Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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SENT VIA ELECTRONIC MAIL

March 8, 2023

Mr. David Coppes
Chief Operating Officer
Massachusetts Water Resources Authority
Charlestown Navy Yard
100 First Avenue
Boson, MA 02129

Re: BELCHERTOWN
Massachusetts Water Resources Authority
PWS ID# 6000000
2022 Annual Watershed Inspection Report for
Filtration Avoidance
Quabbin Reservoir & Ware River Watersheds

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

Dear Mr. Coppes and Mr. Scannell,

Enclosed is a report detailing the findings of the 2022 inspection of the Quabbin Reservoir and Ware River watersheds conducted by the Massachusetts Department of Environmental Protection (MassDEP) Drinking Water Program (DWP). The inspection is an annual requirement for public water systems (PWS) that have approval from MassDEP to avoid filtration of surface water sources. As indicated in the report, MassDEP determined that the Massachusetts Water Resources Authority (MWRA) PWS continues to meet the criteria for filtration avoidance at the Quabbin Reservoir.

The MWRA PWS shall comply with requirements and deadlines stipulated in the enclosed report. Time sensitive corrective action requirements are summarized in Table 5 on Pages 20 through 22 but refer to the report language for additional details.

The watershed inspection report is also designed to accomplish the following:

a) Provide a means for MassDEP to further inquire about topics discussed at the on-site inspection or to obtain additional information on topics covered in various watershed-related documents that are reviewed by MassDEP.

b) Assist MassDEP, MWRA, and the Massachusetts Department of Conservation and Recreation (DCR) with watershed inspection efficiency and thoroughness.

Please note that the signature on this cover letter indicates formal issuance of the attached document. Should you have any questions, please contact Christine Simard (at 413-755-2147 or Christine.Simard@mass.gov) or me (at 413-755-2148 or Deirdre.Doherty@mass.gov).

Respectfully,

Deirdre Doherty
Drinking Water/Municipal Services Chief
Bureau of Water Resources
Western Regional Office

Enclosure

ecc: John Gregoire – Massachusetts Water Resources Authority
Dan Clark – Massachusetts Department of Conservation and Recreation
Jim Deni – Chicopee Water Department
Jeff Cyr – South Hadley Fire District No. 1
Vincent Pafumi – Wilbraham Water Department
J. Kevin Reilly, Andrea Traviglia – U.S. Environmental Protection Agency
Kathy Romero – MassDEP Boston
Robert Bostwick – MassDEP Central Region
Christine Simard – MassDEP Western Region

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Quabbin Reservoir and Ware River Watersheds
On-Site Inspection for Filtration Avoidance
March 8, 2023

On November 7, 2022, representatives of the Massachusetts Department of Environmental Protection (MassDEP) Drinking Water Program (DWP), Massachusetts Water Resources Authority (MWRA), Massachusetts Department of Conservation and Recreation (DCR), and United States Environmental Protection Agency (USEPA) attended a remote meeting to discuss the Quabbin Reservoir and Ware River watersheds. On November 4, 2022, representatives of MassDEP, MWRA, and DCR attended a field inspection of portions of the Quabbin Reservoir watershed. Table 1 lists the attendees present during the 2022 watershed inspection. Photographs taken during the field inspection are included in Attachment A.

Table 1 – Inspection Attendees

Organization/ Affiliation	Representative	
MassDEP	Christine Simard *	Hem Pokharel *
	Adam Kinney *	
MWRA	John Gregoire *	Valerie Moran
DCR	Dan Clark *	John Scannell
	Lisa Gustavsen *	Yuehlin Lee
	Ken MacKenzie	Kristina Gutchess
	Kerry Princiotta	Jenny Sanders
	Tayelor Gosselin	Shasten Sherwell
USEPA	Andrea Traviglia	

Note: *Present during both field inspection (November 4) and remote meeting (November 7).

The annual inspection is a requirement of the Massachusetts Drinking Water Regulations, 310 CMR 22.20A, for public water systems (PWS) that meet criteria for avoiding filtration at a surface water source. The Watershed Protection/Control Program and the disinfection process are interrelated protective barriers to contamination that, when implemented cooperatively, assure a high degree of water quality control. MassDEP evaluates the implementation and effectiveness of this "multi-barrier approach" to source protection through its watershed inspection process.

The MWRA PWS (ID# 6000000) has three active surface water sources: Quabbin Reservoir, Ware River, and Wachusett Reservoir. Water from Quabbin Reservoir is transferred to Wachusett Reservoir through the Quabbin Aqueduct Intake at Shaft 12 and is subsequently treated at the John J. Carroll Water Treatment Plant (JJCWTP) in the City of Marlborough for delivery to MWRA service communities in eastern Massachusetts. The Ware River is used to augment Quabbin Reservoir at Shaft 11A in the Town of Hardwick via a diversion located at Shaft 8 in the Town of Barre.

Quabbin Reservoir supplies water to five western Massachusetts PWS (listed in Table 2) through the Chicopee Valley Aqueduct (CVA) at the Winsor Dam Intake. The MWRA PWS is considered the wholesale system and the Chicopee Water Department PWS, South Hadley Fire District No. 1 PWS, and Wilbraham Water Department PWS are consecutive systems. The Westover Air Reserve Base PWS and Chicopee Walmart Supercenter PWS are consecutive systems to the Chicopee Water Department PWS. Prior to distribution to the CVA systems, water from Quabbin Reservoir is disinfected at the William A. Brutsch Water Treatment Facility (WABWTF) in the Town of Ware. MassDEP conducts a sanitary survey inspection of the CVA section of the MWRA PWS every three years, the most recent of which occurred in November 2022.

Table 2 – CVA Systems

Public Water System	PWS ID
Chicopee Water Department	#1061000
Westover Air Reserve Base*	#1061003
Chicopee Walmart Supercenter*	#1061004
South Hadley Fire District No. 1	#1275000
Wilbraham Water Department	#1339000

Note: *Water provided through the Chicopee Water Department.

Since 2017, MWRA has also provided untreated Quabbin Reservoir water to the McLaughlin Fish Hatchery located at 90 East Street in Belchertown, Massachusetts. A pipeline was installed to convey 6 million gallons of water per day to the hatchery for fish rearing, under an agreement with the Massachusetts Division of Fisheries and Wildlife (MassWildlife). Water is first piped to the WABWTF for electricity production at a 60-kilowatt hydroelectric turbine generator.

Below is a list of documents submitted by DCR for the 2022 inspection. The documents were prepared by the Division of Water Supply Protection (DWSP), unless otherwise noted.

