained deposits overlie coarse grained deposits. Aquifer deposit thickness intervals are 1-50 feet, 50-100 feet, 100-200 feet, 200-300 feet, and 300-400 feet.

The map does not include information on saturated thickness, or depth to ground water, so further investigation is required to determine whether the aquifer will yield viable quantities of water.



This Source Water Protection Plan was prepared along with the Town of Barkhamsted Conservation Commission to protect aquifers along the West Branch of the Farmington River indicated on the CSG aquifer map as having the potential to produce enough water to supply a public water system.

The Management Plan included here in **Section 7** outlines specific actions available to Barkhamsted to protect these aquifers while avoiding adverse impacts on other activities within that area.

1.2 Source Water Protection

The ideal drinking water supply would have excellent natural water quality and no potential contaminant sources (PCSs). There would be no development in the watershed or recharge areas. We are fortunate to have good natural water quality in most of Connecticut's drinking water supplies, however PCSs exist for every water supply and development continues to increase the possible threats.

ASRWWA believes that threats from many PCSs can be mitigated by proper construction, applying best management practices (BMPs) and the responsible use of water resources. Therefore education, outreach and the ability to develop and maintain working relationships in the community are important factors in source water protection.

This plan is prepared by the ASRWWA in cooperation with the National Rural Water Association. Program funding is provided by the United States Department of Agriculture's (USDA) Source Water Protection Program. The purpose of the program is to provide technical assistance to rural and small communities for the development of Source Water Protection Plans (SWPPs).

The SWPP process is community based and the main tasks are:

- ◆ Form a Local Source Water Protection Team
- ◆ Assess threats to the drinking water sources
- ◆ Develop management strategies for these threats
- ◆ Form a Steering Committee to oversee implementation and periodically update the plan

2 Local Source Water Protection Team

The Barkhamsted Source Water Protection Team is a diverse group. The goal is to represent a cross-section of stakeholders in the watershed, Town officials and board members, water system operators, land trusts and residents. Members Barkhamsted Conservation Commission formed the core of the Team and are listed here:

Michael S. Beauchene, Alternate
James D. Becketl, Board Member
Roger A. Behrens, Alternate
Deborah A. Ciriello-Grohowski, Secretary
Amy N. Connelly, Board Member
Kathleen D. Cook, Chairman
Scott A. Johnstone, Board Member
Donald M. Pelletier, Board Member
William A. Winchester, Jr., Board Member

3 West Branch Farmington River Aquifer

3.1 Description

The West Branch Farmington River Aquifer is located in the towns of Hartland, Barkhamsted and New Hartford, Connecticut and follows the course of the West Branch of the Farmington River in those towns. This Plan will focus on the part of the aquifer that lies within the Town of Barkhamsted and shown in **Exhibit I**. The area covered by the aquifer in Barkhamsted is 1.57 square miles (1,004 acres).



The watershed in which the aquifer lies has area of 15.07 square miles (9,647 acres) within Barkhamsted. There is a relatively low level of development within that part of the watershed. Data from The University of Connecticut Center for Land Use Education and Research (CLEAR) indicates that only 9.6% of the land is developed. Most of the watershed land within Barkhamsted is forested (About 80%). A CLEAR Land Use map of the watershed area is included as **Exhibit II**.

There are two village centers that overlie the aquifer; Riverton and Pleasant Valley. The zoning areas designated for these two village centers are shown in **Exhibit III**. Much of the land outside of the rivers narrow flood plain has steep slopes with a thin cover of stony, glacial till soil. Outside of the Village Centers, development in the watershed is residential and open space. There are 3.54 square miles (2,268 acres) of DEP land (**Exhibit IV**).



There are 52 miles of local roads within the Barkhamsted area of the contributing watershed.

Groundwater and Surface Water quality in the Barkhamsted part of the watershed are generally excellent. Surface water streams and impoundments in that area of the watershed are all designated A B or B/A. "A" surface waters "are designated for: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture." "B" surface waters "are designated for: habitat for fish and other aquatic life and wildlife; recreation; navigation; and industrial and agricultural water supply." "B/A" means the water should meet the water quality required for "A" designated uses, but is only meeting the quality required for "B" uses.

Groundwater in the contributing watershed is designated GAA, GAA_S, or GA, except for one relatively small area that "May be impaired." GAA is "Ground water used or which may be used for public supplies of water suitable for drinking

without treatment; ground water in the area that contributes to a public drinking water supply well; and ground water in areas that have been designated as a future water supply in an individual water utility supply plan or in the Area wide Supplement prepared by a Water Utility Coordinating Committee pursuant to Title 25 of the General Statutes.” GAA_S is “Ground water is tributary to a public water supply reservoir.” GA is “Ground water within the area of existing private water supply wells or an area with the potential to provide water to public or private water supply wells. The Department [DEP] presumes that ground water in such an area is, at a minimum, suitable for drinking or other domestic uses without treatment.”

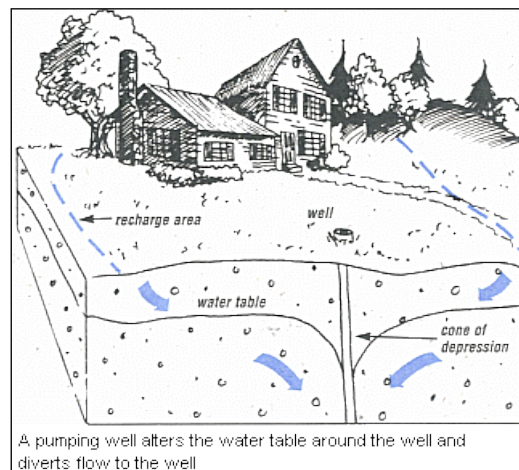
For more detailed information on water classification, see the DEP *Water Quality Standards*. A map of surface and ground water classifications are shown in **Exhibits V & VI**, respectively.

3.2 Existing Source Water Inventory

There are eleven (11) public drinking water systems that currently have sources within the West Branch Farmington River potential aquifer area. They are listed in **Exhibit VII**. All of these systems draw water from bedrock wells and not the aquifer. There is one (1) community water system (CWS), one (1) non-transient non-community system (TNC) and nine (9) transient non-community systems (TNC). Single family residences not served by the above CWS have private wells that draw from groundwater. The Barkhamsted Protection Team has considered protection measures that will achieve the greatest public health protection in the watershed regardless of the source.

3.3 Source Water Protection Areas

The Source Water Protection Areas (SWPA) for systems that draw water from wells are known as Wellhead Protection Areas (WHPAs). These are the land areas from which groundwater and surface water will flow to the well under pumping conditions. As such, these land areas are the critical ones for source water protection. The WHPAs for the all of these bedrock well systems have been delineated by the State of Connecticut Department Public Health (DPH). These are calculated fixed-radius circles, the radius of which is determined by the volume of withdrawal of the source. These WPHAs are shown in **Exhibit VIII**.



Source water protection measures developed to protect the WBFR potential aquifer area will also protect existing groundwater sources. The prevention

measures also directly benefit private wells and thus all of the households within aquifer protection area.

4 Existing Source Water Protection Measures

Following is a sampling of source water protection initiatives that are already in place, or ongoing. This is not a comprehensive list, but is meant to demonstrate the level of commitment by Barkhamsted to this issue. These are in addition to ongoing work by the Planning and Zoning, Conservation and Inland Wetland and Watercourses Commissions.

4.1 Watershed Monitoring

The Barkhamsted Reservoir watershed is a source of drinking water for the Metropolitan District Commission (MDC). The MDC is required to conduct regular inspections of that area annually to identify and mitigate any potential threats. The MDC also reviews any new construction on land they do not own within the watershed for potential impact on the water supply.

4.2 Plan of Conservation and Development (PoCD)

The Barkhamsted's PoCD completed in May 2007 includes the following goal for protecting drinking water sources:

Stratified Drift Drinking Water Aquifer

There is a major underground stratified drift aquifer underlying and parallel to the West Branch of the Farmington in Barkhamsted. Figure 4 shows the location of this aquifer. If properly protected this potential "underground reservoir" can provide a substantial drinking water supply for future water needs.

A "stratified drift" aquifer is an underground reservoir of sand and gravel saturated with water. A well drilled in a aquifer can produce very high volumes of high quality drinking water. In order to protect the West Branch aquifer the Planning and Zoning Commission should consider establishing an additional level of land use protection and controls within the aquifer and river corridor area as shown on maps prepared by the U.S. Geological Survey.

Barkhamsted Reservoir Public Water Supply Watershed Protection

The watershed area draining into the Metropolitan District Commission's Barkhamsted Reservoir consumes a vast area in central and eastern portion of Barkhamsted. Nearly all of this water supply watershed is owned and controlled by the Metropolitan District Commission and the State of Connecticut.

...

Unprotected water supply watershed land should be subject to a land use regulation which will minimize the potential for pollution of ground water and the surface water supply.

5 CT DPH Source Water Assessments

In 2003, the Connecticut Department of Public Health Drinking Water Section completed a state-wide survey of drinking water supplies under the Source Water Assessment (SWA) Program. This program was mandated with the 1996 reauthorization of the Safe Drinking Water Act. The purpose of the program was to evaluate the susceptibility to contamination of each public drinking water source in Connecticut and communicate the results to the public.

The following information was used to assess vulnerability under the Source Water Assessment Program:

- ◆ Sanitary conditions in the source water area
- ◆ The presence of potential or historic sources of contamination
- ◆ Existing land use coverages
- ◆ The need for additional source protection measures within the source water area

Eleven (11) Public Water Supplies have Wellhead Protection Areas (WHPAs) within the West Branch Farmington River Potential Aquifer Area. A table summarizing the Source Water Assessments for these systems is included as **Exhibit VII**. Of those systems, only two (2) were designated with **high** susceptibility to potential contaminate sources, five (4) with **moderate** susceptibility, five (5) with **low** susceptibility.

A copy of the Source Water Assessment for the Fox Ridge Apartments System is included as **Exhibit IX** as an example.

6 Assessment of Threats

6.1 Confirmed Contaminant Detects of Concern in Source Water

Each DPH Source Water Assessment reported on contaminants detected in the source water of each system. While this data is somewhat dated (2003), it provides an idea of the scope of contamination within the source water area. This data is included in **Exhibit VII** and indicates that nitrates were found to be present above the level of 1 mg/l in the sources of one (1) Community Water Systems (CWS), one (1) Non-Transient Non-Community systems and three (3) Transient Non-Community systems. The nitrate levels found in these wells were much lower than the maximum 10 mg/l allowed in drinking water, however detection of nitrate in public wells indicates that it has been released to surface and ground waters and is a potential contamination concern. Typical sources of nitrates are septic systems, lawn care and agriculture.

6.2 Roadways

Roadways present a significant threat to drinking water sources. The possibility of an accident involving a truck transporting bulk shipments of hazardous materials poses a risk. Roadways are also a potential source of contamination due to potential petroleum leaks from vehicles; the application of road salts,

which could cause elevated levels of sodium and chlorides; and maintenance activity which may include herbicide and pesticide applications.



West River Road and East River Road run the length of the potential aquifer area and stormwater runoff from these roads enters the aquifer area and river with no treatment. Those roads, along with others that cross the aquifer area and the West Branch watershed pose a threat to this future drinking water source.

6.3 Residential Land Use

Residential contamination threats to surface or groundwater, if taken on a case-by-case basis, are normally less than other land use contamination, but in the aggregate, form a significant source of contamination. Most citizens are unaware of the effects of numerous potential contaminants stored, used, and disposed of from residential homes. The potential contaminants include:

- ◆ Household chemicals
- ◆ Automotive products
- ◆ Paint/solvents
- ◆ Fuel storage systems
- ◆ On-site septic
- ◆ Lawn/garden chemicals
- ◆ Abandoned wells
- ◆ Riverside homes

On-site septic systems, for instance, represent potential sources of nitrates, chlorides, bacteria and viruses. In addition, if improperly used, such as for disposal of paints, solvents, petroleum products and other hazardous waste, they could be a source of organic compounds.

The West Branch Farmington River aquifer is susceptible to pollution from household chemicals, pesticides, fertilizers and on-site septic systems.

6.4 Commercial Land Use

Many commercial operations use toxic and hazardous materials in their processes. Examples include:

- ◆ Auto repair shops, gas stations, car washes, paint shops
- ◆ Road maintenance depots
- ◆ Construction areas
- ◆ Dry cleaners, Laundromats



- ◆ Medical institutions, laboratories
- ◆ photography establishments, printing facilities
- ◆ Restaurants, bakeries
- ◆ Woodworking and finishing facilities

The storage, use, and disposal of chemicals required by these operations can pose a potential threat to water since even small amounts of the hazardous materials can contaminate large amounts of surface or ground water. Storing quantities of the material can also create a serious problem if they are not contained and stored properly. Leaks and spills from storage tanks and pipes can contaminate water, rendering the water unfit for consumption.

Best management practices should be encouraged at existing commercial sites within the potential aquifer area and some commercial uses should not be allowed in the proposed overlay zone (See **Management Plan, Section 7**).

6.5 Non-Point Sources of Pollution

Non-point sources are described as dispersed contamination from many sources such as soil erosion, on-lot septic systems, storm water discharges, agricultural activities, and pollution associated with resource extraction and silviculture. The most significant contamination associated with non-point sources is nitrates associated with the use of manure, fertilizer, and pesticides which drain into streams and infiltrate into ground water. Household hazardous and commercial/industrial waste (e.g., ammonia, chlorides, paint, paint thinners, waste oil, antifreeze, solvents, etc.), which are sometimes discharged into on-lot septic systems, are also sources of non-point pollution. The potential risk from non-point sources makes the WBFR potential aquifer area vulnerable to contamination.



6.6 Potential Future Sources

Undeveloped land areas represent the potential for future contamination sources that might impact ground and surface water quality if they were to be developed. Based on the amount of undeveloped land within the potential aquifer area (see **Exhibit II**), there exists the possibility for future contamination.

