The Commonwealth of Massachusetts
Massachusetts Water Resources Commission

Guide to Lawn and Landscape Water Conservation

May 2002

A Guide for Communities, Property Owners, Managers, and Massachusetts State Agencies

Commonwealth of Massachusetts
Jane M. Swift, Governor

Executive Office of Environmental Affairs
Bob Durand, Secretary

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
251 Causeway Street, Suite 900
Boston, MA 02114-2119

JANE M. SWIFT
GOVERNOR

BOB DURAND
SECRETARY

Tel. (617) 626-1000
Fax (617) 626-1181
http://www.mass.gov/envir

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Dear Friend of the Environment:

I am pleased to provide you with a copy of the *Guide to Lawn and Landscape Water Conservation*, developed by the Massachusetts Water Resources Commission. This guide was developed in response to the growing concern of public water suppliers and environmental managers about the impacts of peak summer water use on environmental resources and water supply systems. The recommendations contained in this document will help communities and individuals manage their water supplies in an environmentally sound manner.

The *Guide to Lawn and Landscape Water Conservation* contains information for a wide range of groups and individuals, including information specifically for public officials and water supply managers. Of particular interest to public officials is the overview of drought contingency planning that can help every community manage its water supplies and protect environmental resources during dry or drought conditions. The guide also has recommendations for other groups and individuals, including property owners, water suppliers, and managers of recreational fields.

The *Guide to Lawn and Landscape Water Conservation* will also be available electronically through the Executive Office of Environmental Affairs' web site at: www.mass.gov/envir. I encourage you to share copies with other citizens within your community. Thank you for your continued efforts to protect the environmental resources of the Commonwealth.

Very truly yours,

Bob Durand

Bob Durand

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INTRODUCTION: MANAGING WATER USED FOR LAWNS AND LANDSCAPES

Water suppliers and municipalities face significant increases in demand during summer months due to the consumption of water used for maintaining landscapes and lawns. When combined with other water supply stresses such as drought conditions or water shortages resulting from public water supply system issues, increased summer water consumption can threaten the sufficiency of municipal water supplies and the health of environmental resources. For example, overdrawing aquifers can lead to low stream flows in rivers and subsequent harm to habitat and wildlife.

Lawn and landscape watering is a substantial source of summertime water consumption in many areas of the state and is a non-essential use of water compared to water used for public health and safety purposes. Therefore, reducing the amount of water used for lawn and landscape maintenance is key to protecting water supplies for current and future use and for protecting natural resources. The purpose of this document is to help water suppliers, municipalities and the public reduce and better manage the amount of water used for lawn and landscape maintenance.

This document contains three sections. Section I outlines how the development and use of a drought plan can provide communities with a predictable plan for managing water used for lawn and landscape maintenance. Because outdoor water use is the most significant non-essential water used by consumers, developing a drought plan that provides a coherent approach for when and how outdoor water use will be restricted during water shortages or dry periods can be a powerful contingency planning technique. Additionally, in areas that suffer from ongoing aquifer depletion, a drought management plan can be useful in alleviating impacts to rivers, lakes, wetlands and other natural resources. The most significant feature of the drought management plan is the identification of specific drought and water shortage indicators that are related to a series of graduated water use restrictions that can be implemented through a local water restriction by-law.

Section II makes recommendations about various by-laws that can be adopted to assist municipalities in conserving water used for lawns and landscapes. Recommendations are provided to enable water suppliers to implement increasingly strict outdoor water use restrictions based on the severity of the water shortage or drought, to encourage efficient water use practices, and to minimize water needs in new developments.

Public education and outreach is essential to encourage compliance with water restrictions and to promote efficient water use. Section III outlines general public outreach techniques and provides information on water efficient landscaping practices. The purpose of this section is to provide a broad range of groups and people with sound lawn care practices that will promote water conservation in the design, construction, and maintenance of landscapes. These practices are recommended for public, municipal, and state facilities, and private property owners and managers. The information can be used as part of the public outreach programs already conducted by many water suppliers and by other groups and individuals.

Together, these three elements -- drought and water shortage preparedness, appropriate local by-laws, and public education -- can help communities manage the amount of water used for lawns and landscapes to ensure that their water supply system continues to provide safe and sufficient

quantities of water that are necessary to meet public health and safety needs, as well as meet aquatic ecosystem needs. To be effective, the general public, local elected officials, and the managers of municipal government must understand the need for management of outdoor water use. With this support, water suppliers and municipalities can develop and implement the management efforts necessary for maintaining a safe and sufficient water supply system.

BACKGROUND: WHY IS LAWN AND LANDSCAPE WATER USE AN ISSUE IN MASSACHUSETTS?

Municipalities and water suppliers, particularly in fast growing parts of the state, are increasingly finding it difficult to meet summertime water demands. These summer demands can double or triple water use in a community and threaten both the sufficiency and safety of the system. Increased water withdrawals can also have significant impacts on the environment.

A. Public Health and Safety

Water suppliers report that water used for lawns and landscapes is the greatest contributor to increased water consumption during the summer months. This increased demand can threaten public safety, environmental resources, and the quality of public drinking water. In the most extreme cases, the high water use can threaten the ability of municipalities to store water for water pressure and fire protection purposes. Moreover, water suppliers risk violating authorized water withdrawal volumes established under the Water Management Act.

Large peak demands that exceed the intended capacity of the water supply system can also impair water quality. As more water is pumped from water sources, pollution in outlying areas can be drawn into drinking water supplies. This can include inducing surface and other waters that may contain higher levels of pathogens and drawing in toxic plumes that may exist in nearby groundwater. Higher pumping rates also have the potential to increase levels of iron and manganese and, in coastal communities, salt in water supplies. These naturally occurring elements may affect the aesthetic quality of drinking water or present health risks that may require treatment to remove.

B. Growing Environmental Impacts

Excessive withdrawals can have harmful effects on nearby water and other environmental resources. The severity of these impacts is dramatically illustrated in the Ipswich River watershed where stretches of the river have run dry as the local aquifer is drawn down. According to the Ipswich River Watershed Association, the Ipswich River nearly disappeared from the Reading area in 1995, 1997, and 1999. Another example is Kingsbury Pond in Franklin and Norfolk that has been similarly drained by municipal water withdrawals and its size reduced from its original 26 acres to approximately 10 acres. Excessive draw down of natural water resources impairs wetlands and other habitats associated with these resources and decreases their ability to support a diversity of plant or animal life.

C. LAWN AND LANDSCAPE WATERING IS JUST ONE PIECE OF THE WATER MANAGEMENT PUZZLE

Growing peak demands to meet lawn and landscape water needs is just one piece of the water management puzzle. In some communities, water is withdrawn from one watershed and discharged as wastewater into a different watershed. This transfer of water can magnify the impacts of seasonal water consumption on already stressed local water resources by reducing the recharge of the original water source. In addition to the increased water withdrawals, the increased impervious area associated with developed lands results in less permeable surface available for groundwater recharge. Together, these activities alter the natural water cycle by reducing water recharge and increasing the stress on our water resources.

D. THE USE OF PRIVATE WELLS

From a public water supplier's perspective, the use of private wells for lawn and landscape watering may ease the strain on their system and therefore may be a benefit to public systems. However, like any other water withdrawal, water used from private wells have the potential to have environmental impacts, and to the extent it draws from the same aquifer used by the public supplier, it may add to the reduction of groundwater levels. Finally, it can be harder for water suppliers to implement water restrictions if some neighbors can water their lawns while others must abide by the restrictions. Therefore, no matter where the water comes from minimizing the amount of water used to maintain lawns and landscapes and using the water efficiently is important.

