

Building Strong Collaborative Relationships for a Sustainable Water Resources Future:

STATE OF MASSACHUSETTS
SUMMARY OF STATE WATER PLANNING

U.S. Army Corps of Engineers
Civil Works Directorate
441 G Street NW
Washington, DC 20314-1000

December 2009

The findings contained in this report are based on the information collected from the literature search and interviews for this initiative and should not be construed as an official Department of the Army position, policy or decision unless so designated by other official documentation.

STATE OF MASSACHUSETTS

1. STATE/REGIONAL WATER PLANNING STATUS

Water planning is managed primarily at the local level. Of the 286 water supply systems in Massachusetts, most are owned by cities and towns. In addition to these municipal systems some water and fire districts have been created by special acts of the General Court (Massachusetts Legislature). These districts are self-governing. The same is true for wastewater systems, which are primarily municipally owned with some self governing wastewater districts established by the law. There are also a number of homeowner associations in Massachusetts that provide water supply service. Some associations are organized as nonprofit corporations, while others may operate on a more informal basis. Finally, there are a limited number of investor-owned water companies which provide water to their customers.

The major water supply sources for the greater metropolitan Boston and Holyoke area is Massachusetts' only large consolidated system, managed through the combined efforts of the Massachusetts Water Resources Authority (MWRA) and the Department of Conservation and Recreation which manages the watershed lands around a series of reservoirs. The MWRA wholesales water to 51 communities and provides sewer treatment for 43. In total, 61 communities are currently members of the MWRA network.

The state guidance and regulation is fragmented across a number of state environmental agencies in accordance with their specific missions. Through the Water Management Act, administered by the Massachusetts Department of Environmental Protection (MassDEP), withdrawal amounts per community and, when environmental conditions warrant, per well, are regulated. Through the Interbasin Transfer Act, administered by the Water Resources Commission of the Executive Office of Energy and Environmental Affairs, transfer of water from one watershed to another is regulated, with limitations made when such a transfer's would likely have a potentially negative impact on the donor basin. Other water related issues such as habitat, wetlands protection, estuary management, impoundment safety, etc are spread across state's the environmental agencies. Development practices along rivers and streams are impacted by the Rivers Protection Act, whose enforcement is primarily delegated to the 351 cities and towns of the Commonwealth.

Though there is no comprehensive statewide water resource plan, the state has taken significant steps in recent years to improve the scientific basis of its regulators' decision framework. A series of tools to guide regulators as well as the regulated water suppliers are under development. These include:

- **Sustainable Yield Estimator:** A DEP / USGS joint effort to better understand the sustainable yield of a subwatershed. The estimator will provide a GIS-based screening tool for DEP to generate natural streamflow and (with water use and discharge data) present-day flow at ungaged sites for perennial streams helping to evaluate cumulative impacts and consider varying protective stream thresholds to achieve a better balance between competing water uses.

- **Index Streamflows:** Developed for Massachusetts rivers based on historic flow statistics from index gages (gages least impacted by human alteration as identified by USGS), these streamflows represent a seasonal range of flow expected to be present most of the time and are intended to be protective of aquatic habitat resources in lieu of detailed site-specific studies. This index will support overall streamflow criteria, to be the basis of future re-classification of stressed basins, and offer guidance regarding basin capacity to provide withdrawals.
- **Water Budgets:** By quantifying the impact on surface water of current and potential water demands in communities, the water budgets assessment supports long-term public water supply planning, within the context of achieving protection of aquatic ecosystems and minimizing stress on natural flows. Water Budgets takes a broader look at the human impact on surface water bodies of all water and wastewater infrastructure including those systems which move water between subwatersheds thus short-circuiting the natural hydrological cycle. The result is an assessment of where there are subwatersheds under stress and a better understanding of the impact of new well locations and extended wastewater infrastructure, and ways to improve the overall hydrologic balance.

In 2004, in part to address the concern over increased development in Eastern Massachusetts, the Office of Energy and Environmental Affairs created a Water Policy Task Force to develop a water resources policy for the Commonwealth of Massachusetts. The document, *Massachusetts Water Policy*, was released that year and defines the water resources challenges that face the state and a series of policy recommendations that aim to proactively address these challenges. The Massachusetts Water Policy document identifies five key issues related to water resources in the state: maintaining sufficient quantities of streamflow so as to sustain ecological and anthropogenic demands; water reuse and recharge; stormwater; aging infrastructure; and impaired waters and debilitated habitat areas (Source: [1]). The overarching philosophy of the water policy is to keep water local, promote sustainable water use habits, and manage water at the local level as well. There are ten recommended policy initiatives presented in the *Massachusetts Water Policy* document that address the water resources issues listed above. It also includes a brief implementation plan for the ten recommendations, assigning responsible parties and setting a schedule for completion.

MassDEP provides each public water system with a Source Water Assessment and Protection (SWAP) report that includes recommendations as to how a community can reduce the risk of contamination. For broader supply management issues, communities are encouraged to develop Integrated Water Resource Management Plans (IWRMP). With guidance for plan development provided by MassDEP, the goal of the IWRMP is to address the full spectrum of issues that arise in water resource management including drinking water and stormwater issues. In furtherance of the Water Policy, the Guide stresses the need to consider solutions that keep water local and minimize the impact on the overall water budget, the inflow and outflow of water to the community. The Guide also promotes sustainable water resource management strategies. To this end, the Guide encourages communities to consider a wider range of strategies for managing water resources including wastewater reuse, water conservation, optimization of existing drinking water sources, increased ground water recharge of stormwater and wastewater as well as the implementation of low impact development techniques and sustainable development principles. Though these integrated plans can be costly, financial support for the development of these plans can be acquired through the State Revolving Fund (SRF) program, which makes low interest loans available for water and wastewater infrastructure improvements.

Massachusetts has been divided into 27 major land based watersheds, plus the Massachusetts Bay, which form the basis for some of the planning and management activities at the state level. Figure 1 shows the watershed map of Massachusetts. MassDEP uses the Watershed Approach as their main strategy to protect and maintain water quality, which is defined as “a phased holistic program for watershed-based assessment, permitting, outreach and nonpoint source pollution control” (Source: [3]). In a separate effort, the Department of Conservation and Recreation (DCR) has developed land management plans for the four watersheds that supply water to the greater Boston area in Eastern Massachusetts (Quabbin Reservoir, Wachusett Reservoir, Sudbury Reservoir, and Ware River watersheds). The DCR has the responsibility and authority to manage and protect these water supply basins.