7 Management Plan

7.1 Develop Zoning Overlay for WBFR Potential Aquifer Area

The Barkhamsted Conservation Commission should draft a zoning overlay regulation to protect the West Branch Farmington River potential aquifer area. The regulation should include a map of the designated area and should consider not allowing, or restricting, the following the uses:

- ◆ Manufacture, use, storage, transport or disposal of hazardous materials as a principal activity.
- ◆ Sanitary landfill, septage lagoon, waste water treatment facility for municipal or industrial wastes.
- ◆ Road salt storage.
- ◆ Junkyard, salvage yard, truck terminal.
- ◆ Gasoline station, car wash, auto repair or auto body shop.
- ◆ Excavation, filling or removal of earth materials.
- ◆ Underground storage of hazardous materials.
- ◆ Above ground storage of hazardous materials in quantities greater than associated with normal use, other than fuel storage for residential space heating.

The Town of Hebron's Aquifer Protection District regulation is a good model to and is included as **Exhibit X**.

7.2 Conduct Education and Outreach Campaign

Public education and awareness is a key part of this Source Water Protection Plan because everyone in the watershed poses a risk to ground and surface water. Most homeowners will work to protect their local ground and surface water if they know how to minimize contamination risks. Outreach to Barkhamsted residents will be done through mailings, media and/or public meetings to increase awareness of the link between land use and drinking water quality and to involve the public in source water protection activities. The most important areas to focus on should be septic system maintenance, lawn care and riparian buffers.

Examples of outreach material are included as **Exhibits XI** through **XVII**. Other materials are available from the DPH, DEP, Conservation and Health Districts, and MDC. Some useful links are:

CT DEP: www.ct.gov/dep/cwp/view.asp?a=2719&q=325514&depNav_GID=1654

CT DPH: www.ct.gov/dph/cwp/view.asp?a=3139&q=387304&dphNav_GID=1824

Connecticut NEMO: nemo.uconn.edu/tools/publications.htm

Connecticut Sea Grant: web2.uconn.edu/seagrant/publications/index.php

EPA: www.epa.gov/safewater and www.epa.gov/watertrain

Farmington Valley Health District: www.fvhd.org/default.htm

The MDC: www.themdc.com/Source_Protection.shtml

NW Cons. District: conservect.org/northwest/Northwest/tabid/58/Default.aspx

7.3 Form Source Water Protection Steering Committee

The following persons comprise the Barkhamsted Sourcewater Protection Steering Committee. They are members of the Barkhamsted Conservation Commission and developed this drinking water protection plan for their community and are committed to implementing the prevention measures outlined above. Furthermore, this committee will meet at a minimum of once a year to review and update the plan and to assess its progress.

Michael S. Beauchene, Alternate
James D. Becketl, Board Member
Roger A. Behrens, Alternate
Deborah A. Ciriello-Grohowski, Secretary
Amy N. Connelly, Board Member
Kathleen D. Cook, Chairman
Scott A. Johnstone, Board Member
Donald M. Pelletier, Board Member
William A. Winchester, Jr., Board Member

8 Contingency Plan

An Emergency Response Plan will be written in the future by the water system that develops the aquifer for a public water supply.

Exhibit I – WBFR Aquifer and Watershed

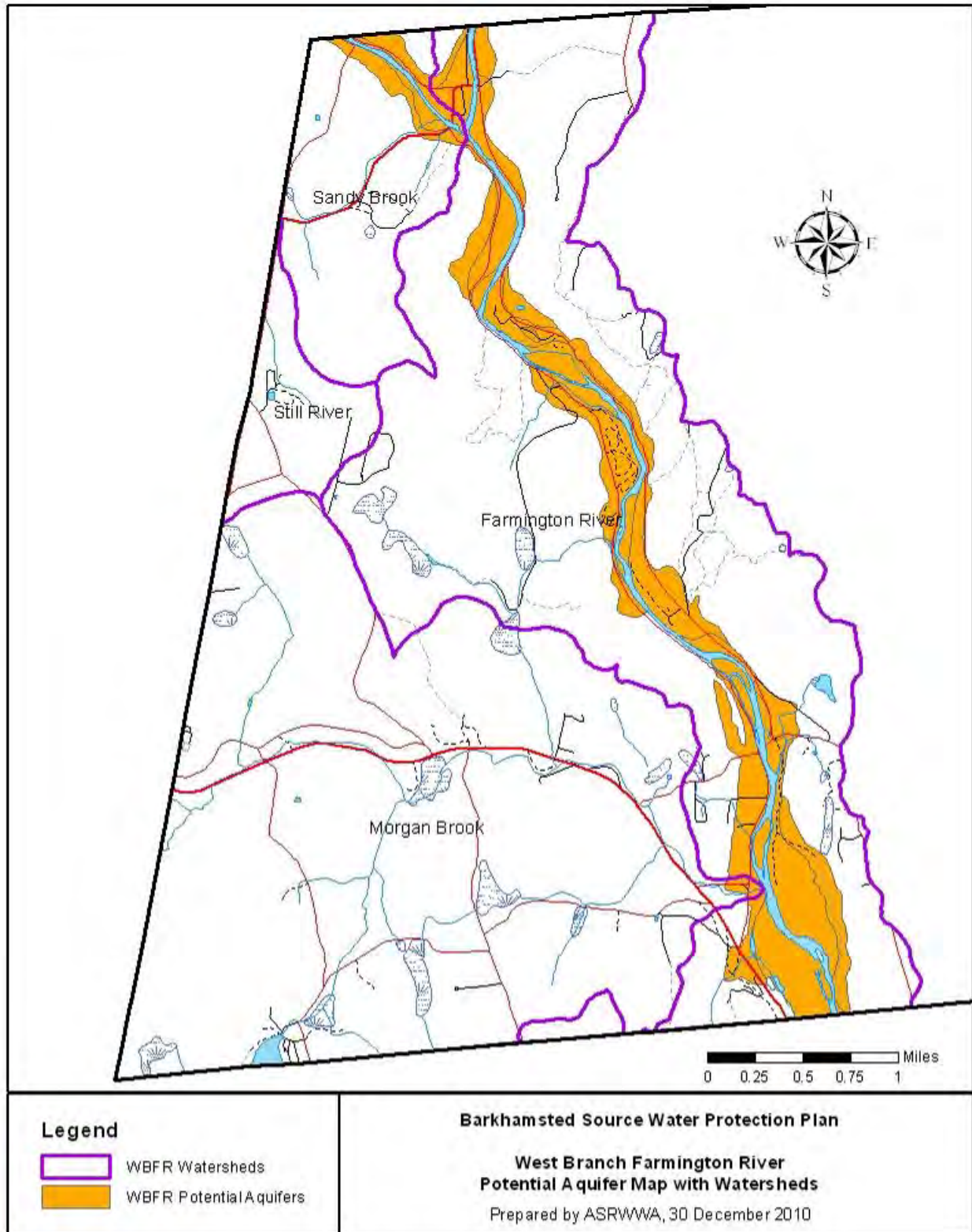


Exhibit II – WBFR Land Use

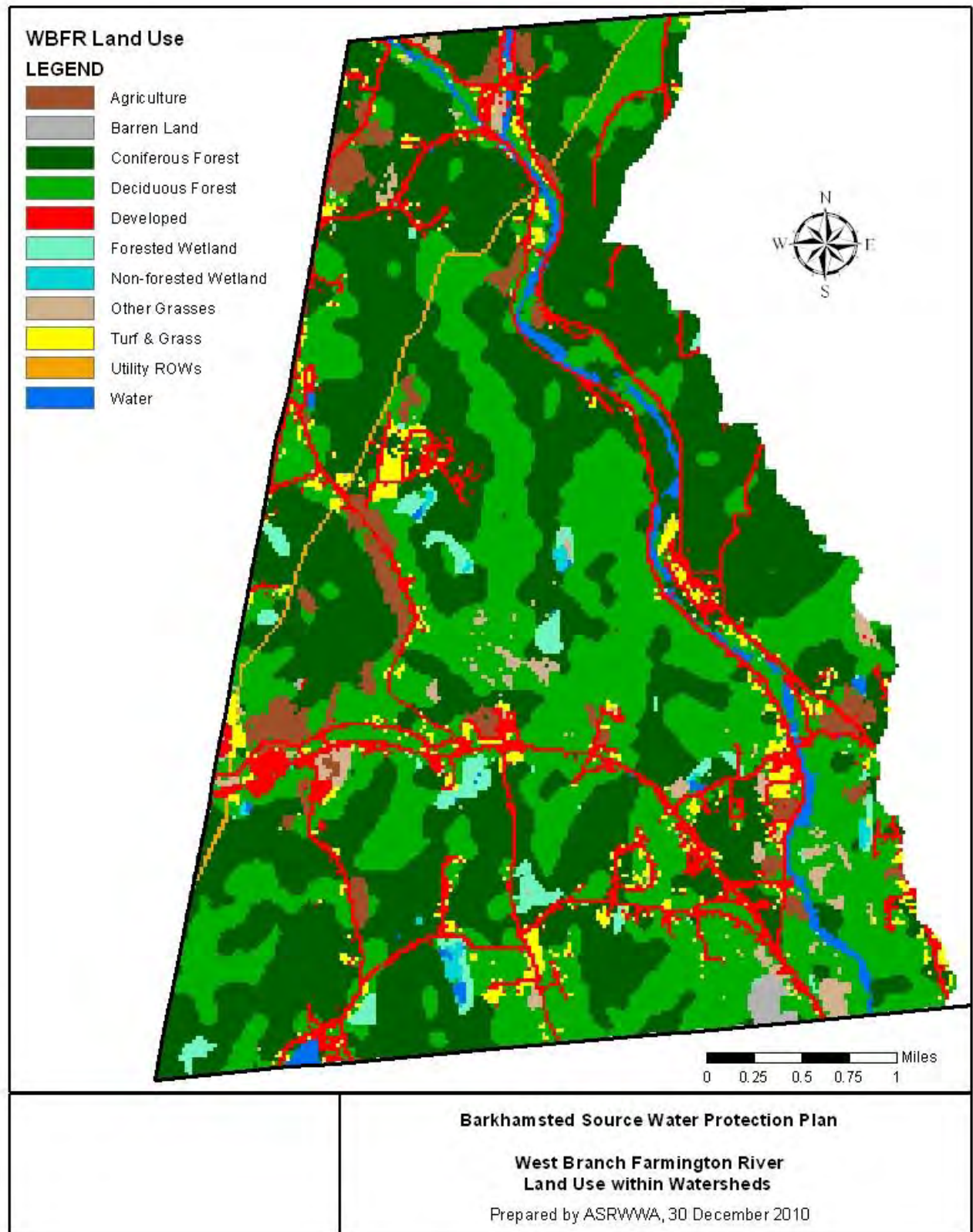


Exhibit III – WBFR Village Centers

[to be added later]

