THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE STREET, BOSTON MA 02114

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

DECISION

On October 11, 2018, by a unanimous roll call vote of the ten (10) voting members present at a public meeting, the Water Resources Commission (WRC) approved the Town of Ashland's request for an Interbasin Transfer for admission to the 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 comments received concerning this proposal.

INTRODUCTION

On October 8, 2015, the Massachusetts Water Resources Commission (WRC) received a request from the Town of Ashland for approval of an action to increase the present rate of interbasin transfer under the Interbasin Transfer Act (ITA) (M.G.L. Chapter 21 §§ 8B-8D) as part of a Draft Environmental Impact Report (DEIR) submitted to the Massachusetts Environmental Policy Act (MEPA) office. Additional information was requested and received in the Final EIR, submitted in May 2018. The WRC accepted Ashland's application as complete at its July 12, 2018 meeting.

Ashland is proposing to purchase a maximum of 1.6 million gallons per day (mgd) of water from the Massachusetts Water Resources Authority (MWRA) to supplement its existing water supply sources the Howe Street Groundwater Wells (Figure 1). This represents a maximum day demand. Ashland's average day demand (ADD), based on the years 2013 to 2017, has ranged from 1.25 mgd to 1.49 mgd.

The Town has five existing water supply sources, all adjacent to the Hopkinton Reservoir which is managed by the Department of Conservation and Recreation (DCR) for recreation and flood control purposes. Two of these sources have shut-off thresholds to be implemented when the reservoir reaches an elevation of 295.85 feet National Geodetic Vertical Datum (NGVD).

FACTS PERTAINING TO THE APPLICATION ARE:

1. Ashland has land area in the Concord River basin.
2. The Town is applying for admission to the MWRA Waterworks System, which has sources in the Chicopee River basin and the Nashua River basin.

3. Ashland is proposing to purchase water from the MWRA to supplement its existing water supply sources and will use MWRA water when the level in the Hopkinton Reservoir is at or below 293 feet NGVD29[1].
4. An environmental review, pursuant to Section 61 & 62H, inclusive, of Chapter 30, was required for this proposed action. The ITA application was submitted as part of the DEIR for this project (EOEEA #15388). Additional information for ITA review was requested through the MEPA process and provided in the FEIR.
5. The Secretary's Certificate on the Final EIR was issued on June 29, 2018, stating that no further MEPA review was needed.
6. Two required public hearings were held to take comment on this application, one in Belchertown, in the donor basin on August 21, 2018 and one in Ashland, in the receiving basin on August 23, 2018. Public comments were accepted until August 30, 2018.
7. A Staff Recommendation to approve the Request was presented to the WRC on September 13, 2018.
8. A public hearing on the Staff Recommendation was held in Boston on September 20, 2018. Written public comments were accepted until September 27, 2018.
9. Responses to comments received through the public comment periods are available in a separate report from the WRC.

EVALUATION OF THE PROPOSED INTERBASIN TRANSFER

This Interbasin Transfer application was reviewed on its own merits and is applicable solely to Ashland's use of MWRA water. The Decision is made on facts relevant to the Interbasin Transfer Act and its regulations. The application was evaluated against the seven criteria outlined in the regulations (313 CMR 4.09), as well as the Interbasin Transfer Act Performance Standards and with consideration of comments received at WRC meetings and through the public comment process.

SYNOPSIS OF THE EVALUATION CRITERIA (313 CMR 4.09)

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

BASIS FOR THE WRC DECISION

This application was reviewed by WRC staff at the DCR Office of Water Resources, and by staff at Department of Environmental Protection (DEP), and Department of Fish and Game's (DFG) Divisions of Fisheries and Wildlife and, Environmental Restoration Program. This Decision was made after an extensive evaluation of the project and of Ashland's compliance with the five

[1] NGVD of 1929

applicable criteria of the Interbasin Transfer Act regulations. The following section describes in detail, compliance with the criteria.

Criterion #1 MEPA Compliance

An environmental review, pursuant to Section 61 through 62H, inclusive, of Chapter 30, and the MEPA regulations, 301 CMR 11.00 was required for this proposed action. The ITA application was submitted as part of the Draft Environmental Impact Report (DEIR) for this project (EOEEA #15388). The Secretary's Certificate on the DEIR was issued on November 13, 2015 and required that a Final EIR (FEIR) be developed. The FEIR Certificate was issued on June 29, 2018 and stated that no further MEPA review was necessary.

Criterion #2 Viable In-Basin Sources

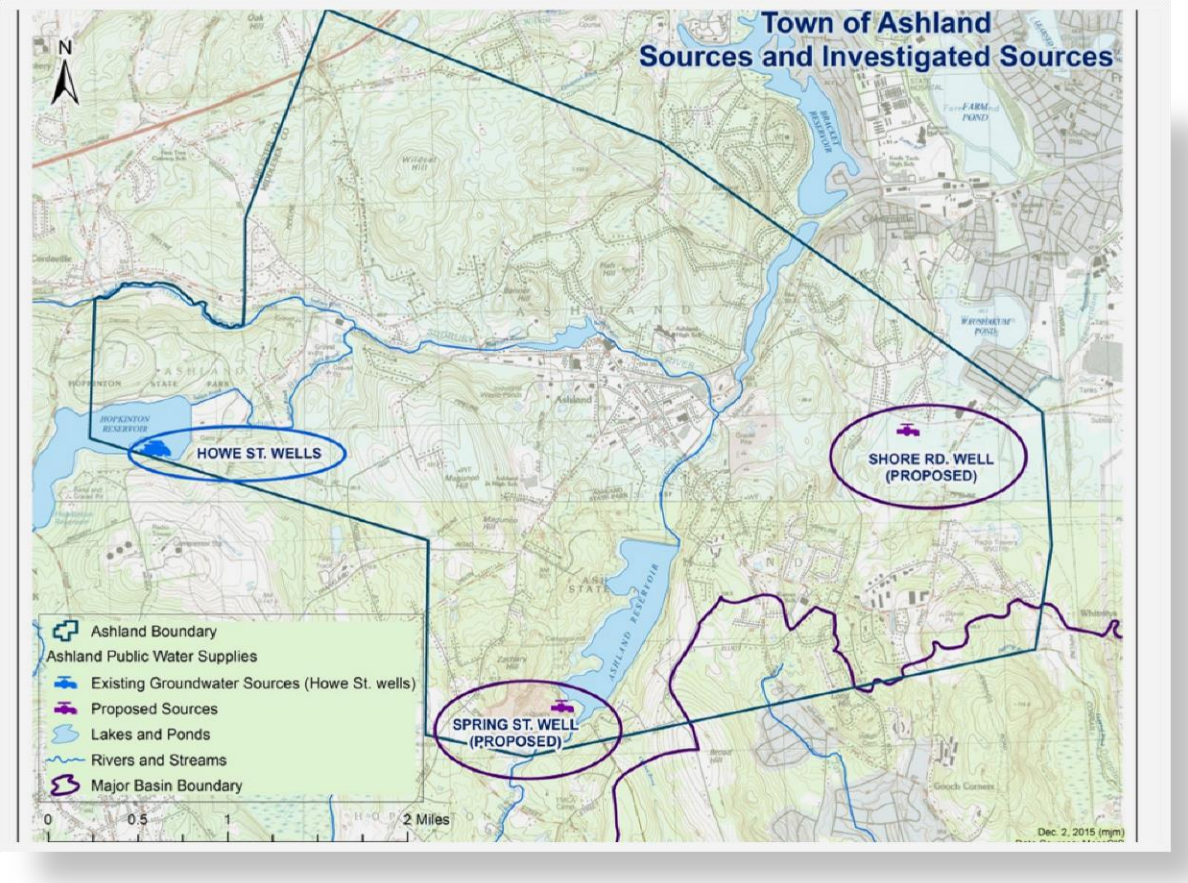
To meet this criterion, Ashland had to demonstrate that it had made all reasonable efforts to identify and develop all viable sources in the receiving area. Ashland compiled a "Potential Water Supply Study" in 2012. The Town reviewed several areas in town and conducted in-depth investigations on three potential in-basin sources, prior to deciding to apply for ITA approval (See Figure 1). These were:

- An additional well at the site of its existing sources (Howe Street): This site has limited yield and is limited by the capacity of the treatment plant. Ashland's existing sources currently impact and are impacted by DCR's prior rights to manage the adjacent Hopkinton Reservoir. Two of Ashland's existing wells must shut down when the Hopkinton Reservoir reaches a level of 295.35 NGVD29. Any additional source developed here would likely only provide redundancy and would be subject to shut-off triggers during the times of year when Ashland would most need supplemental water. In addition, the wells are relatively shallow. In 2007 and 2013 groundwater levels were so low the wells were not useable and an emergency connection to Southborough was needed. DEP has indicated that the subbasin where the Howe Street wells are located (#12029) is identified as Biologic Category (BC) 5 and Groundwater Withdrawal Category (GWC) 5[2], and has a significant estimated seasonal net August groundwater depletion of 236%. Increasing withdrawals from these wells would likely exacerbate impacts to recreational uses and Hopkinton Reservoir levels and require additional permit conditions. In addition, DEP's revised Water Management Act regulations (310 CMR 36.22(5)(a)) will require that Ashland evaluate alternatives to pumping at this location in order to minimize impacts.
- Spring Street site: A source here will need Article 97 legislative approval to secure proposed access through DCR property and a portion of the Zone I, which would extend into DCR's Ashland State Park. Recreational use of the park, including DCR's management of water levels at the Ashland Reservoir, cannot be impacted by use of the well. Therefore it will likely be subject to shut-off thresholds during the times of year when Ashland will need the water. There are also water quality issues associated with the site. In addition, any source developed here will need Interbasin Transfer Act approval, because Ashland discharges its wastewater out of basin, and would likely have restrictions imposed to prevent impacts to Cold Spring Brook.
- Shore Road site: Any source developed here will need Interbasin Transfer Act approval, because Ashland discharges its wastewater out of basin. It is unclear if it would meet the criteria for approval due to wetlands and other environmental concerns. If it could be

[2] These are the most impacted of the Sustainable Water Management Initiative Framework categories.

approved, the well would likely be subject to shut-off triggers during the times of year when Ashland would most need supplemental water. There are also water quality issues associated with this site.