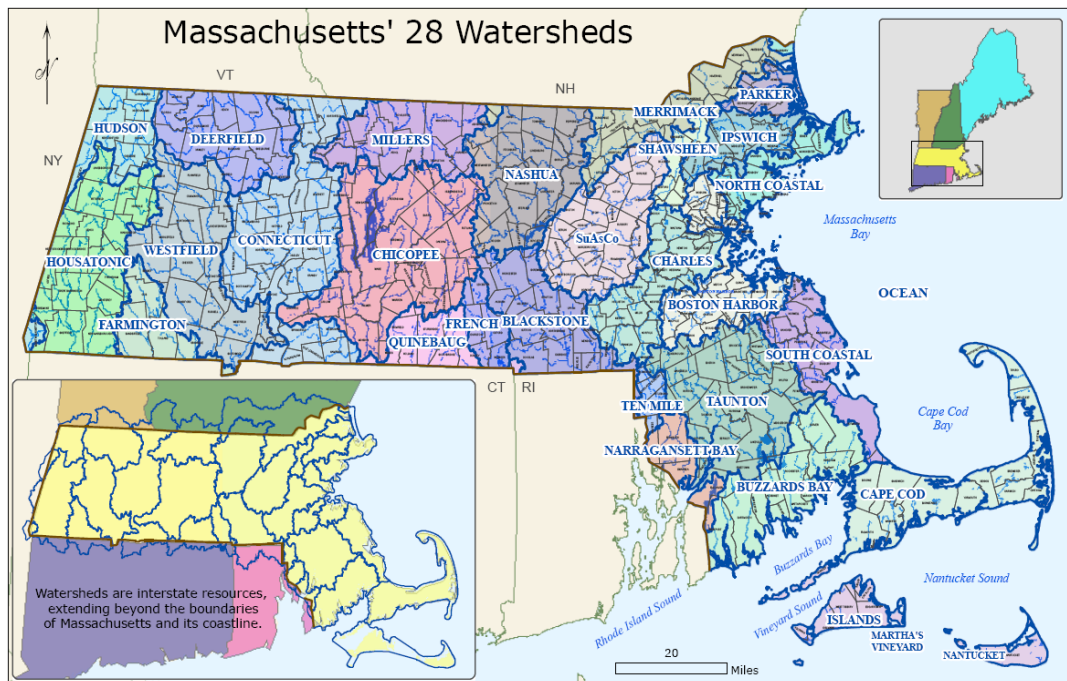


Figure 1. Massachusetts’ Watersheds Map (Source: [2])

2. RESPONSIBLE STATE AGENCIES/REGIONAL ENTITIES

The Executive Office of Energy and Environmental Affairs (EEA) oversees the Commonwealth’s six environmental, natural resource and energy regulatory agencies, and houses within it the Office of Water Policy. EEA was responsible for the development of the Water Policy document released by the Water Policy Task Force in 2004. The Task Force consisted of several state government agencies, federal entities, local governments and commissions, and business interests. The contact information for the EEA is as follows:

Ian A. Bowles – Secretary of Energy and Environmental Affairs
 (617) 626-1000
 env.internet@state.ma.us
 100 Cambridge Street, Suite 900
 Boston, MA 02114

Kathleen Baskin – Director of Water Policy
 (617) 626-1012
 kathleen.baskin@state.ma.us
 100 Cambridge Street
 Boston, MA 02114

Within the EEA is the Massachusetts Water Resources Commission (WRC), which is comprised of state officials and public members who are responsible for “developing, coordinating and overseeing the Commonwealth’s water policy and planning activities”, per Chapter 21A, Section 8A-F of the Massachusetts General Laws (2). The WRC is chaired by the Secretary of Energy and Environmental Affairs (listed above). The contact information for the WRC is as follows:

Anne Monnelly
 (617) 626-1395
 Anne.Monnelly@state.ma.us
 Water Resources Commission
 c/o DCR Office of Water Resources
 251 Causeway Street, Suite 700
 Boston, MA 02114

The Department of Conservation and Recreation (DCR) Division of Water Supply Protection has two offices involved in water planning for the state. The Office of Water Resources (OWR) provides technical and staff support to the WRC and maintains the administrative record for the WRC’s Interbasin Transfer reviews and applications. The Office of Watershed Management section “manages and protects the drinking water supply watersheds for approximately 2.2 million residents of Massachusetts, primarily in Greater Boston” (Source: [5]). The contact for the Division of Water Supply Protection is as follows:

Jonathan Yeo – Director
 (617) 626-1250
 Department of Conservation and Recreation
 251 Causeway Street, Suite 600
 Boston, MA 02114-2104

The Massachusetts Department of Environmental Protection (MassDEP) is responsible for water pollution control and the implementation of the Water Management Act, which requires permits for water withdrawals from ground and surface waters. The MassDEP has also developed the *Water Resource Management Planning – A Guide for Towns and Communities*, which outlines the process for developing comprehensive and integrated water resource management plans on the local level. The contact information for the MassDEP is as follows:

Laurie Burt – Commissioner (617) 292-5856
 Lucy Edmondson – Deputy Commissioner, Policy and Planning (617) 292-5505
 One Winter Street
 Boston, MA 02108

3. WATER MANAGEMENT VISION AND GOALS

In addition to statewide water policy planning and oversight, the Water Resources Commission advises the Department of Environmental Protection (MassDEP) in the administration and enforcement of water pollution control and water management policies and regulations. The Massachusetts Water Policy of 2004 (Source: [1]) provides the general framework for the Commission's long range planning objectives along with the 2006 Water Conservation Standards (Source: [9]).

4. SCOPE OF WATER RESOURCES PLANNING AND MANAGEMENT

While there is no comprehensive, statewide water plan for Massachusetts, this section will summarize the documents and programs that are designed to aid in the management of the state's water resources.

The *Massachusetts Water Policy*, released in 2004, lays out a framework for how the different entities should collaborate, manage, and plan more effectively. Further, the Water Conservation Standards published in 2006 establish updated statewide goals for water conservation and water use efficiency, and provide guidance on the most current conservation measures. They will help bring greater awareness among users about water use and water waste, help improve our infrastructure, ensure sustained water supply, and move us forward toward more pragmatic water use.

These help guide the MassDEP in their implementation of the Water Management Act (WMA). The MassDEP's *Water Resource Management Planning – A Guide for Towns and Communities* document provides guidance on how to develop a comprehensive or integrated water resource plan at the regional or municipal level.