A. Water Quality Report: 2021, Quabbin Reservoir and Ware River Watersheds, August 2022
B. Quabbin/Ware Fiscal Year 2022 1st through 4th Quarter Reports
C. Quabbin/Ware Fiscal Year 2022 Final Report, September 2022
D. Environmental Quality Assessment, Quabbin Northwest Sanitary District, 2021, February 2022
E. Environmental Quality Assessment, Coldbrook and Longmeadow Sanitary District 2021, June 2022
F. Annual Report, Quabbin Reservoir – Bird Harassment Program (BHP) 2021-2022, July 2022
G. DWSP White-tailed Deer Monitoring and Management Programs: 2021 Hunt Results and 2022 Pellet Surveys, Quabbin Reservoir, Wachusett Reservoir, and Sudbury Reservoir Watersheds, July 2022
H. 2022 Results from the Canada Goose (*Branta canadensis*) Population Control Program at the Quabbin Reservoir, August 2022
I. Draft 2022 Ware River Public Access Management Plan, August 2022
J. DCR Staffing Update Letter, June 27, 2022
K. DCR Staffing Update Letter, September 30, 2022
L. Land Acquisition Program Update
M. Fiscal Year 2022 Infractions and Responses: 310 CMR 22.20B
N. *Watershed Currents* Update
O. Control Measure Enhancements Since 2022 Inspection
P. Wildlife Progress Report
Q. Forest Management Update
R. Aquatic Invasive Species (AIS) Update
S. Water Quality Database Update
T. Algae-related Actions Update

U. Road Management Plan Update
V. New Salem Facility Update
W. MWRA Update for Winsor Intake Building Repairs, August 30, 2022

I. INSPECTION CRITERIA

Inspection of the watershed and review of drinking water treatment processes included an evaluation of specific criteria to measure the system's ability to produce safe drinking water. Inspection elements included the following:

A. A review of the effectiveness of the Watershed Protection/Control Program Plan;
B. A review of the physical condition of the source intakes and how well they are protected;
C. A review of the appropriateness of the system's disinfection equipment and maintenance program in order to ensure a high operating reliability;
D. An inspection of the disinfection equipment and review for appropriateness and physical deterioration;
E. A review of management/operating procedures;
F. A review of water quality records that included source water total and fecal coliform bacteria data and turbidity levels with the objective of ensuring that all required tests were conducted and recorded;
G. 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;
H. A review of disinfection byproduct data from the distribution system;
I. An identification of any improvements that are needed in the equipment, system maintenance, system operation, or data collection processes.
J. A review of the status of any Safe Drinking Water Act compliance issues previously identified; and,
K. Confirmation that the system is using a laboratory certified by MassDEP for the required analytical methods.

II. WATERSHED INSPECTION RESULTS

A. SOURCE WATER QUALITY CONDITIONS

In accordance with the Surface Water Treatment Rule (SWTR) [310 CMR 22.20A(2)(a)], a surface water source can avoid filtration if criteria are met for 1) fecal coliform bacteria and 2) turbidity in representative samples of the source water prior to disinfection. MWRA collects daily samples from the raw water tap at the WABWTF, immediately prior to the first point of disinfection, for analyses of fecal coliform bacteria and turbidity. MWRA uses its own laboratory, the MWRA Quabbin Laboratory, which has been certified by MassDEP for the required analytical methods. MWRA submits monthly water quality reports to MassDEP that summarize the daily fecal coliform bacteria and turbidity results. Results for the period between January 1 and December 31, 2022 are summarized below.

1. Fecal Coliform Bacteria – Fecal coliform (FC) bacteria results must be ≤ 20 colony forming units per 100 milliliters (CFU/100 ml) in at least 90% of the measurements made for the six previous months that the system served water to the public. The 2022 FC bacteria results met the

SWTR criteria for filtration avoidance. The highest FC bacteria result at the WABWTF was 10 CFU/100 ml on September 29, 2022.

2. Turbidity – Turbidity levels cannot exceed one Nephelometric Turbidity Unit (NTU). Special circumstances that result in turbidity levels greater than one NTU, as specified in 310 CMR 22.20A(2)(a)2., should be reported to MassDEP for evaluation. The 2022 turbidity results met the SWTR criteria for filtration avoidance. The highest turbidity result at the WABWTF was 0.66 NTU on January 14, 2022.

B. DISINFECTION TREATMENT PROCESS

1. The WABWTF has a sodium hypochlorite disinfection system, designed to meet required CT values and achieve the specified inactivation rates pursuant to 310 CMR 22.20A(3)(a)1. The disinfection process regularly attains the required CT and is therefore sufficient to ensure at least 99.9% inactivation of *Giardia lamblia* cysts and 99.99% inactivation of viruses in accordance with the SWTR.

2. The Long Term 2 Enhanced Surface Water Treatment (LT2) Rule, published by the USEPA on January 5, 2006 to reduce illness linked with *Cryptosporidium* and other pathogenic organisms in drinking water, applies to MWRA as the wholesale system. MWRA complied with initial LT2 Rule requirements by conducting monthly *Cryptosporidium* monitoring between April 2004 and April 2006, and a second round of monitoring between April 2015 and April 2017. Based on the monitoring results under the LT2 Rule, Quabbin Reservoir source water must achieve at least 99% (2-log) inactivation of *Cryptosporidium*. While not required, MWRA has monitored Quabbin Reservoir source water for *Cryptosporidium* and *Giardia lamblia* cysts on a biweekly basis since January 2004.

   The LT2 Rule required that all unfiltered surface waters provide a second form of 99% (2-log) *Cryptosporidium* inactivation, and MWRA complied by adding ultraviolet (UV) disinfection in October 2014. The UV disinfection system at the WABWTF consists of three 24-inch diameter reactors (Sentinel™, manufactured by the Calgon Corporation). The UV reactors must operate within validated conditions for the required UV does to treat at least 95% of the water delivered to the public to comply with the 99% (2-log) inactivation requirement. According to MWRA's monthly UV reporting forms submitted to MassDEP, the UV reactors at WABWTF have been operating within the validated limits as required, with less than 5% of the water considered "Off Specification".

3. The WABWTF is staffed daily with MWRA certified operators during the normal 8-hour work shift. Off-site monitoring of the WABWTF is maintained on a full-time basis during the other 16 hours of the day by MWRA certified operators at JJCWTP. In an emergency, an MWRA certified operator can arrive on-site within 60 minutes or less. The WABWTF has an uninterrupted power supply (UPS) system that ensures that critical equipment remains operational. Multi-parameter, in-line instrumentation devices are used to monitor water quality parameters. MWRA routinely documents maintenance of those devices and other equipment, such as chemical feed pumps.

4. MWRA's Ludlow Monitoring Station (LMS) is considered the point-of-entry to the distribution system for the entire CVA system.

C. WATERSHED PROTECTION/CONTROL PROGRAM

As previously mentioned, the Watershed Protection/Control Program and the disinfection process are interrelated protective barriers to contamination that, when implemented cooperatively, assure a high degree of water quality control. Elements of that program are discussed below along with action items that DCR shall complete by stipulated deadlines, some of which are to be addressed in a written annual update/progress report due to MassDEP by **August 31st of each year**. Quarterly and annual reports summarizing accomplishments within the Quabbin Reservoir and Ware River watersheds shall also be submitted to MassDEP by **August 31st of each year**.

1. Sources and Watersheds

a. Quabbin Reservoir has a surface area of approximately 25,000 acres, or 38 square miles, at full capacity. Mean and maximum depths are 45 and 141 feet, respectively. With an overflow elevation of 530 feet, relative to Boston City Base, Quabbin Reservoir's storage capacity is 412 billion gallons.

