Final Massachusetts Integrated List of Waters for the Clean Water Act 2022 Reporting Cycle

Appendix 17
Millers River Basin
Assessment and Listing Decision Summary

Prepared by:
Watershed Planning Program
Division of Watershed Management, Bureau of Water Resources
Massachusetts Department of Environmental Protection

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Rebecca L. Tepper, Secretary
Massachusetts Department of Environmental Protection
Bonnie Heiple, Commissioner
Bureau of Water Resources
Kathleen M. Baskin, Assistant Commissioner

May 2023

CN 568.1

Massachusetts Department of Environmental Protection

MassDEP's mission is to protect and enhance the Commonwealth's natural resources – air, water, and land – to provide for the health, safety, and welfare of all people, and to ensure a clean and safe environment for future generations. In carrying out this mission MassDEP commits to address and advance environmental justice and equity for all people of the Commonwealth; provide meaningful, inclusive opportunities for people to participate in agency decisions that affect their lives; and ensure a diverse workforce that reflects the communities we serve.

Watershed Planning Program

The Watershed Planning Program is a statewide program in the Division of Watershed Management, Bureau of Water Resources, at MassDEP. We are stewards of the water resources of Massachusetts. Together with other state environmental agencies, we share in the duty and responsibility to protect, enhance, and restore the quality and value of the waters of the Commonwealth. We are guided by the federal Clean Water Act and work to secure the environmental, recreational, and public health benefits of clean water for the residents of Massachusetts. The Watershed Planning Program is organized into five Sections that each have a different technical focus under the Clean Water Act: (1) Surface Water Quality Standards; (2) Surface Water Quality Monitoring; (3) Data Management and Water Quality Assessment; (4) Total Maximum Daily Load; and (5) Nonpoint Source Pollution.

Disclaimer

References to trade names, commercial products, manufacturers, or distributors in this report constituted neither endorsement nor recommendation by MassDEP.

Contact Information

Watershed Planning Program
Division of Watershed Management, Bureau of Water Resources
Massachusetts Department of Environmental Protection
8 New Bond Street, Worcester, MA 01606
Website: https://www.mass.gov/guides/watershed-planning-program
Email address: dep.wpp@mass.gov

Notice of Availability

This report is available on the Massachusetts Department of Environmental Protection website: https://www.mass.gov/lists/integrated-lists-of-waters-related-reports.

Table of Contents

2022 Cycle Impairment Changes 7
Bassett Pond (MA35002) 11
Beaver Brook (MA35-09) 12
Recommendations 12
Designated Use Attainment Decisions 13
Beaver Brook (MA35-28) 22
Beaver Flowage Pond (MA35005) 23
Bents Pond (MA35006) 24
Bents Pond (MA35007) 25
Bourn-Hadley Pond (MA35008) 26
Recommendations 26
Designated Use Attainment Decisions 26
Bowens Pond (MA35009) 28
Designated Use Attainment Decisions 28
Boyce Brook (MA35-17) 30
Recommendations 30
Designated Use Attainment Decisions 31
Brazell Pond (MA35010) 33
Briggs Brook (MA35-32) 34
Cheney Brook (MA35-33) 35
Collar Brook (MA35-34) 36
Coolidge Brook (MA35-35) 37
Designated Use Attainment Decisions 37
Cowee Pond (MA35013) 40
Crow Hill Brook (MA35-36) 41
Crystal Lake (MA35014) 42
Davenport Pond (MA35015) 43
Depot Pond (MA35018) 44
Dunn Brook (MA35-37) 45
Designated Use Attainment Decisions 45
Dunn Pond (MA35021) 48
Designated Use Attainment Decisions 48

East Branch Tully River (MA35-29) 50
East Branch Tully River (MA35-30) 51
Designated Use Attainment Decisions 51
East Templeton Pond (MA35022) 59
Ellinwood Brook (MA35-22) 60
Recommendations 60
Designated Use Attainment Decisions 61
Ellis Pond (MA35023) 71
Designated Use Attainment Decisions 71
Fish Brook (MA35-38) 73
Gales Pond (MA35024) 74
Gate Hill Brook (MA35-39) 75
Designated Use Attainment Decisions 75
Greenwood Pond (MA35025) 78
Greenwood Pond (MA35026) 79
Hastings Pond (MA35028) 80
Hilchey Pond (MA35029) 81
Hoyt Brook (MA35-40) 82
Jacks Brook (MA35-31) 83
Designated Use Attainment Decisions 83
Kendall Pond (MA35034) 93
Kenny Brook (MA35-41) 94
Keyup Brook (MA35-16) 95
Lake Denison (MA35017) 96
Designated Use Attainment Decisions 96
Lake Mattawa (MA35112) 99
Designated Use Attainment Decisions 99
Lake Monomonac (MA35047) 101
Lake Rohunta (MA35070) 102
Supporting Information for Removed Impairments 103
Designated Use Attainment Decisions 110
Lake Rohunta (MA35106) 113
Designated Use Attainment Decisions 113

Lake Rohunta (MA35107) ... 115
Supporting Information for Removed Impairments ... 116
Designated Use Attainment Decisions ... 122
Lake Watatic (MA35095) ... 125
Laurel Lake (MA35035) ... 126
Designated Use Attainment Decisions ... 126
Lawrence Brook (MA35-13) ... 128
Designated Use Attainment Decisions ... 128
Little Pond (MA35037) ... 131
Lower Naukeag Lake (MA35041) ... 132
Lyons Brook (MA35-19) ... 133
Mahoney Brook (MA35-27) ... 134
Recommendations ... 134
Designated Use Attainment Decisions ... 135
Millers River (MA35-01) ... 145
Designated Use Attainment Decisions ... 145
Millers River (MA35-02) ... 159
Recommendations ... 160
Designated Use Attainment Decisions ... 160
Millers River (MA35-03) ... 176
Designated Use Attainment Decisions ... 176
Millers River (MA35-04) ... 189
Recommendations ... 190
Designated Use Attainment Decisions ... 190
Millers River (MA35-05) ... 227
Recommendations ... 228
Designated Use Attainment Decisions ... 228
Millers River (MA35-20) ... 246
Recommendations ... 247
Designated Use Attainment Decisions ... 247
Minott Pond (MA35046) ... 261
Minott Pond South (MA35045) ... 262
Moores Pond (MA35048) ... 263

Mormon Hollow Brook (MA35-15) 264
North Branch Millers River (MA35-21) 265
Designated Use Attainment Decisions 265
North Pond Brook (MA35-23) 268
Designated Use Attainment Decisions 268
North Spectacle Pond (MA35052) 279
Otter River (MA35-06) 280
Designated Use Attainment Decisions 280
Otter River (MA35-07) 287
Designated Use Attainment Decisions 287
Otter River (MA35-08) 299
Recommendations 300
Designated Use Attainment Decisions 300
Packard Pond (MA35053) 313
Parker Pond (MA35056) 314
Supporting Information for Removed Impairments 314
Designated Use Attainment Decisions 314
Partridgeville Pond (MA35057) 317
Designated Use Attainment Decisions 317
Perley Brook Reservoir (MA35059) 319
Phillipston Reservoir (MA35060) 320
Recommendations 320
Designated Use Attainment Decisions 320
Priest Brook (MA35-10) 322
Recommendations 322
Designated Use Attainment Decisions 322
Ramsdall Pond (MA35062) 332
Reservoir No. 1 (MA35063) 333
Reservoir No. 2 (MA35064) 334
Riceville Pond (MA35065) 335
Rich Brook (MA35-42) 336
Designated Use Attainment Decisions 336
Richards Reservoir (MA35067) 339

Royalston Road Pond (MA35071) 340
Ruggles Pond (MA35072) 341
Designated Use Attainment Decisions 341
Sheomet Lake (MA35074) 343
South Athol Pond (MA35078) 344
Supporting Information for Removed Impairments 344
Designated Use Attainment Decisions 344
South Spectacle Pond (MA35081) 346
Sportsmans Pond (MA35082) 347
Stockwell Brook (MA35-25) 348
Designated Use Attainment Decisions 348
Stoddard Pond (MA35083) 358
Sunset Lake (MA35086) 359
Thrower Brook (MA35-43) 360
Tully Brook (MA35-44) 361
Tully Lake (MA35111) 362
Recommendations 362
Designated Use Attainment Decisions 362
Tully Pond (MA35089) 365
Tully River (MA35-14) 366
Unnamed Tributary (MA35-26) 367
Recommendations 368
Designated Use Attainment Decisions 368
Upper Naukeag Lake (MA35090) 378
Upper Reservoir (MA35091) 379
Wallace Pond (MA35092) 380
Ward Pond (MA35093) 381
West Branch Tully River (MA35-11) 382
Designated Use Attainment Decisions 382
West Gulf Brook (MA35-24) 393
Recommendations 393
Designated Use Attainment Decisions 394
Wheelers Pond (MA35097) 404

Whetstone Brook (MA35-18) 405
Designated Use Attainment Decisions 405
White Pond (MA35098) 415
Supporting Information for Removed Impairments 415
Designated Use Attainment Decisions 415
Whites Mill Pond (MA35099) 417
Whitney Pond (MA35101) 418
Wickett Pond (MA35102) 419
Wilson Brook (MA35-45) 420
Wrights Reservoir (MA35104) 421
Designated Use Attainment Decisions 421
Data Sources 423

2022 Cycle Impairment Changes

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Bassett Pond	MA35002	3	3	None		Unchanged
Beaver Brook	MA35-09	5	5	PCBs in Fish Tissue		Unchanged
Beaver Brook	MA35-28	5	5	PCBs in Fish Tissue		Unchanged
Beaver Flowage Pond	MA35005	3	3	None		Unchanged
Bents Pond	MA35006	3	3	None		Unchanged
Bents Pond	MA35007	4a	4a	Algae	4115	Unchanged
Bents Pond	MA35007	4a	4a	Turbidity	4115	Unchanged
Bourn-Hadley Pond	MA35008	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
Bowens Pond	MA35009	3	3	None		Unchanged
Boyce Brook	MA35-17	5	5	PCBs in Fish Tissue		Unchanged
Brazell Pond	MA35010	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
Briggs Brook	MA35-32	--	3	None		Unchanged
Cheney Brook	MA35-33	--	3	None		Unchanged
Collar Brook	MA35-34	--	3	None		Unchanged
Coolidge Brook	MA35-35	--	5	PCBs in Fish Tissue		Added
Cowee Pond	MA35013	3	3	None		Unchanged
Crow Hill Brook	MA35-36	--	3	None		Unchanged
Crystal Lake	MA35014	3	3	None		Unchanged
Davenport Pond	MA35015	3	3	None		Unchanged
Depot Pond	MA35018	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
Dunn Brook	MA35-37	--	5	PCBs in Fish Tissue		Added
Dunn Pond	MA35021	2	2	None		Unchanged
East Branch Tully River	MA35-29	5	5	PCBs in Fish Tissue		Unchanged
East Branch Tully River	MA35-30	5	5	PCBs in Fish Tissue		Unchanged
East Templeton Pond	MA35022	3	3	None		Unchanged
Ellinwood Brook	MA35-22	5	5	PCBs in Fish Tissue		Unchanged
Ellis Pond	MA35023	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
Ellis Pond	MA35023	4c	4c	(Eurasian Water Milfoil, Myriophyllum Spicatum*)		Unchanged
Ellis Pond	MA35023	4c	4c	(Fanwort*)		Added
Ellis Pond	MA35023	4c	4c	(Non-Native Aquatic Plants*)		Unchanged
Fish Brook	MA35-38	--	3	None		Unchanged
Gales Pond	MA35024	5	5	Mercury in Fish Tissue	33880	Unchanged
Gales Pond	MA35024	5	5	Turbidity		Unchanged
Gate Hill Brook	MA35-39	--	5	PCBs in Fish Tissue		Added
Greenwood Pond	MA35025	3	3	None		Unchanged
Greenwood Pond	MA35026	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
Hastings Pond	MA35028	3	3	None		Unchanged

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Hilchey Pond	MA35029	4a	4a	Turbidity	4128	Unchanged
Hoyt Brook	MA35-40	--	3	None		Unchanged
Jacks Brook	MA35-31	5	5	PCBs in Fish Tissue		Unchanged
Kendall Pond	MA35034	3	3	None		Unchanged
Kenny Brook	MA35-41	--	3	None		Unchanged
Keyup Brook	MA35-16	5	5	Escherichia Coli (E. Coli)		Unchanged
Keyup Brook	MA35-16	5	5	PCBs in Fish Tissue		Unchanged
Lake Denison	MA35017	4a	5	Dissolved Oxygen	4123	Unchanged
Lake Denison	MA35017	4a	5	Enterococcus		Added
Lake Denison	MA35017	4a	5	Mercury in Fish Tissue	33880	Unchanged
Lake Mattawa	MA35112	3	4c	(Non-Native Aquatic Plants*)		Added
Lake Monomonac	MA35047	5	5	(Non-Native Aquatic Plants*)		Unchanged
Lake Monomonac	MA35047	5	5	Mercury in Fish Tissue		Unchanged
Lake Rohunta	MA35070	5	4a	(Aquatic Plants (Macrophytes)*)		Changed
Lake Rohunta	MA35070	5	4a	(Fanwort*)		Added
Lake Rohunta	MA35070	5	4a	(Non-Native Aquatic Plants*)		Unchanged
Lake Rohunta	MA35070	5	4a	Mercury in Fish Tissue	33880	Unchanged
Lake Rohunta	MA35106	4a	4a	(Fanwort*)		Added
Lake Rohunta	MA35106	4a	4a	(Non-Native Aquatic Plants*)		Unchanged
Lake Rohunta	MA35106	4a	4a	Mercury in Fish Tissue	33880	Unchanged
Lake Rohunta	MA35107	5	5	(Aquatic Plants (Macrophytes)*)		Changed
Lake Rohunta	MA35107	5	5	(Fanwort*)		Added
Lake Rohunta	MA35107	5	5	(Non-Native Aquatic Plants*)		Unchanged
Lake Rohunta	MA35107	5	5	Mercury in Fish Tissue	33880	Unchanged
Lake Rohunta	MA35107	5	5	Nutrient/Eutrophication Biological Indicators		Added
Lake Watatic	MA35095	3	3	None		Unchanged
Laurel Lake	MA35035	5	5	Dissolved Oxygen		Unchanged
Laurel Lake	MA35035	5	5	Mercury in Fish Tissue		Added
Lawrence Brook	MA35-13	5	5	PCBs in Fish Tissue		Unchanged
Little Pond	MA35037	3	3	None		Unchanged
Lower Naukeag Lake	MA35041	3	3	None		Unchanged
Lyons Brook	MA35-19	5	5	PCBs in Fish Tissue		Unchanged
Mahoney Brook	MA35-27	5	5	PCBs in Fish Tissue		Unchanged
Millers River	MA35-01	5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
Millers River	MA35-01	5	5	Fish Bioassessments		Added
Millers River	MA35-01	5	5	Lack of a Coldwater Assemblage		Unchanged
Millers River	MA35-01	5	5	Temperature		Unchanged
Millers River	MA35-02	5	5	(Curly-leaf Pondweed*)		Added
Millers River	MA35-02	5	5	Fish Bioassessments		Added
Millers River	MA35-02	5	5	PCBs in Fish Tissue		Unchanged
Millers River	MA35-03	5	5	Fish Bioassessments		Added
Millers River	MA35-03	5	5	PCBs in Fish Tissue		Unchanged
Millers River	MA35-04	5	5	(Non-Native Aquatic Plants*)		Added
Millers River	MA35-04	5	5	Fish Bioassessments		Added

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Millers River	MA35-04	5	5	PCBs in Fish Tissue		Unchanged
Millers River	MA35-05	5	5	(Curly-leaf Pondweed*)		Added
Millers River	MA35-05	5	5	Fish Bioassessments		Added
Millers River	MA35-05	5	5	PCBs in Fish Tissue		Unchanged
Millers River	MA35-20	5	5	Benthic Macroinvertebrates		Added
Millers River	MA35-20	5	5	Fish Bioassessments		Added
Millers River	MA35-20	5	5	Lack of a Coldwater Assemblage		Unchanged
Millers River	MA35-20	5	5	Lead		Added
Millers River	MA35-20	5	5	Temperature		Unchanged
Minott Pond	MA35046	3	3	None		Unchanged
Minott Pond South	MA35045	3	3	None		Unchanged
Moores Pond	MA35048	4a	4a	Mercury in Fish Tissue	42398	Unchanged
Mormon Hollow Brook	MA35-15	5	5	PCBs in Fish Tissue		Unchanged
North Branch Millers River	MA35-21	5	5	Mercury in Fish Tissue		Unchanged
North Pond Brook	MA35-23	5	5	PCBs in Fish Tissue		Unchanged
North Spectacle Pond	MA35052	3	3	None		Unchanged
Otter River	MA35-06	5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
Otter River	MA35-06	5	5	Dissolved Oxygen		Unchanged
Otter River	MA35-07	2	5	Escherichia Coli (E. Coli)		Added
Otter River	MA35-08	5	5	(Curly-leaf Pondweed*)		Added
Otter River	MA35-08	5	5	Escherichia Coli (E. Coli)		Added
Otter River	MA35-08	5	5	PCBs in Fish Tissue		Unchanged
Packard Pond	MA35053	3	3	None		Unchanged
Parker Pond	MA35056	4a	4a	(Aquatic Plants (Macrophytes)*)		Unchanged
Parker Pond	MA35056	4a	4a	(Fanwort*)		Added
Parker Pond	MA35056	4a	4a	(Non-Native Aquatic Plants*)		Removed
Parker Pond	MA35056	4a	4a	Nutrient/Eutrophication Biological Indicators	4134	Unchanged
Partridgeville Pond	MA35057	3	4c	(Non-Native Aquatic Plants*)		Added
Perley Brook Reservoir	MA35059	3	3	None		Unchanged
Phillipston Reservoir	MA35060	3	3	None		Unchanged
Priest Brook	MA35-10	2	2	None		Unchanged
Ramsdall Pond	MA35062	3	3	None		Unchanged
Reservoir No. 1	MA35063	4a	4a	(Aquatic Plants (Macrophytes)*)		Unchanged
Reservoir No. 1	MA35063	4a	4a	Nutrient/Eutrophication Biological Indicators	4137	Unchanged
Reservoir No. 2	MA35064	3	3	None		Unchanged
Riceville Pond	MA35065	3	3	None		Unchanged
Rich Brook	MA35-42	--	5	PCBs in Fish Tissue		Added

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Richards Reservoir	MA35067	3	3	None		Unchanged
Royalston Road Pond	MA35071	3	3	None		Unchanged
Ruggles Pond	MA35072	2	2	None		Unchanged
Sheomet Lake	MA35074	3	3	None		Unchanged
South Athol Pond	MA35078	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
South Athol Pond	MA35078	4c	4c	(Fanwort*)		Added
South Athol Pond	MA35078	4c	4c	(Non-Native Aquatic Plants*)		Removed
South Spectacle Pond	MA35081	3	3	None		Unchanged
Sportsmans Pond	MA35082	3	3	None		Unchanged
Stockwell Brook	MA35-25	5	5	PCBs in Fish Tissue		Unchanged
Stoddard Pond	MA35083	4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
Sunset Lake	MA35086	3	3	None		Unchanged
Thrower Brook	MA35-43	--	3	None		Unchanged
Tully Brook	MA35-44	--	3	None		Unchanged
Tully Lake	MA35111	5	5	Harmful Algal Blooms		Unchanged
Tully Pond	MA35089	3	3	None		Unchanged
Tully River	MA35-14	5	5	PCBs in Fish Tissue		Unchanged
Unnamed Tributary	MA35-26	5	5	Copper		Unchanged
Upper Naukeag Lake	MA35090	4a	4a	Mercury in Fish Tissue	33880	Unchanged
Upper Reservoir	MA35091	4a	4a	Mercury in Fish Tissue	33880	Unchanged
Wallace Pond	MA35092	3	3	None		Unchanged
Ward Pond	MA35093	3	3	None		Unchanged
West Branch Tully River	MA35-11	5	5	PCBs in Fish Tissue		Unchanged
West Branch Tully River	MA35-11	5	5	Temperature		Unchanged
West Gulf Brook	MA35-24	5	5	PCBs in Fish Tissue		Unchanged
Wheelers Pond	MA35097	3	3	None		Unchanged
Whetstone Brook	MA35-18	5	5	PCBs in Fish Tissue		Unchanged
White Pond	MA35098	4c	4c	(Fanwort*)		Added
White Pond	MA35098	4c	4c	(Non-Native Aquatic Plants*)		Removed
Whites Mill Pond	MA35099	4a	4a	(Aquatic Plants (Macrophytes)*)		Unchanged
Whites Mill Pond	MA35099	4a	4a	Nutrient/Eutrophication Biological Indicators	4144	Unchanged
Whitney Pond	MA35101	5	5	(Aquatic Plants (Macrophytes)*)		Unchanged
Whitney Pond	MA35101	5	5	Mercury in Fish Tissue		Unchanged
Whitney Pond	MA35101	5	5	Turbidity	4145	Unchanged
Wickett Pond	MA35102	3	3	None		Unchanged
Wilson Brook	MA35-45	--	3	None		Unchanged
Wrights Reservoir	MA35104	3	5	Mercury in Fish Tissue		Added

Bassett Pond (MA35002)

Location:	New Salem.
AU Type:	FRESHWATER LAKE
AU Size:	26 ACRES
Classification/Qualifier:	B

No usable data were available for Bassett Pond (MA35002) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

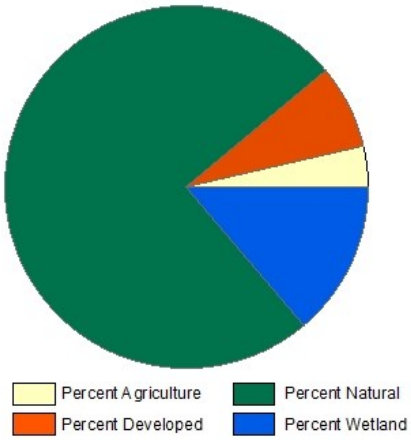
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Beaver Brook (MA35-09)

Location:	former Fernald School discharge, Templeton to confluence with Millers River, Royalston.
AU Type:	RIVER
AU Size:	3.4 MILES
Classification/Qualifier:	B: CWF

Beaver Brook - MA35-09

Watershed Area: 9.5 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.5	3.86	1.97	0.83
Agriculture	3.6%	7%	1.7%	3.6%
Developed	7.5%	4.4%	6.1%	4.8%
Natural	75.1%	75.8%	61.2%	63.6%
Wetland	13.8%	12.8%	31%	28%
Impervious Cover	3.3%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Recommendations

2022 Recommendations
ALU: Templeton Development Center WWTP (MA0102156)) was decommissioned in 2015 (discharges from the housing units are now serviced by permitted (Title 5) groundwater disposal (septic) systems so monitoring should be conducted to evaluate conditions since there has been a significant change with the removal of the discharge.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Insufficient Information	NO
2022 Use Attainment Summary	
MassDEP staff conducted very limited (bacteria) water quality sampling at two sites in this Beaver Brook AU (MA35-09) during the summer of 2011 at Freight Shed Road (south of Route 68) in Templeton/Phillipston (W0685) and near Birch Hill Dam Road in Royalston (W2231). There were no noted observations of any dense/very dense filamentous algae present at either location. Too limited data are available to assess the status of the Aquatic Life Use for this Beaver Brook AU (MA35-09) so it is assessed as having Insufficient Information.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0685	MassDEP	Water Quality	Beaver Brook	[Freight Shed Road (south of Route 68), Templeton/Phillipston]	42.604553	-72.124621
W2231	MassDEP	Water Quality	Beaver Brook	[Birch Hill Dam Road, Royalston]	42.626633	-72.140081

Physico-chemical Water Quality Information

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0685	2011	--	--	--	--	--	--	--	--	6	0
W2231	2011	--	--	--	--	--	--	--	--	3	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

Athough no fish toxics monitoring has been conducted in this Beaver Brook AU (MA35-09), all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for this Beaver Brook AU (MA35-09) will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff conducted very limited sampling at two sites in this Beaver Brook AU (MA35-09) during the summer of 2011 at Freight Shed Road (south of Route 68) in Templeton/Phillipston (W0685) and farther downstream near Birch Hill Dam Road in Royalston (W2231). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at either of these two sampling sites. The Aesthetics Use for this Beaver Brook AU (MA35-09) will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the two sites sampled in the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0685	MassDEP	Water Quality	Beaver Brook	[Freight Shed Road (south of Route 68), Templeton/Phillipston]	42.604553	-72.124621
W2231	MassDEP	Water Quality	Beaver Brook	[Birch Hill Dam Road, Royalston]	42.626633	-72.140081

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0685	Beaver Brook	2011	6	MassDEP aesthetics observations for station W0685 on Beaver Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W2231	Beaver Brook	2011	6	MassDEP aesthetics observations for station W2231 on Beaver Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0685	2011	6	6	0
W2231	2011	6	3	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0685	Beaver Brook	2011	Color	Brownish	1	6
W0685	Beaver Brook	2011	Color	Dark Tan	1	6
W0685	Beaver Brook	2011	Color	Light Yellow/Tan	4	6
W0685	Beaver Brook	2011	Objectionable Deposits	No	5	6
W0685	Beaver Brook	2011	Objectionable Deposits	Yes	1	6
W0685	Beaver Brook	2011	Odor	None	6	6
W0685	Beaver Brook	2011	Scum	No	5	6
W0685	Beaver Brook	2011	Scum	Yes	1	6
W0685	Beaver Brook	2011	Turbidity	None	6	6
W2231	Beaver Brook	2011	Color	Dark Tan	2	6
W2231	Beaver Brook	2011	Color	Light Yellow/Tan	3	6
W2231	Beaver Brook	2011	Color	Reddish	1	6
W2231	Beaver Brook	2011	Objectionable Deposits	No	5	6
W2231	Beaver Brook	2011	Objectionable Deposits	Unobservable	1	6
W2231	Beaver Brook	2011	Odor	None	6	6
W2231	Beaver Brook	2011	Scum	No	3	6
W2231	Beaver Brook	2011	Scum	Yes	3	6
W2231	Beaver Brook	2011	Turbidity	None	4	6
W2231	Beaver Brook	2011	Turbidity	Slightly Turbid	1	6
W2231	Beaver Brook	2011	Turbidity	Unobservable	1	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from this Beaver Brook AU (MA35-09) at Freight Shed Road, south of route 68 in Templeton/Phillipston (W0685) and farther downstream at Birch Hill Dam Road in Royalston (W2231) between May and September 2011 (n = 6 at each site). Data analysis indicated that none of the intervals at either site had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GMs were 49 and 40 cfu/100 ml from up to downstream, respectively. Since the *E. coli* concentrations did not exceed the use attainment impairment thresholds for these two single year limited low frequency datasets, the Primary Contact Recreational Use for this Beaver Brook AU (MA35-09) is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0685	MassDEP	Water Quality	Beaver Brook	[Freight Shed Road (south of Route 68), Templeton/Phillipston]	42.604553	-72.124621
W2231	MassDEP	Water Quality	Beaver Brook	[Birch Hill Dam Road, Royalston]	42.626633	-72.140081

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

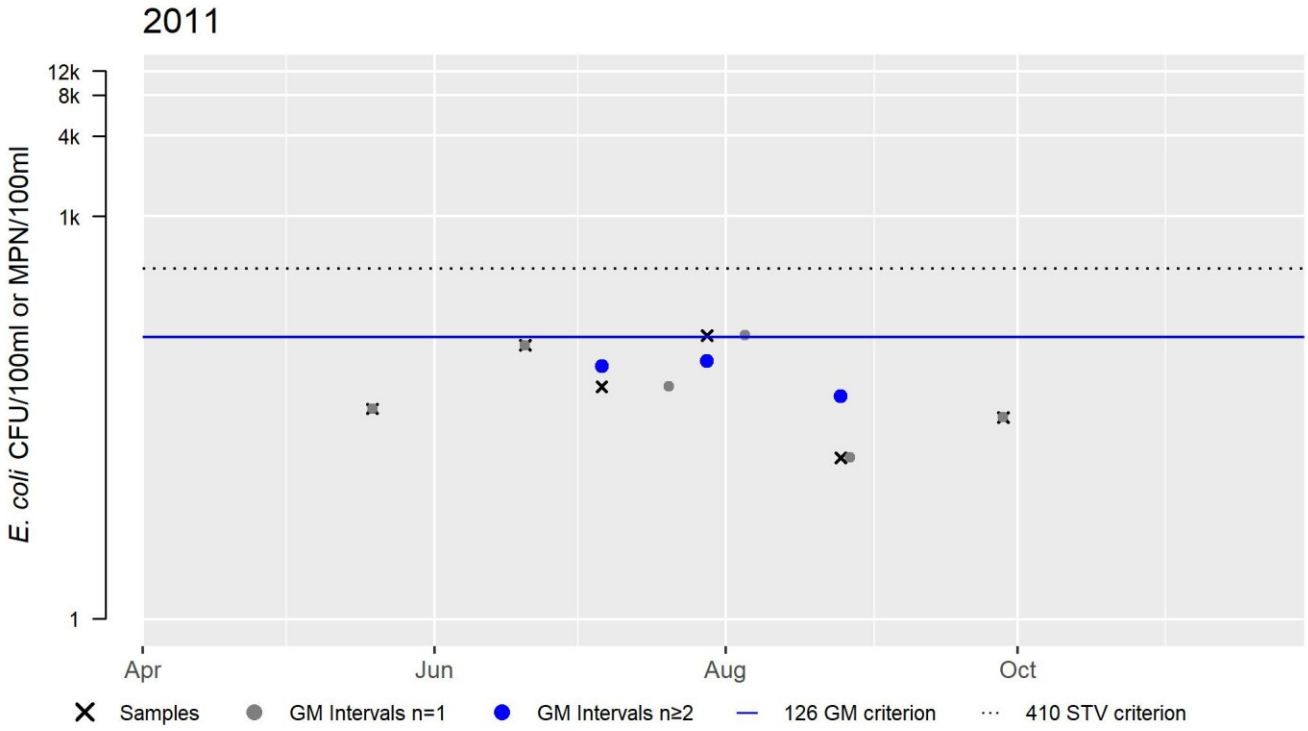
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0685	MassDEP	E. coli	05/19/11	09/28/11	6	16	130	49
W2231	MassDEP	E. coli	05/19/11	09/28/11	6	10	81	40

W0685 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	49
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

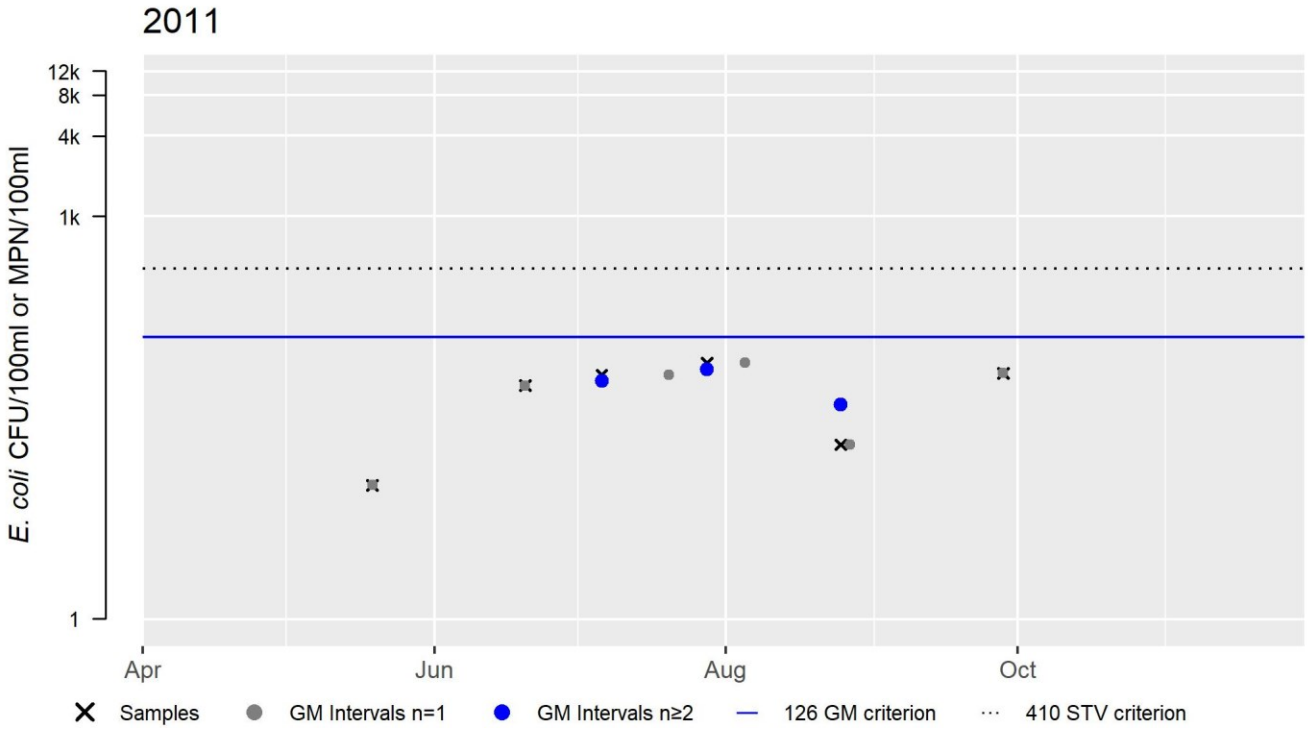
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2231 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	40
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples from this Beaver Brook AU (MA35-09) at Freight Shed Road, south of route 68 in Templeton/Phillipston (W0685) and farther downstream at Birch Hill Dam Road in Royalston (W2231) between May and September 2011 (n = 6 at each site). Data analysis indicated that none of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GMs were was 49 and 40 cfu/100 ml from up to downstream, respectively.

Since the *E. coli* concentrations did not exceed the use attainment impairment thresholds for this these two single year limited low frequency datasets, the Secondary Contact Recreational Use for this Beaver Brook AU (MA35-09) station W0685 is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0685	MassDEP	Water Quality	Beaver Brook	[Freight Shed Road (south of Route 68), Templeton/Phillipston]	42.604553	-72.124621
W2231	MassDEP	Water Quality	Beaver Brook	[Birch Hill Dam Road, Royalston]	42.626633	-72.140081

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

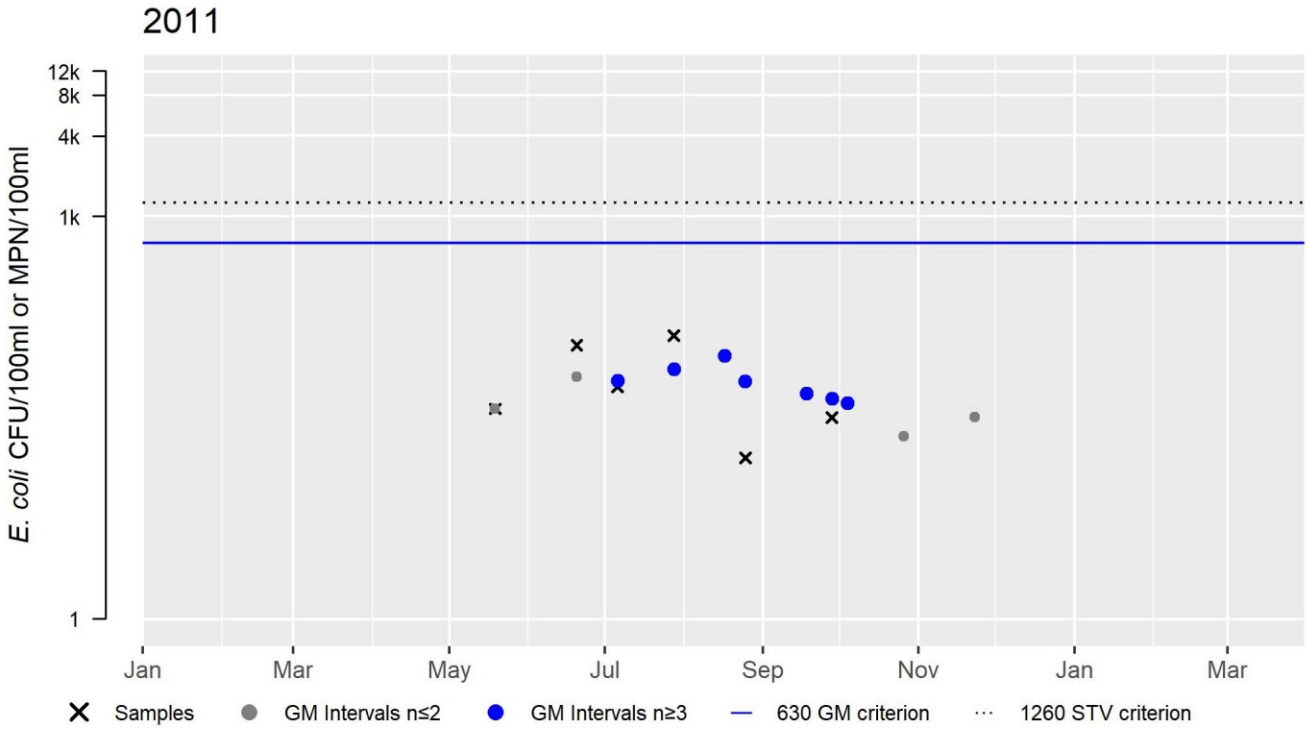
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0685	MassDEP	E. coli	05/19/11	09/28/11	6	16	130	49
W2231	MassDEP	E. coli	05/19/11	09/28/11	6	10	81	40

W0685 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	49
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

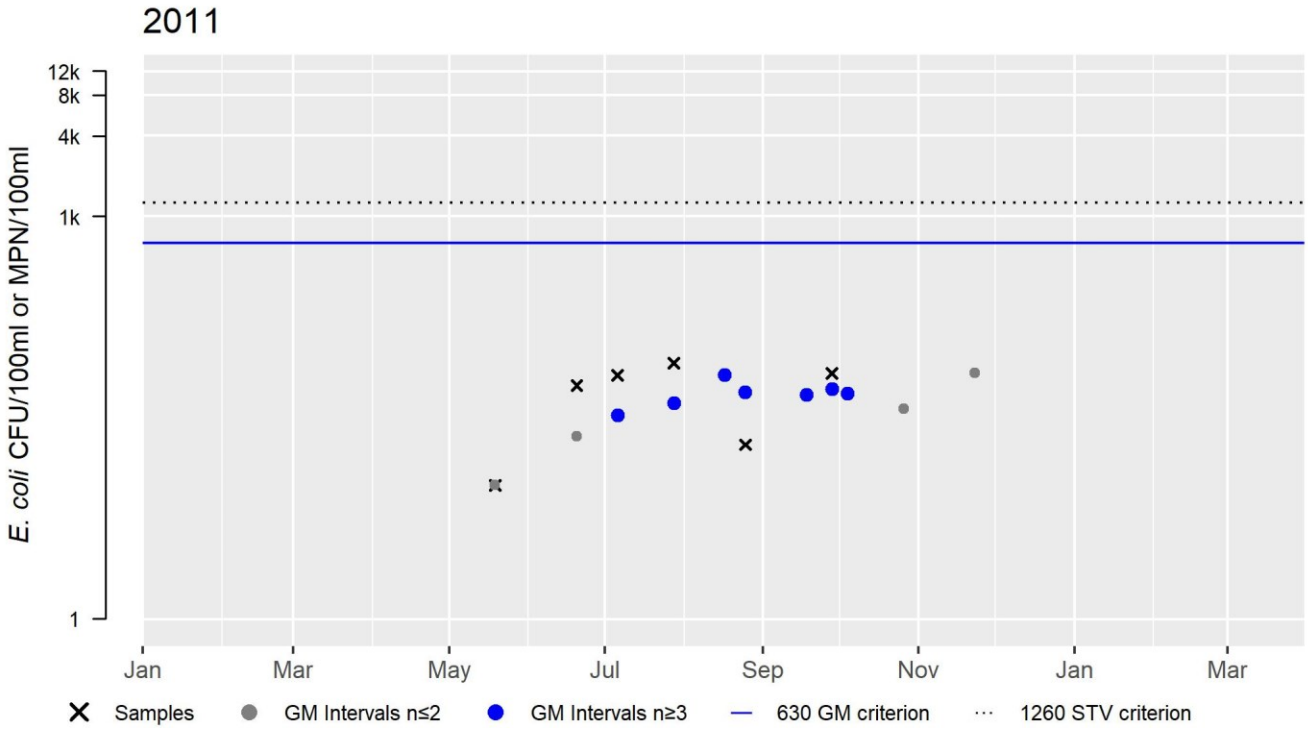
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2231 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	40
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Beaver Brook (MA35-28)

Location:	Headwaters, confluence of Kendall and Chickering brooks, Phillipston to the former Fernald School (MA0102156) discharge, Templeton.
AU Type:	RIVER
AU Size:	2.3 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Beaver Brook (MA35-28) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (N)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (N)		X			

Beaver Flowage Pond (MA35005)

Location:	(Beaver Pond) Royalston.
AU Type:	FRESHWATER LAKE
AU Size:	38 ACRES
Classification/Qualifier:	B

No usable data were available for Beaver Flowage Pond (MA35005) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Bents Pond (MA35006)

Location:	Hubbardston.
AU Type:	FRESHWATER LAKE
AU Size:	28 ACRES
Classification/Qualifier:	B

No usable data were available for Bents Pond (MA35006) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Bents Pond (MA35007)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	6 ACRES
Classification/Qualifier:	B

No usable data were available for Bents Pond (MA35007) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	Algae	4115	Unchanged
4a	4a	Turbidity	4115	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Algae	Source Unknown (N)			X	X	X
Turbidity	Source Unknown (N)			X	X	X

Bourn-Hadley Pond (MA35008)

Location:	Templeton.
AU Type:	FRESHWATER LAKE
AU Size:	26 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Sand/Gravel/Rock Mining or Quarries (N)			X	X	X

Recommendations

2022 Recommendations
ALU: Conduct an aquatic macrophyte survey in Bourn-Hadley Pond when flowering heads are present to determine whether any of the non-native species of Myriophyllum are infesting the pond.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	YES
2022 Use Attainment Summary	
During validation of MassDEP aquatic invasive species records, it was noted that DEP biologists listed "*Myriophyllum* sp." on the field sheet for an August 1995 synoptic survey of Bourn-Hadley Pond. Since no other recent data are available, the Aquatic Life Use for Bourn-Hadley Pond is Not Assessed, however an Alert is being identified for the potential infestation of a non-native aquatic macrophyte. An aquatic macrophyte survey is also be recommended to determine whether any of the non-native Myriophyllum species are infesting the pond.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995)

Summary Statement	Assessment Recommendation
During validation of MassDEP aquatic invasive species records, it was noted that DEP biologists listed "Myriophyllum sp." on the field sheet for an August 1995 synoptic survey of Bourn-Hadley Pond. An aquatic macrophyte survey should be conducted to determine whether any of the non-native *Myriophyllum* species are infesting the pond and an Alert status should be identified for this AU.	Conduct an aquatic macrophyte survey in Bourn-Hadley Pond when flowering heads are present to determine whether any of the non-native species of *Myriophyllum* are infesting the pond.

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Bourn-Hadley Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new/recent data are available so the Aesthetic Use for Bourn-Hadley Pond will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new/recent data are available so the Primary Contact Recreational Use for Bourn-Hadley Pond will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new/recent data are available so the Secondary Contact Recreational Use for Bourn-Hadley Pond will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward.	

Bowens Pond (MA35009)

Location:	Wendell.
AU Type:	FRESHWATER LAKE
AU Size:	17 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
A MassDER priority project for Osgood Brook (a tributary of the Millers River MA35-04, but not itself an AU) proposes the removal of Bowens Pond Dam. The project would include the drawdown of Bowens Pond (MA35009) to create a 2-foot-wide and 2-foot deep channel, as well as the relocation of an existing dry hydrant adjacent to the dam to a location upstream along Osgood Brook. Bowens Pond Dam is designated as an Intermediate-sized, Low (Class III) hazard dam by the Massachusetts Department of Conservation and Recreation's Office of Dam Safety. The restoration of the ecological community of Osgood Brook is designed to allow fish and wildlife passage and improve cold-water fisheries by increasing dissolved oxygen content of the water and decreasing the average water temperature (MA EOEEA 2020). The construction phase of the Bowens Pond Dam removal is likely a few years away (Wildman May 30, 2021). The status of this project should be reevaluated during a future IR reporting cycle. No other water quality data are available to assess the status of the Aquatic Life Use for Bowens Pond so it is Not Assessed.	

Biological Monitoring Information

Habitat and Flow Data (anthropogenic alterations)

A MassDER priority project for Osgood Brook (a tributary of the Millers River MA35-04, but not itself an AU) proposes the removal of Bowens Pond Dam. The project would include the drawdown of Bowens Pond (MA35009) to create a 2-foot-wide and 2-foot deep channel, as well as the relocation of an existing dry hydrant adjacent to the dam to a location upstream along Osgood Brook. Bowens Pond Dam is designated as an Intermediate-sized, Low (Class III) hazard dam by the Massachusetts Department of Conservation and Recreation's Office of Dam Safety. The restoration of the ecological community of Osgood Brook is designed to allow fish and wildlife passage and improve cold-water fisheries by increasing dissolved oxygen content of the water and decreasing the average water temperature (MA EOEEA 2020). The construction phase of the Bowens Pond Dam removal is likely a few years away (Wildman May 30, 2021). The status of this project should be reevaluated during a future IR reporting cycle.

Fish Consumption

2022 Use Attainment	Alert

Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Bowens Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Bowens Pond, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Bowens Pond, so it is Not Assessed.	

Secondary Contact Recreation

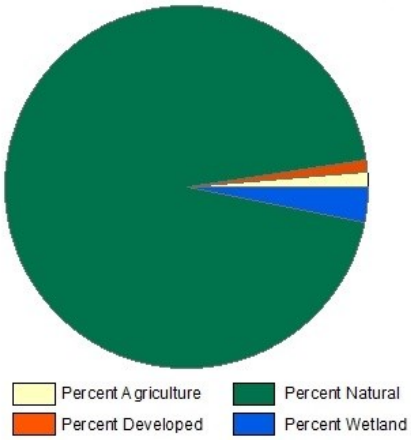
2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Bowens Pond, so it is Not Assessed.	