Figure 1
Ashland Investigated In-Basin Sources



In its comments on this ITA request, DEP indicated that the Spring Street and Shore Road sits are both located in subbasins currently categorized as GWC 2. Very small increases in withdrawals from either subbasin would result in a change of the GWC of that subbasin. The revised Water Management Act regulations require that permittees changing a subbasin's GWC category demonstrate that there is no feasible alternative source that is less environmentally harmful before being granted approval to increase withdrawals (310 CMR 36.22(7)(a)). Hence, there would be significant permitting issues associated with their development and use as viable long-term options for new or increased withdrawals.

At the request of a Commission member, the following additional sites were reviewed and Ashland was consulted on the possibility of developing wells there:

- A parcel near the Hopkinton border, near Legacy Farms: A review of the stratified glacial drift deposits in this area as shown on the Hydrologic Investigation Atlas mapped by the United States Geological Survey (USGS) in cooperation with the Water Resources

Commission, indicates that the area of stratified drift virtually ends at the Hopkinton border. The parcel in Ashland consists of mostly till, and according to the USGS map, is not good aquifer material.

- The former Girl Scout Camp, adjacent to Ashland State Park: Although a portion of the property is shown on MassGIS as having glacial stratified deposits, MassGIS does not show the property as having a potential medium or high-yield aquifer. This site is in close proximity to the Ashland Reservoir. It would have the same challenges faced by the Spring Street site under DEP's Water Management Act, described above. It could also be affected by shut off thresholds needed to protect levels in the Reservoir. In addition, this site was purchased expressly to provide additional wastewater capacity for the Town of Ashland (currently sewered to the MWRA), through a groundwater discharge system. Given this use, it is unlikely that a water supply located at this site could meet Zone I requirements.
- The former Warren Conference Center site, now owned by Framingham State College: Ashland does not own this site and would need Article 97 legislative approval to develop a well here. In addition, a review of the stratified drift deposits in this area indicates that this area is till, and not good aquifer material.

The Town also reviewed other sites, but dismissed them due to contamination issues, lack of suitable aquifer material, and/or groundwater and biological category issues identified through the Sustainable Water Management Initiative Framework.

Criterion #3 Water Conservation

Ashland has an existing water conservation program which meets most of the ITA Performance Standards for Criterion #3 and the Massachusetts Water Conservation Standards (https://www.mass.gov/files/documents/2018/09/11/ma-water-conservation-standards-2018.pdf). Ashland's application was received before the approval of the updated 2018 Massachusetts Water Conservation Standards, however, its water conservation program conforms with the updated standards.

Ashland has been working steadily to meet the Performance Standard for unaccounted-for water. Ashland's unaccounted-for water has averaged 10.85% over the past 5 years. Ashland has identified the cause of high unaccounted-for water to be older, inefficient meters and so has implemented a meter replacement program. As a condition of this approval, Ashland must provide annual reports of the progress with this program to WRC Staff.

Based on this, the WRC has determined that Ashland is in the process of addressing the ITA Performance Standard for unaccounted-for water, and finds that Ashland meets this Criterion.

Table 1 lists Ashland's water conservation accomplishments with respect to all of the water conservation standards.

Table 1
Ashland's Water Conservation Status

CONSERVATION MEASURE	IBT PERFORMANCE STANDARD	ACCOMPLISMENTS	MEETS STANDARDS?
1) Leak Detection and Repair	Full Leak Detection survey within the previous two years of the application	Leak Detection yearly; last in 2016	Yes
	Documentation of survey and of leaks identified and repaired	All identified leaks repaired by January 2017. Documentation of the survey was provided.	Yes
	Completed by methods at least as comprehensive as the MWRA's regulations for leak detection	Yes	Yes
2) Metering	100% Metering	100% Metered	Yes
	Regular maintenance, calibration, testing and repair program; description of program included in application	Ongoing program – especially since they have identified meter age as major factor in UAW	Yes
	All public buildings should be metered	Yes	Yes
	Master meters calibrated annually; documentation of annual master meter calibration	Yes; documentation of calibration provided	Yes
	Quarterly billing, based on actual meter readings; bills should be easily understood by customer	Residential customers billed quarterly; large users billed monthly	Yes
3) Unaccounted-for water	Unaccounted-for water should be at 10% or less	UAW = 10.85% (2013 to 2017 average), but Town has implemented an aggressive meter replacement program to reduce; UAW was 8.2% in 2017	Yes
4) Pricing	Documentation of full cost pricing	Dedicated water/sewer enterprise fund. Water rates are based on the cost of water and include the costs of operation and maintenance of the wells and distribution system.	Yes
	Rate structure must encourage water conservation	Rates encourage conservation through an increasing block rate, with the highest tier more than twice that of the lowest tier, and separate, highest tier rates for irrigation meters.	Yes
	Decreasing block rates prohibited	Does not have decreasing block rates.	Yes

CONSERVATION MEASURE	IBT PERFORMANCE STANDARD	ACCOMPLISMENTS	MEETS STANDARDS?
5) Drought/emergency contingency plan	Written Drought/emergency contingency plan, to include:	Ashland has an extensive emergency contingency plan that is available to all town departments. The Town has a permanent water restriction by-law (updated in September 2015) which restricts outdoor water uses year-round. The Town's website provides information concerning water use restrictions and Hopkinton Reservoir levels.	Yes
	- 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		
6) Public sector water use	All public buildings should be metered	All public buildings are metered	Yes
	Retrofit all public buildings with low-flow devices	Yes	Yes
	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.	An audit on public buildings was conducted in September 2015.	Yes
7) Residential water use	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.	RGPCD = 55 (average 2013 to 2017)	Yes
		Water Efficient Plumbing Fixtures Provided	Yes
		Comprehensive residential water conservation program implemented	Yes
		Outdoor water use restrictions in place	Yes

CONSERVATION MEASURE	IBT PERFORMANCE STANDARD	ACCOMPLISMENTS	MEETS STANDARDS?
8) Public Education	A broad-based public education program which attempts to reach every user at least two times per year- - refer to the WRC's 2018 "Massachusetts Water Conservation Standards" and the Massachusetts Water Works Association for recommended public education measures	Water use restrictions, posted on an electronic message board at the center of town and signage at major primary roads notify the public about the restrictions on water usage. Notices are also published in the local newspaper. Information to promote water conservation and the use of water conserving devices published in the local newspaper	Yes
	Targeting largest users	Ashland is primarily a residential town with few industrial properties that might be considered target large water users.	Yes
9) Outdoor water use		Ashland has a water use restriction by-law which mandates outdoor water use restrictions year-round. The Town's website provides information concerning water use restrictions and Hopkinton Reservoir levels.	Yes
10) 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.	In place	Yes
	A long-term water conservation program which complies with the 2018 Massachusetts Water Conservation Standards should be in place.	Yes	Yes

Criterion #4 Forestry Management
This criterion is not applicable to this proposal. Ashland's sources are ground water sources.

Criterion #5 Reasonable Instream Flow and Criterion #7 Cumulative Impacts
Ashland is proposing to purchase up to 120 million gallons of water from the MWRA per year. System hydraulics and the maximum interbasin transfer amount requested will result in a maximum transfer of 1.6 mgd.

The ITA regulations (313 CMR 4.09(e)) 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, the WRC, through its Staff, evaluated the impacts of transferring 1.6 mgd on the operations of the MWRA Water Works System, which include impacts to reservoir levels, drought levels, low flows, intermediate flows, high flows, and the MWRA's mandated downstream releases. In addition, the cumulative impacts of the Ashland transfer, other recently approved transfers and other potential new communities which may be added in the near future were evaluated on a monthly basis. These transfers could result in an additional combined annual average of 10 mgd of system demand. In its analysis of these criteria, the WRC relied on data provided in the Ashland DEIR, FEIR, information regarding the MWRA system in a document titled, "MWRA Water System Supply and Demand" (May, 2002), and previous WRC Decisions. Streamflow data and reservoir release data for the analysis were obtained from the US Geological Survey and previous WRC ITA reviews.

