COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DRINKING WATER PROGRAM

DEVELOPING A LOCAL SURFACE WATER SUPPLY PROTECTION PLAN

Updated May 2000

Contents

INTRODUCTION

This guidance document outlines the minimum components which should be included in a local Surface Water Supply Protection Plan for filtered reservoirs, provides a step-by-step approach to water supply protection planning, and gives examples of local protection options. **The document is intended to provide water suppliers with a low-cost method of developing a plan using existing information and maps, their own water supply expertise and knowledge of watershed conditions, assistance from volunteers, and input from various individuals and groups.**

Assistance may be obtained from the Executive Office of Environmental Affairs (EOEA) watershed teams which are implementing the Watershed Initiative in the twenty-seven river basins in Massachusetts. The Watershed Initiative is a phased, five-year cyclical program to collect and share water resource information, assess the impacts to water resources, and develop and implement activities to protect and improve them. Water Supply staff in the Department's Boston and regional offices participates on the basin teams and can be contacted for assistance.

Developing a plan to improve watershed protection has many benefits, including: increased protection against waterborne diseases; possible filtration/disinfection cost savings; possible avoidance of disinfection by-products; good public relations; and is an integral part of multiple barrier protection.

An approved protection plan is required to obtain disinfection log credit from the Department under the Surface Water Treatment Rule. Suppliers have obtained up to .5 log credit for having an approved plan and more suppliers may want to apply for credit in anticipation of the Enhanced Surface Water Treatment Rule.

It is important to develop a timetable for implementing the actions identified in the plan. A lead person should be assigned to evaluate progress, assess the timetable annually, update the plan's information as needed and revise the entire plan at least every three years. During the watershed component of the sanitary survey, DEP staff will be available to review the status of watershed protection actions with the water supplier and to provide technical assistance.

The Department is also conducting the Source Water Assessment Program (SWAP), a new federal requirement, to determine the susceptibility of public drinking water sources to potential contamination. Assessments will be developed for the 3000 public water supply sources in Massachusetts by 2003. Assessment results, GIS mapping and recommendations for improving local protection will be provided to suppliers, local officials, community groups and the public.

There are four basic steps for the development and implementation of watershed protection actions.

1. **Delineate**
2. **Inventory**
3. **Protect**
4. **Educate**

The following guidance recommends using these four steps to develop a local Surface Water Supply Protection Plan. **The plan's required components are *two maps*** (or one if the Geographic Information Systems (GIS) map recently distributed by the Department to public surface water suppliers is being used as the base map) **and *seven written summaries***. The GIS map which suppliers received contains most of the watershed characteristics, land uses, and protected open space information which is needed to develop a plan. The seven summaries may be written as seven chapters.

The guidance is divided into a column which shows specific information that must be included in a plan and a column which outlines what actions should be taken by the supplier to obtain that information. Some sections, however, may need to be modified for a particular system. For example, for non-municipal systems, the section entitled *Municipal Land Use Improvements* could be modified to discuss communications with a municipality about such improvements.

Public surface water suppliers may call the DEP offices listed on page 18 with questions about this guidance and to request assistance with developing and implementing a local protection plan. Draft plans may be submitted to DEP staff for preliminary review and comment.

After DEP approved the Surface Water Supply Protection Plan for North Andover, Linda Hmurciak, Assistant Superintendent of the Water Treatment Plant, forwarded a copy to the Town Library and asked that it be displayed during National Drinking Water Week in May. She also enclosed a poster to hang in the library and requested that water-related books be featured in the children's section during that week. Linda calls the protection plan, which was written by staff, "another avenue for education of our source" and says that she subsequently received a request to put more than one copy in the library.

STEP 1: DELINEATE

The first step, DELINEATE, involves mapping. In order to assess and prioritize possible threats to a public drinking water source, the following information related to watershed characteristics, land uses and other activities, at minimum, should be assembled on a map. Most of the information shown below can be found on the GIS map which was distributed to public surface water suppliers in January 1997. Updated maps to use in plans can be obtained by calling the Drinking Water Program at (617) 292-5727. Additional information regarding impacts to your source may be obtained from local, state or federal agencies.