Boyce Brook (MA35-17)

Location:	NH State Line, Royalston to confluence with East Branch Tully River, Royalston.
AU Type:	RIVER
AU Size:	3.2 MILES
Classification/Qualifier:	B: CWF

Boyce Brook - MA35-17

Watershed Area: 5.76 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.11	2.11	0.4	0.4
Agriculture	1.3%	1.3%	2.1%	2.1%
Developed	1.1%	1.1%	2.2%	2.2%
Natural	94.5%	94.5%	85.5%	85.5%
Wetland	3.1%	3.1%	10.2%	10.2%
Impervious Cover	0.5%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Recommendations

2022 Recommendations
ALU: An Alert for temperature was identified in Boyce Brook based on a short term thermistory deployment in the brook at Warwick Road (Route 68 crossing) in Royalston (W1339). This site may have been influence by a small unnamed tributary which appears to originated from a small impoundment and may not be ideal. A location farther downstream may be more representative of typical conditions.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	
MA DFG biologists conducted backpack electrofishing in Boyce Brook near Falls Road crossing in Royalston in August 2014 (SampleID 5335). The sample was dominated by multiple age classes of Eastern brook trout. The Aquatic Life Use of Boyce Brook will continue to be assessed as Fully Supporting based on the presence of cold water fish species which are indicate of excellent habitat and water quality conditions. The Alert for temperature based on summer 2005 data is being carried forward.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5335	MassDFG	Fish Community	Boyce Brook	Falls Rd crossing, Royalston	42.69720	-72.21213

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net]

[Species List: BB = Brown Bullhead, CP = Chain Pickerel, EBT = Brook Trout, WS = White Sucker]

Sample ID	Sample Date	Method	Sample Type	Total Taxa	Total Ind	EBT Ind	EBT Min Length (mm)	EBT Max Length (mm)	EBT ≤140mm Ind	SC Ind	Cold Ind %	Fluvial Ind %	Notables	CFR	Species List
5335	08/26/14	BP	TP	4	55	49	54	210	33	0	89%	95%	Yes	Yes	BB, CP, EBT, WS,

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

Although no fish toxics monitoring has been conducted in Boyce Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for Boyce Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Boyce Brook, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Boyce Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Boyce Brook, so it is Not Assessed.	

Brazell Pond (MA35010)

Location:	Templeton.
AU Type:	FRESHWATER LAKE
AU Size:	15 ACRES
Classification/Qualifier:	B

No usable data were available for Brazell Pond (MA35010) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Unspecified Urban Stormwater (Y)			X	X	X

Briggs Brook (MA35-32)

Location:	Headwaters north of Rattlesnake Mountain, Erving to mouth at confluence with Millers River, Erving.
AU Type:	RIVER
AU Size:	0.8 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Briggs Brook (MA35-32) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Cheney Brook (MA35-33)

Location:	Headwaters east of Allen Road, Warwick to mouth at confluence with West Brook, Orange.
AU Type:	RIVER
AU Size:	3.5 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Cheney Brook (MA35-33) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Collar Brook (MA35-34)

Location:	Headwaters north of Warwick Road, Royalston to mouth at confluence with West Branch Tully River, Orange.
AU Type:	RIVER
AU Size:	3.7 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Collar Brook (MA35-34) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

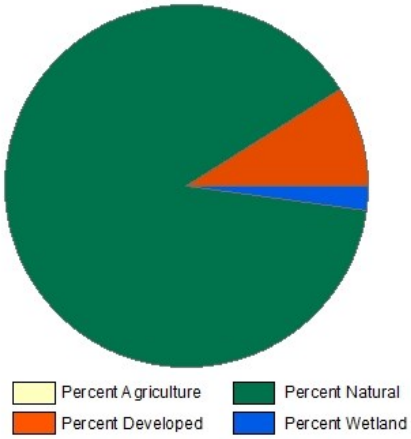
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Coolidge Brook (MA35-35)

Location:	Headwaters, perennial portion west of Holtshire Road, Orange to mouth at confluence with North Pond Brook, Orange.
AU Type:	RIVER
AU Size:	0.3 MILES
Classification/Qualifier:	B: CWF

Coolidge Brook - MA35-35

Watershed Area: 0.14 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	0.14	0.14	0.09	0.09
Agriculture	0%	0%	0%	0%
Developed	9%	9%	6.8%	6.8%
Natural	89%	89%	90%	90%
Wetland	2.1%	2.1%	3.2%	3.2%
Impervious Cover	2.2%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	5	PCBs in Fish Tissue		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MA DFG biologists conducted backpack electrofishing in Coolidge Brook upstream of Holtshire Road crossing (and the house and pond) in Orange (SampleID 5394) in August 2014. The sample was comprised entirely by multiple age classes of Eastern brook trout. The Aquatic Life Use of Coolidge Brook is assessed as Fully Supporting based on the presence of cold water fish species which are indicate of excellent habitat and water quality conditions.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5394	MassDFG	Fish Community	Coolidge Brook	US of house & pond, US of Holtshire Rd xing, Orange	42.58917	-72.33641

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net]

[Species List: EBT = Brook Trout]

Sample ID	Sample Date	Method	Sample Type	Total Taxa	Total Ind	EBT Ind	EBT Min Length (mm)	EBT Max Length (mm)	EBT ≤140mm Ind	SC Ind	Cold Ind %	Fluvial Ind %	Notables	CFR	Species List
5394	08/15/14	BP	TP	1	11	11	54	134	11	0	100%	100%	No	Yes	EBT,

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
Athough no fish toxics monitoring has been conducted in Coolidge Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for Coolidge Brook will be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	

No data are available to assess the status of the Aesthetics Use for Coolidge Brook, so it is Not Assessed.

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Coolidge Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Coolidge Brook, so it is Not Assessed.	

Cowee Pond (MA35013)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	18 ACRES
Classification/Qualifier:	A: PWS, ORW (PWS and Tributary to PWS)

No usable data were available for Cowee Pond (MA35013) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Crow Hill Brook (MA35-36)

Location:	Headwaters west of Route 202, Templeton to mouth at confluence with Trout Brook, Templeton.
AU Type:	RIVER
AU Size:	1.6 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Crow Hill Brook (MA35-36) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Crystal Lake (MA35014)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	142 ACRES
Classification/Qualifier:	A: PWS, ORW

No usable data were available for Crystal Lake (MA35014) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Davenport Pond (MA35015)

Location:	Petersham/Athol.
AU Type:	FRESHWATER LAKE
AU Size:	30 ACRES
Classification/Qualifier:	B

No usable data were available for Davenport Pond (MA35015) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Depot Pond (MA35018)

Location:	(Railroad Pond) Templeton.
AU Type:	FRESHWATER LAKE
AU Size:	15 ACRES
Classification/Qualifier:	B

No usable data were available for Depot Pond (MA35018) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged

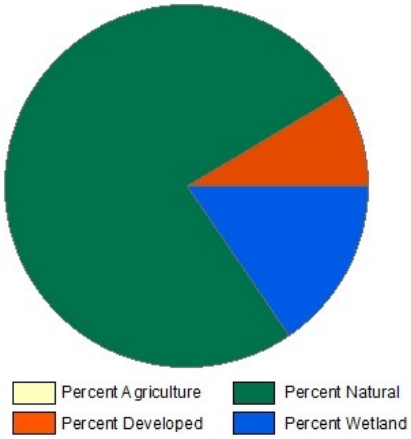
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Discharges from Municipal Separate Storm Sewer Systems (MS4) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X

Dunn Brook (MA35-37)

Location:	Headwaters north of Lincoln Road, Phillipston to mouth at confluence with Chickering Brook, Phillipston.
AU Type:	RIVER
AU Size:	1.8 MILES
Classification/Qualifier:	B: CWF

Dunn Brook - MA35-37

Watershed Area: 1.2 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.2	1.2	0.22	0.22
Agriculture	1%	1%	1.5%	1.5%
Developed	8.4%	8.4%	7%	7%
Natural	75.4%	75.4%	55.4%	55.4%
Wetland	15.2%	15.2%	36.1%	36.1%
Impervious Cover	3.1%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	5	PCBs in Fish Tissue		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Insufficient Information	NO
2022 Use Attainment Summary	

MA DFG biologists conducted backpack electrofishing in the very upper reach of Dunn Brook near the Lincoln Road crossing in Phillipston (SampleID 8378) in August 2019. The sample in this low gradient section of the brook included only a few fish (nine individuals) including one small (124mm) Eastern brook trout. Although too limited data are available to assess the Aquatic Life Use for Dunn Brook (only a few fish at the most upstream reach of the brook), at least one small Eastern brook trout was in the August 2019 sample. The Aquatic Life Use is assessed as having Insufficient Information.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
8378	MassDFG	Fish Community	Dunn Brk.	LIncoln Rd. Crossing, Phillipston	42.54810	-72.14330

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: BB = Brown Bullhead, EBT = Brook Trout, GS = Golden Shiner, P = Pumpkinseed]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
8378	08/21/19	BP	TP	L	4	9	11%	1	11%	11%	1	11%	No	Yes	BB, EBT, GS, P,

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in Dunn Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020).

Until site-specific data are generated, the Fish Consumption Use for Dunn Brook is assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO

2022 Use Attainment Summary
No data are available to assess the status of the Aesthetics Use for Dunn Brook, so it is Not Assessed.

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Dunn Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Dunn Brook, so it is Not Assessed.	

Dunn Pond (MA35021)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	18 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
2	2	None		Unchanged

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aquatic Life Use for Dunn Pond, so it is Not Assessed.	

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Dunn Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Dunn Pond, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
The Dunn Pond (DCR) Beach in Gardner was rarely, if at all, posted for swimming between 2014 and 2019 (postings if any were all <10%). The Primary Contact Recreational Use for Dunn Pond is assessed as Fully Supporting since there were few, if any, swimming advisory postings at the Dunn Pond (DCR) Beach.	

Beach Postings

MassDPH Beach Posting Data Summary (% Bathing Season Posted 2014-2019) (Bailey, Logan Feb. 2, 2021) (MassDEP Undated 4)

Beach ID	Beach Name/Town	Left Boundary (Latitude)	Left Boundary (Longitude)	Right Boundary (Latitude)	Right Boundary (Longitude)	2014	2015	2016	2017	2018	2019	# years> 10%
5181	Dunn Pond (DCR)/Gardner	42.57966	-71.97170	42.57929	-71.97080	0%	8%	7%	0%	4%	2%	0

Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

The Dunn Pond (DCR) Beach in Gardner was rarely, if at all, posted for swimming between 2014 and 2019 (postings if any were all <10%).
The Secondary Contact Recreational Use for Dunn Pond is assessed as Fully Supporting since there were few, if any, swimming advisory postings at the Dunn Pond (DCR) Beach.

East Branch Tully River (MA35-29)

Location:	From the outlet of Tully Lake, Royalston to confluence with the West Branch Tully River forming headwaters Tully River, Orange/Athol (formerly part of 2014 segment: East Branch Tully River MA35-12).
AU Type:	RIVER
AU Size:	3.5 MILES
Classification/Qualifier:	B

No usable data were available for East Branch Tully River (MA35-29) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

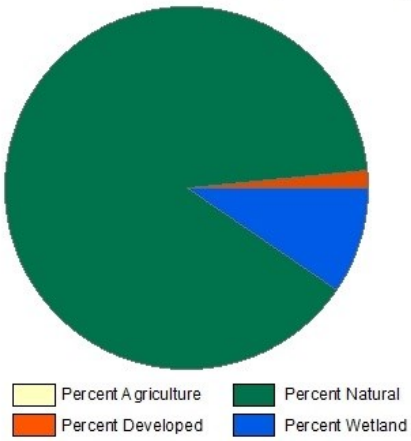
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

East Branch Tully River (MA35-30)

Location:	Confluence of Tully Brook and Falls Brook in Royalston State Forest, Royalston through Long Pond to inlet Tully Lake, Royalston (formerly part of 2014 segment: East Branch Tully River MA35-12).
AU Type:	RIVER
AU Size:	5.4 MILES
Classification/Qualifier:	B

East Branch Tully River - MA35-30

Watershed Area: 21.66 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.03	4.21	1.83	0.94
Agriculture	0.7%	0.9%	0.5%	1%
Developed	1.5%	1.6%	1%	1.6%
Natural	88.4%	84.2%	69.9%	60.9%
Wetland	9.4%	13.2%	28.6%	36.5%
Impervious Cover	0.5%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary
MassDEP biologists sampled the East Branch Tully River upstream from Route 68 (Warwick Road) in Royalston during the summers of 2012, 2013, 2014, and 2015 as part of the Reference Site Network monitoring project. Survey results of this Tier 1 Existing Use Cold Water habitat (multiple age classes of Eastern brook trout documented by MA DFG biologists during August 2007 survey (MassDEP Undated 7)) are briefly summarized here. The benthic community (Site B0821) IBI scores were most often indicative of satisfactory conditions (58-63 in April 2012, August 2014, and August 2015, IBI score in September 2012 was 92 (indicative of excellent conditions) and in August 2013 was 51 (indicative of moderately degraded conditions). Backpack electrofishing in Septembers 2012, 2013, 2014, and 2015 (SampleIDs 5036, 5085, 6326, and 6391) documented fish samples that were all dominated by fluvial fish (three of five or six species) and included one or more Eastern brook trout in each sample (young of year and/or multiple age classes present in three of four samples). Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2287) can be summarized as follows (minimum dissolved oxygen 5.0, 5.7, and 4.6mg/L during long-term probe deployments in the summers 2013, 2014, and 2015 with 7DADMin <6.0mg/L 14, 0, and 12 times, respectively. The maximum temperatures measured during June to September probe deployments in 2012, 2013, 2014, and 2015 were 24.6, 26.7, 23.8, and 24.4°C with maximum 24-hour rolling averages of 23.7, 24.9, 22.9, and 22.1°C, respectively (>23.5°C in 2012 and 2013). Discrete pH measurements between May 2013 and September 2015 were all low (range 5.2 to 6.0 SU, n=12). There were generally no indications of any nutrient enrichment problems (seasonal average total phosphorus concentrations ranged from 0.010 to 0.027 in the summers of 2012 through 2015, max diel DO shifts up to 2.4mg/L, maximum saturation up to only 86%, maximum pH 6.0SU), and there were no observations of any dense/very dense filamentous algae noted (17 observations 2012 through 2015). The concentrations of total ammonia-nitrogen and chloride were all low (<0.094 and 5mg/L, respectively, n=16). The Aquatic Life Use of the East Branch Tully River is assessed as Fully Supporting based on benthic macroinvertebrate, fish population, and water quality monitoring data collected by MassDEP biologists between 2012 and 2015. Although low DO and elevated temperatures were measured in this Tier 1 Existing Use Cold Water, the subwatershed and proximal stream buffer areas in MA are almost completely undeveloped (97.8 and 97.4% Natural/Wetland, respectively) with extremely low Impervious Cover (0.5%) and there were no dams (except for beavers), water withdrawals or discharges anywhere along the river. Land-Use data in NH were not readily available but the area over the state line is similar when viewed with Google Earth imagery. The former alerts for elevated temperature and low pH are considered natural conditions so are being removed.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5036	MassDEP	Fish Community	East Branch Tully River	0.3mi US of Rt 68 (Warwick Rd)	42.69539	-72.22718
5085	MassDEP	Fish Community	East Branch Tully River	~2000 ft US of Rt 68 (Warwick Rd)	42.69539	-72.22718
6326	MassDEP	Fish Community	East Branch Tully River	Approx 2000 ft US from Rt 68 (Warwick Rd), Royalston	42.69539	-72.22718
6391	MassDEP	Fish Community	East Branch Tully River	, Royalston	42.69539	-72.22718
B0821	MassDEP	Benthic	East Branch Tully River/	[approximately 610 meters upstream from Route 68 (Warwick Road), Royalston, MA]	42.695393	-72.227184
W2287	MassDEP	Water Quality	East Branch Tully River	[approximately 2000 feet upstream from Route 68 (Warwick Road), Royalston]	42.695393	-72.227184

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0821	04/24/12	RBP kicknet	Central_Hills_100ct	103	61	S
B0821	09/12/12	RBP kicknet	Central_Hills_100ct	107	92	E
B0821	08/07/13	RBP kicknet	Central_Hills_300ct	267	51	MD
B0821	08/12/14	RBP kicknet	Central_Hills_300ct	298	63	S
B0821	08/11/15	RBP kicknet	Central_Hills_300ct	281	58	S

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: CP = Chain Pickerel, EBT = Brook Trout, F = Fallfish, LMB = Largemouth Bass, WS = White Sucker, YP = Yellow Perch]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5036	09/20/12	BP	TP	H	6	37	3%	3	84%	3%	3	16%	No	Yes	CP, EBT, F, LMB, WS, YP,
5085	09/24/13	BP	TP		5	28	18%	3	75%	18%	2	25%	No	Yes	CP, EBT, F, WS, YP,
6326	09/23/14	NS	TP		5	46	11%	3	61%	11%	2	39%	No	Yes	CP, EBT, F, WS, YP,
6391	09/10/15	BP	TP		5	26	15%	3	50%	15%	2	50%	No	Yes	CP, EBT, F, WS, YP,

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Long-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[7DADMin= 7-Day Average of the Daily Minima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Day Count	7day Count	30day Count	DO Min (mg/L)	Min 7DADMin (mg/L)	Min 7DADA (mg/L)	Delta DO Max (mg/L)	Count CW 7DADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages 7DADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages 7DADMin <5.0	Count WW Other Life Stages 1Day Min <4.0	Count CW 30DADA <8.0	Count WW Other Life Stages 30DADA <6.0
W2287	05/22/13	10/07/13	139	133	110	5	5.2	5.5	2.3	14	0	19	0	0	0	95	0
W2287	06/04/14	09/10/14	99	93	70	5.7	6.2	6.7	2.4	0	0	0	0	0	0	70	0
W2287	05/21/15	09/09/15	112	106	83	4.6	5.4	5.9	2.3	12	3	2	0	0	0	83	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2287	05/21/13	10/08/13	4	6.5	7.6	0	0	0
W2287	06/16/14	09/11/14	4	6.6	7.5	0	0	0
W2287	06/16/15	09/10/15	4	6.7	7.1	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2287	06/01/12	09/15/12	107	107	23.7	24.6	23.8	22.7	72	1	32	0	0	0
W2287	06/01/13	09/15/13	107	107	24.8	26.7	25.5	23.8	52	6	22	3	0	0
W2287	06/01/13	09/15/13	107	107	24.8	26.7	25.5	23.8	51	6	22	3	0	0
W2287	06/04/14	09/10/14	99	93	22.0	23.8	22.1	20.8	46	0	0	0	0	0
W2287	06/01/15	09/09/15	101	98	22.8	24.4	23.4	21.9	66	0	12	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2287	06/01/12	09/15/12	107	5136	23.7	29	0	0
W2287	06/01/13	09/15/13	107	5136	24.9	253	126	0
W2287	06/01/13	09/15/13	107	5136	24.9	254	126	0
W2287	06/01/15	09/10/15	102	4878	22.9	0	0	0
W2287	06/03/14	09/11/14	100	4754	22.1	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2287	05/01/12	10/01/12	2	0	12.8	10.5	0	0	0	0
W2287	05/21/13	10/08/13	6	3	20.9	16.1	1	0	0	0
W2287	06/16/14	09/11/14	4	4	20.5	17.3	1	0	0	0
W2287	06/16/15	09/10/15	4	4	23.9	21.2	3	2	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2287	05/21/13	10/08/13	4	5.3	5.9	4	4
W2287	06/16/14	09/11/14	4	5.2	5.7	4	4
W2287	06/16/15	09/10/15	4	5.6	6	4	3

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2287	2012	4	0.009	0.028	0.020	--	--	--	--	5	0
W2287	2013	3	0.007	0.059	0.027	2.3	0.7	83.5	5.9	4	0
W2287	2014	4	0.005	0.014	0.010	2.4	0.8	85.3	5.7	4	0
W2287	2015	4	0.005	0.016	0.012	2.3	0.8	85.9	6.0	4	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2287	2012	5	0.020	0.020	0.020	0	0
W2287	2013	3	0.020	0.020	0.020	0	0
W2287	2014	4	0.020	0.020	0.020	0	0
W2287	2015	4	0.040	0.094	0.054	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2287	2012	5	3	4	4	0	0
W2287	2013	3	3	4	4	0	0
W2287	2014	4	3	4	4	0	0
W2287	2015	4	4	5	4	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2287	05/21/13	10/08/13	4	23	33	0	0	0	0	0	0
W2287	06/16/14	09/11/14	4	27	31	0	0	0	0	0	0
W2287	06/16/15	09/10/15	4	30	34	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in the East Branch Tully River, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020).

Until site-specific data are generated, the Fish Consumption Use for the East Branch Tully River will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff surveyed the East Branch Tully River upstream from Route 68 (Warwick Road) in Royalston (W2287) during the summers of 2012, 2013, 2014, and 2015 as part of the Reference Site Network monitoring project. No objectionable conditions (i.e., odors, deposits, growths, or turbidity) were observed during any of the surveys.

The Aesthetics Use for the East Branch Tully River is assessed as Fully Supporting based on the lack of any objectionable conditions documented by MassDEP staff during the summers of 2012, 2013, 2014, and 2015.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2287	MassDEP	Water Quality	East Branch Tully River	[approximately 2000 feet upstream from Route 68 (Warwick Road), Royalston]	42.695393	-72.227184

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2287	East Branch Tully River	2012	5	MassDEP aesthetics observations for station W2287 on East Branch Tully River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2012.
W2287	East Branch Tully River	2013	5	MassDEP aesthetics observations for station W2287 on East Branch Tully River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2013.
W2287	East Branch Tully River	2014	4	MassDEP aesthetics observations for station W2287 on East Branch Tully River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2014.
W2287	East Branch Tully River	2015	4	MassDEP aesthetics observations for station W2287 on East Branch Tully River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2015.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2287	2012	5	5	0
W2287	2013	5	4	0
W2287	2014	4	4	0
W2287	2015	4	4	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2287	East Branch Tully River	2012	Color	Light Yellow/Tan	3	5
W2287	East Branch Tully River	2012	Color	Reddish	2	5
W2287	East Branch Tully River	2012	Objectionable Deposits	No	5	5
W2287	East Branch Tully River	2012	Odor	Musty (Basement)	1	5
W2287	East Branch Tully River	2012	Odor	None	3	5
W2287	East Branch Tully River	2012	Odor	NR	1	5
W2287	East Branch Tully River	2012	Scum	No	4	5
W2287	East Branch Tully River	2012	Scum	NR	1	5
W2287	East Branch Tully River	2012	Turbidity	None	5	5
W2287	East Branch Tully River	2013	Color	Light Yellow/Tan	3	5
W2287	East Branch Tully River	2013	Color	Reddish	1	5
W2287	East Branch Tully River	2013	Color	Rusty	1	5
W2287	East Branch Tully River	2013	Objectionable Deposits	No	5	5

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2287	East Branch Tully River	2013	Odor	None	5	5
W2287	East Branch Tully River	2013	Scum	No	3	5
W2287	East Branch Tully River	2013	Scum	Yes	2	5
W2287	East Branch Tully River	2013	Turbidity	None	5	5
W2287	East Branch Tully River	2014	Color	None	2	4
W2287	East Branch Tully River	2014	Color	Reddish	2	4
W2287	East Branch Tully River	2014	Objectionable Deposits	No	4	4
W2287	East Branch Tully River	2014	Odor	None	4	4
W2287	East Branch Tully River	2014	Scum	No	4	4
W2287	East Branch Tully River	2014	Turbidity	None	4	4
W2287	East Branch Tully River	2015	Color	Light Yellow/Tan	1	4
W2287	East Branch Tully River	2015	Color	Reddish	3	4
W2287	East Branch Tully River	2015	Objectionable Deposits	No	4	4
W2287	East Branch Tully River	2015	Odor	None	4	4
W2287	East Branch Tully River	2015	Scum	No	4	4
W2287	East Branch Tully River	2015	Turbidity	None	4	4

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for the East Branch Tully River, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for the East Branch Tully River, so it is Not Assessed.	

East Templeton Pond (MA35022)

Location:	Templeton.
AU Type:	FRESHWATER LAKE
AU Size:	9 ACRES
Classification/Qualifier:	B

No usable data were available for East Templeton Pond (MA35022) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

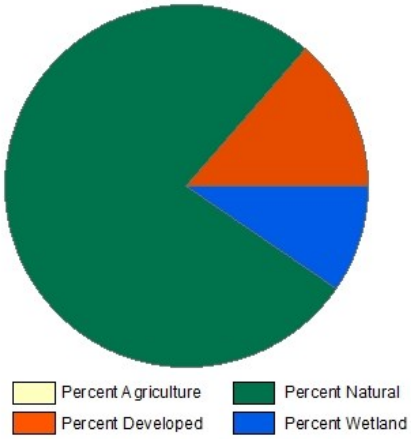
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Ellinwood Brook (MA35-22)

Location:	Headwaters, outlet unnamed pond east of Woodlawn Road, Athol to inlet of White Pond, Athol.
AU Type:	RIVER
AU Size:	3.6 MILES
Classification/Qualifier:	B

Ellinwood Brook - MA35-22

Watershed Area: 3.2 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.2	2.91	0.52	0.52
Agriculture	0.8%	0.9%	0%	0%
Developed	13.5%	14.9%	8.2%	8.2%
Natural	76.2%	73.9%	72.2%	72.2%
Wetland	9.5%	10.3%	19.6%	19.6%
Impervious Cover	3.7%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Recommendations

2022 Recommendations
ALU: Additional metal sampling, particularly given the chronic lead criteria exceedances (TUs ranged 1.6 to 6.4 in July to September 2011 clean technique samples site W2199, n=3), should be a high priority to better evaluate the four-day average lead concentrations in Ellinwood Brook (MA35-22).

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

MassDEP biologists sampled Ellinwood Brook upstream from South Athol Road in Athol during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated 7) although not all was available for the 2016 IR update. The benthic community (B0720) sample, collected in July 2011, had an IBI score of 67 (indicative of satisfactory conditions for a high gradient Central Hills region stream). Backpack electrofishing (Sample ID 4595) in August 2011 documented a sample that was well represented (41%) by multiple age classes of Eastern brook trout indicative of excellent habitat conditions. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2199) can be summarized as follows: minimum dissolved oxygen 7.6mg/L during three short term DO deploys, maximum temperature 23.9°C between June 1st and September 15th with 7DADM exceeding 20°C 64 times. The maximum 24-hour rolling average temperature was 23.0°C, pH ranged from 6.9 to 7.0SU (n=5), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was 0.015mg/L, max diel DO shift only 1.0mg/L, maximum saturation 96%, maximum pH 7.0SU, and no observations of any dense/very dense filamentous algae of five site visits). With the exception of chronic lead criteria exceedances (TUs ranging from 1.6 to 6.4), there were no other toxicant issues (maximum total ammonia-nitrogen concentration was 0.05mg/L, chloride was 98mg/L (n=5), and there were no other exceedances of any of clean metals or aluminum samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out).
The Aquatic Life Use for Ellinwood Brook will continue to be assessed as Fully Supporting based on the benthic macroinvertebrate, fish population, and most of the water quality monitoring data collected by MassDEP during the summer of 2011. While temperatures often exceeded 20°C, this watershed area is ~86% natural/wetland with 3.7% Impervious Cover, and the proximal stream buffer is also minimally disturbed (92% natural/wetland) nor are their dams or water withdrawals, so these conditions are considered naturally occurring. The former Alert for the chronic lead criteria exceedances is being carried forward and addition sampling is being recommended to better evaluate lead toxicity concerns.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4595	MassDEP	Fish Community	Ellinwood Brook	0.85mi US of S. Athol Rd, next to golf course. DEP station MAP2-045, Athol	42.55624	-72.23103
B0720	MassDEP	Benthic	Ellinwood Brook/	[approximately 1370 meters upstream from South Athol Road, Athol, MA]	42.556236	-72.231027
W2199	MassDEP	Water Quality	Ellinwood Brook	[approximately 4500 feet upstream from South Athol Road, Athol]	42.556236	-72.231027

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0720	07/07/11	RBP kicknet	Central_Hills_100ct	100	67	S

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	Ellinwood Brook -- 0.85mi US of S. Athol Rd, next to golf course. DEP station MAP2-045, Athol (42.55624, 72.23103)		
Habitat Comments	DEP survey.		
Efficiency	(Seconds Shocked - 1396)		
Sample Date	**Species**	8	
08/26/11	**Total Ind**	32	
Method	**% Dom**	41%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	1	41%
3522850	FD	1	6%
	MG	6	53%
	Tolerant	**Species**	**% Ind**
	I	1	41%
	M	6	53%
	T	1	6%
	SampleID	4595	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
Black crappie	BC	1	50	50	W	MG	M	Top Carnivore
Chain pickerel	CP	1	90	90	W	MG	M	Top Carnivore
Brook trout	EBT	13	71	260	C	FS	I	Top Carnivore
Largemouth bass	LMB	1	53	53	W	MG	M	Top Carnivore
Pumpkinseed	P	1	72	72	W	MG	M	Generalist Feeder
White sucker	WS	2	75	190	CW	FD	T	Generalist Feeder
Yellow perch	YP	12	61	125	CW	MG	M	Top Carnivore
Redfin pickerel	RP	1	135	135	WB	MG	M	Top Carnivore

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2199	2011	3	12	7.6	7.8	8	1	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2199	05/11/11	10/05/11	5	8.2	8.5	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2199	06/01/11	09/15/11	107	107	23.0	23.9	22.1	21.2	64	0	1	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2199	2011	3	12	21.8	22.6	21.3	20.5	2	0	0	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2199	06/01/11	09/15/11	107	5136	23.0	0	0	0
W2199	06/03/11	08/10/11	68	571	21.8	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2199	05/11/11	10/05/11	6	5	20.2	17.9	1	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2199	05/11/11	10/05/11	5	6.9	7	0	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2199	2011	5	0.007	0.020	0.015	1.0	0.6	96.1	7.0	6	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)
[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2199	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)
[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2199	2011	3	0	0	0	0	3	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)
[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2199	07/06/11	0.4	0.8	0.6	0.74	0.1	3.4
W2199	07/28/11	0.3	0.7	0.2	0.33	0.1	1.6
W2199	09/01/11	0.7	0.0	0.5	0.65	0.2	6.4

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2199	2011	3	0.022	0.067	0.048	0.2	0.3	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2199	2011	5	0.020	0.050	0.026	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2199	2011	5	59	98	79	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2199	05/11/11	10/05/11	5	272	374	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

Athough no fish toxics monitoring has been conducted in Ellinwood Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020) . Until site-specific data are generated, the Fish Consumption Use for Elllinwood Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff conducted sampling in Ellinwood Brook ~4500 feet upstream from South Athol Road in Athol (W2199) during the summer of 2011. There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at either of these two sampling sites. The Aesthetics Use for Ellinwood Brook will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff in the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2199	MassDEP	Water Quality	Ellinwood Brook	[approximately 4500 feet upstream from South Athol Road, Athol]	42.556236	-72.231027

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2199	Ellinwood Brook	2011	6	MassDEP aesthetics observations for station W2199/MAP2-045 on Ellinwood Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2199	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2199	Ellinwood Brook	2011	Color	Brownish	1	6
W2199	Ellinwood Brook	2011	Color	Light Yellow/Tan	3	6
W2199	Ellinwood Brook	2011	Color	Reddish	2	6
W2199	Ellinwood Brook	2011	Objectionable Deposits	No	6	6
W2199	Ellinwood Brook	2011	Odor	None	6	6
W2199	Ellinwood Brook	2011	Scum	No	4	6
W2199	Ellinwood Brook	2011	Scum	Yes	2	6
W2199	Ellinwood Brook	2011	Turbidity	None	6	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP employees staff collected *E. coli* bacteria samples from Ellinwood Brook approximately 4500 feet upstream from South Athol Road, in Athol (W2199) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 25 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for Ellinwood Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2199	MassDEP	Water Quality	Ellinwood Brook	[approximately 4500 feet upstream from South Athol Road, Athol]	42.556236	-72.231027

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

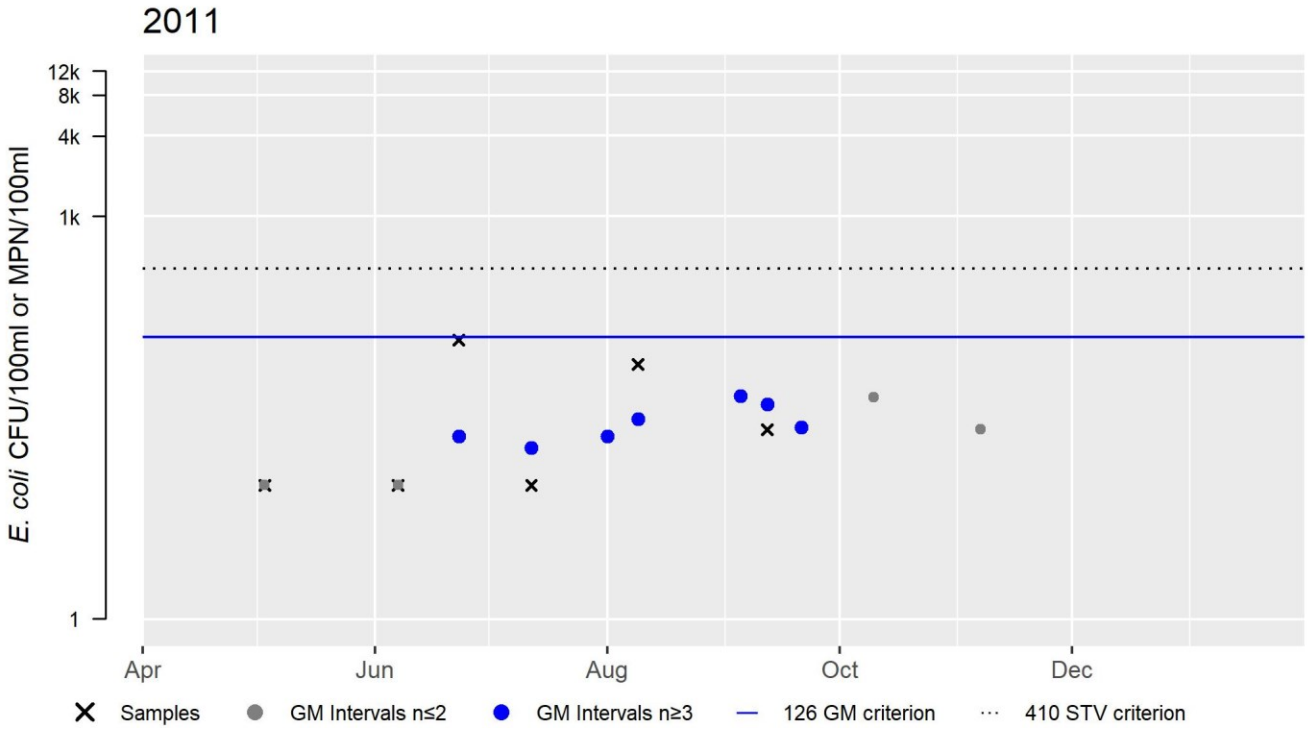
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2199	MassDEP	E. coli	05/03/11	09/12/11	6	10	120	25

W2199 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	25
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Ellinwood Brook approximately 2500 feet upstream from South Athol Road, in Athol (W2199) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 25 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for Ellinwood Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2199	MassDEP	Water Quality	Ellinwood Brook	[approximately 4500 feet upstream from South Athol Road, Athol]	42.556236	-72.231027

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

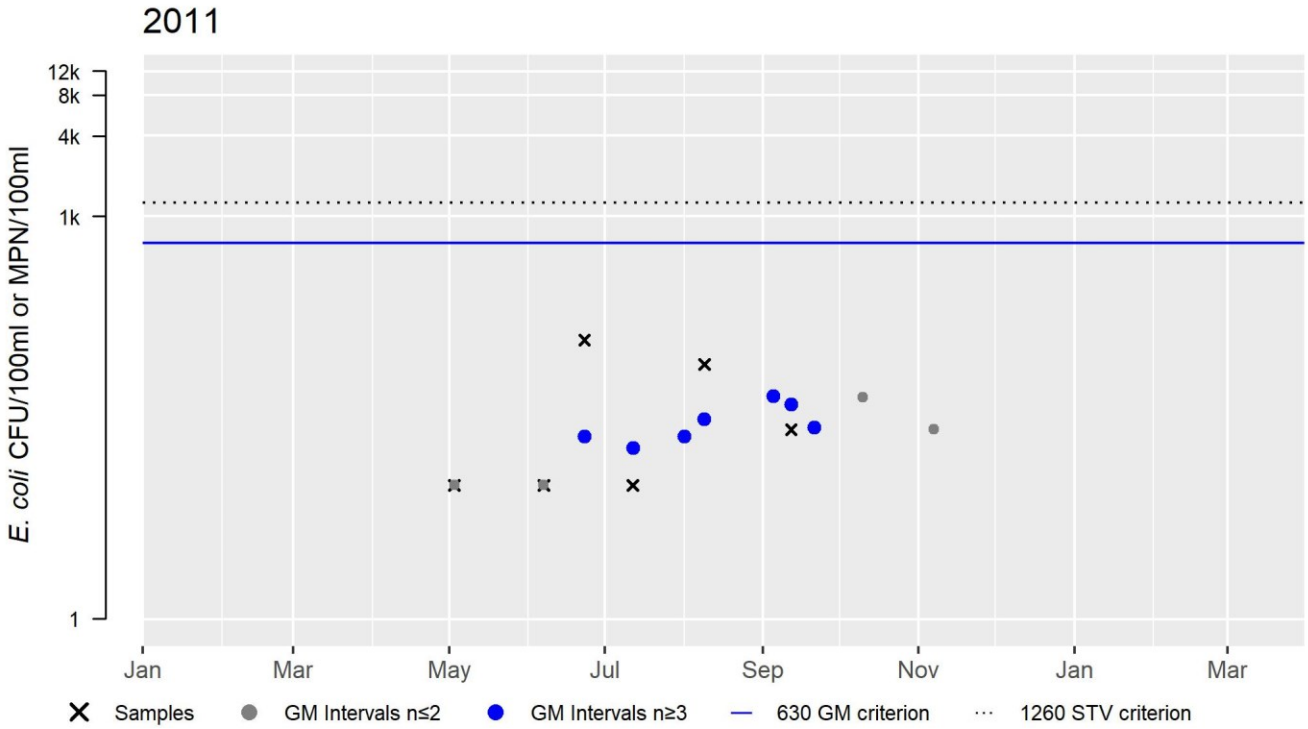
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2199	MassDEP	E. coli	05/03/11	09/12/11	6	10	120	25

W2199 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	25
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Ellis Pond (MA35023)

Location:	Athol.
AU Type:	FRESHWATER LAKE
AU Size:	88 ACRES
Classification/Qualifier:	A: PWS, ORW

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
4c	4c	(Eurasian Water Milfoil, Myriophyllum Spicatum*)		Unchanged
4c	4c	(Fanwort*)		Added
4c	4c	(Non-Native Aquatic Plants*)		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Unspecified Urban Stormwater (Y)			X	X	X
(Eurasian Water Milfoil, Myriophyllum Spicatum*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

As was previously noted, a diagnostic/feasibility study of Ellis Pond identified infestations of the non-native aquatic macrophytes, Eurasian water milfoil (*Myriophyllum spicatum*) and variable milfoil (*M. heterophyllum*) in 1986. MassDEP staff subsequently reported infestations of the non-natives, fanwort (*Cabomba caroliniana*) and water hyacinth (*Eichornia crassipes*) in the pond during an August 1995 synoptic survey.
The Aquatic Life Use for Ellis Pond will continue to be assessed as Not Supporting with the Eurasian water milfoil (Myriophyllum spicatum) and the generic Non-Native Aquatic Plants impairments being carried forward. A Fanwort impairment is being added.

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (Baystate Environmental 1987, MassDEP 1995)

Summary Statement
As was previously noted, a diagnostic/feasibility study of Ellis Pond identified infestations of the non-native aquatic macrophytes, Eurasian water milfoil (*Myriophyllum spicatum*) and variable milfoil (*M. heterophyllum*) in 1986. MassDEP staff subsequently reported infestations of the non-natives, fanwort (*Cabomba caroliniana*) and water hyacinth (*Eichornia crassipes*) in the pond during an August 1995 synoptic survey.

Fish Consumption

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Ellis Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
No new data are available so the Aesthetics Use for Ellis Pond will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
No new data are available so the Primary Contact Recreational Use for Ellis Pond will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward.	

Secondary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
No new data are available so the Secondary Contact Recreational Use for Ellis Pond will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward	

Fish Brook (MA35-38)

Location:	Headwaters east of Bliss Hill Road, Royalston to mouth at confluence with West Branch Tully River, Orange.
AU Type:	RIVER
AU Size:	3.4 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Fish Brook (MA35-38) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Gales Pond (MA35024)

Location:	Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	12 ACRES
Classification/Qualifier:	B

No usable data were available for Gales Pond (MA35024) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Mercury in Fish Tissue	33880	Unchanged
5	5	Turbidity		Unchanged

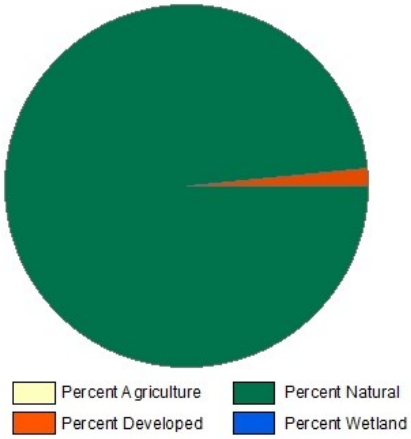
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			
Turbidity	Source Unknown (N)			X	X	X

Gate Hill Brook (MA35-39)

Location:	Headwaters east of Bear Mountain Road, Wendell to mouth at confluence with Mormon Hollow Brook, Wendell.
AU Type:	RIVER
AU Size:	0.7 MILES
Classification/Qualifier:	B: CWF

Gate Hill Brook - MA35-39

Watershed Area: 0.42 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	0.42	0.42	0.09	0.09
Agriculture	0%	0%	0%	0%
Developed	1.5%	1.5%	1.7%	1.7%
Natural	98%	98%	96%	96%
Wetland	0.5%	0.5%	2.4%	2.4%
Impervious Cover	0.5%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	5	PCBs in Fish Tissue		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MA DFG biologists conducted backpack electrofishing in Gate Hill Brook upstream of Farley Road (at Bear Mount Trail) in Wendell (SampleID 5392) in August 2014. The sample was comprised entirely by multiple age classes of Eastern brook trout. The Aquatic Life Use of Gate Hill Brook is assessed as Fully Supporting based on the presence of cold water fish species which are indicate of excellent habitat and water quality conditions.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5392	MassDFG	Fish Community	Gates Hill Brook	US of Farley Rd (at Bear Mtn Trail), Wendell	42.56906	-72.42648

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net]

[Species List: EBT = Brook Trout]

Sample ID	Sample Date	Method	Sample Type	Total Taxa	Total Ind	EBT Ind	EBT Min Length (mm)	EBT Max Length (mm)	EBT ≤140mm Ind	SC Ind	Cold Ind %	Fluvial Ind %	Notables	CFR	Species List
5392	08/11/14	BP	TP	1	78	78	40	168	74	0	100%	100%	No	Yes	EBT,

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
Athough no fish toxics monitoring has been conducted in Gate Hill Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for Gate Hill Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	

No data are available to assess the status of the Aesthetics Use for Gate Hill Brook, so it is Not Assessed.

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Gate Hill Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Gate Hill Brook, so it is Not Assessed.	