Water Policy

The *Massachusetts Water Policy* - the document that is intended to guide water resources planning and management in the state - sets out to advance four principles (Source: [1]):

- *Keep water local and seek to have municipalities live within their water budgets by addressing issues from a watershed perspective.*
- *Protect clean water and restore impaired waters.*
- *Protect and restore fish and wildlife habitat.*
- *Promote development strategies consistent with sustainable water resource management.*

With this document the state aims to provide direction, planning, tools, technical assistance, incentives, and a larger framework for municipalities and regional water departments to address the challenges facing the state. The focus is on the challenges involved with maintaining sufficient quantities of streamflow so as to sustain ecological and anthropogenic demands; water reuse and recharge; stormwater; aging infrastructure; and impaired waters and debilitated habitat areas. The Water Policy offers ten recommendations for how the state, municipalities, and regional water departments can more effectively manage Massachusetts' water resources.

Recommendation #1: Create a "Stress Framework" with increasingly stringent performance standards, recommendations and requirements as a community's basin approaches highly stressed.

Communities that share common watersheds and resources should be aware of the cost of poor water management and planning, as well as the benefit of good water management and planning, in order to prevent crises that occur in the state's "stressed basins". The WRC has identified communities that are situated in stressed basins, and as a result has been able to coordinate reactions to water resource crises. The intention of this recommendation is to provide guidance and education to communities so that crises are avoided. In this situation, the state will provide the necessary information and guidelines to localities so that the management of stressed basins can be carried out effectively at the local level. According to the Policy, "The Stress Framework would set performance standards for the overall basin based on streamflow, and, later, biological and chemical integrity. It would also identify performance standards for specific infrastructure and resource management issues...and establish a menu of targeted recommendations and requirements" (Source: [1]). Specific actions to support this initiative are recommended, as follows:

- The WRC should establish under its oversight a multi-stakeholder working group to expand the existing "stressed basin" into a tiered "stress level" framework.
- Devise a graduated menu of actions related to specific performance standards including water efficiency and savings, seasonal peak pricing, the adoption of local wastewater treatment, water reuse and on-site stormwater and wastewater recharge, leak detection, metering, the adoption of technologies and products, the adoption of water enterprise accounts (and percentage of water rate payments going into the dedicated accounts), ratios of specific kinds of mitigation (water offsets), and establishing water banks.
- Develop mitigation strategies and appropriate tiered ratios to encourage developers, water suppliers, and communities to take actions that "find water or get recharge" at a beneficial ratio and in the right place.
- Revise the Water Conservation Standards to include measurable criteria for use in permitting decisions, grant awards and loans that can be incorporated into the Stress Framework.
- Develop a policy on maintenance and repair of leaking water supply and sewer system infrastructure, including requirements for adequate monitoring.

The responsible party for implementing this recommendation is the WRC, partnered with the DCR, MassDEP, US Geological Survey (USGS) and watershed associations. The 2001 Stressed Basins in Massachusetts report, written by the WRC, defines an initial list of hydrologically stressed watersheds and gives guidance on how to navigate the permitting process when developing water supplies in a stressed basin (Source: [6]). The revised index of streamflows addresses this issue, as does the revised Water Conservation Standards published in 2006.

Recommendation #2: Develop clear guidance and planning materials to help communities meet existing and future water uses by developing watershed solutions based on water budgets.

According to the USGS 65 percent of the Massachusetts' population get their water from surface water supplies, and 35 percent get their water from groundwater supplies (Source: [7]). Local water budgets should be calculated to gain a greater understanding of how communities can keep water local and live within their means. This recommendation also references the Integrated Water Resource Management Plan (IWRMP) under development by the MassDEP, which will "evaluate a wide range of water resource issues, such as existing and potential water supply needs, any interconnections with wastewater

options, groundwater recharge, streamflow and water quality considerations” (Source: [1]). The recommendation does not explicitly suggest the use of conjunctive management of groundwater and surface water supplies as a solution to meeting local water needs. The following specific actions are recommended:

- From a Water Budgets study, identify areas in Massachusetts where existing and future growth pressures can negatively impact riverine and estuarine ecosystems.
- Provide guidance as to when specific “tools” (water banks, stormwater, reclaimed water, wastewater recharge, etc.) should be part of strategies to meet existing and future water supply demands or restore resources.
- Identify critical areas where environmental and human needs may best be met by directing growth away from these areas, or by regional water systems where appropriate.
- Finalize the IWRMP Guidance as soon as practicable and include wastewater, water supply, stormwater, and sustainable development principles that respect the natural hydrological cycle.

The responsible parties for implementing this recommendation are the EEA, WRC, and MassDEP (specifically for developing the IWRMP). The schedule for completion of these actions is between July 2006 and July 2008.

In response to this recommendation, MassDEP released *Water Resource Management Planning – A Guide for Towns and Communities* (Source: [4]). This document defines the different levels of planning options that localities have to manage their water resources and meet permitting and funding requirements. Integrated water resource management planning is described as “a plan that evaluates alternative means for addressing a community’s current and future wastewater, drinking water, and stormwater needs, and identifies the most economical and environmentally appropriate means of meeting those needs” (Source: [4]). Comprehensive water resource management plans are described as more narrowly focused plans that concentrate on the one component of a community’s water resources that presents the greatest challenge. At the lowest level of planning are engineering reports, which are even more focused on how exactly to solve a particular water resource problem, such as a leaky water pipe network.

The guidance document defines the scope of work for comprehensive and integrated water resource management plans to include “an assessment of the man-made and natural environment, and evaluation of the existing infrastructure and identification of future needs, an evaluation of alternative strategies for addressing those needs, and a recommended plan and schedule” (Source: [4]). An integrated plan will address wastewater, water supply, and stormwater; a comprehensive plan will only address one of those sectors. The comprehensive and integrated plans will consolidate information on existing conditions from state, federal and non-governmental monitoring and assessment programs as well as project future needs within the particular locality. The guidance document outlines, in detail, all of the considerations that should be explored when assessing existing conditions, identifying future needs, and evaluating alternatives, including (Source: [4]):

- Wastewater infrastructure – description of existing on-site systems; wastewater treatment plants; wastewater collection systems; residuals treatment, handling and disposal; operation and maintenance of existing treatment works.
- Water supply infrastructure – description of treatment facilities; description of distribution and storage system; description of residuals treatment and disposal practices; description of emergency procedures; description of water use patterns.

