



TOWN OF WAYLAND

WATER DEPARTMENT

WAYLAND, MA 01778
(508) 358-3696

October 28, 2002

Wayland Conservation Commission
41 Cochituate Road
Wayland, MA 01778

Ladies and Gentlemen:

Under the Town's Water Management Act Permit (No. 9P4-3-14-315.01), submittal of a plan to decrease per capita and outdoor water use is required by December 31, 2002. One component of the plan is the enactment, implementation, and enforcement of a bylaw regulating the use of automatic irrigation sprinklers. We have reviewed restrictions imposed by the Wayland Conservation Commission on automatic sprinkler use, as well as an In-Ground Irrigation System bylaw from the Town of Sudbury, both of which are attached. Also, a guide to lawn and landscape water conservation, published by the Water Resources Commission (WRC) is included with this letter. This guide provides valuable information regarding automatic sprinkler systems.


Automatic irrigation systems often waste large amounts of water because they are improperly installed and/or are not scheduled to operate according to current weather conditions and seasonal changes. A proposed bylaw should address these concerns by imposing restrictions on automatic sprinkler system installations. The bylaw should include the following equipment or installation requirements:

- Timing devices
- Moisture sensing devices
- Rain shut-off switches
- Backflow prevention devices
- Flow sensing devices
- Notification of appropriate officials of the intent to install such a system
- Additional fees for connection of an automatic sprinkler system to the public water supply
- Installation limited to a percentage of the total lot coverage
- Adjustment of the system on a regular basis throughout the irrigation season

In addition, it would be helpful to add penalties when the systems are not installed or operated in compliance with the above criteria.

Another approach that the Town should consider is banning the installation of new irrigation systems and/or prohibiting irrigation systems from using public water. The water commissioners took the first step in such an action by voting to implement a moratorium on the installation of sprinkler systems. Input from town council will be important in crafting a bylaw that is enforceable.

Sincerely,



Don Hollender

CC: Selectmen, Planning, Building, BOWC

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**Board of Selectmen
Town of Wayland**

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TOWN OF FRANKLIN WATER USE RESTRICTIONS

The Town of Franklin's water conservation measures includes the following:

Phase I – Reserved

Phase II – lawn watering is restricted to odd and even days

Phase III – lawn watering is restricted to one day per week by precinct

Phase IV – lawn watering is totally prohibited at any time

Phase V – no outside water use at any time.

Please note that in 2000, Phase III of the watering ban was in place for the entire summer and as a result the residential water demand and maximum day demand were lower than previous years.

Restrictions on Automatic Sprinkler Systems Wayland Conservation Commission

The Wayland Conservation Commission has jurisdiction over projects located in a wetland resource area or within 100ft of a bordering vegetated wetland. As such the Conservation Commission has recently developed guidelines and issued decisions regarding the installation of automatic sprinkler systems proposed within its jurisdiction. The Commission has decided to limit the use of water for lawn irrigation purposes for the following three reasons:

- To limit the flushing of lawn additives (e.g., pesticides, fertilizers, etc.) into the resource area.
- To limit the addition of water to a wetlands, as this may change the wetlands characteristics.
- To limit the use of water for lawns, since this use may contribute to overdraw of the aquifer.

The Commission also believes that the application of water for irrigation should be minimized whenever possible. They recommend that the schedule for watering be limited to odd/even watering whether or not there is a watering restriction in effect in the Town, and that the time of watering not exceed 10 minutes per event.

The Commission has recently issued several decisions regulating the use of sprinkler systems within its jurisdiction. The conditions that have been imposed include:

1. No portion of the sprinkler system shall be located within 50 feet of bordering vegetated wetlands. More recently the Commission prohibited the installation of sprinkler systems in areas under the Commission's jurisdiction. The condition states that no underground sprinkler systems shall be installed within the 100-foot buffer zone. This Condition shall remain in force permanently and shall be recorded on the Certificate of Compliance.
2. The sprinkler system shall have a shut off device that prevents its operation during rainfall events. If one is not currently on the system it shall be installed within sixty days and evidence provided to the Commission of the device having been activated. If a sprinkler system is observed operating during a rainfall, the operation may be deemed as a violation of this condition.
3. The submittal of a water conservation plan may be required for the review and approval of the Conservation Commission, which includes the location of sprinkler heads within the system.