Greenwood Pond (MA35025)

Location:	Westminster.
AU Type:	FRESHWATER LAKE
AU Size:	27 ACRES
Classification/Qualifier:	B

No usable data were available for Greenwood Pond (MA35025) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Greenwood Pond (MA35026)

Location:	Templeton.
AU Type:	FRESHWATER LAKE
AU Size:	12 ACRES
Classification/Qualifier:	B

No usable data were available for Greenwood Pond (MA35026) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Discharges from Municipal Separate Storm Sewer Systems (MS4) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X

Hastings Pond (MA35028)

Location:	Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	18 ACRES
Classification/Qualifier:	B

No usable data were available for Hastings Pond (MA35028) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Hilchey Pond (MA35029)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	8 ACRES
Classification/Qualifier:	B

No usable data were available for Hilchey Pond (MA35029) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	Turbidity	4128	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Turbidity	Source Unknown (N)			X	X	X

Hoyt Brook (MA35-40)

Location:	Headwaters east of Colony Road, Phillipston to mouth at confluence with Beaver Brook, Phillipston.
AU Type:	RIVER
AU Size:	1.4 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Hoyt Brook (MA35-40) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

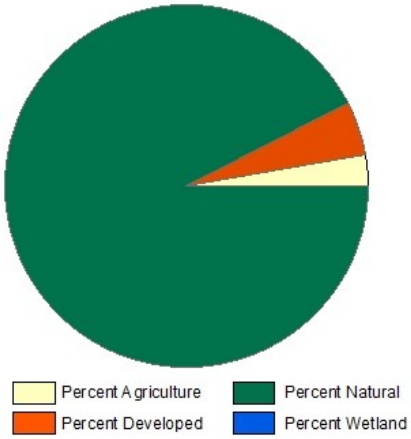
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Jacks Brook (MA35-31)

Location:	Headwaters south of Orange Road, Northfield to mouth at confluence with Keyup Brook, Erving.
AU Type:	RIVER
AU Size:	2.7 MILES
Classification/Qualifier:	B: CWF

Jacks Brook - MA35-31

Watershed Area: 2.03 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.03	2.03	0.34	0.34
Agriculture	2.8%	2.8%	4.8%	4.8%
Developed	4.7%	4.7%	7.1%	7.1%
Natural	91.8%	91.8%	86.6%	86.6%
Wetland	0.8%	0.8%	1.5%	1.5%
Impervious Cover	2.3%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP biologists sampled Jacks Brook upstream from North Street in Erving during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community (B0715) sample, collected in July 2011, had an IBI score of 79 (indicative of excellent conditions for a high gradient Central Hills region stream). Backpack electrofishing (Sample ID 4572) in August 2011 documented a sample that was comprised entirely by fluvial fish including multiple age classes of Eastern brook trout which is indicative of excellent habitat conditions. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2193) can be summarized as follows: minimum dissolved oxygen 8.0mg/L during three short term DO deploys, maximum temperature 19.4°C between June 1st and September 15th with a maximum 24-hour rolling average temperature of 18.8°C, pH ranged from 6.4 to 6.8SU (n=5), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was low at 0.006mg/L, max diel DO shift only 0.8mg/L, maximum saturation 97%, maximum pH 6.8SU, and no observations of any dense/very dense filamentous algae of five site visits). There were no toxicant issues (maximum total ammonia-nitrogen concentration was 0.05mg/L, chloride was 8mg/L (n=5), and there were no exceedances of any of clean metals or aluminum samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out).
The Aquatic Life Use for Jacks Brook will continue to be assessed as Fully Supporting based on the benthic macroinvertebrate, fish population, and water quality monitoring data collected by MassDEP during the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4572	MassDEP	Fish Community	Jacks Brook	~175ft US of North St, DEP station MAP2-033, Erving	42.61498	-72.40184
B0715	MassDEP	Benthic	Jacks Brook/	[approximately 55 meters upstream from North Street, Erving, MA]	42.614980	-72.401840
W2193	MassDEP	Water Quality	Jacks Brook	[approximately 175 feet upstream from North Street, Erving]	42.614980	-72.401840

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)
[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0715	07/07/11	RBP kicknet	Central_Hills_100ct	102	79	E

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)
[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	Jacks Brook -- ~175ft US of North St, DEP station MAP2-033, Erving (42.61498, 72.40184)

Habitat Comments	DEP survey. Hay field on left w/ small buffer strip. Some exposed beds, especially at meanders.		
Efficiency	(Seconds Shocked - 1366)		
Sample Date	**Species**	2	
08/04/11	**Total Ind**	219	
Method	**% Dom**	69%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	2	100%
3522400	FD	0	0%
	MG	0	0%
	Tolerant	**Species**	**% Ind**
	I	1	31%
	M	0	0%
	T	1	69%
	SampleID	4572	

Common Name	**Fish Code**	**Count**	**Min Length**	**Max Length**	**Temp**	**FG**	**PT**	**Function**
Blacknose dace	BND	151	58	80	CW	FS	T	Generalist Feeder
Brook trout	EBT	68	50	190	C	FS	I	Top Carnivore

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2193	2011	3	12	8	8.1	8.3	0.8	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2193	05/11/11	10/05/11	6	8.6	9.2	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2193	06/01/11	09/15/11	107	107	18.7	19.4	18.4	17.8	0	0	0	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2193	2011	3	12	18.8	19.5	18.8	18.1	0	0	0	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2193	06/01/11	09/15/11	107	5136	18.8	0	0	0
W2193	06/03/11	08/10/11	68	572	18.8	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2193	05/11/11	10/05/11	7	6	18.1	14.8	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2193	05/11/11	10/05/11	6	6.4	6.8	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2193	2011	5	0.005	0.006	0.005	0.8	0.6	96.7	6.8	6	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2193	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2193	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2193	07/06/11	0.9	0.0	0.3	0.32	0.1	0.0
W2193	07/28/11	0.4	0.6	0.3	0.35	0.1	0.0
W2193	09/01/11	0.5	0.8	0.3	0.40	0.1	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2193	2011	3	0.012	0.023	0.018	0.1	0.1	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2193	2011	5	0.020	0.050	0.026	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2193	2011	5	5	8	7	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2193	05/11/11	10/05/11	6	49	65	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in Jacks Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020) .

Until site-specific data are generated, the Fish Consumption Use for Jacks Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff conducted sampling in Jacks Brook upstream from North Street in Erving during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. No objectionable conditions (odors, deposits, growths, or turbidity) were noted.

The Aesthetics Use for Jacks Brook is assessed as Fully Supporting

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2193	MassDEP	Water Quality	Jacks Brook	[approximately 175 feet upstream from North Street, Erving]	42.614980	-72.401840

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2193	Jacks Brook	2011	6	MassDEP aesthetics observations for station W2193/MAP2-033 on Jacks Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2193	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2193	Jacks Brook	2011	Color	None	6	6
W2193	Jacks Brook	2011	Objectionable Deposits	No	6	6
W2193	Jacks Brook	2011	Odor	None	6	6
W2193	Jacks Brook	2011	Scum	No	6	6
W2193	Jacks Brook	2011	Turbidity	None	6	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Jacks Brook upstream from North Street in Erving (W2193) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 31 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for Jacks Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2193	MassDEP	Water Quality	Jacks Brook	[approximately 175 feet upstream from North Street, Erving]	42.614980	-72.401840

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

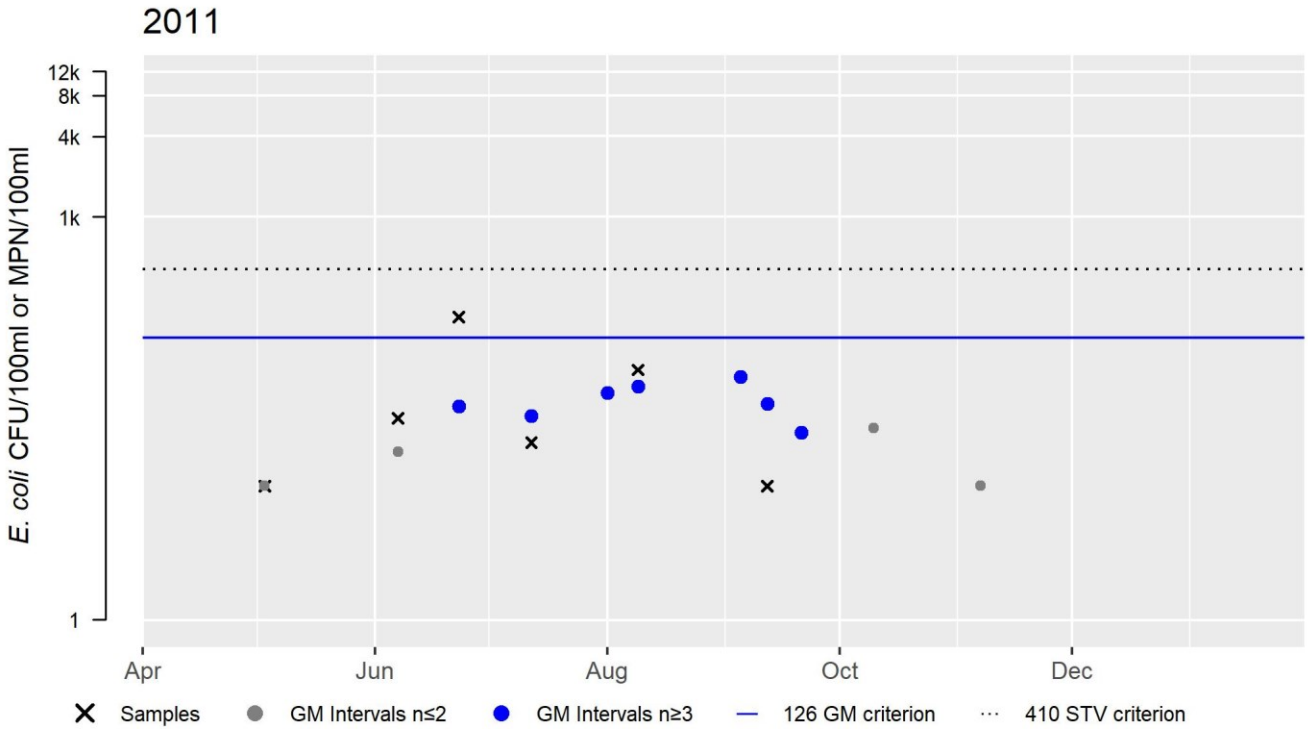
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2193	MassDEP	E. coli	05/03/11	09/12/11	6	10	180	31

W2193 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	31
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Jacks Brook upstream from North Street in Erving (W2193) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals has GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 31 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for Jacks Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2193	MassDEP	Water Quality	Jacks Brook	[approximately 175 feet upstream from North Street, Erving]	42.614980	-72.401840

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

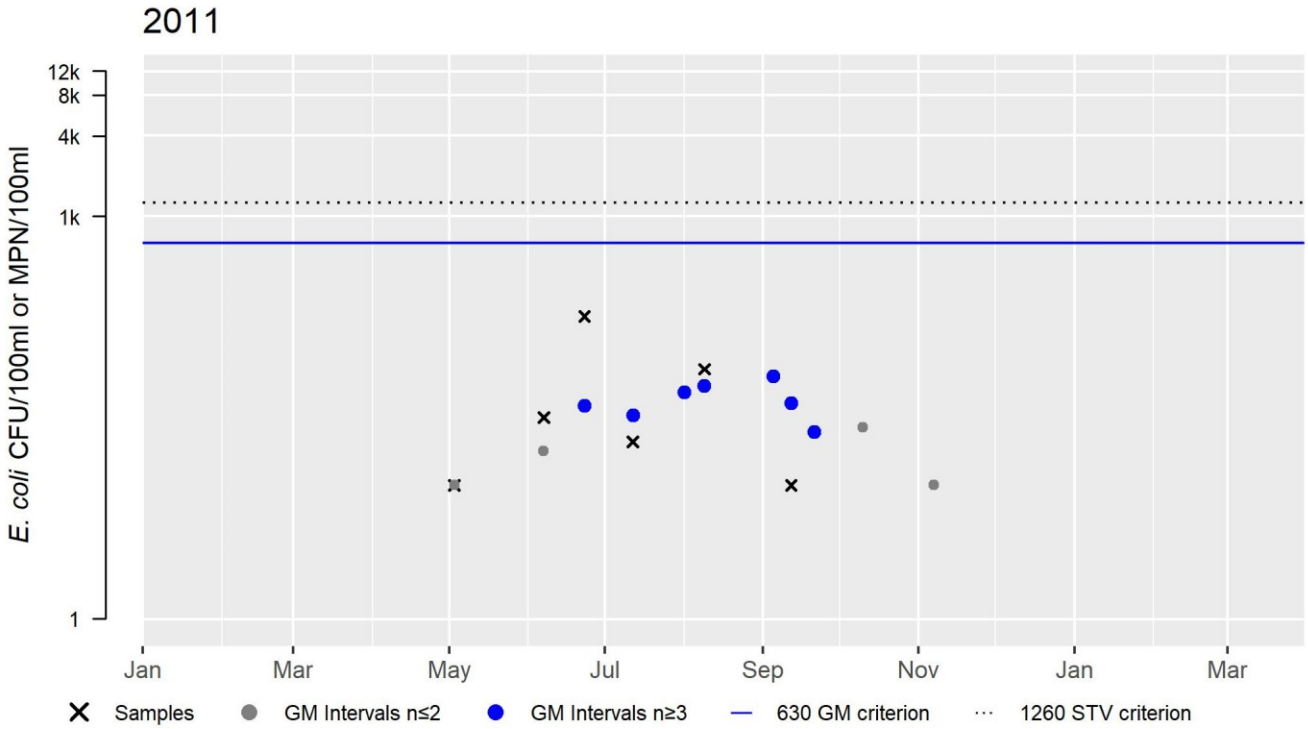
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2193	MassDEP	E. coli	05/03/11	09/12/11	6	10	180	31

W2193 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	31
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Kendall Pond (MA35034)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	22 ACRES
Classification/Qualifier:	B

No usable data were available for Kendall Pond (MA35034) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Kenny Brook (MA35-41)

Location:	Headwaters north of Greenhall Road, Royalston to mouth at confluence with Millers River, Royalston.
AU Type:	RIVER
AU Size:	1.1 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Kenny Brook (MA35-41) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Keyup Brook (MA35-16)

Location:	Headwaters Great Swamp Northfield State Forest, Northfield, to confluence with Millers River, Erving.
AU Type:	RIVER
AU Size:	5 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Keyup Brook (MA35-16) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Escherichia Coli (E. Coli)		Unchanged
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Escherichia Coli (E. Coli)	Source Unknown (N)				X	
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Lake Denison (MA35017)

Location:	Winchendon.
AU Type:	FRESHWATER LAKE
AU Size:	83 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	5	Dissolved Oxygen	4123	Unchanged
4a	5	Enterococcus		Added
4a	5	Mercury in Fish Tissue	33880	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Dissolved Oxygen	Rural (Residential Areas) (Y)	X				
Dissolved Oxygen	Unspecified Urban Stormwater (Y)	X				
Enterococcus	Source Unknown (N)				X	
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new data are available so the Aquatic Life Use for Lake Denison will continue to be assessed as Not Supporting with the Dissolved Oxygen impairment being carried forward.	

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for Lake Denison will continue to be assessed as Not Supporting with the Mercury in Fish Tissue impairment being carried forward. MA DPH advises Children under 12, pregnant women, nursing mothers, women of child-bearing age do not eat Largemouth Bass Lake Denison while the general public should limit consumption of Largemouth Bass to 2 meals/month due to elevated mercury (MassDPH 2021).	

Aesthetic

2022 Use Attainment	Alert

Insufficient Information	YES
2022 Use Attainment Summary	
C-HAB postings for Lake Dennison (MA35017) were reported to MA DPH for 14 days in 2019. Since blooms >20 days in length were not reported, an impairment decision will not be made at this time. Too limited data are available to assess the Aesthetics Use of Lake Denison, so it is assessed as having Insufficient Information. An Alert, however, is being identified for C-HABs.	

Algal Bloom Information

Cyanobacteria Harmful Algal Bloom (C-HAB) Summary Statements for 2015-2019 MassDPH Data (Bailey, Logan April 15, 2021) (MassDEP Undated 4)

C-HAB Summary Statement
C-HAB postings for Lake Dennison (MA35017) were reported to MassDPH for 14 days in 2019. Since blooms >20 days in length were not reported, an impairment decision will not be made at this time. However, an Alert is being identified for C-HABs.

Cyanobacteria Harmful Algal Bloom (C-HAB) Data (2015-2019) Provided by MassDPH (Bailey, Logan April 15, 2021)

Waterbody	Sample Analysis Used in Issuing Advisory	Bloom Days, 2015	Bloom Days, 2016	Bloom Days, 2017	Bloom Days, 2018	Bloom Days, 2019	# Years with >20 Days of Closure	>1 Posting Per Year
Lake Dennison	Not issued or confirmed by sampling					14	0	no

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	YES
2022 Use Attainment Summary	
There are two DCR public beach areas on Lake Denison in the Lake Denison State Park in Winchendon, the Lake Denison Day Use Beach on the southern shore and the Lake Denison Campers Beach on the northern shore (both identified with Beach ID 5182). Two years between 2014 and 2019 (2016 and 2019) had postings that exceeded 10% of the swimming season (12 and 29%, respectively) based on Enterococci bacteria sample data. The Primary Contact Recreational Use for Lake Denison is assessed as Not Supporting since there were two years including the most recent year when postings exceeded 10% of the swimming season. An Enterococcus impairment is being added and an Alert for a CHAB bloom is also being identified.	

Beach Postings

MassDPH Beach Posting Data Summary (% Bathing Season Posted 2014-2019) (Bailey, Logan Feb. 2, 2021) (MassDEP Undated 4)

Beach ID	Beach Name/Town	Left Boundary (Latitude)	Left Boundary (Longitude)	Right Boundary (Latitude)	Right Boundary (Longitude)	2014	2015	2016	2017	2018	2019	# years> 10%
5182	Lake Dennison State Park (DCR)/Winchendon*	42.64754	-72.08893	42.64747	-72.08880	0%	3%	12%	0%	9%	29%	2

Beach ID	Beach Name/Town	Left Boundary (Latitude)	Left Boundary (Longitude)	Right Boundary (Latitude)	Right Boundary (Longitude)	2014	2015	2016	2017	2018	2019	# years> 10%
5182	Lake Dennison State Park (DCR)/Winchendon**	42.64117	-72.08760	42.64079	-72.08680	0%	3%	12%	0%	9%	29%	2

Note: Lake Denison State Park has two beaches Campers Beach* on the northern shore and Day Use Beach** on the southern shore. Enterococcus bacteria sampling is conducted at these beaches (MassDPH Undated).

Secondary Contact Recreation

2022 Use Attainment	Alert
Insufficient Information	YES

2022 Use Attainment Summary

There are two DCR public beach areas on Lake Denison in the Lake Denison State Park in Winchendon, the Lake Denison Day Use Beach on the southern shore and the Lake Denison Campers Beach on the northern shore (both identified with Beach ID 5182). Two years between 2014 and 2019 (2016 and 2019) had postings that exceeded 10% of the swimming season (12 and 29%, respectively) based on Enterococci bacteria sample data. C-HAB postings for Lake Dennison (MA35017) were reported to MA DPH for 14 days in 2019. Since blooms >20 days in length were not reported, an impairment decision will not be made at this time.

Too limited data are available to assess the Secondary Contact Recreational Use of Lake Denison, so it is assessed as having Insufficient Information. An Alert, however, is being identified for C-HABs

Lake Mattawa (MA35112)

Location:	Orange.
AU Type:	FRESHWATER LAKE
AU Size:	112 ACRES
Classification/Qualifier:	A: PWS, ORW (PWS and Tributary to PWS)

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	4c	(Non-Native Aquatic Plants*)		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
In 2003, MassDCR Lakes and Ponds staff reported an infestation of the non-native aquatic macrophyte, variable milfoil (*Myriophyllum heterophyllum*), in Lake Mattawa. The Aquatic Life Use for Lake Mattawa is assessed as Not Supporting because of the infestation of the non-native aquatic macrophyte *M. heterophyllum* so the Non-Native Aquatic Plants impairment is being added.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDCR 2008)

Summary Statement
In 2003, MassDCR Lakes and Ponds staff reported an infestation of the non-native aquatic macrophyte, variable milfoil (*Myriophyllum heterophyllum*), in Lake Mattawa.

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	

No recent fish toxics sampling has been conducted in Lake Mattawa, and since no site-specific advisory has been issued the Fish Consumption Use is Not Assessed.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Lake Mattawa, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Lake Mattawa, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Lake Mattawa, so it is Not Assessed	

Lake Monomonac (MA35047)

Location:	Massachusetts portion only. Winchendon/Rindge,N.H.
AU Type:	FRESHWATER LAKE
AU Size:	186 ACRES
Classification/Qualifier:	B

No usable data were available for Lake Monomonac (MA35047) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Non-Native Aquatic Plants*)		Unchanged
5	5	Mercury in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Mercury in Fish Tissue	Source Unknown (N)		X			

Lake Rohunta (MA35070)

Location:	(Middle Basin) Athol/Orange/New Salem.
AU Type:	FRESHWATER LAKE
AU Size:	209 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	4a	(Aquatic Plants (Macrophytes)*)		Changed
5	4a	(Fanwort*)		Added
5	4a	(Non-Native Aquatic Plants*)		Unchanged
5	4a	Mercury in Fish Tissue	33880	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Source Unknown (N)			X	X	X
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X		X	X	X
Mercury in Fish Tissue	Atmospheric Deposition (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Aquatic Plants (Macrophytes)	Not caused by a pollutant (4c)	As described in detail in the 2022 CALM guidance document (MassDEP 2022), the mapping of Aquatic Plants (Macrophytes) impairments as a pollutant is being reevaluated. Lake Rohunta (Middle Basin) (MA35070) was first listed as impaired for Noxious Aquatic Plants in 1998 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on an August 1995 synoptic survey conducted by MassDEP staff in which it was noted that there was a 100% density of aquatic plants observed from the viewing location (mainly floating vegetation as well as Carex sp. which are sedges) (MassDEP 1995, MassDEP 2002). In Google Earth images from July 2006, August 2016, and September 2019, more than half of the AU is almost completely filled in with vegetation (except for a tiny channel (Google Earth Pro Undated). Based on the high density of aquatic plants covering more than 25% of the lake in multiple years, Aquatic Plants (Macrophytes) is being delisted as a pollutant and added again as a non-pollutant.

Aquatic Plants Macrophytes

1997 WBS Coding Sheet (MassDEP 2002):

WBID: MA35070 WATERSHED: Millers (35) (Printed 02/03/98)
NAME: Lake Rohunta TYPE: Lake/Pond
CODE: 35070 SIZE: 250.00(acres) CLASS: B

LATITUDE: 42.54806
LONGITUDE: 72.27194 (423253/721619)
Lake/Pond Name: Lake Rohunta[Middle Basin] (Ea, Athol/Orange/New Salem
Ecoregion Name: ()
Description: Lake Rohunta (Middle Basin), Athol/Orange/New Salem.

Assessment Date:	9702	**Begin Sampling:**	9508	**303(d) List?:**	No
Cycle:	97	**End Sampling:**	9508	**Pathogens Only?:**	No

Lake Specific Information

Lake size greater than 10 acres?:	Yes
Significantly Publicly Owned:	xxxx
Trophic Status:	Eutrophic
Trophic Trend:	Unknown
Acidity/Toxics Trend:	Unknown
Acidity Effects:	Unknown

Uses	Support	Threat	Partial	Non-Sup	Not-Asses	Not-Attain
OVERALL USE SUPPORT				250.00		
ALUS			250.00			
FISH CONSUMPTION				250.00		
PRIMARY CONTACT				250.00		
SECONDARY CONTACT				250.00		
Aesthetics				250.00		

Nonattainment Causes

Code	Size	Magnitude	"New" Code	Size	Magnitude
0500- Metals	250.00	M			
0501- (Mercury)	250.00	M			
2200- Noxious aquatic plants	250.00	M			
2400- Total toxics	250.00	M			
2600- Exotic species	250.00	M			

Nonattainment Sources

Code	Size	Magnitude	"New" Code	Size	Magnitude
9000- SOURCE UNKNOWN	250.00	H			

Assessment Type
(Assessment Category = > Monitored)
B25- Ecological/habitat surveys (Qualitative/Quantitative)
R35- Primary Producer Surveys

"New" Assessment Category = > M E NA

Media/Pollutants Assessed (Toxics Monitoring = > N)
-

"New" Toxics Monitoring = > YES or NO

Comments:
NO NEW DATA OR INFORMATION AVAILABLE TO MAKE ASSESSMENTS.

1996:
Fish advisory due to mercury.

1997:
August 15, 1995 synoptic survey indicated very dense cover of floating and emergent vegetation in all but central channel, which is maintained by herbicide treatments. Presence of non-native (Cabomba caroliniana) surmised from presence upstream and downstream and citizen information. Fish advisory in effect due to mercury.

Page 83

1995 Synoptic Survey Field Sheet (MassDEP 1995):

Page 1 of 2

Lake/Pond L. Rohunta / Eagleville L. **Date** 15 Aug 95

Town/City Athol / Orange / New Salem **Observers** Penniman / McVoy

River Basin Millers

USGS Topo Orange **PALIS NO.** N - 35106 M - 35070 S - 35107

Location/type of access (be specific, e.g., public boat ramp at west cove area off Simpson Street):

S - S+Middle. Branch Bridge Road causeway - informal dirt boat ramps on either side at west end of causeway

M - King St. Distant observation

N - At dam of Partridgeville Rd; resident only beach to left of dam

Ownership of Location/Access (specify public or private, name of owner(s), and any use restrictions):

Uncertain

Posted signs (re aquatic plants, fish advisories, access, etc.):

None

Water quality observations (clarity, dissolved organic staining, blooms, *et cetera*):

N - Sl. Stain, Sl. turbid

M - Brown turbidity, little water visible

S - Little water open to observe

Page 2 of 2

Record of aquatic plant "species" observed (see note below):

N - Pontederia, Sparganium, P. epihydrus, Nymphaea, Nuphar, Utricularia purpurea, Utricularia vulgaris, Caloumba Caroliniana

likely in all 3 basin

M - Pontedaria, Sagittaria, Brasenia, Najas, Nymphaea, P. epihydrus, Eleocharis, Dulichium, Iris, Sparganium, Carex, Nitella, Potamogeton zaksianus.

S. - Pontedaria, Sagittaria, Sparganium, Nymphaea, Carex, Eleocharis, Nuphar, Phragmites, Lyseemia, Brasenia, Utricularia purpurea, Utricularia sp.

Observed aquatic plant density (at observation site and across lake or pond, if practicable):

N - V. dense submerged around shore near dam - V. dense floating leaf marginally (to 1 st) along east + se. shore w. shore open

M - 100% very dense; carex meadows encroaching s. end of viewed from Kind Street 100% cover floating veg. except central channel

S - Very dense floating + emergent over entire basin

Other notes (e.g., overt pollution, construction, and water uses:

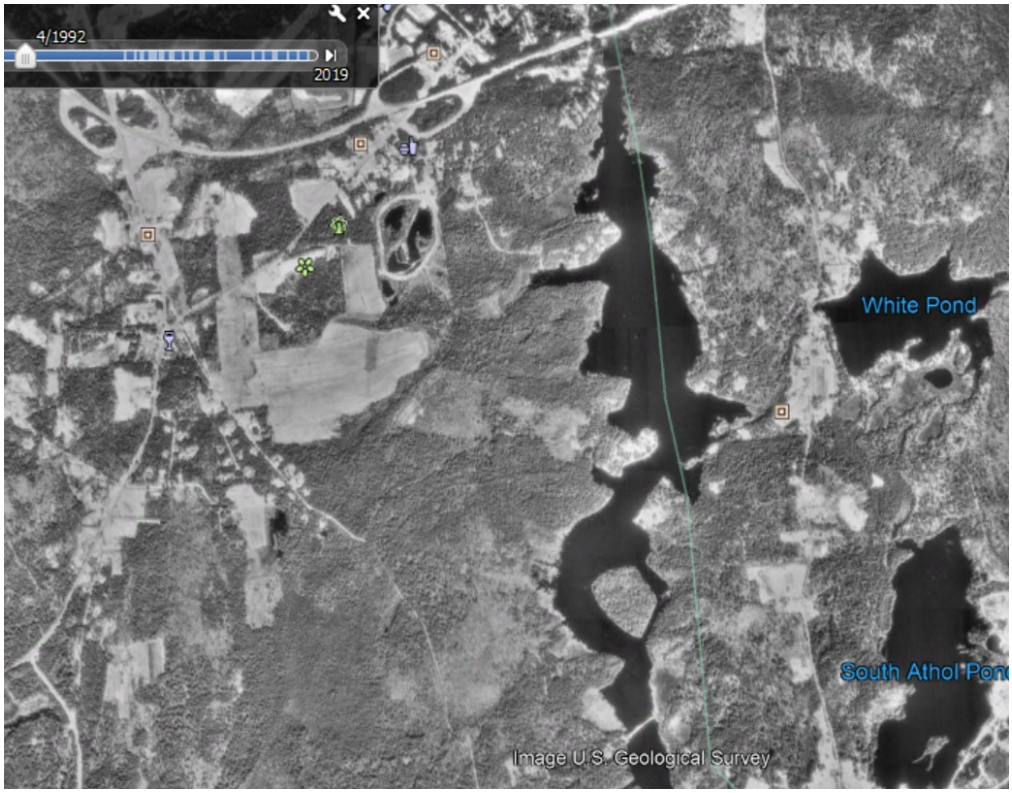
N - No apparent development.

M - Heavily developed - east shore, central channel maintained by recent herbicide treatments

S - No development.

Note: record suspect *M. heterophyllum* plants that may require confirmation once emergent flowering stalks are evident.

Google Earth image of Lake Rohunta (Middle Basin), 4/27/1992 (Google Earth Pro Undated):



Google Earth image of Lake Rohunta (Middle Basin), 7/2/2006 (Google Earth Pro Undated):

USDA Farm Service Agency
Imagery Date: 7/2/2006 42°32'55

Google Earth image of Lake Rohunta (Middle Basin), 8/23/2016 (Google Earth Pro Undated):

Google Earth image of Lake Rohunta (Middle Basin), 9/20/2019 (Google Earth Pro Undated):

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in the Lake Rohunta North Basin during an August 1995 synoptic survey and they judged that the species was likely present in the Middle Basin as well due to the hydrologic connection. Similarly, MassDCR staff confirmed in 2021 that the non-native variable milfoil (*Myriophyllum heterophyllum*) is present in the North Basin and likely the Middle Basin as well due to the hydrologic connection. The Aquatic Life Use for this Lake Rohunta (Middle Basin) AU (MA35070) will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment (for *M. heterophyllum*) being carried forward and a Fanwort (*C. caroliniana*) impairment being added.

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995, Straub March 25, 2021)

Summary Statement
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in the Lake Rohunta North Basin during an August 1995 synoptic survey and they judged that the species was likely present in the Middle Basin as well due to the hydrologic connection. Similarly, MassDCR staff confirmed in 2021 that the non-native variable milfoil (*Myriophyllum heterophyllum*) is present in the North Basin and likely the Middle Basin as well due to the hydrologic connection.

Fish Consumption

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for this Lake Rohunta (Middle Basin) AU (MA35070) will continue to be assessed as Not Supporting with the Mercury in Fish Tissue impairment being carried forward. MA DPH advises Children younger than 12 years, pregnant women, and nursing mothers should not eat any fish from this water body and the general public should limit consumption of all fish from this water body to two meals per month (MassDPH 2021).	

Aesthetic

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
While no new data are available to evaluate the Aesthetics Use for this Lake Rohunta (Middle Basin) AU (MA35070) it will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment being carried forward. The Aquatic Plants (Macrophytes) impairment is being changed from a pollutant to a non-pollutant as detailed in the delisting comment.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
While no new data are available to evaluate the Primary Contact Recreational Use for this Lake Rohunta (Middle Basin) AU (MA35070) it will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment being carried forward. The Aquatic Plants (Macrophytes) impairment is being changed from a pollutant to a non-pollutant as detailed in the delisting comment.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
While no new data are available to evaluate the Secondary Contact Recreational Use for this Lake Rohunta (Middle Basin) AU (MA35070) it will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment being carried forward. The Aquatic Plants (Macrophytes) impairment is being changed from a pollutant to a non-pollutant as detailed in the delisting comment.	

Lake Rohunta (MA35106)

Location:	(North Basin) Athol/Orange.
AU Type:	FRESHWATER LAKE
AU Size:	34 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	(Fanwort*)		Added
4a	4a	(Non-Native Aquatic Plants*)		Unchanged
4a	4a	Mercury in Fish Tissue	33880	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (Cabomba caroliniana), in the Lake Rohunta North Basin during an August 1995 synoptic survey. MassDCR staff confirmed in 2021 that the non-native variable milfoil (Myriophyllum heterophyllum) is present in the North Basin. The Aquatic Life Use for this Lake Rohunta (North Basin) AU (MA35106) will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment (for *M. heterophyllum*) being carried forward and a Fanwort (*C. caroliniana*) impairment being added.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995, Straub March 25, 2021)

Summary Statement

As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in the Lake Rohunta North Basin during an August 1995 synoptic survey. MassDCR staff confirmed in 2021 that the non-native variable milfoil (*Myriophyllum heterophyllum*) is present in the North Basin.

Fish Consumption

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for this Lake Rohunta (North Basin) AU (MA35106) will continue to be assessed as Not Supporting with the Mercury in Fish Tissue impairment being carried forward. MA DPH advises Children younger than 12 years, pregnant women, and nursing mothers should not eat any fish from this water body and the general public should limit consumption of all fish from this water body to two meals per month (MassDPH 2021).	

Aesthetic

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for this Lake Rohunta (North Basin) AU (MA35106), so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for this Lake Rohunta (North Basin) AU (MA35106), so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for this Lake Rohunta (North Basin) AU (MA35106), so it is Not Assessed.	

Lake Rohunta (MA35107)

Location:	(South Basin) New Salem.
AU Type:	FRESHWATER LAKE
AU Size:	42 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Aquatic Plants (Macrophytes)*)		Changed
5	5	(Fanwort*)		Added
5	5	(Non-Native Aquatic Plants*)		Unchanged
5	5	Mercury in Fish Tissue	33880	Unchanged
5	5	Nutrient/Eutrophication Biological Indicators		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Source Unknown (N)			X	X	X
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X		X	X	X
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			
Nutrient/Eutrophication Biological Indicators	Source Unknown (N)			X	X	X

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Aquatic Plants (Macrophytes)	Not caused by a pollutant (4c)	As described in detail in the 2022 CALM guidance document (MassDEP 2022), the mapping of Aquatic Plants (Macrophytes) impairments as a pollutant is being reevaluated. Lake Rohunta (South Basin) (MA35107) was first listed as impaired for Noxious Aquatic Plants in 1998 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on an August 1995 synoptic survey conducted by MassDEP staff in which it was noted that there was "very dense floating & emergent [vegetation] over entire basin," and plants present in this basin included the non-rooted, floating species, Utricularia purpurea and Utricularia sp. (MassDEP 1995, MassDEP 2002). In Google Earth images from August 2016 and September 2019, the AU is almost completely filled in with vegetation (except for a tiny channel) (Google Earth Pro Undated). Nutrient/Eutrophication Biological Indicators is being added as an impairment based on the presence of non-rooted, floating, aquatic macrophyte species (Utricularia spp.). Additionally, Aquatic Plants (Macrophytes) is being delisted as a pollutant and added again as a non-pollutant since more than 25% of the pond was covered in aquatic macrophytes in recent years.

Aquatic Plants Macrophytes

1997 WBS Coding Sheet (MassDEP 2002):

WBID: MA35107 WATERSHED: Millers (35) (Printed 02/03/98)
NAME: Lake Rohunta TYPE: Lake/Pond
CODE: 35107 SIZE: 70.00(acres) CLASS: B

LATITUDE:
LONGITUDE: (423123/721625)
Lake/Pond Name: Lake Rohunta[South Basin], Athol/Orange/New Salem
Ecoregion Name: ()
Description: Lake Rohunta (South Basin), New Salem.

Assessment Date:	9702	**Begin Sampling:**	9508	**303(d) List?:**	No
Cycle:	97	**End Sampling:**	9508	**Pathogens Only?:**	No

Lake Specific Information

Lake size greater than 10 acres?:	Yes
Significantly Publicly Owned:	xxxx
Trophic Status:	Eutrophic
Trophic Trend:	Unknown
Acidity/Toxics Trend:	Unknown
Acidity Effects:	Unknown

Uses	Support	Threat	Partial	Non-Sup	Not-Asses	Not-Attain
OVERALL USE SUPPORT				70.00		
ALUS			70.00			
FISH CONSUMPTION				70.00		
PRIMARY CONTACT				70.00		
SECONDARY CONTACT				70.00		
Aesthetics				70.00		

Nonattainment Causes

Code	Size	Magnitude	"New" Code	Size	Magnitude
0500- Metals	70.00	M			
0501- (Mercury)	70.00	M			
2200- Noxious aquatic plants	70.00	M			
2400- Total toxics	70.00	M			
2600- Exotic species	70.00	M			

Nonattainment Sources

Code	Size	Magnitude	"New" Code	Size	Magnitude
9000- SOURCE UNKNOWN	70.00	H			

Assessment Type "New" Assessment Category => M E NA
(Assessment Category =>Monitored)
B25- Ecological/habitat surveys (Qualitative/Quantitative)
R35- Primary Producer Surveys

Media/Pollutants Assessed (Toxics Monitoring =>N) "New" Toxics Monitoring => YES or NO
-

Comments:
1997:
August 15, 1995 synoptic survey indicated very dense growths of floating and emergent vegetation over the entire pond. Presence of the non-native species Cabomba carolinana surmised from presence upstream and downstream. Fish advisory in effect due to mercury.

Page 108

1995 Synoptic Survey Field Sheet (MassDEP 1995):

Page 1 of 2

Lake/Pond L. Rohunta / Eagleville L. **Date** 15 Aug 95

Town/City Athol / Orange / New Salem **Observers** Penniman / McVoy

River Basin Millers

USGS Topo Orange **PALIS NO.** N - 35106 M - 35070 S - 35107

Location/type of access (be specific, e.g., public boat ramp at west cove area off Simpson Street):

S - S + Middle Branch Bridge Road causeway - informal dirt boat ramps on either side at west end of causeway

M - King St. Distant observation

N - At dam of Partridgeville Rd; resident only beach to left of dam

Ownership of Location/Access (specify public or private, name of owner(s), and any use restrictions):

Uncertain

Posted signs (re aquatic plants, fish advisories, access, etc.):

None

Water quality observations (clarity, dissolved organic staining, blooms, *et cetera*):

N - Sl. stain, sl. turbid

M - Brown turbidity, little water visible

S - Little water open to observe

Page 2 of 2

Record of aquatic plant "species" observed (see note below):

N - Pontederia, Sparganium, P. epihydrus, Nymphaea, Nuphar, Utricularia purpurea, Utricularia vulgaris, Caloumba Caroliniana

likely in all 3 basin

M - Pontedaria, Sagittaria, Brasenia, Najas, Nymphaea, P. epihydrus, Eleocharis, Dulichium, Iris, Sparganium, Carex, Nitella, Potamogeton zaksianus.

S. - Pontedaria, Sagittaria, Sparganium, Nymphaea, Carex, Eleocharis, Nuphar, Phragmites, Lyseemia, Brasenia, Utricularia purpurea, Utricularia sp.

Observed aquatic plant density (at observation site and across lake or pond, if practicable):

N - V. dense submerged around shore near dam - V. dense floating leaf marginally (to 1 st) along east + se. shore w. shore open

M - 100% very dense; carex meadows encroaching s. end of viewed from Kind Street 100% cover floating veg. except central channel

S - Very dense floating + emergent over entire basin

Other notes (e.g., overt pollution, construction, and water uses:

N - No apparent development.

M - Heavily developed - east shore, central channel maintained by recent herbicide treatments

S - No development.

Note: record suspect *M. heterophyllum* plants that may require confirmation once emergent flowering stalks are evident.

Google Earth image of Lake Rohunta (South Basin), 12/31/2000 (Google Earth Pro Undated):

Google Earth image of Lake Rohunta (South Basin), 8/23/2016 (Google Earth Pro Undated):

Google Earth image of Lake Rohunta (South Basin), 9/20/2019 (Google Earth Pro Undated):

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in the Lake Rohunta North Basin during an August 1995 synoptic survey and they judged that the species was likely present in the South Basin as well due to the hydrologic connections among the basins. Similarly, MassDCR staff confirmed in 2021 that the non-native variable milfoil (*Myriophyllum heterophyllum*) is present in the North Basin and likely the South Basin as well due to the hydrologic connections among the basins. The Aquatic Life Use for this Lake Rohunta (South Basin) AU (MA35107) will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment (for *M. heterophyllum*) being carried forward and a Fanwort (*C. caroliniana*) impairment being added.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995, Straub March 25, 2021)

Summary Statement
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in the Lake Rohunta North Basin during an August 1995 synoptic survey and they judged that the species was likely present in the South Basin as well due to the hydrologic connections among the basins. Similarly, MassDCR staff confirmed in 2021 that the non-native variable milfoil (*Myriophyllum heterophyllum*) is present in the North Basin and likely the South Basin as well due to the hydrologic connections among the basins.

Fish Consumption

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for this Lake Rohunta (South Basin) AU (MA35107) will continue to be assessed as Not Supporting with the Mercury in Fish Tissue impairment being carried forward. MA DPH advises Children younger than 12 years, pregnant women, and nursing mothers should not eat any fish from this water body and the general public should limit consumption of all fish from this water body to two meals per month (MassDPH 2021).	

Aesthetic

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
While no new data are available to evaluate the Aesthetics Use for this Lake Rohunta (South Basin) AU (MA35107) it will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment being carried forward. The Aquatic Plants (Macrophytes) impairment is being changed from a pollutant to a non-pollutant as detailed in the delisting comment and the Nutrient Eutrophication Biological Indicators impairment is being added.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
While no new data are available to evaluate the Primary Contact Recreational Use for this Lake Rohunta (South Basin) AU (MA35107) it will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment being carried forward. The Aquatic Plants (Macrophytes) impairment is being changed from a pollutant to a non-pollutant as detailed in the delisting comment and the Nutrient Eutrophication Biological Indicators impairment is being added.	

Secondary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
While no new data are available to evaluate the Secondary Contact Recreational Use for this Lake Rohunta (South Basin) AU (MA35107) it will continue to be assessed as Not Supporting with the Non-Native Aquatic Plants impairment being carried forward. The Aquatic Plants (Macrophytes) impairment is being changed from a pollutant to a non-pollutant as detailed in the delisting comment and the Nutrient Eutrophication Biological Indicators impairment is being added.	

Lake Watatic (MA35095)

Location:	Ashburnham.
AU Type:	FRESHWATER LAKE
AU Size:	133 ACRES
Classification/Qualifier:	B

No usable data were available for Lake Watatic (MA35095) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Laurel Lake (MA35035)

Location:	Erving/Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	44 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Dissolved Oxygen		Unchanged
5	5	Mercury in Fish Tissue		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Dissolved Oxygen	Source Unknown (N)	X				
Mercury in Fish Tissue	Atmospheric Deposition (N)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No recent data are available to assess the Aquatic Life Use for Laurel Lake, so it will continue to be assessed as Not Supporting with the Dissolved Oxygen impairment being carried forward.	

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
Fish toxics sampling was conducted by Normandeau Associates at Laurel Lake (Erving/Warwick) in May 2019 as part of the MassDEP Office of Research and Standards Mercury Initiative. Because of elevated mercury measured in fish fillets, MA DPH recommends the following: Children younger than 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body and the general public should limit consumption of all fish from this water body to two meals per month (MassDPH 2020). Since there is a site specific DPH advisory for elevated mercury in fish tissue, the Fish Consumption Use for Laurel Lake (MA35035) is assessed as Not Supporting. The likely source, although not confirmed, is atmospheric deposition.	

Aesthetic

2022 Use Attainment	Alert

Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Laurel Lake, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Fully Supporting	NO
2022 Use Attainment Summary	
The Laurel Lake (DCR) Beach in the Erving State Forest was not posted during the recreational (swimming) season in any year from 2014 to 2019. The Primary Contact Recreational Use for Laurel Lake is assessed as Fully Supporting since there were no swimming advisory postings at the Laurel Lake (DCR) Beach any year between 2014 and 2019.	

Beach Postings

MassDPH Beach Posting Data Summary (% Bathing Season Posted 2014-2019) (Bailey, Logan Feb. 2, 2021) (MassDEP Undated 4)

Beach ID	Beach Name/Town	Left Boundary (Latitude)	Left Boundary (Longitude)	Right Boundary (Latitude)	Right Boundary (Longitude)	2014	2015	2016	2017	2018	2019	# years> 10%
5357	Laurel Lake (DCR) Beach/Erving	42.620441	-72.368413	42.621168	-72.366759	0%	0%	0%	0%	0%	0%	0

Secondary Contact Recreation

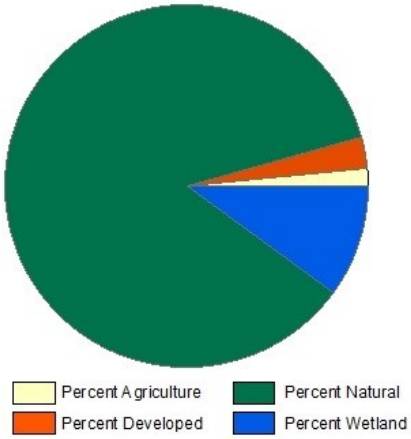
2022 Use Attainment	**Alert**
Fully Supporting	NO
2022 Use Attainment Summary	
The Laurel Lake (DCR) Beach in the Erving State Forest was not posted during the recreational (swimming) season in any year from 2014 to 2019. The Secondary Contact Recreational Use for Laurel Lake is assessed as Fully Supporting since there were no swimming advisory postings at the Laurel Lake (DCR) Beach any year between 2014 and 2019.	

Lawrence Brook (MA35-13)

Location:	New Hampshire state line, Royalston through Doane Falls to confluence with East Branch Tully River at inlet Tully Lake, Royalston.
AU Type:	RIVER
AU Size:	7.1 MILES
Classification/Qualifier:	B

Lawrence Brook - MA35-13

Watershed Area: 26.35 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	14.58	6.78	3.02	1.47
Agriculture	1.6%	1.2%	0.6%	0.4%
Developed	2.8%	3.2%	2.2%	2.5%
Natural	85.6%	85.2%	72.7%	69.3%
Wetland	10%	10.4%	24.4%	27.8%
Impervious Cover	1.2%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MA DFG biologists conducted backpack electrofishing at three sites along Lawrence Brook in Royalston from up to downstream as follows: in a low gradient reach at North Fitzwilliam Road crossing and in a high gradient reach off of Pike Road (SampleIDs 8340 and 8341, respectively) in July 2019, and in another high gradient reach upstream of the Northeast Fitzwilliam Road crossing (SampleID 6999) in August 2017. Between six and nine taxa were present and both high gradient reaches were dominated by fluvial fish (83 -84% of the samples) while the low gradient reach had fewer (33% of the sample). The four brown trout in the most downstream sample were all stocked fish.
The Aquatic Life Use for Lawrence Brook is assessed as Fully Supporting based on the fish sample data indicating the presence/dominance of fluvial fish documented in summers 2017 and 2019 sampling efforts.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6999	MassDFG	Fish Community	Lawrence Brook	NE Fitzwilliam Rd Crossing - US, Royalston	42.68750	-72.17680
8340	MassDFG	Fish Community	Lawrence Brk.	N. Fitzwilliam Rd., Royalston	42.71420	-72.18130
8341	MassDFG	Fish Community	Lawrence Brk.	Pike Rd., Royalston	42.69710	-72.17920

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: B = Bluegill, BB = Brown Bullhead, BND = Blacknose Dace, BS = Banded Sunfish, BT = Brown Trout, CP = Chain Pickerel, GS = Golden Shiner, LMB = Largemouth Bass, P = Pumpkinseed, WS = White Sucker, YB = Yellow Bullhead, YP = Yellow Perch]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
6999	08/23/17	BP	TP	H	6	74	5%	3	84%	5%	1	12%	Yes	Yes	B, BB, BND, BT, P, WS,
8340	07/15/19	BP	TP	L	9	40	0%	2	33%	3%	5	53%	No	Yes	BND, BS, CP, GS, LMB, P, WS, YB, YP,
8341	07/15/19	BP	TP	H	6	60	0%	2	83%	0%	2	13%	No	Yes	B, BND, LMB, P, WS, YB,

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

Athough no fish toxics monitoring has been conducted in Lawrence Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for Lawrence Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent data are available to assess the status of the Aesthetics Use for Lawrence Brook, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent bacteria data are available to assess the status of the Primary Contact Recreational Use for Lawrence Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent bacteria data are available to assess the status of the Secondary Contact Recreational Use for Lawrence Brook, so it is Not Assessed.	