MWRA Water Works System Operations
The MWRA Water Works System obtains water from the Quabbin Reservoir, the Wachusett Reservoir, and the Ware River intake (Figures 2-4). The Quabbin Reservoir has a watershed area of 186 square miles, and maximum storage capacity of 412 billion gallons, equivalent to about five years worth of supply. In addition to the water flowing into the Quabbin directly, Quabbin Reservoir can receive water from the Ware River (also in the Chicopee River basin) via the Ware River intake. The Ware River at its intake has a watershed area of 96.8 square miles. The Quabbin Reservoir is connected by pipeline (the Quabbin Aqueduct) to the Wachusett Reservoir in the Nashua River basin. Wachusett Reservoir has a capacity of 65 billion gallons and a watershed area of 107 square miles. The Quabbin Reservoir came on-line in 1940's to supplement the existing reservoir system (including the Wachusett Reservoir) that had been serving the Boston metropolitan area.

The Quabbin and Wachusett reservoir system is operated with the primary objective of ensuring an adequate, high quality 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 Rivers. The Wachusett Reservoir elevation is controlled through transfers from Quabbin Reservoir. The objective is to operate Wachusett Reservoir over a narrow operating range (between elevation 390 and 391.5 feet BCB[3]) while allowing Quabbin Reservoir to freely fluctuate. The Quabbin Reservoir elevation at the primary spillway is 530 feet BCB. There is also a smaller, low-level spillway at elevation 528 feet BCB.

[3] Boston City Base

Figure 2. Schematic of MWRA Water System

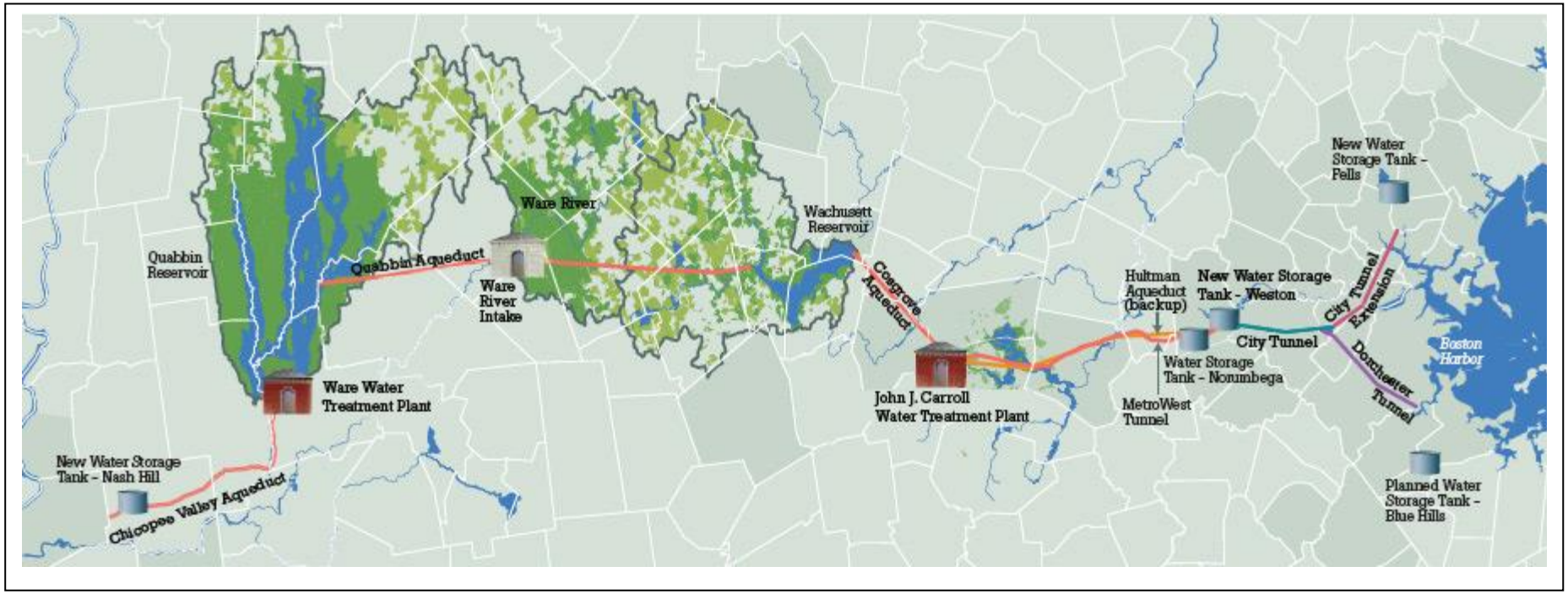
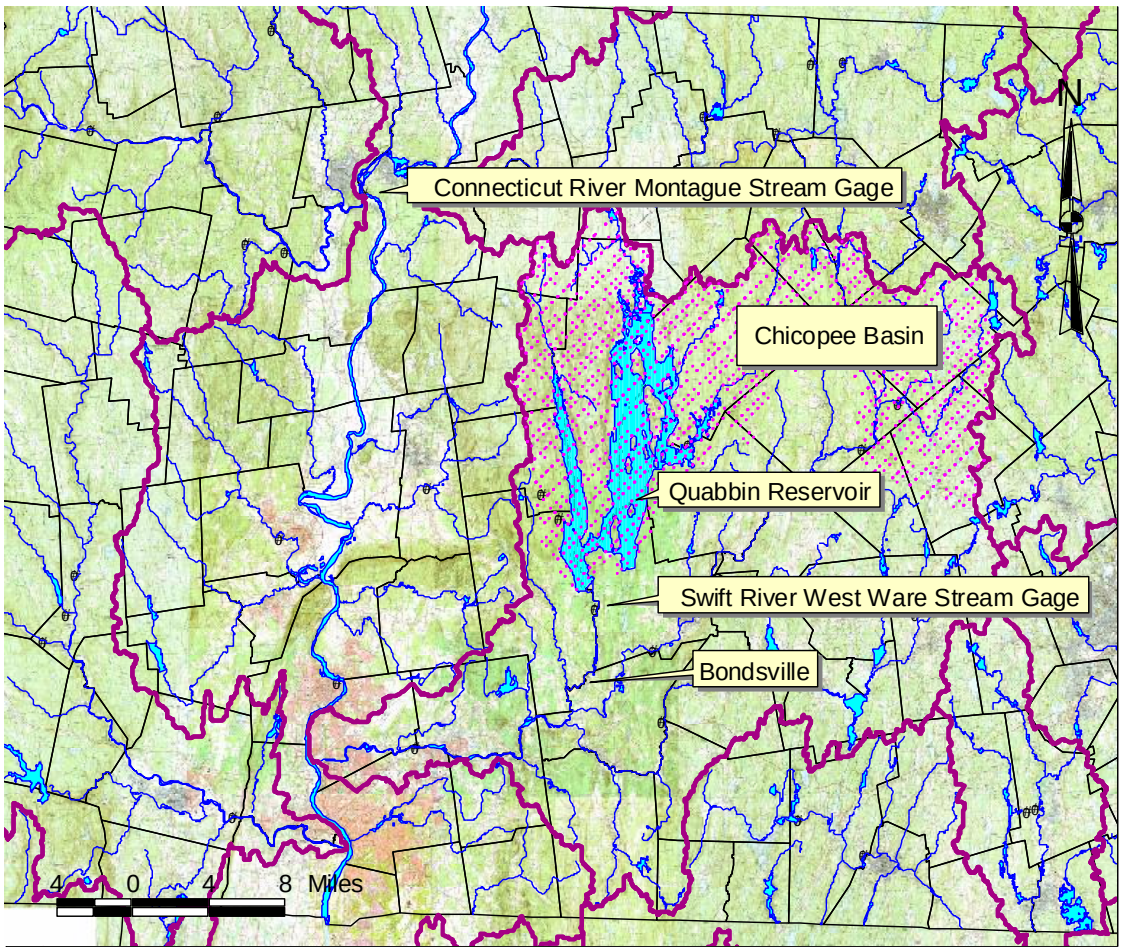
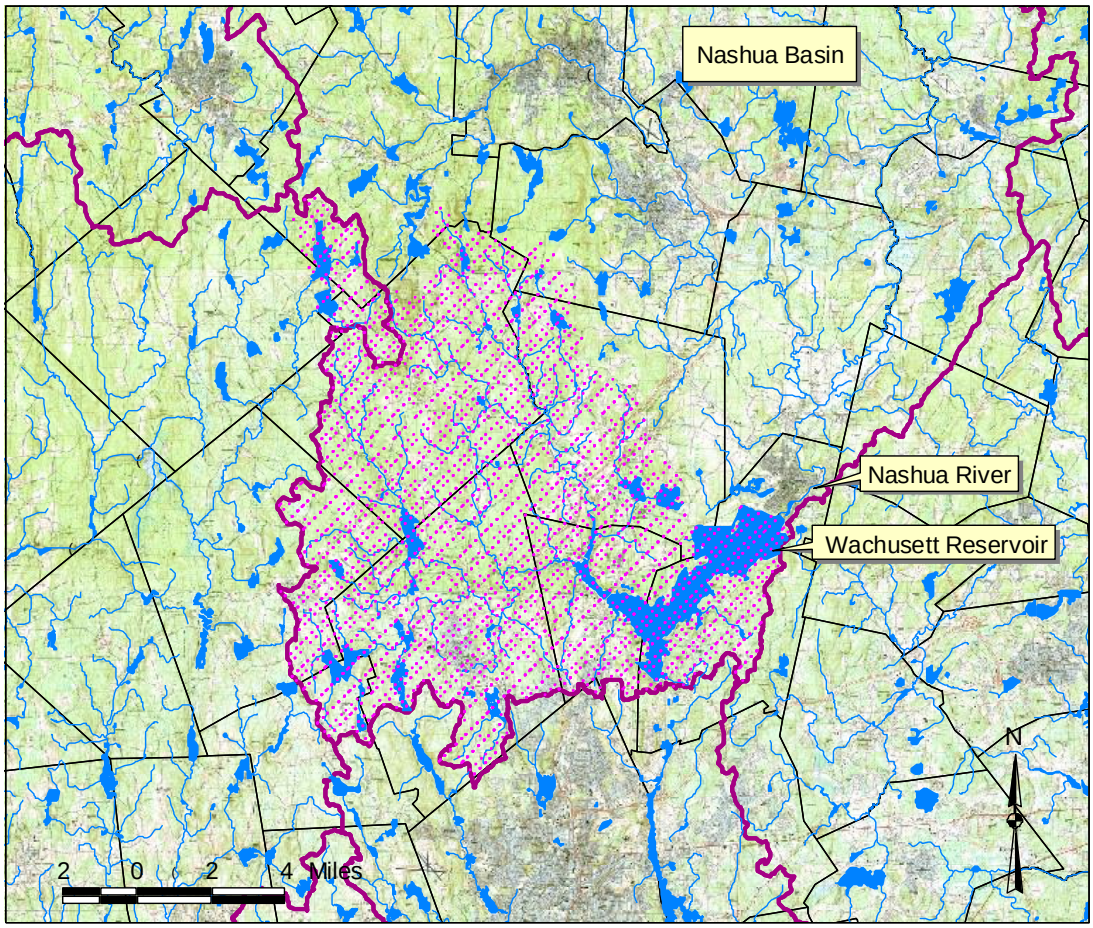


