THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE ST., BOSTON MA 02114

REPORT OF THE FINDINGS, JUSTIFICATIONS AND DECISION OF THE WATER RESOURCES COMMISSION
Relating to the Approval of the
Town of Reading's Request for an Interbasin Transfer
Pursuant to M.G.L. Chapter 21 § 8C

DECISION

On June 9, 2005, by a six to three (6-3) vote, the Water Resources Commission (WRC) approved an amended Staff Recommendation concerning Reading's request, under the Interbasin Transfer Act, to join the Massachusetts Water Resources Authority (MWRA) Water Works System. This vote was taken after review of the facts provided by the applicant, analysis of the associated data, and consideration of public and agency comments concerning the proposal.

INTRODUCTION

On September 20, 2002, the WRC received a request for approval of an action to increase the present rate of interbasin transfer under the Interbasin Transfer Act (M.G.L. Chapter 21 §§ 8B-8D) from the Town of Reading. The Town applied for admission to the MWRA System to purchase up to 219 million gallons (mg) of water annually to supplement its existing water supply sources. (Figure 1)

The WRC accepted Reading's application as complete on April 8, 2004. Two required public hearings were held on May 18 and May 19, 2004. On June 10, 2004, a Staff Recommendation to approve Reading's application was presented to the WRC. A public hearing on this Staff Recommendation was held on June 23, 2004. Responses to comments received through the public hearing process are available in a separate report. The merits of the proposal were discussed at the July 8, 2004 WRC meeting. Because of concerns with some of the conditions of the Staff Recommendation, Reading requested an extension of the decision date. (Reading's concerns are discussed later in this document). In late September 2004, Reading requested to change the time period of the water purchase from May through October back to May through September, as originally proposed in the DEIR. The WRC voted to approve the revised proposal on December 9, 2004.

After that vote, the Massachusetts Environmental Policy Act (MEPA) unit of the Executive Office of Environmental Affairs (EOEA) responding to WRC Staff inquiries from October 2004, determined that the project should have obtained a Notice of Project Change (NPC) because Reading had changed the time period for purchasing MWRA water. Although analysis on this scenario had also been conducted through the MEPA process, it deviated from the Secretary's Certificate on the FEIR, and thus represented a material change under MEPA. Reading decided

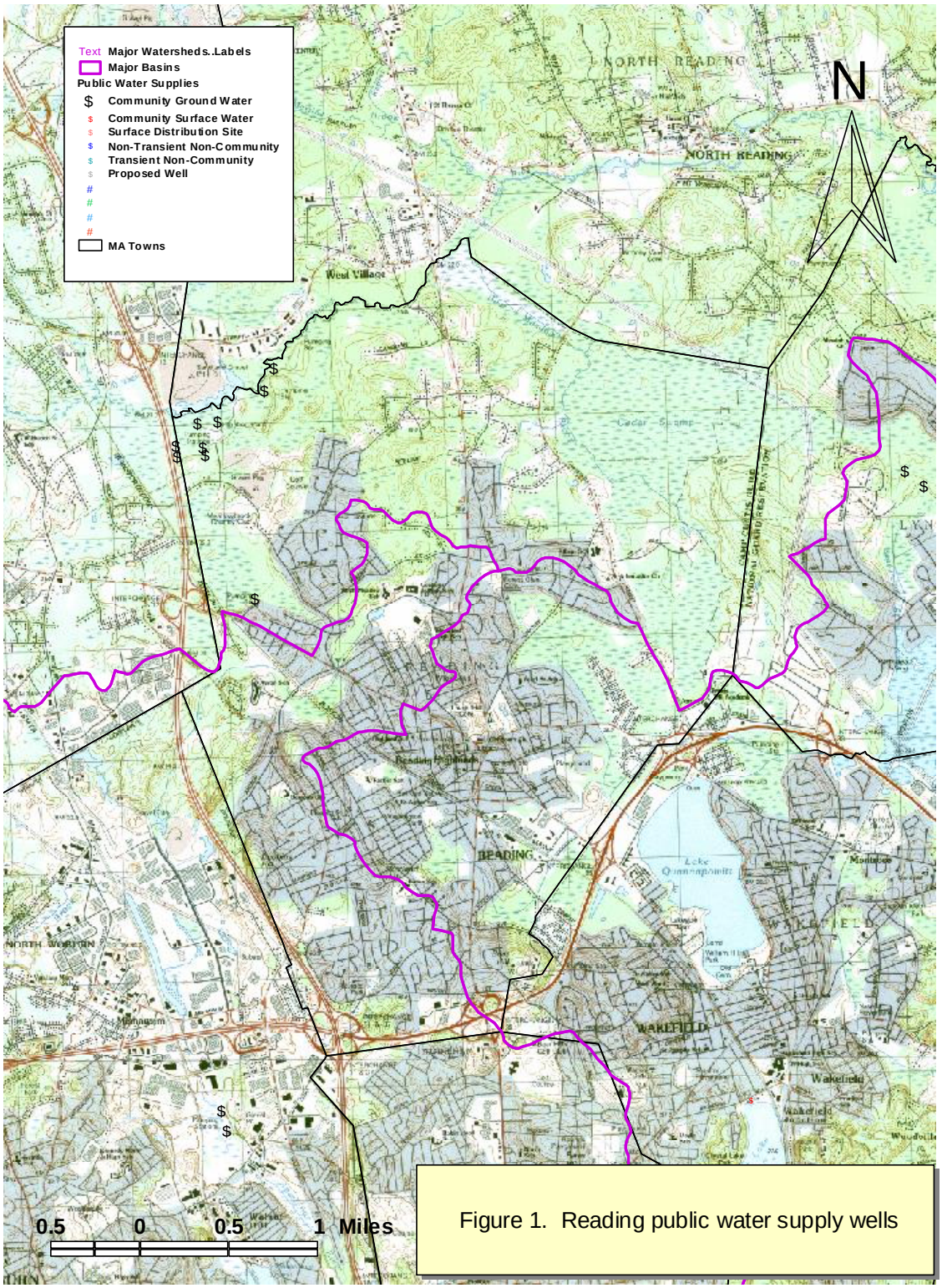


Figure 1. Reading public water supply wells

that rather than filing an NPC, the Town would revert to the project presented in the FEIR: purchasing up to 219 million gallons of water annually from the MWRA between the months of May through October, while limiting withdrawals from its Ipswich River basin sources to its typical production of 1 million gallons per day during that period.

On April 8, 2005, the Commission discussed and clarified some key issues, deciding to postpone the final vote on Reading's application until the May 12, 2005 meeting. On May 12th, the Water Resources Commission (WRC) reviewed the merits of Reading's request, under the Interbasin Transfer Act, to join the Massachusetts Water Resources Authority (MWRA) System. Due to continuing discussions on several issues, the Commission and the Town agreed to postpone the final vote until the meeting of June 9, 2005.

FACTS PERTAINING TO THE APPLICATION

1. The proposed interbasin transfer by the Town of Reading is entirely voluntary and is not required by any regulatory authority.
2. The application was part of the DEIR submitted to MEPA. The WRC requested that additional information be provided through the FEIR. The FEIR was filed on September 15, 2003. Most of the requested information was provided. The Secretary issued a Certificate on the FEIR on October 31, 2003.
3. The outstanding information to evaluate the project under the Interbasin Transfer Act was provided in December 2003.
4. Reading has land area in the Ipswich River basin, the Mystic River subbasin of the Boston Harbor basin and the North Coastal basin.
5. The Town has nine existing water supply sources in the Ipswich River basin. Estimated capacity for these sources is 8.36 mgd.
6. The MWRA Water Works System's sources are located in the Chicopee River basin and the Nashua River basin.
7. Reading has determined that use of its sources during certain times of the year causes impacts to the Ipswich River and is proposing to purchase water to supplement its existing water supply sources during these periods.
8. Two required public hearings were held to take comment on this application, one in Reading, the receiving basin, on May 18, 2004, and one at the Quabbin Reservoir, in the donor basin on May 19, 2004.

EVALUATION OF THE PROPOSED INTERBASIN TRANSFER

This Interbasin Transfer application was reviewed on its own merits. The Decision was made on facts relevant to the Interbasin Transfer Act and its regulations. The application was evaluated against the eight criteria outlined in the regulations (313 CMR 4.05), as well as the Interbasin Transfer Act Performance Standards, and with consideration of comments received through the public comment process.

SYNOPSIS OF THE EVALUATION CRITERIA (313 CMR 4.05)

Criteria	Application Meets?
Criterion #1: MEPA Compliance	Yes
Criterion #2: Viable In-Basin Sources	Yes
Criterion #3: Water Conservation	Yes
Criterion #4: Watershed Management	Not Applicable
Criterion #5: Reasonable Instream Flow	Yes
Criterion #6: Groundwater/Pumping Test	Not Applicable
Criterion #7: Local Water Resources Management Plan	Yes
Criterion #8: Cumulative Impacts	Yes

BASIS FOR THE WRC DECISION

DCR's Office of Water Resources, DEP's Drinking Water Program and Northeast Regional Office, and DFG's Division of Fisheries and Wildlife and the Riverways Program reviewed this application. The WRC Decision was made after an extensive evaluation of the project and of Reading's compliance with the six applicable criteria of the Interbasin Transfer Act regulations. The following section describes in detail compliance with the criteria. Attachment 1 goes into greater detail concerning compliance with the criteria and performance standards.

Criterion #1: MEPA Compliance

The Interbasin Transfer application was part of the DEIR, submitted on September 20, 2002. The WRC requested additional information through the MEPA process. The Secretary's Certificate on the DEIR was issued on November 1, 2002. The certificate directed Reading to address the WRC's Request for Additional Information through the FEIR. The FEIR was submitted on September 15, 2003 and contained most of the information requested by the WRC. The Secretary's Certificate on the FEIR was issued on October 31, 2003. As noted in the introduction, additional steps have been taken to bring the decision of the Commission into compliance with MEPA.