- Stormwater management – identification of priority stormwater problems; assessment of public education and outreach program; assessment of public participation program; assessment of illicit connection detection and elimination program; assessment of construction site runoff program; assessment of post-construction stormwater management programs; assessment of good-housekeeping/pollution prevention practices for municipal facilities.
- Development and screening of alternatives – environmental benefits and impacts of selected alternatives; impacts on sensitive environmental receptors; cost-effectiveness evaluation; institutional arrangements; special considerations for evaluating wastewater alternatives (regulatory standards, groundwater discharges, regional solutions); special considerations for evaluating water supply alternatives (source management, authorized withdrawals, sources outside the basin, new public water systems).

Both the Massachusetts Environmental Policy Act (MEPA) and the State Revolving Fund (SRF) require communities to develop planning at some level as a permitting requirement or criterion for obtaining funding. The guidance document also includes a table of reasons and impositions that a town would reference to decide which kind of plan it would need to develop, and the recommended timeframe for the development of each plan. The EEA, working with MassGIS, has developed the methodology for creating the Massachusetts Water Budgets and released a limited number of pilot studies.

Recommendation #3: Pursue legislation requiring the use of enterprise accounts to fund operation and maintenance of infrastructure, stormwater mitigation and other water resource protection efforts.

This recommendation aims to require that municipalities ensure funding for their water resources needs through enterprise funds. Enterprise accounts should be promoted, preferably, through an act of the Legislature. Though the Legislature has not passed a requirement for enterprise funds, the number of communities who pursue this method of financing expands each year. The Massachusetts Department of Revenue recently reported that 45 communities had enterprise funds solely for their water systems, 39 solely for their wastewater system, and 86 for both water and wastewater. In addition, water and fire districts and commissions established by the Massachusetts Legislature operate under enterprise funds as a result of their structure independent of municipal government.

Recommendation #4: Increase treated wastewater recharge and reuse.

Recognizing the need to recharge aquifers, conserve water, and protect surface water from runoff pollution, the Policy recommends that formal steps be taken to identify opportunities for wastewater reuse and actively promote the practice. The following specific actions aim to accomplish this recommendation:

- Create a working group including DEP, the Office of Technical Assistance (OTA), MA Association of Boards of Health (BOH), and representatives of consultancies, municipalities, and commercial properties to review current treated wastewater disposal policies and practices and to recommend ways to augment reuse and recharge efforts.
- Recommend that BOHs track and regulate septic system maintenance to extend septic system life and maintain proper performance. Furthermore, provide specific recommendations to guide BOH work after assessing the performance and feasibility of the SEPTRACK electronic data sharing effort in Buzzards Bay and the septic system management program in Gloucester.

- Actively promote reclaimed water reuse at specific recreational and institutional venues and new large development sites.

Several state departments are assigned responsibility for this task, including the WRC, EEA, MassDEP and DCR. Draft regulations regarding water reuse have been developed by MassDEP.

Recommendation #5: Promote stormwater recharge close to its site of origin.

In order to mitigate the negative effects that development has on stormwater, as much as it causes a decrease in local groundwater recharge as it increases the opportunity for surface water pollution from runoff, the Policy recommends using the Massachusetts Environmental Protection Act office (MEPA) as a venue for encouraging low impact development (LID) practices. The state wants to go beyond their existing wetlands and federally mandated stormwater programs and provide guidance on best management practices as well as the promote the creation of stormwater utilities at the municipal level. The following actions were developed to support this recommendation:

- Provide guidance on appropriate Best Management Practices (BMPs) based on nature of contamination and impact, and have DEP finalize its current effort to update the Stormwater Guidance including an emphasis on increasing infiltration.
- Extend the application of the Stormwater Guidance from wetland to upland areas and encourage stormwater recharge outside areas designated by Phase II of the National Pollution Discharge Elimination System (NPDES).
- Have MEPA highlight to project proponent's opportunities to incorporate low impact development (LID) techniques for stormwater management.
- Make recommendations as to the most effective way of promoting the establishment of stormwater utilities after investigating the Chicopee Stormwater Utility (see also Recommendation 3).

Recommendation #6: Advance effective management of water supplies.

Recognizing that development and water supply decisions are made at the local level, the state intends to ensure that water resources are distributed appropriately across different needs (namely, public water supply and environmental integrity) by providing a balance of direction and flexibility to municipalities. The state's Water Management Act (WMA) is the venue for regulating water withdrawals, and the recommendation is to incorporate the development of redundant supplies and regional utilities into the regulations, allowing for more flexibility in water supply options, but remaining under the supervision of MassDEP. Specific actions recommended by the Policy to advance effective management of water supplies are:

- Craft a state policy on water supply development in order to promote better long-term planning and provide clear information to local decision-makers regarding the development of new water supplies.
- Review current guidance and practices, and provide guidance for water suppliers on the optimization of sources so as to:
 - Actively encourage the optimization of water withdrawals, by allowing multiple water supply sources without increasing withdrawal amounts so as to balance the rate and timing of withdrawals from multiple sources.
 - Have communities with rivers showing significant impact on stream flow from bank-side withdrawals strongly consider moving their sources.

- Provide guidance on the placement of new wells where their use will reduce the overall impact to aquatic systems (including limits on the timing of pumping).
- Evaluate the benefits and costs of using publicly protected lands (municipal, state) for water supply and maintenance/optimization purposes.
- Have DEP define plans for implementation and oversight, including supervision of source substitution by DEP regional offices, the maintenance of a database at DEP's central office, and monitoring of compliance in conjunction with IWRMPs.

The WRC and EEA, partnered with MassDEP and DCR, are responsible for this recommendation.

Recommendation #7: Protect and restore critical land and water resources.

Working in conjunction with local and regional entities, the state should develop formal programs for identifying and protecting critical resources. These resources include drinking water supply watersheds, important ecological areas, and aquatic habitats. Recently, the Division of Fisheries and Wildlife (Mass Wildlife) completed their *Living Waters* program, which identified the most critical sites for freshwater biodiversity in the state (Source: [8]). Figure 2 shows the final statewide *Living Waters Bio Map* and associated data from the program.