SECTION I. DROUGHT AND WATER SHORTAGE PREPAREDNESS LOCAL GOVERNMENTS AND WATER SUPPLIERS

Even comparatively water rich regions of the United States such as New England are vulnerable to extended periods of dry conditions and drought. Contingency plans for drought and other water shortage circumstances are a critical component of any water supply management program. Water shortage circumstances and environmental impacts from water withdrawals are not necessarily the result of droughts but may occur on a regular basis during dry months. The term drought is used throughout this section to reflect situations where the water shortage or environmental impact is the result of dry conditions or other natural stresses. Water shortages refer to system capacity issues, which may be the result of dry conditions or other factors such as system problems or large uses such as fighting a large fire. In either case, drought plans need to establish the levels of dry or drought conditions are likely to lead to a water supply shortage or emergency. Communities that have insufficient water supplies may implement parts of their plan during non-drought years to help reduce peak demands that threaten the water supply system or the environment.

According to the American Water Works Association, "A well conceived drought management plan can take the "crisis" out of the situation. . .[and] can lessen any public perception that the utility's actions are ill considered or arbitrary. . . a drought management plan can enhance public acceptance of the actions to be taken in response to a water supply emergency." [1]

[1] The American Water Works Association has developed a manual entitled *Drought Management Planning* to assist suppliers in developing and implementing drought management plans. To obtain a copy of this publication, contact the AWWA Bookstore at 800-926-7337 and refer to product number 20289.

Outdoor water used to maintain lawns and landscapes is the largest non-essential water use and is one that involves both residential, commercial, and other water users. Therefore, building public awareness of the limitations of local water supplies and the consequences of overuse through public outreach is a key component of developing and implementing a drought or water shortage plan. A well-informed community will understand that local water supplies are limited and will respond when asked to minimize non-essential water use. The elements of a proactive public outreach and education program to inform consumers of the limited nature of local supplies and of water efficient practices are briefly discussed in Section III of this document.

There are three key elements of drought planning that water suppliers and local governments should have in place to manage water supplies relative to outdoor water use and for drought conditions. These elements should be integrated with the water supplier's more comprehensive emergency response planning efforts. The three elements specific to drought situations are:

1. Drought indicators and drought stage triggers;
2. Water use restriction measures; and
3. Water use restriction by-laws or regulations.

A. Drought Indicators And Drought Stage Triggers

Drought indicators are the elements of the water supply system and the environmental conditions that are monitored to assess the status of water supplies and the associated natural resources. The appropriate drought indicators for each particular water supply system will depend on the specific components and dynamics of each system. Some examples of drought indicators include: reservoir levels, storage tank levels, system pressure, streamflow levels, elevation of nearby surface water bodies, groundwater levels, regulatory limits, precipitation data, and precipitation conditions. Drought indicators and triggers should include both water system and environmental indicators.

By assessing these indicators, water suppliers can develop drought stage triggers that serve as benchmarks to warn of impending water shortages. Historical data can be used to establish drought stage triggers for each drought indicator. The historic water supply fluctuations can also help distinguish normal conditions from drought or other problematic conditions.

Triggers can be used to identify stages of concern before they represent full-blown problems. This allows water system managers to take early action to ease the situation. This is particularly true during times where water use for lawn watering is a primary cause of unsustainable water demands. Triggers can indicate that demand needs to be throttled before a serious problem develops and can alleviate the overall severity of the water shortage. Once a drought plan with indicators, triggers, and restrictions is adopted, the effectiveness of the program must be monitored to ensure that it is achieving the desired results of system safety and environmental protection. Finally, a drought plan should include the identification of the different ways in which to

communicate with the public on the status of water system and environmental conditions and to communicate when restriction are, and are not, in effect.

B. WATER USE RESTRICTIONS

While drought indicators and triggers provide an early warning, they are most effective in managing water use when they are tied to water use restrictions and other demand management activities. Water use restrictions that correspond with particular drought stages can be developed to ensure a sufficient and predictable response to excessive seasonal water use and drought conditions.

Water restrictions should be enforceable restrictions that are implemented through the municipality's water use restriction by-law or ordinance or by the regulations of a water district.[2] The by-law should provide for a graduated system of increasingly stringent restrictions, culminating in a ban on outdoor water use, so that a water supplier can implement an appropriate response based on the severity of dry conditions or water supply problems. Communities may want to have some basic restrictions in place on a yearly basis to help ensure sound water management practices.

Because each municipality's or water district's water supply circumstances are unique, a number of restrictions are suggested below. An effective series of restrictions will allow municipal officials to limit consumption in an increasingly restrictive manner that corresponds with the specific drought stages for that community's water supply. These examples can be modified to meet the particular needs of the town or district.

1. Sample Graduated Water Use Restrictions:

Stage I Voluntary conservation.

Stage II Outside water use is limited to between *** hours on *** days (specify particular hours and days).

And/or

Odd/even day watering or off peak watering only.

Note:
- In general, restricting outdoor water use to between sunset and early morning is best for turf needs and coincides with off peak hours for many water supply systems.

[2] For more information on developing a local Water Use Restriction By-law/Ordinance, see Section II, "Recommendations for Municipal By-law/Ordinance Development."

- Odd/even day watering and off peak watering generally does not reduce overall water demand (and may actually increase overall demand), but can reduce peak demands. Such a restriction is only useful when the system generally has sufficient water quantity, but has system limitations in meeting peak demands.

Stage III. Outside water usage is limited to *** hours during 1 day per week (specify day).

And/or

Outside water use restricted to hand held hose for flower and vegetable gardens only. No lawn watering, car washing (excluding commercial car washing), or pool filling allowed.

Note: While hand held hoses are a relatively inefficient means of irrigation compared to other methods, the fact that it is comparatively labor intensive results in greatly reduced amounts of water that are used for lawns and landscapes.

Stage IV. Mandatory ban on outside water use. All outside use of water is prohibited and subject to penalties in accordance with law for violation of this restriction.

Exceptions: While watering for lawns and landscapes is not an essential use, the water used for agricultural purposes is necessary for these commercial activities to continue. Therefore, restrictions should be focused on lawns and landscapes but should not cover water used by agricultural uses. Restricting water use by commercial and industrial users may be necessary in serious emergency situations, and provisions for these purposes may be covered in other sections of a water restrictions by-law (see DEP model by-law in Appendix A).

Another exception that should be considered is for watering related to plantings being installed specifically for erosion control measures or plantings required by local by-laws as part of local site development requirements.

C. Other Demand Management Measures

Beyond developing a Drought Plan, municipalities and water suppliers should employ additional strategies to encourage water conservation and reduce inefficient water use during summer months and all year long. These include:

1. Public Outreach: Many municipalities and water suppliers already have active public outreach programs. These programs need to include an explanation of the drought stage triggers for the local water supply and the implementation of water use restrictions based on the drought stage triggers. Programs should also include education on how to reduce outdoor water use through minimizing high water use areas such as lawns and promoting efficient lawn watering and appropriate lawn maintenance techniques. In particular,

programs should emphasize the importance of water conservation to protecting water supplies and for protecting nearby streams, fisheries, and other environmental resources.

The use of automatic irrigation systems should be discouraged and for those systems that are installed, rain shutoff devices and efficient irrigation technologies should be promoted. Public outreach can also focus on low water use landscaping techniques and automatic irrigation system operation and maintenance.