Exhibit IV – WBFR State Owned Land

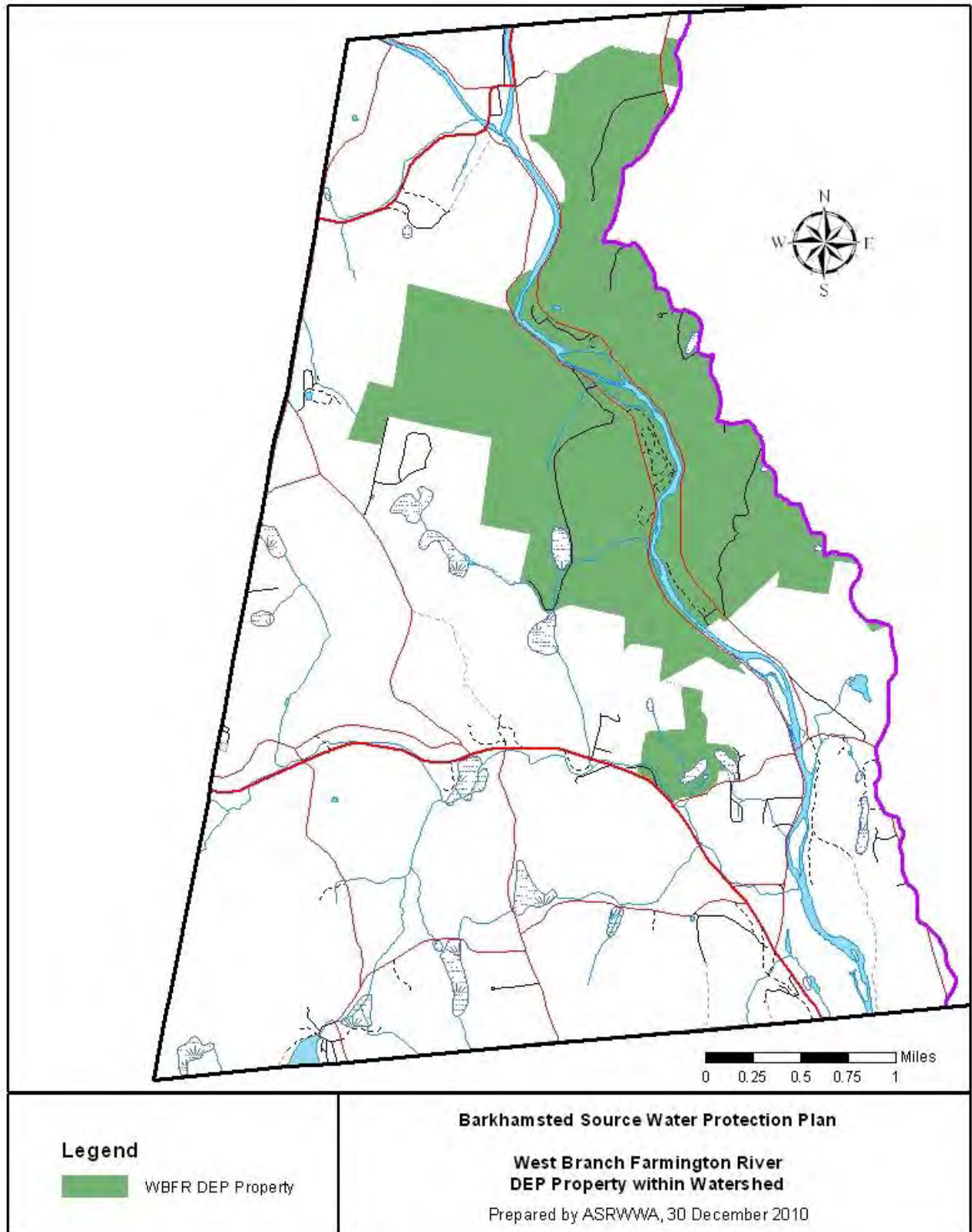


Exhibit V – WBFR Surface Water Quality

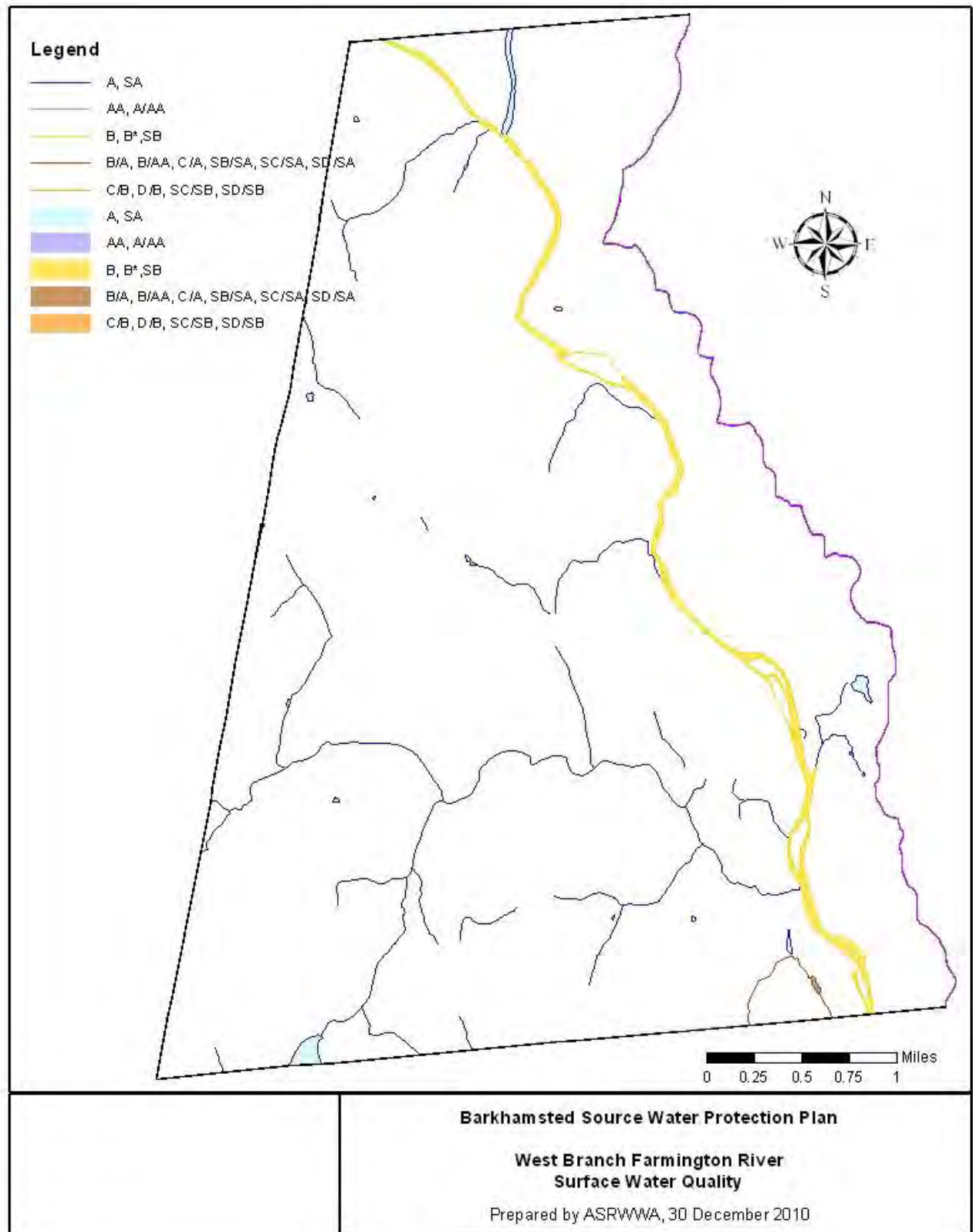


Exhibit VI – WBFR Ground Water Quality

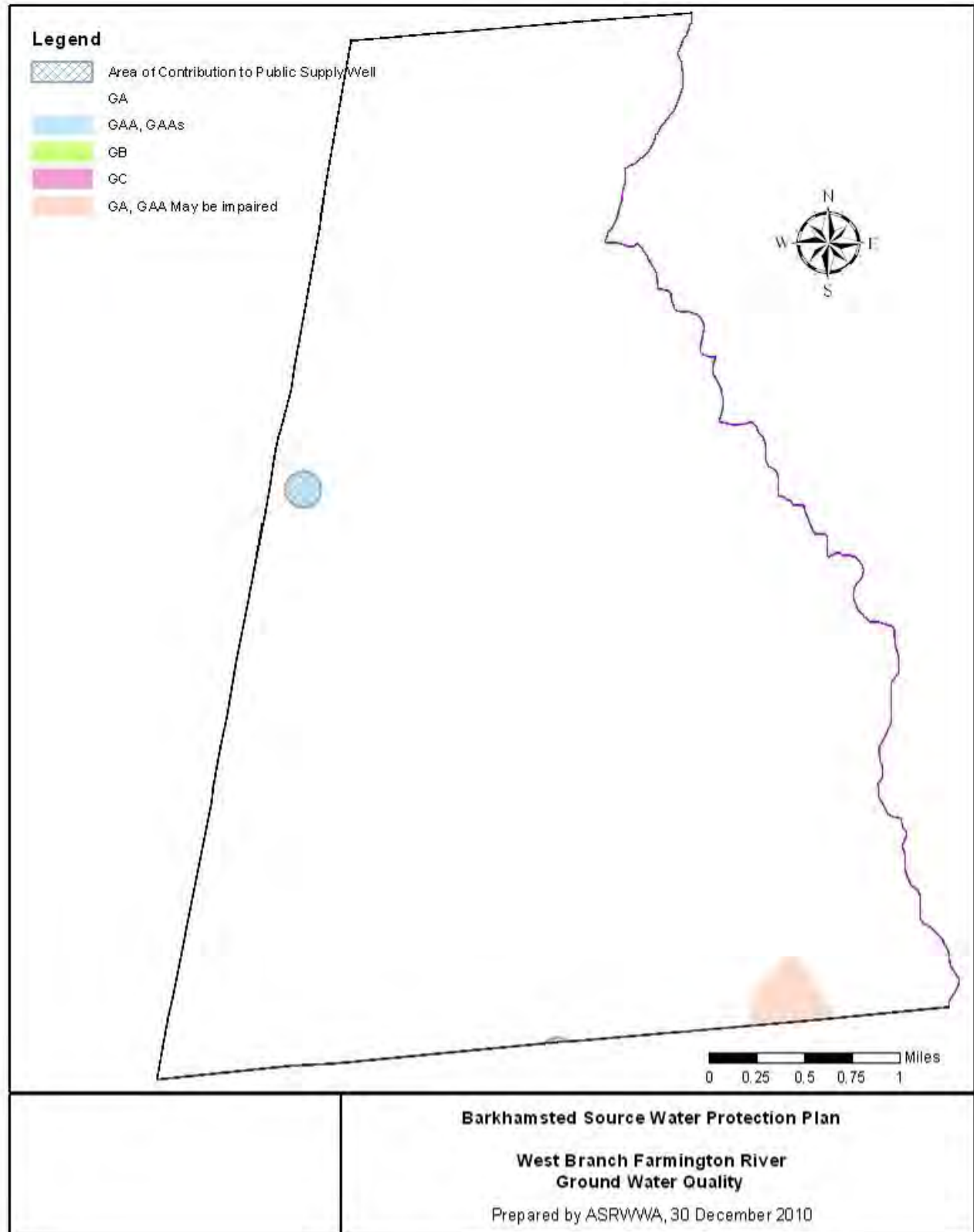


Exhibit VII – Public Water Systems in Potential Aquifer Area

Prepared by ASRWVA

PUBLIC WATER SYSTEMS
IN BARKHAMSTED POTENTIAL AQUIFER AREA
ALONG THE WEST BRANCH FARMINGTON RIVER

December 30, 2010

PWSID	SYSTEM NAME	POP SERVED	SERVICE CONNS	SUSCEPT- IBILITY	CONTAMINANTS DETECTED	WELL CONDITION	CONTAM. RELEASES	CONTAM. SOURCES
Community Water Systems								
CT0051011	FOXBRIDGE APARTMENTS 2 - WELLS 1 & 2	25	10	Moderate	Nitrate > 1 mg/l	Good	None	None
Non Transient Non Community Systems								
CT0055043	BARKHAMSTED ELEMENTARY SCHOOL	360	1	Low	Nitrate > 1 mg/l	Good	None	None
Transient Non Community Systems								
CT0050014	AMERICAN LEGION SF / AUSTIN F. HAWES	42	7	Low	None	Unknown	None	None
CT0050064	OLD RIVERTON INN	25	1	Moderate	None	Unknown	None	1
CT0050104	PEOPLES S.F./MAIN PICNIC AREA	26	4	Low	None	Unknown	None	None
CT0050114	PLEASANT VALLEY DRIVE-IN	25	1	Low	None	Unknown	None	None
CT0050124	PLEASANT VALLEY GENERAL STORE	25	1	Moderate	Nitrate > 1 mg/l	Average	None	2
CT0050134	PLEASANT VALLEY UNITED METHODIST CHURCH	25	1	Low	None	Unknown	None	None
CT0050144	RIVERTON GENERAL STORE	25	1	High	Nitrate > 1 mg/l	Unknown	None	1
CT0050184	SWEET PEAS RESTAURANT	25	1	High	Nitrate > 1 mg/l	Unknown	None	1
CT0050164	THE CATNIP MOUSE TEAROOM	25	1	Moderate	None	Unknown	None	1

Exhibit VIII – Source Water Protection Areas in Potential Aquifer Area

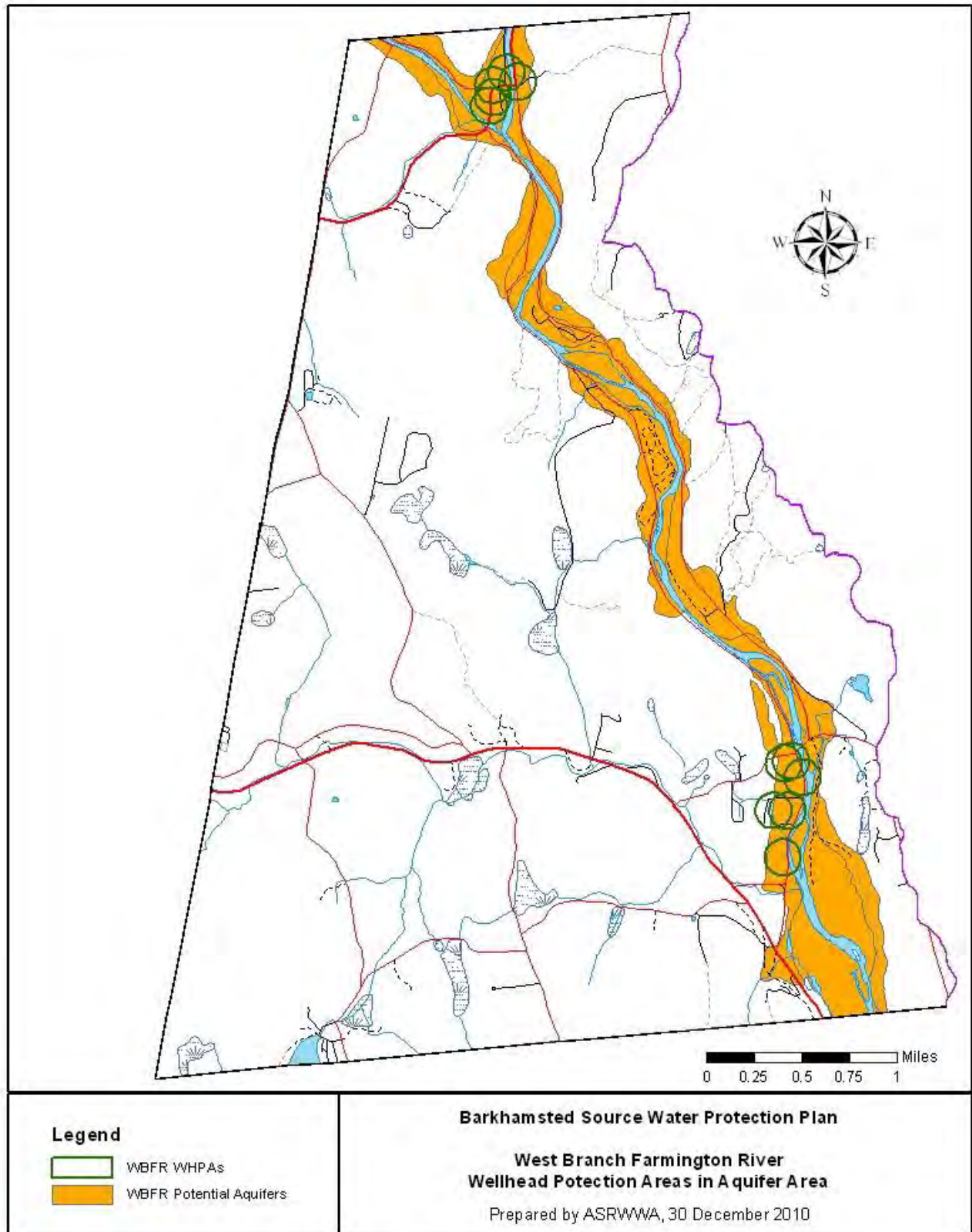


Exhibit IX – Foxridge Source Water Assessment

SOURCE WATER ASSESSMENT REPORT

AN EVALUATION OF THE SUSCEPTIBILITY OF PUBLIC DRINKING WATER SOURCES TO POTENTIAL CONTAMINATION

CT0051011

Foxridge Apartments 2, LLC

The State of Connecticut Department of Public Health (DPH) in cooperation with the Department of Environmental Protection (DEP) recently completed an assessment of sources of public drinking water maintained and operated by Foxridge Apartments 2, LLC. This one-time assessment is part of a nationwide effort mandated by Congress under the Safe Drinking Water Act Amendments of 1996 to evaluate the susceptibility of all public drinking water sources in Connecticut to potential sources of contamination. DPH began working in partnership with the DEP in 1997 to develop Connecticut's Source Water Assessment Program, which was approved by the U.S. Environmental Protection Agency in 1999. Sources of potential contamination that are of concern to public drinking water supplies here in Connecticut are generally associated with historic waste disposal or commercial, industrial, agricultural and residential properties that store or use hazardous materials like petroleum products, solvents or agricultural chemicals.