Criterion #2: Viable In-Basin Sources

The Interbasin Transfer Act requires that "that all reasonable efforts have been made to identify and develop all viable sources in the receiving area of the proposed interbasin transfer" (MGL Ch. 21 §8D). It is unlikely that a new water supply source developed in the Ipswich River Basin section of Reading would be able to meet the permitting requirements of the various agencies. However, because Reading also has land in the Mystic River subbasin of the Boston Harbor basin and North Coastal basin, the town was directed to describe its efforts to "identify and develop all viable sources" in these areas of town.

Mystic River Subbasin of the Boston Harbor Basin

The geology of the Mystic River subbasin consists primarily of exposed bedrock and dense till. Medium and high-yielding sand and gravel aquifers are not present within Reading's land area in this basin (MAGIS). Due to the dense development in this area, it was deemed by Reading's consultants not to offer suitable locations for high-yielding wells. A small area within Conservation Trust Land was tested in 1997 to determine if a shallow unconsolidated wellfield could be developed at this location. The results were not favorable.

The town-wide Fracture Trace Study, conducted in 1997 to assess the potential for bedrock wells in Reading, did not identify areas for bedrock well investigation in this basin. This, combined with the existence of ground water contamination in neighboring Woburn, eliminated this area from further consideration.

North Coastal Basin

This area of Reading is heavily developed. Zone I protection for any well that might be developed here cannot be obtained. The only undeveloped lands in this section of town with potential aquifer formation are wetlands. Furthermore, this area is the headwaters of the Saugus River, which has also historically experienced low flow problems during summer months. Although the North Coastal basin was not classified with respect to flow stress, Saugus River impacts were documented in a June 2002 report, "Saugus River Water Budget and Instream Flow Study" by Gomez and Sullivan Engineers and Environmental Scientists. "The findings indicate that the Saugus River flow is affected during low flow periods in the summer and during certain periods in the fall and spring, when water suppliers are attempting to refill their storage reservoirs." This area of Reading is also upstream of the Reedy Meadows wetland in Wakefield and Lynnfield. Reedy Meadows is a National Natural Landmark recognized for its wetland habitat. Additional water withdrawals that may impact Reedy Meadows and further exacerbate impacts to the Saugus River should be avoided.

Ipswich River Basin

Reading considered bedrock well development within the Ipswich River basin. A fracture trace analysis was used to identify potential bedrock well sites and was followed by test drilling at the Town Forest area (the site of the town's existing wells). Although two wells with a potential yield of 75 gallons per minute each were identified, the approvable yield of the two wells would be limited to less than 200,000 gallons per day. The bedrock wells were found not to be viable and DEP concurred in a letter dated January 22, 2003 that, "based on the test wells installed to date, the available yield is not sufficient to justify conducting the New Source Approval process for the wells." Also, additional withdrawals from this area would contribute to water depletion from the Ipswich River basin even if the hydrologic impacts were delayed or minimized by withdrawing from the bedrock aquifer.

Reading has nine existing water supply sources in the Ipswich River basin. Estimated capacity for these sources is 8.36 mgd. Reading's average day demand (2.0 mgd) is well under the capacity of its sources and of its Water Management Act registration (2.57 mgd).

The spirit of the Interbasin Transfer Act requires that local sources be maximized before a water supplier looks out-of-basin to address its needs. However, the regulations define a "viable source" as one "which can be used while preserving reasonable instream flow as determined by the same criteria provided to evaluate impacts on the donor basin". (313 CMR 4.02). All of the town's sources are located in the Ipswich River basin. The USGS study, "A Precipitation-Runoff Model for Analysis of the Effects of Water Withdrawals on Streamflow, Ipswich River Basin, Massachusetts" (Zarriello and Ries, 2000, Water-Resources Investigation Report 00-4029) found that cumulative ground water withdrawals substantially decrease the magnitude, and increase the duration and frequency of low flows in the Ipswich River. Water withdrawals have little effect on moderate to high flows.

Reading acknowledges that use of its public water supply sources to meet its full demand during certain low flow times of the year contributes to the severe impacts to the river and so is proposing to purchase up to 219 mg from MWRA and restrict use of its sources to 1 mgd from May through October. Reading demonstrates in its application that reducing use of its wells during the targeted low-flow months (May through October) will reduce their impacts on streamflow in the Ipswich River during those periods (as measured at the USGS South Middleton stream gage). However, if the Town has purchased 219 mg from the MWRA prior to October 31st of any year, it will need to use its Ipswich River basin sources to provide for public health and safety.

DEP is concerned about the impacts of Reading's wells on low flow conditions within the Ipswich River. In comments provided on the ITA application, DEP notes, "the portion of the river at Reading's streamside wells is the most impacted stream segment. Under Reading's present pumping regime, the Department has observed that during the summer period, streamflow is frequently depleted to a dry riverbed. Since Reading's pumping contributes to this severe impact, the Department has determined that continued pumping of the Reading wells at existing levels is not a viable option. An alternative is necessary to protect the ability of the Ipswich River to function as a reliable source of safe drinking water, a suitable habitat for aquatic life and wildlife that are adapted to riverine conditions, and an area for primary and secondary contact recreation."

In addition, DEP has expressed concern about use of Reading's existing sources at current levels. The Department notes that the Town's existing water sources are highly susceptible to contamination. Several businesses that use hazardous materials generate hazardous waste, or store oil or hazardous material in above ground or underground tanks are within the Zone II of the Town's wells. Interstate Route 93 crosses the west side of the protective Zone I area around Well No.15 and Well No. 13.

Enhanced Water Conservation

As an additional source of water, Reading has begun to implement a four-year, $1 million conservation program to reduce water usage by 190,000 gallons per day (gpd). This program is discussed in more detail in the next section of this document.

Criterion #3: Water Conservation

Reading has an existing water conservation program which meets all of the 1992 Water Conservation Standards for the Commonwealth of Massachusetts and most of the 1999 Interbasin Transfer Act (ITA) Performance Standards for Criterion #3. Reading does not meet the Performance Standard for retrofitting all public buildings or for having a mechanism in its drought/emergency plan to tie water use restrictions to streamflow levels; however, the Performance Standards acknowledge that in certain cases, local conditions may prevent a proponent from meeting a standard or there may be alternative means of meeting a standard.

Retrofit programs were identified as a priority through the 2001 water audit. Because of the way projects are funded at the town level, these programs were underway, but not completed at the time of the application. Most were scheduled to be completed by mid-August 2004. All public buildings, with the exception of the High School and Barrows Elementary School, had been retrofit by September 30, 2004. In a letter dated October 25, 2004, Reading informed the WRC

that the retrofit program for all other public buildings had been completed. The High School and Barrows Elementary School are undergoing a total renovation. The Barrows Elementary School renovation is expected to be completed by September 2005. The contract for the High School renovation project was awarded in May 2004. As part of this renovation, all plumbing fixtures will be replaced with low flow devices. The renovation is scheduled to be completed by June 2007.

The Town has a two-stage outdoor water conservation regulation modified in January 2005, with the ability to levy a $300 fine for violations. The modification removed all voluntary outdoor water use restrictions and now includes only mandatory outdoor water use restrictions. Stage 1 provides for mandatory outdoor watering restrictions on odd or even days (depending on house number) and restricts time of day watering (4:00 a.m. to 9:00 a.m. and 5:00 p.m. to 8:00 p.m.). Stage 2 is provided for the eventuality that only enough water is available for essential public health and safety purposes. In this event, no outdoor water use of any type is permitted. The Town believes that the continued applicability of the ban, coupled with its high water and sewer bills serves to heighten community awareness of the need for water conservation and significantly dampens summer demand.

Reading's water conservation by-law is not based on streamflow thresholds, as required by the Performance Standards. However, the conditions of this interbasin transfer approval do require a linkage of outdoor water use and streamflows. The Town has demonstrated that through the reduction in use of its Ipswich basin water supply sources, combined with the purchase of MWRA water, impacts to the Ipswich River streamflow are at least as protective of streamflow as directly linking water conservation measures to streamflow. Reading's outdoor water use restrictions are deemed adequate for most years, and Reading's reduction in pumping its wells during the summer months will reduce impacts to the Ipswich River. If it appears that Reading's purchase of water from MWRA will exceed 219 mg prior to the end of October in any year, (expected only as a result of drought conditions), more restrictive limits on non-essential water use are appropriate to reduce impacts of pumping Reading's wells on the Ipswich River. The requirements of this condition are consistent with those issued by DEP in its 2003 Water Management Act permits for the Ipswich River basin. Refer to the Conditions section at the end of this document for specific requirements.

DEP's recently implemented Water Management policy recognizes that communities with a summer to winter water use ratio of 1.2 to 1 or lower are doing a good job of controlling peak water use and only requires that this ratio be maintained. Reading's ratio of summer to winter water use was 1.2 for the years 1998 to 2002. In addition, the analysis conducted to demonstrate the benefits to the Ipswich River from restricting use of local sources during the months of May through October showed that there was almost no difference between using the wells at 1 mgd and tying use of the wells to streamflow.

The WRC has determined that Reading is adequately addressing the Performance Standard for retrofit, and that water use restrictions outlined in the Town's by-laws, together with their overall water conservation program and the proposed well use restrictions, are protective of streamflow resources. Thus, Reading meets this criterion.[1]

[1] MGL Chapter 21 §8D: "that all practical measures to conserve water have been taken in the receiving area, including but not limited to the following:

This Decision requires that Reading notify the Commission when the High School and Barrows School renovations have been completed, with documentation of the retrofit devices installed, and provide annual reports detailing the water conservation actions taken as part of the $1 million program discussed below. This should include an accounting of the money spent and the successes of the program, including the estimated amounts of water conserved. Reading has implemented a four-year, $1 million conservation effort in order to reduce water usage by 190,000 gallons per day (gpd). Programs being implemented include:

- Residential water audits: 64 audits were completed in 2003. The program is ongoing.
- A rebate program for low flow toilets, washing machines and irrigation sensors began in March 2004. Approximately 90 rebates ($17,000) have been processed through April 2004. Reading completed a system-wide water audit in December 2004. The last system-wide water audit was conducted in April 2001. This led to the retrofit program now underway.
- Table 1 lists Reading's water conservation accomplishments with respect to all of the standards.