2. Conservation Rate Structures: According to a study by Johns Hopkins University[3], outdoor residential water demand is far more responsive to price than indoor residential water demand. Therefore, water suppliers should encourage the implementation of increasing block structures to deter inefficient outdoor water use and should consider using seasonal rates, excessive use rates, drought rates, and second meter rates that encourage outdoor water conservation. Further information on conservation rates can be found in the American Water Works Associations' Manual of Water Supply Practices: Water Rates Structures and Pricing, (AWWA M34).[4]

   Municipalities and water suppliers should not provide discount rates for outdoor water use and should avoid the use of second meters that are tied to discount rates for outdoor water use. Second meters are sometimes used in communities that provide both water and sewer service. In these communities sewer use is often based on water use – so a second meter that measures outside water use is used to subtract the amount of water not reaching the sewer system from the sewer portion of the bill. However, this practice encourages rather than discourages outdoor water use and should not be encouraged. If second meters do exist, the water rates charged for outdoor water use should be significantly higher than those charged for normal water use to discourage wasteful consumption.

3. Leak Detection and Repair: An ongoing leak detection and repair program can assure the public that the water supplier is taking steps to implement demand management procedures and protect the water supply. Moreover, detecting and fixing leaks can provide one of the largest returns on investment, especially in older systems, and can be a key ingredient in public education programs, using crews in the street as a point of attention by the media.

4. Conserve Water on Municipal Properties: Municipalities should follow the recommendations contained in the section of this Guide directed to property owners and managers for recommendations for municipally-owned and managed properties. These properties can serve as a visible example of water conservation techniques and an opportunity to educate the public on water conservation issues.

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[3]Linaweaver et al., 1966; Howe and Linnweaver 1967, Johns Hopkins University Residential Water Use Research Project for the Federal Housing Administration.

[4] AWWA has recently published a revised manual on water rates, entitled *Principles of Water Rates, Fees, and Charges, Fifth Edition.* (AWWA M1). To obtain a copy of either of these publications, contact the AWWA Bookstore at 800-926-7337.

5. Promote alternatives to traditional watering techniques and automatic irrigation systems: Communities with very limited water supplies should discourage the use of traditional lawn and landscape watering and the use of automatic irrigation systems for lawn watering and should promote other alternative lawn and landscape watering methods. Traditional techniques of hoses and sprinklers can be inefficient because water is applied unevenly and in a relatively uncontrolled manner. Automatic irrigation systems have the potential to use large amounts of water because they are automatic and will use water with little effort by the property manager. Automatic irrigation systems can waste large amounts of water if the systems are improperly installed or are not scheduled according to current weather conditions and seasonal changes. The belief that watering recharges the groundwater is incorrect because water used to maintain lawns and landscapes only saturates the surface layer of soil (up to four inches) and either evaporates or is used by plants.

   Municipalities and water suppliers should promote alternative lawn and landscape watering methods. This can include the use of cisterns for collecting rainwater and/or directing water from downspouts to areas of the lawn or landscape that need water are alternatives to using traditional lawn watering methods

6. Promote automatic irrigation system audits: In communities where a significant number of automatic irrigation systems exist, municipalities and water suppliers should consider offering audit services that evaluate the efficiency of in-ground irrigation systems by assessing the amount and distribution of water applied as well as the scheduling of the irrigation system controller.

SECTION II. MUNICIPAL BY-LAW AND ORDINANCE DEVELOPMENT

The by-law and ordinance recommendations in this section are intended as guidance for local elected officials. These by-laws and ordinances can strengthen the ability of municipalities and water suppliers to manage supplies responsibly and to assist property owners and managers in outdoor water conservation. Local requirements for adopting by-laws or ordinances may vary according to the terms of individual municipal charters. Consultation with town counsel is strongly advised before adopting any by-law or ordinance to insure adoption of an appropriate, enforceable, and legally valid by-law that will meet your municipal needs.[5] Independent water districts can use this section as guidance for regulations that can be enacted to help manage their systems.

A. WATER USE RESTRICTION BY-LAW RECOMMENDATIONS

All municipalities responsible for operating public water supply systems should have a water restriction by-law or ordinance in place. Such a by-law gives the appropriate person or board the power to declare water restrictions as necessary. These powers are important to allow a municipality to have an enforceable plan to reduce water use as drought conditions develop and to

[5] Tips on drafting municipal ordinances and by-laws can be found on: www.umass.edu/masscptc

prevent water shortages or environmental impacts before they occur. Water districts or boards should adopt similar restrictions through adoption of rules or regulations.

Communities that do not have these powers can only institute such restrictions by requesting a declaration of emergency from the Department of Environmental Protection. However, waiting for an emergency situation to occur means the town will have missed opportunities to reduce non-essential water uses early and, therefore, miss the opportunity to extend the sufficiency of local supplies. Reducing non-essential water uses early can forestall more drastic measures such as using emergency connections or, during extreme emergencies, providing bottled or other water to meet local needs.

1. Linking Restrictions to a Drought Management Plan

An effective water use restriction by-law or ordinance allows water suppliers to limit consumption in an increasingly restrictive manner that corresponds with the specific water shortage or drought stage for municipalities' water supply. The specific restrictions should also be based on triggers that have been established in the water supplier's water shortage/drought management plan. The plan should identify both water system and environmental triggers that correspond with the timing of implementing specific restrictions included in the by-law or ordinance.

Each municipality's or water district's water supply circumstances are unique. A number of restrictions are suggested below. The proper restrictions should be selected and modified to meet the particular needs of the town or district. For further guidance on drafting the specific language of a Water Use Restriction By-law or Ordinance, refer to the Model Water Use Restriction By-law/Ordinance developed by the Department of Environmental Protection and included in Appendix A of this document.

2. Hierarchy of Possible Water Use Restrictions

Because this guide recommends that the water use restrictions contained in the drought management plan be related to the municipal water use restriction by-law or ordinance, these restrictions are the same as those included in Section II "Drought and Water Shortage Preparedness for Water Suppliers and Local Governments."

Stage I. Voluntary conservation

Stage II Outside water use is limited to between *** hours on ***days (specify particular hours and days).

And/or

Odd/even day water use or off peak watering only.

Note:

- *In general, restricting outdoor water use to between sunset and early morning is best for turf needs and coincides with off peak hours for many water supply systems.*

- *Odd/even day watering and off peak watering generally does not reduce overall water demand (and may actually increase overall demand) but can reduce peak demands. Such a restriction is only useful when the system generally has sufficient water quantity, but has system limitation in meeting peak demands.*

Stage III. Outside water usage is limited to *** hours during 1 day per week (specify day).

And/or

Outside water use restricted to hand held hose for flower or vegetable garden watering only. No lawn watering, car washing (excluding commercial car washing), or pool filling, allowed.

Note: While hand held hoses are relatively inefficient means of irrigation compared to other methods, the fact that it is comparatively labor intensive results in greatly reduced amounts of water used for lawn and landscape.

Stage IV. Mandatory ban on outside water use. All outside use of water is prohibited and subject to penalties in accordance with law for violation of this restriction.

Exceptions: While watering for lawns and landscape is not an essential use, the water used for agricultural purposes is necessary for these commercial activities to continue. Therefore, restrictions should be focused on lawn and landscapes but should not cover water used by agricultural uses. Restricting water use by commercial and industrial users may be necessary in emergency situations, and provisions for these purposes may be covered in other sections of a water restrictions bylaw (see the Department of Environmental Protection model by-law in Appendix A).

B. Automatic Irrigation System By-law Recommendations

While automatically controlled in-ground irrigation systems can provide an efficient means of landscape irrigation, they can also increase the overall demand on a municipal water supply system by providing the ability to automatically use water to irrigate lawns. Therefore, communities with severe water shortages or capacity limitations should consider, in addition to adopting tough water use restrictions, banning or enacting a moratorium on the installation of in-ground irrigation systems. If additional, environmentally sound water sources are developed to meet these peak demands, such bans or moratoriums can be reconsidered. Other communities should consider adopting procedures to ensure that automatic irrigation systems are installed and used so as to maximize the efficiency of water use.