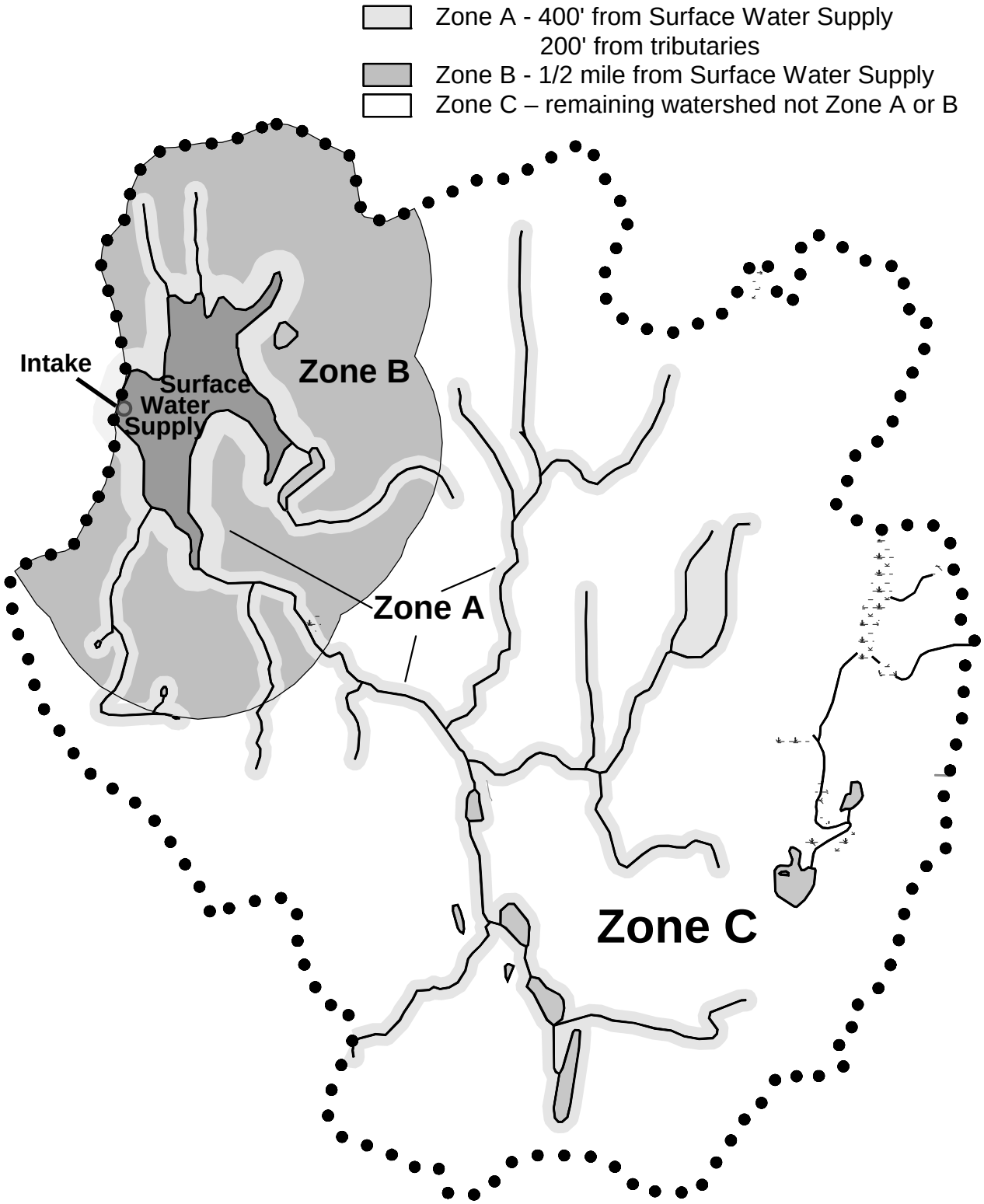
MAP #1 (For base map, may use GIS map provided by DEP)

Watershed Characteristics

The watershed characteristics information required to be submitted on Map #1 helps to show where the areas most vulnerable to contamination are located.