During 2022, the Quabbin Reservoir elevation ranged from a high of 530.03 feet (May 1, 100.1% capacity) to a low of 522.65 feet (December 1, 86.5% capacity). The Massachusetts Office of Energy and Environmental Affairs declared a Level 3 - Critical Drought for the Central Region on July 21, 2022 and for the Connecticut River Valley Region on August 9, 2022. The most recent drought status, as of January 13, 2023, was Level 0 – Normal for the Central Region and Connecticut River Valley Region.

b. The Ware River begins as two branches, the East Branch and West Branch Ware River, that converge in Hubbardston. The Ware River is used to augment Quabbin Reservoir at Shaft 11A during a limited period from October 15 to June 15, but at no time when river flow is less than 85 MGD at the Shaft 8 diversion works in the Town of Barre. Additionally, the Ware River water temperature must be 10 degrees Celsius or lower for 30 days prior to the diversion to render invasives nonviable. MWRA and DCR coordinate on diversions. No water diversions occurred in 2022.

c. Including reservoir and land areas, the Quabbin Reservoir watershed and Ware River watershed encompasses 187 square miles and 96 square miles, respectively. General characteristics of watershed lands are presented in Table 3.

Table 3 – Watershed Land Characteristics*

Watershed	Land Area		% Forested	% Protected Land		
	(acres)	(sq. mi)		DCR*	Others	Total
Quabbin Reservoir	95,364	149	88	62	15	77
Ware River	61,671	96	75	41	13	54

Note: *Includes fee simple purchases and Watershed Preservation Restrictions.

d. Physical characteristics of the watersheds, regulatory mandates, and management strategies for watershed land are detailed in DCR's plans. The system-wide 2017 Land Management Plan and Watershed Protection Plan (WPP) for FY19-FY23 were printed in

2018. DCR is currently working on the FY24-FY28 WPP, which is anticipated for implementation on July 1, 2023.

e. Acquisition of watershed lands continued in 2022, through fee simple purchase and Watershed Preservation Restrictions (WPRs), which are similar to a conservation restriction where landowners sell or donate certain property development rights to DCR under a legal agreement. Four land acquisitions were recorded during FY22, two at the Quabbin Reservoir Watershed and two at the Ware River Watershed. The land acquisitions included a 157-acre WPR in Wendell, a 40-acre WPR donation in Barre, and 8.7-acre fee donation in Hubbardston, and a 12.4-acre WPR in Petersham.

f. DCR typically monitors WPRs on a 3-year cycle after the initial baseline survey, except for annual monitoring at Forest Legacy Program acquisitions. Monitoring was completed at 73 WPRs in the Quabbin Reservoir and Ware River watersheds during 2022. DCR has a working group to address enforcement cases.

g. The *Watershed Currents* newsletter for WPR landowners had not been published since Winter 2019. During FY22, DCR created a new WPR webpage intended for both WPR landowners and the general public. DCR also created a biannual electronic newsletter, *Watershed Moments*, which was first published in Fall 2022.

MassDEP requires completion of the following Sources and Watersheds tasks:

i. **By August 31, 2023,** DCR shall submit to MassDEP a written update/progress report on its land acquisition program that identifies FY23 acquisitions by watershed (number and acreage), corresponding land protection percentages for each watershed, and enforcement cases, if any.

2. Security and Public Access Management

a. Public access onto DCR-owned watershed land is controlled and managed for source protection purposes, safety, and security through DCR's policies and Watershed Protection Regulations at 313 CMR 11.00 (formerly 350 CMR 11.00). Those documents list activities in each watershed that are prohibited, allowed with general restrictions, and allowed with specific restrictions. Messages concerning allowed and restricted activities are also conveyed though signs, kiosks, and physical barriers.

b. Adequate implementation of watershed public access plans is key to retaining an avoidance of filtration. Plans are updated every 10 years, or earlier if needed, through a public stakeholder process. The Quabbin Reservoir Watershed System Public Access Management Plan Update was finalized in June 2018. DCR prepared a draft 2022 Ware River Public Access Management Plan, which was submitted to MassDEP on August 31, 2022. DCR anticipates finalization of the Ware River Public Access Management Plan in 2023.

c. DCR employs Watershed Rangers who are responsible for monitoring and enforcing public access at Quabbin Reservoir and Ware River watersheds. In April 2022, DCR learned through the Executive Office of Environmental Affairs (EEA) General Counsel's Office that

Watershed Rangers were no longer authorized to issue citations to individuals who were violating DCR regulations. The Watershed Rangers coordinate with the Massachusetts State Police, Massachusetts Environmental Police, and other enforcement personnel as needed. DCR DWSP staff also report and document public access observations when completing their own assignments in the watersheds. Surveillance cameras, all-terrain vehicles, snowmobiles, and boats are used to assist with patrols and monitoring.

d. During FY22, the Watershed Rangers reported 230 rule infractions in the Quabbin Reservoir watershed out of 26,739 visitor contacts and 856 rule infractions in the Ware River watershed out of 11,530 visitor contacts. Table 4 presents the most reported infractions of FY22.

Table 4 – Most Reported Infractions of FY22

Infraction Category	Quabbin Reservoir Watershed	Ware River Watershed	Total
Wading/swimming	15	276	291
Motorized vehicles	3	158	161
Animals	93	54	147
Obey lawful directions	60	21	81
Breach of peace	8	71	79

e. A Massachusetts State Police Marine Unit is stationed at the Quabbin Administration Complex. The Marine Unit enforces state laws and provides infrastructure security while patrolling Quabbin Reservoir.

f. DCR maintains websites for the Quabbin Reservoir and Ware River watersheds with public information specific to each location. Both websites indicate that recreational activities within the watersheds are regulated to protect the drinking water supply and lists restricted activities. An interactive Quabbin Reservoir Access Map shows the watershed boundary, gates, roads, trails, parking areas, fishing and boating areas, DCR-owned land, restricted areas, and other visitor points of interest.

g. DCR utilizes a variety of strategies to prevent and discourage the public from creating and using unauthorized trails. Trails are routinely monitored and assessed using mobile devices, and trail signs are replaced as needed. Rocks, brush, and/or trees are applied to unauthorized trails to discourage use. DCR's ArcGIS Trail Inventory is an interactive data viewer showing DCR-owned lands, the classification and location of trails and roads, and points of interest. Metadata includes specific traits about the trail, illegal uses identified, and supporting documentation.

MassDEP requires completion of the following Security and Public Access Management tasks:

i. Public access to watershed lands shall remain restricted to those areas and activities which DCR can adequately manage.

ii. Public Water Systems conduct regular and thorough inspections of the Surface Water Supply Protection Zones A, B and C to determine and enforce compliance

with 310 CMR 22.20B and prompt enforcement actions shall be taken against persons violating 310 CMR 22.20B. All such enforcement actions shall be reported in MWRA's Annual Statistical Report (ASR) along with results of inspections made during the preceding calendar year in accordance with 310 CMR 22.20B(7). In the "Source Protection-Watershed" section of the ASR, "yes" answers shall be given to Question #4 when inspections identify violations of 310 CMR 22.20B or local land use controls adopted for compliance with 310 CMR 22.20C.

iii. DCR shall provide MassDEP with a copy of the finalized Ware River Public Access Management Plan upon completion.

iv. By **August 31, 2023**, DCR shall submit to MassDEP the list of FY23 infractions and responses. Incidents involving violations of the Massachusetts Drinking Water Regulations at 310 CMR 22.20B shall include additional information such as dates, number of offenders, watershed, type of surface water (if applicable) and site location (expressed as an identifier such as "Site A", if desired).

v. By **August 31, 2023**, DCR shall submit an annual update/progress report describing security and public access management efforts since the 2022 watershed inspection, issues (if any), and its proposed strategy for the upcoming year.

