Massachusetts Department of ENVIRONMENTAL PROTECTION

2021 SURFACE WATER MONITORING OVERVIEW

(CN 552.0)

Introduction

The Massachusetts Department of Environmental Protection (MassDEP) Watershed Planning Program (WPP) plans and implements surface water quality monitoring in accordance with its ten-year Monitoring Strategy to support various Clean Water Act (CWA) objectives, including reporting on the condition of waters of the Commonwealth. This report provides a brief overview of the surface water quality monitoring performed in 2021.

The main programmatic objectives of the WPP surface water quality monitoring program are as follows:

- Collect chemical, physical, and biological data to assess the degree to which designated uses, such as aquatic life, primary and secondary contact recreation, fish consumption, and aesthetics, are supported in the waters of the Commonwealth;
- Collect data to support analysis and development of total maximum daily loads (TMDLs) and other plans to reduce pollutant loads to waters of the Commonwealth;
- Screen fish tissue in selected waterbodies for select contaminants (metals, PCBs and organochlorine pesticides) to support public health risk assessments;
- To the extent feasible, locate pollution sources and promote and facilitate timely correction;
- Identify and assess new and emerging water contaminants of concern;
- Collect water quality data to evaluate for trends in parameter concentrations and/or loads;
- Collect data to support the establishment or revision of surface water quality standards and policies; and
- Measure the effectiveness of water quality management projects or programs such as the effectiveness of implementing TMDLs or watershed-based plans.

Quality assurance is maintained for WPP's watershed monitoring program to ensure implementation of an effective and efficient sampling design, to meet programmatic goals and to provide data meeting specific data quality objectives. The U.S. Environmental Protection Agency (EPA) has approved a comprehensive Quality Assurance Program Plan (QAPP) that applies to the generation and use of surface water quality data by WPP for a five-year period (2020 – 2024). This

five-year *program* QAPP is annually supplemented by project-specific Sampling and Analysis Plans (SAPs), which provide detailed information regarding individual project organization, tasks, background, sampling design and non-direct measurements. More information pertaining to the WPP's Quality Management Program and the 2020 – 2024 QAPP can be found at https://www.mass.gov/guides/water-quality-monitoring-quality-management-program.

The WPP initiated a new seven-year rotating watershed schedule for targeted assessment monitoring in 2021. The use of the watershed as a fundamental planning unit for water quality management was a guiding principle in the development of the ten-year Monitoring Strategy, and it remains a goal to perform monitoring and assessment activities on a rotating watershed schedule. However, the need exists to maintain enough flexibility within that schedule to perform additional monitoring to meet other water management program needs. The WPP has adopted a sequential schedule that provides the opportunity for monitoring to be carried out in each watershed at least once every seven years yet allows for monitoring resources to be disproportionately applied in each watershed to fulfill specific water resource management objectives. The WPP prioritized the Concord, Merrimack, Nashua and Shawsheen watersheds for assessment monitoring in 2021. The targeted assessment monitoring and other monitoring activities performed in 2021 are summarized below.

Monitoring Project Descriptions

Targeted Assessment Monitoring (Concord, Merrimack, Nashua and Shawsheen Watersheds): The primary goal of the 2021 targeted assessment monitoring was to collect water quality and biological community data to determine whether waterbodies in the selected watersheds meet water quality standards and support the following designated beneficial uses: *Aquatic Life, Primary Contact Recreation, Secondary Contact Recreation, and Aesthetics*.The WPP developed a general approach for prioritizing waters for monitoring that focuses on strengthening the categorization of waters included in the Massachusetts CWA section 305(b)/303(d) Integrated Report (IR). Highest priority is given to gathering data and information on waterbodies currently listed as impaired that may not be and, therefore, could be delisted, as well as on waterbodies that are not currently identified as impaired but there is some evidence to suggest that they are impaired and should be listed as such.

A total of 96 sites were sampled in 2021. Monitoring consisted of the collection of water samples for physicochemical analyses; continuous measurements of selected variables using deployed sondes and data loggers, and macroinvertebrate and fish community assessments. Sampling site descriptions are presented in the Appendix, and more detail pertaining to each component of the monitoring program is presented below.

***Water Quality*:** Water samples were collected from each site monthly from May through September, field preserved as appropriate, and delivered to the Senator William X. Wall Experiment Station in Lawrence (WES) for nitrate-nitrite, ammonia, chloride, trace elements (Ca^+, Mg^+, and Na^+), dissolved hardness, and dissolved organic carbon analysis and a commercial laboratory for total nitrogen, and total phosphorus analysis. Samples for the analysis of *E. coli* bacteria were collected from each site during three of the water quality sampling events and on three additional occasions to obtain six bacteria samples within a 90-day window between June 1 and September 30 (Primary Contact Recreation Season). These samples were also transported to a commercial laboratory to comply with the prescribed holding time for bacteria samples. Field measurements of dissolved oxygen, temperature, pH and conductivity were taken during all but the "bacteria only" sampling events. Finally, sondes and

data loggers were deployed *in-situ* from May or June through September to obtain long-term, continuous temperature and dissolved oxygen data.