Submit This Information to DEP on Map #1	Action Needed
a. surface drinking water source	confirm location on map
b. surface water supply intake	confirm location on map
c. tributaries	confirm locations on map
d. protection Zones A, B, C for surface sources (see Figure 1)	confirm locations on map
e. drinking water wells	confirm locations on map
f. 100-year floodplain at surface water source	consult FEMA map; delineate on GIS map

Figure 1. **Surface Water Supply Protection Areas**



Land Uses

The following land uses may have negative impacts on drinking water quality and should be prohibited or controlled within Zone A of the surface source. Additional high and medium risk activities should also be controlled within Zones B and C.

Identifying the locations of these activities in the watershed should shape local protection efforts to reduce or eliminate ***existing*** impacts and prevent ***future*** problems.

Submit This Information to DEP on Map #1	Action Needed
g. major existing land uses (high density residential, commercial & industrial areas, private recreation, for example)	confirm locations on map; update map as needed
h. agricultural activities (feedlots, horses, cows, kennels, nurseries, crops, etc.)	confirm locations on map; update as needed
i. permitted solid waste facilities	confirm locations on map; contact DEP Solid Waste for more information; update map as needed
j. state & federal listed hazardous waste sites; other known waste sites within protection zones	confirm locations on map; contact DEP Waste Site Clean-up & local Board of Health for more information; update map as needed
k. permitted wastewater discharges within water supply protection zones	confirm locations on map; contact DEP Water Pollution Control (WPC) & EPA Region I for more information; update map
l. known parking lot, roadway, or other stormwater discharges into surface water supply & tributaries	contact local Highway Dept. & DEP WPC (for permitted stormwater discharges) and delineate on map
m. major roads, railroads, airports within protection zones	confirm locations on map
n. subsurface sewage disposal problem areas which may affect water supply	contact Board of Health, Board of Sewer Comm.; delineate on map

o. areas at water supply where high bacterial readings have been detected in the past	delineate on map
p. other areas of existing or potential impact to water supply: highly erodible soils, steep slope, needed dam repairs, utility rights-of-way using herbicides, sand & gravel excavations, road salt storage areas, planned major projects (airports, expansions of existing land uses, etc.)	delineate on map
q. underground storage tanks (including residential)	contact Board of Health, Fire Dept.; confirm locations on map; update as needed

MAP #2 (For base map: may use GIS map provided by DEP)

The following information, related to *permanently* protected land parcels and local zoning, can be assembled on the GIS map provided in January 1997 by DEP (map shows permanently protected parcels *which are in the GIS database*) or on a separate map. Updated GIS maps to use in plans can be obtained by calling the Drinking Water Program at (617) 292-5727.

Protected Open Space

"Permanent" protection means that the lands will not be sold or developed. Permanently protected parcels may include lands owned by the water supplier, Conservation Commission, nonprofit land trust, some state agencies, or private property upon which activities are restricted for water supply protection through easements, conservation restrictions and other mechanisms.

Mapping permanently protected parcels in the watershed helps to show where additional land acquisition or other types of deed control options are needed. This data, combined with a review of watershed characteristics and historical, present and future land use information, helps to focus land acquisition or other deed control efforts within the areas of the watershed which are the most vulnerable to contamination.

It is important to develop a system for prioritizing properties so that resources can be used to acquire the most vulnerable lands first. Additional criteria used to prioritize parcels for acquisition might include: distance to intake, source, and tributaries; zoning; slope; soil type; extent of bordering vegetated wetlands; wildlife; and proximity to other protected parcels.

Submit This Information to DEP on Map #2	Action Needed
a. protected open space/recreation parcels within watershed	use GIS map provided by DEP or contact MassGIS to obtain a separate open space/recreation map for your watershed; talk with local Assessors and Conservation Commission to confirm information on map; update as needed

Local Zoning

A review of existing local zoning provides a good idea of what types of land uses COULD occur within Zones A, B & C in the future.

Submit This Information to DEP on Map #2	Action Needed
b. current zoning (residential, commercial, business, industrial, farming, other)	refer to town zoning map; transfer information to GIS map or other base map; or submit current zoning map

STEP 2: INVENTORY

The second step to watershed protection, INVENTORY, involves summarizing and prioritizing private and public land uses and activities, which are, or may be, an impact on your surface source.