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Town Of Sudbury By-Laws Relating to Water District Issues

At a legal meeting of the qualified voters of the Town of Sudbury, held April 8, 1998 the following business was transacted under Article 22 (Amend By-Laws, Article V - Water Pollution Emergencies).

Voted in the Words of the Article

To amend the Town of Sudbury by-laws, by adding to Article V, Public Safety, a new Section 31, entitled "Water Pollution Emergencies", as follows:

Section 31. Water Pollution Emergencies

(a) No person shall pollute, corrupt, injure or obstruct the water source or water supply serving the Town through the water distribution system of the Sudbury Water District.

(b) Provided that the Board of Water Commissioners of the Sudbury Water District has declared a water emergency, the Board of Selectmen shall then be authorized to declare water emergencies from time to time as authorized by Massachusetts General Laws Chapter 21G, sections 15, 16 and 17 or through a determination pursuant to Chapter 100 of the Acts of the General Court of Massachusetts or 1934 that a threat of pollution, corruption, injury or obstruction to the water supply exists. The purpose of such a declaration is to conserve and minimize use of water. Following declaration or determination and during such emergency, all outside external use of water from the public water system as supplied by the Sudbury Water District shall be prohibited. Watering lawns, gardens and shrubbery and other landscape watering shall be prohibited. Washing of vehicles shall be prohibited.

Violators of this by-law shall be subject to the following fines:

(1) Fifty dollars (\$50.00) for first offense;
(2) One hundred dollars (\$100.00) for second offense;
(3) One hundred and fifty dollars (\$150.00) for each additional offense.

(c) This section only pertains to residences, commercial property and industry served by the distribution system to the Town through the Sudbury Water District.

At a legal meeting of the qualified voters of the Town of Sudbury, held April 5, 2000 the following business was transacted under Article 27 (In-Ground Irrigation Systems).

Voted in the Words of the Article

To amend the Town of Sudbury by-laws, by adding Article XXVII, entitled "In-Ground Irrigation Systems" as follows:

Article XXVII. In-Ground Irrigation Systems

Purpose: It is the purpose of this by-law to establish requirements for the installation of in-ground irrigation systems on residential properties for the protection of the quality and quantity of water supplied by the Sudbury Water District.

Applicability: All in-ground irrigation systems serving residential uses installed after the effective date of this by-law will be required to comply with the following:

1. Installation of new in-ground irrigation systems and expansion of existing systems will be permitted only when the source of water supply is a private well owned and under the control of the property owner or a legally created organization of the owners of the property using the well.
2. All wells installed for the purpose of this by-law shall be subject to the regulations of the Sudbury Board of Health. All wells shall be tested for coliform bacteria and shall require treatment if such tests indicate the presence of coliform.
3. Installation and continued operation of such systems will be in accordance with the requirements herein:

a)	Private wells for irrigation purposes shall not be located within one hundred (100) feet of a sewage disposal system, within one hundred (100) feet of an existing potable water supply well and within one hundred (100) feet of a wetland or vernal pool.
b)	All wells shall be dug or drilled to a minimum depth of 100 feet, unless it is demonstrated through hydrogeological analysis that the cone of influence of the well at its maximum pumping capacity does not intercept any surface water resource.
c)	There will be no connection between the private water supply and the municipal water service. Separation using valves or removeable sections of pipe is prohibited.
d)	Discharge of water from the private water supply will be through sub-surface sprinkler heads that rise when activated by water pressure. Water from this source will not be available through sill cocks, garden hoses or any other points.
e)	The purpose of the private water supply is limited to irrigation of lawn and plants, and is not to be used for washing automobiles, filling swimming pools or as a potable water supply.

4. Irrigation systems sourced by private water supplies and operated as described herein shall not be limited to specific hours of operation nor odd/even days of use if the Town declares a water emergency.
5. All irrigation systems shall utilize moisture sensors.
6. An Integrated Pest Management Plan shall be compiled and submitted with an application to install an in-ground irrigation system. The plan shall encourage

minimal use of fertilizers and pesticides by use of non-chemical methods to control pests, such as by the use of indigenous species of plants.

7. Sellers of property covered by these regulations are responsible to inform the purchaser of these requirements in any purchase and sale agreement.
8. A permit to install a new in-ground irrigation system shall be required from the Board of Health and fees for review and inspection shall be established. All other state, federal or local approvals shall be required where necessary.