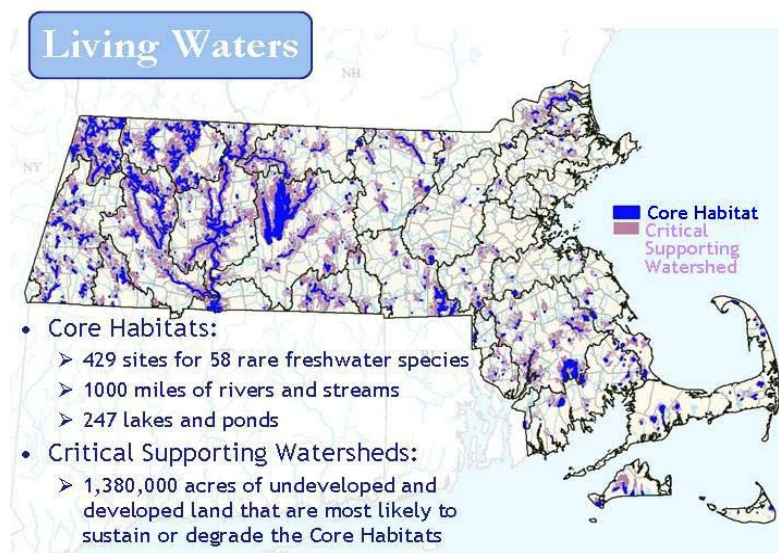


Figure 2. Mass Wildlife Living Waters Bio Map, showing critical freshwater biodiversity sites within the state (Source: [8])

The state intends to build upon the work done through this program, and others, to continue to protect and restore critical resources. The Water Policy lays out detailed actions that outline how to fund such efforts, the studies needed to identify critical resources, and the state's role in protecting those resources. These actions are:

- Establish a grant program to protect water resources that:
 - Prioritizes current and future unprotected municipal water supply lands, such as Zone I and Zone II land areas, aquifers lands, land abutting headwaters (primary order streams), and other riparian corridors.

- Identifies acquisition projects that maintain natural filtration capability and can serve as recharge areas.
 - Leverages municipal / external resources and municipal actions to promote sustainable development by incorporating the program in Commonwealth Capital.
 - Provides extra points for biological integrity, i.e., for land referenced in Living Waters and Bio Map.
- Protect and restore riverine and estuarine habitat by developing a methodology for prioritizing restoration projects
 - Conduct target fish community assessments for mainstems and major tributaries as an indicator of environmental conditions.
 - Define appropriate fish community and habitat for small streams using Indices of Biological Integrity (IBI).
 - Consider undertaking a geomorphic analysis to indicate target river structure (See Appendix A-2).
 - Continue efforts to reduce local impediments to movement of fish, wildlife and other aquatic life requiring stream passage by maintaining the River Continuity project.
 - Disseminate information on resource management, restoration and protection, integrating *Living Waters* and *Biomap* into planning efforts and providing technical support on lakes and ponds issues
 - Advance an education and outreach effort to landowners, local decision-makers, Conservation Commissions, developers, watershed associations, and stream teams about the importance of Core Habitats and Critical Supporting Watersheds and ways to protect them.
 - Incorporate Living Waters education into state programs that work with volunteers, such as the River Instream Flow Stewards, Adopt-A-Stream, and River Continuity.
 - Support the lake and pond technical review group recommended by the Citizen Advisory Committee for the Lake General Environmental Impact Report (GEIR), currently convened by DCR, as a central point of reference to facilitate the review of lake management project proposals, dissemination of lake protection and management information, and to assess lake and pond management and restoration techniques and measures not evaluated in the GEIR.
 - Inform municipalities, private land conservation organizations, and private landowners of the need to protect the lakes and ponds and the tools available to protect them.

The EEA and the Department of Fish and Game have primary responsibilities for carrying out this recommendation, in partnership with watershed associations. In 2005 EEA released the first Drinking Water Supply Protection grant. That grant continues, now administered by MassDEP. Over \$12 million has been offered so far to communities wishing to protect lands surrounding current and future water supplies. The grant takes into account the Living Waters and Biomap information in the evaluation criteria.

Recommendation #8: Promote sustainable development, timely maintenance of old infrastructure, and the protection of priority water resources through refinements to the Clean Water and Drinking Water State Revolving Fund.

The State Revolving Fund (SRF) provides loans for infrastructure repair and development under the objective, “to promote public health, compliance and access to affordable water” (Source: [1]). The Policy recommends incorporating criteria into the SRF that promotes sustainable development, “to

reduce nonpoint source pollution, the protection of parcels critical to supply, water quality and wildlife habitat” (Source: [1]). The following specific actions intend to implement this recommendation:

- Adjust the DW and CW SRF criteria to promote development in downtown areas, previously developed areas and “new growth centers,” making sure to involve communities, the Environmental Protection Agency (EPA), the development community, and others.
- Office of Commonwealth Development (OCD) agencies, in collaboration with the Massachusetts Municipal Association, Regional Planning Agencies, and watershed associations, should provide technical assistance to ensure that the additional sustainable development criteria are not burdensome for communities within regional water authorities or without adequate planning resources.
- Encourage ongoing maintenance of existing wastewater and water infrastructure by giving preference or evaluation points to communities fixing old infrastructure priority in state grants and permits (over those seeking expansions), or using year-end slippage in the program (approximately \$20 million) to fund exclusively Fix-It-Early projects.

The parties responsible for revising the SRF program are MassDEP and EEA.

Recommendation #9: Develop clear guidance and planning materials (including the “Growing Smarter Toolkit”) to help municipalities, developers and consultants advance development that reduces negative impacts on the environment. Also, provide a single point of contact for technical assistance on permits requiring multiple agency review, environmentally-friendly development strategies, fast-tracking, and resource protection strategies within EEA.

The state philosophy for water management appears to be to lean heavily on planning at the local level, while the state provides guidance and tools so that communities can effectively develop solutions locally. This recommendation aims at making it easier for communities to implement sustainable development practices by developing guidance and planning materials as well as streamlining the environmental permitting process. The specific actions for this recommendation in the Policy are as follows:

- EEA should develop information, outreach and relevant technical assistance strategies for municipalities, water suppliers, developers, and consultants as they relate to water issues and sustainable development. The “Growing Smarter Toolkit” should include but not be limited to outreach materials on:
 - Water budgets, data, assessments, and monitoring efforts (the science) in watersheds.
 - State water policy documents, reports, permitting data, etc., in one portal.
 - Definition of Best Management Practices (BMPs).
 - Case studies on Pinehills and developments undertaken in coordination with the Green Neighborhoods Alliance.
 - Stormwater by-laws that encourages reduction in storm-water runoff.
 - By-laws such as Open Space Residential Design (OSRD) and Open Space Mixed Use District (OSMUD), which preserve open space and natural resources by clustering development away from those resources.
 - Zoning ordinances which incorporates green building standards (LEEDs) for certain sizes and types of structures.
 - The adoption of LID techniques, especially in areas around wetlands and rivers.
 - Information packet for developers based on national LID brochure produced in cooperation with the National Home Builders Association.