The assessment is intended to provide Foxridge Apartments 2, LLC consumers with information about where their public drinking water comes from, sources of potential contamination that could impact it, and what can be done to help protect it. This assessment will also assist the public water supply system, regional planners, local government, public health officials and state agencies in evaluating the degree to which the three wells may be at risk from potential sources of contamination. The assessment can be used to target and implement enhanced source water protection measures such as routine inspections, protective land use regulations, acquisition of critical land, proper septic system maintenance, and public education. General sources of contamination with the potential to impact these wells include properties with underground fuel storage tanks, improperly maintained on-site septic systems, improper waste disposal, or commercial/industrial sites that store or use chemicals or generate hazardous wastes.

ASSESSMENT METHODS. The drinking water source assessment methods used by the Department of Public Health Drinking Water Division to evaluate the susceptibility of public drinking water sources to contamination are based on criteria individually tailored to surface water and groundwater sources. The criteria are keyed to sanitary conditions in the source water area, the presence of potential or historic sources of contamination, existing land use coverage's, and the need for additional source protection measures within the source water area. Source-specific data for community and non-community systems were used to determine whether a particular criterion should be rated as low, moderate or high, relative to the risk of potential contamination at the drinking water source. A ranking system was used to compute an average rank for each community drinking water source based on its environmental sensitivity, potential risk of contamination and source protection needs.

ASSESSMENT RESULTS. Individual assessment summaries and recommendations to enhance source protection for the public drinking water source(s) listed below are presented in the attachments.

Location	Name of Drinking Water Source(s)	Susceptibility Summary
Barkhamsted	Well 1 & 2	Moderate

Additional information about drinking water quality and treatment for this source(s) is available in the Foxridge Apartments 2, LLC's annual Consumer Confidence Report.

The assessment of this source(s) and other comparable drinking water sources throughout Connecticut generally finds that adopting recommendations similar to those presented in the attachment(s) could reduce the susceptibility of most groundwater sources to potential sources of contamination.



State of Connecticut Department of Public Health
Drinking Water Division

410 Capitol Avenue – MS# 51WAT
P.O. Box 340308 Hartford, CT 06134
(860) 509-7333

Exhibit IX (Cont'd)

CT0051011

SOURCE WATER ASSESSMENT SUMMARY**Foxridge Apartments 2, LLC**

Well Name	Well Location	Well Type	DEP Groundwater Classification	Source Water Area (acres)
Well #1	Barkhamsted	Bedrock	GA	18

Factor	Source Water Assessment Ratings For This Well	Rating
I	Environmental Sensitivity	Low
II	Potential Risk Factors	Low
III	Source Protection Need	High
Overall Susceptibility to Potential Sources of Contamination		Moderate
This rating is intended to indicate susceptibility to potential sources of contamination that may be in the wellfield source water area and does not necessarily imply poor water quality.		

Assessment Factors		Initial Assessment Findings	Recommendations for Enhanced Source Protection
I	Contaminants Detected in Source Water	Nitrate >1mg/L	Maintain monitoring levels specified in the Connecticut Public Health Code Section 19-13-B102
I	General condition of well and related equipment	Good	Maintain well and equipment according to best management practices
II	DEP-inventoried Contaminant Release Points	There are no DEP-inventoried contaminant release points in this source water area	
II	Potential Sources of Contamination	There are no potential contaminant sources in this well's source water area	
II	Source Water Area Land Use In The Town Of: Barkhamsted (Based on Satellite Imagery developed by University of Conn.)	Commercial/Industrial 9.89% Residential 17.92% Agricultural 46.40% Open or Undeveloped 25.80%	Proactively work with local officials and developers to insure that only low risk development occurs within the source water area. Support and encourage the acquisition of open space land within the source water area.
III	Land Area Around Wellhead	No information available	PWS should provide information about the amount of land it owns or controls within a 200 foot radius around this well
III	Local Aquifer Protection Regulations	There are no local aquifer protection regulations for this source water area	Support the development of local aquifer protection regulations
III	Local Government Source Protection Initiatives	Drinking water source protection policies do not exist at the local governmental level	Promote the development of local source protection policies
III	Water System Source Protection Initiatives	No information available	PWS should provide information about basic practices employed to protect its drinking water sources



Keeping Connecticut Healthy

State of Connecticut Department of Public Health
Drinking Water Division

410 Capitol Avenue – MS# 51WAT
 P.O. Box 340308 Hartford, CT 06134
 (860) 509-7333

Exhibit IX (Cont'd)

CT0051011

SOURCE WATER ASSESSMENT SUMMARY
Foxridge Apartments 2, LLC

Well Name	Well Location	Well Type	DEP Groundwater Classification	Source Water Area (acres)
Well #2	Barkhamsted	Bedrock	GA	18

Factor	Source Water Assessment Ratings For This Well	Rating
I	Environmental Sensitivity	Low
II	Potential Risk Factors	Low
III	Source Protection Need	High
Overall Susceptibility to Potential Sources of Contamination		Moderate
This rating is intended to indicate susceptibility to potential sources of contamination that may be in the wellfield source water area and does not necessarily imply poor water quality.		

Assessment Factors		Initial Assessment Findings	Recommendations for Enhanced Source Protection
I	Contaminants Detected in Source Water	None	
I	General condition of well and related equipment	Good	Maintain well and equipment according to best management practices
II	DEP-inventoried Contaminant Release Points	There are no DEP-inventoried contaminant release points in this source water area	
II	Potential Sources of Contamination	There are no potential contaminant sources in this well's source water area	
II	Source Water Area Land Use In The Town Of: Barkhamsted (Based on Satellite Imagery developed by University of Conn.)	Commercial/Industrial 2.08% Residential 24.90% Agricultural 31.47% Open or Undeveloped 41.55%	Proactively work with local officials and developers to insure that only low risk development occurs within the source water area. Support and encourage the acquisition of open space land within the source water area.
III	Land Area Around Wellhead	No information available	PWS should provide information about the amount of land it owns or controls within a 200 foot radius around this well
III	Local Aquifer Protection Regulations	There are no local aquifer protection regulations for this source water area	Support the development of local aquifer protection regulations
III	Local Government Source Protection Initiatives	Drinking water source protection policies do not exist at the local governmental level	Promote the development of local source protection policies
III	Water System Source Protection Initiatives	No information available	PWS should provide information about basic practices employed to protect its drinking water sources



State of Connecticut Department of Public Health
Drinking Water Division

410 Capitol Avenue – MS# 51WAT
P.O. Box 340308 Hartford, CT 06134
(860) 509-7333

Exhibit X – Hebron Aquifer Protection District Regulations**SECTION 5.0 DISTRICT USE REGULATIONS****5.8 DISTRICT USE REGULATIONS: AQUIFER PROTECTION DISTRICT (AP)****5.8.1 Statement of Intent**

Within this district lies an extensive deposit of coarse grained, stratified drift. The U.S. Geologic Survey notes a portion of this area has a saturated thickness of greater than forty (40) feet, indicative of high water yielding conditions. Creation of this district is deemed essential to protect this significant water supply source for the Town. As ground waters have been shown to be easily, and in many cases, irrevocably contaminated by many common land uses, it is imperative all reasonable controls over land use, waste disposal and material storage be conscientiously exercised.

5.8.2 Establishment of District

The Aquifer Protection District is herein established as an overlay district. The boundaries of this District are those shown on a map entitled, "Aquifer Protection" in Section 2 of these Zoning Regulations. The District includes the entire coarse grained stratified drift deposit with a saturated thickness of greater than forty (40) feet and all land directly upgradient.

Where the bounds of this District are in doubt or dispute, the burden of proof shall be upon the owners of the land in question to show where they should be located. Such proof shall be in the form of a map, prepared by a professional engineer and land surveyor, at a scale of 1 inch to forty feet, with two feet contours, showing the existing district boundary and that proposed.

5.8.3 Permitted Uses

Within this District the requirements of the underlying districts continue to apply, except that notwithstanding the requirements of the underlying district, no uses indicated by an "N" in the following schedule shall be established subsequent to the effective date of these Regulations, nor shall any uses indicated by an "SP" in the following schedule be established subsequent to the effective date of these Regulations without first receiving a special permit subject to the criteria set forth in Section 5.8.4. Single family dwellings are exempt from these aquifer protection regulations.

Exhibit X (Cont'd)**SECTION 5.0 DISTRICT USE REGULATIONS****Section 5.8 District Use Regulations: Aquifer Protection District (AP) (cont.)****PROHIBITED USES**

- N (a) Manufacture, use, storage, transport or disposal of hazardous materials as a principal activity.
- N (b) Sanitary landfill, septage lagoon, waste water treatment facility for municipal or industrial wastes.
- N (c) Road salt storage.
- N (d) Junkyard, salvage yard, truck terminal.
- N (e) Gasoline station, car wash, auto repair or auto body shop.
- SP (f) Excavation, filling or removal of earth materials.

ACCESSORY USES

- N (g) Underground storage of hazardous materials.
- SP (h) Above ground storage of hazardous materials in quantities greater than associated with normal use, other than fuel storage for residential space heating.

5.8.4 Special Permit Criteria

Special permits required under Section 5.8.3 shall be granted only if the Planning and Zoning Commission determines the ground water quality resulting from on-site wastewater disposal or other operations on-site shall not cause degradation of ground waters outside any authorized zone of influence which would result in a condition which renders the ground waters unsuitable for direct human consumption. If existing ground water quality is not now suitable for drinking water purposes, on-site disposal or operations on-site shall cause no further deterioration.

5.8.5 Submittals

In applying for a Special Permit under this Section, the PZC may require, in addition to that required under Section 8, all or some of the following information:

- (a) A complete list of all chemicals, pesticides, fuels or other potentially hazardous materials to be used or stored on the premises in quantities greater than associated with normal household use. Information on the measures proposed to protect all storage containers from vandalism, corrosion, leakage and spillage and for control of spilled materials may also be requested.

Exhibit X (Cont'd)**SECTION 5.0 DISTRICT USE REGULATIONS****Section 5.8 District Use Regulations: Aquifer Protection District (AP) (cont.)**

- (b) A description of all potentially hazardous wastes to be generated, including provision for storage and disposal measures as described in part (a) above.
- (c) For above ground storage of hazardous materials or waste, evidence of qualified professional supervision of the design and installation of such storage facilities or containers.
- (d) For areas with an impervious surface greater than 30% of total lot areas, a showing of runoff water disposal plans. Dry wells shall be used only where other methods are infeasible and shall be preceded by oil, grease and sediment traps designed to remove contaminants. A schedule for maintenance of such traps may also be required.
- (e) For on-site disposal of sewage in quantities in excess of 2000 gpd, documentation from the wastewater discharge permit granting authority that such system meets all applicable codes and regulations.

Exhibit XI – Creating Streamside Buffers

Why is a Vegetative Buffer Garden Important?

Whether natural or planted gardens, vegetated streamside buffers provide shade, stabilize stream banks, slow runoff, help to avoid flooding, and provide food and shelter to wildlife.

In contrast, the common grass lawn provides very little protection to streams. Chemical fertilizers and pesticides can easily wash off a lawn into the stream, degrading water quality. Stormwater runs off grass at a greater volume and a faster rate than from areas with trees and shrubs. Lawn grasses do not have the root structure to stabilize stream banks against the erosion and scour that can lead to stream bank failure.

The benefits will reach beyond your backyard stream—your buffer garden will help preserve and protect water resources downstream too!

**Benefits of Streamside Vegetation**

Shade: Tall trees and shrubs provide the shade streams need. Exposure to sunlight increases water temperatures and encourages algal growth, leading to oxygen depletion. High temperatures and low oxygen levels threaten the health and survival of many fish and aquatic species.

Bank Stabilization: Shrub and tree roots prevent erosion by holding the stream bank together and by absorbing and deflecting the energy of moving water. Removing vegetation can lead to significant stream bank failure and mass bank loss, especially during heavy rains, flooding and ice flows.

Runoff Renovation: Vegetative buffers slow the flow and reduce the volume of runoff. They also filter pollutants such as sediments, nutrients, oils, metals, trash and debris. These pollutants might otherwise be carried into the stream and beyond.

Food and Shelter: Vegetation next to the stream provides the food and shelter needed by many aquatic and terrestrial wildlife species. A well vegetated buffer also provides the travel corridor required by many species to safely move about and maintain population levels.

