



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

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April 27, 2021

John M. Scannell, Director  
Division of Water Supply Protection  
Department of Conservation and Recreation (DCR)  
251 Causeway Street  
Boston, MA 02114

PWS Name: MWRA  
PWS ID #6000000  
Filtration Waiver Inspections  
Wachusett Reservoir

David W. Coppes, Chief Operating Officer  
Operations Division  
Massachusetts Water Resources Authority (MWRA)  
Charlestown Navy Yard  
100 First Avenue  
Boston, MA 02120

Dear Mr. Scannell and Mr. Coppes:

Please find attached the following information – Annual Inspection Follow-up Letter, Wachusett Reservoir. Please see Section IIC on pages five and six and Table 2 on page eight for a discussion of watershed actions required and recommended. The signature on this cover letter indicates formal issuance of the attached document. If you have any questions regarding this letter, please contact Kathy Romero of my staff at [kathleen.romero@mass.gov](mailto:kathleen.romero@mass.gov).

Sincerely,

Yvette DePeiza, Program Director  
Drinking Water Program

cc: Damon Guterman, Margaret Finn, Frank Niles, [program.director-dwp@mass.gov](mailto:program.director-dwp@mass.gov)  
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Y:DWP Archive\Boston\MWRA – Wachusett Reservoir – PWS ID #6000000 – Source Protection – Filtration Waiver – 2021-04-27

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

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April 27, 2021

## Annual Inspection Follow-Up Letter – Wachusett Reservoir

On November 10, 2020 staff from the Massachusetts Department of Environmental Protection (MassDEP), Drinking Water Program, Boston office, with staff from MWRA and DCR, conducted a remote annual review of the Wachusett Reservoir, watershed and intake. This review took place through the Zoom meeting platform due to the Covid-19 pandemic. The Attendance Sheet is provided on page ten.

On November 6, 2020 staff from MassDEP's Northeast Regional Office inspected MWRA's Carroll Water Treatment Plant disinfection facility and processes. These inspections are requirements of the Massachusetts Drinking Water Regulations, 310 CMR 22.00, for systems with a filtration waiver. The watershed inspection, in conjunction with the Watershed Protection Control Program, and the disinfection process inspection are interrelated preventive strategies that ensure adequate control of water quality. The inspections ensure maximum use of the multi-barrier approach to source water protection.

The following information was reviewed by MassDEP Boston office staff for the annual inspection of the Wachusett Reservoir, watershed and intake.

- Wachusett Reservoir compliance letter for 2020 issued by MassDEP on January 21, 2020
- Written Wachusett watershed updates submitted to MassDEP by the DCR Division of Water Supply Protection and MWRA on April 29, 2020
- A detailed Wachusett Reservoir watershed program update presented by MWRA and DCR staff on November 10, 2020. Program highlights included:
  - Overview of DWSP Watershed Protection Plan;
  - Land Acquisition;
  - Land Management;
  - Public Access Management;
  - Bluff/Shoreline Erosion Monitoring Program;
  - Forestry Program;
  - Health of Watershed Trees – Asian Long-horned Beetle, gypsy moths, etc.;
  - Wildlife Management - deer hunt, gull/geese program, loons, beaver, etc.;
  - Watershed Security;
  - Mass. Watershed Protection Act;
  - Rangers/Interpretive Services;
  - Water Quality and Quantity Monitoring – salt use, historical water temps., etc.;
  - Aquatic and Terrestrial Invasive Species Tracking and Management;
  - Environmental Quality Assessments;
  - Stormwater Management and Structural Improvements;
  - Support Services Staff - dam maintenance, vegetation maintenance, building repairs, internal watershed road work, etc.;
  - Other Watershed Staff – vacancies, etc.; and
  - Physical condition and security at Cosgrove intake.