Figure 3. Quabbin Reservoir Donor Basin



Quabbin Reservoir, Chicopee Basin, and Stream Gaging Locations of Interest

Figure 4. Wachusett Reservoir Donor Basin



Wachusett Reservoir and Nashua Basin

Subbasin by Surface Water Supp
MDC/MWRA and Public
Streams 100K
Ponds 100K
Stream Gages
Major Watersheds
MA Towns

The operation of Quabbin Reservoir includes maintenance of a minimum flow 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. A 1929 War Department permit (now overseen by the Army Corps of Engineers) also requires seasonal releases from the Winsor Dam to maintain flow for navigability on the Connecticut River between June 1 and November 30. The seasonal releases 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 streamflow thresholds stated above through controlled releases through a combination of a turbine bypass (formerly used for hydropower production) plus a Ross valve. The reservoir has been historically controlled to maximize safe yield and assure water quality, while at the same time satisfying the regulatory required releases. Uncontrolled releases, or unintended spills, can occur occasionally over the spillway. If the reservoir is close to full and a storm event occurs, excess water may be spilled over the spillway down the Swift River. There have also been extended multi-year periods when no spillway discharges have occurred.

Transfers from the Ware River to Quabbin Reservoir are only allowed at Ware River flows above 85 mgd (131 cfs), 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. Under the "limited Ware" operating approach currently implemented by the MWRA, transfers from the Ware River are made only on a limited basis for flood control or to help fill the Quabbin when Quabbin Reservoir levels are beneath their seasonal normal values.

Minimum releases are also statutorily mandated for 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 (equivalent on average to approximately 2.6 cfs).

Hydrologic Analysis—Overview

Several types of data are available to evaluate the potential impact of the Ashland transfer, as well as any planned or proposed transfers, on the Quabbin Reservoir. Streamflow data, or a hydrograph showing the impact of the proposed transfer on the donor river basin, is usually evaluated as part of an interbasin transfer review. However, several factors make the use of downstream flow data difficult in this case. 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 and reservoir 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. Due to the presence of large water supply dams and their associated reservoirs, Aquatic Base Flow (ABF) criteria were not applied to

downstream releases, since the outflows from the dams would not reflect the size of the watersheds above the dams on a cubic feet per second per square mile (cfsm) basis.

The Ashland application indicates that in general, given the relatively small size of the Ashland transfer in comparison to the capacity of the reservoir and the magnitude of discharges over the spillway, and the discharges governed by regulatory requirements, the effects from Ashland's withdrawals on hydraulic characteristics will be imperceptible. Intended downstream releases at Quabbin, Ware, and Wachusett will not change. There would only be a slight reduction in unintended spillway flows at Quabbin.

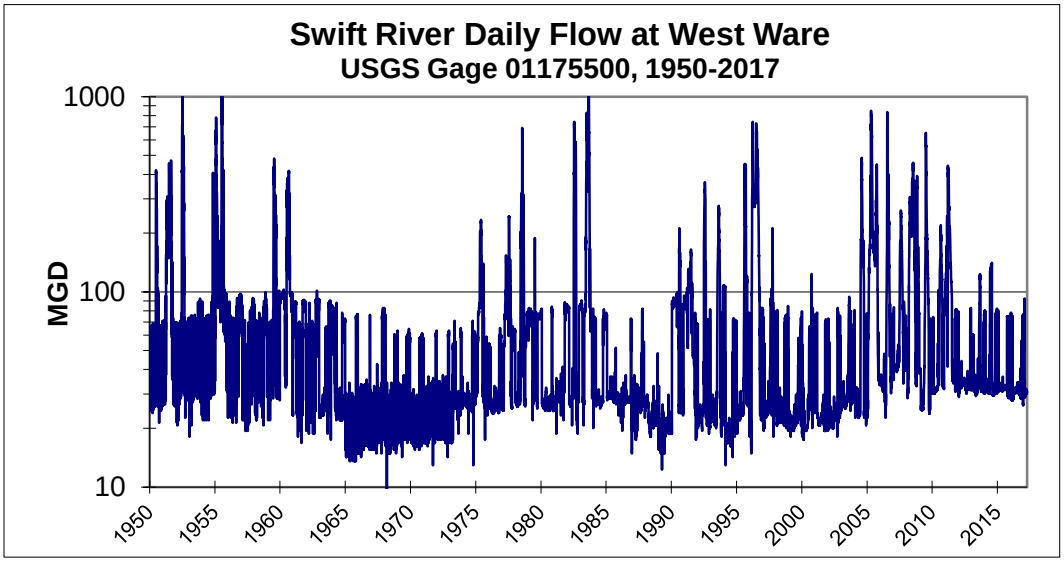
Quabbin Reservoir and Swift River

Both time series flow graphs and flow duration curves are used to describe river flow conditions. Figure 5 shows both the time series and flow duration curve for the Swift River at the West Ware gage for the time period of 1950 to 2017. The Swift River West Ware gage is located 1.4 miles downstream from Winsor Dam and has a period of record from 1913 to present. The West Ware gage is located approximately 3.6 miles upstream of the compliance point at Bondsville. The intervening drainage area between the two points is reported to contribute 4 mgd of base flow (MWRA Water System Supply and Demand, 2002); therefore, releases of at least 16 mgd are made from the Quabbin Reservoir to maintain the minimum 20 mgd flow required at Bondsville. MWRA has commented that releases are more typically about 20-25 mgd. In addition, 6 mgd is supplied to the McLaughlin Fish Hatchery and ultimately returns to the Swift River. Significant flow variation is evident in the time series graph, and the flow duration curve depicts the very high frequency of flows that exceed the minimum release requirement from the Quabbin Reservoir.

Wachusett Reservoir and Nashua River

Statutory releases from Wachusett Reservoir typically occur through a fountain on the downstream side of the dam at the headwaters of the Nashua River. MWRA staff also estimates that an additional 0.9 mgd of seepage occurs from the Wachusett Reservoir dams and dikes. A pressure-reducing sleeve valve installed in 2003 has provided better operational control and allows additional discharges up to 100 mgd. Flows between 1.8 and 100 mgd may be released through the sleeve valve to control the reservoir level or when Wachusett Reservoir is being supplemented with Quabbin water for water quality purposes. Flows above 100 mgd occur when the Wachusett Reservoir spillway crest gate is activated for larger releases and spilling. Previous analysis for the time period of 1938 to 2006 showed that the minimum of 1.71 mgd release or greater occurred 92.5 percent of the time; however, between since 2002 the minimum release was achieved greater than 99 percent of the time. Figure 6 shows a previous analysis of releases to the Nashua River times series and flow duration curve from 1938 to 2006. Figure 7 shows a times series of Nashua River daily releases from 2003-2015 taken from the FEIR. Figure 8 shows a times series of Nashua River flow from the relatively new USGS Gage 01095503 from July 2011 (when the period of record starts) through 2017.