You may contact the Department's regional offices for information relative to the status of your basin in the five-year cycle and to take advantage of inventories, assessments, and other data which may be available through EOEA river basin teams. The teams collect and share water resource information, assess impacts, and develop and implement activities to protect and improve those resources.

EOEA agencies participating on the teams include the Department of Environmental Protection, Department of Environmental Management, Office of Coastal Zone Management, Department of Fisheries, Wildlife & Environmental Law Enforcement, Office of Technical Assistance, Metropolitan District Commission, and the Department of Food & Agriculture. In addition, teams have invited representation from Mass. Highway Department, Mass. Water Resources Authority, regional planning agencies, conservation districts, and watershed associations.

The Department will be inventorying and mapping potential contaminant sources under the Massachusetts Source Water Assessment Program.

SUMMARY #1

Land Use Impacts

Submit This Information to DEP in Summary #1	Action Needed
a. water supply impacts from EXISTING land uses	review current land uses on Maps #1 & 2; consult with town officials & staff and determine which land uses are impacting--or have the potential to impact--water supply

Existing and future land use activities which may have an impact on surface water sources include: on-site septic systems; public and private recreational activities; municipal uses and facilities; untreated stormwater runoff; public and private forestry practices; uncontained storage of fertilizers, manure, road salt/sand; domestic animals; new construction; sand and gravel excavations; spills along roads and railroads and at commercial and industrial facilities; above ground and underground storage tanks; erosion; unpermitted and unauthorized activities; waste disposal areas; use, storage and disposal of hazardous materials; non-sanitary wastewater.

Submit This Information to DEP in Summary #1	Action Needed
b. potential water supply impacts from FUTURE land uses allowed by current zoning	review land uses on Map #1 and those uses allowed by current zoning on Map #2; consult with town officials and staff and determine what future land uses may impact water supply

Public Access/Recreation Impacts

Submit This Information to DEP in Summary #1	Action Needed
c. existing or potential water supply impacts from public access and recreational activities (trails, other facilities)	summarize use on and near water supply

Examples of impacts from allowing public use of water supplier-owned lands include: erosion, trash, vehicular and pedestrian traffic, parking, unauthorized swimming and other activities, restrooms, and waste from domestic animals.

Wildlife Impacts

Submit This Information to DEP in Summary #1	Action Needed
d. existing impacts or potential water supply impacts from wildlife	review existing local, state, or federal information, or conduct in-house survey of wildlife populations in close contact with surface water supply; summarize

Wild animals, farm animals, and domestic pets can be carriers of waterborne diseases such as Giardia, Cryptosporidium, Salmonella, etc. Animal populations to monitor for include--but are not limited to--gulls, geese and other birds, dogs, horses, beaver, muskrat, and deer.

A wildlife survey need not be an expensive, time-consuming effort. In addition to the first-hand knowledge of the water supplier and staff, information may have already been collected by state and federal wildlife agencies. In addition, interested individuals, professors and students from nearby colleges, members of land trusts, and others can often be recruited to conduct a volunteer inventory.

In-lake Problems

Submit This Information to DEP in Summary #1	Action Needed
e. existing impacts or potential in-lake problems (algae, aquatic vegetation, bacteria)	summarize

Other

Submit This Information to DEP in Summary #1	Action Needed
f. other areas of concern	summarize

SUMMARY #2

Watershed Sampling Plan

Submit This Information to DEP in Summary #2	Action Needed
a. include, at minimum, locations of regular sampling for bacteria & turbidity	review identified impacts and select sampling locations which will give a good indication of the success of watershed protection efforts

STEP 3: Protect

The third step to watershed protection, PROTECT, involves developing actions, and time frames for those actions, to address the land uses and activities which were prioritized for action in the previous section. Unless there is an immediate threat, actions for most protection measures discussed in the plan should be developed on a three-year schedule. The assessments conducted under the Mass. Source Water Assessment Program will include recommendations on how suppliers and others can take action to address impacts to local drinking water sources.