3. Wildlife

DCR has developed and implemented programs for various wildlife species, as discussed below:

a. Bird Harassment Program

A harassment program was initiated in 1993 to deter gulls and other birds from roosting on Quabbin Reservoir in relative proximity to the Winsor Dam Intake. The Bird Harassment Program (formerly known as the Gull Harassment Program), operates year-round, with an active harassment period between October and mid-April. During the active harassment period, a 3-mile "Bird Free Zone" (formerly "Gull Free Zone") in the southwestern portion of the Quabbin Reservoir is patrolled daily by boat, weather permitting. DCR works with the Massachusetts Department of Transportation (DOT) Aeronautics Division Drone Program to survey gulls at Quabbin Reservoir. The Bird Harassment Program utilizes ArcGIS applications Collector and Survey123 for daily reporting. Results of the Bird Harassment Program are summarized in an annual report. During the 2021-2022 gull roosting season, there were 27 nights of gull observations and roost counts utilizing drones. The counts ranged from 0 to 1,568 gulls.

b. Geese

The Canada Goose Population Control Program was initiated in 1996 to address the problem of resident geese at Quabbin Reservoir and Wachusett Reservoir. The goose population at Quabbin Reservoir is managed by installing deterrents (e.g., stone riprap, barrier fencing, and coyote decoys), conducting nest surveys of the islands within the Goose Population Control Zone, and treating eggs if discovered. Results of the goose control program are summarized in an annual report.

During April 2022, DCR surveyed all the Quabbin Reservoir islands within the Goose Population Control Zone and Pottapaug Pond. Due to time constraints and limited staffing, the northern areas of the reservoir were not surveyed. The usual Gate 8 Island pair of geese attempted to nest and 6 eggs were treated to prevent hatching. No other nests were found within the control zone. Pottapaug Pond had 3 nests with a total of 11 eggs and all eggs were treated.

c. Loons

Identified as a species of concern in Massachusetts, DCR works with MassWildlife and the Biodiversity Research Institute (BRI) to monitor loon activity at the Quabbin Reservoir, O'Loughlin Pond in the Town of New Salem, and Pattapaug Pond in the Town of Hardwick. Nesting platforms or rafts are seasonally stationed on Quabbin Reservoir north of the Quabbin Aqueduct Intake at Shaft 12. DCR loon management efforts from April through October include raft maintenance and deployment, nesting observations, collecting leg band returns to identify banded individuals, and night capture efforts to band loons in collaboration with BRI.

During 2022, 11 nesting platforms were deployed at Quabbin Reservoir and four were used for nesting. A total of 19 territorial pairs were observed in summer 2022, of which 11 nested pairs resulted in four chicks hatched and three fledged. Abandoned eggs (4) and blood (2) from captured loons were sent to a laboratory for heavy metal analyses. Although the 2022 results were not available, the 2021 mercury levels in feather samples remained within the range for the Northeast and lower than levels found in samples outside of DWSP water bodies. The eggs sampled contained an average mercury concentration lower than the long-term average for eggs collected at Quabbin Reservoir. Lead concentrations in blood samples were below the clinical threshold.

d. Beaver and Muskrat

DCR concentrates on the aquatic wildlife pathogen control zones to manage beaver and muskrat. Measures are taken outside those control zones if necessary, such as when water supply infrastructure is damaged or threatened. Mitigation measures have been installed at 19 sites within the Quabbin Reservoir watershed and 18 sites within the Ware River watershed. If mitigation measures fail to correct a problem, DCR follows a set of criteria before employing lethal removal.

During FY222, 10 beaver (4 males, 4 females, and 2 unknown) were trapped at Quabbin Reservoir and six of the beaver removed were in the Control Zone. No beaver were removed from the Ware River watershed. Six fecal specimens were tested for *Cryptosporidium* and *Giardia* with five showing negative results for both and one specimen showing a very low presence of *Giardia*.

e. Deer

DCR allowed a limited and controlled deer hunting program at Quabbin Reservoir during the 2-week shotgun season from November 29 to December 11, 2021. Interactive maps of Quabbin Reservoir huntable areas on watershed lands within and outside controlled

hunt zones are available online. Deer harvest data is reported by hunters to DCR and/or MassWildlife, and confirmed harvests were cross-referenced by DCR across both databases. In total at the Hardwick, New Salem and Pelham zones, there were 37 deer confirmed harvested. DCR operated the 2022 deer hunting program at Quabbin Reservoir from November 28 to December 10, 2022.

In the Ware River watershed, DCR allows hunting and trapping within DCR water supply lands excluding the restricted area of the Ware River Intake. Approximately 23,000 acres are open to the public and a DCR permit is not required to hunt or trap. The Ware River Watershed Public Access Management Plan, in the process of being updated, includes a proposal to require hunters to have a permit to access this property in the future.

During 2022, pellet count surveys to estimate deer and moose densities were conducted in Quabbin Park, New Salem and Hardwick. The Quabbin Park pellet count study conducted February 22-24, 2022, when there was a period of no snow on the ground, calculated a deer density of 74.1 deer/mi^2. A deer density of 20 deer/mi^2 or less is recommended for a diverse, regenerating forest. DCR recommends controlled deer hunting at Quabbin Park to restore balance to the forests in this area and Commissioner approval is pending.

f. Other Wildlife

Two animal burrow holes at the Winsor Dam were treated during FY22.

MassDEP requires completion of the following Wildlife tasks:

i. **By the last day of each month that the activity occurred**, DCR shall keep MassDEP informed of proposed expansions to wildlife programs and explain what measures will be taken for source protection, monitoring, and controlling public access. Similarly, DCR shall inform MassDEP of any planned program reduction or elimination, providing justification for such decisions.

ii. By **August 31, 2023**, DCR shall submit to MassDEP the latest wildlife management and monitoring reports.

iii. By **August 31, 2023**, DCR shall submit to MassDEP an annual update/progress report that summarizes topics not covered by routine wildlife management and monitoring reports.

4. <u>Forestry Management</u>

a. DCR generates a list of forestry lot proposals for both watersheds in the fall or winter for the upcoming fiscal year. An interactive map with detailed information on these forestry projects is available on a DCR Watershed Forestry Projects website. After lots are reviewed by DCR in the following spring and the public review process is completed, cutting plans are prepared for DCR Bureau of Forestry Service review. A spill response plan is developed for each timber harvest project and loggers are required to store spill

response supplies on their heavy equipment. Nine spill response plans were prepared in FY22.

b. During FY22, DCR Forestry staff made 11 timber sales, of which 2 were started and completed, 2 were started and not completed, and 7 were not started. Ash mortality continues to be a concern due to the emerald ash borer (*Agrilus planipennis*).

c. At timber harvest sites with stream crossings, short-term water quality monitoring is conducted if streams have sufficient flow. Water samples are collected for turbidity at upstream and downstream locations relative to the perennial stream crossings before, during, and after (monthly for one year) the timber harvest. No stream water quality issues related to forestry projects were detected in FY22.

d. DCR conducts long-term monitoring for the potential impacts of timer harvesting on water quality at two surface water sites in the Quabbin Reservoir Watershed. Water quality data is collected at a control site (Middle Brank Dickey Brook) and treatment site (East Branch Underhill Brook) before and after timber operations and assessed for changes that can be attributed to forest management.