- Materials on non-acquisition strategies (model zoning, by-laws and ordinances, and various partnerships) available for municipalities to protect critical water resources, such as headwaters, Zone IIs, aquifers critical for source water and recharge, significant soils, slopes, riparian buffers, etc.
- Information on sustainable development and incentives available to developers (complementary grants to municipalities, fast-track “sustainable development” criteria, etc.).
- Seek legislative approval to expand the mission of OTA from that of providing technical assistance exclusively to businesses to include technical assistance to communities, developers and consultants
- Create a working group led by EEA and including its agencies and interested parties to create a coordinated process for permits requiring multiple agency review, resulting in a single application, and concurrent, predictable timelines
 - Set up pre-application framework to discuss feasibility and point out probable issues early - e.g., for significant municipal/regional projects, hold an initial meeting prior to MEPA submission that involves all permitting authorities and local interests so as to put all issues on the table.
 - Maintain current permit authority, but coordinate timelines and identify permitting, plan approval, and process redundancies so as to reduce duplicative processes and advance multiagency coordination. Work to establish a consistent time period [e.g. 60 days] for interested parties to send in comments and concerns and providing communities the option of posting a pre-permitting notice in the Environmental Monitor.
 - Clarify regulatory roles of state and local players (e.g., of Conservation Commissions).
 - Define interaction with pertinent non-EEA agencies (the US Army Corps of Engineers, Mass Historical Commission, Mass Highway, etc.) regarding relevant project permits and impacts through such vehicles as memoranda of understanding (MOU).
 - Develop model contracts for consultants to use with water suppliers.
 - Start with New Source Approvals but also address permitting bottlenecks as regards important environmental goals (e.g., dam removals).
- Assign OTA staff to act as Ombudsmen on permits requiring multiple agency review and coordinate permits for applicants and provide coordinated, consistent, and unbiased technical and regulatory assistance to municipalities from the pre-planning to permit stage.
- Provide robust interaction and clear guidance to suppliers, localities, developers, and consultants on performance standards, permit information, policies, and reports generally, and on the Growing Smart Toolkit, Fast-Tracking, and non-acquisition land protection strategies. Include efforts to involve external partners such as watershed associations, regional planning agencies, consultancies and developers.

The EEA and several other state agencies and associations share the responsibility for carrying out the actions listed above. The Office of Technical Assistance offered informative seminars on water conservation, and the Smart Growth / Smart Energy Toolkit is now in its second iteration, having been published as an interactive CD as well as accessible through the internet. Each year an annual Smart Growth / Smart Energy Conference is held to reinforce the Commonwealth’s Sustainable Development principles and share successful advances. The conference attracts over 400 participants each year.

Recommendation #10: Take advantage of the new Office for Commonwealth Development (OCD) structure to advance more effective planning with Mass Highways and other development agencies.

The objective of this recommendation is to ensure that repairs and construction on structures that interact with aquatic habitats (such as bridge crossings over rivers) take into account proper design

measures to minimize impact on the environment. Specific actions that can be taken to achieve this are as follows:

- Form a working group to draft a BMP guidance document for habitat lands next to roadways for existing strips of land between roads and nearby rivers to promote resource areas for shade, nutrient absorption and habitat value to rivers and streams, including:
 - Prompt sand sweeping and recovery practices.
 - BMPs to control runoffs on existing roads.
 - Steps to control invasive plants along right-of-ways.
- Enhance Division of Fisheries and Wildlife (DFW) coordination with Mass Highway (MHD) on road/water crossings to:
 - Offset project costs and maximize the use of existing federal grant programs that support fish passage.
 - Develop crossing standards / guidance for project design and a GIS crossing database.
- Work with Mass Highway to involve the DFW early in the design of roadways where a road/water crossing occurs such that:
 - DFW can review Transportation Improvement Project lists for fish and wildlife passage concerns and promote new structures, retrofits, and designs that meet Target Fish Community passage needs.
 - MHD avoids, where feasible, enlarging roads that share the flood plain with a river and increasing the length of armored riverbank.
 - MHD uses infiltration and retention structures to control road runoff and weighs relocation of roads away from rivers when the environmental impacts to the river and the costs of periodic maintenance to the roadbed make this a viable option.

The Policy assigns responsibility to the Office for Commonwealth Development, the Department of Transportation and the Department of Fish and Game. The Office of Commonwealth Development was dissolved at the end of the Romney Administration, with newly elected Governor Deval Patrick issuing Executive Order 487 formally creating the Development Cabinet in June of 2007. Chaired by the Governor, the Cabinet draws together the Lieutenant Governor and the Secretaries of Administration and Finance, Energy and Environmental Affairs, Housing and Economic Development, Labor and Workforce Development, and Transportation and Public Works for bi-weekly discussions. In an effort to break down "silos" in state government the Cabinet works to identify opportunities where secretariats can work together. This is resulting in better coordination among agencies, greater government efficiency and effectiveness, and enhanced transparency of the day-to-day workings of the Commonwealth. The Sustainable Development Principles are a guiding force for the development cabinet.

The Water Policy also states that the EEA will create an interagency group composed of key water staff that will “coordinate capital planning, data gathering, assessment and monitoring, information sharing related to regulation and permitting, and outreach to and collaboration with external partners, such as the WRC, watershed associations, municipal groups, universities, the USGS, and others” (1). In addition to the policy recommendations listed above, the Water Policy document also includes several data collection recommendations to support the policy initiatives.

The Watershed Approach

MassDEP has laid out a framework for protecting and maintaining water quality statewide using the Watershed Approach. As shown in Figure 1, the state has been divided into 27 watersheds. MassDEP defines this initiative as follows (Source: [3]):

The main strategy employed by MassDEP to protect and maintain water quality is the implementation of the Watershed Approach. A phased holistic program for watershed-based assessment, permitting, outreach and nonpoint source pollution control has been adopted by MassDEP's Bureau of Resource Protection to address its Watershed Management goals. The program runs its full course over a five-year cycle, which is repeated.