***Biological Monitoring*:** Biological community assessments, along with associated habitat evaluations, were performed to inform the *Aquatic Life Use* support status for CWA section 305(b) reporting requirements. The benthic macroinvertebrate community was sampled at 83 sites (see Appendix) once during the period July-September using standard operating procedures applicable to the available habitat (i.e., high-gradient versus low-gradient). Specimens were preserved in the field and transported to the DWM lab for further processing. Sample sorting and taxonomic identifications were performed at a contract laboratory.

Fish community and habitat analysis was carried out during the period August-October at 68 sites (see Appendix) while an additional six (6) sites had been assessed in 2020. Fish were collected within a 100-meter reach using backpack electro-fishing equipment and held in plastic buckets containing stream water. Fish were identified to species and a minimum of 25 individuals of each species were measured and weighed. Fish were then redistributed throughout the sampled reach.

Lake Monitoring in the Mystic River Watershed: In collaboration with the EPA, the WPP initiated a monitoring program in 2019 at three nutrient-impaired lakes in the Mystic River Watershed: Horn Pond (Woburn), Spy Pond (Arlington) and Wedge Pond (Winchester). The purpose of this monitoring is to provide a more recent assessment of the designated use support status (i.e., *Aquatic Life, Recreational,* and *Aesthetic* uses) of these ponds and to support the calibration of a Lake Loading Response Model (LLRM) as a step toward developing phosphorus TMDLs. The second round of sampling, scheduled for 2020, was postponed due to the Covid-19 pandemic, and the only work carried out in 2020 was a bathymetry survey of each pond. Water quality monitoring resumed in 2021. Each pond was sampled monthly from June through October. During each sampling event, a vertical profile (dissolved oxygen, temperature, pH and conductivity) and Secchi disk transparency were obtained at the lake “deep hole”, and samples were collected for the analysis of Total Phosphorus, Total Nitrogen, chlorophyll a, color and turbidity. Nutrient samples were analyzed at EPA’s regional laboratory in Chelmsford and the remaining analyses were performed at the WPP laboratory in Worcester. A third round of sampling is planned for 2022.

Monitoring the Effects on Water Quality of Road-Salt Application: The WPP continued to monitor seasonal chloride levels in selected waters at risk of contamination by chlorides originating from road salt application. Continuous conductivity loggers were deployed at 10 sites in the Nashua River Watershed and 12 sites in the Concord River Watershed from December 2020 through October 2021 (Table 1). This monitoring also included the collection of chloride grab samples to continue to verify and fine-tune (as needed) the accuracy of the specific conductance-chloride regression model developed by WPP. Chloride data will also be used for assessment and may, in the future, support the development of TMDLs for waters impaired by chlorides.

Table 1. 2021 chloride and conductivity monitoring sites.

Waterbody	Site Description	Latitude	Longitude
Nashua River Watershed			
Nissitissit River	Mill Street, Pepperell	42.671763	-71.576780
Reedy Meadow Brook	Lowell Road (Route 113), Pepperell]	42.670669	-71.562360

James Brook	Route 111, Ayer	42.579376	-71.588472
Unnamed tributary	unnamed tributary to James Brook, approximately 500 feet southwest/downstream from Boston Road (Route119), Groton	42.595536	-71.560633
Willow Branch	West Main Street, Ayer	42.553156	-71.607977
Catacoonamug Brook	Main Street, Shirley	42.543846	-71.656484
North Nashua River	approximately 700 feet east/downstream from Water Street, upstream of railroad crossing, Fitchburg	42.579167	-71.791111
Unnamed tributary	[unnamed tributary to Sawmill Pond, West Main Street, Fitchburg]	42.550762	-71.852794
Fall Brook	approximately 1000 feet west/upstream of Lancaster Street, Leominster	42.509747	-71.741931
Goodridge Brook	approximately 230 feet east/downstream from Main Street, Clinton	42.435468	-71.684807
Concord River Watershed			
Jackstraw Brook	Upton Road, Westborough	42.25484	-71.6043
Piccadilly Brook	Hopkinton Road (Route 135), Westborough	42.25182	-71.5913
Whitehall Brook	Fruit Street bridge, Hopkinton	42.25623	-71.5709
Sudbury River	Fruit Street bridge, Hopkinton/Westborough	42.26767	-71.5531
Sudbury River	approximately 400 feet north/upstream of Union Street (Route 135), Ashland	42.2596	-71.4557
Baiting Brook	approximately 200 feet south/downstream from Maple Street, Framingham	42.29212	-71.4398
Eames Brook	approximately 800 feet northwest/downstream from Mount Wayte Avenue, near the northern end of Sherwin Terrace, Framingham	42.28971	-71.4344
Sudbury River	Central Street, Framingham	42.306	-71.4314
Concord River	approximately 600 feet south/upstream of Rogers Street (approximately 150 feet downstream of River Meadow Brook confluence to western bank), Lowell	42.635098	-71.302086
Beaver Brook	approximately 460 feet east/downstream from Boston Road (Route 4), Chelmsford	42.5956	-71.3504
Hop Brook	east of Otis Street, Northborough approximately 1700 feet upstream of mouth at confluence with Assabet River, Northborough	42.2868	-71.6475
Cold Harbor Brook	Reservoir Street, Northborough	42.33077	-71.6778