BUFFER RESOURCES ONLINE

"Where Water Meets Land," CT NRCS riparian buffer guide (link to pdf)
www.ct.nrcs.usda.gov/plants.html

CT River Joint Commission fact sheets
www.ctriverjoi.com/riparianbuffers.htm

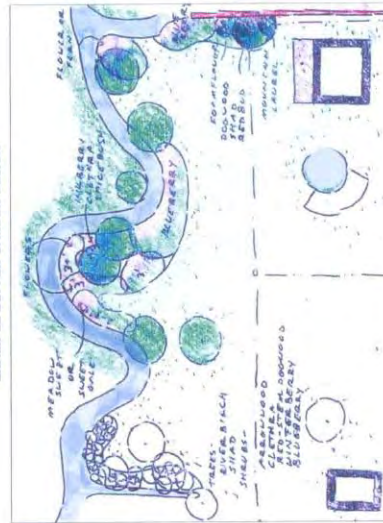
Candlewood Lake buffer guidelines (pdf)
www.conservet.org/southwest/
NPS_resources/candlewoodbuffer.pdf

Care and Maintenance of Your Buffer Garden

As with any garden, once you have planted you will need to keep it well watered and weeded for the first 2 to 3 years. If you use mulch you will need to renew it until your plants are big enough to shade out the weeds. Although many native plants require little care, if you choose you can prune shrubs and trees, and cut back or divide grasses and perennials. Alternatively, you can let your buffer garden go wild. And remember, *as you enrich your garden, your garden will nurture you!*

Native Plants for Buffer Gardens

There are many beautiful native plants that will thrive in a streamside buffer garden. Below are just some of the trees, shrubs and perennials that you might choose from.

EXAMPLE BUFFER GARDEN DESIGN**TREES**

Black Willow*
Red Maple*
River Birch
Swamp White Oak

SHRUBS

American Cranberrybush
Black Chokeberry*
Blackian Viburnum
Buttonbush*
Common Elderberry*
Highbush Blueberry
Inkberry
Meadowsweet*
Northern Arrowwood
Pussy Willow*
Red-Osier Dogwood*
Shadblow/Servicberry
Silky Dogwood*
Spicebush
Stepplesh*
Summersweet
Swamp Azalea
Sweetgale
Winterberry
Witchhazel

PERENNIALS

Blue Flag Iris
Boneset
Cardinal Flower
Great Blue Lobelia
Monkey Flower
Ice Pile Weed
Turtlehead

*good for bank stabilization

SEARCHABLE PLANT DATABASES ONLINE

University of Connecticut: www.hort.uconn.edu/plants/
Connecticut Botanical Society: www.ct-botanical-society.org/index.html
USDA Natural Resources Conservation Service: plants.usda.gov/index.html
CT Invasive Plants Working Group: www.hort.uconn.edu/cipwg/

For information or assistance with a backyard stream, pond or wetland, visit www.conservet.org and contact your local Conservation District today!

This publication was developed by:

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Exhibit XI (Cont'd)

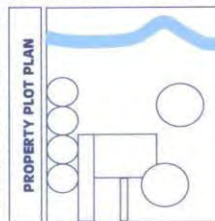
HOW TO CREATE A STREAMSIDE BUFFER GARDEN

Size Up Your Streamside Buffer Garden

To design your buffer garden start with a property plot plan. A plot plan is usually available at town hall, or you can create one by measuring the distances between your house, driveway, garage, etc. and the stream.

On the plot plan roughly sketch how much lawn you need for family activities and draw in existing trees and landscaping. The remaining yard area, adjacent to the stream, is your potential buffer garden.

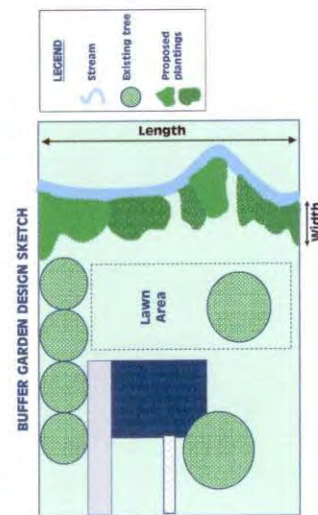
To determine the best size for your buffer garden consider the length you have available alongside the stream, as well as the width available on one or both sides of the stream.



LENGTH is important. Wildlife travel along streamside corridors seeking food and shelter. Try to create a buffer garden along the entire stream length on your property. Paths through the buffer garden can provide access and views of the stream.

WIDTH is also important. The wider the buffer, the more effectively it will intercept and filter runoff, stabilize the soil to prevent erosion, and support wildlife. Conservationists recommend at least a 35-foot wide buffer, but a narrower buffer is better than no buffer at all.

If you have limited time or a limited budget start small. Plant as much buffer garden next to the stream as possible, and in subsequent years you can add plantings to lengthen, or widen, your buffer garden.



Vegetative buffers help stabilize stream banks, prevent erosion, slow runoff, and provide food and shelter for a wide array of wildlife. Buffers can also be backyard gardens that are inviting places to stroll while enjoying views of the stream they protect. It is fun and relatively easy to create a streamside buffer garden. Follow the three simple steps below, and start a buffer garden that you—and your stream—will enjoy!

Design for Everyday Beauty and Pleasure

If you are like most people, you have access to a stream because you enjoy the sight and sound of the water on your property. Your buffer garden should preserve and enhance this relationship with the stream. It should also include plants with shapes, blooms, colors and fragrances that are pleasing to you as well as the local birds, bees, and butterflies.



GRASS PATHS ALLOW ACCESS AND VIEWS OF THE STREAM



SKETCH A DESIGN on your plot plan showing your planting areas and where you want to put trees, shrubs, flowers, meadow grasses and ferns. Also sketch in walking paths and views of the stream. A good way to preserve views of the stream is to put shorter plants along the paths and taller plants at the outer "frame" of view.

Before deciding what to plant consider the environmental conditions in the buffer garden. You will need an idea of the soil moisture and light regime. Note how wet or dry the planting area is, and how sunny or shady it is. Also note areas that are seasonally wet or flooded.

Now you can choose plants that are right for your garden. Refer to any one of the excellent websites referenced on the other side, or peruse a good garden book. Consider species native to southern New England first. They are adapted to our climate and are tolerant of the local soils and pests. Native plants also attract native wildlife, and can be essential to native bird and butterfly survival.

Diversify your buffer garden by choosing a variety of trees, shrubs, grasses and flowering perennials. A mixture of plant heights and colors will add visual interest, and different plant types work together to better protect the stream. Tree and shrub roots grow deeply, preventing undermining of stream banks, while perennials and meadow grasses intercept runoff and help keep surface soil from eroding. And of course, flowering and fruit-bearing plants help feed a wide variety of wildlife species throughout the year.

Implement Your Design

Using your design sketch, mark out the planting areas either by eye or with a measuring tape. Stakes, flags, flagging tape or temporary spray paint can help you demarcate planting areas and visualize your buffer garden.

TO PREPARE FOR PLANTING you will need to clear any weeds or other vegetation and turn the soil. You may also choose to lay down a layer of mulch before you plant, although it can be added afterwards.

If you are planting an area that is lawn you can use a sod-stripper or rototiller, or you can use a smothering technique. To smother, lay a thick layer of newspapers (up to 12 sheets!) on the grass and cover with 4-6" of mulch. Grass can also be smothered by covering it completely with black plastic or cardboard until it turns brown and dies (this takes some time).



Also make sure to look for, and remove, any non-native invasive plants since they can overrun your new garden (to learn more about invasives go to www.hort.uconn.edu/cipwg/).

Now you are ready to plant!

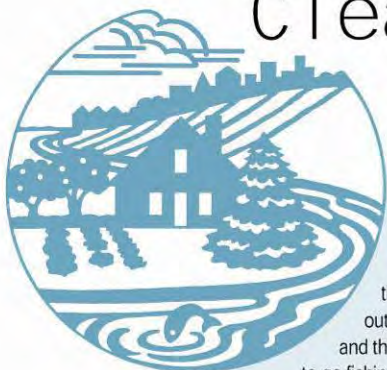
Generally, each plant species has a preferred soil acidity and soil fertility. Ask a professional at the garden center or nursery where you purchase your plants for planting information and plant care recommendations. And remember, leave enough space between the plants so they have room to grow to their full mature size!



Exhibit XII

Clean Waters

Starting in Your Home and Yard



Clean Waters is a collaboration of the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System's NEMO Project, educating individuals about the impacts of everyday activities on water quality and simple techniques that help protect water resources from the home well to Long Island Sound.

What's the Big Deal About Water Quality?

It used to be that no one really thought much about water. It came out of the faucet, went down the drain and that was the end of that. If you wanted to go fishing or swimming, you went to the local stream, swimming hole or maybe even took a trip down to Long Island Sound. Nothing to worry about – there's clean water to spare, right?

There are plenty of reasons to worry about water and water quality. We expect to have crystal-clear, pure water for drinking, food production, and recreation AT THE SAME TIME we use our waters for waste disposal. The old slogan, "the solution to pollution is dilution" typified the feeling that anything dumped down a drain, into a river or even into the ocean was going to disappear without a trace. We now know that NO aquatic system, even an ocean, can absorb unlimited human pollution. Just ask someone with a contaminated well, clambers in a town where shellfishing is prohibited due to pollution, residents of a town where a water conservation emergency has been declared, or sailors who find rafts of plastic trash in the middle of the ocean. They'll tell you that water, both in terms of quantity and quality, is not to be taken for granted.

The need to prevent water pollution has been recognized for years. The federal and state Clean Water Acts were passed in the early 1970's specifically to clean up discharges from industry and sewage treatment plants. We now know the problem is much more complicated than simply ordering a plant to stop discharging pollutants. Factories and sewage treatment plants are two examples of "point source pollution", where pollution enters the water from a specific source. All other types of water pollution are lumped together in a category called "nonpoint source pollution" or "polluted runoff." These pollutants fall from the sky, wash from the land during rain storms, travel across the state in streams and rivers, and even get dumped into storm drains or directly into the water by the thousands of individuals who don't realize that what they are doing causes water pollution. The Environmental Protection Agency now considers nonpoint source pollution the NUMBER ONE threat to water quality in the United States.

Through our everyday activities, we all cause water pollution without realizing it. The exhaust and oil from driving cars, materials washed down drains or flushed down the toilet, pet wastes, fertilizers and pesticides used in yards, all contribute to water pollution. Making simple changes in our everyday activities can help reduce some types of pollution. For example, conserving water both saves money and helps septic systems or the local sewage treatment plant remove pollutants more effectively. Choosing non-toxic alternatives for household cleaning products reduces water pollution, cleaning bills, and our exposure to hazardous materials. Rethinking landscaping and gardening practices reduces the need for pesticides, fertilizer, and irrigation, thus reducing the potential for contaminating local waters.

These are just a few examples of personal efforts that protect water quality. There are many written materials available, including this fact sheet series, with information on different ways to help prevent water pollution. Please take some time and find out how you can help protect our most important natural resource - clean water.

WHAT POLLUTES WATER?

There are six major types of pollutants that affect water quality. Some are primarily a human problem, but others can damage the entire ecosystem.

Sediment: Dirt and sand are natural substances that become pollutants when they end up in the water in excessive quantities. Sediment changes the shape of streambeds, smothers feeding and nursery areas of aquatic animals, and carries other pollutants into the water. Erosion from poorly managed construction sites, agricultural fields, or suburban gardens are major sources of sediment pollution. Another major source is road sand applied to improve winter driving conditions.

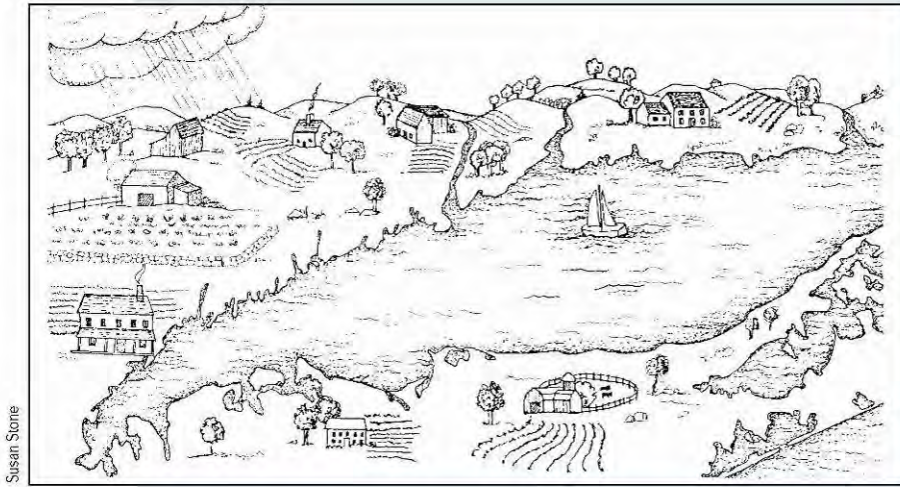
Debris: Non-degradable trash, mostly plastic, when carelessly disposed of, will often end up in a

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Fact Sheet

December 1999

Exhibit XII (Cont'd)



The Connecticut Sea Grant College Program, based at the University of Connecticut, is part of a national network of university-based programs sponsoring coastal and marine-related research, outreach and education.



Fact Sheet #1

nearby water body. Humans find it ugly, as well as hazardous when it entangles boat propellers. Aquatic animals can also become entangled, or mistake plastic for food, and strangle or starve.

Pathogens: Pathogens are the bacteria and viruses that cause disease. They generally come from fecal material from humans and their pets, or from wild animals and birds. When the potential concentration of pathogens in the water exceeds certain limits, areas must be closed to shellfishing or swimming in order to prevent infections or disease outbreaks. Major sources of pathogens include: failing septic systems, leaky sewer lines, and concentrations of animal waste from pets, farm animals or wildlife.