Little Pond (MA35037)

Location:	Royalston.
AU Type:	FRESHWATER LAKE
AU Size:	10 ACRES
Classification/Qualifier:	B

No usable data were available for Little Pond (MA35037) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Lower Naukeag Lake (MA35041)

Location:	Ashburnham.
AU Type:	FRESHWATER LAKE
AU Size:	295 ACRES
Classification/Qualifier:	B

No usable data were available for Lower Naukeag Lake (MA35041) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Lyons Brook (MA35-19)

Location:	Outlet of Ruggles Pond, Wendell to confluence with Millers River, Montague/Wendell.
AU Type:	RIVER
AU Size:	2.1 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Lyons Brook (MA35-19) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

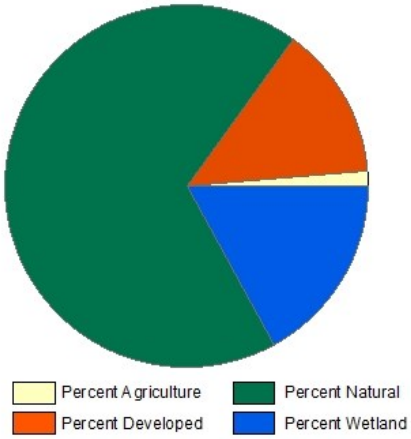
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Mahoney Brook (MA35-27)

Location:	Headwaters, east of Willis Road and Ray Hill, Gardner to Mahoney Pond Dam (MA02319), Gardner.
AU Type:	RIVER
AU Size:	3 MILES
Classification/Qualifier:	B

Mahoney Brook - MA35-27

Watershed Area: 5.04 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.04	5.04	1.03	1.03
Agriculture	1.3%	1.3%	0.5%	0.5%
Developed	13.7%	13.7%	16.7%	16.7%
Natural	68%	68%	49.7%	49.7%
Wetland	17%	17%	33.1%	33.1%
Impervious Cover	6.9%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Recommendations

2022 Recommendations
ALU: Additional metal sampling, particularly given the chronic lead criteria exceedances (TUs ranged 1.8 to 2.4 July to September 2011 clean technique samples site W2177, n=3), should be a high priority to better evaluate the four-day average lead concentrations in Mahoney Brook (MA35-27).

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

MassDEP biologists sampled Mahoney Brook downstream from Betty Spring Road in Gardner during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community sample (B0701), collected in July 2011, had an IBI score of 69 (indicative of satisfactory conditions compared with the low gradient statewide index). Backpack electrofishing (Sample ID 4576) in August 2011 documented a sample with only one small largemouth bass. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2177) can be summarized as follows: minimum dissolved oxygen 5.7mg/L during two short term DO deploys, maximum temperature 26.2°C between June 1st and September 15th with a maximum 24-hour rolling average temperature of 24.1°C, pH ranged from 6.2 to 6.4SU (n=6), and there were generally no indications of nutrient enrichment problems (seasonal average total phosphorus concentrations 0.091mg/L, max diel DO shift only 1.1mg/L, maximum saturation only 84%, maximum pH 6.4SU, and no there were no observations of any dense/very dense filamentous algae during the five site visits). With the exception of chronic lead criteria exceedances (TUs ranging from 1.8 to 2.4), there were no other toxicant issues (maximum total ammonia-nitrogen concentration was 0.16mg/L, chloride was 120mg/L (n=5), and there were no other exceedances of any of clean metals or aluminum samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out).

The Aquatic Life Use for Mahoney Brook is assessed as Fully Supporting based on the benthic macroinvertebrate and most of the water quality monitoring data collected by MassDEP during the summer of 2011 although it is noted that this sampling site is in the upper reaches of the brook so doesn't ideally represent the entire AU. The former Alert for the chronic lead criteria exceedances is being carried forward and additional sampling is being recommended to better evaluate lead toxicity concerns.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4576	MassDEP	Fish Community	Mahoney Brook	~340ft DS of Betty Spring Rd. DEP station MAP2-002, Gardner	42.56671	-71.95196
B0701	MassDEP	Benthic	Mahoney Brook/	[approximately 105 meters downstream from Betty Spring Road, Gardner, MA]	42.566709	-71.951964
W2177	MassDEP	Water Quality	Mahoney Brook	[approximately 340 feet downstream from Betty Spring Road, Gardner]	42.566709	-71.951964

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0701	07/06/11	RBP multihab	Statewide_Low_Gradient	105	69	S

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	Mahoney Brook -- ~340ft DS of Betty Spring Rd. DEP station MAP2-002, Gardner (42.56671, 71.95196)		
Habitat Comments	DEP survey. Very sandy, silty. Much wood debris. Low flow.		
Efficiency	(Seconds Shocked - 1026)		
Sample Date	**Species**	1	
08/05/11	**Total Ind**	1	
Method	**% Dom**	100%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	0	0%
3524075	FD	0	0%
	MG	1	100%
	Tolerant	**Species**	**% Ind**
	I	0	0%
	M	1	100%
	T	0	0%
	SampleID	4576	

Common Name	**Fish Code**	**Count**	**Min Length**	**Max Length**	**Temp**	**FG**	**PT**	**Function**
Largemouth bass	LMB	1	63	63	W	MG	M	Top Carnivore

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2177	2011	2	8	5.7	6.1	6.4	1.1	0	0	1	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2177	05/11/11	10/05/11	6	6.3	6.6	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2177	06/01/11	09/15/11	107	107	24.2	26.2	23.9	22.5	98	1	36	1	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2177	2011	3	12	23.4	26.2	24.0	22.0	3	0	2	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2177	06/01/11	09/15/11	107	5136	24.1	82	0	0
W2177	06/03/11	08/10/11	68	568	23.6	18	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2177	05/11/11	10/05/11	7	6	23.9	20.7	5	3	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2177	05/11/11	10/05/11	6	6.2	6.4	6	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2177	2011	5	0.037	0.180	0.091	1.1	0.7	83.9	6.4	5	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2177	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2177	2011	3	0	0	0	0	3	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2177	07/06/11	0.5	0.9	0.7	0.89	0.1	1.9
W2177	07/28/11	1.0	0.0	0.5	0.60	0.1	1.8
W2177	09/01/11	0.4	0.7	0.8	0.97	0.1	2.4

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2177	2011	3	0.086	0.2	0.149	0.6	1.0	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2177	2011	5	0.020	0.160	0.068	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2177	2011	5	35	120	80	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2177	05/11/11	10/05/11	6	264	442	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in Mahoney Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises “Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination” (MassDPH 2020) .

Until site-specific data are generated, the Fish Consumption Use for Mahoney Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary
MassDEP staff conducted sampling in Mahoney Brook downstream from Betty Spring Road in Gardner (W2177) during the summer of 2011. There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at this sampling site. The Aesthetics Use for Mahoney Brook will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff in the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2177	MassDEP	Water Quality	Mahoney Brook	[approximately 340 feet downstream from Betty Spring Road, Gardner]	42.566709	-71.951964

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2177	Mahoney Brook	2011	6	MassDEP aesthetics observations for station W2177/MAP2-002 on Mahoney Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2177	2011	6	5	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2177	Mahoney Brook	2011	Color	Brownish	2	6
W2177	Mahoney Brook	2011	Color	Light Yellow/Tan	1	6
W2177	Mahoney Brook	2011	Color	Reddish	2	6
W2177	Mahoney Brook	2011	Color	Rusty	1	6
W2177	Mahoney Brook	2011	Objectionable Deposits	No	6	6
W2177	Mahoney Brook	2011	Odor	None	6	6
W2177	Mahoney Brook	2011	Scum	No	6	6
W2177	Mahoney Brook	2011	Turbidity	Moderately Turbid	1	6
W2177	Mahoney Brook	2011	Turbidity	None	4	6
W2177	Mahoney Brook	2011	Turbidity	Slightly Turbid	1	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Mahoney Brook ~ 340 feet downstream from Betty Spring Road in Gardner (W2177) between May and September 2011 (n = 6). Data analysis indicated that 14% of intervals had GMs > 126 cfu/100 ml, and two samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 59 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for Mahoney Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2177	MassDEP	Water Quality	Mahoney Brook	[approximately 340 feet downstream from Betty Spring Road, Gardner]	42.566709	-71.951964

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

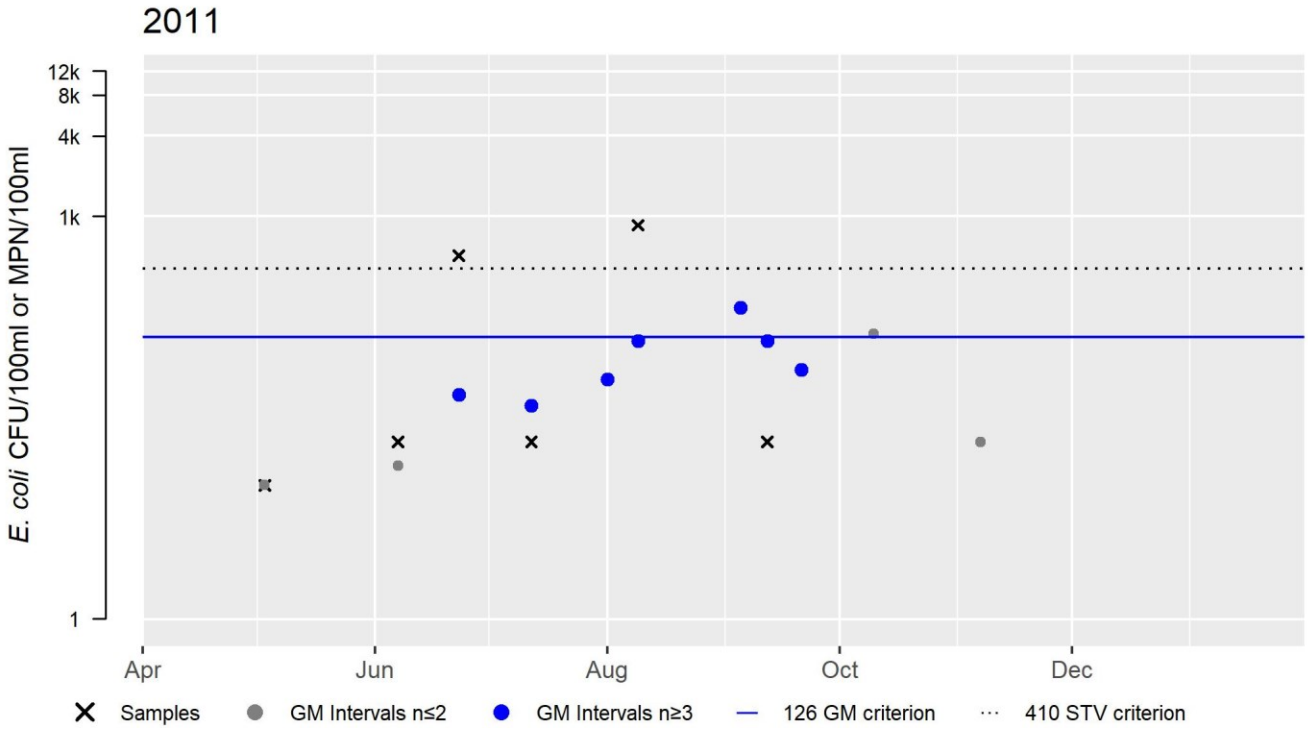
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2177	MassDEP	E. coli	05/03/11	09/12/11	6	10	860	59

W2177 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	59
#GMI	7
#GMI Ex	1
%GMI Ex	14
n>STV	2
%n>STV	33

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Mahoney Brook ~340 feet downstream from Betty Spring Road in Gardner (W2177) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml. The seasonal GM was 59 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for Mahoney Brook is assessed to be Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2177	MassDEP	Water Quality	Mahoney Brook	[approximately 340 feet downstream from Betty Spring Road, Gardner]	42.566709	-71.951964

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

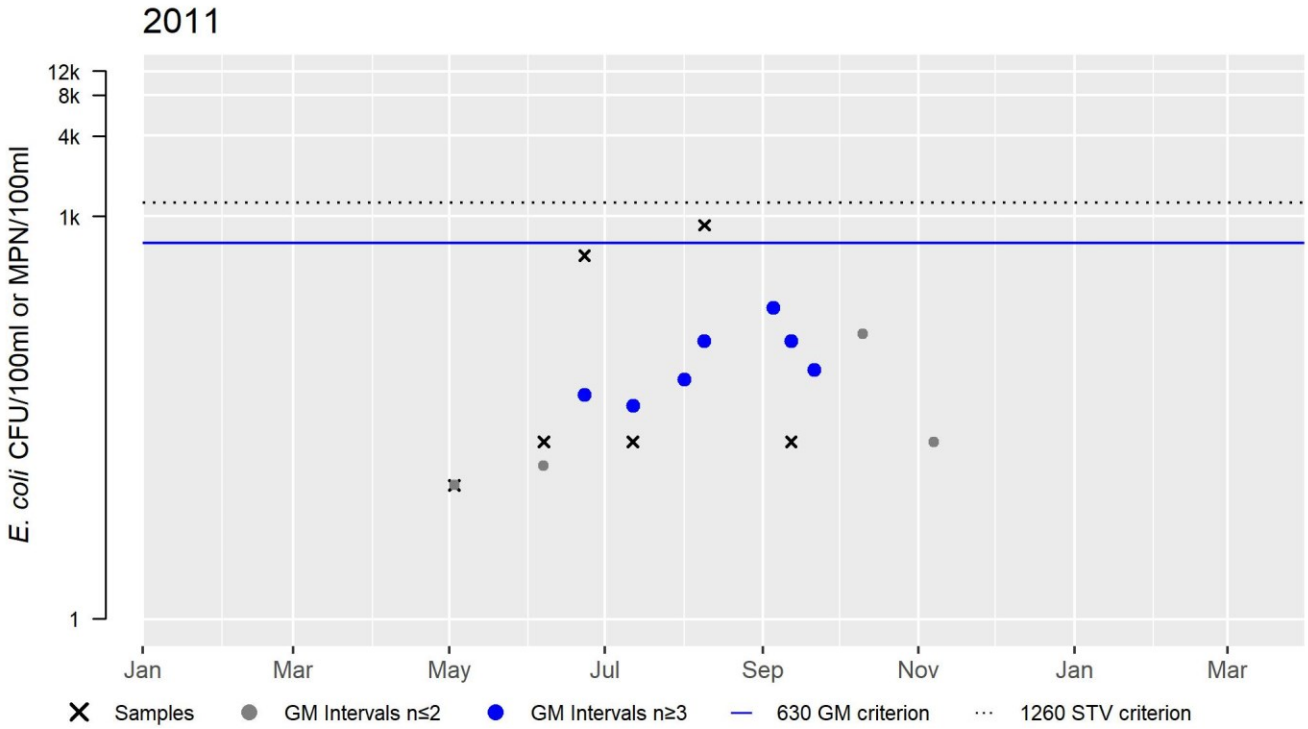
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2177	MassDEP	E. coli	05/03/11	09/12/11	6	10	860	59

W2177 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	59
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

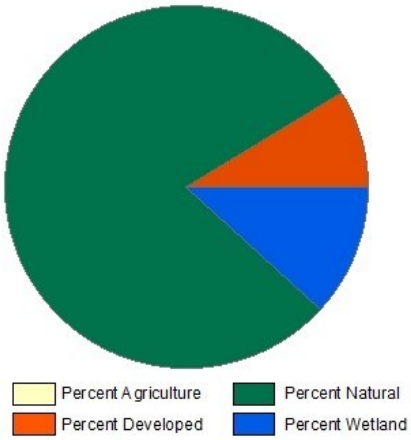


Millers River (MA35-01)

Location:	Outlet of Whitney Pond, Winchendon to Winchendon WWTP, Winchendon.
AU Type:	RIVER
AU Size:	3.3 MILES
Classification/Qualifier:	B: CWF

Millers River - MA35-01

Watershed Area: 41.3 sq miles including area outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	41.29	10.98	8.48	1.88
Agriculture	0.8%	2%	0.3%	0.6%
Developed	8.6%	16.3%	9.6%	13.7%
Natural	78.8%	73.5%	66.8%	65.9%
Wetland	11.7%	8.2%	23.3%	19.9%
Impervious Cover	3.7%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
5	5	Fish Bioassessments		Added
5	5	Lack of a Coldwater Assemblage		Unchanged
5	5	Temperature		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Ambient Bioassays - Chronic Aquatic Toxicity	Source Unknown (N)	X				
Fish Bioassessments	Dam or Impoundment (Y)	X				
Fish Bioassessments	Source Unknown (N)	X				
Lack of a Coldwater Assemblage	Dam or Impoundment (Y)	X				
Temperature	Dam or Impoundment (Y)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

The overall Target Fish Community evaluation can be summarized as follows: Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 31.71% for the 2 CWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order.
MassDEP staff conducted very limited sampling (primarily bacteria) at two sites along this Millers River AU (MA35-01) at Route 202 in Winchendon (W1311) and farther downstream ~720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge) in Winchendon (W2228) during the summer of 2011. There were observations of dense/very dense filamentous algae at the upstream site on two of six site visits and no observations of any at the downstream site during four site visits.
Given the lack of wild individuals from coldwater species among the study samples, the Aquatic Life Use of this Millers River AU (MA35-01) will continue to be assessed as Not Supporting with the Lack of a coldwater assemblage impairment being carried forward. The Temperature and Ambient Bioassays - Chronic Aquatic Toxicity impairments documented during the 2016 IR cycle (MassDEP Undated 7) are also being carried forward. A Fish Bioassessments impairment is being added because of the low similarity of the overall fish community (36%) with the Millers River TFC model.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5922	MassDFG	Fish Community	Millers River	Rt 202 crossing., Winchendon	42.67800	-72.06104
5923	MassDFG	Fish Community	Millers River	Upstream of river rd bridge., Winchendon	42.67630	-72.06754
W1311	MassDEP	Water Quality	Millers River	[Route 202, Winchendon]	42.677855	-72.061606
W2228	MassDEP	Water Quality	Millers River	[approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge), Winchendon]	42.685908	-72.082945

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

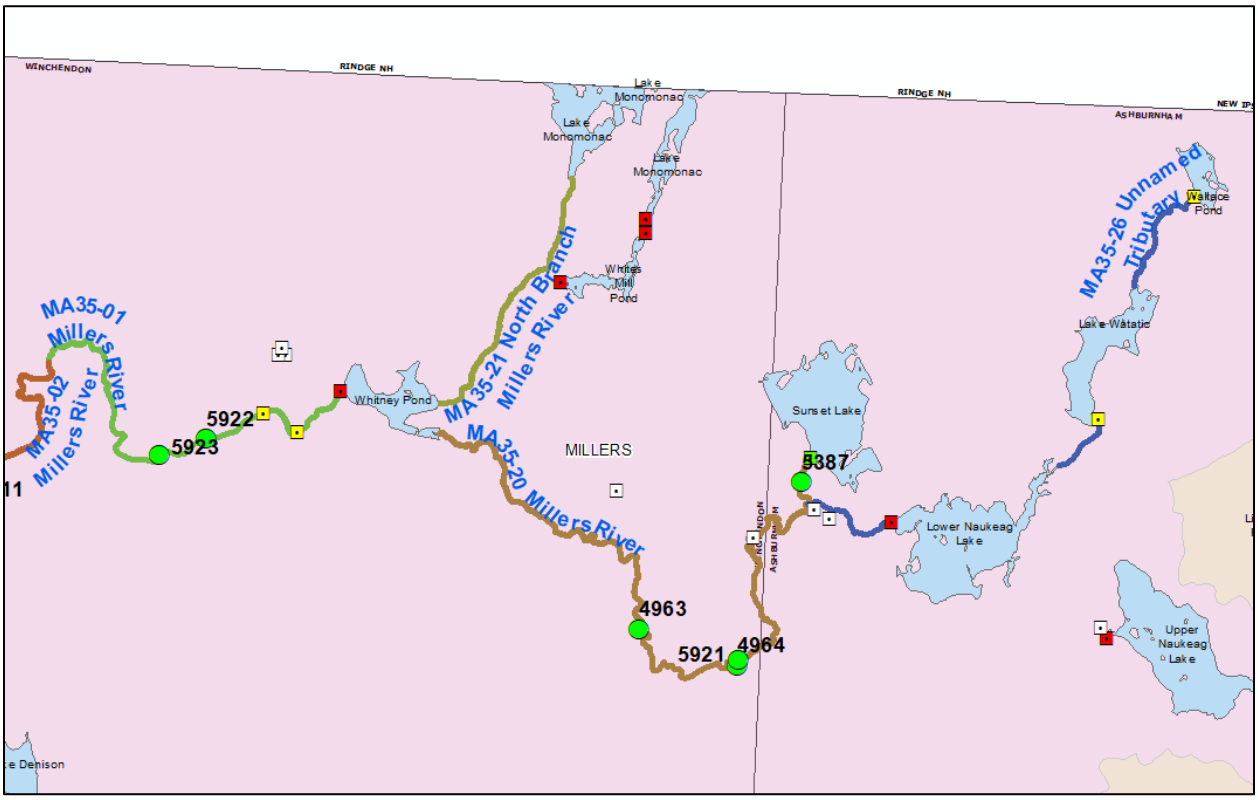
[Species List: B = Bluegill, BND = Blacknose Dace, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, LND = Longnose Dace, P = Pumpkinseed, RBS = Redbreast Sunfish, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5922	08/18/16	BP	TP		10	359	0%	6	95%	0%	2	4%	No	No	B, BND, CP, CS, F, LND, RBS, TD, WS, YB,
5923	08/18/16	BP	TP		10	178	0%	5	90%	0%	3	7%	No	No	B, CP, CS, F, LND, P, RBS, TD, WS, YB,

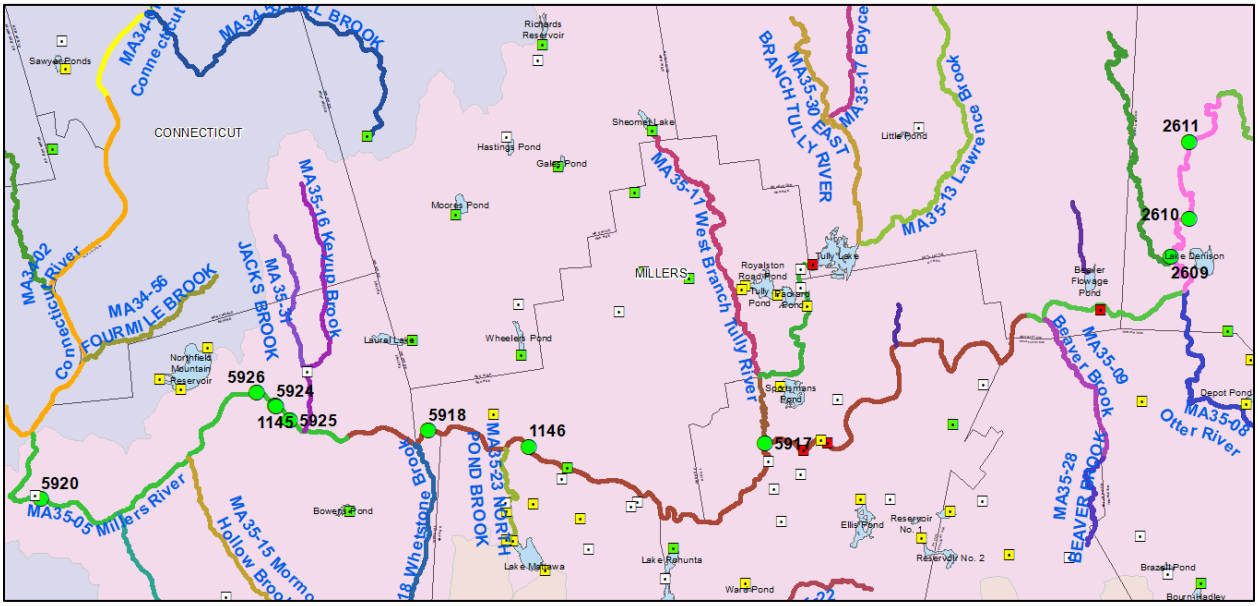
Data Sources: (MassDFG 2018, MassDEP Undated 2, Kashiwagi and Richards 2009)

Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 31.71% for the 2 CWF AUs alone). Of the 5 most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. Given the lack of wild individuals from coldwater species among the study samples, the Aquatic Life Use of these Millers River AUs (MA35-20, MA35-01) should remain assessed as Not Supporting for "Lack of a coldwater assemblage." Additionally, the low similarity of the overall fish community (36%) with the Millers River TFC model indicates the need to add a Fish Bioassessments impairment.

Fish Community Samples in the Millers River (From upstream to downstream and right to left, CWF AUs MA35-20, MA35-01):



Fish Community Samples in the Millers River (From upstream to downstream and right to left, WWF AUs MA35-02 in pink, MA35-03 in green, MA35-04 in red, MA35-05 in green):



Millers TFC Model:

Table A9. Species percent composition for reference rivers used to develop the Millers River target fish community model. Species are ordered by mean rank. Non-native, stocked, and out-of-range species were deleted from the ranking and calculation of expected proportion in the target fish model. The ranks were converted to expected proportions (as a percent) using a rank-weighting technique as outlined by Bain and Meixler (2008).

Species	EB Westfield River	Third Branch White River	Tenmile River	Ashuelot River	Ammonoosuc River	Piscataquog River	Total	Rank	Expected Proportions
Blacknose dace	41.3	25.0	14.9	19.8	24.1	22.5	147.6	1	32.6
Longnose dace	18.7	19.9	9.3	12.7	38.5	15.2	114.2	2	16.3
Common shiner	7.8	2.6	13.8	22.3	1.4	15.8	63.7	3	10.9
Fallfish	0.5	0.0	18.7	26.8	0.0	2.8	48.8	4	8.1
Atlantic Salmon	9.7	0.0	0.0	2.2	24.1	3.4	39.4		
Slimy sculpin	0.0	33.1	0.0	0.0	6.0	0.0	39.1	6	5.4
White sucker	8.2	0.3	15.8	7.9	0.5	2.8	35.5	7	4.7
Smallmouth bass	9.6	0.0	12.2	1.3	0.0	12.0	35.1		
Longnose sucker	0.0	5.6	0.0	0.0	4.8	2.8	13.2		
Tessellated darter	0.0	0.1	7.3	3.8	0.2	0.0	11.4	10	3.3
Rainbow trout	0.1	7.5	0.1	0.0	0.0	0.2	7.8		
Creek chub	2.7	1.4	0.6	0.2	0.0	0.0	4.9	12	2.7
Cutlips minnow	0.0	0.0	4.6	0.0	0.0	0.0	4.6		
Brown trout	0.0	3.3	0.1	0.3	0.0	0.4	4.1		
Yellow bullhead	0.0	0.0	0.1	1.0	0.0	3.0	4.1		
Redbreast sunfish	0.0	0.0	0.0	0.0	0.0	2.7	2.7	16	2.0
Pumpkinseed	0.1	0.0	0.6	0.3	0.0	1.4	2.4	17	1.9
Brook trout	0.5	1.2	0.1	0.0	0.6	0.0	2.3	18	1.8
American eel	0.0	0.0	0.0	0.2	0.0	1.4	1.6	19	1.7
Bluegill	0.2	0.0	1.3	0.0	0.0	0.0	1.5		
Largemouth bass	0.0	0.0	0.0	0.0	0.0	1.4	1.4		
Golden shiner	0.1	0.0	0.3	0.0	0.0	0.5	0.9	22	1.5
Spottail shiner	0.0	0.0	0.0	0.0	0.0	0.5	0.5	23	1.4
Brown bullhead	0.0	0.0	0.0	0.2	0.0	0.2	0.4	24	1.4
Bluntnose minnow	0.0	0.0	0.4	0.0	0.0	0.0	0.4		
Rock bass	0.0	0.0	0.3	0.1	0.0	0.0	0.4		
Chain pickerel	0.0	0.0	0.0	0.1	0.0	0.2	0.3	27	1.2
Yellow perch	0.0	0.0	0.0	0.3	0.0	0.0	0.3	28	1.2
Bridle shiner	0.1	0.0	0.0	0.0	0.0	0.0	0.1	29	1.1

Fish Community Analysis:

Combined fish community analysis for all 6 AUs (MA35-20, MA35-01, MA35-02, MA35-03, MA35-04, MA35-05); samples 1570 and 5919 were excluded because of low sampling efficiency

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	0.61%	2.0	1.4	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	42	1.29%	-	1.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	7	0.21%	33.0	32.8	
Millers	Bluegill	27	0.83%	-	0.8	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	36	1.11%	1.0	0.1	
Millers	Brown Trout	7	0.21%	-	0.2	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	37	1.14%	1.0	0.1	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	663	20.36%	11.0	9.4	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	10	0.31%	-	0.3	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	1135	34.85%	8.0	26.8	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	0.61%	2.0	1.4	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	21	0.64%	-	0.6	
Millers	Longnose Dace	116	3.56%	16.0	12.4	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	14	0.43%	2.0	1.6	
Millers	Rainbow Trout	2	0.06%	-	0.1	
Millers	Redbreast Sunfish	240	7.37%	2.0	5.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	1.44%	-	1.4	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	5.96%	-	6.0	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	229	7.03%	-	7.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	273	8.38%	5.0	3.4	
Millers	Yellow Bullhead	61	1.87%	-	1.9	
Millers	Yellow Perch	56	1.72%	1.0	0.7	
Millers	(blank)		0.00%	-	-	36.43
Grand Total		3257	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Analysis of samples from CWF AUs (MA35-20, MA35-01) alone, excluding sample 1570

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel		0.00%	2.0	2.0	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	36	2.67%	-	2.7	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	3	0.22%	33.0	32.8	
Millers	Bluegill	18	1.34%	-	1.3	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	27	2.01%	1.0	1.0	
Millers	Brown Trout		0.00%	-	-	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	11	0.82%	1.0	0.2	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	85	6.32%	11.0	4.7	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	2	0.15%	-	0.1	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	725	53.86%	8.0	45.9	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner		0.00%	2.0	2.0	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	14	1.04%	-	1.0	
Millers	Longnose Dace	70	5.20%	16.0	10.8	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	8	0.59%	2.0	1.4	
Millers	Rainbow Trout		0.00%	-	-	
Millers	Redbreast Sunfish	21	1.56%	2.0	0.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey		0.00%	-	-	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass		0.00%	-	-	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	134	9.96%	-	10.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	140	10.40%	5.0	5.4	
Millers	Yellow Bullhead	24	1.78%	-	1.8	
Millers	Yellow Perch	28	2.08%	1.0	1.1	
Millers	(blank)		0.00%	-	-	31.71
Grand Total		1346	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Individuals from coldwater species (brown trout, rainbow trout) were not collected in the 2 CWF AUs and were all >140 mm in length, indicating they were likely stocked:

Sample	Brown Trout Length (mm)	Rainbow Trout Length (mm)
1145		350
2610	305	
2611	257	200
2611	250	
2611	306	
2611	355	
5918	196	
5918	234	

Physico-chemical Water Quality Information

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W1311	2011	--	--	--	--	--	--	--	--	6	2
W2228	2011	--	--	--	--	--	--	--	--	4	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent fish toxics sampling has been conducted in this Millers River AU (MA35-01), and since no site-specific advisory is listed the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff surveyed two sites along this Millers River AU (MA35-01) during the summer of 2011 from up to downstream as follows: at Route 202 in Winchendon (W1311) and farther downstream at approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge) in Winchendon (W2228). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at either of these two sampling sites. The Aesthetics Use for this Millers River AU (MA35-01) will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the two sites sampled in the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W1311	MassDEP	Water Quality	Millers River	[Route 202, Winchendon]	42.677855	-72.061606
W2228	MassDEP	Water Quality	Millers River	[approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge), Winchendon]	42.685908	-72.082945

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W1311	Millers River	2011	6	MassDEP aesthetics observations for station W1311 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W2228	Millers River	2011	6	MassDEP aesthetics observations for station W2228 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W1311	2011	6	6	2
W2228	2011	6	4	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W1311	Millers River	2011	Color	Light Yellow/Tan	6	6
W1311	Millers River	2011	Objectionable Deposits	No	6	6
W1311	Millers River	2011	Odor	Musty (Basement)	1	6
W1311	Millers River	2011	Odor	None	5	6
W1311	Millers River	2011	Scum	No	5	6
W1311	Millers River	2011	Scum	Yes	1	6
W1311	Millers River	2011	Turbidity	None	6	6
W2228	Millers River	2011	Color	Dark Tan	1	6
W2228	Millers River	2011	Color	Light Yellow/Tan	4	6
W2228	Millers River	2011	Color	Reddish	1	6
W2228	Millers River	2011	Objectionable Deposits	No	5	6
W2228	Millers River	2011	Objectionable Deposits	Unobservable	1	6
W2228	Millers River	2011	Odor	None	6	6
W2228	Millers River	2011	Scum	No	4	6
W2228	Millers River	2011	Scum	Yes	2	6
W2228	Millers River	2011	Turbidity	None	6	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff collected *E. coli* bacteria samples from this Millers River AU (MA35-01) at Route 202 in Winchendon (W1311) and farther downstream at approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge) in Winchendon (W2228) between May and September 2011 (n = 6 at each site). Data analysis indicated that none of the intervals at either site had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GMs were 74 and 46 cfu/100 ml from up to downstream, respectively.
Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for these two single year limited low frequency datasets, the Primary Contact Recreational Use for this Millers River AU (MA35-01) is assessed to be Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W1311	MassDEP	Water Quality	Millers River	[Route 202, Winchendon]	42.677855	-72.061606
W2228	MassDEP	Water Quality	Millers River	[approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge), Winchendon]	42.685908	-72.082945

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

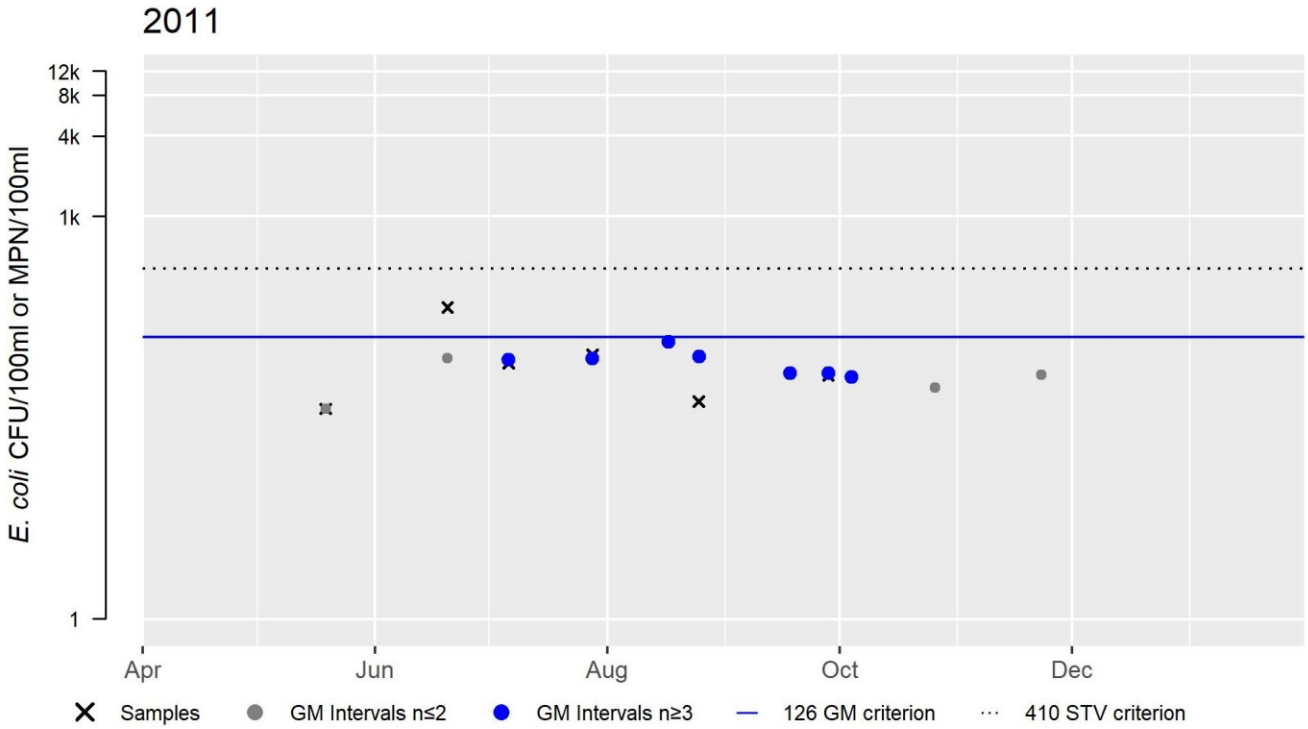
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W1311	MassDEP	E. coli	05/19/11	09/28/11	6	37	210	74
W2228	MassDEP	E. coli	05/19/11	09/28/11	6	26	73	46

W1311 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	74
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

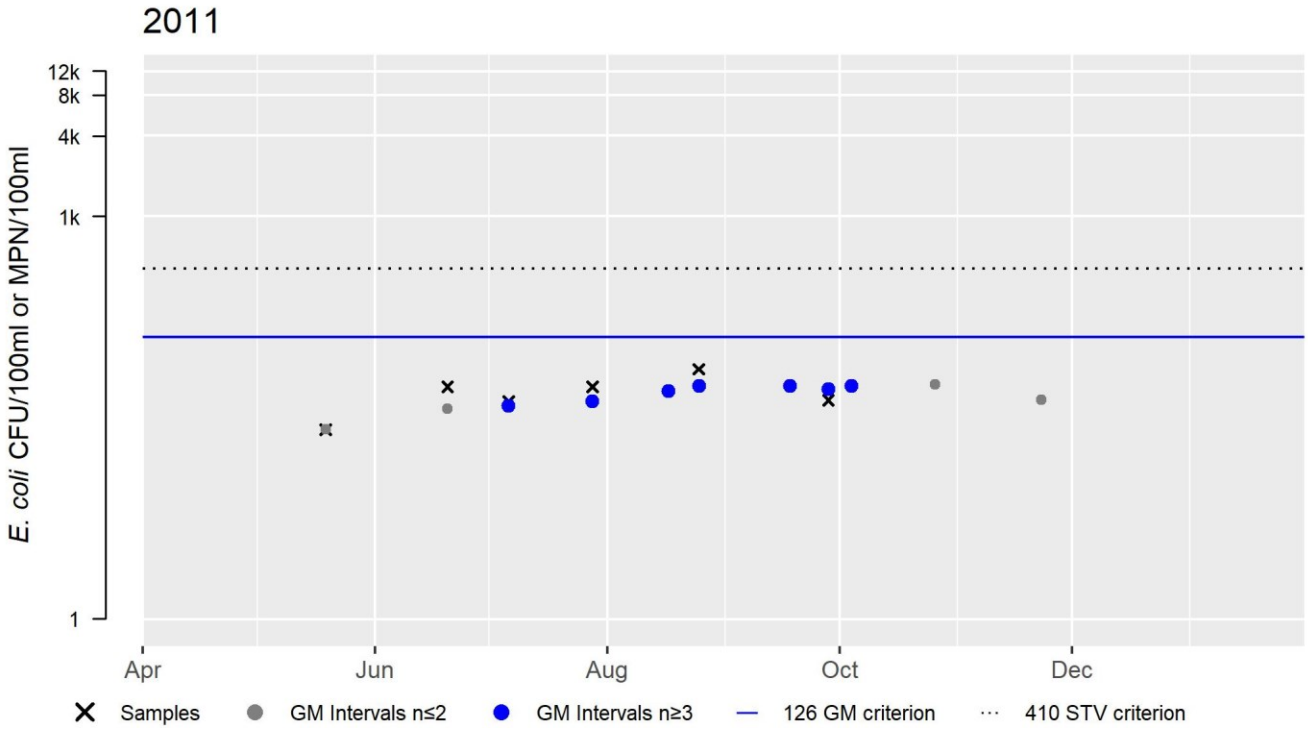
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2228 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	46
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples from this Millers River AU (MA35-01) at Route 202 in Winchendon (W1311) and farther downstream at approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge) in Winchendon (W2228) between May and September 2011 (n = 6 at each site). Data analysis indicated that none of the intervals at either site had GMs > 630 cfu/100 ml, and no and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GMs were 74 and 46 cfu/100 ml from up to downstream, respectively. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for these two single year limited low frequency datasets, the Secondary Contact Recreational Use for this Millers River AU (MA35-01) is assessed to be Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W1311	MassDEP	Water Quality	Millers River	[Route 202, Winchendon]	42.677855	-72.061606
W2228	MassDEP	Water Quality	Millers River	[approximately 720 feet upstream of River Street (approximately 100 feet upstream of the Winchendon WWTP discharge), Winchendon]	42.685908	-72.082945

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

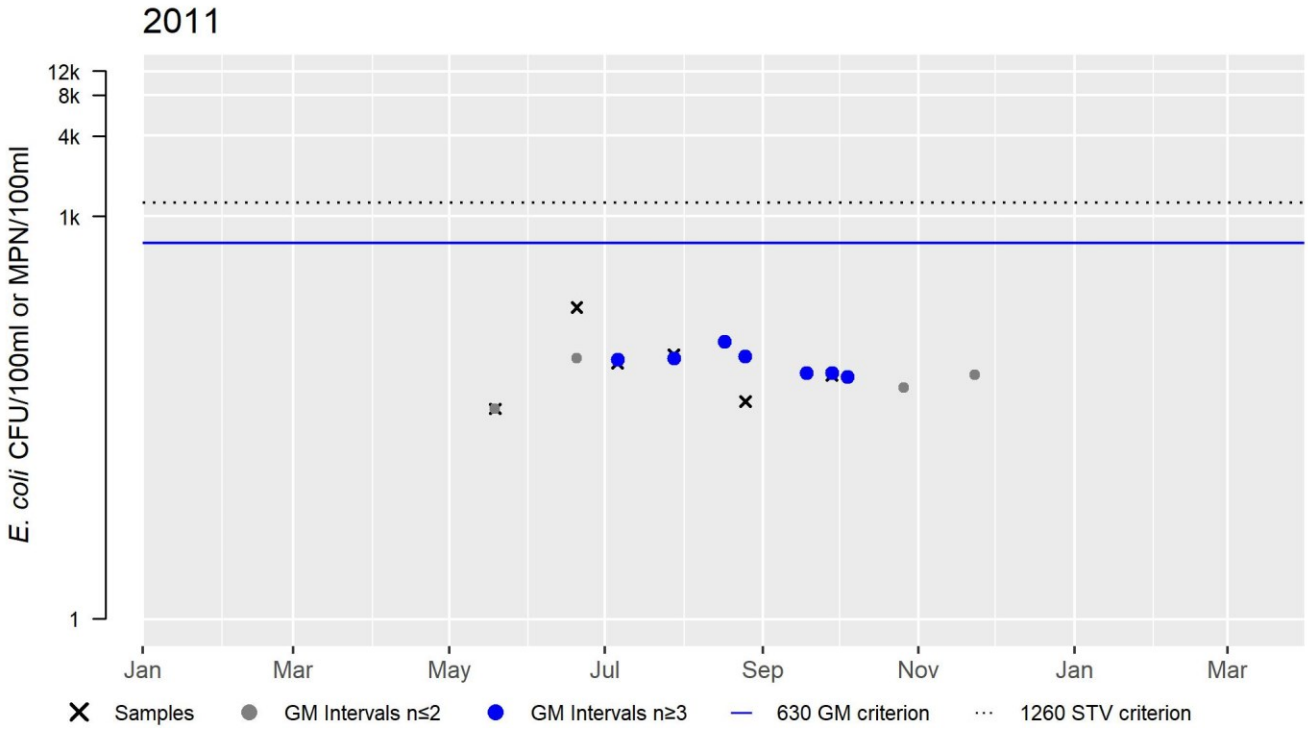
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W1311	MassDEP	E. coli	05/19/11	09/28/11	6	37	210	74
W2228	MassDEP	E. coli	05/19/11	09/28/11	6	26	73	46

W1311 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	74
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

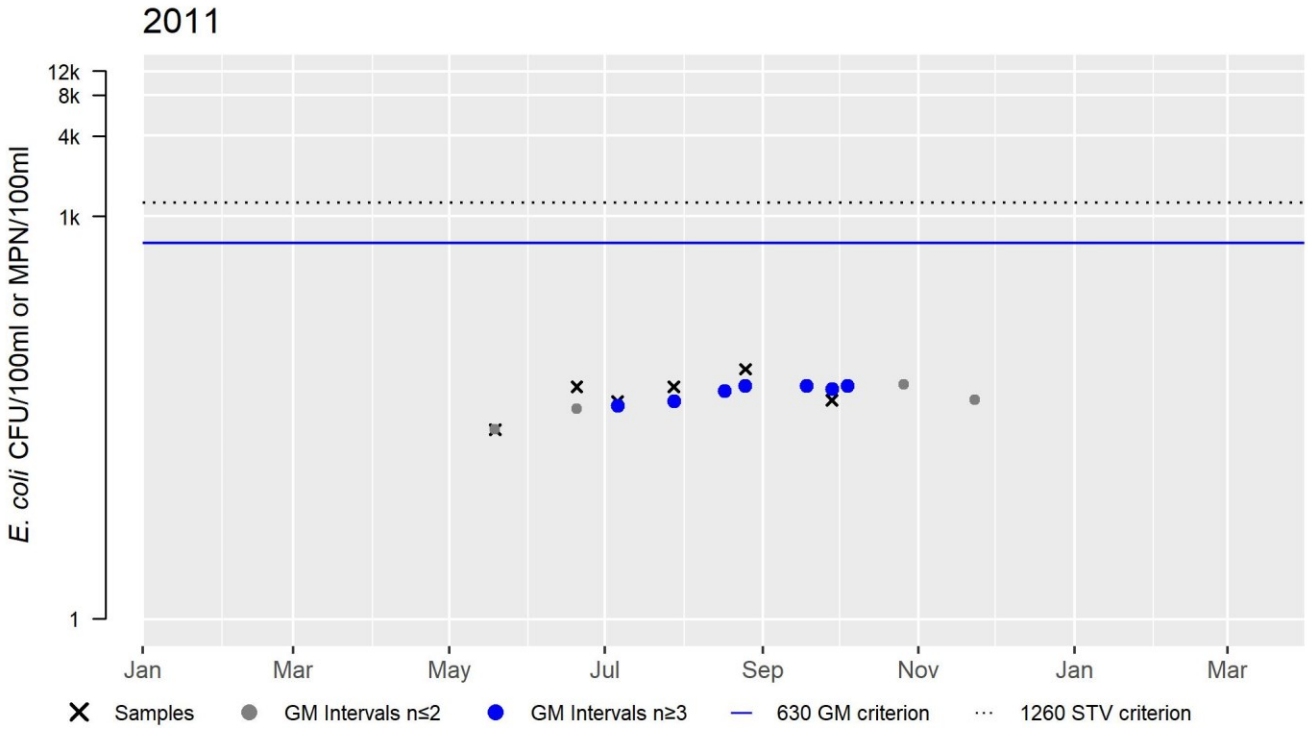
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2228 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	46
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

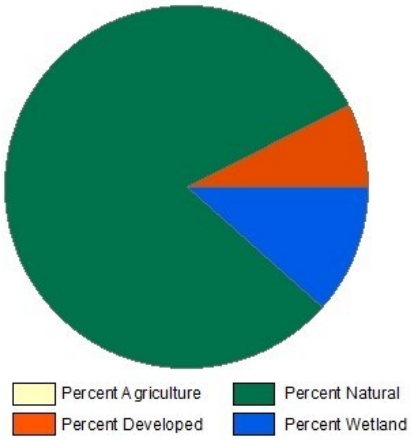


Millers River (MA35-02)

Location:	Winchendon WWTP, Winchendon to confluence with Otter River, Winchendon.
AU Type:	RIVER
AU Size:	5.6 MILES
Classification/Qualifier:	B: WWF

Millers River - MA35-02

Watershed Area: 112.6 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	57.61	9.54	12.03	2.5
Agriculture	0.9%	0.5%	0.3%	0.5%
Developed	7.4%	5.8%	7.9%	5.5%
Natural	80.3%	82.2%	67.9%	69.9%
Wetland	11.4%	11.4%	23.9%	24.1%
Impervious Cover	3.1%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added
5	5	Fish Bioassessments		Added
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Curly-leaf Pondweed*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Fish Bioassessments	Dam or Impoundment (N)	X				
Fish Bioassessments	Source Unknown (N)	X				
PCBs in Fish Tissue	Contaminated Sediments (Y)	X				
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)	X				

Recommendations

2022 Recommendations
REC: *E. coli* bacteria sampling should be conducted on a frequent basis in this Millers River AU (MA35-02) in Winchendon particularly at the Winchendon boat launch (MRWC_MW1) where an alert was identified, in addition to sampling at the old bridge abutments on eastern shore of the closed dirt road (Sibley Road) (W0694), and the New Boston Road launch (MRWC_MOSF1) to better evaluate the Primary Contact Recreational Use attainment status.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary
The overall Target Fish Community evaluation can be summarized as follows: Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the 4 WWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. MassDEP staff also conducted discrete water quality sampling in this Millers River AU (MA35-02) near Winchendon Road in Royalston (at USGS flow gaging station #01162500) (W0694) as part of the SMART monitoring project between January 2011 and March 2013. The discrete water quality sampling data can be briefly summarized as follows: the minimum DO was 7.3mg/L (n=11 measurements), the maximum temperature was 23.5°C (n=11), pH ranged from 5.9 to 6.4SU, n=11), there were generally no indications of nutrient enrichment problems (seasonal average total phosphorus concentrations 0.027 in 2011 and 0.034mg/L in 2012, maximum saturation 100%, maximum pH 6.4SU, and only one observation of dense/very dense filamentous algae during 11 site visits). The total ammonia nitrogen concentrations were low (maximum TAN 0.13mg/L) and chloride concentrations were also low (maximum 30mg/L) (n=11 for both analytes). Staff noted an infestation of the non-native aquatic macrophyte, curly-leaf pondweed (*Potamogeton crispus*), at this site in 2010 and 2012. The Aquatic Life Use for this Millers River AU (MA35-02) will continue to be assessed as Not Supporting with the PCB in Fish Tissue impairment (historical whole fish study data (Kennedy and Rojko 2004)) being carried forward. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River – not sediment contamination in this segment of the Millers River per se. Additionally, impairments are being added for Fish Bioassessment based on the low similarity of the overall fish community (36%) with the Millers River TFC and the non-native aquatic macrophyte Curly-leaf Pondweed (*P. crispus*).