It is important to conduct public outreach throughout the process of developing a local protection plan to disperse information and to obtain input from various groups which have a stake in water supply protection. Outreach efforts are particularly important and useful during the selection and development of protection measures. Outreach should be directed at residents, public officials and staff, community groups, businesses, agricultural entities, and others. Where there are multi-town watersheds, educational efforts should be undertaken regionally. The Department will be conducting outreach to distribute SWAP information to the public and to encourage public involvement in, and support of, local protection measures.

SUMMARY #3

Watershed Control

One option for controlling watershed activities is direct land purchase by the water supplier. It is also possible to acquire control through other means, such as conservation restrictions, easements, purchase of development rights and other written agreements. Under such agreements, the land remains in private ownership and may continue to provide revenue to the owners through activities which are consistent with water supply protection. This type of control should be emphasized within Zone A of the surface water source and within other vulnerable areas, such as where there are, or could be, high impact land uses within Zones B & C.

Submit This Information to DEP in Summary #3	Action Needed
a. prepare 10-year plan for land purchase or control through deed restrictions/easements	review Maps #1 & #2 and target parcels for purchase or deed control for water supply protection; coordinate efforts with local town boards and private land trusts

Water suppliers should have a written management program for each property which is under their control. The program should include regular, logged inspections to look for unauthorized activities, illegal dumping, obstructions to stream flow, deteriorating or missing signs, other maintenance needs, and to check boundaries for encroachment by adjacent landowners.

Municipal Land Use Improvements

Municipal uses within the watershed should be reviewed to ensure that any detrimental activities are identified and corrected. Municipal activities which could have an impact on surface water sources include: road salt/sand use and storage; chemical use and storage; composting and recycling facilities; sites of permanent or one-day household hazardous waste collection events; motor oil collection centers; underground storage tanks; gasoline pumps; vehicle repair operations; public recreation areas; and septic systems.

It is also important to plan for the installation of a municipal sewage collection system where needed, the repair and maintenance of existing water supply distribution lines and the construction of new lines.

Submit This Information to DEP in Summary #3	Action Needed
b. describe plans to eliminate or control municipal activities/ relocate facilities detrimental to water supply; develop schedule for infrastructure improvements	discuss local needs with capital improvement committee and other appropriate town boards to ensure adequate long-term funding of projects

The City of Chicopee, with assistance from the Pioneer Valley Planning Commission and a Clean Water Act s.319 Nonpoint Source Competitive Grant from DEP, has established a Stormwater Management Program and passed a municipal ordinance that instituted a stormwater management fee to be collected from residents The fee is expected to generate $500,000 annually. The Planning Commission created a packet which contains a summary of the project, a step by step guide to developing a local stormwater utility, sample outreach materials and a model stormwater utility ordinance which can be used as a model by others. This project was the first of its kind in Massachusetts.

SUMMARY #4

Public Access/Recreation Control

Submit This Information to DEP in Summary #4	Action Needed
a. develop plan to control	determine what level of

public access on water supply and within adjacent water supplier-owned lands; include provisions for inspections, enforcement, and education	public access is acceptable to protect water supply quality from degradation and vandalism

Measures to control public access/recreation include: replanting eroded areas; rerouting trails away from vulnerable soils, slopes and intake; developing "adoption" program; creating well-defined parking areas; installing and maintaining signs denoting water supply; blocking off vulnerable areas to vehicular and pedestrian traffic; conducting regular inspections; maintaining an inspection log; developing and enforcing rules; and conducting public education. Public access/recreation should be prohibited if appropriate controls, and funds to sustain those controls, are not available.

Wildlife Management

Submit This Information to DEP in Summary #4	Action Needed
b. develop plan to control wildlife contact with surface water supply	determine measures to control wildlife contact with surface water supply

Standard procedures for wildlife management include: regular inspections for wildlife presence near source, especially near intake; appropriate actions, such as use of an air cannon, to deter presence; and regular water quality monitoring to assess wildlife impacts. Nearby landfills and sewage treatment facilities should be contacted to determine whether a gull management program is regularly conducted.

The Metropolitan District Commission (MDC) has Aquatic Wildlife Pathogen Control Zones at Quabbin and Wachusett Reservoirs. Within those designated areas, MDC staff focuses their aggressive gull/waterfowl harassment program. The creation of those zones was based on existing knowledge of pathogens, settling rates, hydrologic modeling and other factors.