Exceptions: In-ground irrigation systems installed on land used primarily and directly for the raising of fruits, vegetables, berries, nuts and other foods for human consumption, feed for animals, flowers, trees, nursery or greenhouse products, and ornamental plants and shrubs; or on land to be used in a related manner which is incidental thereto and represents a customary and necessary use in raising such products.



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Water Supply District of Acton

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ACTON, MASSACHUSETTS 01720

FAX (508) 264-0148

TELEPHONE (508) 263-9107

Rules and Regulations for Underground Lawn Watering Systems

At the regularly scheduled Commissioners meeting held on September 8, 1997, the Board of Water Commissioners voted to rescind the ban on the installation of underground lawn water systems, and chose to allow the installation of same, with the following conditions.

1. 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 District's odd/even outdoor watering restrictions.
2. 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.
3. All automatic lawn watering systems must be installed with an approved backflow prevention device (Watts 800 or equal). Said device will be inspected initially by the plumbing inspector, and may be inspected periodically after that by water district employees.
4. Any person who now has, or who intends to install an automatic lawn watering system in the future, must notify the Water District 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.
5. Any system not in conformance with the above criteria may be disconnected from the public water supply system.



Automatic Lawn Irrigation Systems Policy and Requirements Town of North Andover

To assure the safe and proper installation, repair and maintenance of lawn irrigation systems, protect the quality of the water distribution system, and to promote water conservation the North Andover Division of Public Works adopts the following "Lawn Irrigation System Policy".

REQUIREMENTS: GENERAL

INSTALLATION WITH OR WITHOUT A BY-PASS METER

Owner or representative shall provide the following:

1. AUTOMATIC LAWN IRRIGATION PERMIT

- A. A plumber licensed in the Commonwealth of Massachusetts holding a valid and current license shall provide the DPW with a copy of said license.
- B. The plumber shall complete and submit the "Automatic Lawn Irrigation Permit" form.
- C. The plumber, must install the connection to the municipal water supply within the building, the water line to the outside of the building and the backflow device. A registered irrigation installer may then install the balance of the Automatic Lawn Irrigation system.

- 2. A rain or moisture sensing devise **MUST** be included as part of the Automatic Lawn Irrigation system. Its location must be sketched, by the installer, on the back of the permit prior to inspection by the Town. The system shall be inspected and approved by the Water Department prior to the Automatic Lawn Irrigation system being placed in use
- 3. No part of the Automatic Lawn Irrigation System shall be in the right of way (street). The system shall be entirely on private property and the spray can be directed on that portion of the lawn that is within the right of way.
- 4. All systems must be inspected and approved by the Water Department prior to its being placed in use.
- 5. Backflow protection devices shall be utilized on all connections to the municipal water system

REQUIREMENTS: SYSTEMS ON SEPTIC, NO METER

- 1. An inspection fee of \$35.00 will be charged to the water account.
- 2. Backflow protection devices shall be utilized on all connections to the municipal water system



The Commonwealth of Massachusetts
MASSACHUSETTS WATER RESOURCES
COMMISSION

partial
copy

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

Massachusetts Executive Office
of Environmental Affairs
Bob Durand, Secretary

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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. Because lawn and landscape watering is a substantial source of summertime water consumption in many areas of the state, and because it is a non-essential use of water compared to water used for public health and safety purposes, 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 shortage 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 and 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 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 and 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 increase 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. Recognizing that 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

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

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.

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 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

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 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 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 water used for lawn and landscape water use.

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 serious emergency situations, and provisions for these purposes may be covered in other sections of a water restrictions bylaw (see DEP model bylaw 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 bylaws 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 University³, 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 discouraged. 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.

³Linaweaver 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.

4. Conserve Water on Municipal Properties: Municipalities should follow the recommendations contained in the section of this Guidance directed to property owners and managers for municipal 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.
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 automatic irrigation systems for lawn watering and 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 apply 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

7. 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.

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

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 bylaw 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 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 stages 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 guidance document 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 is 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 water used for lawn and landscape water use.

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 DEP model bylaw 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 system does 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 an water irrigation system. This amount can be developed as a percentage of landscape area so that it varies somewhat with 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 bylaws that limit the use of irrigation systems or restricting watering or irrigation should include an exception to protect commercial agricultural operations. This exemption 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

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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