(a) the identification of distribution system sources of lost water, and where cost effective, the implementation of a program of leak detection and repair;
(b) metering of all water users in the receiving area and a program of meter maintenance;
(c) implementation of rate structures which reflect the costs of operation, proper maintenance and water conservation and encourage the same;
(d) public information programs to promote water conservation, including industrial and commercial recycling and reuse; and
(e) contingency plans for limiting use of water during seasonal or drought shortages"

Table 1
Reading's Conservation Status

CONSERVATION MEASURE	1992 STANDARD	1999 IBT PERFORMANCE STANDARD	ACCOMPLISHMENTS	MEETS STANDARD?
Public Education	Active Public Education Program in place which should include: - Targeting largest users - School program - Bill stuffers or worksheet to calculate water use - Advertising/media stories - Conservation information centers - Speakers - PSAs etc - Promoting use of water saving devices - Civic/professional resources - Special events - Multilingual materials (as needed) - Contests/recognition	A broad-based public education program which attempts to reach every user at least two times per year - refer to the WRC's 1992 "Water Conservation Standards for the Commonwealth of Massachusetts" and the Massachusetts Water Works Association for recommended public education measures Targeting largest users	Once per year, Reading sends out bill inserts. There are daily PSAs. Water conservation information is available at multiple locations, including the library, Town Hall and Water Treatment Plant. Tours of water treatment plant are offered. Newspaper articles appear at least annually. The town website is updated monthly with conservation information. The town seeks to specifically contact its largest users and provide educational programs.	Yes

CONSERVATION MEASURE	1992 STANDARD	1999 IBT PERFORMANCE STANDARD	ACCOMPLISHMENTS	MEETS STANDARD?
Leak Detection and Repair	Full Leak Detection survey every two years Include in full cost pricing	Full Leak Detection survey within the previous two years of the application Documentation of survey and of leaks identified and repaired Completed by methods at least as comprehensive as the MWRA's regulations for leak detection	Annual leak detection. Last survey conducted in June 2003 Included in full cost pricing Reading has provided documentation of its leak detection surveys and of leaks identified and repaired Reading's leak detection surveys are conducted in a manner as comprehensive as the MWRA's regulations	Yes
Metering	100% Metering Regular maintenance, calibration, testing and repair program All public buildings should be metered Quarterly billing, based on actual meter readings Master meters calibrated annually	100% Metering Regular maintenance, calibration, testing and repair program; description of program included in application All public buildings should be metered Quarterly billing, based on actual meter readings; bills should be easily understood by customer Master meters calibrated annually; documentation of annual master meter calibration	100% Metered Meters were changed over in '88; a phased replacement program is scheduled to begin in FY '05. Reading has an ongoing maintenance & repair program. All public buildings are metered and billed for water use. Quarterly billing, based on actual meter readings; considering monthly billing; second meters charged full price Master meters are calibrated annually. Documentation of annual master meter calibration was provided	Yes

CONSERVATION MEASURE	1992 STANDARD	1999 IBT PERFORMANCE STANDARD	ACCOMPLISHMENTS	MEETS STANDARD?
Pricing	Full cost pricing Enterprise accounts Regular evaluation of rate structure	Documentation of full cost pricing Rate structure must encourage water conservation	Documentation of full cost pricing was provided Reading has an Enterprise account Reading has a flat rate structure, but the rates are high $3.66/100 cu. ft. The rate structure evaluated annually – last change was 8/01	Yes
Residential water use	Make water saving plumbing devices available to residential customers Strictly enforce State plumbing code	If the community's residential gallons per capita/day is greater than 65, the proponent should be implementing a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program for encouraging installation of household water saving devices, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use.	Reading's residential gpcd averaged 59 from 1999 to 2001. Reading began providing water audits to residential customers in 2003. Reading offers retrofit kits to residential customers at no cost. Reading began a rebate program for the installation of low-flow toilets and purchase of low flow washing machines. The plumbing code is strictly enforced by the building inspector	Yes

CONSERVATION MEASURE	1992 STANDARD	1999 IBT PERFORMANCE STANDARD	ACCOMPLISHMENTS	MEETS STANDARD?
Public sector water use	All public buildings metered and water use accounted for	All public buildings should be metered	All public buildings are metered and billed for water use	Yes
	Retrofit all public buildings with low-flow devices	Retrofit all public buildings with low-flow devices	The High School and Barrows Elementary School are currently being renovated. Low flow devices will be installed as part of this renovation. All other public buildings requiring retrofits have been completed.	No, however, the performance standards recognize that local conditions may prevent a proponent from meeting a standard. Because of the way these projects are funded at the town level, Reading is just now in the process of renovating the High School and Barrows Elementary School, which will include retrofit with low flow devices. This provides an alternate method of meeting intent of the criteria, as provided in the Performance Standards.
	Meter hydrants used for pipe flushing and construction; charge for use		Hydrants used for pipe flushing and construction are metered; there is a charge for use	Yes
	Water audit every 3-5 years	Proponents should provide records of water audits conducted on public facilities. The most recent audit should have occurred within two years prior to the application for Interbasin Transfer approval.	A system-wide water audit is currently being conducted. The last water audit was conducted in April 2001. This led to the retrofit program now underway	

CONSERVATION MEASURE	1992 STANDARD	1999 IBT PERFORMANCE STANDARD	ACCOMPLISHMENTS	MEETS STANDARD?
Water Supply System Management	Drought management plan Strategies to reduce peak daily and seasonal peak demands	Drought/emergency contingency plan, to include: - seasonal use guidelines - measures for voluntary and mandatory water use restrictions and describe how these will be implemented - tie water use restrictions to streamflow and/or surface water levels in the affected basin(s) where this information is available	Reading has a By-law to restrict outdoor water use and a DEP-approved handbook to deal with all water supply emergencies.	Yes. Reading's water conservation by law does not include a link to streamflows. However, the conditions of this interbasin transfer require a linkage between streamflows and outdoor water use. In a drought year, if it appears that Reading's purchase of water from MWRA will exceed 219 MG, additional outdoor water use restrictions are appropriate.
	Update all water uses/plan to reduce unaccounted-for water	Unaccounted-for water should be at 10% or less	Unaccounted-for water averaged 10% over the past five years; Reading's UAW has generally declined over this period.	Yes
	Develop interconnections with other systems		Reading has emergency interconnections with Woburn, Stoneham, Wakefield and the MWRA.	Yes
Other		A program of land use controls to protect existing water supply sources of the receiving area that meet the requirements of the Department of Environmental Protection.	Reading's land use controls meet DEP's Guidelines. Reading has an aquifer protection by-law.	Yes
		A long-term water conservation program that complies with the 1992 Water Conservation Standards for the Commonwealth of Massachusetts should be in place.	Reading has a long-term water conservation program which complies with the 1992 Water Conservation Standards for the Commonwealth of Massachusetts	Yes

CONSERVATION MEASURE	1992 STANDARD	1999 IBT PERFORMANCE STANDARD	ACCOMPLISHMENTS	MEETS STANDARD?
Lawn and Landscape Water Conservation	Communities and public and private water suppliers should develop drought management plans that identify water supply and environmental indicators to serve as drought stage triggers and that outline a set of increasingly stringent water use restrictions that are designed to protect public health and the environment and that can be implemented through bylaw, ordinance or regulation.		Reading has a water conservation by-law tied to water supply indicators which outline a set of increasingly stringent water use restrictions	Yes
	Communities and public and private water suppliers should implement a water use restriction bylaw, ordinance or regulation that provides the community or water supplier with the ability to implement mandatory water use restrictions. These restrictions should be tied to environmental and water supply indicators as outlined in a drought management plan.		Reading has a by-law, which gives the Town the ability to implement mandatory water use restrictions.	Yes

Criterion #4: Watershed Management

This criterion is not applicable to this proposal. Reading's sources are ground water sources.

Criterion #5: Reasonable Instream Flow and Criterion #8: Cumulative Impacts

Reading is proposing to purchase up to 219 mg of water from the MWRA from May through October. This is an average of 1.2 mgd. The Town proposes to operate its Ipswich River basin wells at a rate limited to 1 mgd during these months and to supplement its needs with MWRA water. This would enhance flow in the Ipswich River basin. MWRA's sources are the Quabbin Reservoir in the Chicopee River Basin and the Wachusett Reservoir in the Nashua River basin. Reading is located in the Boston Harbor Basin (Mystic River subbasin), the North Coastal basin, and the Ipswich River basin. Most of Reading's wastewater (90% of the population) is sewered to the Massachusetts Coastal Basin via MWRA's Deer Island Treatment Facility. Approximately 350 on-site wastewater disposal systems are present in Reading, most of which are located in the Ipswich River basin.

The Interbasin Transfer Act regulations (313 CMR 4.05) direct the WRC to consider that "reasonable instream flow in the river from which the water is transferred is maintained" in making its decision to approve or deny an Interbasin Transfer request. In this case, WRC Staff evaluated the impacts of transferring 1.2 mgd during the months of May through October on the operations of the MWRA Water Works System, which include impacts to reservoir levels, drought levels, uncontrolled releases (spills) and the MWRA's mandated downstream releases. In addition, the cumulative impacts of the Reading transfer and other potential transfers (Wilmington and Dedham-Westwood) were evaluated on a monthly basis. These other potential transfers could result in an additional annual average of 1.7 mgd and an additional maximum of up to 2.96 mgd being transferred during the months of June through October.

