

Comments on EOEA's Draft Water Conservation Standards of September, 2005



Ipswich Riverbed

I commend the fine job done by Anne Monnelly, Vandana Rao and others who contributed to the draft Water Conservation Standards document.

A significant portion of current water withdrawals in Massachusetts is unnecessary and wasteful. Excessive water withdrawals, especially in summer, degrade our rivers, streams and wetlands, and accelerate contamination of our drinking water. The following comments propose water conservation standards that would help restore an acceptable and sustainable balance between human and environmental uses of water.

Article 97 of the Amendments to the Constitution of Massachusetts states that:

“The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air, and other natural resources is hereby declared to be a public purpose.”

In other words, we the people have a right to expect our natural resources, including our vital water resources, to be managed prudently. Wasteful water use practices must not be tolerated, because we have a constitutional obligation to allocate enough of our finite water resources to sustain our rivers, streams, lakes, ponds, wetlands and aquifers. These natural assets in turn purify our drinking water, support biodiversity, and provide recreational, esthetic and other valuable “services” that sustain and enrich our lives in Massachusetts. We must not allow our water resources to suffer the so-called tragedy of the commons.

It has been 13 years since the Water Conservation Standards were last updated. It may be a long time before they are reviewed again. Given the essential contributions of our water resources to quality of life in Massachusetts, those ultimately responsible for deciding what the standards ought to be should weigh carefully the effect the standards will have on restoring them, and re-establishing an acceptable and sustainable balance between human and environmental needs for water. Will the new Water Conservation Standards be part of the problem by allowing wasteful and unsustainable water use practices to persist, or will they drive much needed and achievable reforms?

Conspicuously absent from the draft Water Conservation Standards are specific performance standards or guidelines for fixtures and appliances. In 1987, Massachusetts led the nation by passing a law allowing only sale of toilets using 1.6 gallons per flush or less. That standard became effective nation-wide in 1994, and continues to save

enormous volumes of water every day. It is time to shift gears and adopt the 1.28 gpf High Efficiency Toilet (HET) standard specified by the California Urban Water Conservation Council (see <http://www.cuwcc.org/Uploads/product/HET.pdf>). The same approach should apply to washing machines, requiring a maximum of 15 gallons per load. Similarly, the present 2.5 gpm standard for showerheads should be lowered to 2.0 gpm. Manifold or multiple showerheads in a single shower stall should not be allowed except in cases of disability or medical necessity. At a minimum, specific performance levels should be recommended as goals. Otherwise the new Water Conservation Standards will constitute little more than lofty rhetoric.

The year-round total water use standard of 65 residential gallons per capita per day (rgpcd) proposed in the draft is reasonable and readily achievable. According to Amy Vickers' Handbook of Water Use and Conservation, indoor water use in a conserving household should be 45 rgpcd. Vickers' 45 rgpcd indoor figure was computed in 2001 based on 1.6 gpf toilets, a 27 gpl washing machine and 2.5 gpm showerheads available at that time. Substituting the latest 1.1 gpf high-efficiency toilets, a 15 gpl front-load washing machine, and 2.0 gpm showerheads would reduce Vickers' figure from 45 rgpcd to 36 rgpcd for apartment and condo dwellers. Allowing an additional 10 rgpcd (= 24 rgpcd for May through September) for lawn watering and other outdoor water uses, this would equate to just 46 rgpcd annually for conserving households, far below the proposed 65 rgpcd standard. In my suburban single-family household on a one-acre lot with a nice lawn and old 3.5 gpf toilets, we average 41 rgpcd.

The Massachusetts Water Resources Commission (WRC) has classified many watersheds as medium or high stress basins, especially in eastern Massachusetts. In medium stress basins, the per capita water use standard should be 60 rgpcd (5 rgpcd less than the 65 rgpcd general standard), and in high stress basins it should be 55 rgpcd (10 rgpcd less than the 65 rgpcd general standard). As noted above, these stricter water use standards are readily achievable, and represent a first step toward restoring a sustainable balance between human and environmental needs. Failure to set water use standards that will lead to significant improvement in medium and high stress basins would render the Water Conservation Standards part of the problem rather than part of the solution during the upcoming decade or more that may elapse until these standards are next reviewed.