Figure 5. Swift River Time Series and Flow Duration Curve 1950 to 2017



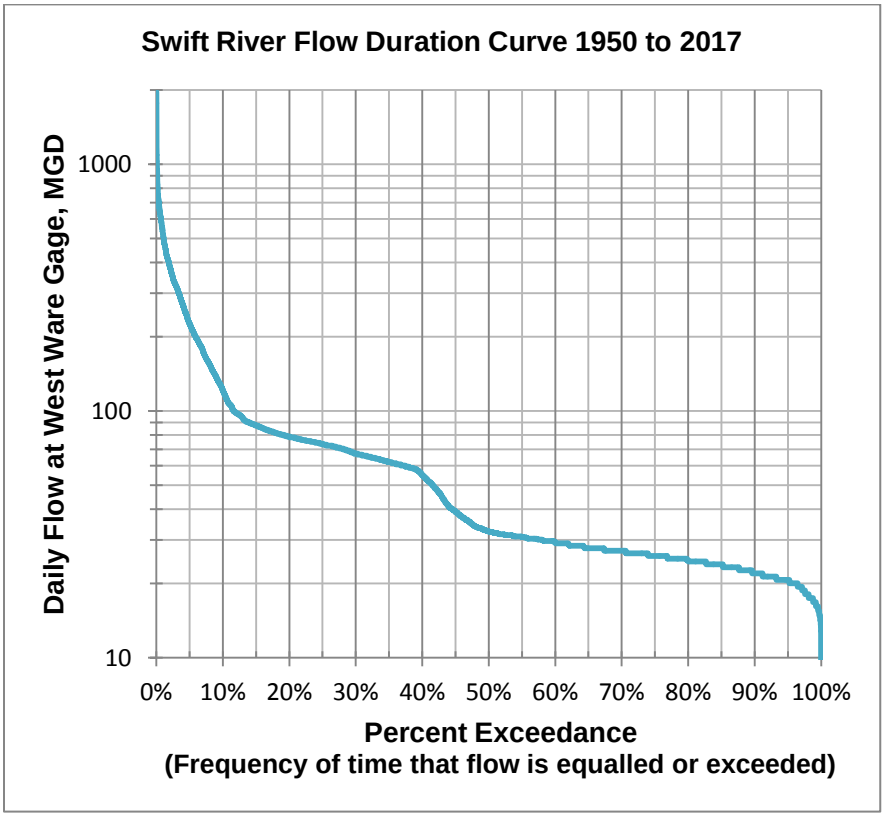
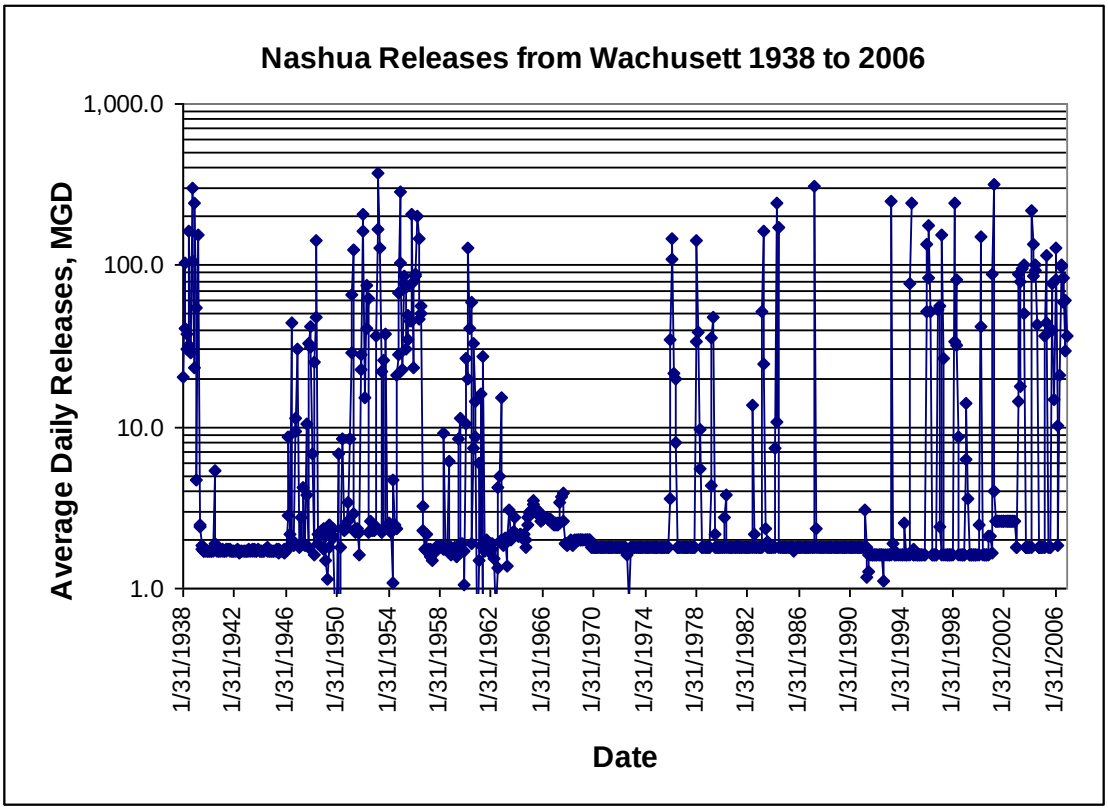


Figure 6. Releases from Wachusett Reservoir to Nashua River, 1938 to 2006 Time Series and Flow Duration Curve