The safe yield of the MWRA reservoir system is approximately 300 mgd. Demands on the MWRA water supply system peaked in 1980 at 343 mgd. Subsequent demand management programs reduced demand, and MWRA water demand continued its decline to 220 mgd in 2004, the lowest in 50 years. The average annual baseline demand for the past five years on the MWRA water supply has been 251 mgd. Metropolitan Area Planning Council (MAPC) future water demand estimates for the system indicated additional demands of 13 mgd through 2025 (prior to Stoughton's connection to the system). This results in a future system demand of 264 mgd. With the addition of Stoughton, the future system demand is 265 mgd. (Stoughton began receiving water from the MWRA in October 2003). The future monthly demands for Reading, Wilmington, and Dedham-Westwood were added to this amount to simulate total impacts on the MWRA reservoir system.

MWRA System

The construction of Winsor Dam on the Swift River was completed in 1939, creating the Quabbin Reservoir. In addition to the water impounded by Winsor Dam, Quabbin Reservoir can receive water from the Ware River in the Chicopee River basin. The MWRA system also includes the Wachusett Reservoir in the Nashua River basin. According to the FEIR for the Reading proposal (CDM, September 2003), "The MWRA reservoir system is operated with the primary objective of ensuring high quality adequate water supply. Secondary operational objectives include maintaining an adequate flood protection buffer particularly during the spring melt and hurricane seasons and maintaining required minimum releases to both the Swift and Nashua River."

Quabbin Reservoir has a storage capacity of 412 billion gallons and is fed by a well-protected watershed. The Wachusett Reservoir has a storage capacity of 65 billion gallons and is fed by a

slightly more developed watershed. The MWRA controls Wachusett Reservoir elevation through transfers from Quabbin Reservoir to Wachusett Reservoir. The objective is to operate Wachusett Reservoir over a narrow operating range (between elevation 390 and 391.5 feet) while allowing Quabbin Reservoir to freely fluctuate. The Quabbin Reservoir elevation at the spillway is 528 feet. The structural controls of the MWRA/DCR water system also allow Quabbin Reservoir to receive water from the Ware River watershed through diversions in the Quabbin Tunnel.

The operation of Quabbin Reservoir includes maintenance of a flow threshold in the Swift River at Bondsville (five miles downstream of Winsor Dam) of 20 mgd, or 30 cubic feet per second (cfs). This threshold was mandated in Chapter 321 in the 1927 Acts of Massachusetts. Releases from Quabbin through its bypass at the Winsor Dam are used to meet this requirement, supplemented by intervening drainage between Quabbin and the Bondsville stream gage that contributes flow. An Army Corps of Engineers permit also requires seasonal releases to maintain flow for navigability on the Connecticut River. The seasonal releases, which are in effect June 1 through November 30, are 70 cfs (45 mgd) if the flow in the Connecticut River, as measured at the Montague stream gage, falls below 4,900 cfs, and 110 cfs (70 mgd) if the flow in the Connecticut River falls below 4,650 cfs.

During its normal operation, the Quabbin Reservoir maintains the required thresholds stated above through controlled releases via the by-pass. The by-pass has a capacity of approximately 100 MGD (155 cfs). In addition, uncontrolled releases, or spills, occur periodically over the spillway. Uncontrolled releases are avoided due to downstream flooding impacts and the rapid increase of high flow these cause. While a high spring flow is normally considered beneficial for channel maintenance, the sudden high flows caused by Quabbin spills can be detrimental to downstream aquatic habitat. In addition, warm water spills from the surface of the reservoir during the summer have negative temperature impacts on both instream aquatic habitat and a downstream fish hatchery that uses Swift River water.

Flow thresholds are also part of the operation of the Wachusett Reservoir on the South Branch of the Nashua River. Chapter 488 of the 1895 Acts of Massachusetts requires a release of 12 mg per week or 1.71 mgd. Although uncontrolled releases, or spills, can also happen over the Wachusett Dam, they rarely occur.

Transfers from the Ware River to Quabbin Reservoir are only allowed at flows above 85 mgd, and must be limited to the period from October 15 to June 15. In addition, permission must be obtained from the Army Corps of Engineers to transfer water during the periods of June 1 through June 15 and October 15 through November 30. Historically, transfers from the Ware River have been made only on a limited basis for flood control or to help fill the Quabbin under drought conditions.

Hydrologic Analysis

Several types of data are available to evaluate the potential impact of the Reading transfer, as well as any planned or proposed transfers, on the Quabbin Reservoir. Streamflow in the Swift River is measured at a gage in West Ware. The gage is located 1.4 miles downstream from Winsor Dam and has a period of record from 1913 to present. Other available data include modeled reservoir releases, spills and drought levels.

Streamflow data, or a hydrograph showing the impact of the proposed transfer on the donor river basin, is usually evaluated as part of the interbasin transfer review. However, several factors make the use of downstream flow data difficult. First, the Quabbin Reservoir has a huge storage capacity, which is used to maintain a constant minimum flow. Second, the current MWRA system demand is significantly lower than its historic demand; therefore superimposing the transfer on a historic downstream hydrograph would not be realistic. For these reasons, other types of data, including releases, spills and drought levels, are being used to evaluate these criteria.

To account for the change in system demand, some of the analyses have used a shortened period of record on which to superimpose the transfer. The period of record chosen for the analysis of the impact of the proposed transfer is 1990 to 2000, which reflects current demands.

Because the Quabbin has met the mandated flow requirements, even during periods when demands were nearly 100 mgd (155 cfs) over the current level, it is assumed that those thresholds will continue to be met under the proposed transfer scenarios, which are significantly less than the historic use. Therefore the analyses focus on the impact to the reservoir in meeting required releases and the impact to uncontrolled releases.

Several facts have been considered in the review of the data:

- An instream flow requirement for the Swift River, as measured at Bondsville, of 30 cfs (20 mgd) has always been met.
- A seasonal 70 to 110 cfs flow release, based on levels in the Connecticut River, has also always been met June through November, as needed to supplement Connecticut River flow.
- The instream flow requirements listed above are intended to maintain pre-existing mill operation on the Swift River and navigation on the Connecticut River, but do not take into account the other instream uses which are evaluated when determining a reasonable instream flow.
- The flow in the Swift River was significantly impacted when the Quabbin Reservoir was built.
- An Indicators of Hydrologic Alteration (IHA) analysis of pre-1939 flows compared to post-1939 flows indicates that in general, streamflows in the Swift River have been significantly reduced. The mean annual flow has gone from 313 cfs to 100 cfs. In addition:
    1. All monthly flows have been reduced.
    2. The timing and duration of high flow events have changed significantly.
    3. The duration of low flow events has increased.

<u>Uncontrolled Releases</u>

Uncontrolled releases from the Quabbin Reservoir, hereafter referred to as spills, have been evaluated for potential changes over the base 1990-2000 period, due to the proposed transfer. These spills represent the annual peaks on the Swift River hydrograph. The addition of the potential future demands from Reading, Wilmington, and Dedham-Westwood are projected to

significantly decrease the amount of annual spills by an average of 18.4%.[2] Table 2 shows the amount of water that would have spilled from Quabbin for each year from 1990 through 2000 at a demand of 265 mgd. The additional demand from Reading and the other communities would have decreased the annual amount of water spilled by 0% to 100%. The highs of 85% and 100% would have occurred in 1998 and 1992, which appear to be years with relatively low amounts of snow, which likely resulted in little spring runoff. The issue of uncontrolled releases and spring flows are further discussed under the section Impacts to Other Uses, *Fisheries.*

Table 2 - Modeled Swift River Spills with the addition of Reading, Wilmington, and Dedham-Westwood

Year	Demand 265 (MG)	Demand 265+Future (MG)	Difference (MG)	Difference (MG/day)	Difference (%)
1990	0.00	0.00	0.00	0.00	0.0%
1991	0.00	0.00	0.00	0.00	0.0%
1992	973.66	0.00	973.66	2.67	-100.0%
1993	11,242.98	10,283.14	959.84	2.63	-8.5
1994	0.00	0.00	0.00	0.00	0.0%
1995	0.00	0.00	0.00	0.00	0.0%
1996	28,654.13	26,583.61	2,070.52	5.67	-7.2%
1997	22,843.36	22,416.26	427.10	1.17	-1.9%
1998	729.71	107.41	622.30	1.70	-85.3%
1999	0.00	0.00	0.00	0.00	0.0%
2000	0.00	0.00	0.00	0.00	0.0%
		Average for the Period		1.26	-18.4

Total Releases

Increasing demands can impact the amount of water that is released from Quabbin to maintain the instream flow requirements, through both controlled and uncontrolled releases. Increased amount and frequency of releases can impact the reservoir level. The total amount of water released was estimated for:

1. actual historical releases (1990-2000),
2. current system's future demand at 265 MGD, and
3. demand at 265 MGD plus Reading and other potential future transfers (Wilmington and Dedham-Westwood).

The flow duration curve for the three scenarios is shown as Figure 2. There was almost no difference in the flow releases necessary for the Reading and other future transfers (3) as compared to the current system's future demand scenario (2). However, both of these scenarios depict a decrease in the frequency and magnitude of high flow releases from the Winsor Dam to the Swift River compared with the actual historical releases (scenario 1).

[2] This value is different than the value of 7.8 percent presented in the FEIR only as a result of the method used to determine the average. While the FEIR used the reduction in the sum of the volume of the spills over the period, WRC staff calculated the average of each year's percent difference for an overall average for the period.

Quabbin Levels/Drought Analysis

Quabbin Reservoir levels fluctuate by design, but minimum percent full values have been established and are the basis for drought designations. The applicant evaluated maximum pool level reductions at various demands and hydrologic conditions simulated for 1948 through 2000. The results of the analysis are that at the base withdrawal plus Reading and future community demands, the maximum pool descent does not vary considerably and does not decline below the minimum acceptable pool descent of 470 feet elevation.