In order to be efficient, in-ground systems must be designed and installed correctly and scheduled to deliver the appropriate volume of water at the appropriate rate and time. Irrigation systems should be programmed to water during cooler parts of the day. In addition to proper installation and programming, the use of a rain shut off device can eliminate wasted water by ensuring the irrigation system shuts off when it rains. Rain shutoff devices are inexpensive, easy to install, and can be installed on any in-ground irrigation system. A by-law or ordinance requiring the installation of rain shut-off devices on in-ground irrigation systems that are connected to the municipal water supply is strongly recommended. Other hardware can also be required, such as master valves that ensure the water to the irrigation system is shut off during non-use times, and flow sensing devices that will shut off water that may be caused by a leak in the system. Some of these options are discussed in more detail in Section III of this document. Backflow devices are also important to ensure that water from irrigation systems do not accidentally flow in the water supply system.

Soil moisture meters that allow the system to operate only when the soil reaches a certain level of dryness are also available. However, a by-law requiring the use of soil moisture monitors is not specifically included in the list of examples because soil monitors are currently somewhat difficult to operate and effective soil moisture monitors can be quite expensive. However, as this technology improves, communities should consider requiring their use.

1. Sample Restrictions for In-ground Irrigation Systems
   Several communities in Massachusetts and in other states have developed by-laws or ordinances relative to in-ground irrigation systems. The Water Supply District of Acton has enacted the following restrictions:

   a. All automatic lawn watering systems, connected to the public water supply, must be equipped with a timing device that can be set to make the system conform to the local odd/even outdoor watering restrictions.

   b. All automatic lawn watering systems must be equipped with some type of moisture sensing device that will prevent the system from starting automatically when not needed.

   c. All automatic lawn watering systems must be installed with an approved backflow prevention device. Said device will be inspected initially by the plumbing inspector, and may be inspected periodically thereafter by water district employees.

   d. Any person who now has, or who intends to install an automatic lawn watering system in the future, must notify the department (include name of appropriate municipal office) of the existence of said system, or of their intention to install a new system prior to the actual installation. All systems, those currently in existence as well as any installed in the future must comply with all Rules and Regulations adopted on this date.

   e. Any system not in conformance with the above criteria may be disconnected from the public water supply system.

Another restriction considered in the Town of Wayland would limit the amount of the landscape area that can be serviced by a water irrigation system. This amount can be developed as a percentage of landscape area so that it varies according to the size of the property

2. Other Examples of By-laws

- The Town of North Andover has a by-law to assess a fee for the connection of an automatic lawn irrigation system to the municipal water supply.

- The Town of Sharon has adopted a by-law to prohibit the installation of underground piped irrigation systems to a percentage of the total lot coverage.

- The Town of Sterling has adopted a water district policy requiring rain shutoff switches on automatic irrigation systems.

- The following towns have adopted by-laws or water district policies that prohibit the connection of in-ground irrigation systems to municipal water supplies:

    - Town of Sudbury
    - Town of Bridgewater
    - Mashpee Water District
    - Town of Norton

Communities considering by-laws that limit the use of irrigation systems or restricting watering or irrigation should include an exception to protect commercial agricultural operations. This exception should exempt all the various water uses of the various forms of agriculture, as defined at General Laws Chapter 128, Section 1A.

C. Land Clearing Lawn Size and Other By-law Recommendations

Lawn size is related to the amount of water that may be ultimately used for landscape watering. The clearing of natural vegetation and trees that occurs as a site is being prepared for development can influence the eventual homeowner's choice of lawn size. By minimizing the loss of natural vegetation and establishing smaller lawns as a standard for new development, municipalities can reduce outdoor water used for lawn watering. In addition, minimizing soil disturbance by maintaining natural vegetation will enhance groundwater recharge, reduce sediment and stormwater run-off, and subsequent siltation of nearby streams, lakes and ponds, and maintain habitat for native wildlife.

Another way to improve water efficiency in landscapes and to provide an incentive to reduce lawn size is to require that a minimum of 6 inches of loam be required under lawn areas. Deep soils hold moisture and therefore need less watering. They also allow for grasses to develop deep roots, which improves their drought tolerance. One way to address this issue is to restrict or prevent the

removal of topsoil from development sites. Municipalities have reported that during the development process topsoil may be removed (as it is a valuable commodity) and then inadequate loam replaced when landscapes are installed. Such situations result in lawns with shallow roots that require large amounts of water to survive a typical New England summer.

There are two different mechanisms that can be used to minimize clearing activities or to require certain soil types and depths. Regulations can be adopted into the zoning by-law, requiring a special permit for clearing of sites that exceed a certain size. As an alternative, a town may adopt Site Plan Review standards that apply to all projects requiring Site Plan approval.

The Cape Cod Commission "Model Land Clearing, Grading and Specimen Tree Protection By-law" requires that any project involving land clearing of an area greater than 40,000 square feet be reviewed. However, the threshold for review should vary according to the circumstances of each community. The percentages for land clearing allowed within specific land use types will also depend upon unique variables such as land use patterns and lot size[6].

For projects in areas where there is no existing natural vegetation, site plan review standards for projects that exceed a certain size could require that specific percentages of the lot be composed of native species of shrubs, trees, and other turf alternatives.

The by-laws reviewed to develop these guidelines include: the Town of Barnstable By-laws, The Cape Cod Commission Model Land Clearing, Grading, and Protection of Specimen Trees By-law, and the Town of Sharon By-law.

SECTION III. RECOMMENDATIONS FOR PROPERTY OWNERS AND MANAGERS RESPONSIBLE FOR RECREATIONAL FIELDS[7]

The recommendations included in this section are meant to assist municipal and other recreational property managers in maintaining water efficient facilities. For playing fields, reducing the size of the turf area is generally not on option. In addition, a healthy field can be a safer field for those engaged in the recreational activities. Therefore, water efficient maintenance techniques are particularly important for these areas. For other facilities, such as golf courses, both design and irrigation considerations can greatly reduce the water needs.

Because of the highly visible nature of many recreational fields and because they are often managed by municipalities and institutions, it is important that watering of recreational fields is done efficiently so that they may be seen as an example of water conservation techniques. There are six principal recommendations for recreational facility managers included below. In addition

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[6] For more information on the Cape Cod Commission Model Land Clearing, Grading, and Specimen Tree Protection By-law visit the Commission's web site at www.cape.com/~cccom/By-laws/ or contact the Cape Cod Commission at (508) 362-3828.

[7] The Essex Conservation District in cooperation with the Massachusetts Department of Food and Agriculture (DFA) has developed a guide entitled *Turf Management for Municipal Athletic Fields – A resource guide and planning tool for environmentally responsible turf management."* For copies of this report contact the DFA at (617) 626-1700.

to these, facility managers should review the landscaping design, maintenance, and construction recommendations in Section V and adopt those that are appropriate for the particular circumstances of their facilities.

1. Design Facilities to Minimize Water Use

Well designed facilities will enhance the water use efficiency and drought tolerance. Facilities should be designed to minimize water use needs. This includes choosing types of grass and plant species that require less water. It also may mean minimizing areas that need higher water use. For playing fields this may mean limiting irrigation to the playing areas themselves and not irrigating surrounding areas. For golf courses[8] this may affect design of fairways. Finally, ensuring that sufficient loam is used under the irrigated areas will help promote a healthy grass field and hold moisture to reduce watering needs.