Participation in the Northeast Regional Monitoring Network (RMN): In collaboration with its regional offices, states, tribes, and other entities, the EPA has established Regional Monitoring Networks (RMNs). The goal of the RMNs is to help EPA and their partners collect current, baseline biological, thermal, and hydrologic data from freshwater wadable streams. Over time, these data can help facilitate a better understanding of relationships between biological, thermal, and hydrologic data, ecosystem responses and recovery from extreme weather events, and effects of climate change and regional phenomena such as drought and pollutant/nutrient deposition on aquatic ecosystems.

As part of the Northeast RMN, the WPP has established five sites in Massachusetts which have been designated for long-term monitoring for temperature regimes, flow characteristics, and stream macroinvertebrate communities (Table 2). Since 2012 the WPP has been collecting air

and water time-series temperature data, as well as annual macroinvertebrate kick-samples. Time-series streamflow data are obtained from Brown's and Parkers brooks by the Massachusetts Division of Ecological Restoration. Flow data are available for the other three streams from USGS gages located at or near the RMN sampling sites.

Table 2. Northeast Regional Monitoring Network (RMN) sites in Massachusetts

Site ID	Watershed	Waterbody	Description	Latitude	Longitude
CR01ACC	Deerfield	Cold River	Approximately 70 meters upstream/north of South County Road, Florida.	42.6669	-73.0302
HRCC	Farmington	Hubbard Brook	Approximately 245 meters upstream/northwest of West Hartland Road, Granville.	42.0654	-72.9675
BB01CC	Quinebaug	Browns Brook	Approximately 645 meters upstream from May Brook Road, Holland	42.0348	-72.1616
WSR01CC	Chicopee	West Branch Swift River	Approximately 195 meters upstream from Cooleyville Road Extension, Shutesbury	42.4647	-72.3845
PBCC	Chicopee	Unnamed, known as Parkers Brook	Approximately 160 meters west (downstream) of Coldbrook Road, Oakham (due south of Route 122)	42.3943	-72.0492

Monitoring to Support the National Water Quality Initiative: Monitoring was continued at two tributaries to the Nashua River, James Brook and Unkety Brook, in support of the National Water Quality Initiative (NWQI), a cooperative program among the U. S. Department of Agriculture's Natural Resources Conservation Service (NRCS), U. S. Environmental Protection Agency (EPA) and state water quality agencies that promotes voluntary conservation efforts to restore impaired waterbodies. The NRCS provides financial and technical assistance to farmers to implement best management practices (BMPs) in small watersheds to control erosion and reduce pollutant runoff. Monitoring is designed to track improvements in water quality resulting from BMPs and other nonpoint source controls.

Personnel of the EPA Region 1 New England Regional Laboratory (NERL) initiated the monitoring program in the Nashua River Watershed in 2020. Monitoring sites are described in Table 3. In 2021, water sampling was performed by WPP staff and NERL personnel performed the laboratory analyses. Grab samples were collected from each monitoring site every two weeks from approximately mid-May through the end of October. Samples were analyzed at NERL for nutrients (total phosphorus, orthophosphate, total nitrogen, nitrate/nitrite-N, and ammonia-N), total suspended solids and *E. coli.* During one of the 2-3 sampling events each month, measurements were taken *in situ* for temperature, dissolved oxygen, pH, total dissolved solids and specific conductance. Finally, sondes and dataloggers were deployed at two sites to measure temperature and dissolved oxygen continuously for approximately five months.

Table 3. NWQI Monitoring Sites in the Nashua River Watershed

Site ID	Waterbody	Description	Latitude	Longitude
JB01	James Brook	Broad Meadow Road, Groton, MA	42.6045	-71.5732
JB02	James Brook	Old Ayer Road, north of Peabody	42.5977	-71.5694

Table 3. NWQI Monitoring Sites in the Nashua River Watershed

Site ID	Waterbody	Description	Latitude	Longitude
		Street, Groton, MA		
JB03	James Brook	North of Old Ayer Road near Smith Road, Groton, MA	42.5821	-71.5720
JB04*	James Brook	Route 111/Park St, Ayer MA	42.5794	-71.5882
UNK01	Unkety Brook	Groton Street, Dunstable, MA	42.6575	-71.5203
UNK02*	Unkety Brook	River Street, Dunstable, MA	42.6896	-71.5480

*included long-term continuous temperature and dissolved oxygen measurements

Field and Lab Support for the Assessment and Management of Cyanobacteria Blooms: MassDEP provided technical expertise and laboratory support for the investigation of potentially toxic algae (cyanobacteria) blooms. Staff biologists performed cyanobacteria counts and identifications on water samples to determine whether cell counts exceeded MassDPH advisory levels for recreational waters. Three waterbodies were investigated in 2021 (Table 4).