Toxic Contaminants: Many of the tens of thousands of chemicals in use today are harmful to both humans and aquatic organisms. Some of these chemicals can be passed through the food chain and concentrate in top predators (like humans). Extremely small concentrations of some toxic materials in the water can kill the eggs and larvae of many animals. Sources of toxic contaminants range from the exhaust and fluids that come from automobiles to the cleaning and disinfectant products used in homes to the pesticides used in yards, farms and parks.

Nutrients: Materials that are necessary for plant growth, primarily forms of nitrogen or phosphorus, are known as nutrients. When too many nutrients end up in an aquatic system, they alter the natural

plant community and can cause massive plant growth known as algal "blooms" which deplete oxygen concentrations in the water. Excess nitrates in drinking water have been linked to human health problems, including heart conditions and birth defects.

Thermal Pollution: During summer months, thermal pollution can make the water in critical aquatic habitats too warm for sensitive native plants and animals to survive, as well as allowing the spread of non-native species. Overheated water can result from the removal of vegetation that shaded the stream, runoff from hot roofs and parking lots, or the collection of water in shallow unshaded ponds.

Written by -

Heather M. Crawford
Coastal Resources Educator
CT Sea Grant Extension Program

Other Fact Sheets in this Series:

Managing Your Hazardous Household Chemicals
Caring for Your Septic System
Conservation Landscaping for Water Quality
Integrated Pest Management for the Homeowner
Animal Waste and Water Quality
Backyard Biodiversity: Selecting Plants for Habitat and Water Conservation
Environmentally Friendly Lawn Care
Seasonal Yard Care Tips
Boating for a Better Environment
Household Water Conservation

For more information contact: Connecticut Sea Grant,
1084 Shennecossett Rd. Groton, CT 06340
www.seagrant.uconn.edu

Exhibit XIII

Clean Waters

Starting in Your Home and Yard



Clean Waters is a collaboration of the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System's NEMO Project, educating individuals about the impacts of everyday activities on water quality and simple techniques that help protect water resources from the home well to Long Island Sound.

Managing Your Household Chemicals

Your Home Contains Hazardous Chemicals

Household products are potentially hazardous if they pose risks to people, animals or the environment. Many of the chemicals that are used in everyday activities can be poisonous when they enter aquatic systems (lakes, ponds, streams or estuaries such as Long Island Sound) and can also contaminate area drinking water supplies. The U.S. Environmental Protection Agency estimates that the average household in America generates 20 pounds of hazardous household wastes annually. The typical home also stores 100 pounds of hazardous wastes.

How Do You Know if a Product is Hazardous?

Hazardous chemicals fit into one of the following categories:

CORROSIVE – able to eat through other materials;
FLAMMABLE – can ignite or burn readily;
REACTIVE – will undergo rapid chemical change such as bubbling or explosion if improperly used;
TOXIC – poisonous, can cause severe illness or death if inhaled or swallowed.

Many household products have cautionary labeling. The purpose of cautionary labeling is to alert consumers to potential human health hazards resulting from improper use. The Federal Hazardous Substance Act requires household cleaning products to be labeled by manufacturers as follows:

CAUTION or WARNING – Risk is minor; permanent damage not likely to result with first aid treatment
DANGER – Risk is substantial; typical for flam-

mable, corrosive or toxic products
POISON – Extremely risky; a severe hazard; (uncommon on household products).

Cautionary labeling does not apply to environmental hazards resulting from improper use. Some products with no or low-level cautionary labeling may cause significantly more harm to the environment than they would to human health.

Protect Yourself, Your Family, Your Community

You can prevent human health and environmental problems, and save some time and money by making wise choices in the purchase and use of hazardous household products.

At the Store:

- Read labels thoroughly.
- Select products with the least cautionary labeling.
- Compare products.
- Seek the least hazardous products to accomplish the job.
- Products mixed with water are better for the environment.
- Select the right products.
- Buy products with safety closures.
- Choose products with environmental friendly packaging (i.e., recyclable symbols).
- Look for concentrates, which use less packaging.
- Purchase the smallest amounts needed.

At home:

- Follow directions on products.
- Consider using all-purpose products to accomplish multiple tasks.
- Discover safe, tested, alternative products that may also save you money.
- Store cleaning chemicals safely in locked cabinets in the kitchen, garage and hobby areas, away from children, the sun, heat, and ignitable sources.

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Exhibit XIII (Cont'd)



- Store pressurized containers away from heat sources and moisture to prevent explosion and rusting.
- Use products in well-ventilated areas.
- Store products only in original containers.
- Dispose of containers when empty; don't reuse.
- Do not mix commercial chemicals.
- Use appropriate landscaping techniques to reduce chemical applications.
- Do not use septic system additives. Some may actually damage your system.
- Wear protective clothing – long pants, long sleeved shirts, gloves, goggles, closed shoes and hats (in some cases) as recommended on the label.
- Dispose of cleaning rags in a safe manner to avoid spontaneous combustion.
- Keep fire extinguishers handy throughout your home. (Check with your fire department for recommended type.)
- Do not burn or bury leftover oil, chemicals, paints, pesticides or containers.
- Do not pour leftover products down storm drains or on the ground.
- Do not wash chemicals down impervious

surfaces (paved driveways and sidewalks).

- Never pour chemicals down the sink or storm drain.
- Do not apply pesticides on windy days.

If chemical spills do occur, clean up with an absorbent material like kitty litter or sawdust to avoid dispersion.

You can reduce the amount of cleaners used by following some practical household tips:

- Clean up messes when they occur. Stronger cleaning products may be required to remove stains once they set.
- Use water or a dampened cloth whenever possible to polish or eliminate spills.
- Reduce mildew in bathrooms by installing an exhaust fan. Squeegee shower walls after bathing.
- Pour fat/grease in metal containers, not down the drain.
- Wipe up oven spills promptly after cooking.
- Vacuum rugs frequently to reduce the necessity of shampooing.
- Regularly bathe pets and comb with a flea comb.

In Your Community:

- Follow your community recycling guidelines.
- Share unused products with others (in a clearly labeled container).
- Participate in community hazardous chemical collection days.
- Think about how your actions could affect others.
- Be a neighborhood advocate for safe home management and product practices.

Make Your Own Non/Low Toxic Household Cleaners

By making your own cleaning products, you can: promote a healthy environment, reduce chemicals going to landfills or incinerators, save money, eliminate cluttered cabinets, and easily prepare the right amount of cleaner for any job.

Exhibit XIII (Cont'd)

Follow these safety tips when making and using homemade cleaners:

- Ventilate the area.
- Wear gloves.
- Wear protective clothing and shoes.
- Avoid contact with skin and eyes.
- Store cleaners in labeled, non-food containers.
- Lock cleaners in a cabinet out of children's reach.
- Rinse surfaces thoroughly with water before applying a different product.
- Do not mix different products.
- Keep products away from heat, cigarettes, and flammable sources.
- Keep the telephone number of the nearest poison control center handy.
- Dispose of empty containers by following recycling instructions in your community.

Cleaning Supply List

These items can be purchased at most super-markets and discount or hardware stores.

Products	Supplies
Baking Soda	Aluminum Foil
Chlorine Bleach*	Bucket
Lemon Oil	Cleaning Cloths
Mineral Oil	Gloves
Salt	Measuring Cups
Soap Flakes	Measuring Spoons
White Vinegar	Non-food Containers
Whiting**	

* Chlorine bleach compounds are toxic to aquatic organisms in **very** low concentrations but are **less** toxic than many other cleaning products. Consider using chlorine as a cleaning agent only when necessary for heavy cleaning jobs.

**Whiting (calcium carbonate) is available at hardware and paint stores.

Air Fresheners

- Open windows
- Circulate air with a fan or air conditioner
- Place cut lemons or baking soda in a dish
- Boil cinnamon and cloves in water

All Purpose Cleaners

- Mix 1/4 cup baking soda and 1 quart warm water. Wipe surface with sponge, then dry.
- **Soap Jelly** can be made by adding 1 cup of shaved soap flakes or leftover soap pieces to 1 quart of boiling water. Stir until dissolved. Pour into jar and let cool. Mix with water as needed.

Aluminum Cleaners

- Soak in a solution of 1/4 cup white vinegar to 1 quart water; boil if necessary.
- Soak in a solution of 2 teaspoons cream of tartar in 1 quart of water; boil if necessary.

Bathroom Cleaners

- Mix 1/2 cup chlorine bleach and 1 cup water. Spray on tile to remove mildew. Let stand for ten minutes. Rinse with water.
- Mix 1/4 cup baking soda and 1 quart water. Wash with sponge, wipe dry.
- Remove tub stains by scrubbing with a paste of cream of tartar and hydrogen peroxide.
- Remove copper stains (green) by using salt and vinegar or salt and lemon juice.
- Remove lime deposits with vinegar.

Brass and Copper Cleaner

- Mix 2 tablespoons salt, 1 tablespoon lemon juice and 1 tablespoon vinegar. Rub with sponge and let dry. Rinse with hot water, then dry with soft cloth.

Chrome Cleaner

- Mix 1/4 cup baking soda with enough water to make a paste. Rub on, rinse with water, then dry.
- Apply whiting on a damp cloth.

Disinfectants

- Mix 1/4 cup bleach to 1 quart water
- Mix 1/2 cup borax to 1 gallon hot water.

Drain Cleaners

- Use drain traps.
- Pour boiling water down the drain.
- Use a plunger or plumber's snake.
- Mix 1/2 cup baking soda, 1/2 cup vinegar and 1/2 cup boiling water. Pour into drain. Let stand.

Exhibit XIII (Cont'd)



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**Floor Wax Remover**

- Mix 3/4 cup dry detergent, 1 gallon hot water and 1/3 cup ammonia. Spread solution on a small area and let stand a few minutes. Scrub to remove wax. Rinse floor thoroughly. Let dry.

Furniture Polish

- Mix 1 teaspoon lemon oil and 1 pint mineral oil. Spray on furniture; wipe clean with soft cloth.
- Mix 1/4 cup linseed oil, 1/4 cup vinegar and 1/2 cup lemon juice. Rub into wood with soft cloth.

Household Insecticides (For Plants)

- Mix 1/2 teaspoon shaved soap flakes and 1 quart water. Wash leaves with soap solution, rinse with water. Large plants can be rinsed in the shower. (Do not use on plants located in low light.)

Household Pests

- Contact the UConn Home and Garden Center (toll free) @ 1-877-486-6271.

Marble

- Mix 1 tablespoon baking soda and 1 quart water. Wash with sponge, wipe dry.

Mothballs

- Store clean clothing in airtight chests or containers.

Oven Cleaner

- Make a paste of equal parts of salt, baking soda and water. Apply to walls of oven. Let stand for five minutes, wipe clean with a damp cloth. (Use a brush on heavy spills). Do not allow baking soda to touch wiring or heating elements.

Paint Brushes

- Place hardened paintbrushes in a bowl of hot vinegar for ten minutes. Rinse thoroughly.

Painted Surfaces

- Dust and vacuum surface before applying liquid solutions. Use a well-wrung cloth dipped in the cleaning solution. Starting from the baseboard, work upwards toward the ceiling to prevent streaking. Clean small areas at a time. Rinse with water, then dry.

- Mix 1/4 cup soap jelly (see **all-purpose cleaners**) and 1 gallon hot water. Wash walls with cloth dipped in this mixture.
- Mix four parts whiting to one part soap jelly to clean heavily soiled areas. Rub carefully on soiled areas. Rinse with water and let dry.

Refrigerator

- Mix 1/2 cup bleach and 1 gallon water. Wash refrigerator interior, wipe dry.

Silver Cleaners

- Line an aluminum pan with a piece of aluminum foil.
- Mix 1 teaspoon baking soda, 1 teaspoon salt and 1 quart hot water. Add silver and boil for three minutes. Remove silver, wash with detergent, rinse and dry. (Do not use on silver jewelry).

Toilet Bowl Cleaner

- Add 1/2 cup bleach to toilet. Let stand for a half-hour. Scrub bowl with brush and flush.

Upholstery Shampoo

- Mix 2 teaspoons mild detergent, 1 teaspoon water softener and 1 pint warm water. Whip into a foam with electric beater. Vacuum furniture. Test foam for color fastness in an inconspicuous area. Apply foam gently with a sponge or soft brush in a circular motion. Rub until foam disappears. Do not saturate fabric. Dry rapidly with fans.

Whiting

- Sprinkle whiting on surface. Rub with soft damp cloth to polish chrome or porcelain and remove metal marks on stoneware.

Window Cleaner

- Add 2 tablespoons vinegar to 1 quart warm water. Spray on windows and wipe dry.

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For more information contact: Connecticut Sea Grant,
1084 Shennecossett Rd. Groton, CT 06340
www.seagrants.uconn.edu

Exhibit XIV



Clean Waters

Starting in Your Home and Yard

Animal Waste and Water Quality

Clean Waters is a collaboration of the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System's NEMO Project, educating individuals about the impacts of everyday activities on water quality and simple techniques that help protect water resources from the home well to Long Island Sound.

It's first thing in the morning and the dog wants to go out right NOW, the cats are standing by their litter box waiting for some fresh kitty litter, and your toddler is demanding a trip to the park to feed the ducks. While none of these activities may sound like a major threat to the environment, animal waste is one of the many little sources of pollution that can add up to big problems for water quality and may cause human health problems as well. While most people connect animal waste problems to agriculture, studies have shown that pets, waterfowl and other urban wildlife waste can cause significant water pollution problems.

Animal waste contains several types of pollutants that contribute to water quality problems: nutrients, pathogens and a naturally toxic material, ammonia. When animal waste ends up in a lake, stream, or Long Island Sound, it decomposes, using up oxygen and releasing its pollutant load. During summer months when the water is warm, the combination of low oxygen levels and ammonia can kill fish and other aquatic organisms. The nutrients cause excessive growth of aquatic weeds and algae. When these conditions make the water murky green and smelly, or when the surface of the water is completely covered with a thick mat of vegetation, the area becomes unattractive or unusable for swimming, boating or fishing.