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0694	MassDEP	Water Quality	Millers River	[old bridge abutments on eastern shore of closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle), Winchendon]	42.672322	-72.093055

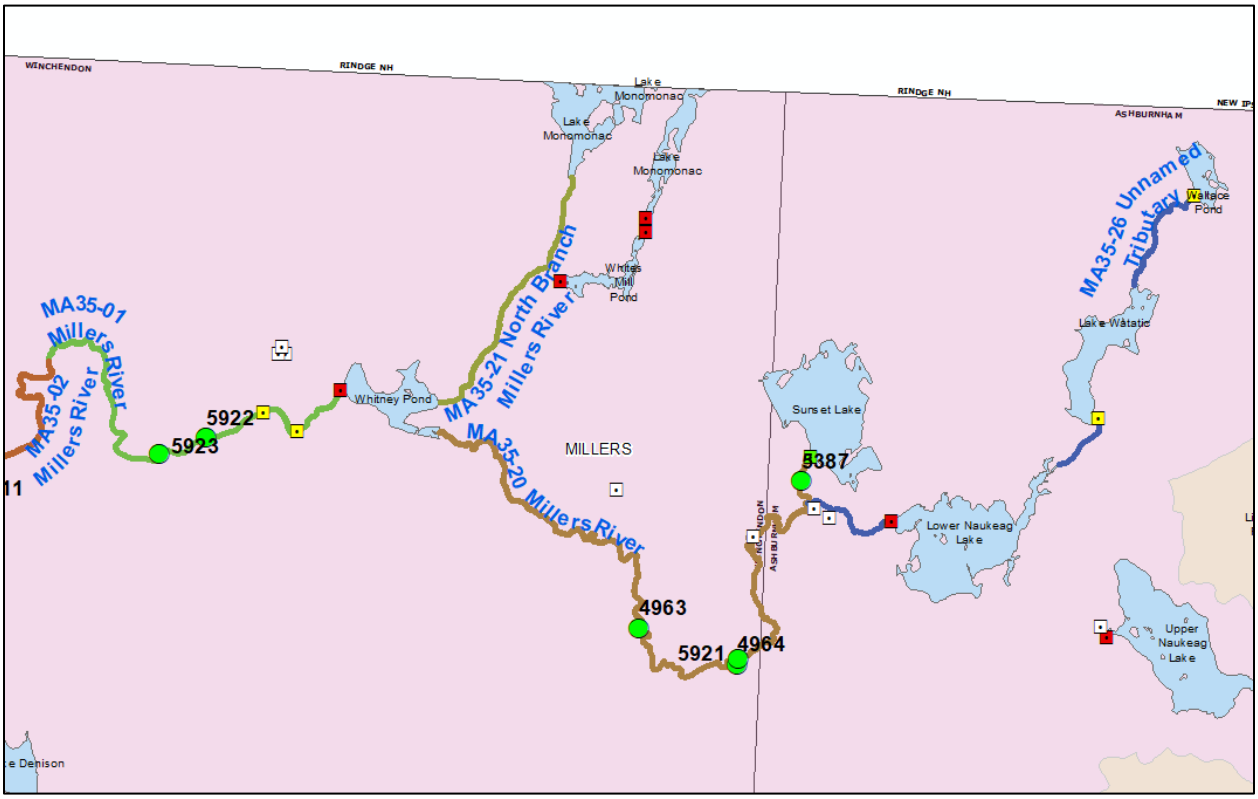
Biological Monitoring Information

Fish Community Data and DELTS

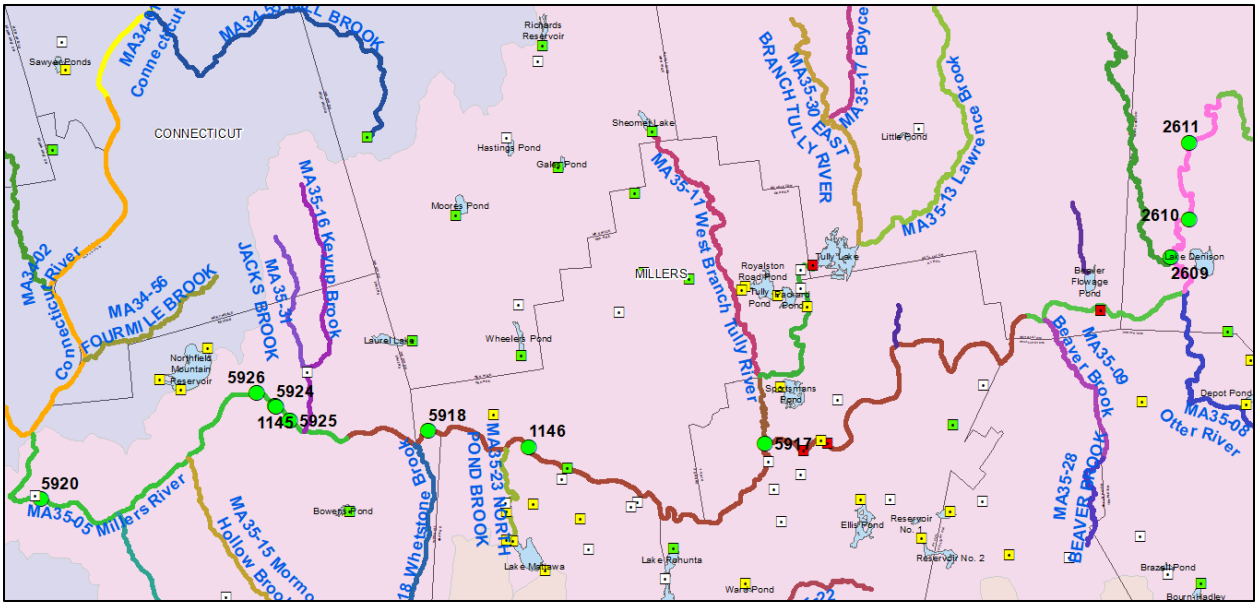
Data Sources: (MassDFG 2018, MassDEP Undated 2, Kashiwagi and Richards 2009)

Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the 4 WWF AUs alone). Of the 5 most common species in the TFC, only 2 of the species (fallfish, common shiner) were also in the top 5 among the study samples (combined among all AUs), and in a different ranked order. Based on the low similarity of the overall fish community (36%) with the Millers River TFC, the Aquatic Life Use for these Millers River AUs (MA35-02, MA35-03, MA35-04, MA35-05) should be assessed as Not Supporting for Fish Bioassessments.

Fish Community Samples in the Millers River (From upstream to downstream and right to left, CWF AUs MA35-20, MA35-01):



Fish Community Samples in the Millers River (From upstream to downstream and right to left, WWF AUs MA35-02 in pink, MA35-03 in green, MA35-04 in red, MA35-05 in green):



Millers TFC Model:

Table A9. Species percent composition for reference rivers used to develop the Millers River target fish community model. Species are ordered by mean rank. Non-native, stocked, and out-of-range species were deleted from the ranking and calculation of expected proportion in the target fish model. The ranks were converted to expected proportions (as a percent) using a rank-weighting technique as outlined by Bain and Meixler (2008).

Species	EB Westfield River	Third Branch White River	Tenmile River	Ashuelot River	Ammonoosuc River	Piscataquog River	Total	Rank	Expected Proportions
Blacknose dace	41.3	25.0	14.9	19.8	24.1	22.5	147.6	1	32.6
Longnose dace	18.7	19.9	9.3	12.7	38.5	15.2	114.2	2	16.3
Common shiner	7.8	2.6	13.8	22.3	1.4	15.8	63.7	3	10.9
Fallfish	0.5	0.0	18.7	26.8	0.0	2.8	48.8	4	8.1
Atlantic Salmon	9.7	0.0	0.0	2.2	24.1	3.4	39.4		
Slimy sculpin	0.0	33.1	0.0	0.0	6.0	0.0	39.1	6	5.4
White sucker	8.2	0.3	15.8	7.9	0.5	2.8	35.5	7	4.7
Smallmouth bass	9.6	0.0	12.2	1.3	0.0	12.0	35.1		
Longnose sucker	0.0	5.6	0.0	0.0	4.8	2.8	13.2		
Tessellated darter	0.0	0.1	7.3	3.8	0.2	0.0	11.4	10	3.3
Rainbow trout	0.1	7.5	0.1	0.0	0.0	0.2	7.8		
Creek chub	2.7	1.4	0.6	0.2	0.0	0.0	4.9	12	2.7
Cutlips minnow	0.0	0.0	4.6	0.0	0.0	0.0	4.6		
Brown trout	0.0	3.3	0.1	0.3	0.0	0.4	4.1		
Yellow bullhead	0.0	0.0	0.1	1.0	0.0	3.0	4.1		
Redbreast sunfish	0.0	0.0	0.0	0.0	0.0	2.7	2.7	16	2.0
Pumpkinseed	0.1	0.0	0.6	0.3	0.0	1.4	2.4	17	1.9
Brook trout	0.5	1.2	0.1	0.0	0.6	0.0	2.3	18	1.8
American eel	0.0	0.0	0.0	0.2	0.0	1.4	1.6	19	1.7
Bluegill	0.2	0.0	1.3	0.0	0.0	0.0	1.5		
Largemouth bass	0.0	0.0	0.0	0.0	0.0	1.4	1.4		
Golden shiner	0.1	0.0	0.3	0.0	0.0	0.5	0.9	22	1.5
Spottail shiner	0.0	0.0	0.0	0.0	0.0	0.5	0.5	23	1.4
Brown bullhead	0.0	0.0	0.0	0.2	0.0	0.2	0.4	24	1.4
Bluntnose minnow	0.0	0.0	0.4	0.0	0.0	0.0	0.4		
Rock bass	0.0	0.0	0.3	0.1	0.0	0.0	0.4		
Chain pickerel	0.0	0.0	0.0	0.1	0.0	0.2	0.3	27	1.2
Yellow perch	0.0	0.0	0.0	0.3	0.0	0.0	0.3	28	1.2
Bridle shiner	0.1	0.0	0.0	0.0	0.0	0.0	0.1	29	1.1

Fish Community Analysis:

Combined fish community analysis for all 6 AUs (MA35-20, MA35-01, MA35-02, MA35-03, MA35-04, MA35-05); samples 1570 and 5919 were excluded because of low sampling efficiency

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	0.61%	2.0	1.4	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	42	1.29%	-	1.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	7	0.21%	33.0	32.8	
Millers	Bluegill	27	0.83%	-	0.8	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	36	1.11%	1.0	0.1	
Millers	Brown Trout	7	0.21%	-	0.2	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	37	1.14%	1.0	0.1	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	663	20.36%	11.0	9.4	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	10	0.31%	-	0.3	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	1135	34.85%	8.0	26.8	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	0.61%	2.0	1.4	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	21	0.64%	-	0.6	
Millers	Longnose Dace	116	3.56%	16.0	12.4	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	14	0.43%	2.0	1.6	
Millers	Rainbow Trout	2	0.06%	-	0.1	
Millers	Redbreast Sunfish	240	7.37%	2.0	5.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	1.44%	-	1.4	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	5.96%	-	6.0	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	229	7.03%	-	7.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	273	8.38%	5.0	3.4	
Millers	Yellow Bullhead	61	1.87%	-	1.9	
Millers	Yellow Perch	56	1.72%	1.0	0.7	
Millers	(blank)		0.00%	-	-	36.43
Grand Total		3257	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Analysis of samples from WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05) alone, excluding sample 5919

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	1.05%	2.0	1.0	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	6	0.31%	-	0.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	4	0.21%	33.0	32.8	
Millers	Bluegill	9	0.47%	-	0.5	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	9	0.47%	1.0	0.5	
Millers	Brown Trout	7	0.37%	-	0.4	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	26	1.36%	1.0	0.4	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	578	30.25%	11.0	19.2	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	8	0.42%	-	0.4	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	410	21.45%	8.0	13.5	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	1.05%	2.0	1.0	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	7	0.37%	-	0.4	
Millers	Longnose Dace	46	2.41%	16.0	13.6	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	6	0.31%	2.0	1.7	
Millers	Rainbow Trout	2	0.10%	-	0.1	
Millers	Redbreast Sunfish	219	11.46%	2.0	9.5	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	2.46%	-	2.5	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	10.15%	-	10.2	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	95	4.97%	-	5.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	133	6.96%	5.0	2.0	
Millers	Yellow Bullhead	37	1.94%	-	1.9	
Millers	Yellow Perch	28	1.47%	1.0	0.5	
Millers	(blank)		0.00%	-	-	35.49
Grand Total		1911	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP Undated 1)

Summary Statement
MassDEP staff noted an infestation of the non-native aquatic macrophyte, curly-leaf pondweed (*Potamogeton crispus*), in the Millers River in the vicinity of water quality station W0694 in 2010 and 2012.

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0694	01/25/11	11/15/11	5	7.3	10.2	0	0	0
W0694	02/21/12	10/23/12	5	7.8	10.2	0	0	0
W0694	01/29/13	03/25/13	1	13.5	13.5	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W0694	01/25/11	11/15/11	5	1	23.5	12.6	1	1	0	0
W0694	02/21/12	10/23/12	5	2	21.1	12.2	1	0	0	0
W0694	01/29/13	03/25/13	1	0	2.5	2.5	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W0694	01/25/11	11/15/11	5	5.9	6.3	5	1
W0694	02/21/12	10/23/12	5	6.1	6.4	5	0
W0694	01/29/13	03/25/13	1	6.3	6.3	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0694	2011	3	0.021	0.027	0.025	--	--	99.8	6.3	2	0
W0694	2012	2	0.021	0.034	0.028	--	--	100.4	6.4	4	1
W0694	2013	--	--	--	--	--	--	99.0	6.3	1	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W0694	2011	5	0.020	0.080	0.046	0	0
W0694	2012	5	0.020	0.130	0.054	0	0
W0694	2013	1	0.080	0.080	0.080	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0694	2011	5	11	26	19	0	0
W0694	2012	5	16	30	21	0	0
W0694	2013	1	20	20	20	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W0694	01/25/11	11/15/11	5	67	145	0	0	0	0	0	0
W0694	02/21/12	10/23/12	5	85	149	0	0	0	0	0	0
W0694	01/29/13	03/25/13	1	105	105	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent fish toxics sampling has been conducted in this Millers River AU (MA35-02), and since no site-specific advisory is listed the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff surveyed one site along this Millers River AU (MA35-02) at the old bridge abutments on eastern shore of the closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle) in Winchendon (MassDEP W0694) between January 2011 and March 2013 as part of the SMART monitoring project. There were generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) observed during the surveys. The Aesthetics Use for this Millers River AU (MA35-02) is assessed as Fully Supporting based on the general lack of objectionable conditions documented by MassDEP staff at the site surveyed between January 2011 and March 2013.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0694	MassDEP	Water Quality	Millers River	[old bridge abutments on eastern shore of closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle), Winchendon]	42.672322	-72.093055

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0694	Millers River	2011	5	MassDEP aesthetics observations for station W0694 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0694	Millers River	2012	5	MassDEP aesthetics observations for station W0694 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2012.
W0694	Millers River	2013	1	MassDEP aesthetics observations for station W0694 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2013. However, there is insufficient information to assess the Aesthetics Use since data were limited (n=1).

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0694	2011	5	2	0
W0694	2012	5	4	1
W0694	2013	1	1	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0694	Millers River	2011	Color	Reddish	5	5
W0694	Millers River	2011	Objectionable Deposits	No	2	5
W0694	Millers River	2011	Objectionable Deposits	Unobservable	3	5
W0694	Millers River	2011	Odor	None	5	5
W0694	Millers River	2011	Scum	No	2	5
W0694	Millers River	2011	Scum	Yes	3	5
W0694	Millers River	2011	Turbidity	None	2	5
W0694	Millers River	2011	Turbidity	Unobservable	3	5
W0694	Millers River	2012	Color	Reddish	5	5
W0694	Millers River	2012	Objectionable Deposits	No	1	5
W0694	Millers River	2012	Objectionable Deposits	Unobservable	1	5
W0694	Millers River	2012	Objectionable Deposits	Yes	3	5
W0694	Millers River	2012	Odor	None	5	5
W0694	Millers River	2012	Scum	No	2	5
W0694	Millers River	2012	Scum	Yes	3	5
W0694	Millers River	2012	Turbidity	None	5	5
W0694	Millers River	2013	Color	Reddish	1	1

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0694	Millers River	2013	Objectionable Deposits	No	1	1
W0694	Millers River	2013	Odor	None	1	1
W0694	Millers River	2013	Scum	Yes	1	1
W0694	Millers River	2013	Turbidity	None	1	1

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

E. coli bacteria sampling was conducted by both MassDEP staff and Millers River Watershed Council (MRWC) staff/volunteers at three sites along this Millers River AU (MA35-02) from up to downstream as follows: at the Winchendon boat launch (MRWC_MW1) between June and September 2014 (n = 6) and June and September 2015 (n = 7), at the old bridge abutments on eastern shore of the closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle) in Winchendon (MassDEP W0694) between May and September 2011 (n = 3) and between April and October 2012 (n = 4), farther downstream at the New Boston Road launch (MRWC_MOSF1) between June and September 2014 (n = 6) and June and September 2015 (n = 7). Data analysis at the most upstream site MRWC_MW1 indicated GM exceedances (75 and 82% exceedances with cumulative GM exceedance of 79%) but no STV exceedances in either year. Too limited data were available to assess at the next downstream site (W0694) although no STV exceedances occurred, while at the most downstream sampling site (MRWC_MOSF1) data analysis indicated GM exceedances in only one of two years (71 and 0% exceedances with cumulative GM exceedance of 28%) and one STV exceedance in one of two years.

Since the *E. coli* concentrations exceeded the use attainment impairment thresholds at only one of two sites for the multi-year limited frequency dataset (and that site was near the upper end of this AU so less representative of the entire length of the AU), and only one of the 33 samples collected at the three sites between 2011 and 2015 was above the STV, the Primary Contact Recreational Use for this Millers River AU (MA35-02) is assessed as Fully Supporting but an Alert for E. coli is being identified. Additional *E. coli* bacteria sampling is also being recommended in the river at the Winchendon boat launch.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0694	MassDEP	Water Quality	Millers River	[old bridge abutments on eastern shore of closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle), Winchendon]	42.672322	-72.093055
MRWC_MOSF1	Millers River Watershed Council	Water Quality	Millers River	New Boston road launch	42.645661	-72.098717
MRWC_MW1	Millers River Watershed Council	Water Quality	Millers River	Winchendon boat launch	42.683944	-72.083117

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0694	MassDEP	E. coli	05/16/11	09/20/11	3	47	240	122
W0694	MassDEP	E. coli	04/10/12	10/23/12	4	22	152	56
MRWC_MOSF1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	6	88.6	517.2	164
MRWC_MOSF1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	55.6	193.5	102
MRWC_MW1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	6	78.9	387.3	138
MRWC_MW1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	71.2	325.5	145

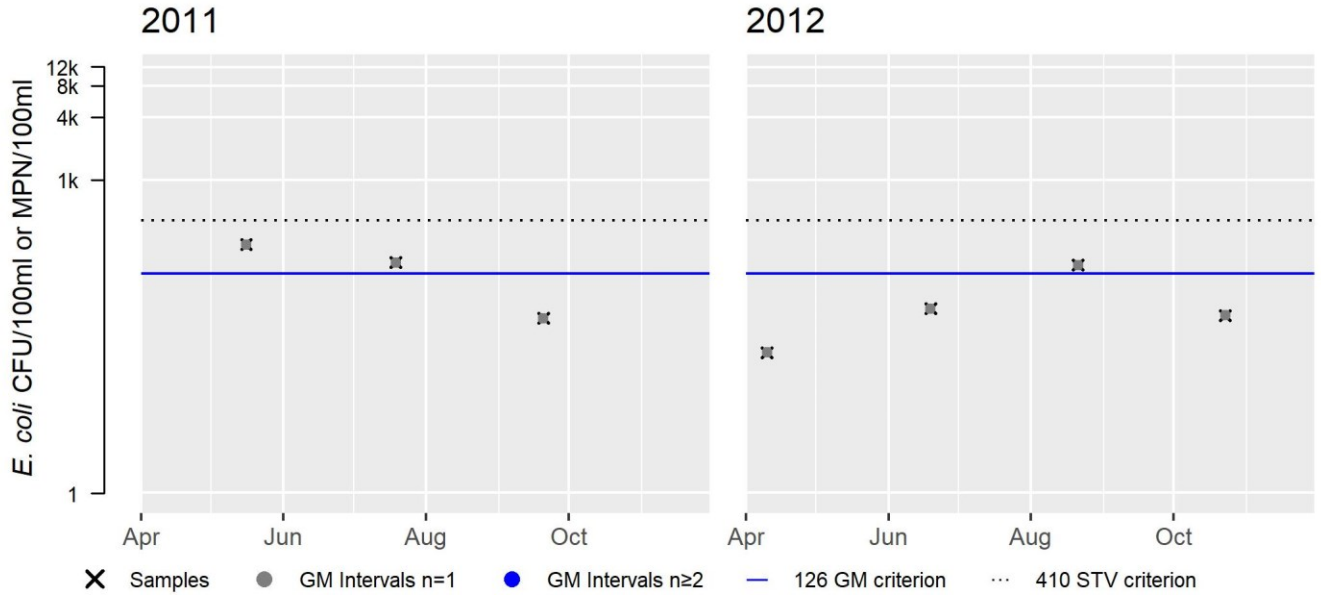
W0694 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	3
SeasGM	122
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	4
SeasGM	56
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



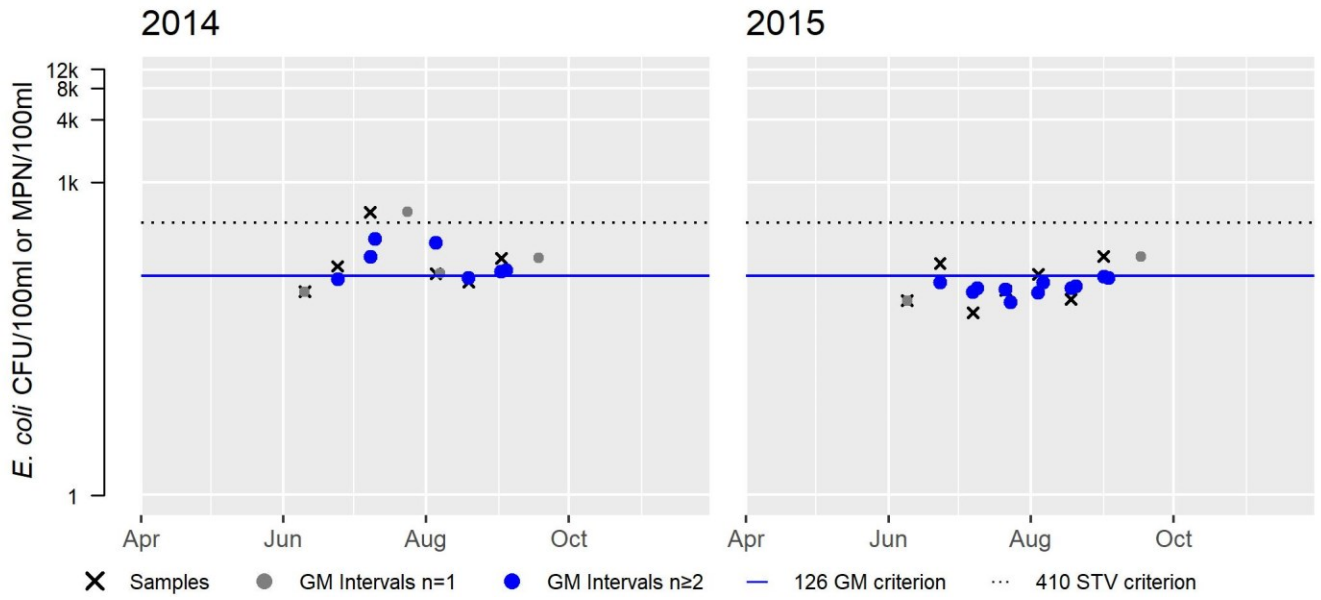
MRWC_MOSF1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	164
#GMI	7
#GMI Ex	5
%GMI Ex	71
n>STV	1
%n>STV	17

Var	Res
Samples	7
SeasGM	102
#GMI	11
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	28



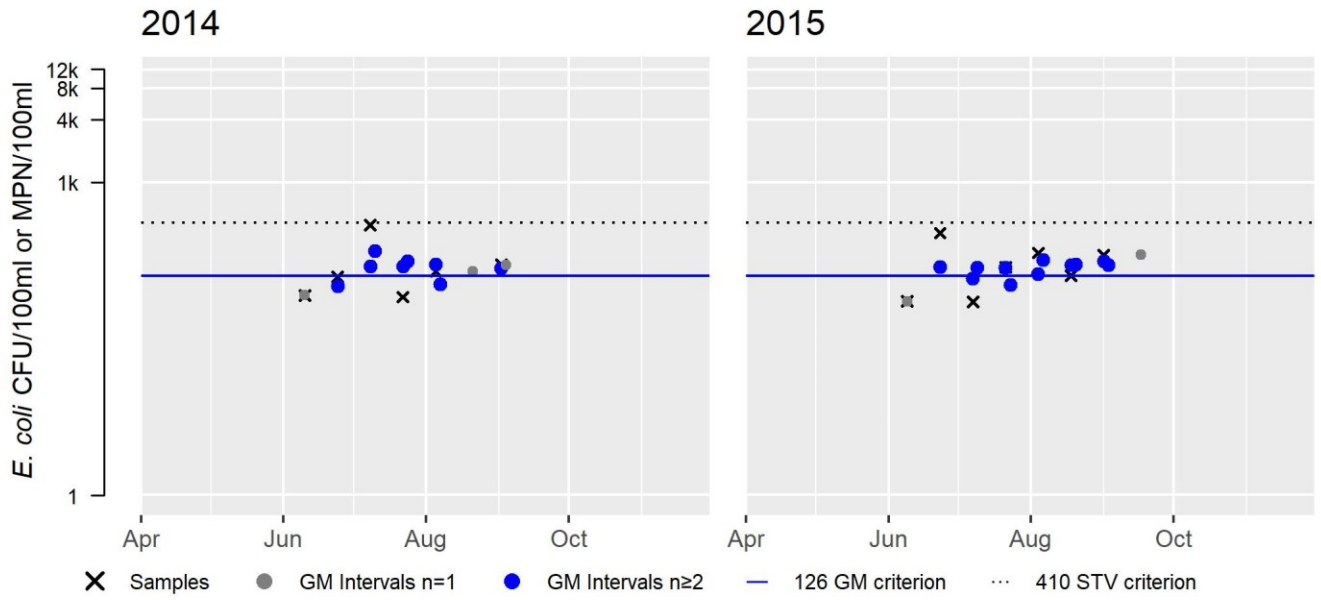
MRWC_MW1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	138
#GMI	8
#GMI Ex	6
%GMI Ex	75
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	145
#GMI	11
#GMI Ex	9
%GMI Ex	82
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	79



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

E. coli bacteria sampling was conducted by both MassDEP staff and Millers River Watershed Council (MRWC) staff/volunteers at three sites along this Millers River AU (MA35-02) from up to downstream as follows: at the Winchendon boat launch (MRWC_MW1) between June and September 2014 (n = 6) and June and September 2015 (n = 7), at the old bridge abutments on eastern shore of the closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle) in Winchendon (W0694) between March and November 2011 (n = 5), February to October 2012 (n=5), and one sample in March 2013 (n = 1), and farther downstream at the New Boston Road launch (MRWC_MOSF1) between June and September 2014 (n = 6) and June and September 2015 (n = 7). Data analysis indicated that none of the intervals at any site had GMs > 630 cfu/100 ml and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GMs at MRWC_MW1 were 138 and 145 cfu/100 ml (2014 and 2015, respectively), 37, 33, and 13 cfu/100 ml at W0694 (2011, 2012, and 2013, respectively), and 164 and 102 cfu/100 ml at MRWC_MOSF1 (2014 and 2015, respectively).
Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for these three multi-year low frequency datasets, the Secondary Contact Recreational Use for this Millers River AU (MA35-02) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0694	MassDEP	Water Quality	Millers River	[old bridge abutments on eastern shore of closed dirt road (Sibley Road on 1998 Winchendon USGS quadrangle), Winchendon]	42.672322	-72.093055
MRWC_MOSF1	Millers River Watershed Council	Water Quality	Millers River	New Boston road launch	42.645661	-72.098717
MRWC_MW1	Millers River Watershed Council	Water Quality	Millers River	Winchendon boat launch	42.683944	-72.083117

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0694	MassDEP	E. coli	03/29/11	11/15/11	5	5	240	37
W0694	MassDEP	E. coli	02/21/12	10/23/12	5	4	152	33
W0694	MassDEP	E. coli	03/25/13	03/25/13	1	13	13	13
MRWC_MOSF1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	6	88.6	517.2	164
MRWC_MOSF1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	55.6	193.5	102
MRWC_MW1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	6	78.9	387.3	138
MRWC_MW1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	71.2	325.5	145

W0694 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

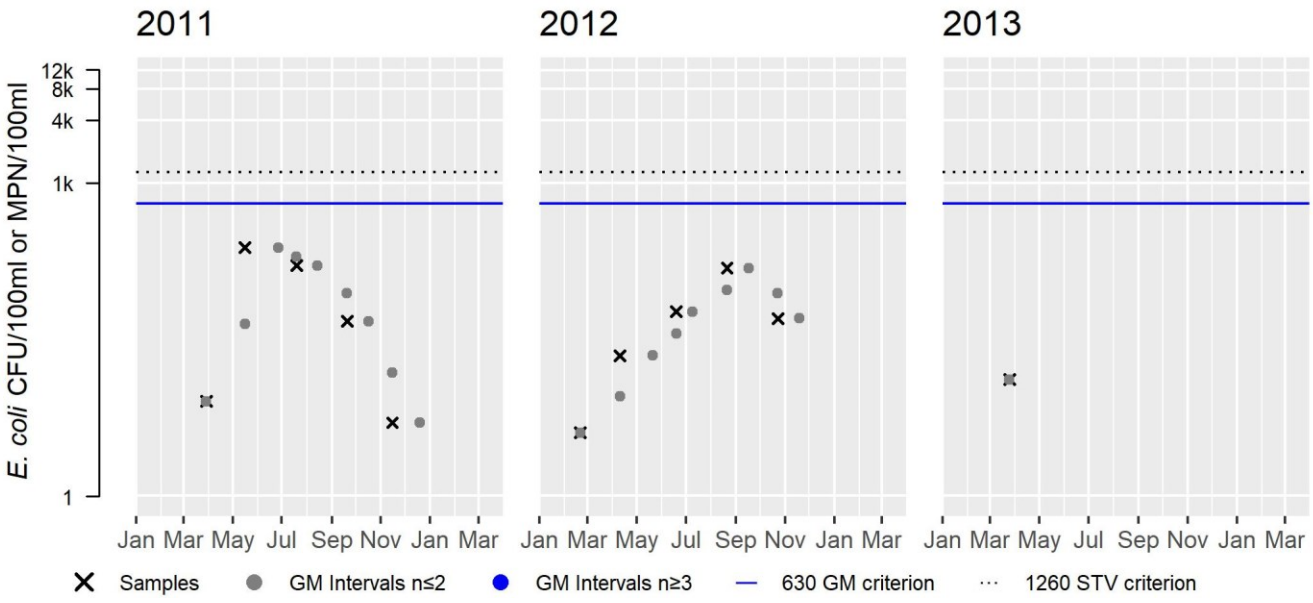
Var	Res
Samples	5
SeasGM	37
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	5
SeasGM	33
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	1
SeasGM	13
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



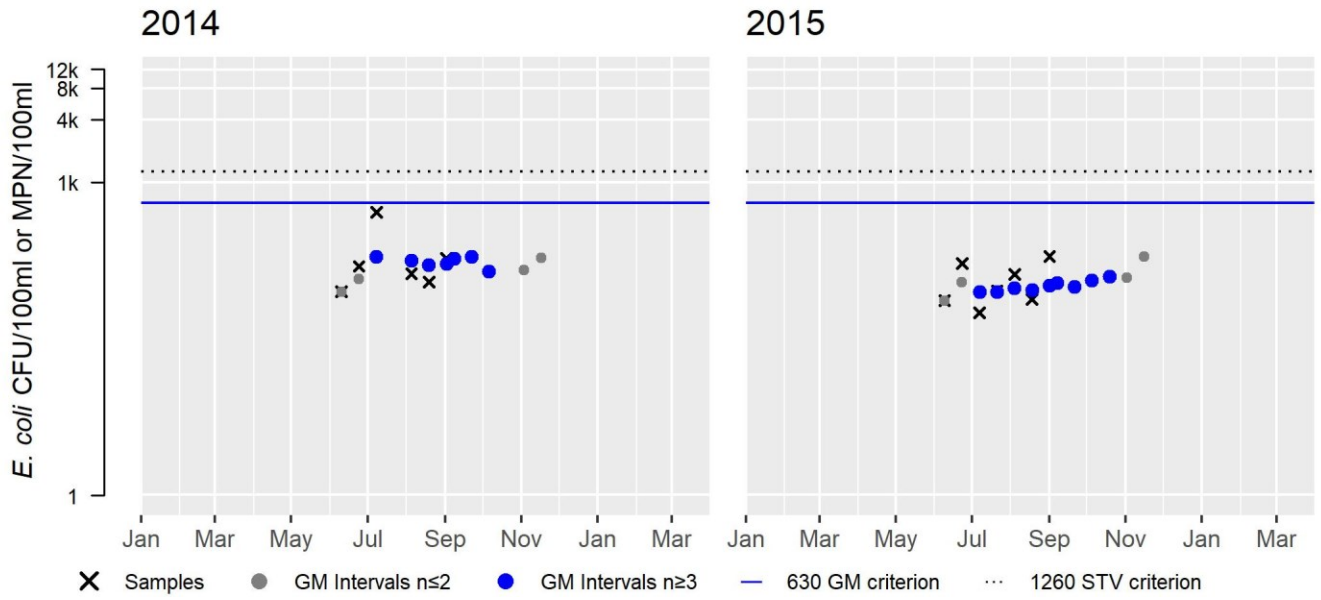
MRWC_MOSF1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	164
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	102
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



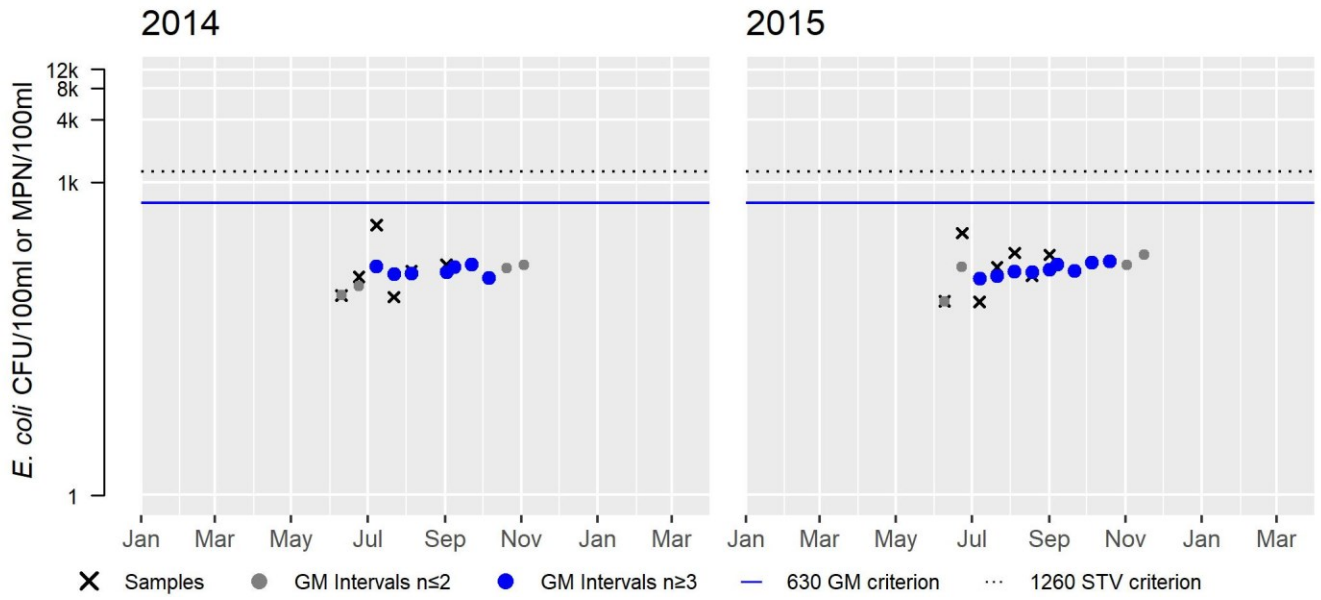
MRWC_MW1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	138
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	145
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0

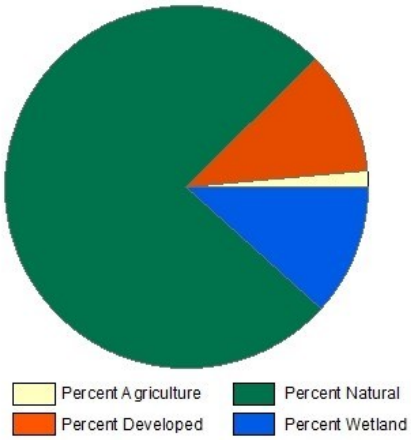


Millers River (MA35-03)

Location:	Confluence with Otter River, Winchendon to South Royalston USGS Gage, Royalston.
AU Type:	RIVER
AU Size:	3.5 MILES
Classification/Qualifier:	B: WWF

Millers River - MA35-03

Watershed Area: 188.94 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	133.95	13.72	29.96	3.12
Agriculture	1.4%	3.3%	0.6%	2.1%
Developed	11%	3.6%	9.4%	4.5%
Natural	75.8%	80.4%	66.1%	66.3%
Wetland	11.7%	12.7%	23.9%	27.1%
Impervious Cover	4.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Fish Bioassessments		Added
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Fish Bioassessments	Dam or Impoundment (N)	X				
Fish Bioassessments	Source Unknown (N)	X				
PCBs in Fish Tissue	Contaminated Sediments (Y)	X	X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)	X	X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert

Not Supporting	NO
2022 Use Attainment Summary	
MA DFG biologists conducted backpack electrofishing in this Millers River AU (MA35-03) near Blossom Road upstream of the Town of Royalston Water Treatment Plant discharge in Royalston (SampleID 5919) in August 2016. The sample was dominated by fluvial fish (91%). MassDEP staff also conducted discrete water quality sampling in this area south of Blossom Street, ~ 450 feet west of King Street at USGS flow gaging station #01164000 as part of the SMART monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. Discrete water quality sampling data (W0692), n=11 surveys between January 2011 and March 2013, can be summarized as follows: minimum dissolved oxygen 7.8mg/L, maximum temperature 25.1°C, pH ranged from 5.9 to 7.0SU (once <6.0SU), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations 0.039 and 0.046mg/L, maximum saturation 101%, maximum pH 7.0SU, and three observations of dense/very dense filamentous algae in 2012), and low concentrations of total ammonia-nitrogen (0.07mg/L) and chloride (maximum 46mg/L). The overall Target Fish Community evaluation can be summarized as follows: Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the 4 WWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. The Aquatic Life Use for this Millers River AU (MA35-03) will continue to be assessed as Not Supporting with the PCB in Fish Tissue impairment (historical whole fish study data (Kennedy and Rojko 2004) being carried forward. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River. Additionally, a Fish Bioassessment impairment is being added based on the low similarity of the overall fish community (36%) with the Millers River TFC.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5919	MassDFG	Fish Community	Millers River	Blossom Rd upstream of water treatment plant., Royalston	42.63001	-72.15079
W0692	MassDEP	Water Quality	Millers River	[south of Blossom Street, approximately 450 feet west of King Street at USGS flow gaging station #01164000, Royalston]	42.629698	-72.150357

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

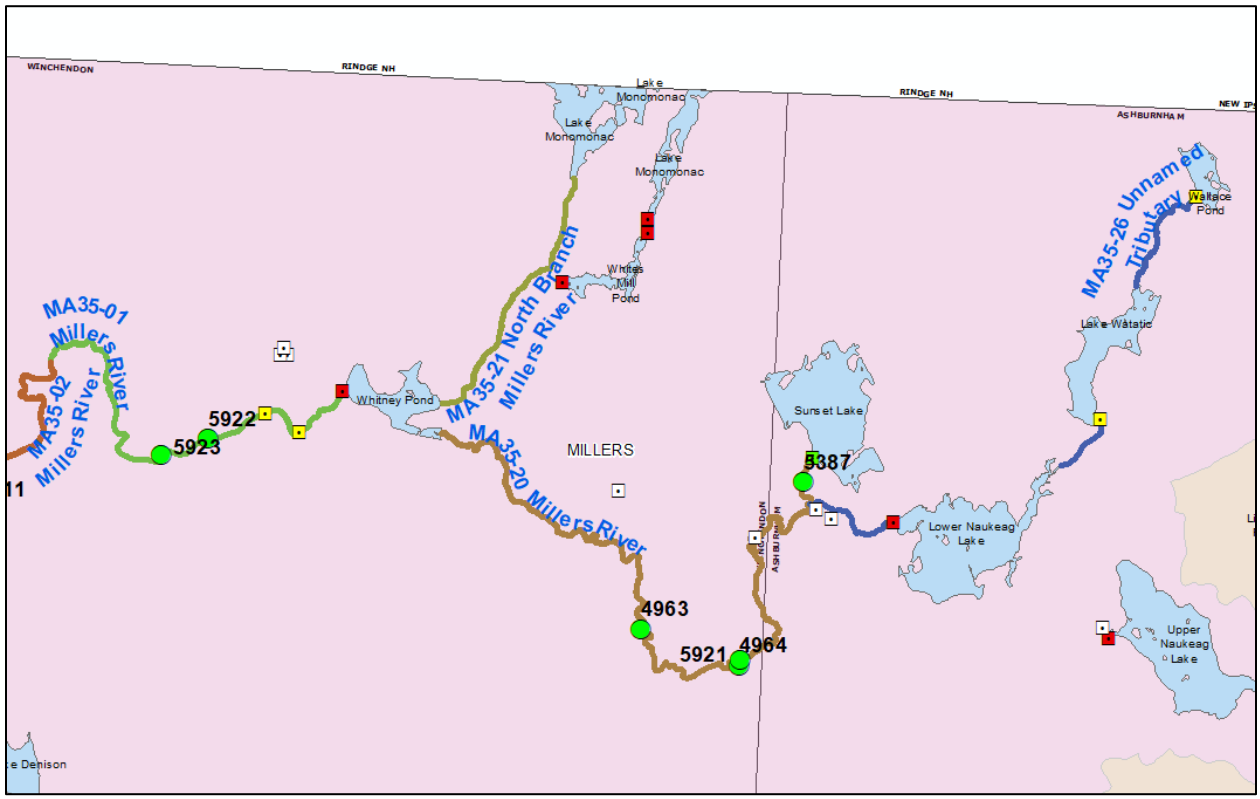
[Species List: CS = Common Shiner, F = Fallfish, LMB = Largemouth Bass, LND = Longnose Dace, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5919	08/17/16	BP	TP		7	274	0%	5	91%	0%	1	3%	Yes	No	CS, F, LMB, LND, TD, WS, YB,

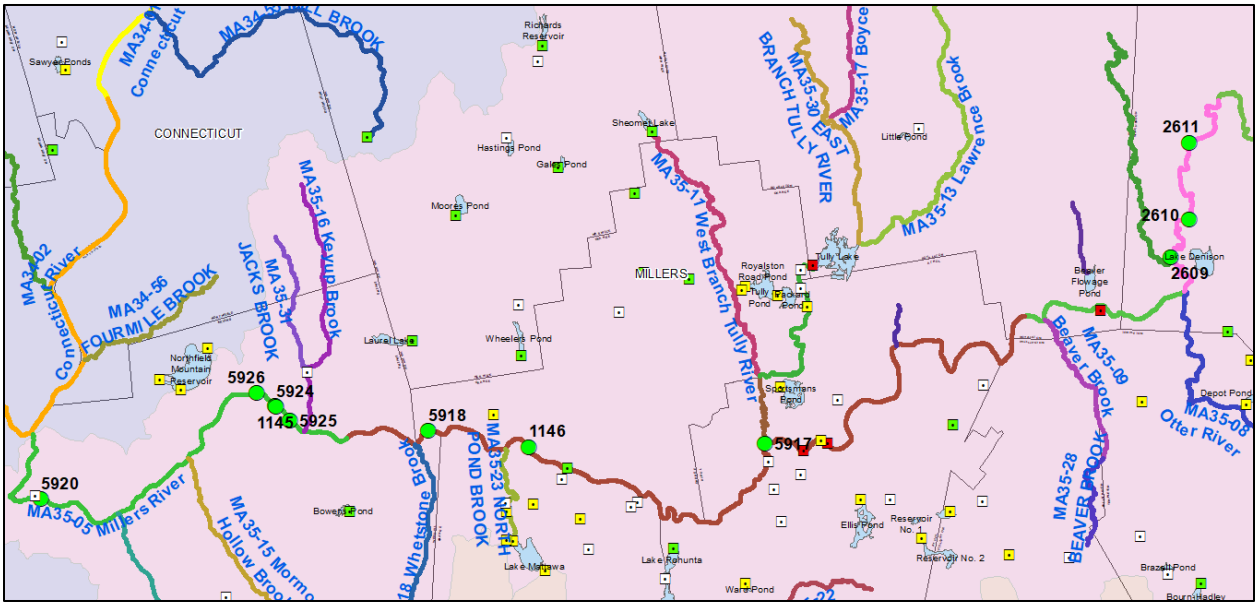
Data Sources: (MassDFG 2018, MassDEP Undated 2, Kashiwagi and Richards 2009)

Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the 4 WWF AUs alone). Of the 5 most common species in the TFC, only 2 of the species (fallfish, common shiner) were also in the top 5 among the study samples (combined among all AUs), and in a different ranked order. Based on the low similarity of the overall fish community (36%) with the Millers River TFC, the Aquatic Life Use for these Millers River AUs (MA35-02, MA35-03, MA35-04, MA35-05) should be assessed as Not Supporting for Fish Bioassessments.