Table 4. Waterbodies for which MassDEP staff performed cyanobacteria cell counts (C) and taxonomic identifications (ID) in 2021.

Waterbody	Municipality	Number of sampling events	Sample Processing
East Monponsett Pond	Halifax/Hanson	5	C, ID
West Monponsett Pond	Halifax/Hanson	5	C, ID
Snow's Pond	Rochester	2	ID

Work continued with EPA's Cyanobacteria Collaborative on the further development of methods for obtaining cyanobacteria bloom information from citizens, lake associations and other government agencies. The bloomWatch smartphone app can be used by individuals or groups to notify EPA, public health departments or local boards of health of cyanobacteria blooms. A new on-line dashboard tabulates and graphically presents reports of cyanobacteria freshwater blooms (see https://cyanos.org/bloomwatch/).

Monitoring to Estimate Contaminant Loadings: Massachusetts' long-term monitoring strategy identifies, as one of its key monitoring objectives, monitoring to support the development, implementation and evaluation of pollution control strategies, and indicates that "limited fixed-site monitoring may be required to quantify pollutant loadings." Through a joint funding agreement with the USGS, the WPP initiated a monitoring network in 2021 to estimate contaminant loadings in the Merrimack River Watershed to inform updated water quality assessments and support future development and implementation of pollution control measures. This network consists of three (3) sampling sites on the mainstem Merrimack River and nine (9) sites on major tributary streams (Table 5). Eleven (11) sites are sampled monthly year-round while a single open-water site in the Merrimack River estuary is sampled at the surface and off the bottom twice monthly from May to October. Standard field parameters are measured during each site visit and discrete water samples are collected for the analysis of nutrients, major ions, metals and *E. coli*. Chlorophyll *a* and pheophytin analyses are added from May to September. During this same timeframe, continuous measurements of pH, specific conductance, temperature, and dissolved oxygen are collected at the open-water estuary site using multi-parameter sondes deployed near the surface and off the bottom. Finally, stream

discharge measurements are performed at the time of sampling at four (4) sites that are not co-located or near established USGS stream gages. This monitoring program is scheduled to continue through September, 2024.

Table 5. Contaminant loading study sites in the Merrimack River Watershed

Site Description	Latitude	Longitude
Nashua River at East Pepperell, MA	42.6675	-71.5756
Assabet River at West Concord, MA	42.4564	-71.3899
Sudbury River at Saxonville (Framingham), MA	42.3253	-71.3981
Concord River downstream from River Meadow Brook at Lowell, MA	42.6367	-71.3025
Merrimack River downstream from Concord River at Lowell, MA	42.6458	-71.2989
Spicket River at Lawrence, MA	42.7136	-71.1608
Shawsheen River at Andover, MA	42.6714	-71.1497
Beaver Brook at Lowell, MA	42.6600	-71.3194
Stony Brook at Chelmsford, MA	42.6351	-71.3800
Powwow River at Amesbury, MA	42.8573	-70.9300
Merrimack River at Groveland, MA	42.7636	-71.0332
Open waters of Merrimack River estuary, Newburyport, MA	42.8127	-70.8598

Monitoring Water Quality in Mount Hope Bay: The WPP maintains two YSI marine water quality monitoring buoys in the Massachusetts portion of Mount Hope Bay (MHB) that are part of the more extensive Narragansett Bay Fixed-Site Monitoring Network (NBFSMN) currently administered by the Rhode Island Department of Environmental Management (RIDEM) and the University of Rhode Island Graduate School of Oceanography (URI). Data from the MHB buoys are helping to define ambient water quality conditions for dissolved oxygen, nitrate-nitrogen, algal abundance, temperature, and other parameters. Specifically, the data may be used to assess trends over time, identify impaired waters, assess the effectiveness of management decisions (i.e., wastewater treatment facilities (WWTF) upgrades, TMDL efforts, and stormwater management), and support refinement, calibration, and validation of water quality models. During the deployment of the buoys (May-November) grab water samples were collected for chemical analysis every two weeks at each buoy location within one meter of the deployed sensors. Instantaneous grab sample data will be compared to corresponding sensor data to validate the accuracy of sensor measurements.