The establishment of Aquatic Wildlife Pathogen Control Zones is one component of MDC's Pathogen Prevention Program, which also includes agricultural controls, recreation and access restrictions, sewer construction, on-site wastewater disposal management and extensive vegetated buffer zones.

In-lake Management

Submit This Information to DEP in Summary #4	Action Needed

c. develop procedures for managing in-lake problems (algae, aquatic vegetation, bacteria, etc.), including source sampling for bacteria at least 2 times per year	determine measures to control in-lake problems

Controls for in-lake problems include: conduct regular water quality monitoring and inspections; identify failing septic systems; control public access/recreational uses near surface water source; establish vegetative buffer; eliminate direct stormwater discharges to source and tributaries; and otherwise reduce the quantity of nutrients entering the system from direct/indirect runoff. The Department of Environmental Management's Lakes & Ponds Program may be contacted at (617) 727-3267, or www.state.ma.us/dem, for assistance.

Staffing

Submit This Information to DEP in Summary #4	Action Needed
d. identify primary contact person responsible for implementing local watershed protection measures, system operation and maintenance; develop outline for meeting staffing needs	assess staffing needs

Employ sufficient and qualified staff to perform all system operations, maintenance and repairs, monitoring, inspections, and enforcement, as well as the watershed protection measures outlined in the protection plan. The water supplier shall also have the ability to update the plan at least every three years.

SUMMARY #5

Regulatory Controls

Where other protection measures are not appropriate or effective, the following local regulatory controls are some **options**: re-zoning, zoning and non-zoning bylaws, other non-zoning mechanisms (such as subdivision rules and regulations, which can allow flexibility in development based on land characteristics), Board of Health regulations, Best Management Practices (BMPs) for agriculture, erosion control, and stormwater management. Model bylaws and recommended BMPs can be obtained from DEP and regional planning agencies.

Submit This Information	Action

to DEP in Summary #5	Needed
a. evaluate current water supply protection regulations and analyze what additional local regulatory actions are needed for water supply protection; use a 3 year time-line for actions	review maps #1 & #2 and land use inventory; talk to town officials & staff; identify actions to be taken to address specific water supply needs; contact DEP for technical assistance; include water supply protection component in Town's Master Plan

The Newburyport City Council passed a Water Supply Protection District ordinance to protect Indian Hill and Artichoke reservoirs, as well as the City's ground water sources. The ordinance's prohibitions include the following land uses within Zone A and Zone I: any activity which causes earth movement or disturbance; construction or placement of permanent structures; construction of new roads; storage of animal manure; and horse paths.

The Town of Marlboro passed a Water Supply Protection bylaw which applies to all new construction, reconstruction, expansion of existing buildings, and new or expanded uses. There are criteria for site design, including conditions for impervious areas, hazardous materials, fill, emergency response, monitoring, runoff and infiltration. Clearing, grading, earth moving or construction of any kind within fifty feet of a wetland resource area is prohibited.

SUMMARY #6

Emergency Planning

Submit This Information to DEP in Summary #6	Action Needed
a. status of emergency response plan/procedures	determine if emergency plan addresses water supply protection or needs to be updated to address those issues; conduct a pilot run of emergency system

Information to be assembled into an emergency response plan, or procedures, for water supply protection includes: response team, communication system, equipment, training, and drills. For multi-town watersheds, emergency planning should be coordinated with all towns in the watershed.

Step 4: Educate

The fourth step to watershed protection, EDUCATE, involves assessing the water supply-related educational needs within your watershed and developing programs to address those needs. In multi-town watersheds, each educational program should be focused on the entire watershed. The formation of a multi-town committee can help the water supplier promote and establish a base-line level of protection in each community. The committee can assist with the planning and implementation of water supply-related educational efforts.

EOEA basin teams, which may be contacted through the Department's Boston and regional offices, can also provide assistance with outreach activities.

In addition, the Department will be conducting outreach activities to distribute SWAP information, mapping, and recommendations for local actions.