MassDEP requires completion of the following Forestry Management tasks:

i. By **August 31, 2023**, DCR shall submit to MassDEP an annual update/progress report of the FY23 forestry projects. The submittal shall describe the harvest focus and status of the FY23 forestry projects and describe any stream water quality issues detected.

5. <u>Invasive Species</u>

a. The annual macrophyte survey of Quabbin Reservoir was conducted by DCR and MWRA consultant TRC (formerly ESS Group) during August 10-17, 2022. No new aquatic invasive species (AIS) were discovered. Portions of Quabbin Reservoir and select ponds within the Quabbin Reservoir and Ware River watersheds are periodically assessed for the presence of AIS. If an AIS is found, DCR will notify MWRA and coordinate for its removal, utilizing the best methods for that species. DCR collaborates with existing lake or pond associations and with the DCR Lake & Ponds Program to determine appropriate response actions.

b. At Quabbin Reservoir, DCR conducted vertical net tows monthly at the core water quality monitoring sites and oblique tows quarterly near the Boat Launch Areas to screen for invasive zooplankton. No invasive zooplankton were found in the reservoir during FY22.

c. To prevent the spread of AIS, DCR operates the Quabbin Boat Decontamination Program (since 2009) and the self-certification program at the Ware River Watershed (since 2010). Private boats launched on Quabbin Reservoir require an intact Quabbin Boat Seal between the boat and trailer, demonstrating proper decontamination to minimize the threat of AIS. Decontamination is either accomplished by scheduling an appointment with DCR for either a high temperature water wash or cold weather quarantine. The boat seal data system uses ArcGIS Online and electronic tablets and continues to be maintained and

improved, including a dashboard to identify how many boaters are on the water in real-time. A total of 160 boats were decontaminated during 17 events between April and September 2022. Five dates were set for cold weather quarantine in November and December 2022. At the Ware River watershed, boaters at Asnacomet Pond and Long Pond are required to complete a self-certification form prior to launching to confirm that their boat 1) has not been launched in any of the listed water bodies likely affected by invasive species within the last 30 days or 2) has been decontaminated.

d. DCR is working on a division-wide AIS assessment and management plan for the Quabbin Reservoir and Ware River watersheds during FY23.

e. Treatment of invasive plants, specifically buckthorn, bittersweet, and Japanese knotweed, was conducted at various locations around the watersheds during FY22, including Quabbin Park Cemetery, below Goodnough Dike, and various roads in Pelham, Shutesbury, and New Salem.

f. During FY22, DCR staff met with personnel from the Office of Dam Safety (ODS) and GEI Consulting to review the condition of upstream riprapped embankments for Winsor Dam and Goodnough Dike with special concern for invasive vines growing within the riprap. GEI Consulting will perform a study to outline options for controlling vegetation on the upstream side of these dams. Photograph 3 shows bittersweet growing within the riprap of Winsor Dam.

MassDEP requires completion of the following Invasive Species tasks:

i. By **August 31, 2023**, DCR shall submit to MassDEP an annual update/progress report that identifies AIS monitoring results and any new actions taken since the 2022 watershed inspection. The submittal shall also identify the AIS monitoring and response action strategy for the upcoming year.

ii. DCR shall provide MassDEP with a copy of the division-wide AIS assessment and management plan upon completion.

6. <u>Environmental Quality Assessments</u>

a. DCR conducts annual Environmental Quality Assessments (EQA) to identify existing and potential water quality threats through field inspections, water quality sampling and analysis (see Section II.C.7. below), and records review. Each watershed is divided into four “Sanitary Districts” that are evaluated on a rotating schedule on a fiscal year basis (July 1 through June 30). Each sanitary district is comprehensively evaluated by DWSP once every five years. Potential contaminant sources of interest include construction activities, wastewater disposal, roadways and railways, commercial, industrial, and residential properties, agriculture, wildlife, public access, and timber harvesting. During FY22, EQAs were conducted of the Quabbin Northwest Sanitary District and the Coldbrook and Longmeadow Sanitary District.

b. The Quabbin Northwest Sanitary District consists of 23,160 acres of land, predominantly forested, and three subdistricts: West Swift, Middle Swift, and Hop Brook. The EQA

revealed minimal to no changes in the pollutant assessment categories at each of the subdistricts. At the West Swift subdistrict, the EQA recommendations are to monitor erosion on Cooleyville Road and to establish contact with the Town of New Salem Highway Department regarding the road. No new recommendations were made for the Middle Swift and Hop Brook subdistricts. The Quabbin Northwest Sanitary District EQA report was finalized February 2022.

c. The Coldbrook and Longmeadow Sanitary District consists of 17,033 acres of land, predominantly forested and wetlands, and five subdistricts: Barre Falls, Demond Pond, Mill Brook, Rutland State Park, and Ware River Intake. As with previous EQA reports, the identified potential threats to water quality were public access issues and hazardous materials. Public access issues include unauthorized use of off-road vehicles, dumping, camping/campfires, and trails near tributaries and ponds. Hazardous materials include spills and the threat of impacts from landfills, junkyards, former hazardous waste sites, and commercial businesses. The Coldbrook and Longmeadow Sanitary District EQA report was finalized in June 2022.

MassDEP requires completion of the following Environmental Quality Assessments tasks:

i. By **August 31, 2023**, DCR shall submit to MassDEP the most recent EQA reports.

7. Water Quality Monitoring

DCR manages a comprehensive water quality monitoring program for the Quabbin Reservoir and Ware River watersheds. Monitoring efforts are reviewed and updated annually to ensure that DCR DWSP programs remain current, appropriate, and informative for the WPP goals. A summary of the water quality monitoring methods and results are presented in an annual report. Some Quabbin Reservoir data are also included in monthly SWTR forms that MWRA submits to MassDEP. Water quality samples are analyzed by MWRA laboratories.

a. Quabbin Reservoir

The three core monitoring locations at Quabbin Reservoir are Site 202 (near Winsor Dam), Site 206 (near Shaft 12 and the Quabbin Aqueduct), and Den Hill (north of Den Hill). On a monthly basis from May to December, water quality samples are collected from the core sites at three depths for analyses of nutrients, UV254, total organic carbon, alkalinity, sodium, chloride, calcium, and bacteria. Water column profiles of various physiochemical parameters (temperature, pH, dissolved oxygen, specific conductance, chlorophyll *a*, and phycocyanin) are measured in conjunction with phytoplankton sampling.