Pathogens, the disease-causing bacteria and viruses associated with animal waste, can also make water unsafe for human use. If pathogens or the indicator bacteria associated with animal waste are found during water testing, shellfish beds may be closed to harvest, beaches may be closed to swimming and drinking water supplies may require expensive filtration or disinfection.

Fortunately, there are some simple practices everyone can do to help prevent pollution by keep-

ing animal waste out of the water. While it may seem easier to ignore the problem of animal waste, remember that you are protecting not only the environment but also your own health.

Keeping Animal Waste Out of the Water

1. Pick up after your pet. Preventing water pollution can be as simple as remembering to take along a plastic bag or pooper scooper when you walk your dog. For both "quality of life" and public health reasons, many communities actually have laws requiring anyone taking their animal off of their property to immediately clean up the waste after the pet relieves itself. Your choices once you have picked up the waste include:

- Flush it down the toilet so the septic system or sewage treatment plant will treat it in the same manner as human waste.
- Put it in the trash. This is less effective, as waste that ends up in a landfill may still cause pollution problems. Putting animal waste in the trash is actually against the law in some communities.
- Bury it in your yard. The microorganisms in the soil will

break down the waste and release the nutrients to nearby plants. Make sure the hole is at least five inches deep and located away from vegetable gardens, children's play areas, or any lake, stream, wetland, well or ditch. **CAUTION:** Don't bury waste in your compost pile. The pile does not get hot



**PLEASE
CLEAN UP
AFTER
YOUR PET**

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December 1999

Exhibit XIV (Cont'd)

Judy Ricketts-White



enough to kill the pathogens and using the compost could cause illness.

- Install an underground pet waste digester. These function like small septic tanks. Before buying one, check for local laws that

does them no good and may cause long-term health problems.

Feeding waterfowl also tends to cause the birds to concentrate in numbers higher than can be supported by the natural food supplies. This can cause problems in the winter months when fewer people come to the park or shore with food. There have been cases along the Connecticut shoreline where swans were so used to being fed at a particular location that they remained in the area long after the feeding stopped, became too weak to fly someplace with a better food supply, and eventually died of starvation. These large flocks of birds also create large quantities of waste and the serious water pollution problems described earlier in this fact sheet.

4. Dispose of kitty litter properly. When cleaning out the litter box, a two-step approach is most effective. Cat waste may be scooped out and flushed down the toilet, and the used litter should be bagged, sealed and placed in the trash. Dumping the entire contents of the litter box down your toilet will cause plumbing problems and prematurely fill up your septic tank or sewer system with indigestible material, but sending untreated cat waste to the landfill can cause pollution problems.

While it may not seem like a big deal if one more dog, cat or bird "contributes" some waste to the neighborhood environment, think about how many animals there are out there. Animal waste may not be the biggest or most toxic pollutant going into your local waters, but it is one of those little problems that, when all the pieces are added together, leads to serious environmental and health problems. So please think twice about your pet's bathroom habits and do your part to help keep our waters and environment clean.

Reference: J.A. Hill and C.D. Johnson. *Pet Waste and Water Quality*. Wisconsin Nonpoint Source Water Pollution Abatement Program. January 1992.

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may restrict their use or location.

2. Keep your yard clean. While there are no laws requiring you to clean up animal waste on your own property, there are good reasons to be careful where you leave it to decay. Some diseases can be transmitted from pet waste to humans through soil contact. Children who play outside and adults that garden are most at risk for infection, so cleaning up waste from play and garden areas is especially important. Washing hands with anti-bacterial soap and water after working or playing in the dirt is the best protection from disease.

Some of the more common waste-borne diseases and their symptoms are the following. *Campylobacteriosis* causes diarrhea in humans. *Salmonellosis* has symptoms including fever, headache, vomiting and diarrhea. *Toxocariasis* is a roundworm that may cause a rash, fever, and cough or vision loss. *Toxoplasmosis*, a protozoan parasite that can cause severe birth defects if a woman becomes infected during pregnancy, is the reason pregnant women are told to avoid handling used kitty litter. This parasite can also cause problems for people with weak immune systems. Symptoms include headache, muscle aches and lymph node enlargement.

3. Don't feed waterfowl. While one of the pleasures of a trip to the park has always been taking stale bread to feed the ducks, the environmental and health impacts of this activity for both humans and birds can be serious. While ducks, geese and swans all love bread, it lacks in the nutrients and roughage of their natural diet. Feeding these birds bread is similar to feeding a small child a diet of candy and soda; they may love it, but it



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Exhibit XV



Starting in Your Home and Yard

Lawn Care the Environmentally-Friendly Way

Clean Waters is a collaboration of the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System's NEMO Project, educating individuals about the impacts of everyday activities on water quality and simple techniques that help protect water resources from the home well to Long Island Sound.

Americans devote an amazing amount of time and money to cultivating the "perfect" lawn. Literally BILLIONS of dollars are spent each year to re-seed, irrigate, and de-thatch lawns. Tons of water, lime, fertilizers and pesticides are applied, with potentially serious environmental and human health consequences, in order to create an expanse of green without the biodiversity or ecological structure of the plant community it replaces. While lawns have roles in the home landscape, including covering septic fields and serving as play areas, they do not have to be meticulously managed to be healthy and look good. Understanding a lawn's environmental needs and tailoring lawn care practices to suit local conditions allows for a dense, healthy, environmentally friendly lawn with less work and expense.

KNOW YOUR GRASSES

Cool-weather turfgrasses flourish in the spring and fall and some can spread by growing lateral stems across and below the soil surface. These grasses, including bluegrasses, fescues, ryegrasses and bentgrasses are not native to New England but have adapted to this environment through three hundred years of natural selection. These grasses still grow best with cool temperatures and adequate moisture and tend to go dormant or semi-dormant during hot, dry weather.

New England's native grasses include both cool-weather grasses and warm-weather grasses, which "green up" later in the spring and grow as a slowly expanding bunch or clump. Zoysia grass, a non-native, warm weather grass, grows best in hot temperatures, providing a green summer lawn, but it browns out early in the fall and is VERY slow to "green up" in the spring.

Different grass species have varying tolerances to the range of growing conditions found even within

one yard. Conditions that can affect turfgrass growth include shade, excessively well-drained or poorly-drained soils, low pH or acid soils, low nutrient availability, high salt concentrations, and heavy foot, play, or animal traffic. The major reason for lawn failure is the improper match of selected grass species to site conditions. An evaluation of the lawn area before selecting a grass seed mix or sod type can go a long way toward preventing lawn problems.

KNOW YOUR SOIL

A soil test is one of the most important steps in maintaining a healthy lawn. Soil pH, organic matter and fertility (or nutrient availability) all affect grass growth. Proper soil pH (6.2 to 6.5) enhances the ability of grass to use available nutrients, tolerate drought, and resist diseases. Most soils in New England are more acidic (lower pH) than is optimal for grass, so soil pH is adjusted by applying limestone, in powder or pelletized form.

Limestone can be applied, at a rate of no more than 50 pounds per 1,000 square feet, at any time the ground is not frozen.

Organic matter in the soil helps the soil hold water and provides some nutrients. If soil is low in organic matter, compost can be spread in a very thin layer over the surface or tilled in to gradually increase the organic content. Leaving grass



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June 2000

Exhibit XV (Cont'd)

ALL GRASSES ARE NOT CREATED EQUAL							
	Shade Tolerance	Drought Tolerance	Wet Soil Tolerance	Low pH Acid Soil Tolerance	Low Fertility Tolerance	Salt Tolerance	Traffic Wear Tolerance
Fine Leaf Fescues	XX	XX	☹	X	XX	☹	☹
Roughstalk Bluegrass (M)	XX	☹	XX				☹
Supina Bluegrass (M)	XX	☹					XX
Tall Fescue	X	XX	XX	XX	X	XX	XX
Zoysia grass	X	XX	X	X	X	X	XX
Kentucky Bluegrass	☹	X	X	☹	☹	☹	X
Canada Bluegrass (C)		XX					
Redtop (C)		XX	XX				
Perennial Rye Grass	☹	X	X	☹	☹	X	X
Key XX = Excellent (M) = moist conditions required X = Good (C) = for conservation or erosion control areas ☹ = Poor							

clippings on the lawn after mowing also adds organic matter to the soil.

Lawn health can be affected by soil compaction, as when heavy equipment is driven over the lawn area. Compacted soils prevent water infiltration and deep root growth. Soil coring or aeration helps correct this problem by loosening soils. Spring or Fall is the best time to address compaction. Check for soil compaction by cutting both ends off a large can – like a coffee can. Pound one end at least two inches into the ground. Fill the can with water and measure the water height, then time how long it takes for the water to filter into the ground. A minimum infiltration rate for Connecticut soils would be 0.5 to 1 inch per hour. Anything slower would indicate the soils are probably compacted. [Example calculation: If a full can has 5 inches of water and the water takes 12 hours to completely empty from can, the infiltration rate is 5/12 or 0.42 inches per hour.]

KNOW YOUR FERTILITY

Before adding ANY fertilizer to the lawn, consider all the "free" sources of nutrients. Rainfall provides about one-half pound of nitrogen per 1,000 square feet every year. Lesser amounts of phosphorus and sulfur also come with the rain. Lawns that have clover in their plant mix require less nitrogen since the clover "fixes" nitrogen and makes it available to the surrounding plants. Leaving the grass clippings on the lawn after mowing is the best kind of fertilizer.

Research at the University of Connecticut shows that recycling clippings in place reduces the need for supplemental fertilizer applications by 50 to 100 per cent!

If you must fertilize, avoid over-fertilization by following soil test recommendations. Choose a fertilizer formulation that most closely matches what the soil lacks. Slow-release fertilizers improve the chances

Exhibit XV (Cont'd)

that nutrients will remain in the root zone until the grass can use them. For additional water quality protection, use organic fertilizers if possible. Organic formulas combine the benefits of slow nutrient release with the addition of organic matter to the soil. Organic fertilizers may also help reduce some turf disease problems.

Turf type will determine the annual amount of fertilizer required for a healthy lawn. Never apply more than one pound of nitrogen per 1,000 square feet at one time. To determine what is one pound of nitrogen, divide the first number on the fertilizer bag into 100. The result is the amount (in pounds) of fertilizer that should be applied to 1,000 square feet of lawn. Fine and tall fescue-type lawns require only one (September) or two (May and September) applications per year. Bluegrass lawns generally require three applications. Recommended application times coincide with three holidays: Memorial Day, Labor Day and Columbus Day.

To ensure best plant use of fertilizers and to reduce potential water quality problems, New England lawns should never be fertilized before April 1 or after October 15. Always check the weather and avoid applying fertilizer before heavy rainstorms or during long, dry spells.

KNOW YOUR WATERING SCHEDULE

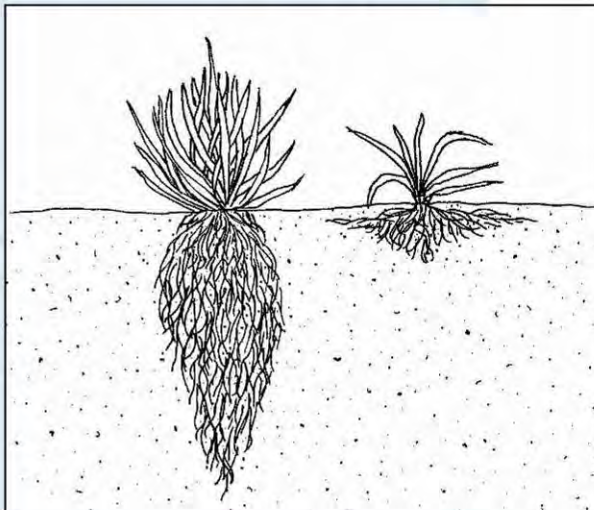
Most lawns require about one inch of water per week, either from natural rainfall or irrigation. Some homeowners like to water their lawn for a few minutes several times a week, but this practice actually weakens the grass by discouraging deep root growth. To promote deep root growth and drought resistance, use a rain gauge to keep track of rainfall. If Mother Nature has not provided an inch of rain in a week, then apply an inch of water. Measure watering levels by placing a tuna fish or other shallow can under the sprinkler system. Don't apply water faster than the ground can soak it up. If water runs off the lawn, slow down the watering.

During prolonged dry spells, it is better to let the lawn go dormant than to stress the grass by watering and forcing it to grow. Stressed grass is susceptible to pest and disease problems. Fine fescues and turf-type tall fescues are the more drought-tolerant of the common lawn grasses. Bluegrasses,

ryegrasses and bentgrasses may require supplemental water to survive drought conditions.

KNOW YOUR PESTS

The best tool for pest management is to plant grass varieties suitable for the site's growing conditions, and then to avoid stressing them with poor lawn care practices. Weeds have a hard time invading a dense, healthy lawn. When establishing a new lawn or overseeding an old one, take advantage of a natural pest control by looking for "endophyte-enhanced" seed vari-



Judy Ricketts-White

eties. Certain fescues and ryegrasses contain a fungus that produces compounds that reduce certain insect and disease problems. As these varieties also tend to be more drought-tolerant, water and pesticide use can be reduced at the same time.

Scout your lawn for pest problems frequently; catching a problem early makes it easier to correct. If you find a problem, take time to determine:

- What is causing the problem?
- What is the potential for damage?
- What is the best approach to solve the problem?

Correct identification of pest problems is CRITICAL. It does no good to spray grub control pesticides on brown spots in your lawn if they were actually caused by a fungus or dog urine.

Reduce your use of, and exposure to, pesticides by only treating the problem area. Avoid the use of

Exhibit XV (Cont'd)

combination fertilizer-pesticide products, which force you to treat your entire lawn. You should also avoid applying pesticides according to a calendar UNLESS you have had a problem for several years and a pesticide is the ONLY means of control. When pesticide use is necessary, ALWAYS READ THE ENTIRE LABEL! Products should be chosen and treatments timed to be most effective in dealing with the pest and least likely to damage natural controls or be carried to other parts of the environment.