2. Maintain Facilities to Minimize Water Use

Turf drought tolerance can also be enhanced through mowing practices. The frequency and height of lawn mowing, can greatly affect water needs. Longer grass blades, especially during the spring and fall growing seasons, support deeper root systems that enable turf to avoid dehydration. Additionally, longer grass blades shade the soil and reduce evapotranspiration rates and maintain soil moisture. Therefore, minimizing mowing during extremely hot periods can help reduce water needs.

3. Use Automatic Irrigation Systems to Reduce Water Use

Recreational facilities are good candidates for the use of automatic irrigation systems because such systems can be designed and scheduled to be far more efficient than the typical use of water cannons. Also, such facilities are generally able to install more sophisticated irrigation system controls to ensure irrigation is undertaken in the most efficient manner for the property. The controllers and components of these systems should enable site specific irrigation according to the particular plant and soil conditions of the landscape elements. Irrigation should also be scheduled to occur during the cooler parts of the day to minimize water evaporation. They should also be scheduled to reduce or eliminate watering during times when others in the communities are facing mandatory water use restrictions or bans so that they provide a good model for other citizens.

4. Use Reused[9] Water Where Possible

Treated wastewater can be used for irrigation of facilities like golf courses where contact with the irrigated areas is less direct than other playing fields. Property managers should consult with their

[8]The Massachusetts Department of Environmental Protection recently revised the Golf Course Water Use Policy. Effective Date: June 8, 2000 Policy #: BRP/BWM/PeP-P00-5.

[9] The Massachusetts Department of Environmental Protection has revised the Interim Guidelines on Reclaimed Water. Effective Date: January 2000 Policy #: BRP/DWM/PeP-P00-3.

regional office of the Department of Environmental Protection to design a water reuse system for their property.

5. Reduce Water Use During Dry and Drought Conditions

Watering of recreational fields can use significant amounts of water. When the communities in which fields are located are implementing water restrictions, property managers should reduce water use by reducing the frequency of watering. For those using water cannons or other means, managers should both reduce the number of water cannons used at any one time and reduce the frequency of watering.

6. Raise Public Awareness

Take advantage of opportunities for promoting the water efficient maintenance practices of recreational facilities by informing users of water efficient irrigation techniques and other innovative approaches to water conservation that are being implemented. Property managers should consider developing outreach materials such as signs, brochures, and other materials to educate the public on how to effectively maintain turf and landscape vegetation while minimizing or eliminating water use.

SECTION IV. RECOMMENDATIONS FOR PROPERTY OWNERS AND MANAGERS -- INFORMATION ON ENVIRONMENTALLY SOUND LANDSCAPE DESIGN, CONSTRUCTION, AND MAINTENANCE

Outdoor water use can account for more than half of the total water used in summer months in some communities. The amount of water necessary for landscape water use purposes is directly related to the features of the landscape. This section contains recommendations on outreach that municipalities, water suppliers, and others can undertake related to landscape design, construction, and maintenance. While municipalities and water suppliers are not landscape specialists, they can work to help educate the public on these issues in order to help reduce the amount of water that their system will have to supply for lawn water use purposes. Other groups can also play an important role in reaching out to members of the public, including landscape professionals, watershed and environmental organizations, garden clubs, and nurseries. These recommendations are applicable whether the water used comes from a public water supplier or from a private well.

The recommendations contained in this section are useful for all property owners and managers – including residential, commercial, industrial, municipal, state, and institutional property owners. Outreach activities by state agencies, municipalities, and others should be targeted to reach all of these property managers.

A. PRINCIPAL LANDSCAPING RECOMMENDATIONS

There are nine key landscaping recommendations that provide a good summary of water efficient landscaping techniques. These are:

1. Abide by Water Restrictions and Other Conservation Measures Implemented by Your Municipality or Water Supplier

Municipalities and water supply managers need the cooperation of their users in order to manage the water supply system in a manner that is protective of public health, safety, and the environment. Abiding by water restrictions and other measures is critical to ensuring the viability of the system for all users and for ensuring the protection of the environment.

2. Minimize Lawn Size and Maintain Existing Native Vegetation

Lawns are the biggest users of water in most landscapes. By reducing lawn size during site and landscape design, property owners will substantially reduce the amount of water used for landscape maintenance. Replacing lawn areas with native species of trees and shrubs and with more natural grass areas such as meadow grasses and wild flowers can benefit property owners by creating privacy and shade around homes and by reducing the time needed for maintenance of landscapes. Trees and shrubs can also provide shade around homes, offering potential savings on indoor cooling costs.

For areas where turf is a functional necessity, use drought resistant grass species. Generally an insect resistant mixture of grasses that includes a high percentage of fine fescues will promote a drought resistant lawn.

3. Choose Native and Drought Tolerant Plant Species

Native species have adapted to the environmental conditions of New England and have evolved in such a way that they can provide habitat for native wildlife. Moreover, native species generally need fewer landscaping inputs, such as water and chemicals, than other species. Some native species may be more drought resistant than others. Also, choosing plant species that can withstand some extended dry periods can reduce or eliminate the need for watering. Consult with a knowledgeable nursery person to determine what plant species are appropriate for the soil, moisture, and shade characteristics of the location. Appendix B. contains additional sources for information regarding native species.

4. Water Only When Necessary

Massachusetts generally has enough rainfall to naturally supply the water needs of most mature lawns without the need for watering. Mature lawns that go brown during summer heat are in a natural period of dormancy. They will green up when wetter, cooler weather returns. In fact, too much water causes more harm than too little. Over-watering can cause turf problems by depriving roots of oxygen and encouraging fungal growth and disease. Frequent shallow watering can result in the development of shallow, compacted root systems that are vulnerable to drought and foot traffic.

Turf water needs vary according to many factors including: amount of solar radiation, temperature, humidity, grass species and rate of growth, rooting depth, and soil texture. In order to determine when to water, one should observe both soil and turf conditions. The general rule of thumb is one inch of water a week from all sources, both natural and from watering, is all that is necessary.

5. Ensure Adequate Depth and Type of Soil

Ensuring soil conditions are appropriate for lawns and landscapes is a critical factor in sustaining an low water use, and healthy, lawn. Loam, (soil with adequate organic material), of 6 inches will greatly reduce water needs by providing the ability to hold water and provide nutrients to the plants. Without adequate soil quality and depth large amounts of water may be needed to sustain lawns and landscapes because poor soils have little ability to hold the water that either falls as precipitation or is applied through watering.

6. Do Not Water Lawns and Do Not Install Automatic Lawn Irrigation Systems in Water Short Communities

Some communities face chronic water shortage problems, typically having trouble meeting peak demands during summer months. In these communities, property owners and managers should minimize outdoor water use and refrain from lawn watering. Additionally, automatic lawn irrigation systems, which greatly ease the ability to water lawns and landscapes, should not be installed as a way to reduce landscape water use.

7. Install Water Conservation Equipment and Properly Maintain Automatic Irrigation Systems

A rain shutoff device, an adequate control system, master valves and other equipment such as flow sensors should be used on automatic irrigation systems. A rain shut-off device shuts off the automatic irrigation system when it rains, protecting the landscape from over-watering and saving property owners money. Rain shutoff devices are inexpensive, easy to install, and can be installed on any automatic irrigation system. System controllers should be set to water only when necessary, generally once a week is sufficient. They should also be set to meet the types of outdoor water restrictions that may be imposed by the municipality or water supplier. Flow sensing devices can detect excess water flow that may be a result of broken sprinkler heads or pipes. Finally, irrigation systems should be audited every one to two years to ensure that it is functioning properly.

8. Collect Rain Water for Landscaping Needs

Use cisterns or rain barrels to capture rainwater from downspouts to use for newly planted vegetation. Proper use of these systems can greatly reduce water use from the municipal system. Also, directing water from downspouts to areas of the landscape that can benefit from the water can ensure rainwater is used effectively.