MWRA deployed a monitoring buoy near DWSP Site 202 in October 2020. The buoy houses a multiparameter instrument that collects continuous data for several parameters (e.g., temperature, specific conductance, chlorophyll *a*) at 1- to 3-meter depth and additional profiles throughout the water column at 6-hour intervals. Similar buoys have been deployed by MWRA at Wachusett Reservoir. MWRA and DCR review the data to monitor for source water quality and plan response actions accordingly.

b. Phytoplankton

DCR monitors several phytoplankton taxa in Quabbin Reservoir to identify the source of potential undesirable taste and odor characteristics or cyanotoxin impacts to the drinking water supply. At Site 202, phytoplankton samples are collected biweekly from May to September and monthly from October to April. At Site 206, samples are collected monthly year-round. Samples for phytoplankton enumeration are collected from 2-3 depths depending on the location: from 1- to 5-meter depth corresponding with the epilimnion, at the chlorophyll *a* maximum reading with simultaneous high dissolved oxygen (typically with the metalimnion), and near the intakes. Phytoplankton monitoring increases to weekly at Sites 202 or 206 when early monitoring triggers are reached.

An aggregation of *Chrysosphaerella*, a genus of freshwater golden algae, occurred in Quabbin Reservoir during July and August of 2022. The *Chrysosphaerella* aggregation was observed at Site 202 from July 6 to August 31 (9 weeks) and at Site 206 from July 13 to August 24 (7 weeks). *Chrysosphaerella* densities were observed at Site 202 above the treatment consideration level of 500 Areal Standard Units per milliliter (ASU/ml) at four sampling dates. MWRA did not receive any taste or odor complaints during this aggregation event. Aside from *Chrysosphaerella* (mainly at Site 202) and *Synura* (mainly at Site 206), all other taxa of concern remained below early monitoring triggers in 2022.

MWRA obtained a USEPA National Pollutant Discharge Elimination System (NPDES) permit for the application (if necessary) of copper sulfate as a pesticide to control algal blooms in Quabbin Reservoir.

c. Tributaries

DCR conducts biweekly monitoring of tributaries in the Quabbin Reservoir and Ware River watersheds for bacteria, turbidity, temperature, pH, dissolved oxygen, and specific conductance. Core sites are designated for long-term monitoring and EQA sites are designated for short-term monitoring (1 year period every 4 years). The Quabbin Reservoir watershed has seven Core sites and up to seven EQA sites. The Ware River watershed has six Core sites and up to five EQA sites. Water quality monitoring results are compared to regulatory levels, thresholds for aquatic life protection, recreation contact, and the USEPA Ecoregional Nutrient Criteria for Rivers and Streams, when applicable.

The U.S. Geological Survey records daily streamflow data at six tributaries in the Quabbin Reservoir and Ware River watersheds. DCR maintains staff gauges at five tributary locations in the Quabbin Reservoir Watershed. The National Ecological Observatory Network generates daily streamflow data at Lower Hop Brook in the Quabbin Reservoir Watershed. The MassWildlife Division of Ecological Restoration maintains a stream gauge at Parkers Brook in the Ware River watershed. DCR recently developed a standard operating procedure for the DCR Quabbin Hydrologic Monitoring Program.

In January 2022, Mayfly stations were installed at Gates Brook and West Branch Swift River in the Quabbin Reservoir Watershed as part of a 2-year pilot study. The Mayfly stations are solar powered and cellularly transmit real-time specific conductance, water depth, and temperature data to an online data portal.

d. Meteorological Data

Daily precipitation and air temperature measurements are recorded at three locations within the Quabbin Reservoir and Ware River watersheds. Snow depth and snow water equivalent measurements are recorded weekly during periods of snow cover at six locations within the Quabbin Reservoir Watershed.

e. Water Quality Database

DCR has collaborated with the Department of Civil and Environmental Engineering at the University of Massachusetts Amherst since 2016 to create a system for organizing and managing the water quality data collected from the MWRA-DCR watershed system. Reservoir, tributary, and meteorological data collected from the Quabbin Reservoir and Ware River watersheds are stored in the centralized DCR-Quabbin Water Quality Database. In 2021, DWSP migrated the water quality database across platforms from Microsoft Access to SQL Server, which allows for cloud-based storage and access. Field data can be uploaded instantly into the database using the Water System Data Import Tool (WIT). Data queries, visualization and analysis can occur through the Water System Data Analysis and Visualization Environment (WAVE) web-browser based application. Work related to DWSP data management and integration of historical records prior to 2010 remains ongoing.

MassDEP requires completion of the following Water Quality Monitoring tasks:

i. By **August 31, 2023,** MassDEP requires submittal of the next annual water quality monitoring report.

ii. MWRA shall notify MassDEP prior to any application of copper sulfate to Quabbin Reservoir, per 310 CMR 22.20B(8), using the Notification of Copper Algaecide Application Form.

8. Education

a. DCR maintains and regularly updates the websites for the Quabbin Reservoir and Ware River Watershed. Both DCR and MWRA maintain online resources for schools and educational groups to promote learning about various water and watershed issues. Information kiosks are installed at various public access locations within both watersheds. DCR continues to offer educational programs and technical assistance to watershed communities on zoning matters. Public educational materials have been developed on topics such as AIS, horse-keeping, and the Watershed Protection Act.

b. During 2022, the Quabbin Reservoir Visitor Center was open to the public 6 days per week and received approximately 4,600 visitors and 630 phone calls.

c. DCR Interpretive Services coordinated with the Sign Shop and the Watershed Rangers to place trailhead signs and trail markers to improve the Quabbin Park trail system and Ware River watershed.

9. Emergency Response

    a. Emergency response training, in conjunction with MWRA, is provided to DCR staff, local emergency officials, and loggers working on DCR property. Emergency response sessions are provided by Technical Instruction and Guidance for Emergency Response (TIGER). Unannounced drills and night-time training have been incorporated into the training program.

    b. DCR vehicles are equipped with spill kits and additional emergency response supplies are stored within trailers located near the Quabbin Administration Building.

10. Watershed Protection Act

    a. The Watershed Protection Act (WsPA) regulates land uses and activities in critical areas of the watersheds. DCR reviews WsPA applications, provides technical assistance to watershed communities where the regulations are applicable, and participates in enforcement actions. DCR staff received and processed 28 cases in the Ware River watershed and 14 cases in the Quabbin Reservoir watershed.

11. Maintenance and Improvements

    a. DCR finalized its policy regarding forestry in-kind services during FY22 and will incorporate language related to road improvements through forestry timber sales into the draft Road Management Plan and finalize this plan.

    b. The DCR road working group, comprised of staff from Civil Engineering, Forestry, Watershed Maintenance, and Management, met several times in 2022 to prioritize, coordinate, and plan road work through the Quabbin and Ware River watersheds. The road working group plans to meet at least quarterly to discuss anticipated road usage (e.g., forestry lot requirements), unexpected repairs (e.g., storm damage), and planned maintenance/repair projects (e.g., Gate 40).

    c. During FY22, road work performed by DWSP staff included clearing several miles of roadside brush, cleaning drains, and filling potholes in Quabbin Park. DWSP staff conducted mowing, brush cutting, and other maintenance operations on dams and dikes. Site visits were conducted for dams on Brigham Pond, Asnacomet Pond, Demond Pond, and Peppers Mill Pond.

    d. MWRA has completed several projects since 2019 to address water leakage at the Winsor Dam Intake Building, including the installation of a new membrane roof, the removal and resetting of the roof parapet capstones, and the application of new caulking and sealing a former chimney vent with masonry. MWRA's Engineering and Construction Department performed a detailed inspection to assess the leakage and found that the probable cause is rain penetration through the gaps in the masonry joints near the interior floor level. In December 2022, MWRA awarded a contract for mortar removal and repointing of exterior masonry of the Winsor Dam Intake building with work to begin in 2023.

e. In 2022, DCR hired HKT architects to work on a revised restoration plan for the DCR New Salem field office. A preliminary building design and site plan was recently completed and reviewed by DCR. The new building design is a single rectangular structure that contains several garage bays and a modest size office. HKT will develop a cost estimate for the proposed building, and the plans and estimate will be presented to MWRA for financial approval. If approved, DCR will move forward with developing construction plans and bidding out the project. The bidding and construction process will likely take several years.

f. In amended Administrative Consent Order No. 00014044, executed on November 7, 2022, DCR and MassDEP agreed that the new groundwater source for the Quabbin Administration Complex, Source ID #1024011-02G, shall be online and operational by April 30, 2023. Supply chain problems for materials and a delay in the electrical utility power feed installation led to DCR requesting an extension of the October 2, 2022 compliance date. The new source is approved for 21,600 gallons per day, which corresponds to a Zone I radius of 300 feet and Interim Wellhead Protection Area (IWPA) radius of 880 feet.