KNOW YOUR LAWN MOWER

How a lawn is mowed can help or hurt lawn health. Even the choice of lawn mower and its maintenance can make a difference. Gas-powered lawn mowers produce the same amount of air pollution in one hour as driving a car for 350 miles. Consider electric power or reel-type push mowers if you have small lawn areas to manage. Keep the mower blade sharp so grass blades are cut cleanly, reducing moisture loss and limiting disease spread. A mulching blade cuts grass clippings into very small pieces so they can be left on the lawn without clumping.

Always try to mow when the grass is dry to prevent spreading disease problems. Mow the lawn to the recommended height for the grass variety but never less than two inches. Grass plants have a hard time recovering from mowing if they have little blade left with which to photosynthesize. Reduce plant stress by never removing more than one-third of the blade at a time. Recommended mowing heights are:

- Tall fescues: 2.5 - 3 inches
- Perennial ryegrass/fine fescues: 2 - 3 inches
- Kentucky bluegrass: 2.5 inches
- Zoysia grass: 1 inch (an exception)

UNDERSTAND THATCH

Thatch is a dense layer of dead grass stems and roots that develops between the soil surface and the green grass blades. Contrary to popular belief, grass clippings do NOT contribute to thatch problems. Heavy thatch reduces water infiltration into the soil. Some grasses (fine fescues, Kentucky bluegrass) are prone to thatch problems; others (tall fescues, perennial ryegrass) are not. Serious thatch problems are usually a sign of poor lawn care practices, such as

over-fertilization and improper mowing. De-thatching, best done in the fall, is recommended for lawns with more than one inch of thatch build-up. Top-dressing the lawn with a thin layer of good topsoil will also help control thatch.

ADDITIONAL RESOURCES

There are lots of excellent fact sheets available from The University of Connecticut Cooperative Extension System that cover lawn and pest problems in great detail. Call the University's Home and Garden Education Center, toll-free, at 877-486-6271 or check out the website at <http://www.lib.uconn.edu/canr/HomeGard/> (case-sensitive).

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The Connecticut Sea Grant College Program, based at the University of Connecticut, is part of a national network of university-based programs sponsoring coastal and marine-related research, outreach and education.



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Exhibit XVI

Clean Waters

Starting in Your Home and Yard



Clean Waters is a collaboration of the Connecticut Sea Grant Extension Program and the University of Connecticut Cooperative Extension System's NEMO Project, educating individuals about the impacts of everyday activities on water quality and simple techniques that help protect water resources from the home well to Long Island Sound.

Conserving Water at Home

Water is a precious natural resource that benefits all living things. It provides nourishment for people, animals

and plants, and serves as the living environment for aquatic life. Maintaining a safe and adequate water supply is everyone's responsibility. The daily actions of individuals and communities directly impact water supplies. By making sensible choices, people can preserve and protect household water.

Water conservation has personal and economic impacts. Especially during drought conditions, homeowners can extend their water supply by practicing conservation year round. An extended water supply provides an added measure of safety, protects lawns and gardens, and enables people to enjoy modern conveniences which often are taken for granted, such as a consistent water supply and plumbing that operates as designed. Water consuming appliances may not produce the expected results during drought conditions (e.g., laundry may appear discolored).

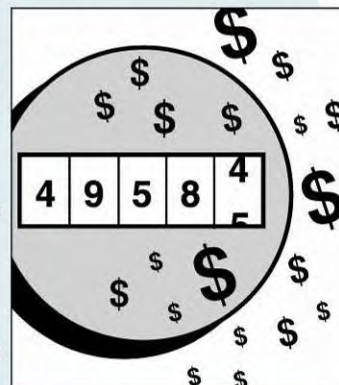
Municipal customers save money on water, sewer, energy and potential tax bills by practicing conservation. Municipalities that consume substantial amounts of water typically increase taxes in order to construct sewage treatment plants that can adequately handle the volume and lessen the load on existing systems. It is preferable for communities to improve water treatment technology, rather than build additional treatment plants. Both municipal and household sewage treatment systems require water in order to function. As water consumption increases, costs increase. For homeowners on private septic systems, the tank must be pumped more frequently with increased water use. As septic systems experience greater stress, they are likely to require replacement more frequently, costing thousands of dollars.

DEVELOP WATER SAVING HABITS

Modify your household water usage patterns by involving every person in your home. Children can get really excited if you make it a game and are a source of inspiration for the entire family!

In the bathroom...

- Shorten shower time (use a minute timer) and install low-flow-showerheads (that deliver 1.5 gallons of water per minute) with shut-off valves (for turning water off temporarily while soaping or shampooing) and aerators (screens that introduce bubbles, producing a feeling of greater water pressure). These devices are easily installed and very cost effective.
- Run hot water very briefly before getting in the shower. When taking a bath, close the stopper from the start and then let the water rise in temperature in the bathtub.
- Install low-flow faucet fixtures and repair leaks promptly. A leaky faucet can result in a daily loss of fifteen gallons of water. Encourage family members to turn faucets off tightly when not in use; turn the water on and off while brushing your teeth or partially fill the basin while shaving to save up to ten gallons of water daily. Continuously running water is very wasteful.
- Toilets are the major water consumers in most homes. Consider replacing older toilets with ultra-low-

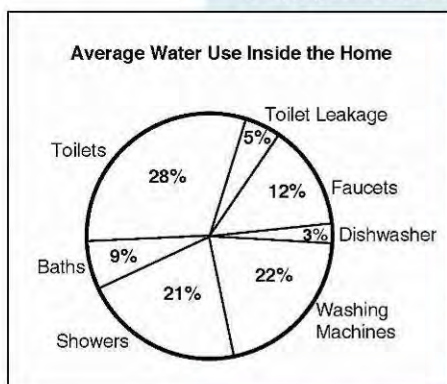


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Fact Sheet

June 2000

Exhibit XVI (Cont'd)



flush (ULF) models. Traditional toilets use about 3.5 to 7 gallons of water per flush, depending upon their age. ULF models use about 1.6 gallons per flush and are characterized by efficient bowl and discharge designs, compatible with existing plumbing fixtures.

If toilet replacement is not feasible, be sure to check all household toilets for leaks by placing three drops of food coloring

inside the tank. If the food coloring appears in the bowl without flushing, a leak is present. The trip mechanism may not be attached properly; or the flushball/flapper may be old and distorted in shape or may not be making the right contact with the ball seat and needs to be replaced. If the valve is not shutting off, the float ball may either need to be adjusted or repaired/replaced if defective. Occasionally, the ball seat may be the source of the problem that can be solved by cleaning, repairing or replacing the seat.

Installing a dual flush mechanism on an existing toilet is another option until the toilet can be replaced. With this mechanism the user can choose between two different water settings.

- Remind family members to dispose of kitty litter, tissues, paper towels, cigarettes and other litter in wastebaskets...not the toilet!

In the kitchen...

- Run the sink for the minimum amount of time necessary to clean dishes, food, pots and pans and other items. Soak dishes in a dishpan, if necessary. Rinse all vegetables at once. Avoid running water continuously when performing kitchen tasks!
- Replace faucets with water-saving devices and check valves for leaks.
- Use the minimum amount of detergent (low-sudsing) to avoid excessive rinsing of dishes and countertops.
- Apply elbow grease and a sponge or scrubber to clean sinks. Do not use lots of water to remove debris from sinks.
- Store a pitcher of cold water in the refrigerator so

you will avoid running water until it gets cold.

- Research has shown that automatic dishwashers use less water than hand dishwashing. Measure detergent, select water and energy conserving cycles, run only full loads and avoid excessive pre-rinsing.
- Boil only as much water as you need in a tea kettle or covered pot (with a lid) and turn it off as soon as it boils to reduce evaporation and waste.
- Dispose of vegetable scraps in a compost pile; the garbage disposal wastes water.

In the laundry...

- Sort clothing, pretreat stains, select the load size which corresponds to the quantity of clothing you are washing, measure detergent, and use the recommended water temperature.
- When purchasing a washing machine, consider new front-loading models that consume only 30 percent of the water of traditional top-loading models.

In the household...

- Inspect your water meter for leaks by reading the meter (number) at night (after family members have stopped using water). The next morning, before anyone uses water, check the number on the meter again. If the number has changed, there is a leak in the system. Assuming leaks in household faucets/appliances have already been corrected, have the piping system inspected to determine the source.
- It is preferable to select household cleaners that do not require rinsing with water. For cleaners requiring hydration, measure and make the minimum amount needed.

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or Connecticut Sea Grant, 1084 Shennecossett Rd., Groton, CT 06340 www.seagrant.uconn.edu



The Connecticut Sea Grant College Program, based at the University of Connecticut, is part of a national network of university-based programs sponsoring coastal and marine-related research, outreach and education.



Exhibit XVII



fact sheet

Tips For Maintaining Your Home Heating System:**Prevent Heating Oil Leaks and Spills**

Cleaning up oil leaks from home heating systems can be very expensive. The average cost can range between \$20,000 and \$50,000, with some cleanups costing significantly more. Here are some ways to save money, help prevent leaks and spills, and protect the environment.

For all heating oil systems:

- Annually:
 - Inspect for leaks. Look at the tank, fuel delivery line, valves, piping, and fittings.
 - Have your oil company:
 - Clean the furnace and repair or replace damaged parts. A well-maintained furnace means lower fuel bills and cleaner emissions.
 - Install an oil **safety valve** or replace the fuel delivery line with one encased in a **protective sleeve**. These are inexpensive upgrades. Contact the fire department to determine if a permit is required for this work.
 - Each fall, inspect the vent pipe to ensure that it is free of obstructions and that an audible signal (whistle) is on the vent. Oil company personnel listen for the whistle to help avoid overfills, a common source of spills.
- At least every 10 years, have the oil tank cleaned out. Over time, water (from condensation) and sludge can cause corrosion resulting in leaks.
- When appropriate:
 - Remove abandoned fill and vent pipes immediately.
 - Clearly mark the location of the tank's fill pipe.
 - Consider upgrading to a modern, fuel-efficient furnace.

Typical Above-Ground Home Heating Oil System

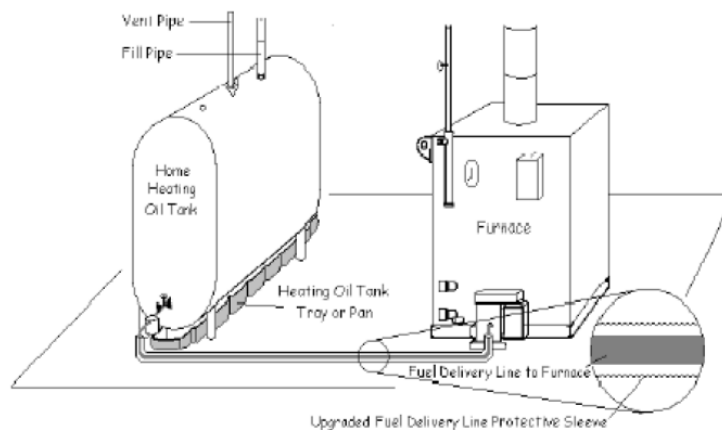


Exhibit XVII (Cont'd)

Massachusetts Department of
Environmental Protection
One Winter Street
Boston, MA 02108-4746

Commonwealth of Massachusetts
Mitt Romney, Governor
Kerry Healey, Lt. Governor

Executive Office of
Environmental Affairs
Ellen Roy Herzfelder, Secretary

Department of
Environmental Protection
Robert W. Gollidge, Jr.,
Commissioner

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1/02/rev. 5/04.
Printed on recycled paper

This information is available in
alternate format by calling our ADA
Coordinator at
(617) 292-5565.



- Determine if the underground storage tank is made of steel (common) or fiberglass (rare). Most steel underground storage tanks will last approximately 10 to 20 years. If the tank is older than that or the age is unknown, replace it with an above-ground storage tank. Locate your new tank under a shelter, or inside a basement or garage, to prevent rust, corrosion, or damage.

For outdoor above-ground tanks:

- Ask your oil company to inspect the stability of the above-ground tank. A full 275-gallon tank weighs more than 2,000 pounds! They have metal legs and should sit on a concrete pad. If the legs become loose or the pad cracks, the tank can fall over and rupture.
- Replace an outdoor above-ground storage tank that has been uncovered for 10 years or longer. These tanks rust from the inside out, so cleaning or painting the outside does not usually prolong their life.
- Protect the tank from the weather, such as falling snow and ice, and prevent ruptures by tree limbs.

For indoor above-ground tanks:

- Inspect indoor above-ground storage tanks for signs of pitting and corrosion, particularly at the bottom of the tank. Tanks primarily rust from the inside out, so if signs of aging are present, replace the tank. Indoor tanks do not last more than about 30 years, and often their lifespan is much shorter.
- Consider placing a plastic heating oil tray or pan under the tank. This makes it easier to keep the tank area clean and help identify and contain small leaks.

If your oil company offers to perform a "tightness test," ask if this could cause a problem. Generally, these tests should NOT be performed on older residential heating oil systems. Because of the pressure used during a tightness test, older equipment can fail, causing a leak or spill. If you have a tank, fuel delivery line, valves, piping, and fittings on which it is inadvisable to perform a tightness test because of age or condition, then it is probably better to replace the equipment that is causing the concern.

Visit our web site: <http://mass.gov/dep/cleanup/laws/facts.htm> to review related documents, including "Heating Oil Delivery Lines" (<http://www.mass.gov/dep/cleanup/deline.pdf>).

If you suspect an oil leak or spill, **immediately** contact your oil company and fire department for assistance. Leaks or spills of 10 gallons or more must be reported to DEP within 2 hours. To report a leak or spill, call DEP (within 2 hours) and the fire department.

DEP's 24-hour statewide emergency response number is 888-304-1133.