SUMMARY #7

Education

Submit This Information to DEP in Summary #7	Action Needed
a. develop year-round program of activities targeted at varied audiences	determine what types of educational activities are needed within the community for water supply awareness and which of those activities are able to be conducted by water supplier (consider time, staff, funding)

Educational activities include: Water Department open houses, water fairs; media contact; bill stuffers; work with town officials; schools; community groups; businesses; etc. For multi-town watersheds, efforts should be coordinated with other water suppliers in watershed.

The Pioneer Valley Planning Commission and the Barnes Aquifer Protection Advisory Committee teamed up, using a grant from the Massachusetts Environmental Trust, to hold workshops for small business owners, especially auto body shops, about Best Management Practices that they can implement to improve their business management and protect ground and surface waters. Planning board members and other officials from Easthampton, Holyoke, Southampton, and Westfield were also brought into the project. The Planning Commission noted that "it was a pleasure to work with the business owners" and that the materials developed as part of that grant are available to other communities to use to accomplish similar goals.

Communication/Coordination

Submit This Information to DEP in Summary #7	Action Needed
b. show communication with other towns in watershed; plan coordinated protection efforts	exchange copies of watershed maps and bylaws, Board of Health regulations, etc. related to water supply protection; form inter-municipal agreement and/or committee

Three of the City of Cambridge's reservoirs are located in other communities and Fresh Pond, located in Cambridge, is the City's largest open space. Chip Norton, the Watershed Manager, has a lot of challenges when it comes to protection. The Water Department is particularly good at public outreach. They have a web site which discusses water supply administration, budget, distribution, operation, engineering, water quality information, water facts and brochures and has a description of the awards the Water Department has received for their protection work. They also have a newsletter that is distributed within Cambridge and the other towns in the watersheds and have developed partnerships with area businesses.

Being a water district, rather than a municipal system, can be particularly challenging. At the Cherry Valley & Rochdale Water District, which serves 4200, Superintendent Michael Knox and the Water Commissioners developed a DEP-approved protection plan for Henshaw Pond. The Water District is very pro-active and has developed the ability to work with others to get things done – local officials, state agencies, developers, schools and others.

For example, they put together a Memorandum of Understanding (MOU) with the School Committee regarding the placement of two underground storage tanks at a new high school. The agreement set the terms for the installation and annual testing of monitoring wells as well as protective measures.

The District is currently working with a variety of parties to make stormwater improvements to Route 9.

ASSISTANCE

Public surface water suppliers may call the following DEP offices with questions about this guidance and to request assistance with developing and implementing a local protection plan. In addition, draft plans may be submitted to the Boston office for preliminary review and comments.

In addition, the Drinking Water Program has two new grant programs to plan and implement local source protection projects! Information can be obtained from the Department's web page or by calling (617) 292-5770.

DEP Offices

Boston (617) 292-5500 1-800-337-6245 **TDD** (617) 574-6868
Western Region/Springfield (413) 784-1100
Central Region/Worcester (508) 792-7650
Northeast Region/Wilmington (978) 661-7600
Southeast Region/Lakeville (508) 946-2700

Web Page http://www.state.ma.us/dep

Examples of town bylaws and Drinking Water Program policies, regulations, guidance manuals and fact sheets are available on the Department's web site.

Water suppliers serving fewer than 10,000 persons may also contact Larry Stepenuck of the Rural Community Assistance Program (RCAP) at (978) 297-5300 for help.

*The Drinking Water Program has two new grant programs to fund local protection work. Public water suppliers are eligible to apply for funds from the **Wellhead Protection Grant Program**. Many kinds of projects are eligible for funding, including hiring a local staff person to develop or maintain wellhead protection efforts, removing potential sources of contamination from Zone I and conducting educational programs.*

*Third party organizations, such as watershed groups, volunteer boards and committees, regional planning agencies and consultants are eligible to apply for funds from the **Source Water Protection Grant Program** to provide technical assistance to public water suppliers. Eligible projects include developing a local surface water supply protection plan or protection bylaw, designing stormwater improvements, or managing existing water supplier-owned lands.*

You can visit DEP's web site (Drinking Water Program) or call (617) 292-5770 for more information.