Fish Community Samples in the Millers River (From upstream to downstream and right to left, CWF AUs MA35-20, MA35-01):



Fish Community Samples in the Millers River (From upstream to downstream and right to left, WWF AUs MA35-02 in pink, MA35-03 in green, MA35-04 in red, MA35-05 in green):



Millers TFC Model:

Table A9. Species percent composition for reference rivers used to develop the Millers River target fish community model. Species are ordered by mean rank. Non-native, stocked, and out-of-range species were deleted from the ranking and calculation of expected proportion in the target fish model. The ranks were converted to expected proportions (as a percent) using a rank-weighting technique as outlined by Bain and Meixler (2008).

Species	EB Westfield River	Third Branch White River	Tenmile River	Ashuelot River	Ammonoosuc River	Piscataquog River	Total	Rank	Expected Proportions
Blacknose dace	41.3	25.0	14.9	19.8	24.1	22.5	147.6	1	32.6
Longnose dace	18.7	19.9	9.3	12.7	38.5	15.2	114.2	2	16.3
Common shiner	7.8	2.6	13.8	22.3	1.4	15.8	63.7	3	10.9
Fallfish	0.5	0.0	18.7	26.8	0.0	2.8	48.8	4	8.1
Atlantic Salmon	9.7	0.0	0.0	2.2	24.1	3.4	39.4		
Slimy sculpin	0.0	33.1	0.0	0.0	6.0	0.0	39.1	6	5.4
White sucker	8.2	0.3	15.8	7.9	0.5	2.8	35.5	7	4.7
Smallmouth bass	9.6	0.0	12.2	1.3	0.0	12.0	35.1		
Longnose sucker	0.0	5.6	0.0	0.0	4.8	2.8	13.2		
Tessellated darter	0.0	0.1	7.3	3.8	0.2	0.0	11.4	10	3.3
Rainbow trout	0.1	7.5	0.1	0.0	0.0	0.2	7.8		
Creek chub	2.7	1.4	0.6	0.2	0.0	0.0	4.9	12	2.7
Cutlips minnow	0.0	0.0	4.6	0.0	0.0	0.0	4.6		
Brown trout	0.0	3.3	0.1	0.3	0.0	0.4	4.1		
Yellow bullhead	0.0	0.0	0.1	1.0	0.0	3.0	4.1		
Redbreast sunfish	0.0	0.0	0.0	0.0	0.0	2.7	2.7	16	2.0
Pumpkinseed	0.1	0.0	0.6	0.3	0.0	1.4	2.4	17	1.9
Brook trout	0.5	1.2	0.1	0.0	0.6	0.0	2.3	18	1.8
American eel	0.0	0.0	0.0	0.2	0.0	1.4	1.6	19	1.7
Bluegill	0.2	0.0	1.3	0.0	0.0	0.0	1.5		
Largemouth bass	0.0	0.0	0.0	0.0	0.0	1.4	1.4		
Golden shiner	0.1	0.0	0.3	0.0	0.0	0.5	0.9	22	1.5
Spottail shiner	0.0	0.0	0.0	0.0	0.0	0.5	0.5	23	1.4
Brown bullhead	0.0	0.0	0.0	0.2	0.0	0.2	0.4	24	1.4
Bluntnose minnow	0.0	0.0	0.4	0.0	0.0	0.0	0.4		
Rock bass	0.0	0.0	0.3	0.1	0.0	0.0	0.4		
Chain pickerel	0.0	0.0	0.0	0.1	0.0	0.2	0.3	27	1.2
Yellow perch	0.0	0.0	0.0	0.3	0.0	0.0	0.3	28	1.2
Bridle shiner	0.1	0.0	0.0	0.0	0.0	0.0	0.1	29	1.1

Fish Community Analysis:

Combined fish community analysis for all 6 AUs (MA35-20, MA35-01, MA35-02, MA35-03, MA35-04, MA35-05); samples 1570 and 5919 were excluded because of low sampling efficiency

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	0.61%	2.0	1.4	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	42	1.29%	-	1.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	7	0.21%	33.0	32.8	
Millers	Bluegill	27	0.83%	-	0.8	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	36	1.11%	1.0	0.1	
Millers	Brown Trout	7	0.21%	-	0.2	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	37	1.14%	1.0	0.1	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	663	20.36%	11.0	9.4	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	10	0.31%	-	0.3	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	1135	34.85%	8.0	26.8	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	0.61%	2.0	1.4	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	21	0.64%	-	0.6	
Millers	Longnose Dace	116	3.56%	16.0	12.4	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	14	0.43%	2.0	1.6	
Millers	Rainbow Trout	2	0.06%	-	0.1	
Millers	Redbreast Sunfish	240	7.37%	2.0	5.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	1.44%	-	1.4	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	5.96%	-	6.0	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	229	7.03%	-	7.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	273	8.38%	5.0	3.4	
Millers	Yellow Bullhead	61	1.87%	-	1.9	
Millers	Yellow Perch	56	1.72%	1.0	0.7	
Millers	(blank)		0.00%	-	-	36.43
Grand Total		3257	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Analysis of samples from WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05) alone, excluding sample 5919

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	1.05%	2.0	1.0	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	6	0.31%	-	0.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	4	0.21%	33.0	32.8	
Millers	Bluegill	9	0.47%	-	0.5	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	9	0.47%	1.0	0.5	
Millers	Brown Trout	7	0.37%	-	0.4	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	26	1.36%	1.0	0.4	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	578	30.25%	11.0	19.2	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	8	0.42%	-	0.4	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	410	21.45%	8.0	13.5	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	1.05%	2.0	1.0	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	7	0.37%	-	0.4	
Millers	Longnose Dace	46	2.41%	16.0	13.6	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	6	0.31%	2.0	1.7	
Millers	Rainbow Trout	2	0.10%	-	0.1	
Millers	Redbreast Sunfish	219	11.46%	2.0	9.5	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	2.46%	-	2.5	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	10.15%	-	10.2	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	95	4.97%	-	5.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	133	6.96%	5.0	2.0	
Millers	Yellow Bullhead	37	1.94%	-	1.9	
Millers	Yellow Perch	28	1.47%	1.0	0.5	
Millers	(blank)		0.00%	-	-	35.49
Grand Total		1911	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0692	01/25/11	11/15/11	5	7.8	10.2	0	0	0
W0692	02/21/12	10/23/12	5	8	10.3	0	0	0
W0692	01/29/13	03/25/13	1	13.1	13.1	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W0692	01/25/11	11/15/11	5	1	25.1	12.9	1	1	0	0
W0692	02/21/12	10/23/12	5	2	21.8	12.6	1	0	0	0
W0692	01/29/13	03/25/13	1	0	2.6	2.6	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W0692	01/25/11	11/15/11	5	5.9	7	3	1
W0692	02/21/12	10/23/12	5	6.5	6.9	0	0
W0692	01/29/13	03/25/13	1	6.4	6.4	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0692	2011	3	0.033	0.039	0.037	--	--	98.2	7.0	1	0
W0692	2012	2	0.023	0.046	0.035	--	--	101.2	6.9	4	3
W0692	2013	--	--	--	--	--	--	96.4	6.4	1	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W0692	2011	5	0.020	0.070	0.042	0	0
W0692	2012	5	0.020	0.060	0.034	0	0
W0692	2013	1	0.040	0.040	0.040	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0692	2011	5	19	46	32	0	0
W0692	2012	5	3	45	28	0	0
W0692	2013	1	36	36	36	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W0692	01/25/11	11/15/11	5	104	236	0	0	0	0	0	0
W0692	02/21/12	10/23/12	5	139	220	0	0	0	0	0	0
W0692	01/29/13	03/25/13	1	169	169	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020).

The Fish Consumption Use for this Millers River AU (MA35-03) will continue to be assessed as Not Supporting because of the site-specific Fish Consumption Advisory for PCBs in Fish Tissue. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

MassDEP staff surveyed one site along this Millers River AU (MA35-03) south of Blossom Street, ~450 feet west of King Street at USGS flow gaging station #01164000 in Royalston (W0692) between January 2011 and March 2013 as part of the SMART monitoring project. There were generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) observed during the surveys although in 2012 there were observations of dense/very dense algae noted in three of four site visits.

The Aesthetics Use for this Millers River AU (MA35-03) is assessed as Fully Supporting based on the general lack of objectionable conditions documented by MassDEP staff at the site surveyed between January 2011 and March 2013 but the alert for occasional observations of excess algal growth is being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0692	MassDEP	Water Quality	Millers River	[south of Blossom Street, approximately 450 feet west of King Street at USGS flow gaging station #01164000, Royalston]	42.629698	-72.150357

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0692	Millers River	2011	5	MassDEP aesthetics observations for station W0692 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0692	Millers River	2012	5	MassDEP aesthetics observations for station W0692 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2012.
W0692	Millers River	2013	1	MassDEP aesthetics observations for station W0692 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2013. However, there is insufficient information to assess the Aesthetics Use since data were limited (n=1).

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0692	2011	5	1	0
W0692	2012	5	4	3
W0692	2013	1	1	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0692	Millers River	2011	Color	Reddish	5	5
W0692	Millers River	2011	Objectionable Deposits	No	1	5
W0692	Millers River	2011	Objectionable Deposits	Unobservable	4	5
W0692	Millers River	2011	Odor	Musty (Basement)	2	5
W0692	Millers River	2011	Odor	None	3	5
W0692	Millers River	2011	Scum	Yes	5	5
W0692	Millers River	2011	Turbidity	None	3	5
W0692	Millers River	2011	Turbidity	Slightly Turbid	1	5
W0692	Millers River	2011	Turbidity	Unobservable	1	5
W0692	Millers River	2012	Color	Reddish	4	5
W0692	Millers River	2012	Color	Rusty	1	5
W0692	Millers River	2012	Objectionable Deposits	No	2	5
W0692	Millers River	2012	Objectionable Deposits	Unobservable	2	5
W0692	Millers River	2012	Objectionable Deposits	Yes	1	5
W0692	Millers River	2012	Odor	None	4	5
W0692	Millers River	2012	Odor	Other	1	5
W0692	Millers River	2012	Scum	Yes	5	5

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0692	Millers River	2012	Turbidity	None	2	5
W0692	Millers River	2012	Turbidity	Slightly Turbid	2	5
W0692	Millers River	2012	Turbidity	Unobservable	1	5
W0692	Millers River	2013	Color	Reddish	1	1
W0692	Millers River	2013	Objectionable Deposits	No	1	1
W0692	Millers River	2013	Odor	None	1	1
W0692	Millers River	2013	Scum	Yes	1	1
W0692	Millers River	2013	Turbidity	None	1	1

Primary Contact Recreation

2022 Use Attainment	Alert
Insufficient Information	NO

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples from this Millers River AU (MA35-03) south of Blossom Street, approximately 450 feet west of King Street at USGS flow gaging station #01164000 in Royalston (W0692) between May and September 2011 (n = 3) and between April and October 2012 (n = 4). Too limited data were available to assess although none of the samples exceeded the 410 cfu/100 ml STV and the seasonal GMs were 91 and 48 cfu/100 ml in 2011 and 2012, respectively.
Too limited *E. coli* data are available to assess the Primary Contact Recreational Use for this Millers River AU (MA35-03) so it is assessed as having Insufficient Information.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0692	MassDEP	Water Quality	Millers River	[south of Blossom Street, approximately 450 feet west of King Street at USGS flow gaging station #01164000, Royalston]	42.629698	-72.150357

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0692	MassDEP	E. coli	05/16/11	09/20/11	3	30	387	91
W0692	MassDEP	E. coli	04/10/12	10/23/12	4	6	133	48

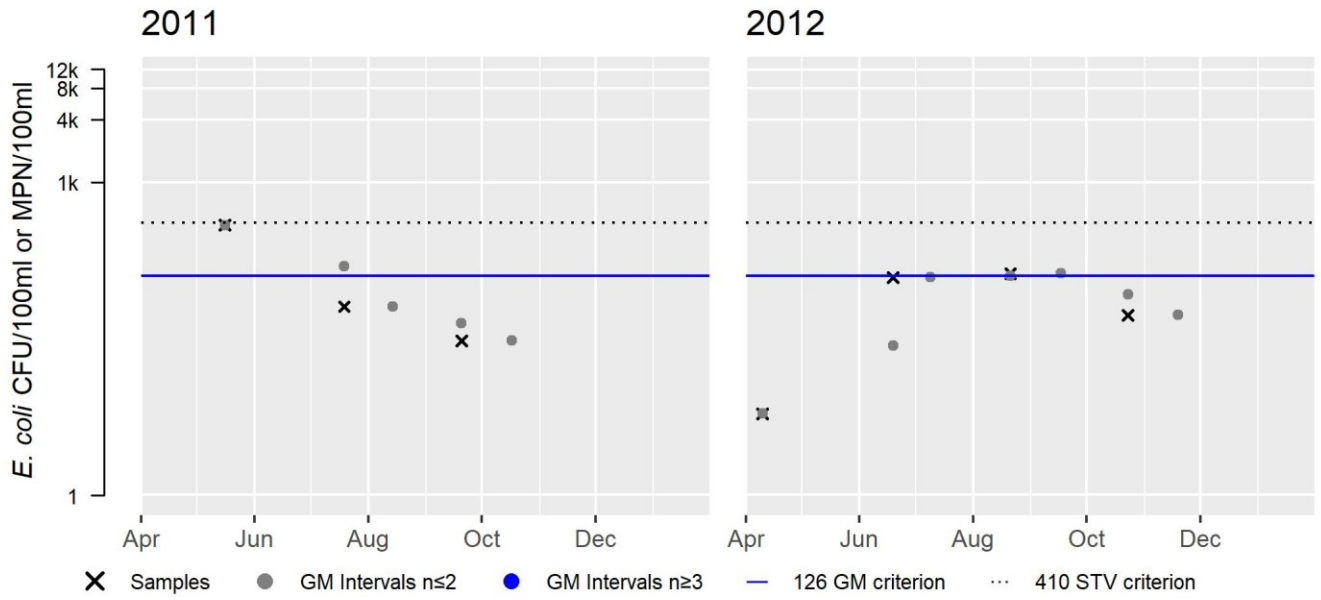
W0692 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	3
SeasGM	91
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	4
SeasGM	48
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



Secondary Contact Recreation

2022 Use Attainment	Alert
Insufficient Information	NO

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples from this Millers River AU (MA35-03) south of Blossom Street, approximately 450 feet west of King Street at USGS flow gaging station #01164000 in Royalston (W0692) between March and November 2011 (n = 5), February and October 2012 (n=5), and in March 2013 (n=1). Data analysis of this low frequency multi-year dataset indicated insufficient samples to calculate usable GMs and no samples in any of the three years exceeded the STV of 1260cfu/100mls. The seasonal GMs were 32, 31, and 55 cfu/100ml in 2011, 2012, and 2013, respectively.

Too limited *E. coli* bacteria data are available to assess the status of the Secondary Contact Recreational Use for this Millers River AU (MA35-03), so it is assessed as having Insufficient Information.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0692	MassDEP	Water Quality	Millers River	[south of Blossom Street, approximately 450 feet west of King Street at USGS flow gaging station #01164000, Royalston]	42.629698	-72.150357

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0692	MassDEP	E. coli	03/29/11	11/15/11	5	1	387	32
W0692	MassDEP	E. coli	02/21/12	10/23/12	5	6	133	31
W0692	MassDEP	E. coli	03/25/13	03/25/13	1	55	55	55

W0692 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

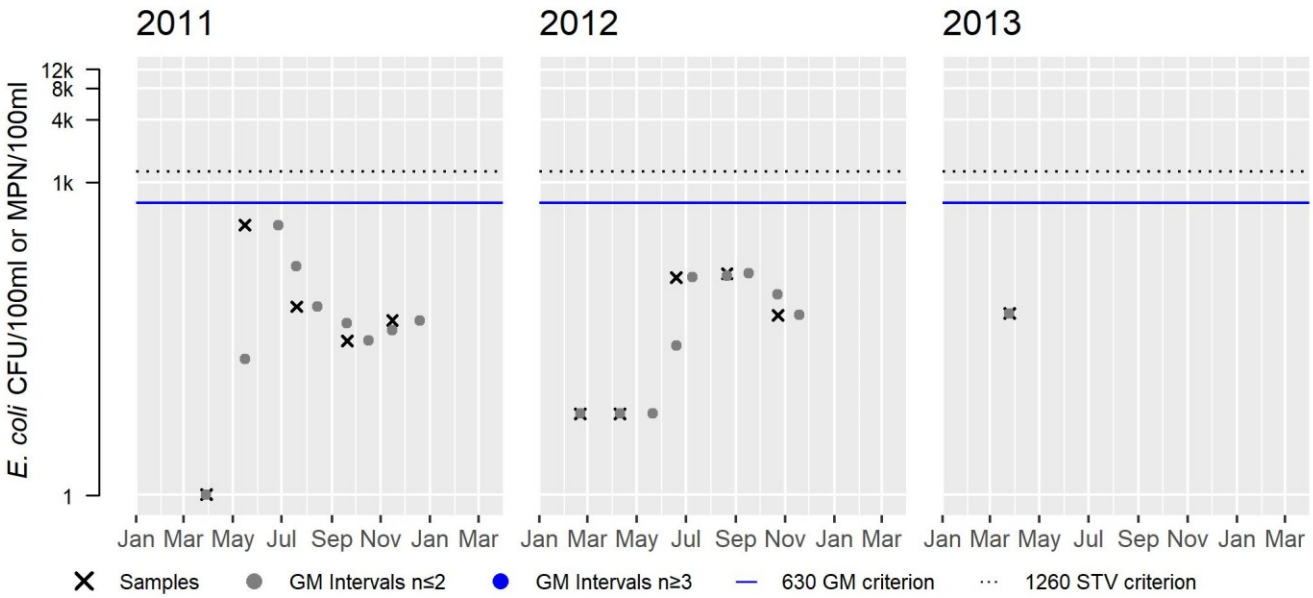
Var	Res
Samples	5
SeasGM	32
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	5
SeasGM	31
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	1
SeasGM	55
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0

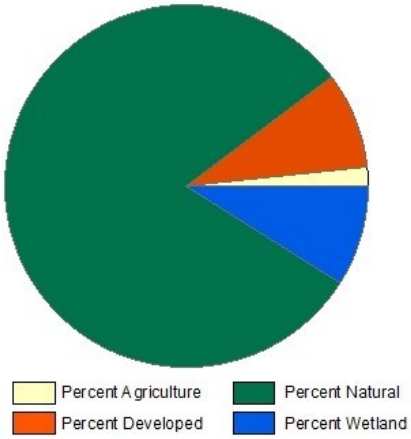


Millers River (MA35-04)

Location:	South Royalston USGS Gage, Royalston to Erving Center WWTP (formerly known as Erving Paper Company), Erving.
AU Type:	RIVER
AU Size:	18.5 MILES
Classification/Qualifier:	B: WWF

Millers River - MA35-04

Watershed Area: 359.98 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	280.39	15.85	61.74	4.09
Agriculture	1.7%	0.8%	0.9%	1%
Developed	8.6%	3.9%	8%	5.8%
Natural	80.7%	90.4%	71.5%	84%
Wetland	9%	4.9%	19.6%	9.3%
Impervious Cover	3.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Non-Native Aquatic Plants*)		Added
5	5	Fish Bioassessments		Added
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Fish Bioassessments	Dam or Impoundment (N)	X				
Fish Bioassessments	Source Unknown (N)	X				
PCBs in Fish Tissue	Contaminated Sediments (Y)	X	X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)	X	X			

Recommendations

2022 Recommendations
REC: Continue to conduct *E. coli* bacteria sampling at several sampling locations along this Millers River AU (MA35-04) particularly including sites W0684/MRWC_MCM1 and W0682/MRWC_MW01 to evaluate whether concentrations exceed use attainment thresholds or the Primary Contact Recreational Use is being met.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary
MA DFG biologists conducted electrofishing in this Millers River AU (MA35-04) in three general reaches as follows: barge or backpack shocking between the public canoe launch and the Alan Rich Environmental Park in Athol (SampleIDs 5917, 5493, and 5467 in August 2016, October 2015, and June 2015), boat electrofishing Athol/Orange downstream of Route 202 bridge (SampleIDs 7376, 7375, and 7374 in September 2018), and Rt 2 bridge Wendell Depot Road in Orange (SampleID 5918) in August 2016. Sampling efforts varied (a few were selective pickup) but all of the samples did have fluvial fish (range 24 to 81%). The overall Target Fish Community evaluation can be summarized as follows: Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the 4 WWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. MassDEP staff also conducted primarily bacteria sampling but did not make any notes of dense/very dense filamentous algae issues in the river at Holtshire Road bridge in Orange (W0682) during the summer of 2011. An infestation of the non-native aquatic macrophyte, variable milfoil (*Myriophyllum heterophyllum*), however near this sampling location was confirmed in the river in 2017. The Aquatic Life Use for this Millers River AU (MA35-04) will continue to be assessed as Not Supporting with the PCB in Fish Tissue impairment (historical whole fish study data (Kennedy and Rojko 2004)) being carried forward. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River. Additionally, a Fish Bioassessment impairment is being added based on the low similarity of the overall fish community (36%) with the Millers River TFC and the Non-Native Aquatic Plants impairment is being added for the variable milfoil (*M. heterophyllum*) infestation.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5467	MassDFG	Fish Community	Millers River	US of Rt 2A bridge at Alan Rich Envir. Park, Athol	42.59350	-72.23941
5493	MassDFG	Fish Community	Millers River	US of Fish Park on Rt 2A, Athol	42.59618	-72.24040
5917	MassDFG	Fish Community	Millers River	North Orange St Public Canoe Launch, site # 1., Athol	42.59624	-72.24038
5918	MassDFG	Fish Community	Millers River	Rt 2 bridge (site 2), Wendell Depot Rd., Orange	42.59874	-72.35802
7374	MassDFG	Fish Community	Millers River	downstream of Rt. 202. Site #1., Athol /Orange	42.57565	-72.26262

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
7375	MassDFG	Fish Community	Millers River	upstream of Rt. 202. Site #2., Athol /Orange	42.57628	-72.25603
7376	MassDFG	Fish Community	Millers River	Site #3., Athol /Orange	42.58099	-72.24899
W0682	MassDEP	Water Quality	Millers River	[Holtshire Road bridge, Orange]	42.598155	-72.341352

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: AE = American Eel, B = Bluegill, BB = Brown Bullhead, BND = Blacknose Dace, BT = Brown Trout, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, GRBS = Green Sunfish X Red Breasted Sunfish Hybrid, GS = Golden Shiner, LND = Longnose Dace, P = Pumpkinseed, RBS = Redbreast Sunfish, RT = Rainbow Trout, SMB = Smallmouth Bass, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead, YP = Yellow Perch]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5467	06/19/15	BG	SP		4	14	0%	1	43%	0%	3	57%	Yes	No	CP, RBS, SMB, WS,
5493	10/15/15	BP	SP		8	30	0%	3	47%	0%	4	50%	Yes	No	B, CP, F, P, SMB, TD, WS, YP,
5917	08/16/16	BP	TP		9	145	0%	3	77%	0%	4	13%	No	No	B, BND, CP, CS, P, RBS, SMB, TD, YB,
5918	08/16/16	BP	TP		10	133	2%	4	35%	2%	2	62%	Yes	No	AE, BB, BT, CS, GRBS, LND, RBS, SMB, TD, YB,
7374*	09/14/18	BT	TP		8	21	0%	1	24%	0%	4	48%	Yes	No	AE, B, CP, GS, RBS, SMB, WS, YP,
7375*	09/14/18	BT	TP		9	156	1%	3	81%	1%	5	15%	Yes	No	B, CP, CS, P, RBS, RT, SMB, WS, YP,
7376*	09/14/18	BT	TP		8	21	0%	3	29%	0%	4	67%	Yes	No	B, CP, CS, F, RBS, SMB, WS, YP,

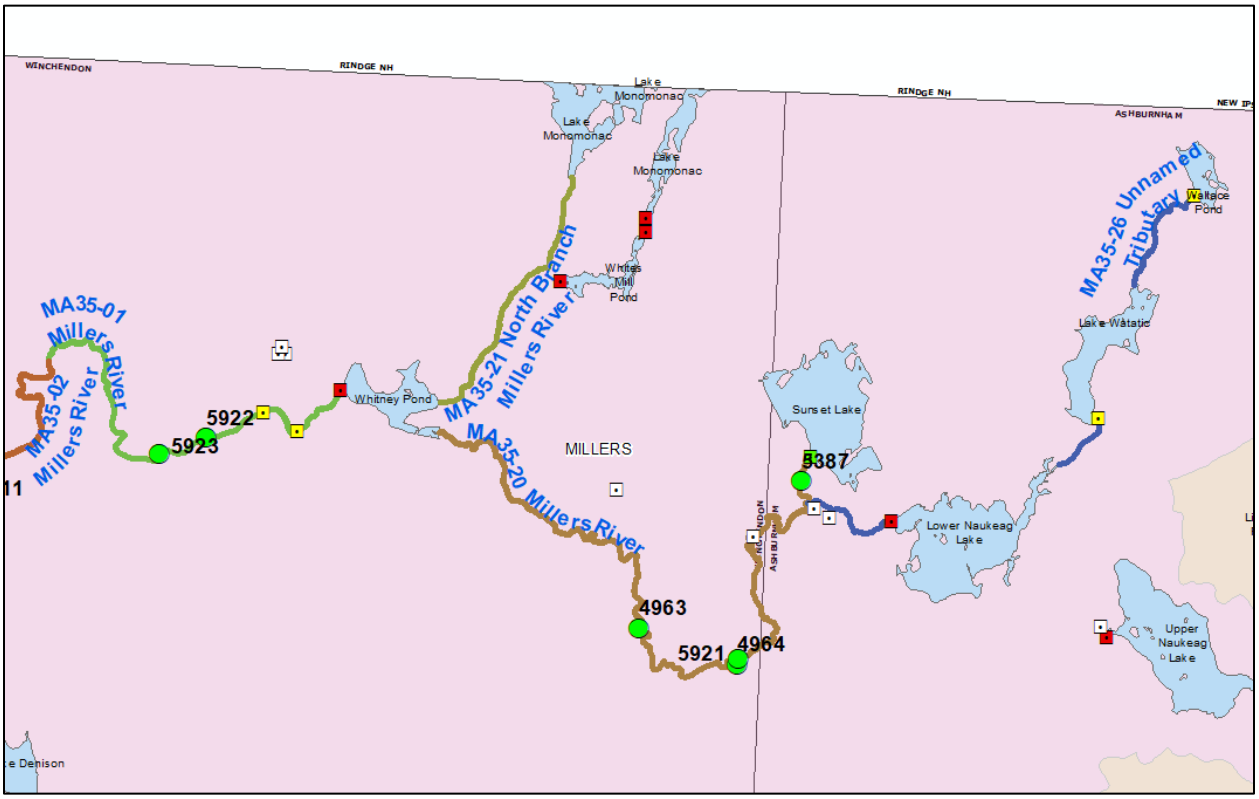
* Heavy/moderate current and poor visibility limited sampling effort

Data Sources: (MassDFG 2018, MassDEP Undated 2, Kashiwagi and Richards 2009)

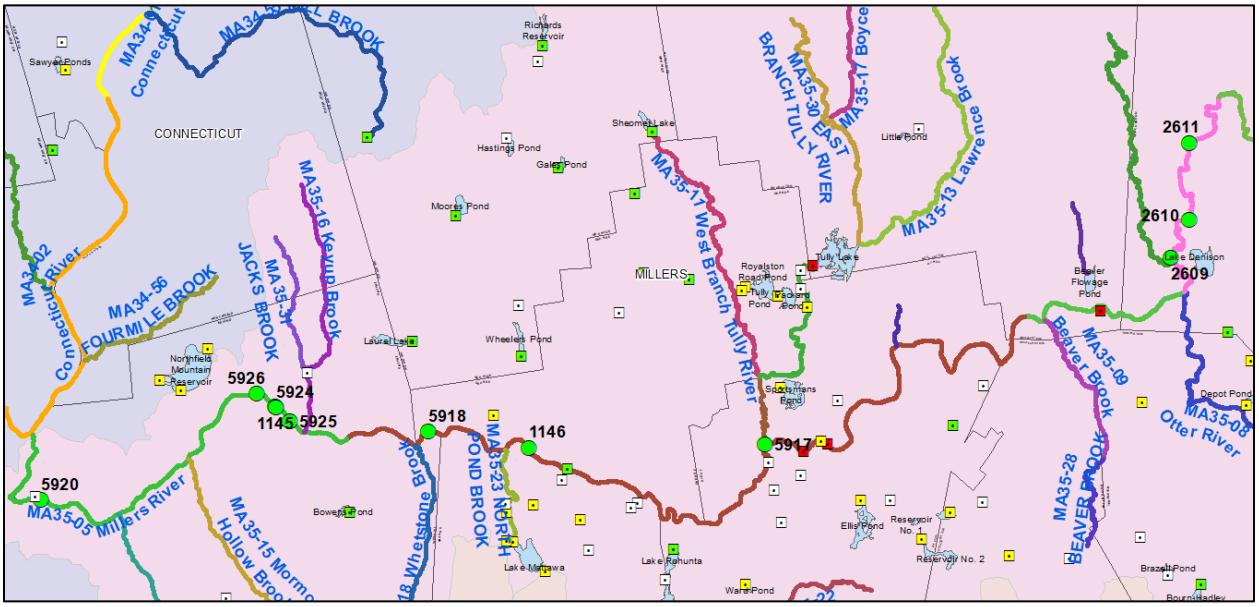
Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the 4 WWF AUs alone). Of the 5 most common species in the TFC, only 2 of the species (fallfish, common shiner) were also in the top 5 among the study samples (combined among all AUs), and in a different ranked order. Based on the low similarity of the overall fish community (36%) with the Millers River TFC, the Aquatic Life

Use for these Millers River AUs (MA35-02, MA35-03, MA35-04, MA35-05) should be assessed as Not Supporting for Fish Bioassessments.

Fish Community Samples in the Millers River (From upstream to downstream and right to left, CWF AUs MA35-20, MA35-01):



Fish Community Samples in the Millers River (From upstream to downstream and right to left, WWF AUs MA35-02 in pink, MA35-03 in green, MA35-04 in red, MA35-05 in green):



Millers TFC Model:

Table A9. Species percent composition for reference rivers used to develop the Millers River target fish community model. Species are ordered by mean rank. Non-native, stocked, and out-of-range species were deleted from the ranking and calculation of expected proportion in the target fish model. The ranks were converted to expected proportions (as a percent) using a rank-weighting technique as outlined by Bain and Meixler (2008).

Species	EB Westfield River	Third Branch White River	Tenmile River	Ashuelot River	Ammonoosuc River	Piscataquog River	Total	Rank	Expected Proportions
Blacknose dace	41.3	25.0	14.9	19.8	24.1	22.5	147.6	1	32.6
Longnose dace	18.7	19.9	9.3	12.7	38.5	15.2	114.2	2	16.3
Common shiner	7.8	2.6	13.8	22.3	1.4	15.8	63.7	3	10.9
Fallfish	0.5	0.0	18.7	26.8	0.0	2.8	48.8	4	8.1
Atlantic Salmon	9.7	0.0	0.0	2.2	24.1	3.4	39.4		
Slimy sculpin	0.0	33.1	0.0	0.0	6.0	0.0	39.1	6	5.4
White sucker	8.2	0.3	15.8	7.9	0.5	2.8	35.5	7	4.7
Smallmouth bass	9.6	0.0	12.2	1.3	0.0	12.0	35.1		
Longnose sucker	0.0	5.6	0.0	0.0	4.8	2.8	13.2		
Tessellated darter	0.0	0.1	7.3	3.8	0.2	0.0	11.4	10	3.3
Rainbow trout	0.1	7.5	0.1	0.0	0.0	0.2	7.8		
Creek chub	2.7	1.4	0.6	0.2	0.0	0.0	4.9	12	2.7
Cutlips minnow	0.0	0.0	4.6	0.0	0.0	0.0	4.6		
Brown trout	0.0	3.3	0.1	0.3	0.0	0.4	4.1		
Yellow bullhead	0.0	0.0	0.1	1.0	0.0	3.0	4.1		
Redbreast sunfish	0.0	0.0	0.0	0.0	0.0	2.7	2.7	16	2.0
Pumpkinseed	0.1	0.0	0.6	0.3	0.0	1.4	2.4	17	1.9
Brook trout	0.5	1.2	0.1	0.0	0.6	0.0	2.3	18	1.8
American eel	0.0	0.0	0.0	0.2	0.0	1.4	1.6	19	1.7
Bluegill	0.2	0.0	1.3	0.0	0.0	0.0	1.5		
Largemouth bass	0.0	0.0	0.0	0.0	0.0	1.4	1.4		
Golden shiner	0.1	0.0	0.3	0.0	0.0	0.5	0.9	22	1.5
Spottail shiner	0.0	0.0	0.0	0.0	0.0	0.5	0.5	23	1.4
Brown bullhead	0.0	0.0	0.0	0.2	0.0	0.2	0.4	24	1.4
Bluntnose minnow	0.0	0.0	0.4	0.0	0.0	0.0	0.4		
Rock bass	0.0	0.0	0.3	0.1	0.0	0.0	0.4		
Chain pickerel	0.0	0.0	0.0	0.1	0.0	0.2	0.3	27	1.2
Yellow perch	0.0	0.0	0.0	0.3	0.0	0.0	0.3	28	1.2
Bridle shiner	0.1	0.0	0.0	0.0	0.0	0.0	0.1	29	1.1

Fish Community Analysis:

Combined fish community analysis for all 6 AUs (MA35-20, MA35-01, MA35-02, MA35-03, MA35-04, MA35-05); samples 1570 and 5919 were excluded because of low sampling efficiency

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	0.61%	2.0	1.4	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	42	1.29%	-	1.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	7	0.21%	33.0	32.8	
Millers	Bluegill	27	0.83%	-	0.8	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	36	1.11%	1.0	0.1	
Millers	Brown Trout	7	0.21%	-	0.2	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	37	1.14%	1.0	0.1	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	663	20.36%	11.0	9.4	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	10	0.31%	-	0.3	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	1135	34.85%	8.0	26.8	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	0.61%	2.0	1.4	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	21	0.64%	-	0.6	
Millers	Longnose Dace	116	3.56%	16.0	12.4	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	14	0.43%	2.0	1.6	
Millers	Rainbow Trout	2	0.06%	-	0.1	
Millers	Redbreast Sunfish	240	7.37%	2.0	5.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	1.44%	-	1.4	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	5.96%	-	6.0	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	229	7.03%	-	7.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	273	8.38%	5.0	3.4	
Millers	Yellow Bullhead	61	1.87%	-	1.9	
Millers	Yellow Perch	56	1.72%	1.0	0.7	
Millers	(blank)		0.00%	-	-	36.43
Grand Total		3257	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Analysis of samples from WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05) alone, excluding sample 5919

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	1.05%	2.0	1.0	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	6	0.31%	-	0.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	4	0.21%	33.0	32.8	
Millers	Bluegill	9	0.47%	-	0.5	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	9	0.47%	1.0	0.5	
Millers	Brown Trout	7	0.37%	-	0.4	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	26	1.36%	1.0	0.4	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	578	30.25%	11.0	19.2	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	8	0.42%	-	0.4	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	410	21.45%	8.0	13.5	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	1.05%	2.0	1.0	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	7	0.37%	-	0.4	
Millers	Longnose Dace	46	2.41%	16.0	13.6	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	6	0.31%	2.0	1.7	
Millers	Rainbow Trout	2	0.10%	-	0.1	
Millers	Redbreast Sunfish	219	11.46%	2.0	9.5	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	2.46%	-	2.5	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	10.15%	-	10.2	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	95	4.97%	-	5.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	133	6.96%	5.0	2.0	
Millers	Yellow Bullhead	37	1.94%	-	1.9	
Millers	Yellow Perch	28	1.47%	1.0	0.5	
Millers	(blank)		0.00%	-	-	35.49
Grand Total		1911	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP Undated 1)

Summary Statement
MassDEP staff noted an infestation of the non-native aquatic macrophyte, variable milfoil (*Myriophyllum heterophyllum*), in the Millers River in the vicinity of water quality station W0682 in 2017.

Physico-chemical Water Quality Information

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0682	2011	--	--	--	--	--	--	--	--	3	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020).
The Fish Consumption Use for this Millers River AU (MA35-04) will continue to be assessed as Not Supporting because of the site-specific Fish Consumption Advisory for PCBs in Fish Tissue. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff surveyed five sites along this Millers River AU (MA35-04) during the summer of 2011 from up to downstream as follows: near the southern end of Bearsden Road, downstream from the confluence of Gulf Brook in Athol (W2229), Route 2A bridge in Athol (W0684), Daniel Shays Highway bridge in Athol (W0683), South Main Street (Route 122) in Orange (W2230), and Holtshire Road bridge in Orange (W0682). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at any of these five sampling sites during the summer of 2011.
The Aesthetics Use for this Millers River AU (MA35-04) will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the five sites sampled in the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0682	MassDEP	Water Quality	Millers River	[Holtshire Road bridge, Orange]	42.598155	-72.341352
W0683	MassDEP	Water Quality	Millers River	[Daniel Shays Highway bridge, Athol]	42.575926	-72.260640
W0684	MassDEP	Water Quality	Millers River	[Route 2A bridge, Athol]	42.592809	-72.239114
W2229	MassDEP	Water Quality	Millers River	[near the southern end of Bearsden Road, approximately 190 feet downstream from the confluence of Gulf Brook, Athol]	42.623178	-72.180736

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2230	MassDEP	Water Quality	Millers River	[South Main Street (Route 122), Orange]	42.589221	-72.309559

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0682	Millers River	2011	6	MassDEP aesthetics observations for station W0682 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0683	Millers River	2011	6	MassDEP aesthetics observations for station W0683 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0684	Millers River	2011	6	MassDEP aesthetics observations for station W0684 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W2229	Millers River	2011	6	MassDEP aesthetics observations for station W2229 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W2230	Millers River	2011	6	MassDEP aesthetics observations for station W2230 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0682	2011	6	3	0
W0683	2011	6	0	0
W0684	2011	6	0	0
W2229	2011	6	0	0
W2230	2011	6	0	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0682	Millers River	2011	Color	Light Yellow/Tan	6	6
W0682	Millers River	2011	Objectionable Deposits	No	3	6
W0682	Millers River	2011	Objectionable Deposits	Unobservable	3	6

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0682	Millers River	2011	Odor	None	6	6
W0682	Millers River	2011	Scum	No	3	6
W0682	Millers River	2011	Scum	Yes	3	6
W0682	Millers River	2011	Turbidity	None	3	6
W0682	Millers River	2011	Turbidity	Slightly Turbid	2	6
W0682	Millers River	2011	Turbidity	Unobservable	1	6
W0683	Millers River	2011	Color	Dark Tan	1	6
W0683	Millers River	2011	Color	Light Yellow/Tan	5	6
W0683	Millers River	2011	Objectionable Deposits	No	2	6
W0683	Millers River	2011	Objectionable Deposits	Unobservable	4	6
W0683	Millers River	2011	Odor	None	6	6
W0683	Millers River	2011	Scum	No	2	6
W0683	Millers River	2011	Scum	Yes	4	6
W0683	Millers River	2011	Turbidity	None	3	6
W0683	Millers River	2011	Turbidity	Slightly Turbid	1	6
W0683	Millers River	2011	Turbidity	Unobservable	2	6
W0684	Millers River	2011	Color	Brownish	1	6
W0684	Millers River	2011	Color	Dark Tan	1	6
W0684	Millers River	2011	Color	Light Yellow/Tan	3	6
W0684	Millers River	2011	Color	NR	1	6
W0684	Millers River	2011	Objectionable Deposits	No	3	6
W0684	Millers River	2011	Objectionable Deposits	Unobservable	3	6
W0684	Millers River	2011	Odor	None	5	6
W0684	Millers River	2011	Odor	NR	1	6
W0684	Millers River	2011	Scum	No	2	6
W0684	Millers River	2011	Scum	Yes	4	6
W0684	Millers River	2011	Turbidity	None	2	6
W0684	Millers River	2011	Turbidity	NR	1	6
W0684	Millers River	2011	Turbidity	Slightly Turbid	1	6
W0684	Millers River	2011	Turbidity	Unobservable	2	6
W2229	Millers River	2011	Color	Dark Tan	1	6
W2229	Millers River	2011	Color	Light Yellow/Tan	5	6
W2229	Millers River	2011	Objectionable Deposits	No	5	6
W2229	Millers River	2011	Objectionable Deposits	Unobservable	1	6
W2229	Millers River	2011	Odor	Musty (Basement)	1	6
W2229	Millers River	2011	Odor	None	5	6
W2229	Millers River	2011	Scum	No	2	6
W2229	Millers River	2011	Scum	Yes	4	6
W2229	Millers River	2011	Turbidity	None	4	6
W2229	Millers River	2011	Turbidity	Slightly Turbid	2	6
W2230	Millers River	2011	Color	Dark Tan	2	6
W2230	Millers River	2011	Color	Light Yellow/Tan	4	6
W2230	Millers River	2011	Objectionable Deposits	No	2	6
W2230	Millers River	2011	Objectionable Deposits	Unobservable	4	6
W2230	Millers River	2011	Odor	None	6	6
W2230	Millers River	2011	Scum	No	3	6

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2230	Millers River	2011	Scum	Yes	3	6
W2230	Millers River	2011	Turbidity	None	3	6
W2230	Millers River	2011	Turbidity	Slightly Turbid	1	6
W2230	Millers River	2011	Turbidity	Unobservable	2	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

MassDEP staff and Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Millers River AU (MA35-04) at the following 10 sampling sites (six general areas) from up to downstream as follows: near Bearsden Road, downstream from the confluence of Gulf Brook in Athol (W2229) between May and September 2011 (n = 6), farther downstream in Upper Athol (MRWC_MUA1) between June and September 2011 (n = 7), farther downstream at Cass Meadow launch (MRWC_MCM1) between June and September 2011, June and September 2014, and June and September 2015 (n = 7 each year) and near Route 2A bridge in Athol (W0684) between May and September 2011 (n = 6), farther downstream at Fielding Way (MRWC_MFW1) between June and September 2011 (n = 7) and Daniel Shays Highway bridge in Athol (W0683) between May and September 2011 (n = 6), farther downstream at Orange River Front (MRWC_MORF1) between June and September 2014, June and September 2014, and June and September 2015 (n = 7 samples each year) and near South Main Street (Route 122) in Orange (W2230) between May and September 2011 (n = 7), and the most downstream sampling sites in this Millers River AU at Holtshire Road bridge in Orange (W0682) between May and September 2011 (n = 6)/in West Orange (MRWC_MWO1) between June and September 2011 (n = 7). Data analysis indicated the following: site W2229 had 67% GM interval and no STV exceedances, site MRWC_MUA1 had 9% GM interval and no STV exceedances, combined sites W0684/MRWC_MCM1 had two of three years and the cumulative GM interval exceedances >20% but no STV exceedances, combined sites W0683/MRWC_MFW1 had 53% GM interval and one STV exceedance, combined sites W2230/MRWC_MORF1 had zero of three years and no cumulative GM interval exceedances >20% nor any STV exceedances, combined sites W0682/MRWC_MW01 had 37% GM interval and 3 STV exceedances. Overall, there were only four STV exceedances of 93 total samples (~4%) which only occurred in 2011 (no STV exceedances in 2014 or 2015).