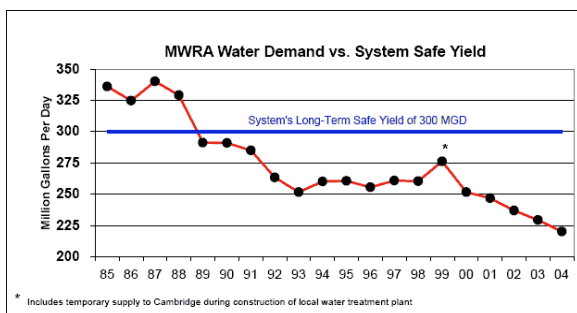
With over 6 million people living in Massachusetts, every improvement of one rgpcd in average statewide water use translates to a savings of over 6 million gallons per day. Massachusetts' present average residential usage rate of about 69 rgpcd is 23 rgpcd higher than the 46 rgpcd that is achievable. This 23 rgpcd we are wasting represents an unnecessary loss of 138 million gallons statewide every day, or one-third of total residential use of one of our most precious resources. This fact is starkly at odds with the spirit of Article 97 of the amendments to our state constitution. Eliminating this loss would reduce the cost of supplying our water, help keep contaminants out of our wells, and improve the ecological health of our streams and wetlands.

The Water Conservation Standards document should provide advance notice that water use standards such as 65 rgpcd are only the first step in the process of restoring balance between human and environmental water requirements. Inevitably, water use will be further restricted as population increases and technology improves. The document should urge communities whose usage is already under 65 rgpcd to anticipate stricter water use standards in the future, and continue to strive for even better water efficiency.

Summer (May through September) is the only time of year that most communities in Massachusetts face a water supply challenge. In summer, rising temperatures and accelerating plant transpiration draw substantial volumes of water into the atmosphere, parching the land and causing water tables to drop. Unfortunately, summer is when most communities experience a surge in demand for water. The Water Conservation Standards should target summer water use by recommending a general summer water use standard that is lower than current usage rates, such as a 75 rgpcd average from May 1 through September 30. The summer standard in medium stress basins should be 5 rgpcd less than the general summer standard, and in high stress basins it should be 10 rgpcd less. To improve summertime rgpcd, indoor as well as outdoor water use will have to be reduced, since even in summer the majority of water use occurs indoors.

This targeted, quantitative approach to capping the spike in summer water use sidesteps the problematic 1.2/1 summer/winter ratio standard applied by MA DEP in reviewing WMA permits. A significant problem with the summer/winter ratio approach is that it provides an inherent disincentive for communities to encourage indoor water conservation because reductions in indoor use increase the summer/winter ratio.

Obviously, outdoor water use, representing roughly one third of summertime water use, should also be targeted. Outdoor water use, especially lawn irrigation, is largely non-essential. It is quite possible to have an attractive, healthy lawn (at least in spring and fall) without any irrigation whatsoever. Section 9 of the Water Conservation Standards provides good lawn care advice, but by itself will not put a dent in outdoor water use. As



the MWRA experience has demonstrated, high water prices reduce usage. Ascending block rate water pricing helps, but it is a blunt instrument that hits households with large families and low rgpcd's as well as wasteful lawn irrigators with high rgpcd's. To curb non-essential lawn watering, automatic lawn irrigation systems should be required to have

separate meters, and the price charged for irrigation water should be much higher than the price for water used indoors for more necessary purposes. In the event of a drought or water shortage, the ability to monitor lawn irrigation (using a fixed-network automatic meter reading (AMR) system to read meters daily and detect irrigation systems that violate watering restrictions or bans) could provide the enforcement capability necessary for rationing water reserves, especially in stressed basins. To prevent proliferation of

private wells to circumvent higher prices, water meters should be required for all automatic lawn irrigation systems regardless of their water source, and private well water used for lawn irrigation should be billed as if it were municipal water. Water, like air, should be considered public property. The protection of Massachusetts' water resources guaranteed by Article 97 trumps consideration of cosmetic landscape greenery, especially during a drought. Ironically, using a pricing strategy to diminish the amount of water used for lawn irrigation could actually forestall proliferation of total outdoor watering bans.

Actual summertime usage in a community must be measurable in order to compute summer rgpcd for comparison with a summertime water use standard. To measure summer water use in a community, all water meters must be read on May 1 and September 30. This can be facilitated by implementation of automatic meter reading (AMR) technology, which transmits readings from every meter by radio. AMR is already in place or being installed in many communities. Fixed network AMR systems that read all meters daily are also very useful for monitoring unaccounted for water, charging higher water rates in summer, detecting leaks, revealing unusual water usage patterns, collecting data for statistical reporting, providing daily usage data for water auditors and consumers, detecting meter tampering, enhancing cash flow, and eliminating billing disputes. In short, fixed network AMR is an invaluable tool for managing water supplies. Debt service for AMR systems should be factored into water rates, and this technology should be installed state-wide as rapidly as possible, beginning in stressed basins.



One million gallon tank

New leak mapping technology can be integrated into AMR systems to locate leaks on a daily basis. Even a 2 gpm leak (roughly the equivalent of a running faucet) wastes a million gallons per year, enough to fill a typical municipal water storage tank. If system-wide leak detection is only performed every year or two, leaks that start shortly after leak detection has been performed will run and expand for a very long time before the next leak detection cycle. Unlike “retail” water conservation, fixing leaks in the water distribution system does not cut into water revenues. With an AMR system in place, the labor formerly required to read the meters can be redirected to repairing leaks.