- DCR’s Watershed Protection Plan Update, FY19-FY23
- DCR’s Land Management Plan Update, 2017
- *Fiscal Year 2020 Final Report*, DCR, September 2020
- Wachusett Aquatic Invasive Species Update, 2016
- Terrestrial Invasive Plants: Problem Statement & Management Strategy, 2011
- Wachusett Watershed Stillwater District Environmental Quality Assessment
- Water Quality Report: 2019 Wachusett Reservoir Watershed, August 2020
- MWRA Board of Directors Report on Key Indicators of MWRA Performance (Orange Notebook)
- Water quality data submitted to MassDEP by MWRA
- A review of the status of laboratory state certifications on 9/24/19. All water quality records reported to MassDEP by MWRA were performed by laboratories certified by Massachusetts for the methods used since the last review on 10/1/18.
- A select review of minutes from Mass. Water Supply Protection Trust meetings in 2020
- A review of DCR’s current watershed outreach materials posted at <https://www.mass.gov/service-details/brochures-fact-sheets-and-reports>
- WPR Landowners Handbook
- A breakdown of historical total annual ammunition use associated with bird harassment at Wachusett
- Various maps, publications and additional watershed information

## **I. INSPECTION CRITERIA**

The purpose of the on-site inspections was to evaluate the adequacy of the Wachusett Reservoir watershed and subsequent drinking water system to produce safe drinking water. The inspections included:

- 1) a review of the effectiveness of the Watershed Protection Control Program for Wachusett Reservoir;
- 2) a review of the physical condition of the source intake and how well it is protected;
- 3) a review of the appropriateness of the system’s disinfection equipment and maintenance program in order to ensure a high operating reliability;

- 4) an inspection of the disinfection equipment for physical deterioration;
- 5) a review of management/operating procedures;
- 6) a review of data records that included source water quality data for fecal coliform bacteria and turbidity levels with the objective of ensuring that all required tests were conducted and recorded;
- 7) a separate review of bacteriological data for the occurrence of coliform in the distribution system in order to ensure that the disinfection process is effectively applied;
- 8) an identification of any improvements that are needed in the equipment, system maintenance, system operation, or data collection processes;
- 9) a review of the status of any SDWA compliance issues previously identified; and
- 10) confirmation that the public water system is using a laboratory certified by MassDEP for the required analytical methods.

## II. INSPECTION RESULTS FOR WACHUSETT RESERVOIR

### A. SOURCE WATER QUALITY CONDITIONS

- 1) Coliform Bacteria – The system has demonstrated that the requirements of 310 CMR 22.20A(2)(a)(1) for fecal coliform bacteria have been met in at least 90 percent of the representative source water samples. The samples were taken immediately prior to the point of disinfection application and were representative of the prior six-month period during which water was served to the public.
- 2) Turbidity – The system has met the requirements of 310 CMR 22.20A(2)(a)(2) and (3) for turbidity levels in representative source water samples that were taken immediately prior to the point of disinfection application.
- 3) Lab Certification - The system is using a laboratory that has been certified by MassDEP for the required analytical method(s).

### B. DISINFECTION TREATMENT PROCESS

At the Carroll Water Treatment Plant (“CWTP”) the disinfection treatment process that is in place has been designed to meet the required residual disinfectant concentration and contact time (“CT”) values and to achieve the inactivation rates specified in 310 CMR 22.20A(3)(a)(1). The disinfection system is sufficient to ensure at least 99.9% inactivation of Giardia Lamblia cysts and 99.99% inactivation of viruses. Ultraviolet light (“UV”) provides at least 2-log inactivation of Cryptosporidium. MWRA calculates inactivation rates hourly and reports Giardia inactivation at maximum flow and Cryptosporidium inactivation at minimum UV dose. A review of data records demonstrates that all required tests are being conducted and disinfection is effectively practiced. In addition to the approved methods for calculating log credit inactivation, MWRA provides additional disinfection using sodium hypochlorite following UV treatment. Disinfection credit using sodium hypochlorite is not included in MWRA’s compliance calculations.