The Primary Contact Recreational Use for this Millers River AU (MA35-04) is assessed as Fully Supporting since the *E. coli* concentrations were below the use attainment impairment thresholds overall for these single and/or multi-year low and moderate frequency datasets between 2011 and 2015 at the six general sampling areas spread along this river reach. Since two areas, combined sites W0684/MRWC_MCM1 and W0682/MRWC_MW01, did have slight exceedances, an alert for *E. coli* is being identified and additional sampling is being recommended.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0682	MassDEP	Water Quality	Millers River	[Holtshire Road bridge, Orange]	42.598155	-72.341352
W0683	MassDEP	Water Quality	Millers River	[Daniel Shays Highway bridge, Athol]	42.575926	-72.260640
W0684	MassDEP	Water Quality	Millers River	[Route 2A bridge, Athol]	42.592809	-72.239114
W2229	MassDEP	Water Quality	Millers River	[near the southern end of Bearsden Road, approximately 190 feet downstream from the confluence of Gulf Brook, Athol]	42.623178	-72.180736

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2230	MassDEP	Water Quality	Millers River	[South Main Street (Route 122), Orange]	42.589221	-72.309559
MRWC_MCM1	Millers River Watershed Council	Water Quality	Millers River	Cass Meadow launch	42.593531	-72.239153
MRWC_MFW1	Millers River Watershed Council	Water Quality	Millers River	Fielding Way	42.57592	-72.25922
MRWC_MORF1	Millers River Watershed Council	Water Quality	Millers River	Orange River Front	42.588756	-72.308147
MRWC_MUA1	Millers River Watershed Council	Water Quality	Millers River	Upper Athol	42.59515	-72.21584
MRWC_MWO1	Millers River Watershed Council	Water Quality	Millers River	West Orange	42.59839	-72.34146

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

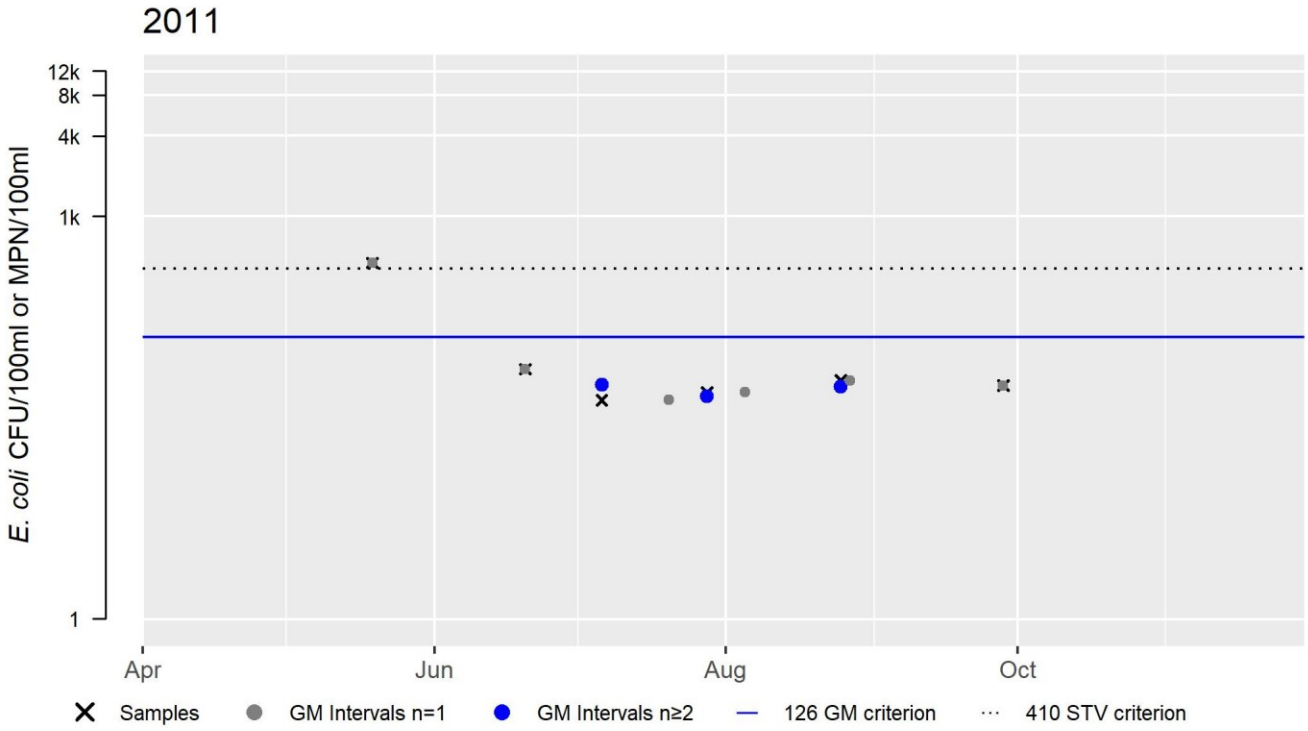
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0682	MassDEP	E. coli	05/19/11	09/28/11	6	43	450	78
W0683	MassDEP	E. coli	05/19/11	09/28/11	6	16	120	56
W0684	MassDEP	E. coli	05/19/11	09/28/11	6	26	270	70
W2229	MassDEP	E. coli	05/19/11	09/28/11	6	26	67	46
W2230	MassDEP	E. coli	05/19/11	09/28/11	6	59	270	95
MRWC_MCM1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	52	320	129
MRWC_MCM1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	47.3	224.7	84
MRWC_MCM1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	58.3	387.3	136
MRWC_MFW1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	64	2000	218
MRWC_MORF1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	46	240	97
MRWC_MORF1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	25.6	365.4	68
MRWC_MORF1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	25.6	261.3	57
MRWC_MUA1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	12	170	70
MRWC_MWO1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	70	420	157

W0682 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	78
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	17

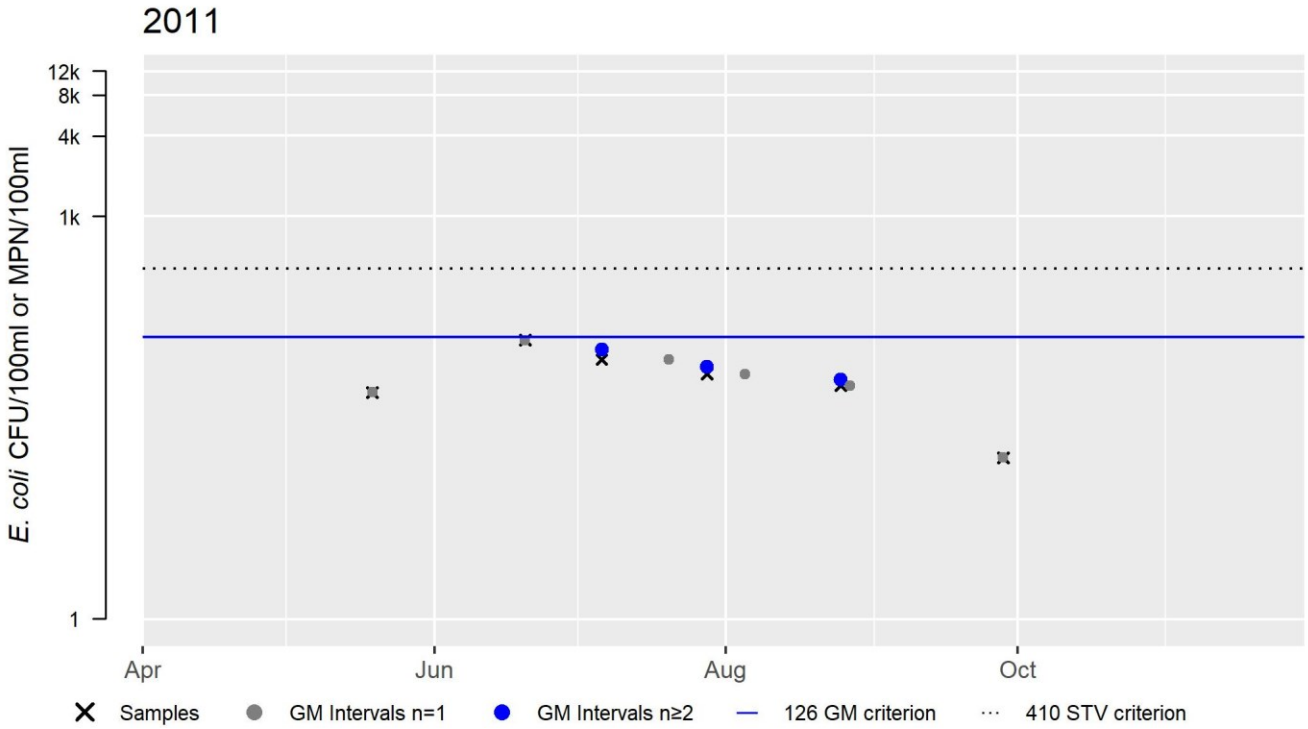
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W0683 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	56
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

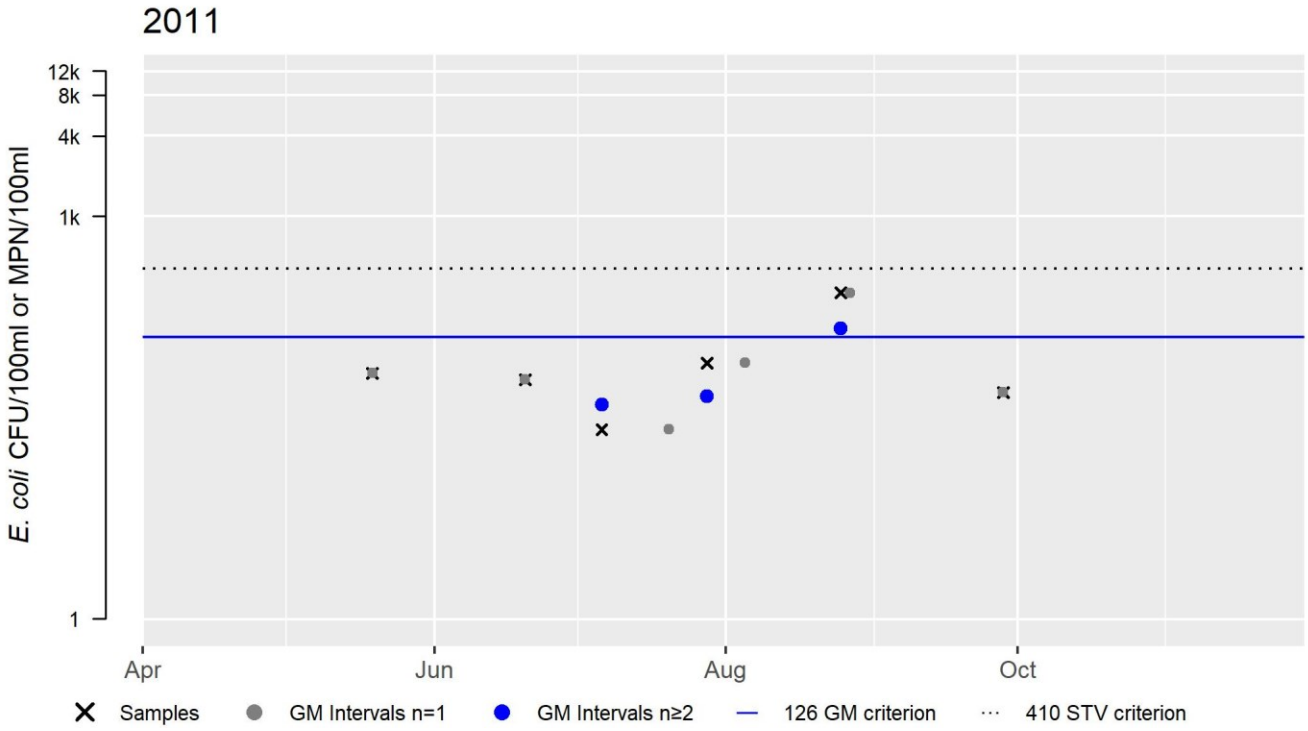
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W0684 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	70
#GMI	3
#GMI Ex	1
%GMI Ex	33
n>STV	0
%n>STV	0

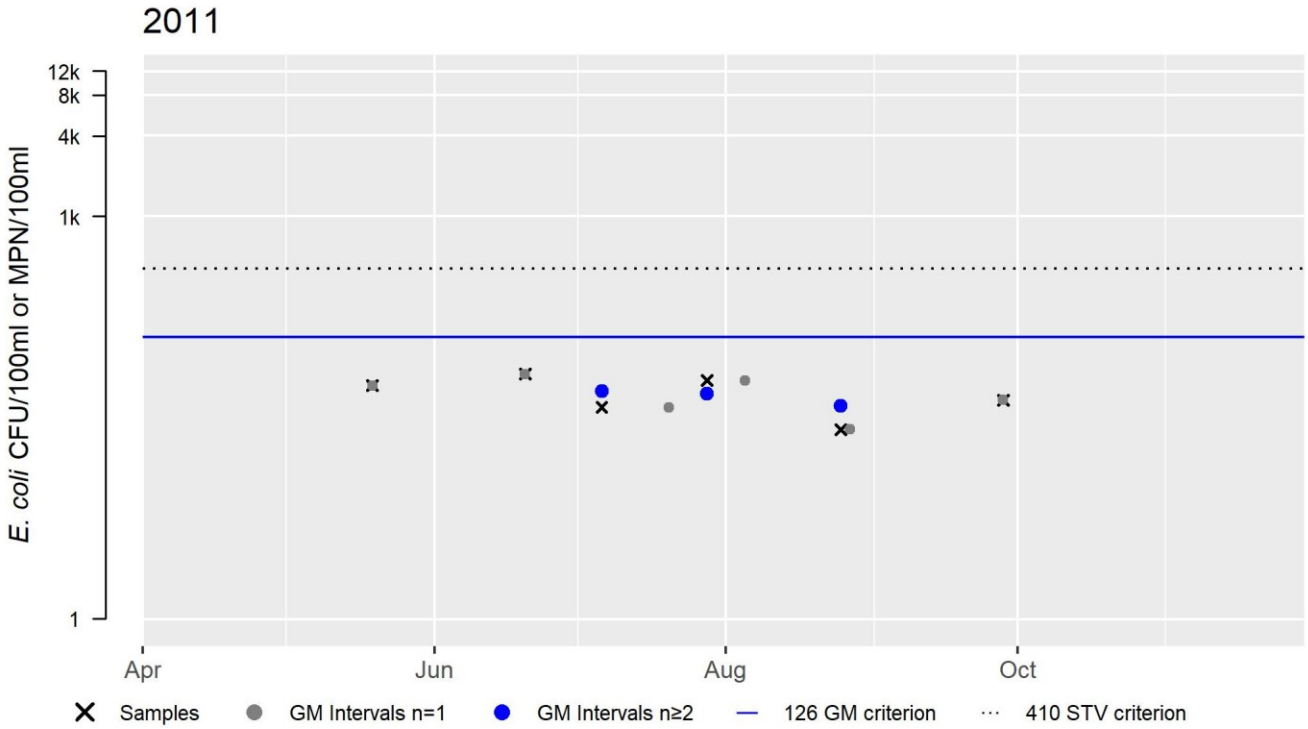
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2229 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	46
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

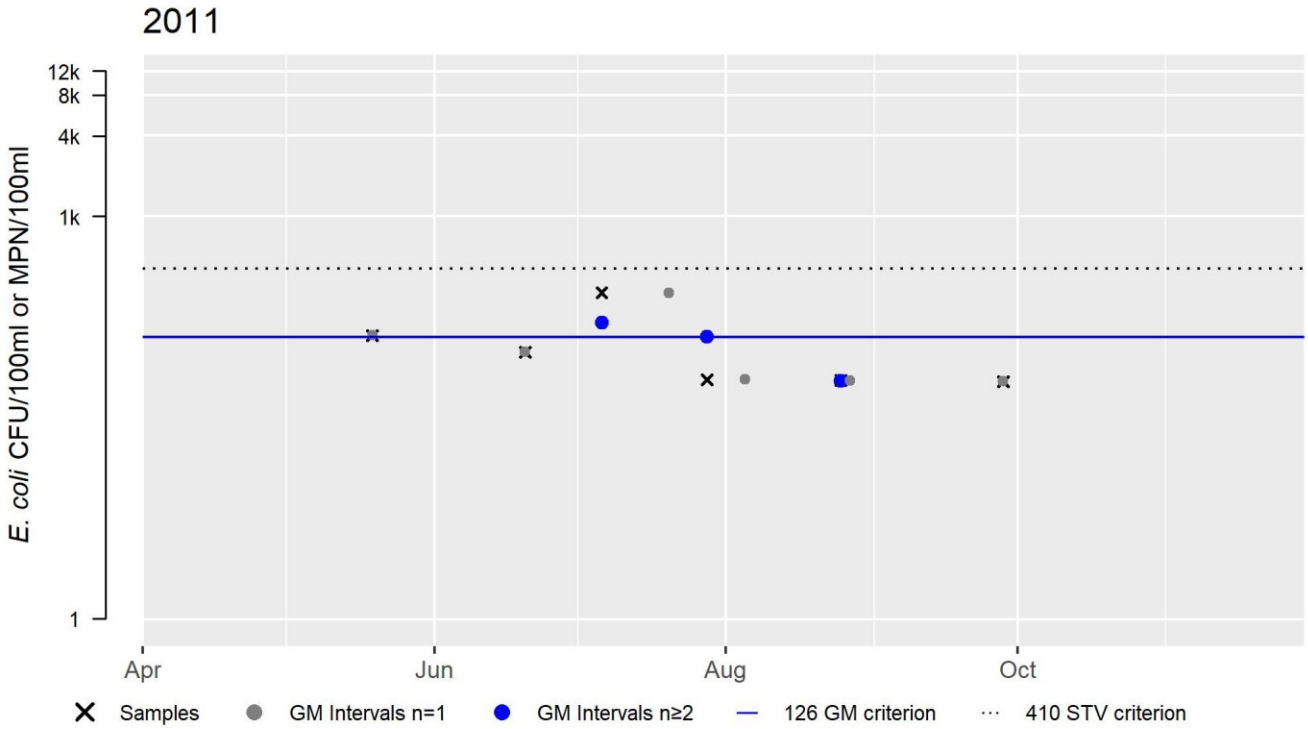
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2230 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	95
#GMI	3
#GMI Ex	2
%GMI Ex	67
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_MCM1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

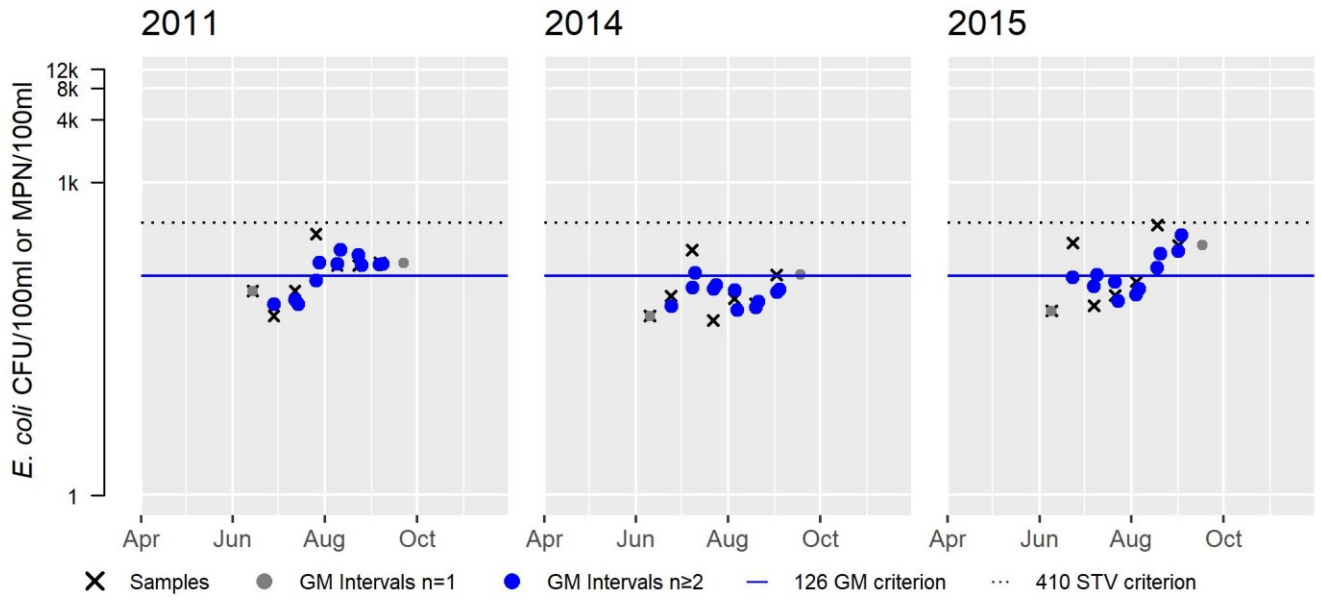
Var	Res
Samples	7
SeasGM	129
#GMI	11
#GMI Ex	7
%GMI Ex	64
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	84
#GMI	11
#GMI Ex	1
%GMI Ex	9
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	136
#GMI	11
#GMI Ex	5
%GMI Ex	45
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

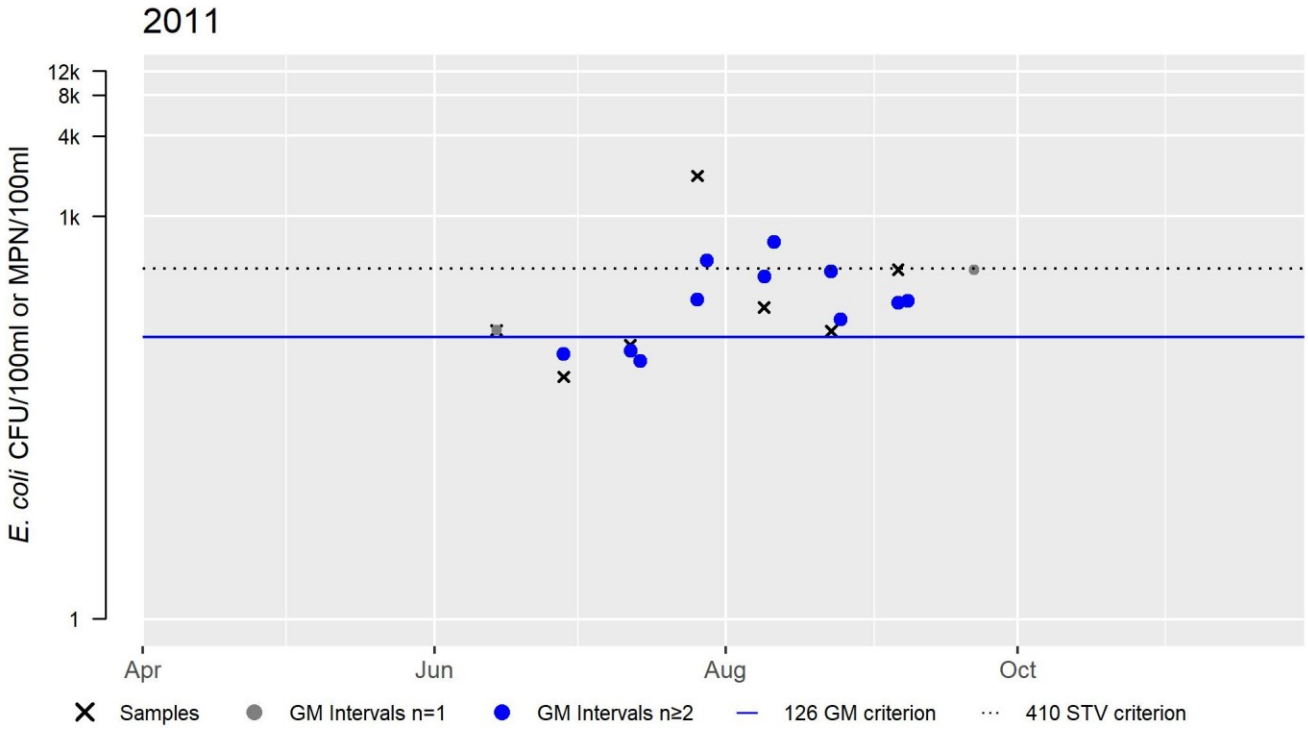
Variable	Cumulative %GMI Ex (all years)
Result	39



MRWC_MFW1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	218
#GMI	11
#GMI Ex	8
%GMI Ex	73
n>STV	1
%n>STV	14

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_MORF1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

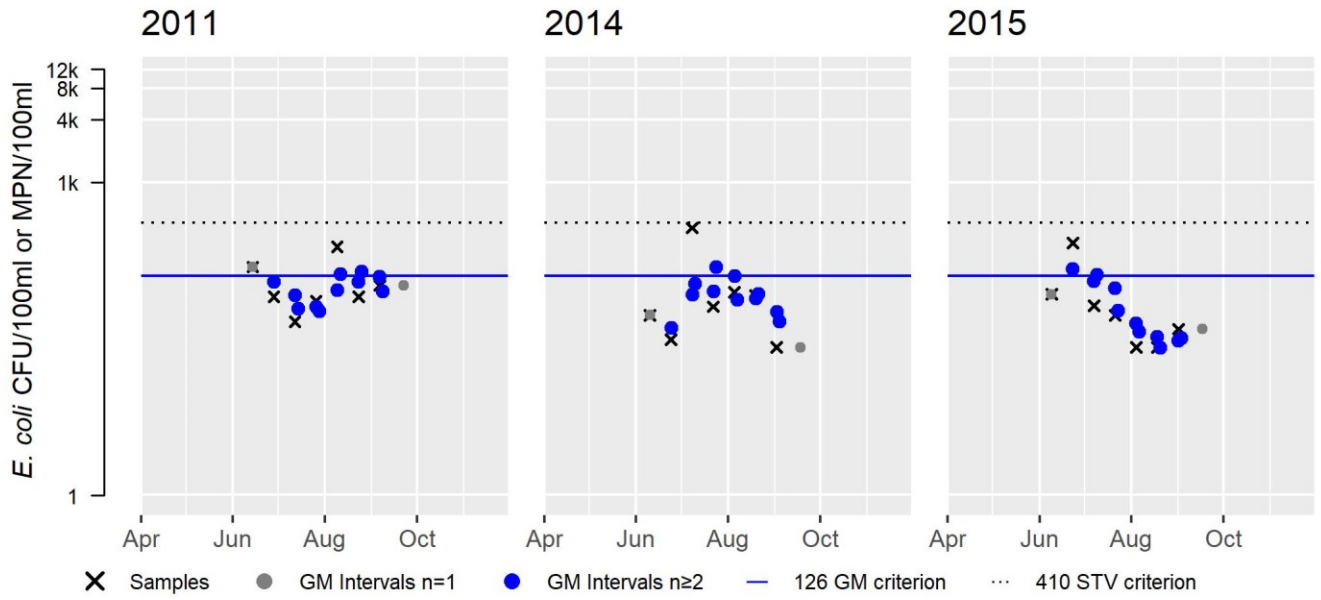
Var	Res
Samples	7
SeasGM	97
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	68
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	57
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

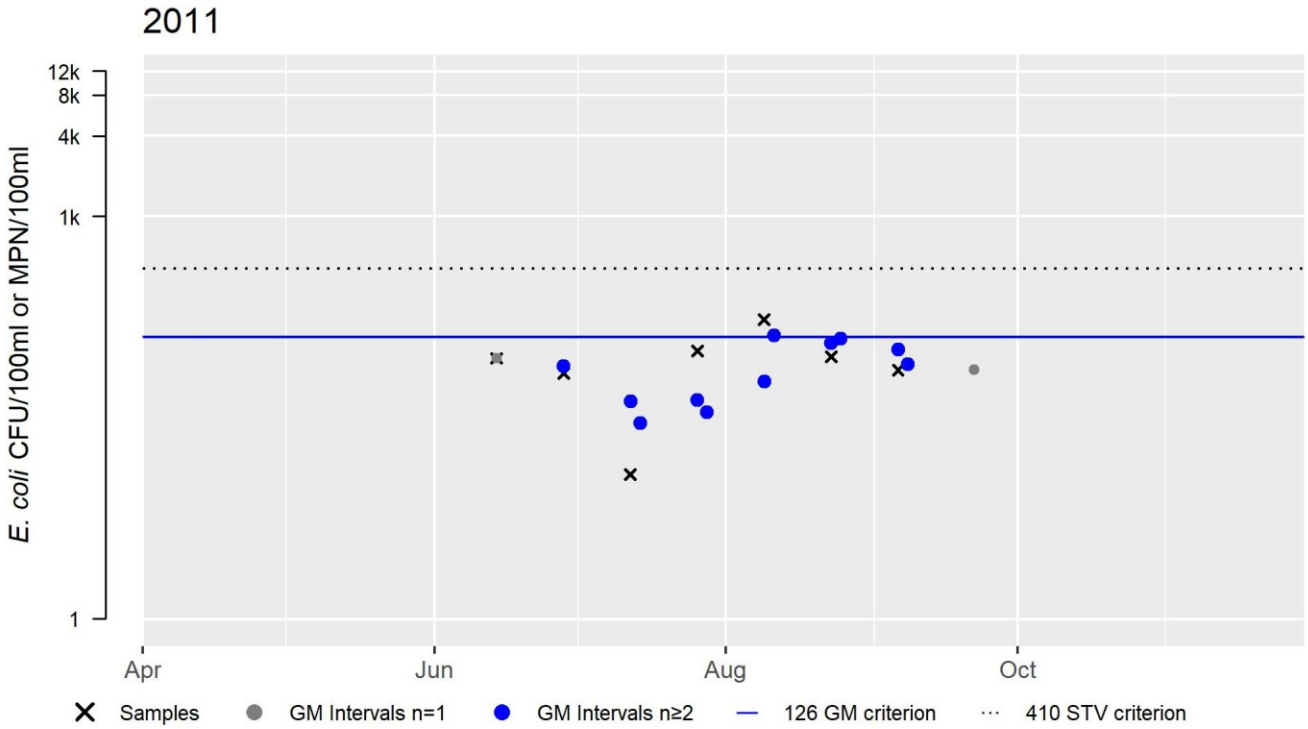
Variable	Cumulative %GMI Ex (all years)
Result	18



MRWC_MUA1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	70
#GMI	11
#GMI Ex	1
%GMI Ex	9
n>STV	0
%n>STV	0

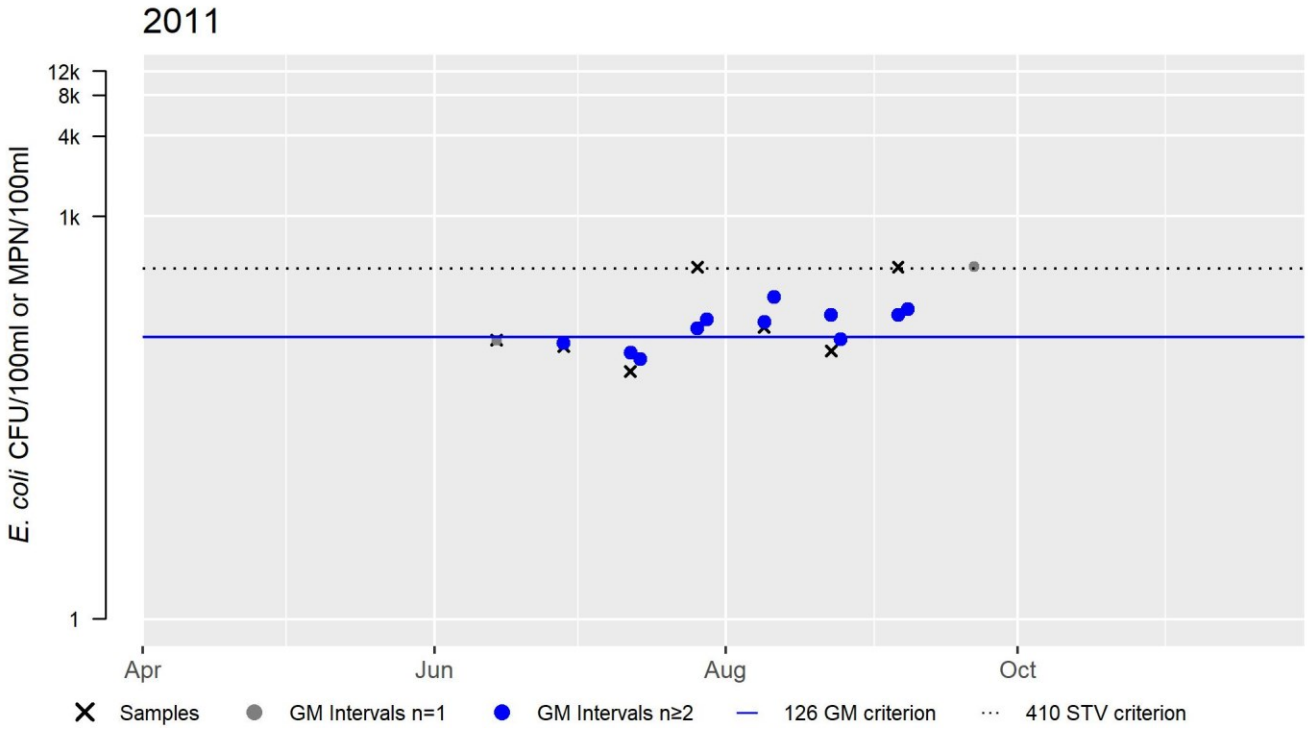
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_MWO1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	157
#GMI	11
#GMI Ex	7
%GMI Ex	64
n>STV	2
%n>STV	29

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



These are the combined site analyses where MassDEP and MRWC sampling sites were similarly located:

W0684 and MRWC_MCM1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

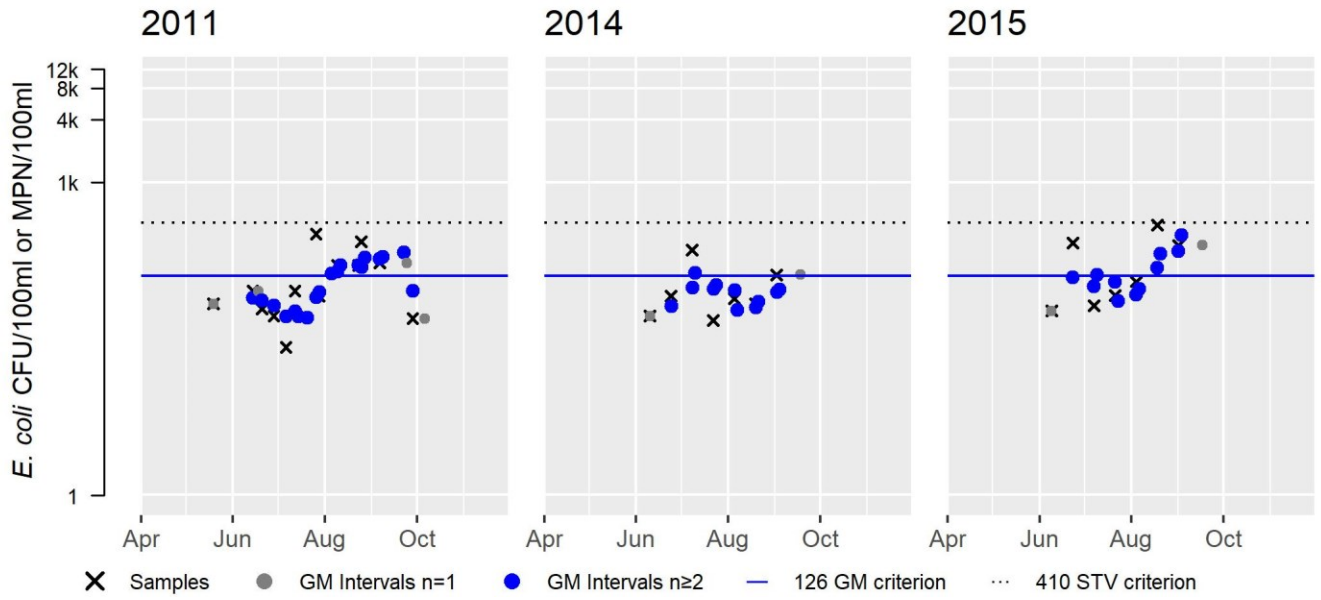
Var	Res
Samples	13
SeasGM	97
#GMI	19
#GMI Ex	9
%GMI Ex	47
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	84
#GMI	11
#GMI Ex	1
%GMI Ex	9
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	136
#GMI	11
#GMI Ex	5
%GMI Ex	45
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

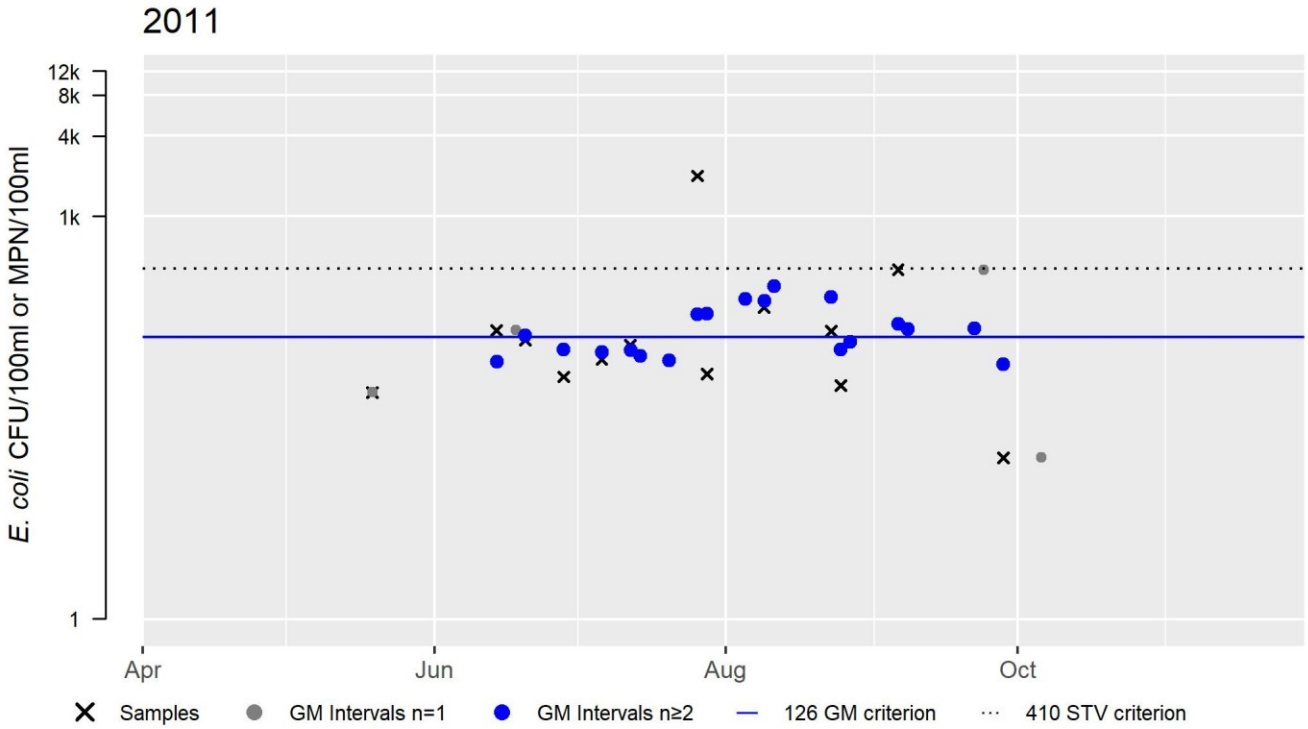
Variable	Cumulative %GMI Ex (all years)
Result	37



W0683 and MRWC_MFW1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	13
SeasGM	116
#GMI	19
#GMI Ex	10
%GMI Ex	53
n>STV	1
%n>STV	8

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2230 and MRWC_MORF1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

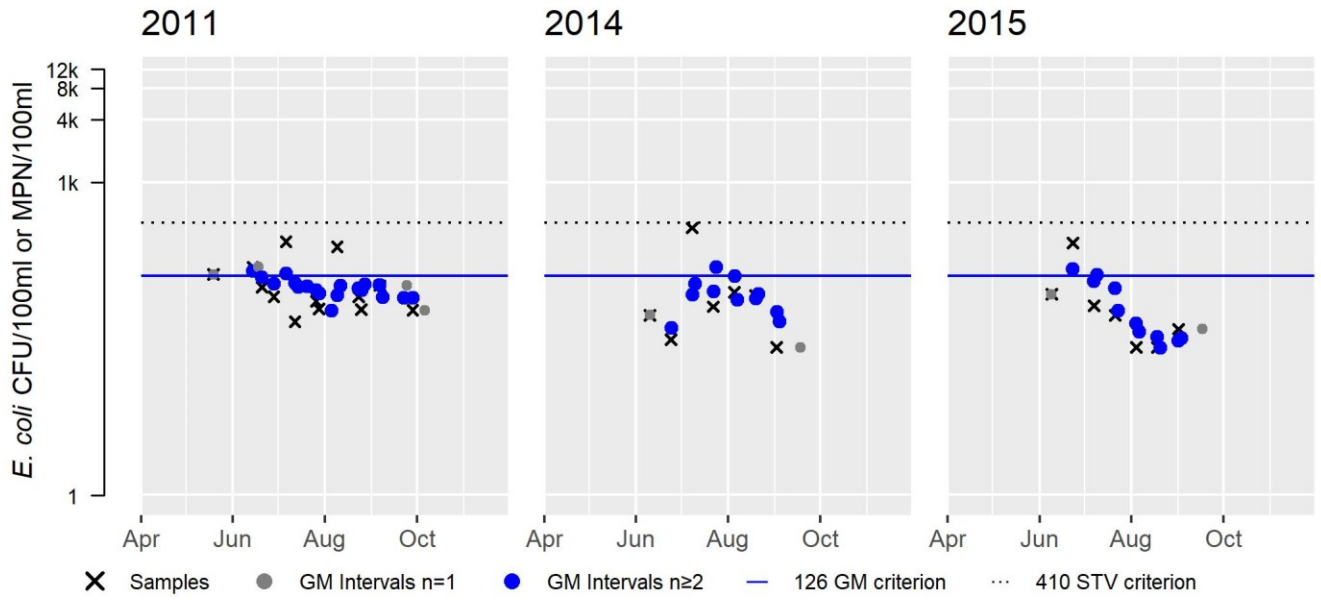
Var	Res
Samples	13
SeasGM	96
#GMI	19
#GMI Ex	2
%GMI Ex	11
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	68
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	57
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

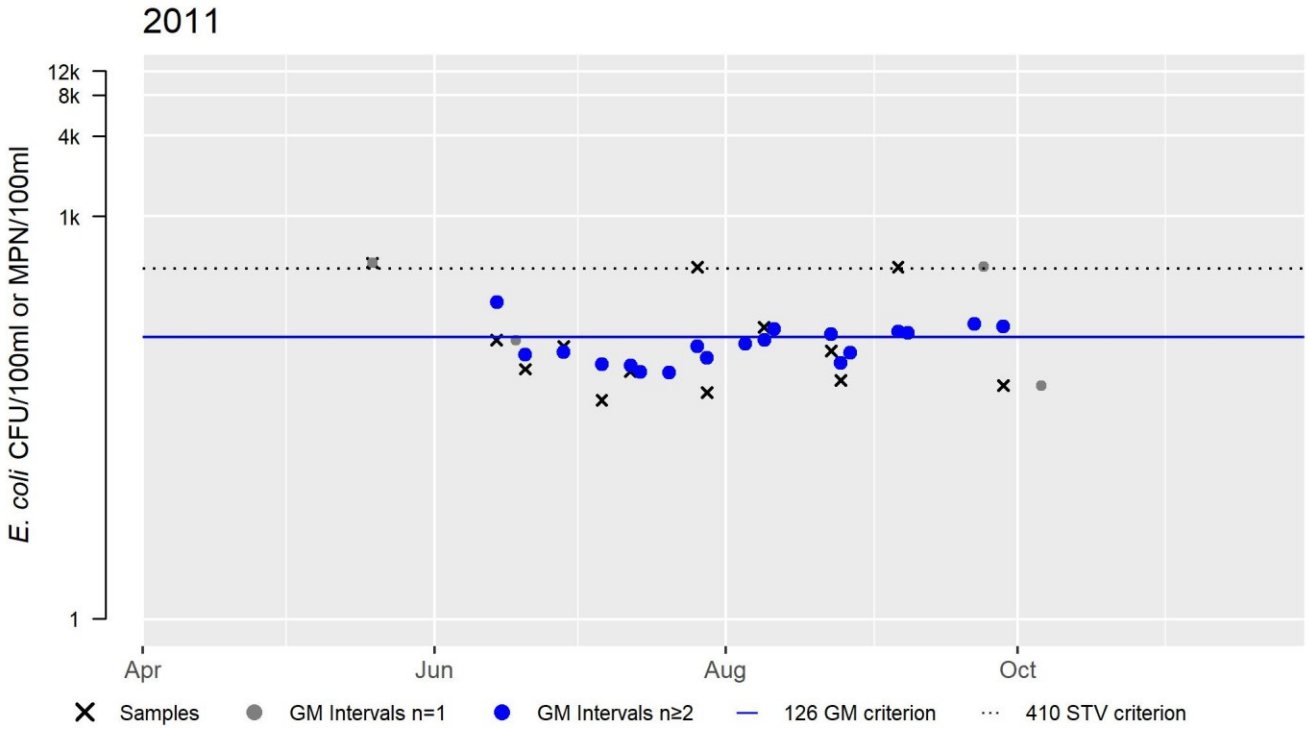
Variable	Cumulative %GMI Ex (all years)
Result	15