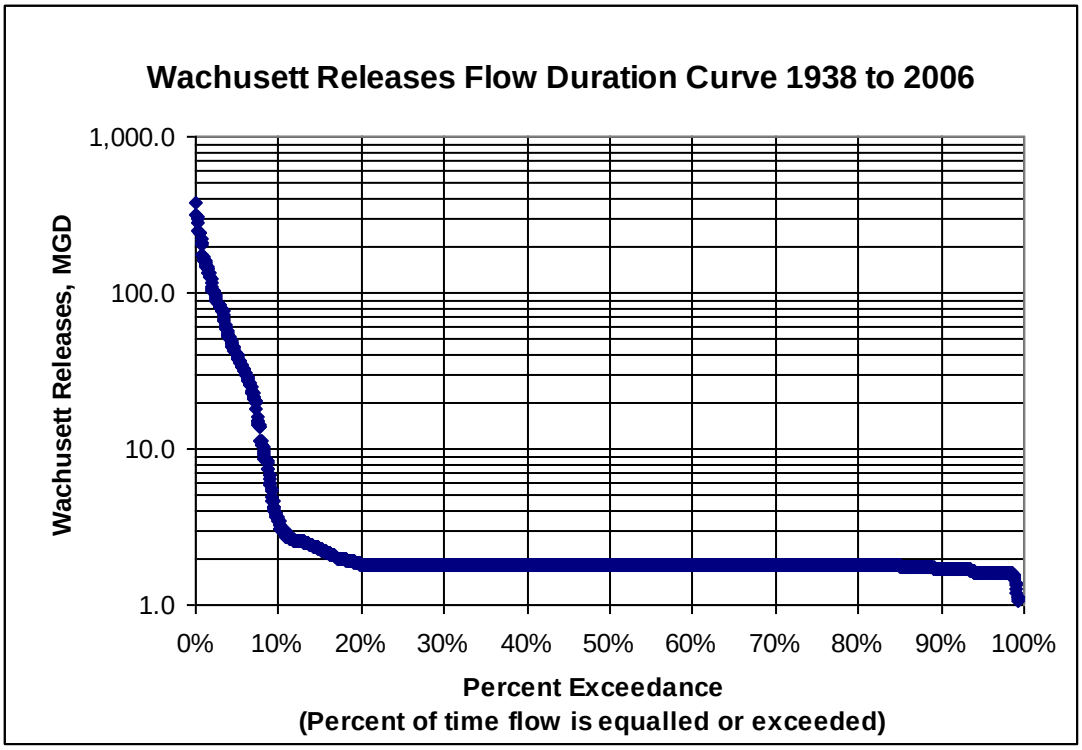


Figure 7 Nashua Daily Releases 2004-2015
From FEIR

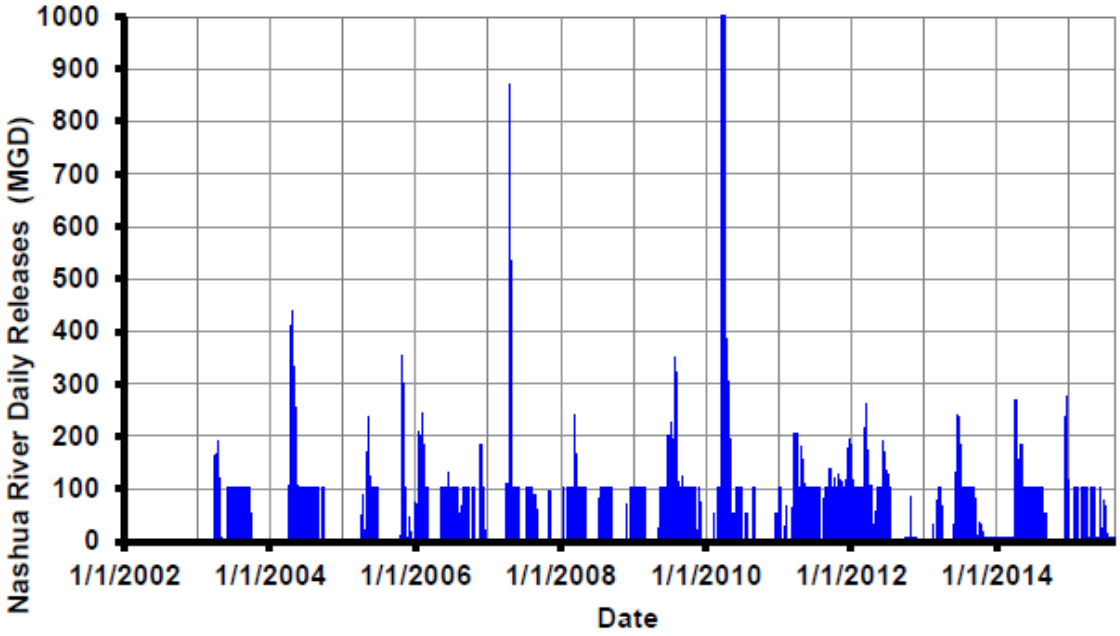
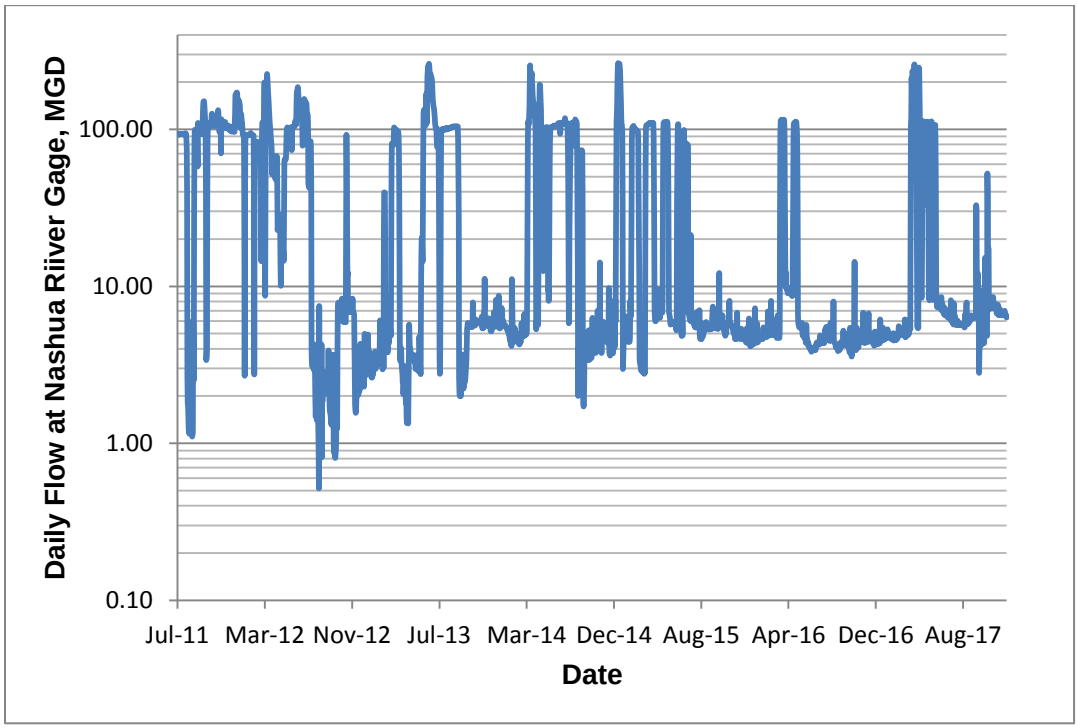


Figure 8 Nashua River Flow, MGD
USGS Gage 01095503



Ware River

According to MWRA, the Ware intake at Barre was designed to pass the first 85 mgd before flow can be siphoned into the intake. Flow is measured by MWRA using its own meter at the intake. However, since the diversions are only allowed at flows exceeding 85 MGD (and the operating practice is to not divert below 89 mgd), there are no impacts to low flows caused by the diversions. It is noted that diversions from the Ware River to the Quabbin Reservoir are typically only made when the reservoir level is below normal or the Army Corps of Engineers requests it for flood control. Figure 9 shows the time series and flow duration curve from a previous analysis for the Ware River for the time period 2002 to 2006. The USGS gage 01173000 data time series has superimposed on it the reduced flow as a result of diversions to the Quabbin Reservoir during that time

Low Flows

USGS data indicates that the minimum Quabbin release to the Swift River (16 mgd) as measured at the West Ware gage was maintained over 99 percent of the time between 1950 and 2017. Because the mandated flow requirements have been maintained, even during periods when demands were nearly 100 mgd over the current level, and through the drought of record, it is assumed that those releases will continue to be met and permit conditions will be satisfied under the proposed transfer demand scenarios, which are significantly less than the historic use. Additional demands from Ashland and other proposed users are not expected to affect Swift River releases from the Quabbin Reservoir, which represent the majority of low flows.

Previous analysis for the period of 1938 to 2006 indicate that releases from Wachusett Reservoir to the Nashua River have met the 1.71 mgd requirement more than 92.5 percent of the time and 99 percent of the time since 2002. Again, additional demands of Ashland and other proposed users are not expected to affect Nashua River releases from the Wachusett reservoir.

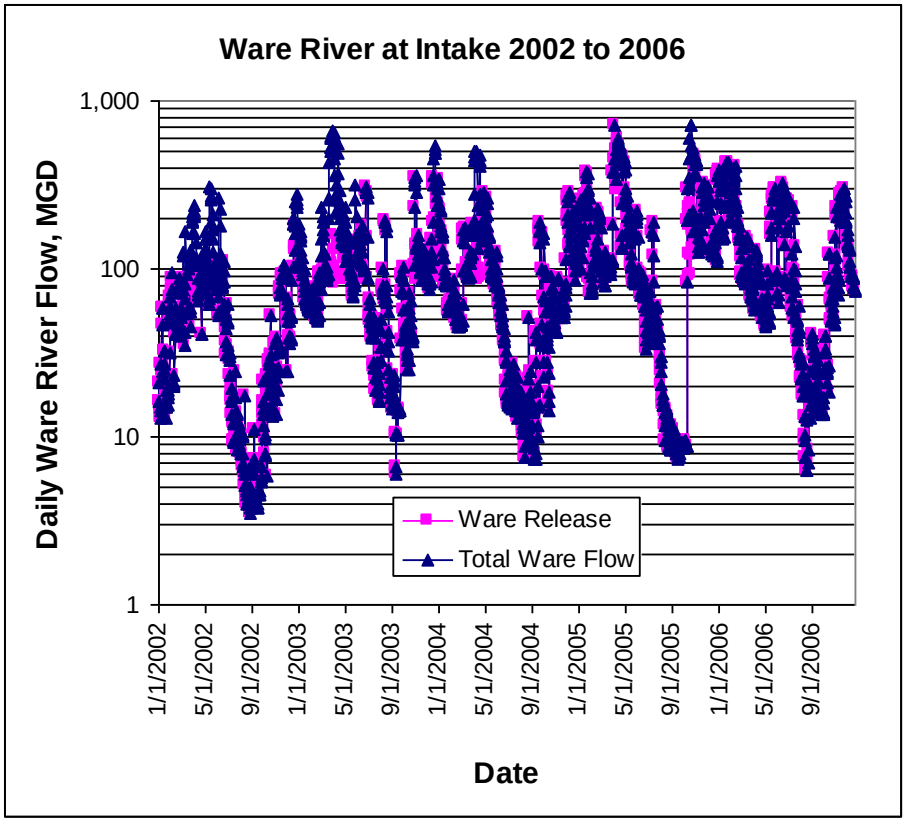
Low-flow impacts on Ware River diversions as a result of the additional demands posed by Ashland are not expected. Ware River diversions are limited to non-low-flow months (November through May), and to periods when flow exceeds 85 mgd.