The CWTP UV system uses a variable ASCF that is a function of the specific operating conditions of flow, UVT (transmittance) of the water, number of lamps in operation and UV

lamp output. The CWTP ASCF coefficients were programmed into the CWTP UV system by the UV system manufacturer in 2019 and has operated using these coefficients through 2020 to apply the correct UV dose to achieve the required *Cryptosporidium* inactivation. From November 2019 to Jun 2020 there were five occurrences of UV lamp breaks at the CWTP before reaching their 5,000 hour service life. The manufacturer determined the premature failure was caused by acoustic resonance that occurred when the 20 kW lamps operation between 12 and 16kW. Working with the manufacturer, MWRA replaced a portion of the existing UV bulbs with new lower pressure lamps provided by the manufacturer. The lamps have the same part number and are physically identical. Graphs of the spectral output show that they are essentially the same. These are being monitored and will be replaced when new bulbs when available as recommended by the manufacturer.

In 2020, a review of the disinfection process maintenance records found that all critical maintenance was completed on schedule. The treatment facility appears to be adequately operated and staffed. A review of operating procedures demonstrated that sufficient procedures were available for providing direction to operators and facility personnel. Detailed procedures are available for review electronically and hard copy.

An inspection of the physical condition of the equipment showed the equipment to be in excellent condition and well maintained. The MWRA received approval from the Department on October 8, 2019 to change out the existing Pulsafeeder hydro tube chemical sodium hypochlorite feed pumps with positive displacement diaphragm chemical metering pumps. Piping, valves and appurtenances in the chemical building, post treatment building and UV Rooms is being replaced. Construction is ongoing and substantial completion is anticipated by the end of 2021.

### C. WATERSHED PROTECTION/CONTROL PROGRAM

MassDEP is concerned that DCR DWSP staffing levels at the time of this watershed review had fallen below its previously articulated staffing needs. Maintaining adequate staffing levels is relevant to fulfilling the conditions of MWRA's filtration waiver under the federal Safe Drinking Water Act. Therefore, MassDEP requires the following actions by MWRA and DCR DWSP (these actions are also included in Table 2).

#### 1) Maintain Adequate Staffing Numbers for Watershed Protection Program

MWRA is required by the Safe Drinking Water Act to maintain sufficient technical, managerial and financial resources under its Capacity Program. At the time of the watershed review, there were one ranger, three laborers and one maintenance crew supervisor (making up one watershed crew) positions vacant at DCR DWSP. These vacancies contributed to the 20 vacancies throughout the system (of a total of 150 positions). Vacancies are likely impacting watershed programs, with fewer ranger patrols, fewer targeted enforcement days/patrols, less road maintenance and mowing and less time for future planning for climate change impacts occurring. MassDEP understands that MWRA, DCR and the Executive Office of Energy and Environmental Affairs have discussed staffing levels and that Secretary Theoharides has committed to assist and support DCR in filling critical staffing vacancies. To that end, as of April 2021, DCR-DWSP staffing levels have increased and 134 FTEs are currently onboard.

**Requirement:** MWRA and DCR will seek to backfill critical vacancies and/or identify alternative strategies, such as contracting specific activities, for meeting Watershed Protection Program workloads.

**Requirement:** DCR shall provide MassDEP with quarterly (July 2021 and October 2021) updates about the number of vacancies in watershed programs, the status of filling them and how watershed programs are impacted.

**2) Continue to Reduce, Eliminate and/or Treat Stormwater Runoff to Wachusett Reservoir and Tributaries**

MWRA and DCR DWSP have done an outstanding job reducing, treating and eliminating stormwater runoff into Wachusett Reservoir and tributaries.

**Requirement:** MWRA and DCR DWSP shall continue to reduce, treat and/or eliminate stormwater runoff to Wachusett Reservoir and tributaries and work with watershed landowners and facility operators to reduce impermeable surfaces and install vegetative buffers where appropriate.

**D. DISEASE OUTBREAK**

The public water system has not been identified as a source of a waterborne disease outbreak during the previous year.

**E. SYSTEM COLIFORM**

The public water system has complied with the maximum contaminant level (MCL) for E.coli as outlined in 310 CMR 22.05(8) and monitoring requirements as outlined in 310 CMR 22.05(1), (2), (3). The system is using a laboratory that has been certified by MassDEP for the required analytical method(s).

**F. DISINFECTION BYPRODUCTS – TOTAL TRIHALOMETHANES (TTHMs) & HALOACETIC ACIDS (HAAs)**

The public water system has complied with the monitoring requirements and Running Annual Average (RAA) MCLs for total trihalomethanes (TTHMs) and haloacetic acids (HAA5s) in its distribution system. The system is using a laboratory that has been certified by MassDEP for the required analytical method(s).