9. Mow Lawns at the Highest Recommended Height

Most turf grass species are healthiest when grass blades are at least 2 ½ and 3 inches. Longer grass shades the soil improving moisture retention. Longer grass during the spring and fall growing season also has more leaf surface to take in sunlight, allowing it to grow thicker and develop a deeper root system, which in turn helps grass survive drought, tolerate insect damage, and fend off disease.

B. Public Education and Outreach Methods

There are many public outreach techniques that can be highly effective at fostering the efficient use of water and compliance with water use restrictions when they are imposed. Some potential mechanisms to disseminate information are included in the following list. Water suppliers and agencies should choose from these and other resources to create and implement comprehensive and ongoing public outreach programs.

- Target the largest users and uses to realize the greatest potential savings and to serve as demonstrations of the benefits of efficient landscape water use.
- Place stories in media and other public places concerning the status of local water sources, and successes/ innovations in landscape water conservation efforts.
- Develop public service announcements such as radio, cable television, audio visual presentations, and prominent posting on community web site regarding water supply sources and status.
- Develop demonstration sites of low water use landscaping at public buildings and other visible locations.
- Implement school programs and field trips focusing on outdoor water conservation.
- Work with other groups such as watershed and environmental groups, nurseries, and landscape professionals to help provide educational materials to water users.
- Use bill stuffers and/or bills with a worksheet on the reverse to enable consumers to track water use and conservation efforts and figure the dollar savings.
- Develop conservation information centers, perhaps run jointly with electric or gas companies.
- Provide speakers for community organizations.
- Put up displays at special events such as conservation fairs.
- Multilingual materials should be developed and made available as needed.
- Provide water audits for residences and businesses.

C. Elements of Water Efficient Landscaping: Design, Construction, and Maintenance

The following elements of landscaping are provided to help water suppliers and municipalities educate their residential and commercial water users on how they can develop and maintain an aesthetically pleasing landscape that uses little or no water. These guidelines can be used by all types of property owners to ensure that work to build new or restore existing landscapes is done in a manner to minimize water use.

1. Landscape Design: The Most Important Step – Reduce Lawn Area

When planning a landscape, consider how it will be used, what space and site attributes are necessary, and how much work and resources will be required for maintenance. These recommendations are appropriate for a relatively low maintenance, residential landscape.

- Minimize lawn size and maintain existing native vegetation when designing landscapes. Consider alternatives to grass, especially for steep slopes, shady areas, and near streams and ponds, where grass is difficult to maintain.

- Use drought resistant and native species of grasses. Generally, an insect resistant mixture of grasses that includes a high percentage of fine fescues will ensure a drought tolerant lawn. For more information regarding the appropriate grasses for site-specific conditions contact the Massachusetts Horticultural Society Master Gardener Hotline at (781) 235-2116.

- Some native species of shrubs, trees, and wildflowers are drought tolerant. Planting these species will create wildlife habitat and build a more drought resistant landscape. For information regarding the appropriate native species for site specific conditions contact the Massachusetts Horticultural Society Master Gardener Hotline at (781) 235-2116 Additionally, shrubs and trees create shade that helps to keep lawns green during hot, dry weather.

- Be aware of the various zones in your yard (hot/sunny, cool/shady, moist, or dry) and choose plants according to the conditions. Sloping grass areas (i.e., areas with a 6% slope or greater) tend to be difficult to maintain due to water runoff and mowing difficulty and might best be planted with a drought resistant ground cover.

- Cluster plants that require extra care together to save time and water by watering just one area.

- Design contours or "grades" in the landscape to prevent water from draining to areas off the site.

2. Landscape Construction: Please Don't Call It "Dirt"

A key factor in constructing a low water use landscape is to have proper soil conditions for the landscape. Landscapes on poor and shallow soils can be extremely water intensive because root

systems remain shallow and require increased water to survive during summer months. Also, poor soils are unable to absorb and hold water, resulting in high water run-off that does not benefit the landscape. Finally, adequate organic material in the soil not only helps to hold water, but provides a source of nutrients for the plants.

Soil is a complex mixture of minerals, organic matter, microorganisms, water, and air. As the foundation of the landscape, the type and quality of the soil directly influences water use. It is important to know the composition of the soil in order to improve it. There are 3 broad categories of soil:

A clay soil consists of small particles, is slow to absorb water, has good water retention, and has poor drainage capacity.

A sand soil consists of large particles, absorbs water quickly, retains water poorly, and drains well.

A silt soil consists of medium particles, absorbs water quickly, has moderate retention and drainage capacity, and is ideal for most gardens.

For more information on the composition of the soils on residential properties, the University of Massachusetts' Extension Service offers a wide variety of soil test options that range in cost from $3.00 to $30.00. Call the UMass Extension Soil Testing Lab (413) 545-2311 or through their web site at www.umass.edu/plsoils/soiltest.

- Add compost or an organic material as necessary, preferably adding it to soil to a depth of 6"-8" inches for grass areas and 12" to 18" inches for shrub and tree areas to improve soil conditions and water retention. Organic soils can hold water significantly longer than sandy soils.

- Use mulch in flower beds and around shrubs and trees to minimize evaporation, reduce weed growth, and decrease erosion.

3. Landscape Maintenance: Don't Be A Slave To Your Lawn

a. Watering

Lawn watering accounts for the majority of landscape water use. Maintaining adequate water supplies during summer months has become a critical problem for many Massachusetts communities causing some towns to impose annual restrictions on outdoor water use. Citizens should be aware of the situation and should strive to conserve water at every opportunity.

- Abide by water restrictions and other conservation measures put into effect by the municipality or water supplier.

- Lawns should only be watered when necessary, generally no more than once per week. The rule of thumb is to apply an inch of water (from all sources, both natural and watering) to the

lawn. An easy way to measure this by putting out one or more shallow containers and then measuring the depth of the water collected. To determine when to water, walk across the lawn and look for footprints. If the grass springs up after being walked on, it does not need to be watered.

- If watering is necessary, watering techniques (especially the length of time spent watering) should be matched to soil needs. Watering slowly and deeply during the spring and fall months will allow the water to be absorbed and will train grass roots to grow deeply (grass is generally not growing in the summer, so deep water does not promote root growth at this time); frequent shallow watering results in root systems that stay near the surface making the lawn drought intolerant. Ideally, root zone areas of a lawn should be thoroughly moistened during watering.

- Water between sunset and early morning to reduce evaporation. Avoid watering at night if disease is present and actively damaging the lawn or during periods of very hot humid weather.

- In newly seeded lawns, keep soil moist, but beware of overwatering.

- Install shutoff nozzles on hoses to prevent water loss from unattended hoses. Hoses without a nozzle can spout 10 gallons or more per minute.

- Use drip irrigation systems to deliver water more efficiently to flower beds, shrubs, vegetable gardens, and newly planted trees.

- Use cisterns or rain barrels to capture and recycle rain water from downspouts to use for flower beds, shrubs, and newly planted trees. Use a lid, mesh fabric or several drops of baby oil on the surface of the water to prevent mosquitoes from breeding.

i. Recommendations for Automatic Irrigation Systems:

The growing proliferation of automatic irrigation systems is part of the cause of increasing summertime water demands. While communities with severe water shortages should consider a moratorium on the installation of these systems, other communities should work to ensure that their use promotes efficient water use. For property managers and owners in these communities:

- Determine the best irrigation system to fit lawn size and configuration. Install matched precipitation sprinkler heads and keep them in good repair. Matched precipitation sprinkler heads are designed and installed to apply irrigation water to a particular region in site-specific quantities according to landscape needs. These systems ensure that one area of the landscape is not overwatered while another is underwatered. Check the sprinkler heads frequently for proper direction and even spray pattern. Use the controller to adjust the system according to seasonal and climate changes and reschedule the controller if runoff occurs. An irrigation system's efficiency is measured by what is called the coefficient of uniformity (CU). A highly efficient CU ranges from .75-.85.