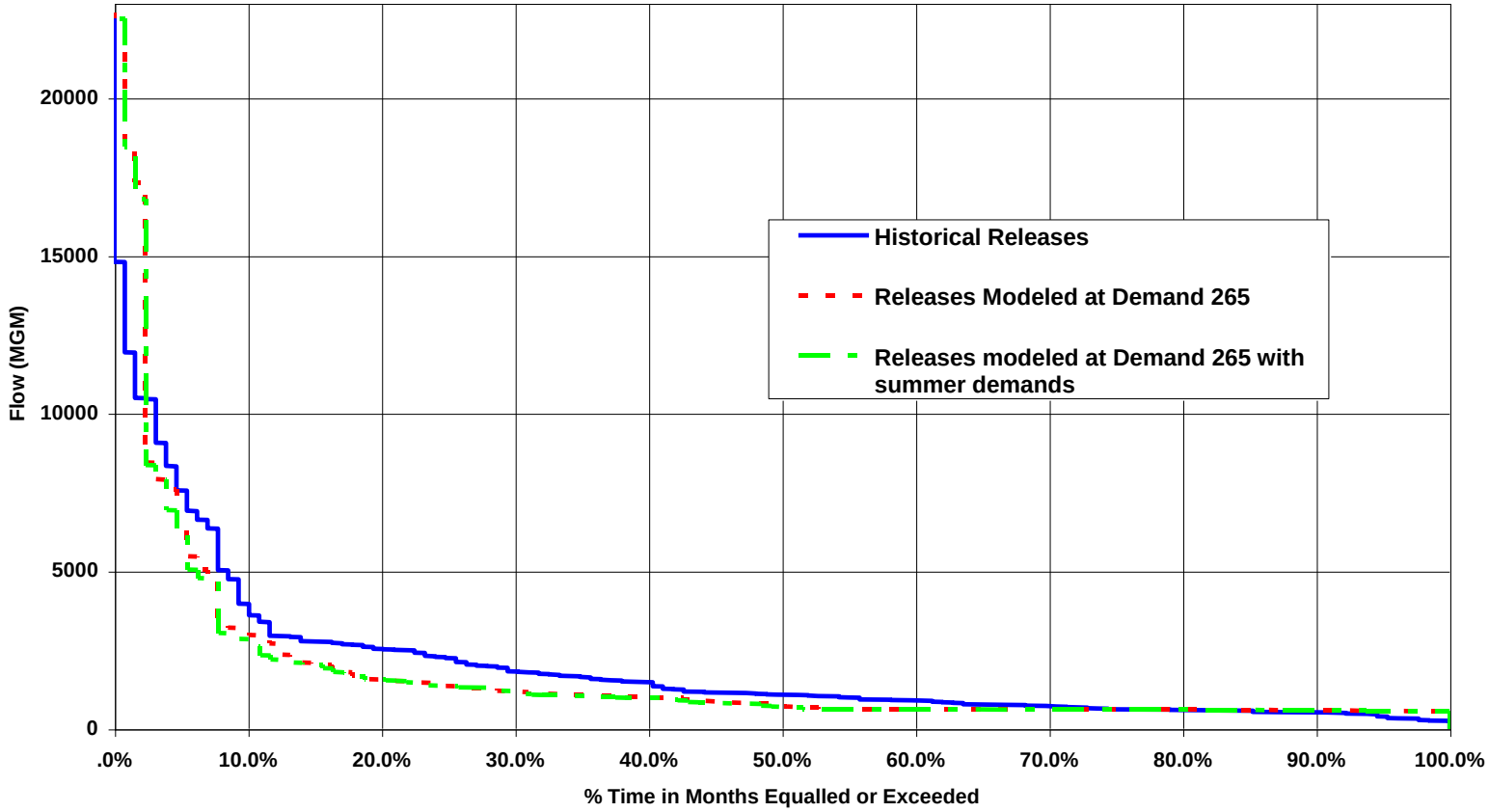
An analysis was done to determine the impact of the proposed transfer on the Quabbin Reservoir during a drought. Increasing demands can impact the frequency with which a reservoir system reaches various drought levels. This analysis is useful to determine impacts to levels in the reservoir as well as impacts to other communities currently on the MWRA system. Finally, this analysis supplements the data presented from 1990-2000, which includes several dry years but does not include any prolonged dry periods such as the 1960s drought.

Analyses of the increase in demand due to the proposed Reading transfer and future community transfers show that the MWRA system would result in an insignificant increase the frequency and duration of drought levels. Specifically, modeling showed that compared with a base demand of 265 mgd, the system would be in a Drought Warning for two additional months, and would be in a Drought Emergency stage 1 for two additional months, with the addition of Reading, Wilmington, and Dedham Westwood. This analysis was based on a period of 1948 to 2000. If the 1960's drought were removed from the analysis, a drought Emergency level would not be reached.

Impacts to Flow Characteristics

The September 2003 "Overview of Water Use and Transfer in the Chicopee River Basin" (Gomez and Sullivan Engineers, P.C.) evaluated Swift River flows and concluded, "The operation of Quabbin Reservoir significantly alters the timing and magnitude of streamflow in the Swift River.… This diversion of water from Quabbin Reservoir results in alterations to the timing and magnitude of flows within the Swift River watershed, which may result in adverse impacts to downstream aquatic biota. Alterations in flow are particularly evident during the typical spring high flow period, when flows are drastically reduced in the Swift River because of flood skimming and water storage operations at the Quabbin….MRWA is required to release a minimum flow of 20 mgd (32 cfs) from Quabbin Reservoir to the Swift River. There are also additional release requirements, when flows in the Connecticut River drop below certain thresholds. This flow release has beneficial effects such as maintaining Swift River flows, during late summer/early fall 2001." The study recommended, "Evaluate alternative schedules for minimum flow releases from Quabbin Reservoir to the Swift River to mimic natural flow patterns to the extent possible… It may be possible to minimize the potential impact of these water withdrawals on downstream aquatic biota through alternative reservoir management practices."

Figure 2
Flow Duration Curve
Showing Swift River Releases at Winsor Dam
Time Period 1990 - 2000



Impacts to the Swift River Aquatic Base Flow (ABF), 95% flow duration, flood flows, and flow velocity will be minimal compared to existing conditions. The estimated natural 7Q10 flow and the 95% flow duration are less than the required controlled releases from Quabbin Reservoir. Therefore they will be maintained by the current operations and will not be affected by the proposed transfer. The frequency of the summer aquatic base flow (ABF) of 0.5 cfsm (94 cfs at the Winsor dam or 1,830 MGM) based on simulated releases will not be reduced due to the Reading transfer and other planned or proposed future community withdrawals, when compared with the current system's future demand of 265 MGD. Flood flows will not be reduced based on the data. It should also be noted that since 1990, the annual 1-day, 3-day, 7-day, 30-day and 90-day maximum flows have increased. In addition the timing of the annual 1-day maximum (i.e. the Julian date of the 1-day maximum flow) improved from a median value of July 15 to June 11 between 1990 and 2000. This is an improvement because the timing of this 1-day maximum value has moved closer to the spring season, when natural high flows typically occur.

Although flow characteristics are not expected to change significantly over current conditions, it is worth re-stating that the Swift River has had large impacts from the construction of Quabbin Reservoir, which overshadow the addition of the Reading transfer. Also, the future demands of the existing water supply system will have a more significant impact than the Reading transfer.

Impacts to Other Uses

Fisheries

According to the Massachusetts Division of Fisheries and Wildlife, the Swift River below Winsor Dam down to the confluence with the Ware River, contains significant fisheries habitat. In addition, the river is one of only two rivers in Massachusetts, which receive a cold-water release that significantly benefits habitat, such as the catch and release trout fishery directly below the dam. The current required flow releases are beneficial to the fishery, as they provide a continuous source of fresh cold water. However, DFW has stated that the amount of the controlled releases, although beneficial in terms of quality, have not been determined to be optimum in terms of quantity for the cold water fishery. In addition, DFW operates a trout hatchery downstream of the Winsor Dam on the Swift River, which uses river intakes as part of its water supply. Relatively warm-water spills from the surface of Quabbin Reservoir are detrimental to both the instream cold-water fishery and the fish hatchery operation.

An IFIM study of the Swift River in 1997 by Normandeau Associates indicates that the current flow releases are adequate. However this study concedes that fish may have to seek refuge in pools when bank to bank flows are not present and further recommends that "provision of higher flows...would enhance habitat...as long as highly cyclic flows are avoided".

DFW, MWRA and DCR Division of Water Supply Protection (as defined by MGL Chapter 92A1/2, and hereinafter referred to as "the Watershed Agency") have been discussing habitat improvements that could be made within the limitations of existing permits. Through a Memorandum of Understanding with MWRA, the Division of Water Supply Protection acts as "the Watershed Agency" responsible for developing policies and procedures to be followed during wet weather or flood periods, to enable MWRA to determine how much water (above statutory requirements) shall be discharged through MWRA controlled waterworks facilities into the Nashua, Swift, Ware, or Sudbury Rivers. During winter and spring months when the Quabbin Reservoir is filling, it may be possible to increase releases to the Swift River (using the

Winsor Dam by-pass and/or other future improvements) and avoid late spring/early summer spills when it appears the reservoir is filling at an acceptable rate. Winter/spring diversions from the Ware River (in accordance with permitted limitations) may be used to supplement Quabbin and allow for enhancement of higher controlled Swift River releases in the spring months. Similarly, Quabbin releases may be reduced during summer months if it appears that the flow targets at Bondsville can be maintained with inputs from the intervening drainage area. This approach would allow for a more natural seasonal hydrograph for the Swift River, and avoid late spring spills. The WRC recommends that DFW, MWRA and the Watershed Agency continue to cooperate to establish and implement enhanced releases to the Swift River from the Quabbin Reservoir.

Hydropower
A hydropower turbine was in use at the Winsor Dam until 1991, when it was damaged by a fire. The Normandeau study was commissioned to determine suitable flow levels for fisheries during drought periods. This information would directly impact the feasibility of generating hydropower while maintaining a trout fishery. As stated above, the report concluded that the current releases are adequate for the trout fishery. However, no action has been taken to re-implement the hydropower production. There are no plans at this time to reactivate the hydropower station at the Winsor Dam.