MassDEP requires completion of the following Maintenance and Improvement tasks:

i. DCR shall provide MassDEP with a copy of the finalized Road Management Plan upon completion.

ii. Watershed management includes road maintenance and culvert replacement, some of which may require local, state and federal regulations. DCR shall notify MassDEP of projects involving wetlands and/or Water Quality Certification.

12. Staffing

a. MWRA and DCR are required to maintain sufficient technical, managerial, and financial resources under its Safe Drinking Water Act Capacity Program. Maintaining adequate staffing levels is relevant to fulfilling the conditions of MWRA's filtration waiver under the federal Safe Drinking Water Act.

b. DCR provided MassDEP with staffing updates for the Quabbin/Ware River region on June 27, 2022 and September 30, 2022. DCR added a new Land Acquisitions Coordinator in 2022. The Quabbin Aquatic Biologist resigned in April 2022, and Quabbin and Wachusett staff collaborated to complete phytoplankton monitoring and EQA work. DCR hired two Aquatic Biologists that started in late 2022.

MassDEP requires completion of the following Staffing tasks:

i. 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.

ii. DCR shall provide MassDEP with a written staffing update by **July 1, 2023** and **October 1, 2023**, specifying the number of vacancies in watershed programs, the status of filling them, and how watershed programs are impacted.

D. DISEASE OUTBREAK

During 2022, no waterborne disease outbreaks, as defined in 310 CMR 22.00, occurred at the MWRA PWS or any of the CVA consecutive PWS.

E. SYSTEM BACTERIA

The RTCR requires all PWS to collect total coliform (TC) bacteria samples at sites representative of water throughout the distribution system, at the entry point to the distribution system, and at storage facilities. Routine and repeat sample sites and their sampling frequency are included in the PWS-specific Coliform Bacteria Sampling Plan.

The current Coliform Bacteria Sampling Plan for the CVA section of the MWRA PWS was finalized in October 2020. MWRA collects four samples per month from a tap for the two Nash Hill storage tanks and daily samples (28-31 per month) from the point-of-entry tap at the LMS for TC bacteria analyses. Additionally, MWRA collects one sample per month from the raw water tap at the WABWTF for TC bacteria analyses. This raw water sampling requirement under the RTCR is different and independent of the fecal coliform source sampling requirement under the SWTR for unfiltered systems.

At the MWRA CVA, a Level 1 Assessment, required under 310 CMR 22.05(4), was triggered on July 20, 2022 when four routine bacteria samples collected at LMS during July 2022 tested positive for TC bacteria (negative for *E. coli* bacteria). No downstream repeat samples were present for TC or *E. coli* bacteria. MassDEP received the completed Coliform Bacteria Level 1 Assessment form on August 10, 2022. The MWRA performed the following corrective actions: removed a gooseneck in the plumbing at LMS, which was considered a potential source of stagnant water close to the sample tap, conducted a sanitary survey of the LMS building, and implemented a procedure to routinely flush the pipe serving the sample tap.

The Wilbraham PWS had one routine purchased water sample and one routine distribution system sample test positive for TC bacteria (negative for *E. coli* bacteria) in August 2022. The SHFD Number 1 PWS had one routine bacteria sample test positive for TC bacteria (negative for *E. coli* bacteria) in September 2022. In both instances, no repeat samples were present for TC or *E. coli* bacteria and these results did not trigger any assessment requirements under 310 CMR 22.05(4).

F. DISINFECTION BYPRODUCTS

Compliance with the Disinfection/Disinfectant Byproduct Rule (DBPR) (310 CMR 22.07E-F) is a condition for maintaining avoidance from filtration under the SWTR. Based on chlorine disinfection of the source water, the DBPR requires distribution system monitoring for total trihalomethanes (TTHM) and five haloacetic acids (HAA5) on a quarterly basis. TTHM and HAA5 form when chlorine is added to water containing naturally occurring organic matter.

The DBPR established Maximum Contaminant Levels (MCL) for TTHM and HAA5 as 0.080 mg/L and 0.060 mg/L, respectively. Compliance with the TTHM and HAA5 MCL is based on the Locational Running Annual Average (LRAA) of quarterly samples for each sampling site in the distribution system. The DBPR also established an Operational Evaluation Level (OEL), which is calculated using the TTHM and HAA5 compliance monitoring results, as an indicator of

operational performance. Should an OEL exceedance occur, MassDEP requires the submittal of an Operational Evaluation Report by a prescribed deadline.

The Chicopee and Wilbraham PWS did not have any OEL or MCL exceedances for TTHM or HAA5 during 2022. The SHFD Number 1 PWS had a TTHM OEL exceedance at one sample location during Quarter 3 of 2022.

III. CONCLUSION

Any PWS that utilizes a surface water source must implement a Watershed Control/Protection Program and meet all conditions as specified in 310 CMR 22.20A(2) to maintain a waiver from filtration requirements. The on-site inspection, the review of water quality parameters, and the review of the WPP revealed that the Watershed Protection/Control Program for the Quabbin Reservoir and Ware River watersheds is adequate to minimize and prevent the potential contamination of the source water. **MWRA PWS #6000000 continues to meet the criteria for avoiding filtration at the Quabbin Reservoir.**

IV. REQUIREMENTS AND RECOMMENDATIONS

Requirements and/or recommendations are listed in Table 5 on Pages 20 through 22. MassDEP has determined reasonable deadlines for taking the required actions. If any issue or requirement needs clarification or if a deadline extension(s) is preferred, DCR and/or MWRA shall contact MassDEP to discuss.