- Consider installing a controller with the following features:
  - At least two independent programs to allow watering different parts of the yard on different days;
  - Station run times from one to 99 minutes;
  - Two start times per program;
  - Odd, even, weekly, and interval program capability up to 30 days; and
  - Rain shutoff device capability.

- Install a rain shutoff device on the irrigation system. Ensure that the shutoff device is adjusted to shut off the system after only a small amount of rain, generally 1/8 of an inch.

- Install a master valve that is connected directly to the system control timer that prevents any water from entering the system when it is not running. This can prevent water loss from leaks in the system. Check valves on sprinkler heads can also prevent water from draining from low sections of the system.

- Install flow-sensing devices that detect excess flow that may be the result of a broken sprinkler head or pipe.

- Use drip irrigation systems to deliver water more efficiently to flower beds, shrubs, vegetable gardens, and newly planted trees.

- Locate irrigation heads at least eight inches from paved areas and ensure they are directed only to landscape areas. Locating heads too close to pavement or misdirected sprinkler heads result in wasted water.

- Repair broken sprinkler heads (which can waste up to twelve gallons per minute).

- Turn off the irrigation system if runoff occurs and allow the soil to absorb the water.

- Set controllers to water between sunset and early morning and adjust them bi-monthly to correct run times. Controllers need to be rescheduled to account for current weather conditions and for seasonal changes.

- Undertake a irrigation system audit every one to two years to ensure the system is working properly.

ii. Recommendations for Property Owners and Managers Using Private Wells or Water Sources:

The use of private wells for lawn and landscape watering can reduce demands on public systems and therefore help water suppliers avoid the impacts that large peak demands can cause. However, property owners and managers who use water from private wells or other private sources should follow the same practices as those on public systems in order to

minimize water use for lawn and landscape watering purposes. In addition, property owners and managers should closely monitor whether their water withdrawals are having negative environmental impacts and reduce use accordingly. In particular, users of private water sources should:

- Abide by water restrictions and other conservation measures put into effect by the municipality or water supplier. This is particularly true if the private well is located in the zone of contribution to the municipal groundwater supply, is within the watershed of a surface water supply and if the local restrictions are caused by dry conditions rather than a water shortage caused by a system problem.

- Users of private water sources should not hook up pumps to withdraw water directly from any small ponds/lakes, streams, or rivers. These withdrawals can have negative environmental impacts, including impacts to fisheries and wildlife resources, particularly if multiple properties are drawing water from these surface water bodies.

b. Mowing

Mow lawns at the highest recommended height and do not mow when grass is under drought stress. A lawn's ideal length will vary with the type of grass, but many turf grass species are healthiest when kept to a height of at least 2-1/2 to 3 inches. Longer grass has more leaf surface to take in sunlight allowing it to grow thicker and develop a deeper root system, which in turn helps the grass survive drought, tolerate insect damage, and fend off diseases. Longer grass also shades the soil surface keeping it cooler, helping it retain moisture, and making it difficult for weeds to germinate and grow.

- Mow often enough that you never cut more than one-third of the height of the grass blades. Keep lawnmower blades sharp. Dull mower blades tear the grass blade and create a brownish appearance of the turf and may make it more susceptible to pests and diseases.

c. Soil Maintenance

- Aerate compacted soils to improve lawn rooting and moisture absorption. Compacted soil inhibits lawn rooting and water absorption. Options to improve rooting and counteract compaction include the use of mechanical core aerators: create holes by pulling out plugs of soil to improve rooting and water absorption. Aerators can be rented or used by a lawn care professional.

- Leaving grass clippings to decompose into the soil can both add organic matter and nutrients to the soil.

APPENDIX A.

DEP MODEL WATER USE RESTRICTION BY-LAW/ORDINANCE

This is a model provided by the Department of Environmental Protection (the "Department") for use by municipalities in developing their own by-laws to regulate the use of water supplied by a municipal water system. The by-law is for communities looking to establish enforceable limitations on the use of water during temporary periods of high water demand. If properly enacted, the municipal by-law will enable municipal water systems to control and mitigate periods of high demand --with an associated stressed water supply -- typically occurring during the summer months. The restrictions included in the by-law include odd/even day outdoor watering, limited outdoor watering hours, outdoor watering bans, and prohibitions on filling swimming pools and the use of automatic irrigation systems. Persons violating the by-law restrictions are subject to civil fines. If a municipality is experiencing complex system problems affecting its ability to consistently provide an adequate supply of water, adopting and implementing the model by-law may not address the problem. In that case a declaration of water supply emergency under M.G.L. c.21G, §15-17 should be requested from the Department. After enactment, the Department would like to be notified of the level of restriction imposed, and is planning to revise its regulations to require such notification. Local requirements for adopting by-laws may vary according to the terms of individual municipal charters. Consultation with town counsel is strongly advised before adopting any by-law. The Department makes no representation concerning the legal effect or validity of this model.

CONSULT WITH YOUR TOWN COUNSEL TO INSURE ADOPTION OF AN APPROPRIATE, ENFORCEABLE, AND LEGALLY VALID BY-LAW THAT WILL MEET YOUR MUNICIPALITY'S NEEDS

Section 1 Authority

This by-law is adopted by the Town under its police powers pursuant to the Home Rule Amendment of the Massachusetts Constitution, Article LXXXIX, to protect public health and welfare and its powers pursuant to M.G.L. c.40, §§21 et seq. and implements the Town's authority to regulate water use pursuant to M.G.L. c. 41, §69B. This by-law also implements the Town's authority under M.G.L. c. 40, §41A, conditioned upon a declaration of water supply emergency issued by the Department of Environmental Protection.

Section 2 Purpose

The purpose of this by-law is to protect, preserve and maintain the public health, safety and welfare whenever there is in force a State of Water Supply Conservation or State of Water Supply Emergency by providing for enforcement of any duly imposed restrictions, requirements, provisions or conditions imposed by the Town or by the Department of Environmental Protection.

Section 3 Definitions

Agriculture shall mean farming in all its branches and agriculture, as defined at M.G.L. c. 128, § 1A.

Outdoor watering shall mean any residential, municipal, industrial, or commercial watering of decorative lawns, trees or shrubbery.

Person shall mean any individual, corporation trust, partnership, association, agency or authority, or other entity and any officer, employee, group or agent of such persons.

State of Water Supply Emergency shall mean a State of Water Supply Emergency declared by the Department of Environmental Protection under M.G.L. c.21G, §15-17.

State of Water Supply Conservation shall mean a State of Water Supply Conservation declared by the Town pursuant to Section 4 of this by-law.

Water Users or Water Consumers shall mean all persons using water from the Town's public water source irrespective of that person's responsibility for billing purposes for use of the water.

Section 4 Declaration of a State of Water Supply Conservation

The Town, through its Board of Water Commissioners or selectmen authorized to act as such, may declare a State of Water Supply Conservation upon a determination by a majority vote of the Board that a shortage of water exists of such a degree that conservation measures are appropriate to ensure an adequate supply of water to all water consumers. Public notice of a State of Water Conservation shall be given under Section 6 of this by-law before it may be enforced.