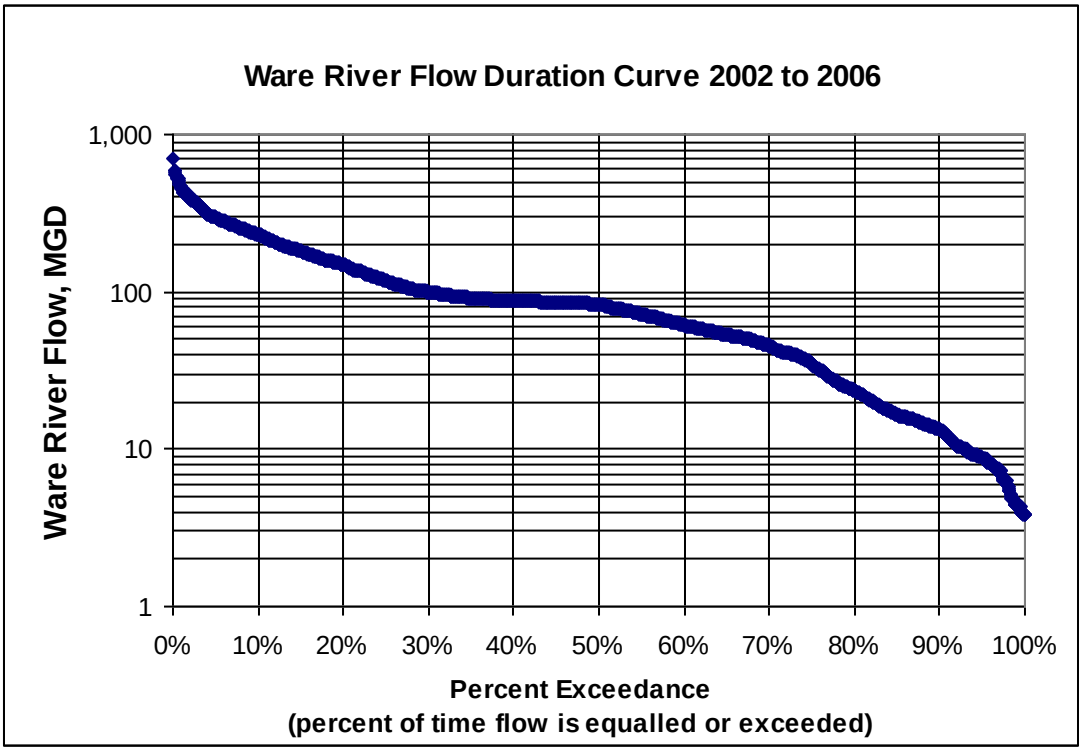
Intermediate Flows

While only "minimum" release requirements apply to the Quabbin and Wachusett Reservoirs, data from USGS gages indicate that intermediate flows occur as a result of releases above the minimum requirements for both the Swift and Nashua Rivers. There will only be a slight reduction in unintended spillway flows at Quabbin. The additional demand of Ashland will not in itself cause any change in how the Wachusett Reservoir is operated, nor in releases to the Nashua River.

Previous analysis showed that intermediate flows at the Ware River intake (classified herein between 50 to 100 mgd) occurred 38 percent of the time between 2002 and 2006. During this period, at times when the diversion was activated, up to 85% of Ware River flow was diverted, while maintaining at least the minimum 85 MGD downstream release. For the period analyzed (2002 to 2006), the Ware diversion was operated 184 days, or about 27 percent of the time

Figure 9. Ware River Flows and Flow Duration Curve, 2002 to 2006





during the intermediate flows. It is acknowledged that Ware diversions are limited based on MWRA's operating principles. Even with the diversions, however, the frequency and magnitude of intermediate flows in the Ware River appear nearly normal.

High Flows

Increasing demands can impact the amount of water that is spilled from Quabbin. Ashland's ITA application stated that there is no correlation between flows in the Swift River and system demand; rather, variations in flow are related to operational practices as well as climatic conditions. Increasing transfers from the Quabbin Reservoir to meet water quality objectives and to meet increased summer demands decrease the likelihood of spills. Spills from Quabbin are undesirable because of their adverse impacts downstream including warm water releases and flooding issues.

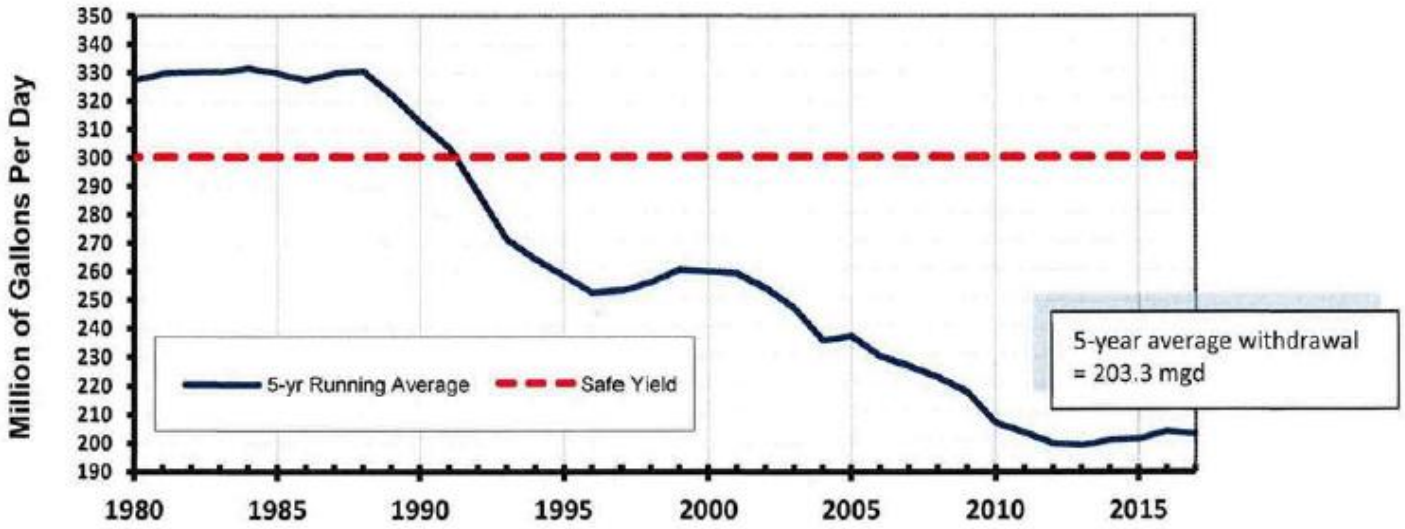
Since high flows from the Wachusett Reservoir are generally uncontrolled spills, and the reservoir level is intended to be managed to a narrow range of levels, the proposed Ashland interbasin transfer is not considered to have an impact on high flows in the Nashua River.

High flows on the Ware River are impacted by diversions to the Quabbin Reservoir. Previous analysis showed that high flows (above 100 mgd) at the Ware River intake occurred 30 percent of the time between 2002 and 2006. During this period, at times when the diversion was activated, up to 84% of Ware River flow was diverted, while maintaining at least the minimum 85 MGD downstream release. For the period analyzed (2002 to 2006), the Ware diversion was operated only 34 days, or about 6 percent of the time during high flows. As noted previously, Ware diversions are limited based on MWRA's operating principles. Even with the diversions, however, the frequency and magnitude of high flows in the Ware River appears nearly normal. The addition of Ashland will not likely have an impact on the use of Ware River diversions or high flows in the Ware River.

<u>Quabbin Levels/Drought Analysis</u>

The safe yield of the Quabbin and Wachusett reservoir system is approximately 300 mgd (MWRA, 2002). MWRA system demand has decreased dramatically since the 1980's (see Figure 10), as a result of aggressive water conservation efforts, water efficiency initiatives, response to price and rate increases, and regional economic conditions. In the FEIR, the baseline demand given was 200 mgd (5-year average 2009-2014). According to the MWRA, the most recent five-year average reservoir withdrawal (2013 to 2017) was 203.3 mgd, and the 2017 reservoir withdrawal was 195.64 mgd. Using population projections provided in the FEIR from the Metropolitan Area Planning Council and University of Massachusetts Donahue Institute, future demands for the existing system of an additional 18.5 to 22 mgd through 2035 were conservatively estimated. The FEIR drought analysis used a future demand of 232.6 MGD, which leaves a margin of safety for any communities that may approach MWRA in the near future.

Figure 10 Total Reservoir Withdrawals Five Year Running Average 1980-2017



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 from 190 to 300 and hydrologic conditions simulated from 1948 through 2000. A withdrawal of 240 MGD was used in the EIR for evaluation of reservoir performance. This represents the base withdrawal, plus Ashland and future community demands (232.6 MGD total plus 6 MGD to the McLaughlin Fish Hatchery) in 2035. At a demand of 240 mgd, there would be one month spent in drought stage 1. In addition, at demands below 250 mgd, Quabbin's maximum descent would still be above 500 feet, well above the level at which reservoir performance could be affected.

Impacts to Flow Characteristics

Interbasin Transfer Act criteria require evaluating impacts of the transfer on specific flow statistics. No impact to the Swift River 95% flow duration (20.0 mgd) is expected, compared to existing conditions. The 95% flow duration is equivalent to the state-mandated release requirement of 20 mgd at Bondsville. Data from the Swift River gage indicate that the mandated release has been achieved at virtually all times and it is expected that it will be maintained into the future and will not be affected by the proposed transfer or those of future communities included in this analysis.

Likewise, the 95% flow duration at the Wachusett Reservoir is not likely to be affected by the proposed additional transfers requested by Ashland. Data previously provided by the DCR Office of Watershed Management and USGS gage data indicate that the mandated release has been achieved at virtually all times since 2002 and it is expected that it will be maintained into the future and not be affected by the proposed transfer. Thus, the 95% flow duration flow is expected to increase slightly with future operations to at least the 1.71 mgd threshold.

The 95% flow duration at the Ware River should not be impacted by the proposed increase in interbasin transfer since Ware River diversions are not allowed during low flow periods.

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.

An instream flow incremental method (IFIM) study of the Swift River in 1997 by Normandeau Associates for MWRA indicated that the current flow releases were adequate to protect the Swift River trout fishery. The study found substantial, large, deep pools in the Swift River that serve as habitat refuge for adult trout. The efficacy of pools as low flow refuges is enhanced by an abundance of overhanging and downed trees that contribute substantial amounts of woody debris.