Massachusetts Coastal Condition Assessment (MCCA): The EPA encourages states to adopt networks of randomly selected sampling sites that will allow for statistically unbiased assessments that can be applied at larger scales (e.g., statewide). During 2011 – 2015 the WPP surface water monitoring program carried out probabilistic monitoring and assessment surveys of Massachusetts' shallow streams. This was followed by a statistically-valid (probabilistic) sampling program for Massachusetts' lakes and ponds from 2016 – 2018. In 2019, a probabilistic monitoring network was designed with the overall goal of providing an unbiased assessment of the condition of Massachusetts coastal and estuarine waters. Known as the Massachusetts Coastal Condition Assessment, or MCCA, this network was designed to obtain the data needed to assess a waterbody's level of attainment of a single designated use: "suitable habitat for Fish, other Aquatic Life and Wildlife" (i.e., Aquatic Life). The random sampling design allows for the determination, with a known statistical confidence, of the

percentage of coastal waters that are supporting and not supporting this use. Additionally, the MCCA will establish a baseline to measure trends in conditions through future surveys.

The MCCA is administered collaboratively by MassDEP and the Massachusetts Bays National Estuary Partnership (MassBays). MassBays is managing the collection and analysis of field samples and data for the MCCA. A total of 90 coastal and estuarine sites are included in the MCCA which will continue through 2023.

Twenty-five sites were sampled in 2021 (Table 6). A contractor was selected to perform sample collection and record ambient data at each site once per month from June through September. During each sampling event field crews recorded ambient environment conditions, collected water column profile data, and collected water samples from each site. Sediment samples for chemical analyses and the assessment of the benthic infauna community were collected once at each site. However, the completion of taxonomic identifications of the macroinvertebrate specimens will depend on the availability of future funding. Finally, the presence/absence of eelgrass was surveyed once in July. Water quality and ecological variables measured at each MCCA monitoring site are listed along with their sampling frequencies in Table 7.

Table 6. Location of the MCCA coastal and estuarine sites monitored in 2021. Ctrl+Click on the Site ID to follow link to site map.

Site ID	General Location (Assessment Unit)	Latitude	Longitude
MAP2E-002	Neponset River (MA73-04)	42.286144	-71.036989
MAP2E-003	Porter River (MA93-04)	42.559530	-70.920655
MAP2E-004	Plum Island Sound (MA91-12)	42.701332	-70.792510
MAP2E-005	Plum Island River (MA84A-27)	42.798499	-70.820640
MAP2E-006	Boston Harbor (MA70-01)	42.323759	-70.943767
MAP2E-008	Annisquam Harbor (No AU)	42.659945	-70.693869
MAP2E-009	Merrimack River (MA84A-06)	42.817703	-70.843096
MAP2E-010	Hingham Bay (MA70-07)	42.270839	-70.926502
MAP2E-011	Lynn Harbor (MA93-53)	42.398322	-70.977357
MAP2E-012	Rockport Harbor (MA93-57)	42.666217	-70.620459
MAP2E-013	Quincy Bay (MA70-04)	42.276554	-71.003364
MAP2E-014	Hingham Bay (MA70-07)	42.264761	-70.931846
MAP2E-016	Salem Sound (MA93-55)	42.548688	-70.835911
MAP2E-017	North Coast (No AU)	42.763750	-70.792898
MAP2E-018	Boston Harbor (No AU)	42.350501	-70.893835
MAP2E-020	Ipswich River (MA92-02)	42.686852	-70.815730
MAP2E-021	North Coast (No AU)	42.845416	-70.810064
MAP2E-022	Boston Harbor (MA70-01)	42.340113	-70.947177
MAP2E-024	Mill River (MA93-28)	42.644557	-70.677573
MAP2E-025	Merrimack River (MA84A-06)	42.824110	-70.935266
MAP2E-026	Hingham Harbor (MA74-18)	42.265374	-70.887287
MAP2E-027	Mystic River (MA71-03)	42.387259	-71.064808
MAP2E-031	Salem Harbor (MA93-54)	42.524181	-70.874247
MAP2E-032	Salem Harbor (MA93-54)	42.536623	-70.789605

MAP2E-033	North Coast (No AU)	42.726878	-70.777523

Table 7. Sampling frequency of water quality and ecological variables measured at each of 25 coastal and estuarine sites in 2021.

Medium	Variable	Sample Frequency
Water	Vertical profile (Temperature, Salinity, Dissolved oxygen, pH, Turbidity)	Monthly (June, July, August)
	Light attenuation/PAR	Monthly (June, July, August)
	Water clarity/Secchi depth	Monthly (June, July, August)
	Nutrients (Total phosphorus, Orthophosphate, Total nitrogen, Dissolved inorganic nitrogen, Total Kjeldahl nitrogen)	Monthly (June, July, August)
	Chlorophyll a	Monthly (June, July, August)
Sediment	Grain size	Once (July)
	Total organic carbon	Once (July)
	Chemistry (metals, mercury, PAHs, PCBs, organochlorine pesticides)	Once (July)
	Toxicity (estuarine amphipod, *Leptocheirus plumulosus)*	Once (July)
Biological	Benthic macroinvertebrates*	Once (August)
	Submerged aquatic vegetation	Once (July)

*sample processing subject to the availability of future funding

Summary

This document presents a brief overview of the surface water monitoring performed by MassDEP's WPP and its contractors in 2021. Several laboratories and contractors are working to process and analyze the water and biological samples collected. The WPP will continue to work with these laboratories to receive the data and complete a rigorous data validation process to ensure that the prescribed data quality objectives are met. Final data will be published on MassDEP's website, although timeframes vary with individual and multi-year projects. Planning is currently underway for monitoring in 2022.