The purpose of the program, also referenced as the Watershed-Based Plan (WBP), “is to organize information about Massachusetts's watersheds, and present it in a format that will enhance the development and implementation of projects that will restore water quality and beneficial uses in the Commonwealth” (Source: [3]). The program allows all of the state's watersheds to be eligible for EPA Section 319 funds for nonpoint source pollution abatement projects. The five year cycle divides the program into clear steps: (1) gather information, public outreach and identify water quality issues; (2) conduct monitoring and collect data to fill information gaps; (3) review results of monitoring, establish total maximum daily loads (TMDLs), issue impairment classifications and permits, and issue recommendations for further monitoring; (4) development of a watershed action plan, enforcement of TMDLs and permits, and planning for targeted nonpoint source abatement programs; (5) implementation of Year 4 corrective actions and assessment of the Watershed Approach to prepare for adjustments in the next 5 year cycle (Source: [3]). Figure 3 shows the status of the state's watersheds in their respective 5-year cycles.

The result of the Watershed Approach is an interactive website application that provides all of the data, information and results of the 5-year program through links and GIS maps (<http://public.dep.state.ma.us/Watershed/Map.aspx>).

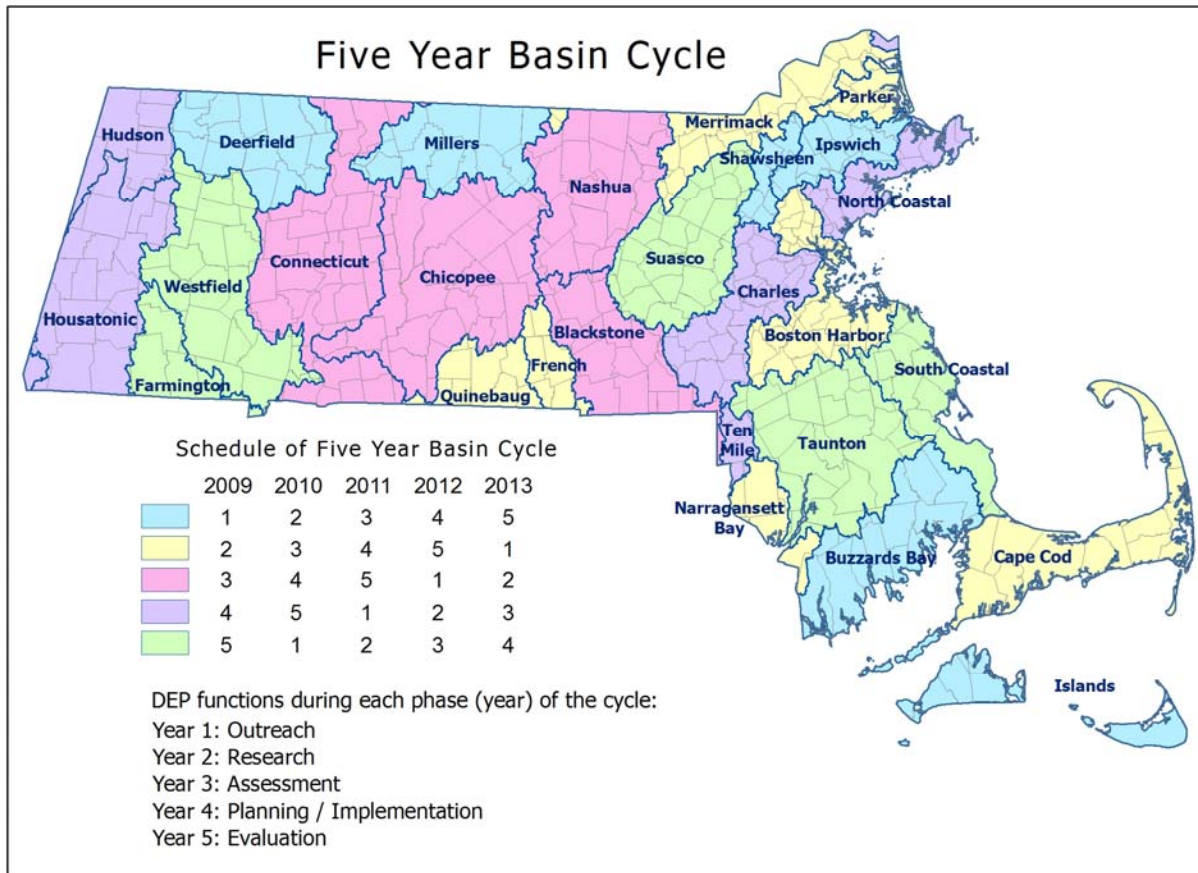


Figure 3. MassDEP Watershed Approach, Schedule of 5-year Basin Cycle

5. PARTNERSHIPS, STAKEHOLDER, AND PUBLIC INVOLVEMENT

The Water Resource Commission (WRC), which is the organization “responsible for developing, coordinating and overseeing the Commonwealth's water policy and planning activities” (Source: [2]), is comprised of members from several state agencies and public organizations. The list of members of the WRC is as follows:

- Executive Office of Energy and Environmental Affairs (EEA)
- Department of Housing and Community Development
- Department of Conservation and Recreation (DCR)
- Department of Environmental Protection (MassDEP)
- Department of Agricultural Resources
- Department of Fish and Game
- 5 public members

Based on what Massachusetts has documented regarding its state water planning initiatives, the focus appears to be on guidance and regulation, transferring the responsibilities for planning and management

onto the municipal and regional level entities. The state also relies on federal agencies and non-governmental organizations to help craft guidance and policy documents.

6. PLAN IMPLEMENTATION STRATEGY

The Massachusetts watershed cycle has a clear 5 year implementation strategy, as described above. Overall planning at the state level, as presented in the 2004 Massachusetts Water Policy document, does not appear to follow an implementation strategy. There is a section of the Policy which assigns responsibilities and a timeline for the implementation of the various recommendations, but there is no publicly available follow up information on the status of the recommendations. Figure 4 shows the implementation schedule for the ten recommendations of the Water Policy. The EEA tracked the progress of the various objectives internally by holding monthly interagency meetings and maintaining a spreadsheet of the status of each agency's responsibilities.

7. OUTCOMES ASSESSMENT PROCESS

There is not a formal process for monitoring the status of water planning initiatives and projects. The most recent statewide water planning document was the 2004 Massachusetts Water Policy, and there do not appear to be any published progress reports or updates to the recommendations in the Policy.