As a result of discussions and negotiations initiated during previous ITA reviews for admission to the MWRA, DFW, MWRA and DCR Office of Watershed Management considered habitat improvements that could be made within the limitations of existing permits. The MWRA and the DFW have entered into a Memorandum of Agreement (MOA) to tap raw water from the MWRA's Chicopee Valley Aqueduct (CVA) and convey six million gallons a day to DFW's McLaughlin Fish Hatchery, except during periods of drought. This work was completed in 2017. The pipeline to the Hatchery is used in the Hatchery's fish rearing facilities, and replaced the water that the Hatchery withdrew from Swift River. Ultimately, the water supplied for use in the Hatchery's operations is discharged after treatment to the Swift River (the Hatchery borders the Swift River) to supplement existing flows in the Swift River.

In addition, MWRA and DCR Office of Watershed Management have taken a number of steps to address fisheries issues in the Swift River, including:

1. Continuous 24-hour discharges from Quabbin into Swift River all year round, instead of higher releases for 5-7 hour periods.
2. Revision of MWRA operations to more slowly ramp up the higher volume controlled discharges made in the summer months, in response to a request of the Division of Fisheries and Wildlife.
3. Continued coordination with the Fish Hatchery regarding warm water spills in reservoir operating procedures.

MWRA has continued to use the new facilities at the Wachusett Dam to make additional releases to the Nashua River, above the required minimum. According to the MWRA, from 2003 to present, on average, over 25 times the required minimum release to the Nashua River has been made.

Hydropower
A hydropower turbine was in use at the Winsor Dam until 1991, when it was damaged by a fire. The 1997 Normandeau study was commissioned to determine suitable flow levels for fisheries during drought periods, as this information would directly impact the feasibility of generating hydropower while maintaining a trout fishery. However, no action was taken to re-implement the hydropower production, and according to MWRA, there are no plans at this time to reactivate the hydropower station at the Winsor Dam. The addition of the proposed community to the MWRA system would not likely have any impact on hydropower at the Winsor Dam nor on any downstream hydropower facilities.

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 and Wachusett reservoirs will not change with the Ashland transfer.

Wetlands
Other than the 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.

Summary of Reasonable Instream Flow Analysis

The analyses of release data indicate there will be no change in the operation of the Quabbin and Wachusett Reservoirs in response to the proposed Ashland transfer or to other potential transfers up to the 10 mgd used in the analyses of the MWRA Water Works System. Downstream flows will continue to meet all applicable permit and regulatory requirements. Low flows will not change, and intermediate and high flows will only be slightly affected possibly on the Swift and Ware Rivers. Current resources will be unaffected by the transfer. The proposed action to increase the Present Rate of Interbasin Transfer will still maintain reasonable instream flow in the donor basins. The Commission recognizes that current conditions represent a highly engineered environment. Modifications to the timing and magnitude of releases to the Swift and Nashua Rivers, undertaken as a result of previous ITA approvals for admission to the MWRA, may be beneficial to the downstream aquatic habitat. This Decision attempts to address the balance between water supply needs and aquatic habitat needs of flow, water quality and water temperature in the Swift, Ware, and Nashua Rivers.

Criterion #6 Groundwater/Pumping Test

This criterion is not applicable to this proposal. MWRA's sources are surface water sources.

OTHER ISSUES CONSIDERED

Timing of the MWRA Purchase

Ashland proposes to use MWRA water when levels in the Hopkinton Reservoir are at or below 293 feet NGVD29. However, DCR's operations of the Reservoir are impacted by use of the town's Howe Street wells. DCR operates Hopkinton Reservoir elevations within a range of 296 to 298 feet NGVD29 in May through August for recreational uses. Below an elevation of 296 feet NGVD29, the popular beach and boat ramp on Hopkinton Reservoir are essentially unusable.

Public water supply demands are greatest in the summer months, coincident with maximum annual evapotranspiration caused by high temperatures and vegetation growth. Given the Howe Street well field's immediate proximity to the Hopkinton Reservoir, in a transmissive sand and gravel aquifer, there is direct hydraulic communication between the wells and the Reservoir. The well water withdrawals likely have a nearly immediate impact on reservoir levels. During each summer month, Ashland's historic groundwater withdrawals have caused at least a foot of drawdown in Hopkinton Reservoir. In order to partially alleviate this situation, MassDEP has required that Wells #7 and #8 be shut down when the reservoir water level drops below 295.85 feet NGVD29. Ashland has tied this elevation level to its outdoor water use restriction by-law.

Although beyond the Commission's jurisdiction to require under this transfer request, we strongly urge Ashland to reconsider the parameters it has set for use of MWRA water and to purchase more water during the summer months, when use of the Howe Street wells conflicts with DCR's reservoir management requirements and causes other impacts. In their comments on

this application, DFG noted the GWC and BC of the subbasin containing these wells (discussed under Criterion 2, above) and stated "Extending the period when MWRA water is used will help reduce some of the existing alteration and maintain higher groundwater and Reservoir levels as well as potentially improve downstream flow in Indian Brook. When the Reservoir is at a higher elevation, there is more opportunity for it to spill or for water to be released downstream. Additionally, keeping groundwater higher in the summer months by using supplemental MWRA water could help alleviate some of the groundwater depletion as well as provide more base flow to Indian Brook." Ashland may purchase water during other times of year and at higher reservoir levels than proposed in the ITA. Since Ashland is limited to the1.6 mgd amount proposed to be purchased from the MWRA, use of MWRA water during other times of year and at higher reservoir levels should not result in adverse impacts to the MWRA Water Supply System, and will not require additional ITA review.

Impacts to Hopkinton/Ashland Intermunicipal Agreement

There was some question of how Ashland's purchase of MWRA water would impact its contractual obligation to sell water to Hopkinton. In 1999, the WRC approved a Determination of Insignificance under the Interbasin Transfer Act from the Town of Hopkinton to receive up to 0.056 mgd from Ashland, for transfer and subsequent discharge as wastewater into the Charles River basin and Blackstone River basin sections of Hopkinton. This is part of a larger water sale from Ashland to Hopkinton of up to 1 mgd (most of which remains in the Concord River basin). There is a dedicated water main from Ashland's Howe Street Treatment Plant directly to the Town of Hopkinton, separate from that which goes to Ashland. Therefore the purchase of MWRA water by Ashland will not directly affect the water sale to Hopkinton. The 1999 Determination of Insignificance remains in effect and is not superseded by this Decision to allow Ashland to purchase water from the MWRA. As long as Ashland and Hopkinton are not exceeding the parameters of the 1999 decision, the existing water sale to Hopkinton is beyond the Commission's jurisdiction under this transfer request. If Hopkinton amends its Intermunicipal Water Agreement with Ashland, allowing it to purchase more water from Ashland's Howe Street wells, and this results in an increase in the amount of water being discharged to the Charles River and Blackstone River basins, the ITA would be triggered and additional WRC review and approval would be required. As stated above, this Decision is based solely on Ashland's purchase and use of MWRA water.

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 FOR APPROVAL

Based on the analyses of this project, the approval of Ashland's application under the Interbasin Transfer Act for admission to the MWRA Waterworks System is subject to the following conditions. **Ashland must commit in writing within 30 days of the approval to abide by any conditions required by the approval of this transfer.**

1. Ashland must continue effective demand management programs that meet the Interbasin Transfer Performance Standards for Criterion #3, Water Conservation. The Town must

not amend its outdoor watering bylaw to make it less restrictive while the Town continues to use its existing ground water sources during the summer recreational season.

2. According to the FEIR, Ashland is updating its Emergency Response Plan and developing a Drought Management Plan. These were to have been completed this year. Ashland must provide copies of these plans to WRC Staff for review upon completion. If these plans are not completed in 2018, Ashland must provide a schedule for completion to WRC Staff by January 2, 2019.
3. WRC Staff will monitor Ashland's DEP Annual Statistical Reports for the first five (5) years after the town begins to receive MWRA water, to determine if the programs in place are successful in reducing unaccounted-for water at or below 10% and residential gallons per capita per day (gpcd) at 65 or less and to confirm that the interbasin transfer from MWRA to Ashland meets the annual limit of 120 million gallons. After the five year period, this may be done periodically.
4. If per capita residential water use increases above 65 gpd, 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, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use, including the imposition of seasonal water use rates and other measures. If this occurs, the Town must provide a plan for this program to the WRC for approval.
5. Ashland must provide annual reports to WRC Staff outlining progress with its meter replacement program. These reports will be due on March 1st of each year, until the program has been completed. At the completion of the meter replacement program, the final report should discuss future plans for meter replacement, as these newer meters reach the end of their useful life.
6. Ashland cannot sell MWRA water to Hopkinton or other municipalities or entities outside of the Town of Ashland without prior approval from the WRC, as this would represent a change in the operating rules, thus triggering the ITA (313 CMR 4.04(5)).

Approval under the Interbasin Transfer Act is just one of the approvals required for admission to the MWRA Water Works System. Ashland must obtain all other required permits and approvals before joining the MWRA.