Recreation
Aside from the sport fishery addressed above, there is some boating recreation on the impoundments in Bondsville. Again, these uses will not be affected because operation of Quabbin reservoir will not change with the Reading transfer.

Wetlands
Other than Quabbin Reservoir itself, the only significant wetland in the Chicopee River basin that could be affected by the transfer is in Ware, along the Swift River. The area is 70 acres of open water impounded by a dam in Bondsville. Because this area is open water and is part of the river, current minimum flow requirements appear to be adequate to protect the wetland area.

Judgment of the WRC that a Reasonable Instream Flow will be maintained
The analyses of release data indicate there will be no significant change in the operation of the Quabbin Reservoir in response to the proposed Reading transfer. Current resources will be unaffected by the transfer. Obviously, current conditions represent an impacted environment. Proposed modifications to the timing and magnitude of Swift River releases in the spring months would benefit the downstream aquatic habitat. This recommendation attempts to achieve a balance between water supply needs and aquatic habitat needs of flow, water quality and water temperature in the Swift River through minor release modifications.

Criterion #6 Groundwater/Pumping Test
This criterion is not applicable to this proposal. MWRA's sources are surface water sources.

Criterion #7 Local Water Resources Management Plan
A Draft Local Water Resources Management Plan was submitted with Reading's Interbasin Transfer Act application. The Plan addresses the issues identified in the 1999 Interbasin Transfer Act Performance Standards Appendix B Local Water Resources Management Plan

Outline. The WRC approved Reading's Local Water Resources Management Plan on December 9, 2004.

OTHER ISSUES CONSIDERED

Alternative Out-of-Basin Source

Reading investigated another potential water supply, not within the receiving basin, namely, a connection to the Andover water system. This action would also require Interbasin Transfer Act review and approval. As stated in a previous decision, the WRC does not advise a proponent to pursue one out-of-basin source over another. The proponent must make this judgment. Any proposed transfer will need to meet the applicable criteria of the Act and its regulations in order to be approved. After studying the infrastructure improvements needed and the costs of this alternative, Reading decided that application for admission to the MWRA Water Works System was in its best interests.

Timing of the Application

An issue raised through the public comment period was that this application should not be considered until a larger plan for the Ipswich River headwaters is coordinated and underway. The WRC cannot unilaterally choose to delay rendering a decision on this application until completion of the larger Ipswich River Plan. The WRC is required by the regulations to make a decision within 60 days of the final public hearing[3], unless both the WRC and the proponent agree in writing to extend the deadline (313 CMR 4.04(5)(g)). In addition, the WRC has been unsuccessful in the past in coordinating the actions of different communities. The Ipswich River Plan and Wilmington's proposed Interbasin Transfer application are still many months from completion. The WRC believes it is not good public policy to hold up one community's application until another community has done the work necessary to enter the process.

Downstream Flow Improvements

Another issue considered during this review was streamflow downstream of the MWRA's reservoirs. When the WRC approved Stoughton's request for admission to the MWRA's Water Works System in 2002, it noted that the Swift River is one of only two rivers in Massachusetts which receive a cold-water release that significantly benefits fishery habitat, and that there was potential for improving the fisheries habitat downstream of the Quabbin Reservoir and restoring the natural variability of flow in the Swift River. DFW stated that modifications to downstream habitat and to the flow release scheduling (even without increasing the overall amount of releases) could significantly benefit the fishery resource below the Winsor Dam.

The WRC acknowledged that any potential changes to operations or any downstream improvements would involve multi-party, multi-year discussions and negotiations. Therefore, the WRC recommended that before the MWRA entered into negotiations with additional communities wishing to apply for admission into the Water Works System, the Authority should enter into discussions with DFW and other interested parties to determine if any changes could be made to improve habitat or flows downstream of both Winsor and Wachusett Dams. The

[3] 313 CMR 4.04(5)(e) states "The Commission shall, … within sixty (60) days of completing said (public) hearings … complete its review and *approve or deny* the requested action to increase the present rate of interbasin transfer." (emphasis added)

MWRA has stated that any actions that would impact compliance with its existing permits are not negotiable; however, since the time of the Stoughton decision, DFW, MWRA and the Watershed Agency have been discussing habitat improvements.

MWRA and the Watershed Agency have either completed or offered to undertake the following actions:

- MWRA and the Watershed Agency have no authority over and do not own the Bondsville Dams, which DFW would like to see removed to improve habitat by mitigating temperature issues, however, the Authority and the Watershed Agency have stated that they have no objection to removal of the dams by a third party, if this would not impact permit requirements to monitor flow at Bondsville.
- Operations of the turbines at Winsor Dam, which resulted in pulsing flows, no longer occur. Flows since 1991 have been steadier. As stated earlier, there are no plans at this time to reactivate the hydropower station at the Winsor Dam.
- MWRA and the Watershed Agency have a history of working with DFW on downstream channel improvements including removal of debris. The Watershed Agency will continue to consult with DFW and provide mechanical assistance when possible, to improve habitat in the channel downstream of Winsor Dam.
- DFW has stated that the ramping rates used to reach permit requirements, are too high. MWRA and the Watershed Agency will decrease to a rate of approximately 93-186 cfs per hour.
- DFW has stated that releases in summer should only be cold water, not warm water spills from top of reservoir. MWRA and the Watershed Agency have stated that operation of the Quabbin and Wachusett Reservoirs requires maintenance of water quality criteria for drinking water. In maintaining these criteria it was necessary to allow Quabbin to fill in the spring resulting in some uncontrolled spills during the summer. The Watershed Agency will work with MWRA to transfer water to Wachusett Reservoir, and so reduce the number of uncontrolled spills in the spring, as water quality concerns permit. This may be more possible once the Walnut Hill Treatment Plant is put on line.

Discussions between DFW, the Watershed Agency, and MWRA are ongoing.

Concerns with the June 2004 Staff Recommendation

After the issuance of the June 10, 2004 Staff Recommendation on this proposal, the Town expressed concerns that the conditions recommended would not allow flexibility in the way they managed their water sources. In particular, Reading was concerned that the requirement under Criterion #2 which stated "Reading must limit use of its existing local sources to no more than 1 mgd (total) during the months from May through October" would not allow the Town to address public health and safety concerns that could arise if the interbasin transfer limit of 219 mg had been purchased from the MWRA before the end of this time period. Reading's original proposal outlined in the DEIR was to limit use of its sources for the months of May through September, but was extended to October based on comments received through the DEIR process. Reading was confident that it could meet its demand under the original scenario, but was not sure that it could restrict use of its sources through October under this condition. Over the summer of 2004, discussions between WRC Staff and the Town took place. Reading requested a return to their original position of reducing use of its sources from May through September. The WRC agreed to this request because review of the data indicated no significant change to impacts on the donor

basin compared with the May through October transfer from MWRA. However, as stated earlier, the WRC and the Town subsequently learned from MEPA that this change would require a NPC, so Reading rescinded its request.

Another condition in the June Staff Recommendation that caused Reading concern was the requirement to revise its drought/emergency plan to tie water use restrictions to streamflow levels in the Ipswich River under Criterion #3. As stated in the revised July 8, 2004 Staff Recommendation, this is a Performance Standard for Interbasin Transfer Act compliance. However, the Performance Standards allow for alternative methods to address the criteria of the Act. As discussed earlier in this document, Reading has since demonstrated that restriction of local sources to 1 mgd from May through October and the current water use restrictions are as protective of streamflow resources. In addition, the conditions of this interbasin transfer approval include a linkage of outdoor watering with streamflows.

ADDITIONAL PUBLIC COMMENTS

At the June 23, 2004 public hearing on the June 10, 2004 Staff Recommendation, the Town of Reading requested an extension of the comment period to July 31, 2004. During this extended comment period, public comments were received from WSCAC and the Watershed Action Alliance. These comments reflect comments made earlier by others. The additional written public comments have been provided to the WRC in a separate document.

Since the December meeting of the WRC, additional comments were received from the IRWA, the WAA and several citizens regarding the WRC's approval of Reading's application. As noted previously, these comments, and those provided by EOEA have led the WRC to reconsider of Reading's application under the Act. Copies of comments received have been distributed to the WRC and discussed at the January 2005 WRC meeting and via mailings. Since January, several additional comments have been received, and these will be distributed in an upcoming mailing from the WRC.

EO 385

This Decision is consistent with Executive Order 385, which has the dual objective of resource protection and sustainable development. This Decision does not encourage growth in areas without adequate infrastructure nor does it cause a loss of environmental quality or resources.

CONDITIONS OF THE WRC DECISION

Based on the analyses and concerns expressed about this project, approval of Reading's application under the Interbasin Transfer Act for admission to the MWRA System is subject to the following conditions. Reading must commit in writing to abide by these conditions.

1. (a) Reading will manage its sources so that for the months of May through October, it will limit use of its Ipswich River Basin sources to 1 mgd and will purchase up to 219 million gallons of water from the MWRA during that period. If the Town of Reading has purchased 219 million gallons from the MWRA prior to October 31, it will rely on withdrawals from its Ipswich River basin sources, as described below in conditions 1b and 1c.

   (b) As noted in the MEPA letter of March 31, 2005, "in the event that the Town of Reading should require the withdrawal of additional water supply from within the Ipswich River basin

beyond the proposed 1 mgd during the May 1—October 31 low flow period as described in the FEIR to respond to an unforeseen, isolated or emergency situation, the Town would not be required to notify the MEPA Office. Should the Town require additional water supply from within the Ipswich River Basin in amounts beyond the proposed 1 mgd during the May 1—October 31 period to address its water supply needs to respond to more than an unforeseen, isolated or emergency situation, then the Town would be required to submit a Notice of Project Change (NPC) to the MEPA Office."

(c) The WRC interprets "unforeseen, isolated or emergency situation" to mean either a "Short-term water supply emergency" or "Interim water supply emergency" as prescribed in the DEP Declaration of a State of Water Supply Emergency (August 2000 Printing) Policy, SOP or Guideline #87-05 (See Note #1 below).

