

Summary: Water Resource Conservation and Restoration in Massachusetts

Charles River Watershed Association

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There are three fundamental affects of the engineered water cycle, described in detail in the attached paper “Engineered Impacts to the Natural Water Cycle,” on surface water bodies and groundwater in Massachusetts:

- Human demand for potable water supply and irrigation competes with natural instream flow in the summer months.
- Paved and constructed land surfaces, impervious to rain, cause rainwater to flow quickly into stormdrains and then to rivers, preventing the rainwater from percolating into the ground to recharge groundwater aquifers, and increasing runoff contributing to flooding and erosion.
- Potable well and reservoir water once used is collected by centralized wastewater systems that discharge the treated effluent far from its sub-basin of origin, contributing to nutrient loading in surface water bodies. In the summer, flow in many eastern Massachusetts rivers and streams is nearly 100 percent treated wastewater effluent.

As a consequence of engineered water systems, rivers and streams in eastern Massachusetts are being drawn down, or are drying up during the summer months, and wastewater effluent makes up nearly 100 percent of instream flow in others. Withdrawing water from one location, using it in a second, and discharging it in a third, while also throwing rainfall away as polluted runoff, is simply not sustainable.



The Ipswich River, suffering the effects of the engineered water cycle.

There are solutions to these problems, however, and water conservation plays a key role in reducing potable demand, curtailing impacts on rivers and streams, and protecting supply for future growth.

Massachusetts environmental agencies including the Executive Office of Environmental Affairs, the Department of Environmental Protection, the Department of Conservation

and Recreation, and the Water Resources Commission have made great strides over the last decade to first understand and then adopt standards and policies to address these problems.

EOEA developed the state's first Water Policy in 2004. The Policy, developed with input from a group of well-respected developers, scientists, engineers, municipalities, advocates, and agencies, addresses all aspects of water use, with an emphasis on water quantity. Recommendations include development and refinement of planning tools and strategies to promote efficient use of water, measures to promote proper infrastructure maintenance, wastewater reuse and recharge, stormwater recharge, water supply development, resource protection and restoration strategies, and permit streamlining. A key Water Policy goal is a more effective partnership with municipalities. Working with localities, the policy includes recommendations on planning and design innovations, fix-it-first strategies to encourage compact development and the revitalization of cities and towns, and proactive protection of future water supplies and critical water resources.

The Water Resources Commission issued its first water conservation standards governing interbasin transfers of water for water supply in 1992. The WRC issued Interbasin Transfer Performance Standards in 2001, based on the 1992 document, setting goals of 65 residential gallons per capita daily (RGPCD) as the basis for estimates of water demand, and 10 percent unaccounted for water for water supply systems. Currently, the WRC is revising the 1992 conservation standards, and has set 65 RGPCD and 10 percent unaccounted for water as its standards for assessing interbasin transfer applications.

DEP's "new" Water Management Act withdrawal permit policy setting 65 RGPCD and 10 percent unaccounted for water as standards is therefore hardly new. In fact, 67 percent of municipalities in the state currently meet DEP policy requirements. To address water supplier concerns, DEP issued Guidance to its WMA Policy in January, 2006. Recognizing that water conservation and changing water use habits will take time, the Guidance gives communities two full calendar years (2009 for permits reissued in 2006) to meet the performance standards for residential use and unaccounted for water. Even then, under the Guidance, so long as a community is making reasonable progress towards meeting the standards, DEP will exercise enforcement forbearance through the five-year permit review, or re-issuance period. DEP also eliminated the seasonal limit on withdrawals in the Guidance. In other words, as long as a community is making progress, it has five years to achieve the standards, and two-thirds of communities in Massachusetts already meet them.

All of these policies and standards are designed to reduce nonessential potable water use, thereby mitigating the impacts of summer water withdrawals on rivers and streams, and protecting potable water supplies for future growth. Cisterns, for example, can be used to capture and store roof runoff to supply water for discretionary landscape irrigation. Their widespread use would dramatically reduce the need for potable water supplies for irrigation.

The Metropolitan Area Planning Council has completed a study of water demand for the 101 communities in its region. Entitled “Growth Trends and Water Supply in Eastern Massachusetts,” the study indicates many communities are already beginning to grapple with obtaining enough potable water to meet demand, and by 2030, most will face serious shortages. (See attached MAPC graphics) Long before communities begin to run out of water, the damage to the natural environment will be catastrophic. In many eastern Massachusetts rivers and streams, it already is.

Conservation plays a critical role in reducing impacts. It is not, however, the sole solution. We must also fundamentally change our water and wastewater infrastructure.

The use of low impact development techniques, which capture rainwater runoff from impervious surfaces and return it to the ground rather than discharging it to rivers and streams will begin to resolve the problem. Moving from large centralized wastewater treatment systems to centrally operated small groundwater discharge wastewater treatment systems will both restore instream flow and improve surface water quality. Such treatment should rely on granulated activated charcoal and ozonation systems to remove pharmaceuticals and personal care products from the waste stream, while also dramatically reducing nutrient loads and other toxics.^{1,2} Selective discharge of wastewater effluent to the ground so that it can recharge our rivers and streams will dramatically enhance water quality and quantity in them without compromising water quality for potable use.

Most Americans understand the need to protect and husband natural resources. A comprehensive approach to water use including water conservation and the restructuring of stormwater runoff facilities and wastewater treatment systems will insure that Massachusetts secures sustainable water resources for human use, while restoring natural instream flow and habitat. If we are successful in the coming 15 to 20 years in achieving these ends, we will also enhance the attractiveness of Massachusetts as a location for commercial and industrial activities. The rest of the nation, particularly in the southeast and southwest, faces serious water quantity and quality issues.

We must begin, however, and conservation of our water resources is the first step.

¹ David Sedlak, Karen Pinkston, *Factors Affecting the Concentrations of Pharmaceuticals Released to the Aquatic Environment*, University of California, 2002.

² Kellyn Betts, “Keeping Drugs Out of Drinking Water,” *Environmental Science & Technology*, September 4, 2002.