Appendix
2021 Targeted Assessment Monitoring (TAM) Sites

This table presents the 96 TAM stream sites that were monitored by MassDEP's Watershed Planning Program in 2021. Ctrl+Click on the Site ID to follow link to site map. Water quality analyses, macroinvertebrate and fish community assessments were performed at all sites except those designated with the following notes on their Site IDs:

[1] Macroinvertebrates not sampled
[2] Fish not sampled
[3] Fish sampled in 2020 as part of cold-water fishery assessments

Site ID	Waterbody	Site Description	Latitude	Longitude
Nashua River Watershed				
AB01[3]	Asnebumskit Brook	[approximately 0.4 miles upstream of mouth at inlet Eagle Lake, dirt track crossing northwest of Kendall Road, Holden]	42.35233	-71.89096
WT02[3]	Warren Tannery Brook	[Quinapoxet Street, Holden]	42.36599	-71.87191
MB01	Muschopauge Brook	[Route 68, Rutland]	42.39746	-71.91626
SW01	South Wachusett Brook	[Ball Hill Road, Princeton]	42.42579	-71.90613
RB01	Rocky Brook	[approximately 200 feet west/downstream from Beaman Road, Sterling]	42.44947	-71.80251
UNTW	Unnamed Tributary	[unnamed tributary to unnamed pond southeast of intersection of routes 12 and 190, Sterling, George Peeso Lane, Sterling]	42.45339	-71.74566
GR01	Goodridge Brook	[north of St. Johns Cemetery, approximately 2900 feet east/downstream from South Meadow Road, Lancaster]	42.43536	-71.69942
GA01	Gates Brook	[approximately 235 feet east/downstream from Worcester Street, West Boylston]	42.35718	-71.78024
UNTA3	Unnamed Tributary	[unnamed tributary to Snows Millpond at powerline crossing approximately 3000 feet east/downstream from Battles Road, south of Route 2A, Westminster]	42.54988	-71.88118

Site ID	Waterbody	Site Description	Latitude	Longitude
NNB1[2]	North Nashua River	[Mill #9 bridge, Fitchburg (approximately 0.8 miles downstream from West Fitchburg WWTF (MA0101281) discharge)]	42.57155	-71.84031
FBA1	Flag Brook	[approximately 150 feet upstream from railroad bridge crossing east of Route 31, Fitchburg]	42.55865	-71.84384
Nas08	Unnamed Tributary	[unnamed tributary to Sawmill Pond, opposite intersection of Development Road and Authority Drive, Fitchburg]	42.54982	-71.86116
SB02	Unnamed Tributary	[unnamed tributary to Monoosnoc Brook, Exchange Street, Leominster]	42.52880	-71.78174
FA02	Fall Brook	[approximately 125 feet west/upstream of Litchfield Street, Leominster]	42.50935	-71.74639
Nas09	Fall Brook	[approximately 925 feet west/upstream of Lancaster Street, Leominster]	42.50980	-71.74124
NNA2[2]	North Nashua River	[approximately 100 feet south/downstream from Ponikin Bridge Road, Lancaster]	42.48100	-71.68500
WB01	Unnamed Tributary	[unnamed tributary to Whitman River, Williams Road at Bray Avenue, Ashburnham]	42.61911	-71.92480
LB01	Laws Brook	[Dean Hill Road, Westminster]	42.61909	-71.87228
FB02	Falulah Brook	[approximately 1270 feet east/downstream from Pearl Hill Road, Fitchburg]	42.59495	-71.78312
FB01	Falulah Brook	[approximately 850 feet east/downstream from Lunenburg Street, Fitchburg]	42.58472	-71.77524
BB01[3]	Baker Brook	[Crawford Street, Fitchburg]	42.56316	-71.76155
CR01[3]	Catacoonamug Brook	[approximately 550 feet downstream/east of Reservoir Road, Lunenburg]	42.56718	-71.69666