Section 5 Restricted Water Uses

A declaration of a State of Water Supply Conservation shall include one or more of the following restrictions, conditions, or requirements limiting the use of water as necessary to protect the water supply except as provided in Section 11. The applicable restrictions, conditions or requirements shall be included in the public notice required under section 6.

a) Odd/Even Day Outdoor Watering: Outdoor watering on property having an odd numbered address is restricted to odd numbered days. Outdoor watering on property having an even numbered address is restricted to even numbered days. (*Odd/even day watering and off peak watering generally does not reduce overall water demand (and may actually increase overall demand), but can reduce peak demands. Such a restriction is only useful when the system generally has sufficient water quantity, but has system limitations in meeting peak demands).*

or

Off-Peak Outdoor Watering: Outdoor watering is limited to between *** hours on *** days (specify particular hours and days). (*In general, restricting outdoor water use to*

between sunset and early morning is best for turf needs and coincides with off peak hours for many water supply systems. Systems may choose to restrict water use to one or two days per week during specified hours.)

b) Outdoor Watering Method Restriction: Outdoor watering is restricted to bucket, can or hand held hose watering with automatic shutoff nozzle.

c) Outdoor Watering Ban: Outdoor watering is prohibited.

d) Outdoor Watering Hours: Outdoor watering is permitted only during daily periods of low demand, to be specified in the declaration of a State of Water Supply Conservation and public notice thereof.

e) Swimming Pools: Filling and topping off of swimming pools is prohibited.

f) Automatic Sprinkler Use: The use of automatic sprinkler systems is prohibited.

g) Car washing: Car or vehicle washing is prohibited.

Section 6 Public Notification of a State of Water Supply Conservation and State of Water Supply Emergency; Notification of the Department of Environmental Protection

Notification of any provision, including any restriction, requirement or condition imposed by the Town as part of a State of Water Supply Conservation shall be published in a newspaper of general circulation within the Town, or by such other means reasonably calculated to reach and inform all users of water of the State of Water Supply Conservation. Notification of a State of Water Supply Emergency declared by the Department shall be provided by furnishing a copy of the Notice to radio and television stations serving the area served by the public water system as soon as possible, but no later than 48 hours after the public water system receives notice of the Department's declaration. Any restriction imposed under section 5 or in the Department declaration of emergency or Order shall not be effective until such notification is provided. Notification of the State of Water Supply Conservation shall also be provided to the Massachusetts Department of Environmental Protection at the same time that notification is given.

Section 7 Termination of a State of Water Supply Conservation; Notice

A State of Water Supply Conservation may be terminated by a majority vote of the Board of Water Commissioners upon a determination that the water supply shortage no longer exists. Public notification of the termination of a State of Water Supply Conservation shall be given in the same manner as is required for notice of the Town's declaration of its State of Water Supply Conservation.

Section 8 State of Water Supply Emergency; Compliance with DEP Orders
Upon notification to the public that a declaration of a State of Water Supply Emergency has been issued by the Department of Environmental Protection, no person shall violate any provision, restriction, requirement, condition of any order approved or issued by the Department for the

purpose of bringing about an end to the State of Water Supply Emergency. The notice prescribed by this section shall be in writing and shall be published once in a newspaper of general circulation within the town where it is to be effective. Such notice shall summarize the provisions of the Declaration of Water Supply Emergency and the requirements and conditions thereof. Notice as prescribed by this section shall be sufficient for enforcement of the requirements of such Declaration on and after the date following newspaper publication.

Section 9 Penalties

The Town, through its Water Commissioner, water superintendent, building inspector or local police may enforce this by-law(ordinance). Any person violating this by-law(ordinance) shall be liable to the Town in the amount of $ ___.__ for the first violation and $ ___.__ for each subsequent violation. Fines shall be recovered by indictment, or on complaint before the District Court, or by non-criminal disposition in accordance with section 21D of chapter 40 of the general laws.

Section 10 Severability

The invalidity of any portion or provision of this by-law shall not invalidate any other portion or provision thereof.

Section 11 Exemptions

The water use restrictions adopted under this by-law shall not apply to the specific uses outlined below provided the user meets any applicable eligibility criteria. The Department suggests that municipalities develop a specific procedure for granting those exemptions. *(The Department suggests that exemptions may be appropriate for the following uses:)*

a. Commercial agriculture;
b. Water to sustain animal life;
c. Swimming pools used as a primary means of exercise, therapy or rehabilitation located at a medical or rehabilitation facility;
d. Commercial car or vehicle washing facilities;

(In granting exemptions, municipalities should assess whether the user being granted the exemption is using the water efficiently. The municipality may want to condition exemptions to include specific conservation measures. For example, the municipality may want to consult with the United States Department of Agriculture's Natural Resource Conservation Service, to confirm that agricultural users seeking exemptions are using the best management practices available or will commit to adopting such practices as soon as feasible.)

1 The terms "town" and "by-law" used throughout this document are intended to also refer to cities and ordinances, respectively.
2 References to Boards of Water Commissioners throughout this by-law should be edited by particular cities and towns to accurately describe the municipal department or board having responsibility for the operation and maintenance of the water supply system.

APPENDIX B.

RESOURCES FOR MORE INFORMATION

Information on public water supply management, water conservation, and xeriscaping:
American Water Works Association, Headquarters:
6666 West Quincy Avenue
Denver, CO 80235
Customer Service and Bookstore: (800) 926-7337
www.awwa.org
www.waterwiser.org

Information on Irrigation System Efficiency and Certified Irrigation Designers and Contractors:
The Irrigation Association
6540 Arlington Blvd.
Falls Church, VA 22042-6638
Phone: (703) 536-7080, Fax: (703) 536-7019
www.irrigation.org

Publications for professionals and consumers related to water supply management and water conservation techniques:
Massachusetts Department of Environmental Protection
100 Winter Street
Boston, MA
Phone: (617) 292-5500
www.state.ma.us/dep/pubssite.htm

Information on current weather conditions, streamflow, drought conditions, and historical data:
US Geological Survey
www.water.usgs.gov

Information on model ordinances and drafting municipal by-laws or ordinances:
Citizen Planner Training Collaborative
406 Goodell Building
University of Massachusetts
Amherst, MA 01003
www.umass.edu/masscptc

Information on integrated pest management and turf management for municipal athletic fields:
Massachusetts Department of Food and Agriculture
251 Causeway Street
Boston, MA 02114
Phone: (617) 626-1700

University of Massachusetts Turf Program
Department of Entomology
Agricultural Engineering Bldg.
University of Massachusetts
250 Natural Resources Rd.
Amherst, Mass. 01003-9295
www.umass.edu/umext/programs/agro/ipm'

Horticultural, native species, and landscaping information:
Massachusetts Horticultural Society
Library facilities at:
900 Washington Street (Route 16)
Wellesley, MA 02482-5725.
Main Number: (617) 536-9280
Master Gardener Hotline: (718) 235-2116
www.masshort.org

New England Wild Flower Society
180 Hemenway Road
Framingham, MA 01701-2699
508/877-7630
www.newfs.org

Master Gardener Hotlines
University of Massachusetts Turf Program
www.umassturf.org/gardener.html

Information on habitat conservation:
Massachusetts Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581
www.masswildlife.org

Nation Wildlife Federation
Backyard Wildlife Habitat Program
www.nwf.org/habitats/backyard/program.cfm

Consumer soil sample testing:
University of Massachusetts Cooperative Extension Service
Soil Testing Laboratory: (413) 545-2311
www.umass.edu/plsoils/soiltest

For additional copies of this document, please visit the EOEA website at www.state.ma.us/envir or contact:

Massachusetts Water Resources Commission
251 Causeway Street, Suite 900
Boston, Massachusetts 02114
(617) 626-1000

Office of Water Resources
Dept. of Environmental Management
251 Causeway Street, Suite 600
Boston, Massachusetts 02114
(617) 626-1250