**G. INTAKE**

The intake structure has not changed since the last review and is well protected through multi-level security measures.

**III. STATUS OF REQUIREMENTS AND/OR RECOMMENDATIONS FROM PREVIOUS ON-SITE INSPECTION (2019)**

See attached Table 1

**IV. REQUIRED AND/OR RECOMMENDED ACTIONS TO MAINTAIN WATERSHED STATUS (2020)**

See attached Table 2

**V. WATERSHED PROGRAM APPROVAL STATUS AND SUMMARY**

A supplier of drinking water that uses a surface water source must meet all of the conditions as specified in 310 CMR 22.20A(2) in order to maintain a filtration waiver.

Wachusett Reservoir continues to meet the minimum source and finished water quality for all customers on the system. It appears that the Watershed Protection Control Program will continue to be effective in minimizing microbiological contamination of this source water. MassDEP grants continued approval to MWRA and DCR for the Watershed Protection Control Program.

**VI. The next on-site inspections will be conducted during 2021.**

Table 1  
**Status of Requirements and Recommendations  
 from the October 11 and December 19, 2019 Inspections**

Was this item identified during a prior inspection?	Reference #	Requirement/Recommendation 2019	Deadline for Taking Corrective Actions & Status
Annual Action	2019-1	<u>Requirement</u> : Submit a brief, written update to MassDEP's Boston office on the watershed topics that were presented during the watershed meeting and inspection on October 11, 2019 (see page two, bullet three, of this letter for topics).	May 1, 2020 {Submitted to MassDEP on April 29, 2020}
Yes	2019-2	<u>Recommendation</u> : Continue to update written SOPs, as necessary, to coincide with electronic SOPs.	On-going
Yes	2019-3	<u>Recommendation</u> : Continue to train and update operators on maintenance and recording procedures.	On-going

**Table 2**  
**Requirements and/or Recommendations Action Plan from the Wachusett Reservoir, Intake and Watershed Inspection on November 10, 2020 and the Carroll Water Treatment Plant Disinfection Facility and Processes Inspection on November 6, 2020**

Was this item identified during a prior inspection?	Reference #	Requirement/Recommendation 2020	Deadline for Taking Corrective Actions
Annual Action	2020-1	<u>Requirement:</u> Submit a written update to MassDEP's Boston office on the watershed topics (listed on pages two and three above) that were presented during the watershed meeting and inspection on November 10, 2020.	July 1, 2021
Yes	2020-2	<u>Requirements:</u> 1) MWRA and DCR will seek to backfill critical vacancies and/or identify alternative strategies, such as contracting specific activities, for meeting Watershed Protection Program workloads and  2) Submit to MassDEP a quarterly (July 2021 and October 2021) update about the number of vacancies in watershed programs, the status of filling them and how watershed programs are impacted.	Quarterly as noted
Yes	2020-3	<u>Requirement:</u> 1) Continue to reduce, treat and/or eliminate stormwater runoff to Wachusett Reservoir and tributaries and 2) work with watershed landowners and facility operators to reduce impermeable surfaces and install vegetative buffers where appropriate.	Ongoing
No	2020-4	<u>Requirement:</u> Provide an update on the progress toward replacing the remaining UV bulbs that were susceptible to premature failure due to acoustic resonance. The update shall include an evaluation of the performance of the new lower pressure UV bulbs and changes in operating procedures, if any.	On-going
Yes	2020-5	<u>Recommendation:</u> Continue to periodically evaluate and update written SOPs, as necessary, to coincide with electronic SOPs. Specifically, this should include inspections to the new lower pressure UV bulbs to verify that they are operating as intended.	On-going
Yes	2020-6	<u>Recommendation:</u> Continue to train and update operators on maintenance and recording procedures.	On-going
No	2020-7	<u>Recommendation:</u> Continue to evaluate and repair assets, as needed, to keep them operating as intended.	On-going

Attendance Sheet Provided by DCR DWSP  
Wachusett Reservoir Watershed Review – November 10, 2020

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