Site ID	Waterbody	Site Description	Latitude	Longitude
JB04	James Brook	[Route 111, Ayer]	42.57947	-71.58862
Concord River Watershed				
SN01	Snake Brook	[Main Street/North Main Street, Wayland/Natick]	42.31595	-71.36301
BD01	Beaverdam Brook	[Boden Lane, Natick]	42.28469	-71.39216
SudAsh[1,2]	Sudbury River	[approximately 400 feet north/upstream of Union Street (Route 135), Ashland]	42.25961	-71.45565
IN01	Indian Brook	[Indian Brook Road bridge, Ashland]	42.26150	-71.49712
PC01[2]	Piccadilly Brook	[approximately 340 feet east/downstream from Hopkinton Road, Westborough]	42.25345	-71.59088
Jacks	Jackstraw Brook	[the central of three Upton Road crossings, Westborough]	42.25495	-71.60415
NO01	Unnamed Tributary	[unnamed tributary to Assabet River Reservoir approximately 130 feet north/downstream from Old Nourse Street, Westborough]	42.25661	-71.63390
GH01	Unnamed Tributary	[unnamed tributary to Assabet River Reservoir east of the southern bend of Linda Street, Westborough]	42.25608	-71.65323
SD03[1,2]	Sudbury River	[Shermans Bridge Road/Lincoln Road, Wayland/Sudbury]	42.39635	-71.36467
PB01	Pine Brook	[Pine Brook Road bridge, Wayland]	42.35959	-71.34347
MW01[2]	Unnamed Tributary	[unnamed tributary to Hager Pond, north/just upstream of Boston Post Road East (Route 20), Marlborough]	42.35097	-71.49085
MW02	Unnamed Tributary	[unnamed tributary to Hager Pond, Old Boston Post Road, Marlborough]	42.35185	-71.49522

Site ID	Waterbody	Site Description	Latitude	Longitude
SudFram[1,2]	Sudbury River	[Central Street, Framingham]	42.30599	-71.43145
Eames	Eames Brook	[footpath at end of Sherwin Terrace, Framingham]	42.28971	-71.43437
Bait	Baiting Brook	[approximately 200 feet south/downstream from Maple Street, Framingham]	42.29214	-71.43990
BB02	Baiting Brook	[approximately 560 feet south/downstream from Berkeley Road, south of the Clearwater Drive cul-de-sac, Framingham]	42.30677	-71.45711
HB01	Unnamed Tributary	[unnamed tributary to Hop Brook that crosses Old Concord Road, Marlborough approximately 2250 feet upstream of mouth in Sudbury and 2000 feet east/downstream from dirt track at Marlborough/Sudbury corporate boundary]	42.37738	-71.47238
HB02	Unnamed Tributary	[unnamed tributary to Hop Brook that crosses Sudbury Street, Marlborough approximately 2400 feet upstream of mouth in Sudbury and approximately 650 feet east/downstream from dirt track at Marlborough/Sudbury corporate boundary]	42.37205	-71.47609
RB01[3]	Run Brook	[approximately 0.1 mile upstream of mouth at confluence with Hop Brook, west of Sexton Street, Sudbury]	42.38603	-71.43975
DU01[3]	Dugan Brook	[Old Road To Nine Acre Corner, Concord]	42.44795	-71.37828
SD04[1,2]	Sudbury River	[Nashawtuc Road bridge, Concord]	42.45975	-71.35936
MB01	Mill Brook	[Lowell Road bridge, Concord]	42.46275	-71.35132
NB01	Unnamed Tributary	[the unnamed tributary to North Brook just south of Jones Road, at South Street, Berlin]	42.36870	-71.64038

Site ID	Waterbody	Site Description	Latitude	Longitude
FMB_71	Fort Meadow Brook	[approximately 880 feet south/upstream of Shay Road, Hudson]	42.38551	-71.53040
AR1475_72[1,2]	Assabet River	[Cox Street bridge, Hudson]	42.39980	-71.54599
UNT_73	Unnamed Tributary	[unnamed tributary to Assabet River, Hudson Road, Stow]	42.41530	-71.54110
DB_74[2]	Unnamed Tributary	[unnamed tributary to Assabet River, west of Houghton Street approximately 100 feet upstream of mouth at confluence with Assabet River, Hudson]	42.38981	-71.56658
DB_75	Danforth Brook	[approximately 300 feet north/upstream of Cox Street, Hudson]	42.40049	-71.56608
HB_76	Hog Brook	[approximately 0.3 miles upstream of mouth at inlet Tripp Pond, east of Timothy Lane, Hudson]	42.39315	-71.58189
UNTHB_77	Unnamed Tributary	[unnamed tributary to Hop Brook in Hudson approximately 2000 feet east/downstream from Gates Pond Road, Berlin]	42.39133	-71.59109
GB_78	Great Brook	[approximately 1200 feet north/upstream of Sugar Road, Bolton]	42.44734	-71.59198
UNTGB_79	Unnamed Tributary	[unnamed tributary to Great Brook, East End Road, Bolton]	42.44699	-71.56139
FPB_81[2]	Fort Pond Brook	[Arlington Street, Acton]	42.47903	-71.47061
FPB_82[2]	Fort Pond Brook	[Parker Street, Acton]	42.45801	-71.43391
CB_83	Coles Brook	[approximately 800 feet east/downstream from Hosmer Street, Acton]	42.46595	-71.42297
AR0697_84[1,2]	Assabet River	[at USGS flow gaging station #01097000 near the Route 27/62 bridge, Maynard]	42.43206	-71.44974
AR1479_85[1,2]	Assabet River	[first Route 62 bridge crossing below the "Powdermill Dam", Acton]	42.44087	-71.42936