8. NEEDS, CHALLENGES AND CRITICAL PRIORITIES - INTERVIEW INSIGHTS

EEA identified several issues and geographical areas as their greatest water resources priorities at this time. Within the Interstate 495 belt (which is 10 to 30 miles outside Boston proper to the south, west and north) the focus is on water use and allocation. Within the Route 128 belt (up to 10 miles outside Boston proper to the south, west and north) the issues are primarily related to land use, and how it will translate into future water resource problems. Throughout the state, planning efforts are focused on the following issues:

- Sustainable use and supply, and identifying stressed basins that are not capable of meeting water supply demands now or in the future.
- Stormwater management, especially nonpoint source contributions to elevated phosphorus levels in the state's rivers.
- Wastewater disposal issues, including increased discharges and recharge opportunities.
- The state is trying to develop instream flow requirements and has created or studied tools for this purpose including a index streamflow report to determine unimpacted flows, the USGS sustainable yield estimator, and an index of hydrologic alteration.

The state needs their network of streamflow and groundwater gages and monitoring system to be intact and well-maintained. They need for projects to be fully funded and not have to be cut short due to lack of funding. The state has a strong desire for an easier way to exchange information and experience with other states, especially on the issue of sustainable water supply. They would like to see facilitated dialogue with neighboring states, as well as other states that may be facing similar issues.

No.	ACTION	PHASE I	PHASE II		PHASE III				
		Fiscal 05		Fiscal 06		Fiscal 07		Fiscal 08	
		Jan-05	Jul-05	Jan-06	Jul-06	Jan-07	Jul-07	Jan-08	Jul-08
1	Create a Stress Framework	WRC / DCR							
2	Meet water needs based on water budgets					WRC / DCR			
3	Use of enterprise accounts			EOEA					
4a	Increase treated wastewater recharge and reuse	WRC / DEP							
4b	Track septic system maintenance			EOEA					
4c	Promote reclaimed water reuse			WRC / DEP					
5a+b	Stormwater BMP guidance			DEP					
5c	Incorporation of LID into MEPA projects	MEPA							
5d	Establish stormwater utilities			EOEA					
6a	Policy on water supply development			WRC					
6b	Optimization of water withdrawals			DEP / DCR / NEWWA / MWWA					
7a	Grant program for critical land and water resources	EOEA							
7b	Methodology for restoration of habitat	DFG							
7c	Integrate <i>Living Waters</i> and <i>BioMap</i> into planning; lake and pond restoration			DFG					
8	Promote sustainable development and Fix-it-Early through CW and DW SRF	DEP							
9a	Develop technical assistance to towns	EOEA							
9b	Expand OTA mission	EOEA / OTA							
9c	Coordinate permits; provide regulatory assistance			EOEA / permitting agencies					
9d	EOEA staff act as Ombudsperson			EOEA					
9e	Growing Smarter Toolkit, fast tracking, etc. guidance	EOEA / OTA							
10	Planning with Mass Highways	OCD / DOT / DFG / MassHighways							
DATA									
a	Stress Framework	WRC / DCR							
b	Target fish and methodology for restoration targets	DFG / DFW							

Figure 4 – Massachusetts Water Policy Implementation Schedule (Source: [1])

The policy created by the Task Force was very successfully implemented because everyone had bought into the ideas from the beginning. One aspect of the policy that has fallen a little short, due to a lack of legislative support, is each community developing an enterprise account to fund water related projects. Also, many of the initiatives took longer than expected, because of funding, competing priorities, attitude shifts, and the lack of sound science to support new policies.

The state recently passed the Global Warming Solution Act (GWSA). In addition to setting aggressive goals on the reduction of greenhouse gas emissions, the Act also called for the establishment of advisory committees to look at all of the sectors of the state regarding climate change mitigation as well as adaptation. In Section 7 of the GWSA agencies charged with issuing permits, licenses and other administrative approvals and decisions are directed to take predicted climate change impacts into account. A generally accepted definition of “predicted climate change impact”, especially as affecting floodplain alterations, sea level rise, and greenhouse gas emissions is needed to along with guidance for regulators and the regulated alike regarding the incorporation of these impacts into these agency responsibilities.

Massachusetts has worked with the USGS on planning, USACE on individual projects, including hands on modeling and data collection, NOAA on coastal zone management, and the EPA on water quality regulations. The state is a co-signatory with EPA on NPDES permits. The EPA has also collaborated with MassDEP on stormwater regulations. Massachusetts would like to see the federal government facilitate more sharing of information between states, and keep an eye on issues to provide guidance to states that could benefit from collaboration.

9. REFERENCES

- [1] MA Executive Office of Environmental Affairs. (2004) *Massachusetts Water Policy*
- [2] Executive Office of Energy and Environmental Affairs Website. Retrieved 12/12/2008 from:
<http://www.mass.gov/envir>
- [3] MA Department of Environmental Protection Website. Retrieved 12/12/2008 from:
<http://www.mass.gov/dep/water/priorities/wshappr.htm>
 - a. And:
 - b. <http://public.dep.state.ma.us/Watershed/Intro.aspx>
- [4] MA Department of Environmental Protection. (2008) *Water Resource Management Planning – A Guide for Towns and Communities*. Retrieved 12/31/2008 from:
<http://www.mass.gov/dep/water/laws/policies.htm>
- [5] Department of Conservation and Recreation Website. Retrieved 12/12/2008 from:
<http://www.mass.gov/dcr/waterSupply/watershed/water.htm>
- [6] Commonwealth of Massachusetts Water Resources Commission. (2001) *Stressed Basins in Massachusetts*. Retrieved 12/12/2008 from:
http://www.mass.gov/Eoeea/docs/eea/wrc/stressed_basins.pdf
- [7] United States Geologic Survey. (1997) *Public-Water Supplies in Massachusetts and Rhode Island: Investigations of Processes Affecting Source-Water Quality*.

- [8] MA Division of Fisheries and Wildlife Website. Retrieved 12/31/2008 from:
http://www.mass.gov/dfwele/dfw/nhosp_temp/land_protection/living_waters/living_waters_home.htm
- [9] Executive Office of Energy and Environmental Affairs and Water Resources Commission. (2006) *Water Conservation Standards*. Retrieved 2/4/2009 from:
www.mass.gov/Eoeea/docs/eea/water/water_conservation_standards.pdf