(d) If, for any reason Reading amends its contract with the MWRA to increase the amount of water purchased, the Town will need to apply to the WRC for additional ITA review.

2. In order to ensure that the water purchased from the MWRA will last through October, and that restrictions on Reading's outdoor water use are linked to streamflow in the Ipswich River, the following conditions apply:

(a) If the Town purchases water from the MWRA during the May 1—October 31 period in volumes that equal or exceed those in Table 3, and if the streamflow as measured at the USGS South Middleton gage (#01101500) is at or below 18.7 cfs (0.42 cfsm) for any three consecutive days during the 30 day period following the Trigger Dates in Table 3, then the Town will implement the outdoor water use restrictions as noted in Table 4 below. These restrictions will remain in place until October 31st or until streamflows are above the threshold for seven consecutive days or the Town's MWRA water use at the next trigger date is below the threshold volume.

(b) By "three consecutive days", the WRC means the daily mean streamflow for any three consecutive days as reported at the USGS South Middleton streamflow gage. If this occurs, the threshold has been crossed and the Town will have 7 days to notify citizens and enforce the required restrictions, as noted in Table 4 below. If the Town's use of MWRA water does not equal or exceed the volumes on the Trigger Dates, the streamflow threshold will not apply and the Town will maintain its existing mandatory conservation measures (The Town's Stage 1 restrictions on outdoor water use are in effect at all times; see Note #2 below).

c) Similarly, the "seven consecutive days" above the threshold means that when conservation measures in Table 4 have been implemented, and when the daily mean streamflow reading is above 18.7 cfs for any seven consecutive days, the Town may revert back to the previous mandatory conservation measures in Table 4 level or to the Town's stage 1 mandatory conservation restrictions or keep the extra measures in place, at its discretion.

(d) The Town will implement each additional water conservation measure within 7 days of reaching the MWRA water use/streamflow level, and the Town may grant waivers. If the Town determines that some other restrictions will be at least as effective as those noted in each threshold above, the Town may petition the WRC for modification of these restrictions.

Waivers are usually not given for landscaping, but for exceptional, short-term cases such as pressure washing houses prior to painting and some swimming pools that require filling after completion or repair.

(e) Within ten business days of each Trigger Date, the Town will provide a written report of cumulative MWRA water consumption for the calendar year to the Water Resources Commission. In the same report, the Town also will report on the current conservation restrictions in place and any waivers granted.

Table 3
Trigger Dates and MWRA Water Use Thresholds

Trigger Date	MWRA water use threshold
June 1	44 million gallons or more
July 1	97 million gallons or more
August 1	136 million gallons or more
September 1	167 million gallons or more
October 1	197 million gallons or more

Table 4
Required Town Actions Based on Streamflow and MWRA Water Use

Levels	Town actions if streamflow is below threshold for 3 consecutive days
First	Town will reduce hours of allowed outdoor water use by four hours per day from the existing Town of Reading Stage 1 mandatory restrictions.
Second	Town will reduce hours of allowed outdoor water use by four hours per day from the existing Town of Reading Stage 1 mandatory restrictions and will require that only hand-held watering devices be used.
Third	Town will implement its Stage 2 water restrictions (a ban on all outdoor water use)

(f) On or after the first trigger date at which MWRA water use volume is equaled or exceeded, if the streamflow is below the threshold for three consecutive days, the Town will implement the first level of additional conservation measures shown in Table 4. On the next trigger date at which MWRA water use volume is equaled or exceeded, and if an additional level of conservation is still in place, the next level of restrictions will be applied.

3. Notwithstanding the foregoing, irrigation of public parks and recreational fields by means of automatic sprinklers equipped with moisture sensors or similar control technology may also be permitted outside of the hours 9 a.m. to 5 p.m. Additionally, for the purpose of data collection for EPA's Targeted Watershed Grant Program, and at the discretion of the town, up to fifteen private automatic sprinkler systems equipped with water-saving, weather-responsive controller switches will be allowed to continue irrigation operations outside the

hours of 9 a.m. to 5 p.m., until the conclusion of the data collection period on March 31st, 2009.

4. It is expressly recognized that the streamflow threshold noted above reflects the levels proposed in the DEP Water Management Act water withdrawal permits issued to permittees in the Ipswich River basin in May 2003 and that these thresholds may be further modified in the future. If the thresholds set forth in the water withdrawal permits issued to permittees in the Ipswich River basin change, the Town or the WRC may request an amendment of the thresholds in this Interbasin Transfer Act document to be consistent with the thresholds in withdrawal permits applicable to other communities with sources in the Ipswich River basin.

5. After the new water treatment plant is on line in Reading, the Town will consult with the WRC relative to alternative purchase and withdrawal scenarios.

6. Reading must provide annual reports to WRC Staff detailing how much water was pumped from its own sources and how much water was purchased from the MWRA for the first five years after the town begins to receive MWRA water. After this period, Reading must furnish these reports to WRC Staff if requested.

7. Reading must work with DEP to condition its registration statement to address the three registration issues presented in the Secretary's Certificate on the FEIR dated October 31, 2003. (Note that this was done via a letter from the Town to the DEP of November 28, 2004.)

8. Reading must continue effective demand management programs that meet the Interbasin Transfer Performance Standards for Criterion #3, Water Conservation.

9. Reading must provide the DEP Annual Statistical Reports to the WRC for the first five years after the town begins to receive MWRA water to determine if the programs in place are successful in keeping unaccounted-for water at or below 10% and residential gallons per capita per day (gpcd) at 65 or less.

10. If the amount of unaccounted-for water increases to greater than 10%, Reading must either provide an explanation of why this has occurred (e.g. water main break, large fire, etc.) or provide a plan, for WRC approval, to reduce unaccounted-for water to acceptable levels.

11. If residential gpcd increases above 65, the Town must implement a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program for encouraging installation of household water saving devices, such as faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use. If this occurs, the Town must provide a plan for this program to the WRC for approval.

12. Reading must notify the WRC when the High School and Barrows Elementary School renovations have been completed, with documentation of the retrofit devices installed. Reading must provide annual reports detailing the water conservation actions taken as part of the four-year, $1 million program. This should include an accounting of the money spent and the successes of the program.

NOTE #1

From: DECLARATION OF A STATE OF WATER SUPPLY EMERGENCY (YEAR 2000 PRINTING)
Policy, SOP or Guideline #87-05; effective Date: 2-13-97
http://www.mass.gov/dep/brp/dws/files/guides/8705.doc

"Water supply emergency" means one of the following situations.

> "Short-term water supply emergency" means the problem has been identified and can be remedied quickly and is not expected to recur. (Short-term water supply emergencies do not include water supply emergencies that occur repeatedly for the same reason. That type of water supply emergency indicates a more serious, longer-term problem and will be classified as an interim or a long-term water supply emergency).
>
> "Interim water supply emergency" means that additional sources have been identified or are in the process of being developed or that water sources which had been previously closed will be brought back on line.

NOTE #2

Section 4.9 -- Town of Reading Water Conservation Program

Stage 1

Stage 1 provides for mandatory water conservation, subject to penalties in accordance with law for violation of these restrictions.

Water may be used for outdoor purposes only from 4:00 A.M. to 9:00 A.M. and 5:00 P.M. to 8:00 P.M. Monday through Sunday, and only in accordance with the following schedule:

- Even numbered addresses: Outdoor use is permitted on even-numbered days of the month only during the hours specified above.
- Odd-numbered addresses: Outdoor use is permitted on odd-numbered days of the month only during the hours specified above.

There is no restriction on hand held devices.

In addition, the following regulation on filling swimming pools is mandatory: Swimming pools shall be filled in accordance with the above schedule only, unless a waiver is granted by the Town manager.

Stage 2

Stage 2 is provided for the eventuality that only enough water is available for essential public health and safety purposes. In this event, no outdoor water use of any type is permitted. Water use is restricted to domestic home use only for purposes including normal bathing, laundry, and sanitary uses.

Violation of these regulations is punishable by a $300.00 fine.

Adopted 4-25-89, 11/04, Revised 1-4-05

ATTACHMENT 1

READING'S APPLICATION FOR ADMISSION TO THE MWRA WATER WORKS SYSTEM INTERBASIN TRANSFER ACT CRITERIA FOR EVALUATING AN APPLICATION

CRITERION #1: An environmental review pursuant to MGL, c. 30, §§ 61 and 62H, inclusive has been complied with for the proposed IBT.

- *The Interbasin Transfer application was part of the EIR. The Secretary's Certificate on the Final EIR for this project was issued on October 31, 2003.*

CRITERION #2: All reasonable efforts have been made to identify and develop all viable sources in the receiving area.

The WRC performance standard for a water supply source directs a proponent to discuss the water supply alternatives considered, but rejected. Reason for the rejection of these alternatives should be clearly stated. This information should be included as part of the Local Water Resources Management Plan required under Criterion #7. In addition, as stated in the regulations, a local source must not cause unacceptable environmental damage.

- *Reading has investigated several potential local water supply sources including:*
  - *The development of bedrock wells in the Town Forest area. These potential wells were low yielding. DEP has stated that development of these sources is not viable because of the low yield.*
  - *The expansion of existing sources and reactivation of abandoned sources. DEP has stated that development of these sources is not viable because of impacts to the Ipswich River and existing sources of potential contamination.*
  - *The possible development of bedrock wells in the Bare Meadow area. This source was rejected because of environmental impacts, permitting difficulties and cost.*
  - *Reading has investigated potential sources in the North Coastal and Mystic River. Due to the nature of the geologic material, potential contamination and development density, no suitable public water supply sources have been found there.*
  - *DEP concurs that development of local sources within Reading is not viable.*

- *It should be noted that any local source developed by Reading would result in an Interbasin Transfer of wastewater, as Reading is sewered to the MWRA.*
- *DEP has determined that continued pumping of the Reading wells at existing levels is not a viable option due to impacts on streamflows.*

CRITERION #3: All practical measures to conserve water have been taken in the receiving area...