Site ID	Waterbody	Site Description	Latitude	Longitude
SDB_86	Second Division Brook	[approximately 1900 feet east/downstream from eastern most edge of Border Road loop, Concord]	42.43563	-71.41354
AR0843_87[1,2]	Assabet River	[Route 2/2A bridge, Concord]	42.46569	-71.39143
NB_88[2]	Nashoba Brook	[Wetherbee Street bridge, Acton]	42.47509	-71.41094
RHB_91	Unnamed Tributary	[unnamed tributary to Cold Harbor Brook, Stiles Road, Boylston]	42.33230	-71.69071
HB_92	Hop Brook	[approximately 425 feet west/upstream of Route 20, Northborough]	42.29444	-71.66321
AR0695_93[2]	Assabet River	[School Street, Northborough]	42.30485	-71.62845
HB_94	Howard Brook	[approximately 440 feet east/downstream from Howard Street, Northborough]	42.32671	-71.64672
AR1472_95[1,2]	Assabet River	[Boundary Street bridge, Northborough/Marlborough (approximately 600 feet upstream from Marlborough Westerly WWTP discharge)]	42.34151	-71.61641
BB_96	Unnamed Tributary	[unnamed tributary to North Brook, west of Pleasant Street, approximately 330 feet from mouth at confluence with North Brook, Berlin]	42.36644	-71.63306
GPB_97	Gates Pond Brook	[approximately 1100 feet west/upstream of River Road West, Berlin]	42.36456	-71.61255
SFB_98	Sheep Fall Brook	[east of Pleasant Street, approximately 450 feet upstream of mouth at confluence with Flagg Brook, Marlborough]	42.36144	-71.56733
FB_99	Flagg Brook	[approximately 200 feet east/downstream from Fitchburg Street, Marlborough]	42.36245	-71.56922
CD01[1,2]	Concord River	[approximately 925 feet north/downstream from Lawrence Street, Lowell]	42.63028	-71.29792

Site ID	Waterbody	Site Description	Latitude	Longitude
CD02[1,2]	Concord River	[Pollard Street bridge, (North Billerica) Billerica]	42.58482	-71.28719
FY01	Farley Brook	[Concord Road, Chelmsford]	42.58213	-71.34506
ML01	Mill Brook	[the Dudley Road crossing approximately 1000 feet from mouth at confluence with Concord River, Billerica]	42.52054	-71.30320
CD03[1,2]	Concord River	[Monument Street bridge, Concord]	42.47117	-71.34989
CN01	Unnamed Tributary	[unnamed tributary to Nashoba Brook, locally known as Conant Brook, Main Street, Acton]	42.49708	-71.42169
NG01	Nagog Brook	[Main Street (Route 27), Acton]	42.50069	-71.42029
Merrimack River Watershed				
BM01	Bare Meadow Brook	[Refrew Street crossing, Methuen]	42.75656	-71.13309
BT01	Bartlett Brook	[Route 113 (North Lowell Street) crossing, Methuen]	42.70433	-71.22361
BT02	Bartlett Brook	[Broadway Road, Dracut]	42.70045	-71.24861
RN01	Richardson Brook	[approximately 350 feet south/downstream from Methuen Street, Dracut]	42.66230	-71.26683
TL01	Trull Brook	[upstream at River Road, Tewksbury]	42.64923	-71.26010
PP01	Peppermint Brook	[Lakeview Avenue crossing, Dracut]	42.66325	-71.32020
LW01	Lawrence Brook	[approximately 130 feet downstream/south of Sherburne Avenue, Tyngsborough]	42.67163	-71.41182
BW01	Bridge Meadow Brook	[approximately 450 feet west/upstream of Dunstable Road, Tyngsborough]	42.65603	-71.43593

Site ID	Waterbody	Site Description	Latitude	Longitude
CS01	Crooked Springs Brook	[Graniteville Road, Chelmsford]	42.61474	-71.39177
GN01	Gilson Brook	[approximately 300 feet south/downstream from Nabnasset Street, Westford]	42.61544	-71.40871
TK01	Tadmuck Brook	[approximately 750 feet south/upstream of Lowell Road, Westford]	42.59576	-71.41792
BR01[1,2]	Beaver Brook	[footbridge west of Delaney Drive, approximately 2100 feet north/downstream from the northern most crossing of Interstate 495 in Littleton]	42.54851	-71.49059
BV01	Beaver Brook	[Harwood Avenue, Littleton]	42.53581	-71.50843
Shawsheen River Watershed				
MW01	Meadow Brook	[Kendall Road, Tewksbury]	42.63205	-71.22022
SW02	Strong Water Brook	[approximately 320 feet east/downstream from Livingston Street, Tewksbury]	42.61558	-71.21401
SW01	Strong Water Brook	[Shawsheen Street, Tewksbury]	42.59577	-71.19608
HH01	Heath Brook	[Shawsheen Street, Tewksbury]	42.58874	-71.20406