Installing fixed network AMR and leak mapping systems is cost-effective in the long run. Requiring all public water suppliers, beginning with those in stressed basins, to implement these technologies, funded by a modest increase in water rates, would be another way for the state to live up to the spirit of Article 97.

Comparing community water use statistics with state standards and statistics from other communities requires a standardized and clearly defined method for classifying and reporting water use. The Annual Statistical Report (ASR) form provided by MA DEP

each year to water suppliers lists categories for water use, but does not clearly define how they should be used. For example, should water used by a dormitory be classified as residential, institutional or school use, and should it be included as part of rgpcd? If so, is the population living in the dormitory counted as part of the census for purposes of calculating rgpcd? How should significant seasonal population fluctuations in resort communities be accounted for when computing rgpcd? How should variable occupancy in apartment buildings be dealt with? How should “confidently estimated” but unmetered water (such as water used for fire fighting) be defined and documented, so that unaccounted for water can be determined consistently from community to community?

Like a financial statement, the ASR should include a summary inflow and outflow statement showing all sources of water at the top (adjusted for documented master meter calibration errors if necessary), followed by itemized, metered uses of water (also adjusted for significant, documented large meter calibration errors) according to a classification system standardized by MA DEP and used by all water suppliers. Total metered water should be subtracted from total water sourced to show a subtotal called unmetered water. Confidently estimated water use (documented with date, location, description and official signature) should be subtracted from total unmetered water to arrive at unaccounted for water.

The confidently estimated water use section of the ASR provides a way to document and report extraordinary but legitimate and unavoidable unmetered water uses such as fire-fighting or water main breaks that are beyond the control of water suppliers. Also reported as unmetered but confidently estimated water are non-emergency water uses within the control of the water supplier, such as routine water main and storm drain flushing. Any unmetered water use for which a date, location, description, and authorized signature is not reported on the ASR should be classified as unaccounted for water.

With an AMR system in place to monitor the volume of unaccounted for water on a daily basis, an acoustic leak mapping system to locate leaks, and idled meter readers available to repair leaks and replace old, under-reading meters, it should be feasible to keep unaccounted for water under the 10% standard. Communities reporting more than 10% unaccounted for water, especially those in stressed basins, should be required to install AMR and leak mapping systems.

Accurate water use data is a key component of an effective water conservation program. The current ASR form’s lack of clear guidance for water suppliers who fill them out means that the ASR data, including rgpcd and unaccounted for water figures, are suspect. Much as the financial accounting profession has developed Generally Accepted Accounting Principles (GAAP) to keep track of monetary flows, a standardized system for tracking water flows is needed in order to monitor, regulate and manage water supplies, provide reliable state-wide water use statistics, and protect and preserve our increasingly valuable water resources.

In addition to raising prices for lawn irrigation use, water rates in general should be increased between May 1 and September 30 to reflect the higher environmental cost of summertime water withdrawals, and encourage water conservation in summer. Additional revenues generated by higher irrigation rates and higher summertime water rates should be invested in leak detection, metering, rebates, and other water conservation and education programs to reduce demand, purchase land to protect drinking water aquifers, and pay for recharge systems to get more surface runoff back into the ground. Strictly administered and audited enterprise fund accounting should be employed to guard against diverting water revenues to pay expenses unrelated to managing and conserving the water supply. A state-administered trust, funded by a modest surcharge to be incorporated into water pricing state-wide, and administered by the Massachusetts Department of Environmental Protection, should be established to assist less affluent communities with long term, interest-free loans to finance capital equipment needed to properly manage their water supplies.

A water banking fee should be assessed on all new development sufficient to cover the cost of measures needed to conserve at least two gallons for every gallon of projected demand associated with the new development. In addition to being required to install on-site recharge systems designed to maintain or exceed the pre-development recharge rate, new developments should have to pay for off-site recharge systems to cleanse and infiltrate surface runoff back into the ground in the Zone II's of the local wells that supply their water.

Water conservation should be considered as a source of water just like a new well or a desalination plant. Since it is the most cost-effective and environmentally responsible way of balancing supply with demand, it should be treated as the source of first resort. However, it should be recognized that conserving significant volumes of water is not something that can be achieved overnight. It requires a sustained and adequately staffed and funded effort, such as that of the MWRA over the past 20 years, to make a meaningful difference. It calls for a new mind-set among regulators, water suppliers and the public, brought about by visionary leadership of politicians at both state and local levels, to live up to the requirements of our state constitution and save our water resources from falling victim to the tragedy of the commons.

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