Table 5 - Required and/or Recommended Action Plan

Category	Topic/Issue	Required or Recommended Actions	Deadline
General	DCR prepares quarterly and annual reports to summarize accomplishments in land acquisition and preservation, wildlife management, water quality monitoring, etc.	DCR shall submit to MassDEP the FY23 quarterly and annual reports.	August 31, 2023*
Sources and Watersheds	DCR acquires watershed lands through fee simple purchases and WPRs.	DCR shall submit to MassDEP a written update on its land acquisition program that identifies FY23 acquisitions by watershed (number and acreage), corresponding land protection percentages and enforcement cases, if any.	August 31, 2023*
Security & Public Access Management	Public access onto DCR-owned watershed land is controlled and managed for source protection purposes, safety and security through DCR's policies and Watershed Protection Regulations at 313 CMR 11.00. Adequate implementation of watershed public access plans is key to retaining an avoidance of filtration.	Public access to watershed lands shall remain restricted to those areas and activities which DCR can adequately manage.	Ongoing
		DCR shall submit to MassDEP the finalized Ware River Public Access Management Plan.	Upon completion
		MassDEP requires submittal of an update/progress report that describes control efforts since the 2022 watershed inspection, issues (if any) and strategy for the upcoming year.	August 31, 2023*
	DCR tracks infractions on a fiscal year cycle and provides a summary table to MassDEP. A PWS has enforcement responsibilities to protect Zones A, B and C of its surface water source(s) pursuant to 310 CMR 22.20B.	DCR shall submit to MassDEP the list of FY23 infractions and responses (e.g., written warning). Incidents involving violations of the Massachusetts Drinking Water Regulations at 310 CMR 22.20B shall include additional information such as dates, number of offenders, watershed, type of surface water (if applicable) and site location (expressed using identifiers, if preferred).	August 31, 2023*
		Inspection summaries for all watersheds shall be submitted in MWRA's Annual Statistical Report in accordance with 310 CMR 22.20B(7) and "yes" answers shall be given to Question #4 in "Source Protection-Watershed" sections of the ASR when inspections identify violations of 310 CMR 22.20B or local land use controls adopted for compliance with 310 CMR 22.20C.	Ongoing
Wildlife	DCR has developed and implemented programs for various wildlife species (e.g., deer, geese, gull).	DCR shall keep MassDEP informed of proposed expansions to wildlife programs, such as expansion (e.g., deer harvest schedules and locations) and explain what measures will be taken for source protection, monitoring and controlling public access, etc. Similarly,	Last day of each month that activity occurred

Category	Topic/Issue	Required or Recommended Actions	Deadline
		DCR shall inform MassDEP of any planned program reduction or elimination, providing justification for such decision.	
		MassDEP requires submittal of the most recent wildlife reports.	August 31, 2023*
		DCR shall submit to MassDEP an update/progress report that summarizes wildlife topics not covered by routine management and monitoring reports.	August 31, 2023*
Forestry	DCR generates a list of forestry lot proposals for both watersheds in the fall or winter for the upcoming fiscal year. After lots are reviewed by DCR in the following spring and the public review process is completed, cutting plans are prepared for DCR Bureau of Forestry Service review. At sites with stream crossings, water quality monitoring is conducted if streams have ample water; monitoring is completed prior to, during and after (monthly for one year) the timber harvest.	MassDEP requires submittal of an annual update/progress report that identifies harvest focus (e.g., damage from pests or disease) and status (e.g., pending, partially complete, fully complete) of the FY23 forestry projects. The submittal shall describe any impacts that were encountered, if any (e.g., stream water quality, restoration work).	August 31, 2023*
Invasive Species	DCR has programs to monitor for aquatic invasive species (AIS).	MassDEP requires submittal of an annual update/progress report that identifies AIS monitoring results and any new actions taken since the 2022 watershed inspection. The submittal shall also identify the AIS monitoring and response action strategy for the upcoming year.	August 31, 2023*
	DCR is working on a division-wide AIS assessment and management plan for the Quabbin Reservoir and Ware River watersheds during FY23.	DCR shall provide MassDEP with a copy of the division-wide AIS assessment and management plan.	Upon completion
Environmental Quality Assessments	DCR conducts annual EQAs to identify existing and potential water quality threats.	DCR shall submit to MassDEP the most recent EQA reports.	August 31, 2023*
Water Quality Monitoring	DCR has a comprehensive water quality monitoring program, the results of which are summarized in an annual report.	MassDEP requires submittal of the next annual water quality report.	August 31, 2023*

Category	Topic/Issue	Required or Recommended Actions	Deadline
	MWRA obtained a USEPA NPDES permit for the application (if necessary) of copper sulfate as a pesticide to control algal blooms in Quabbin Reservoir.	MWRA shall notify MassDEP prior to any application of copper sulfate to Quabbin Reservoir using the Notification of Copper Algaecide Application Form.	Ongoing
Maintenance & Improvements	DCR finalized its policy regarding forestry in-kind services during FY22 and will incorporate language related to road improvements through forestry timber sales into the draft Road Management Plan and finalize this plan.	DCR shall provide a copy of the finalized Road Management Plan.	Upon completion
	Watershed management includes road maintenance and culvert replacement, some of which may require local, state and federal regulations.	DCR shall notify MassDEP WERO DWP of projects involving wetlands and/or Water Quality Certification.	Ongoing
Staffing	MWRA and DCR are required to maintain sufficient technical, managerial, and financial resources under its Safe Drinking Water Act Capacity Program. Vacancies can affect watershed protection programs.	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.	Ongoing
		DCR shall provide MassDEP with updates about the number of vacancies in watershed programs, the status of filling them, and how watershed programs are impacted.	July 1, 2023 October 1, 2023

*Required annually thereafter.

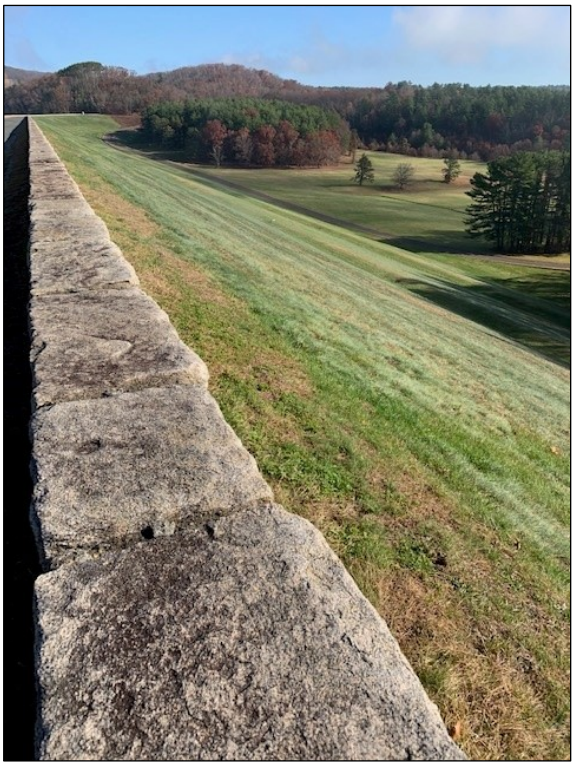
ATTACHMENT A
PHOTOGRAPHS

(November 4, 2022)

Photograph 1 – Puddled water inside north-facing wall of Winsor Intake Building.

Photograph 2 – Screen washing unit inside Winsor Intake Building.

Photograph 3 – Upstream slope of Winsor Dam at Quabbin Reservoir – note orange bittersweet berries.



Photograph 4 – Downstream slope of Winsor Dam at Quabbin Reservoir.

Photograph 5 – Monitoring buoy at Site 202 in Quabbin Reservoir.

Photograph 6 – Boat Cove Brook core tributary monitoring site.

Photograph 7 – Boat Cove at Quabbin Reservoir.

Photograph 8 – Upstream slope of Goodnough Dike at Quabbin Reservoir.