For a water supply transfer, the WRC performance standards require:

1) A full leak detection survey should have been completed within the previous two years of the application. The proponent should provide documentation regarding repair of leaks identified during the survey. Leak detection surveys should be carried out in accordance with the MWRA's leak detection regulations (360 CMR 12.00).

- *Reading conducts an annual leak detection survey. The last survey was completed in June 2003.*
- *Surveys are included in the full cost pricing system.*
- *Documentation of the leaks identified and repaired has been provided.*
- *The surveys are conducted using methods at least as comprehensive as the MWRA's regulations for leak detection.*

2) The water supply system should be 100% metered, including public facilities served by the proponent. A program of meter repair and/or replacement must be in place. Documentation of annual calibration of master meters and a description of the calibration program should be included in the application.

- *The system is 100% metered, including public buildings.*
- *Reading has a regular maintenance, calibration, testing and repair program; documentation of the program was included in the application.*
- *Reading will begin a phased meter replacement program in 2005.*
- *Documentation of annual master meter calibration was provided.*
- *Reading has problems with iron and manganese that cause faulty readings at the production meters. The Town is piloting a new cleaning technique and the use of a magnetic meter to begin to address this issue.*

3) Unaccounted-for water should be 10% or less. The proponent should provide documentation of unaccounted-for water, in both gallons and percentage of the total water pumped and withdrawn, for each of the past five years. The definition of accounted-for and unaccounted-for water for use in Interbasin Transfer applications is given in Appendix C of the Performance Standards. The plan by

which the community intends to maintain or reduce this level should be included in the water resources management plan required under Criterion #7.

- *Unaccounted-for water averaged 10% over the 5 years prior to this application: 15 % in 1998; 11% in 1999 and 2000; in 2001 it dropped to 4% and in 2002 it was 6%.*
- *DEP reports that in 2003, Reading's unaccounted-for water was 8.96%.*

4) The proponent should provide documentation to show that there are sufficient sources of funding to maintain the system, including covering the costs of operation, proper maintenance, proposed capital improvements, and water conservation. The rate structure must encourage water conservation.

- *Reading's water rates are high, $3.66 per 100 cubic feet. The rate is flat, but the high cost encourages conservation.*
- *Reading has an enterprise account.*
- *The rate structure is evaluated annually. It was last changed in August 2001.*
- *Documentation of full cost pricing was provided.*

5) The proponent should bill its customers at least quarterly based on actual meter readings. Bills should be easily understandable to the customer (e.g. providing water use in gallons and including comparison of the previous year's use for same period).

- *Reading bills its customers quarterly, based on actual meter readings.*
- *Reading is considering monthly billing.*
- *Second meters are charged for the full price of water.*
- *Bills are easily understandable to the customer and include a comparison of the previous year's use for same period.*

6) A drought/emergency contingency plan, as described in 313 CMR 4.02, should be in place. This plan should include seasonal use guidelines and measures for voluntary and mandatory water use restrictions and describe how these will be implemented. There should be a mechanism in place to tie water use restrictions to streamflow and/or surface water levels in the affected basin(s) where this information is available. The plan should be part of the Local Water Resources Management Plan required under Criterion #7.

- *Reading has a written drought/emergency plan.*
- *Reading has a water conservation by-law tied to water supply indicators.*
- *Reading's by-law outlines a set of increasingly stringent water use restrictions and gives the Town the ability to implement mandatory water use restrictions. Reading has shown that these restrictions, combined with restriction of its local sources to 1 mgd from May through October provide an equivalent level of environmental protection as restrictions based on streamflow levels.*
- *Additional outdoor water use restrictions are appropriate during drought years, as specified in the conditions.*

7) All government and other public buildings under the control of the proponent should have been retrofit with water saving devices.

- *Not all public buildings had been retrofit at the time of the application.*
- *The contract for the high school renovation was awarded in May 2004. Renovations are scheduled for completion by June 30, 2007. Retrofit will be completed in conjunction with the renovation.*
- *The Barrows Elementary School is also undergoing renovation. This renovation is expected to be completed by September 2005.*
- *The retrofit of the remaining public buildings was completed by September 30, 2004. Documentation of the retrofit was provided on October 25, 2004.*

8) Proponents should provide records of water audits conducted on public facilities. The most recent audit should have occurred within two years prior to the application for Interbasin Transfer approval.

- *A water audit on public facilities was conducted in April 2001. Results have been provided.*

9) If the community's residential gallons per capita/day is greater than 65, the proponent should be implementing a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program for encouraging installation of household water saving devices, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use.

- *Residential gpcd averaged 59 from 1998 to 2002. The range was from 54 in 2000 to 62 in 1999.*
- *DEP reports that in 2003, Reading's residential gpcd was 54.*

10) A broad-based public education program, which attempts to reach every user at least two times per year, through such means as mailings, billboards, newspaper articles, cable television announcements or programs, or the use of other media, should be in place. Water suppliers should refer to the WRC's 1992 "Water Conservation Standards for the Commonwealth of Massachusetts" and the Massachusetts Water Works Association for recommended public education measures.

- *Reading provides mailings once per year.*
- *Public service announcements on cable TV are sponsored once/day.*
- *Newspaper articles are sponsored at least annually.*
- *Water conservation information is available at the public library.*
- *Handouts are distributed during tours of water treatment plant.*

11) A program which identifies and ranks all commercial, industrial and institutional customers according to amount of use, and requires regular contact with the largest users to promote water conservation, should be in place. The water supplier should make regular contact with these users to promote water conservation. Materials on water reuse and recirculation techniques should be provided, where appropriate.

- *The Town has provided a list of the top ten water users. There is no specific outreach program, as most of these are residential complexes. Outreach is conducted in conjunction with Reading's normal water conservation programs.*

12) A program of land use controls to protect existing water supply sources of the receiving area that meet the requirements of the Department of Environmental Protection.

- *Reading's program of land use controls to protect existing water supply sources meets the requirements of the Department of Environmental Protection.*
- *Reading has an aquifer protection by-law.*

13) As part of the local water resources management plan, there should be a long-term water conservation program, which complies with the 1992 Water Conservation Standards for the Commonwealth of Massachusetts, in place. This plan should reflect the goal of maintaining unaccounted-for at 10% or less of all water used, and of reducing future residential water use through a comprehensive residential water conservation program, if residential gpcd is greater than 65. The water conservation program should also have a goal of operating the system to balance water supply with other environmental needs. If the transfer is approved, the proponent will need to submit a copy of its Public Water Supply Annual Statistical Report (required by DEP) to the Commission annually to demonstrate the continued effectiveness of the program.

- *Reading has a long-term water conservation program, which complies with the 1992 Water Conservation Standards for the Commonwealth of Massachusetts. Reading's residential gpcd is under 65.*

14) In 2002, the WRC amended the 1992 Water Conservation Standards for the Commonwealth of Massachusetts to include standards for Lawn and Landscape Water Conservation:

Communities and public and private water suppliers should develop drought management plans that identify water supply and environmental indicators to serve as drought stage triggers and that outline a set of increasingly stringent water use restrictions that are designed to protect public health and the environment and that can be implemented through bylaw, ordinance or regulation.

- *Reading has a water conservation by-law tied to water supply indicators which outline a set of increasingly stringent water use restrictions.*

Communities and public and private water suppliers should implement a water use restriction bylaw, ordinance or regulation that provides the community or water supplier with the ability to implement mandatory water use restrictions. These restrictions should be tied to environmental and water supply indicators as outlined in a drought management plan.

- *Reading has a by-law that gives the Town the ability to implement mandatory water use restrictions.*

CRITERION #4: A comprehensive forestry management program which balances water yields, wildlife habitat, and natural beauty on watershed lands presently serving the receiving area and under control of the proponent has been implemented.

- *All of Reading's public water supply sources are ground water sources. Therefore this criterion is not applicable to this project.*

CRITERION #5: Reasonable instream flow in the river from which the water is transferred is maintained.

- *An instream flow requirement for the Swift River below the Quabbin Reservoir, as measured at Bondsville, of 30 cfs (20 mgd) is always met.*
- *A seasonal 70 to 110 cfs flow release from Quabbin Reservoir, based on levels in the Connecticut River, is always met.*
- *A flow release of 12 mg per week from the Wachusett Reservoir on the South Branch of the Nashua River is required.*
- *Analyses of the increase in demand due to the proposed Reading transfer show that the MWRA system would have minimal impacts on the frequency or duration of drought levels.*
- *The analyses of release data indicate there will be no significant change in the operation of the Quabbin Reservoir in response to the proposed Reading transfer. Current resources will be unaffected by the transfer.*
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CRITERION #6: The results of the pump test have been used to indicate the potential impacts of this project on other environmental resources and adjacent wells.

- *Not applicable – the donor sources are surface water sources.*

CRITERION #7: Communities have adopted or are actively engaged in developing a local water resources management plan.

- *A Draft Local Water Resources Management Plan was submitted with the application.*
- *The Plan addresses the issues identified in the 1999 Interbasin Transfer Act Performance Standards Appendix B Local Water Resources Management Plan Outline.*

CRITERION #8: The Commission shall consider the impacts of all past, authorized or proposed transfers in the donor basin.

- *Although the Reading request would not adversely impact existing conditions downstream of the Quabbin and Wachusett Reservoirs, current conditions represent an impacted environment.*
- *Issues surrounding the amount of flow released, timing of releases, timing of spills (which are indirectly determined by system operation) and maintaining steady flow could become significant if demand increases.*
- *DFW, DCR Division of Water Supply Protection ("the Watershed Agency", as defined by MGL Chapter 92A1/2) and MWRA have been discussing these issues.*

EO 385

- *This Decision is consistent with Executive Order 385, which has the dual objective of resource protection and sustainable development. This Decision does not encourage growth in areas without adequate infrastructure nor do they cause a loss of environmental quality or resources.*