W0682 and MRWC_MWO1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	13
SeasGM	114
#GMI	19
#GMI Ex	7
%GMI Ex	37
n>STV	3
%n>STV	23

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff and Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Millers River AU (MA35-04) at the following 10 sampling sites (six general areas) from up to downstream as follows: near Bearsden Road, downstream from the confluence of Gulf Brook in Athol (W2229) between May and September 2011 (n = 6), farther downstream in Upper Athol (MRWC_MUA1) between June and September 2011 (n = 7), farther downstream at Cass Meadow launch (MRWC_MCM1) between June and September 2011, June and September 2014, and June and September 2015 (n = 7 each year) and near Route 2A bridge in Athol (W0684) between May and September 2011 (n = 6), farther downstream at Fielding Way (MRWC_MFW1) between June and September 2011 (n = 7) and Daniel Shays Highway bridge in Athol (W0683) between May and September 2011 (n = 6), farther downstream at Orange River Front (MRWC_MORF1) between June and September 2014, June and September 2014, and June and September 2015 (n = 7 samples each year) and near South Main Street (Route 122) in Orange (W2230) between May and September 2011 (n = 7), and the most downstream sampling sites in this Millers River AU at Holtshire Road bridge in Orange (W0682) between May and September 2011 (n = 6)/in West Orange (MRWC_MWO1) between June and September 2011 (n = 7). Data analysis indicated none of 10 sites sampled had GMs intervals >630 cfu/100ml, none of the samples exceeded the 1260 cfu/100ml STV, and the overall GMs at sites ranged from 46 to 218 cfu/100ml.
The Secondary Contact Recreational Use for this Millers River AU (MA35-04) is assessed as Fully Supporting since the *E. coli* concentrations were all below the use attainment impairment thresholds for these single and/or multi-year low frequency datasets at the 10 sites sampled in the summers 2011, 2014, and/or 2015.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0682	MassDEP	Water Quality	Millers River	[Holtshire Road bridge, Orange]	42.598155	-72.341352
W0683	MassDEP	Water Quality	Millers River	[Daniel Shays Highway bridge, Athol]	42.575926	-72.260640
W0684	MassDEP	Water Quality	Millers River	[Route 2A bridge, Athol]	42.592809	-72.239114
W2229	MassDEP	Water Quality	Millers River	[near the southern end of Bearsden Road, approximately 190 feet downstream from the confluence of Gulf Brook, Athol]	42.623178	-72.180736
W2230	MassDEP	Water Quality	Millers River	[South Main Street (Route 122), Orange]	42.589221	-72.309559
MRWC_MCM1	Millers River Watershed Council	Water Quality	Millers River	Cass Meadow launch	42.593531	-72.239153
MRWC_MFW1	Millers River Watershed Council	Water Quality	Millers River	Fielding Way	42.57592	-72.25922
MRWC_MORF1	Millers River Watershed Council	Water Quality	Millers River	Orange River Front	42.588756	-72.308147
MRWC_MUA1	Millers River Watershed Council	Water Quality	Millers River	Upper Athol	42.59515	-72.21584
MRWC_MWO1	Millers River Watershed Council	Water Quality	Millers River	West Orange	42.59839	-72.34146

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

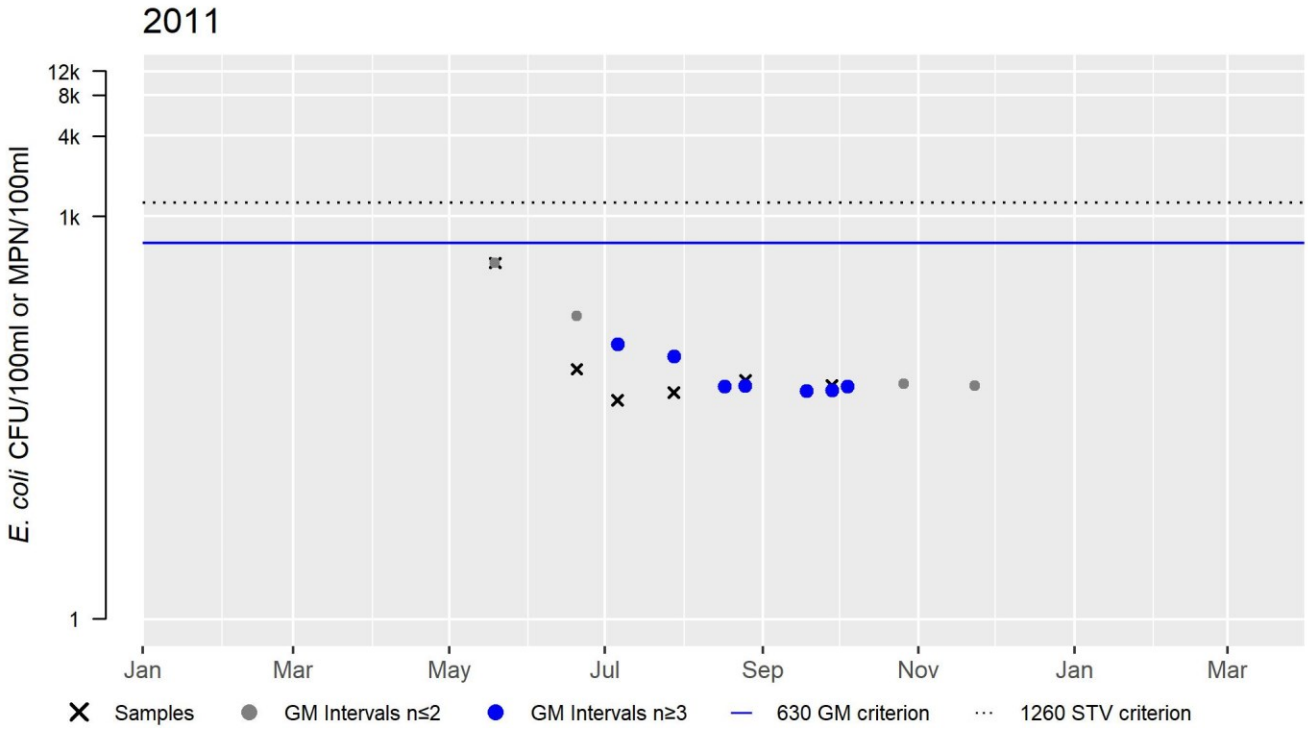
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0682	MassDEP	E. coli	05/19/11	09/28/11	6	43	450	78
W0683	MassDEP	E. coli	05/19/11	09/28/11	6	16	120	56
W0684	MassDEP	E. coli	05/19/11	09/28/11	6	26	270	70
W2229	MassDEP	E. coli	05/19/11	09/28/11	6	26	67	46
W2230	MassDEP	E. coli	05/19/11	09/28/11	6	59	270	95
MRWC_MCM1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	52	320	129
MRWC_MCM1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	47.3	224.7	84
MRWC_MCM1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	58.3	387.3	136
MRWC_MFW1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	64	2000	218
MRWC_MORF1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	46	240	97
MRWC_MORF1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	25.6	365.4	68
MRWC_MORF1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	25.6	261.3	57
MRWC_MUA1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	12	170	70
MRWC_MWO1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	70	420	157

W0682 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	78
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

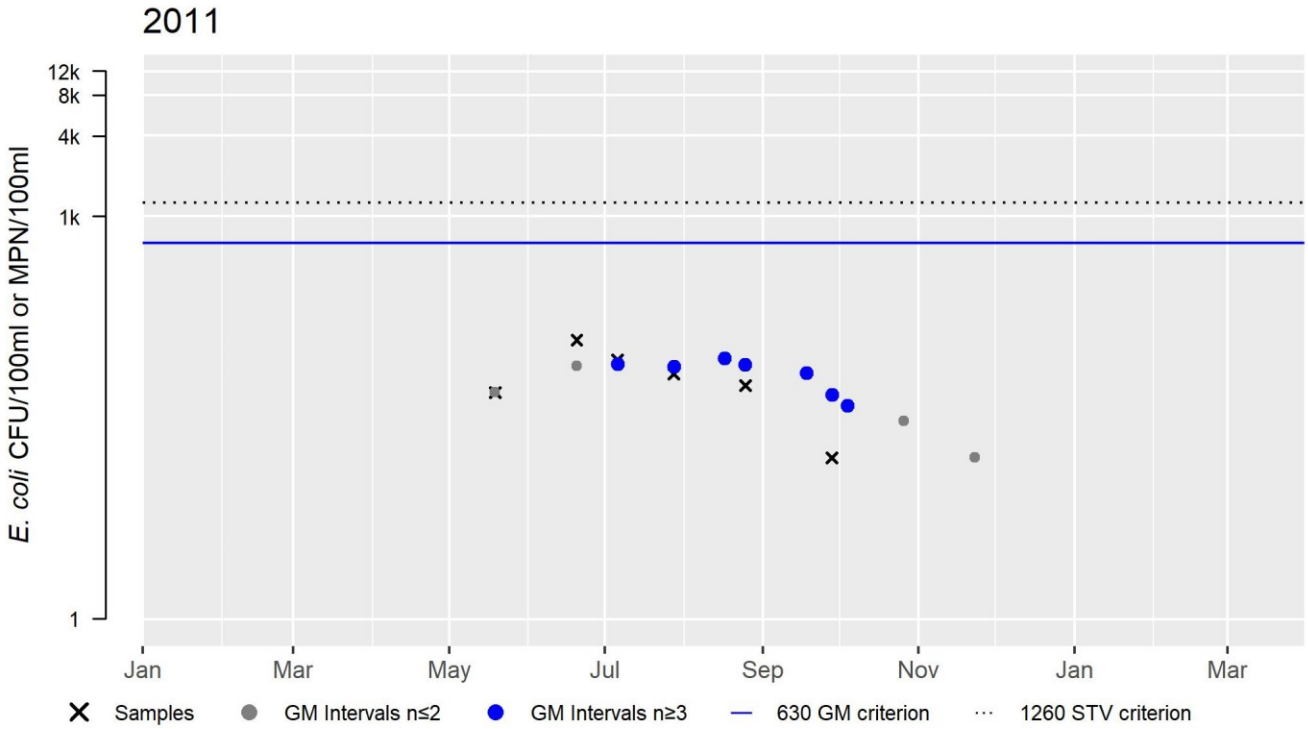
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W0683 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	56
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

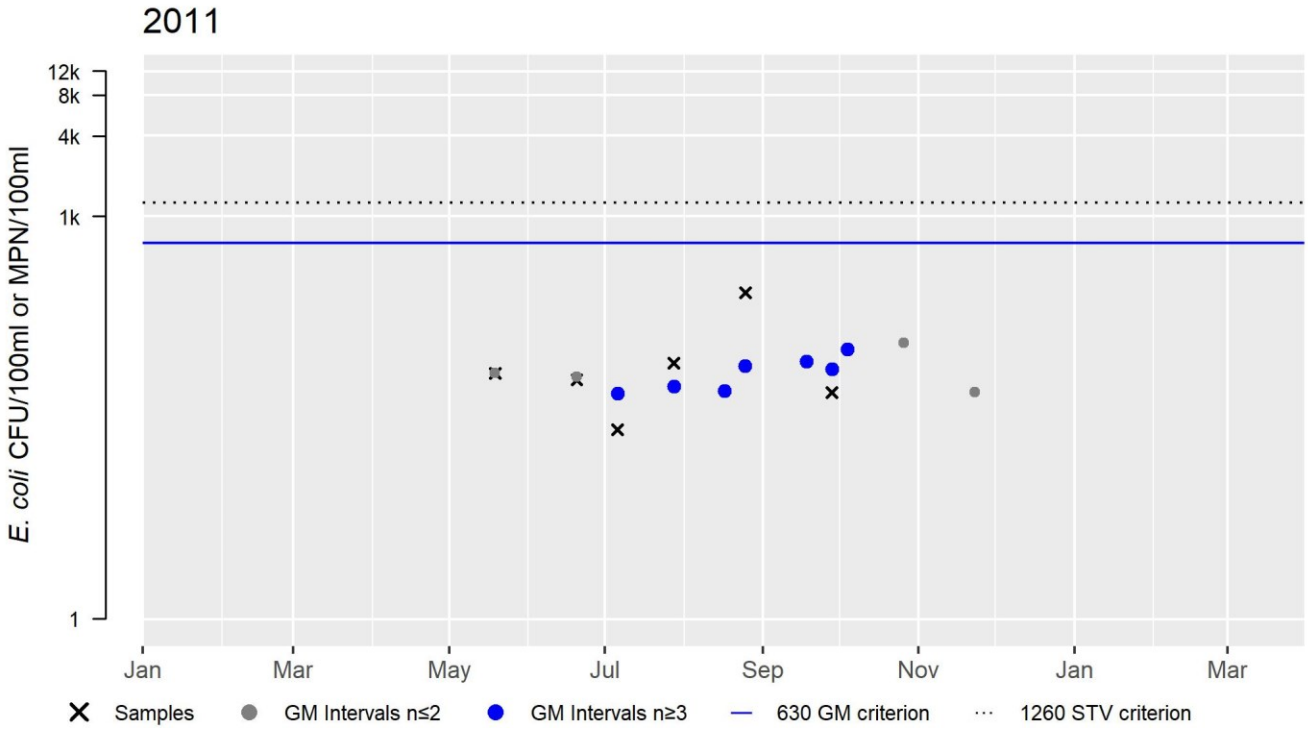
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W0684 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	70
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

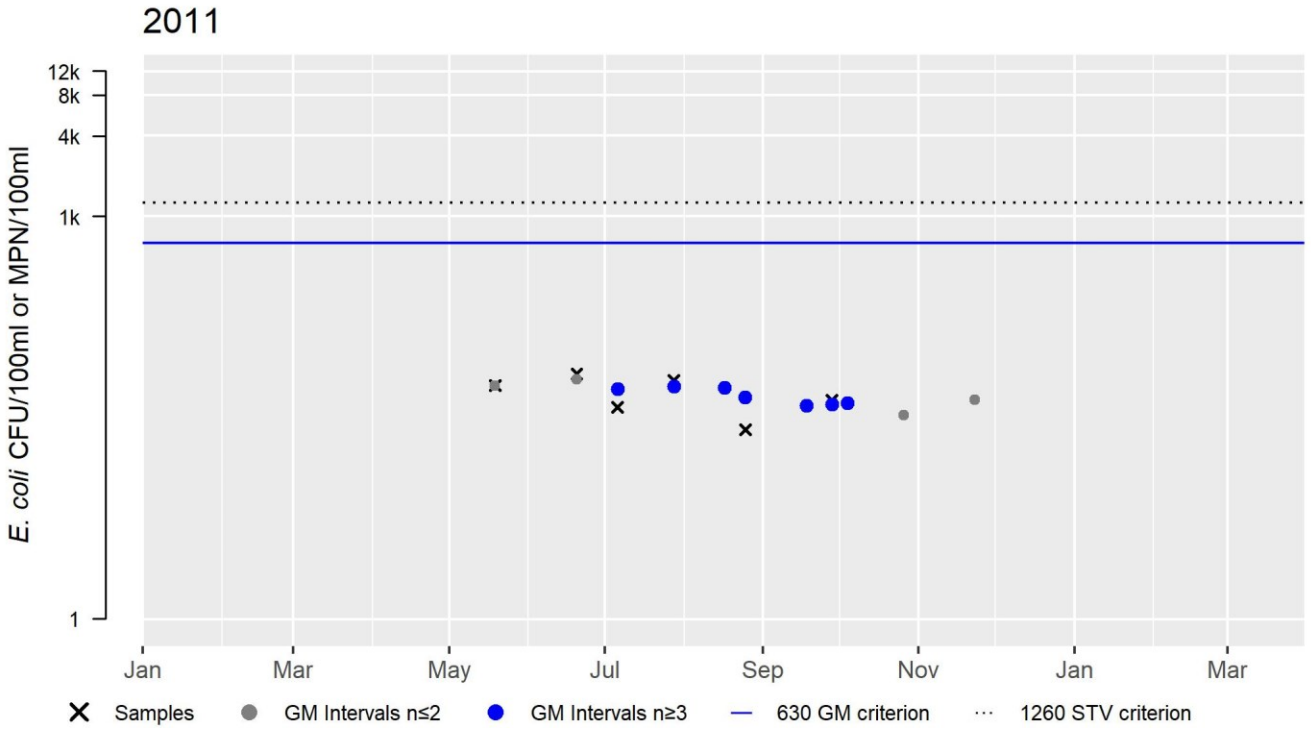
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2229 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	46
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

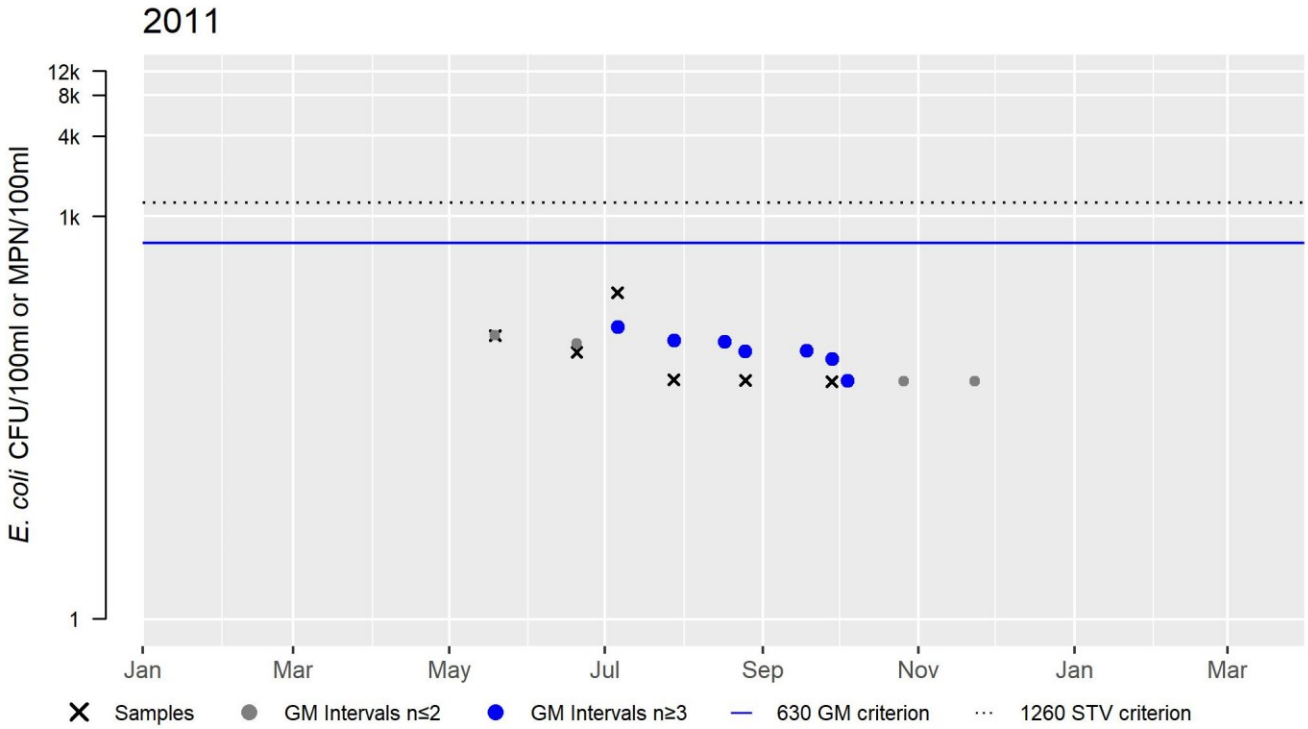
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2230 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	95
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_MCM1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

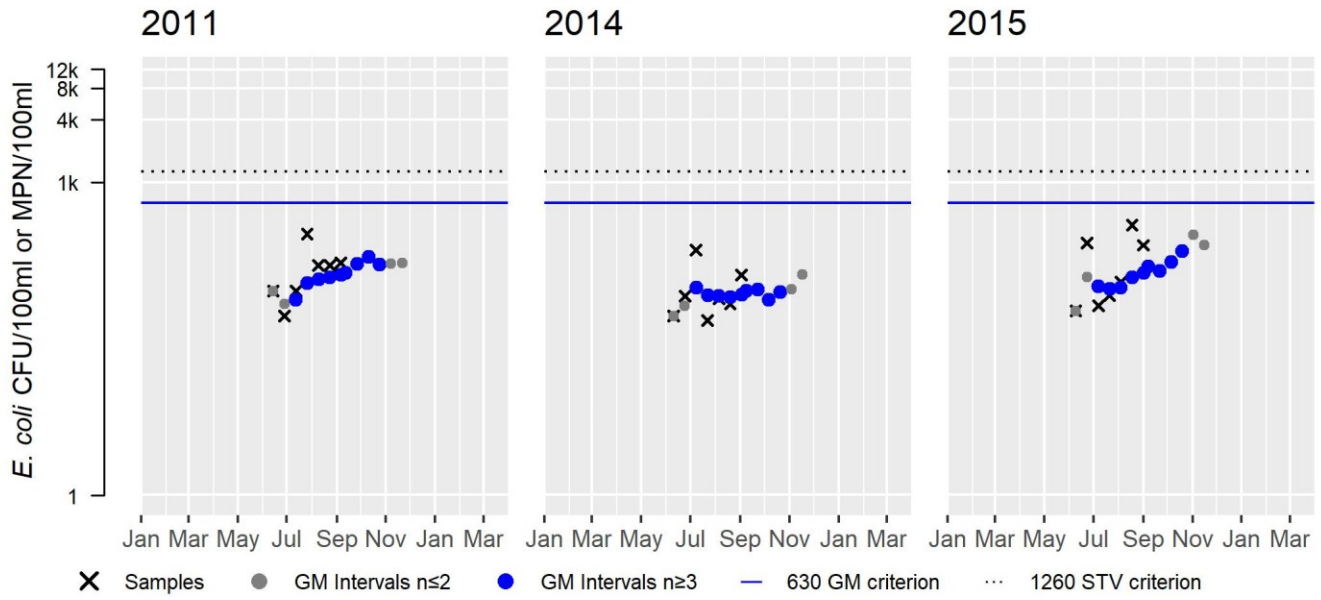
Var	Res
Samples	7
SeasGM	129
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	84
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	136
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

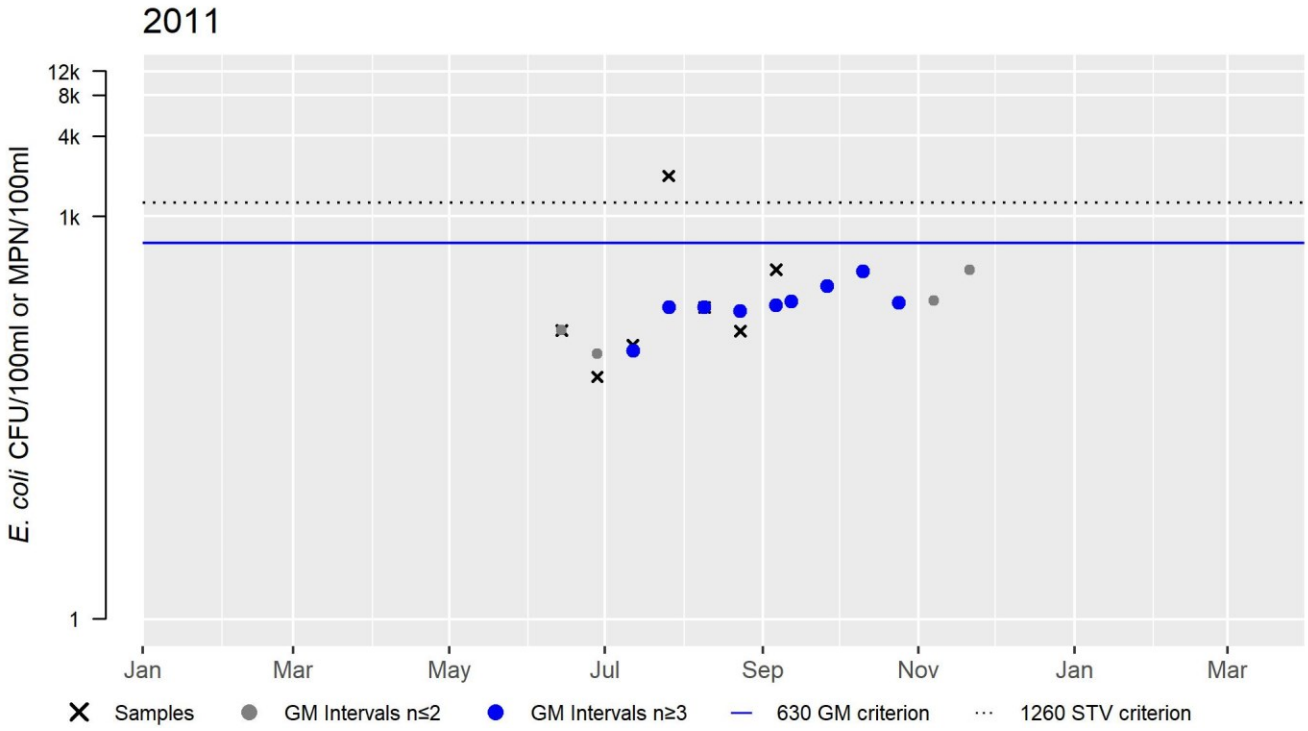
Variable	Cumulative %GMI Ex (all years)
Result	0



MRWC_MFW1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	218
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	14

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_MORF1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

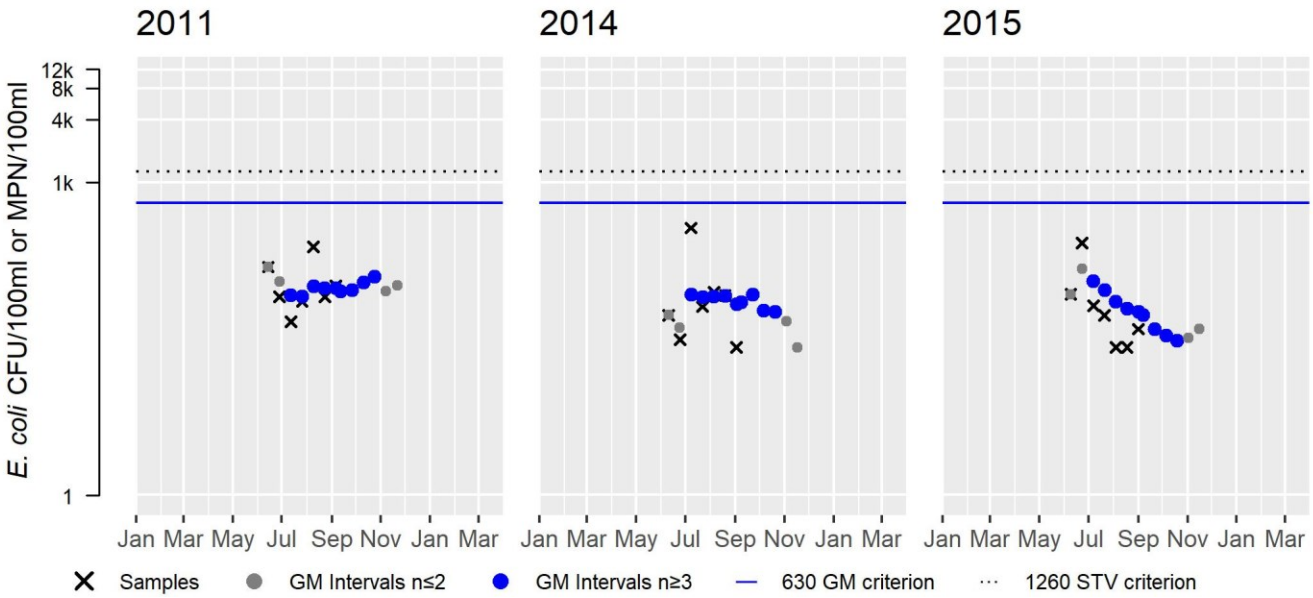
Var	Res
Samples	7
SeasGM	97
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	68
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	57
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

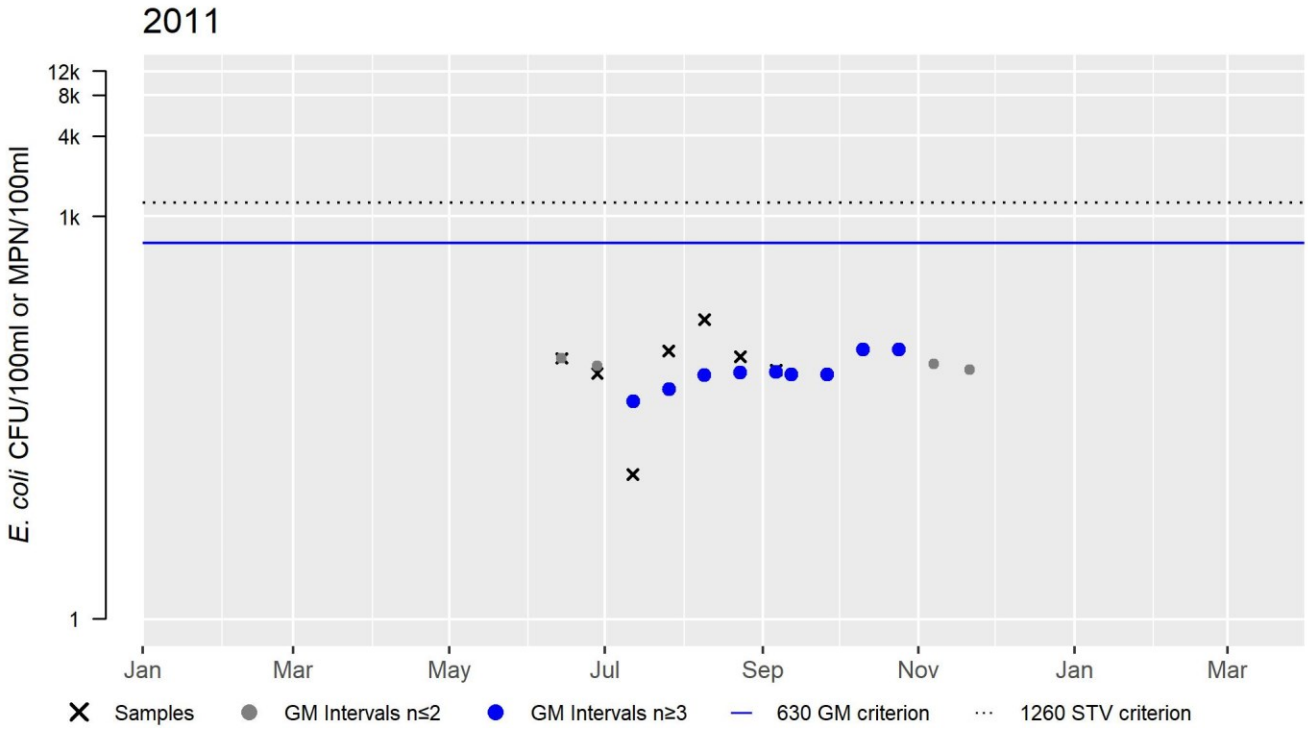
Variable	Cumulative %GMI Ex (all years)
Result	0



MRWC_MUA1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	70
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

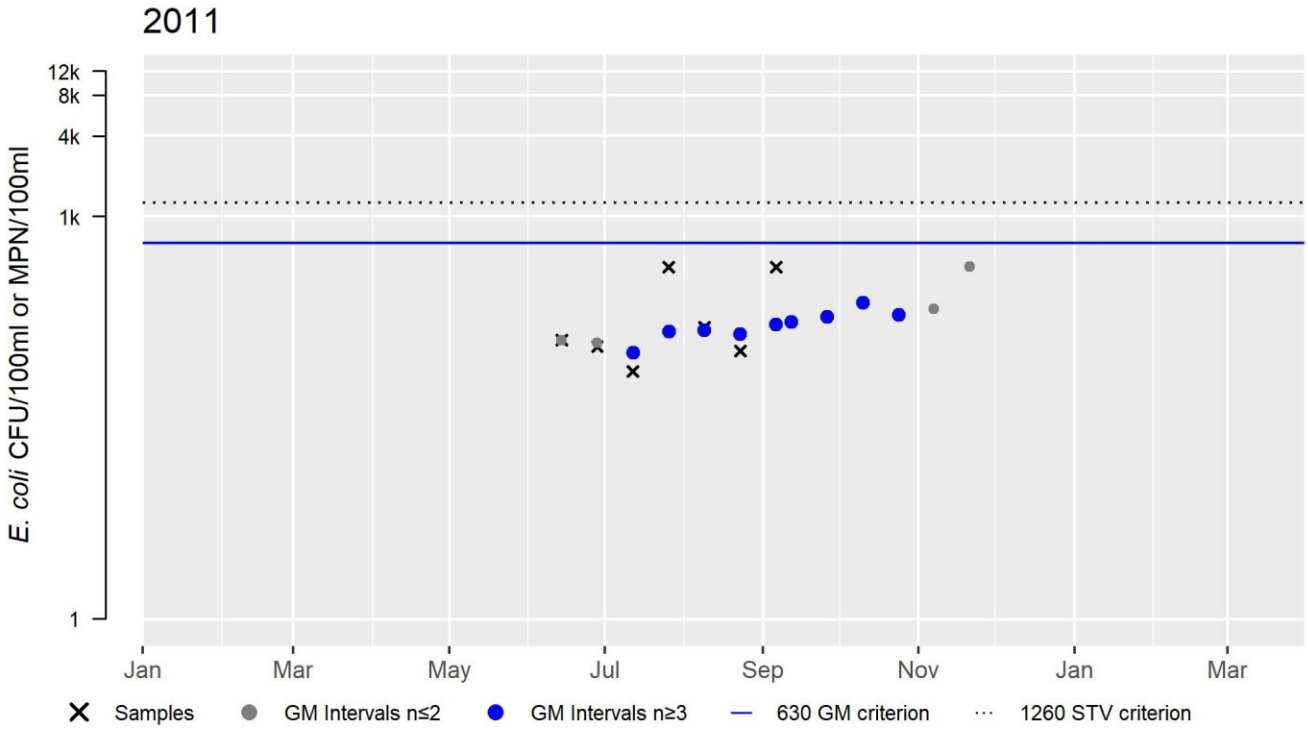
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_MWO1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	157
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

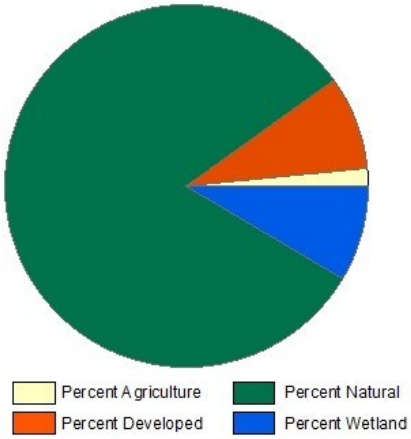


Millers River (MA35-05)

Location:	Erving Center WWTP (formerly known as Erving Paper Company), Erving to confluence with Connecticut River, Erving/Montague.
AU Type:	RIVER
AU Size:	9.2 MILES
Classification/Qualifier:	B: WWF

Millers River - MA35-05

Watershed Area: 389.09 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	309.46	8.67	67.02	1.78
Agriculture	1.6%	2.1%	0.9%	1.7%
Developed	8.3%	9.8%	8%	11.9%
Natural	81.6%	86.3%	72.6%	82.1%
Wetland	8.5%	1.8%	18.5%	4.3%
Impervious Cover	3.5%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added
5	5	Fish Bioassessments		Added
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Curly-leaf Pondweed*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Fish Bioassessments	Dam or Impoundment (N)	X				
Fish Bioassessments	Source Unknown (N)	X				
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Recommendations

2022 Recommendations
REC: Continue to conduct *E. coli* bacteria sampling at several sampling locations along this Millers River AU (MA35-05) particularly including the Erving access area (MRWC_MEr1) to evaluate whether concentrations exceed use attainment thresholds or the Primary Contact Recreational Use is being met.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary
MA DFG biologists conducted backpack electrofishing in this Millers River AU (MA35-05) in August 2016 in two general sampling reaches along Route 2/2A downstream from Arch Street in WMA in Wendell (SampleIDs 5925, 5924, and 5926), and farther downstream near Newton Street off East Main Street in Montague (SampleID 5920). All samples contained fluvial fish (range 41 to 83% of the samples). The overall Target Fish Community evaluation can be summarized as follows: Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the four WWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. MassDEP staff also conducted discrete water quality sampling in this Millers River AU (MA35-02) at USGS flow gaging station #01166500 near Bridge Street/Farley Road in Erving/Wendell (W0690) as part of the SMART monitoring project between January 2011 and March 2013. The discrete water quality sampling data can be briefly summarized as follows: the minimum DO was 8.7mg/L (n=13 measurements), the maximum temperature was 23.7°C (n=13), pH ranged from 6.0 to 7.5SU, n=13), there were generally no indications of nutrient enrichment problems (seasonal average total phosphorus concentrations 0.024 in 2011 and 0.025mg/L in 2012, maximum saturation 105%, maximum pH 7.5SU, and no observations of dense/very dense filamentous algae during 11 site visits). The total ammonia nitrogen concentrations were low (maximum TAN 0.11mg/L) and chloride concentrations were also low (maximum 40mg/L) (n=13 for both analytes). Staff noted an infestation of the non-native aquatic macrophyte, curly-leaf pondweed (*Potamogeton crispus*), at this site in in 2008, 2009 and 2012. The Aquatic Life Use for this Millers River AU (MA35-05) is assessed as Not Supporting based on the low percent similarity with the Millers River TFC model and the presence of the non-native aquatic macrophyte, (P. crispus). Fish Bioassessment and Curly-leaf pondweed impairments are being added.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5920	MassDFG	Fish Community	Millers River	Newton St off E. Main St., Montague	42.58002	-72.49309
5924	MassDFG	Fish Community	Millers River	Millers River WMA across Arch St., Wendell	42.60442	-72.41138
5925	MassDFG	Fish Community	Millers River	Across Arch St, in WMA., Wendell	42.60098	-72.40640
5926	MassDFG	Fish Community	Millers River	Along Rt 2A., Erving	42.60799	-72.41830

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0690	MassDEP	Water Quality	Millers River	[at USGS flow gaging station #01166500 near Bridge Street/Farley Road, Erving/Wendell]	42.597511	-72.437840

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

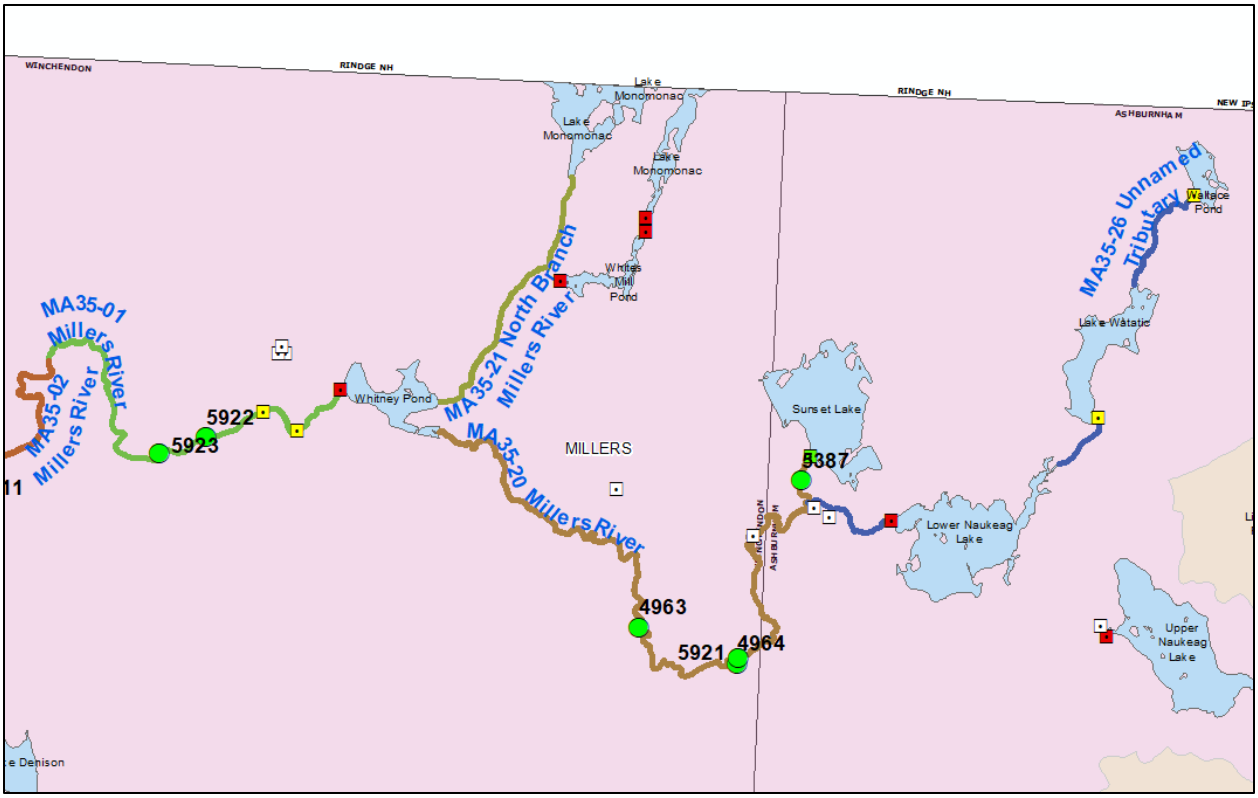
[Species List: AE = American Eel, B = Bluegill, BND = Blacknose Dace, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, LND = Longnose Dace, RBS = Redbreast Sunfish, SL = Sea Lamprey, SMB = Smallmouth Bass, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5920	08/17/16	BP	TP		7	96	0%	4	55%	0%	2	44%	No	No	CS, F, LND, RBS, SMB, WS, YB,
5924	08/19/16	BP	TP		11	106	0%	5	41%	0%	2	40%	No	No	AE, B, CS, F, LND, RBS, SL, SMB, TD, WS, YB,
5925	08/19/16	BP	TP		11	236	0%	4	51%	0%	3	33%	No	No	AE, B, CP, CS, F, RBS, SL, SMB, TD, WS, YB,
5926	08/19/16	BP	TP		10	300	0%	5	83%	0%	2	15%	No	No	AE, B, BND, CS, F, LND, RBS, SMB, WS, YB,

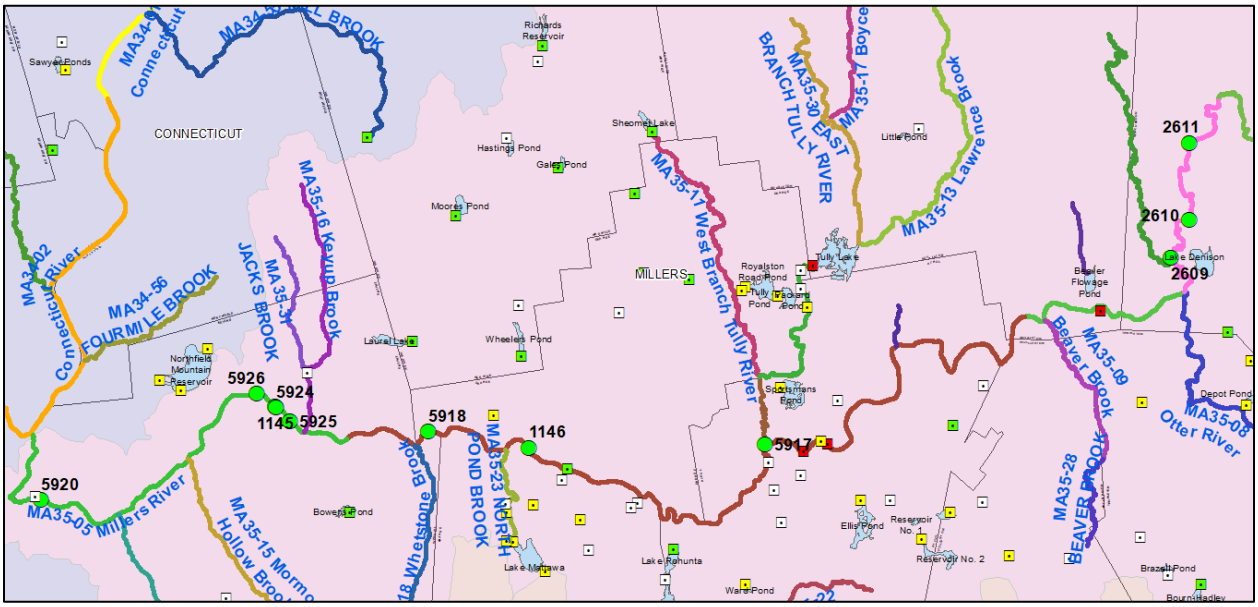
Data Sources: (MassDFG 2018, MassDEP Undated 2, Kashiwagi and Richards 2009)

Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 35.49% for the four WWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. Based on the low similarity of the overall fish community (36%) with the Millers River TFC, the Aquatic Life Use for these Millers River AUs (MA35-02, MA35-03, MA35-04, MA35-05) should be assessed as Not Supporting for Fish Bioassessments.

Fish Community Samples in the Millers River (From upstream to downstream and right to left, CWF AUs MA35-20, MA35-01):



Fish Community Samples in the Millers River (From upstream to downstream and right to left, WWF AUs MA35-02 in pink, MA35-03 in green, MA35-04 in red, MA35-05 in green):



Millers TFC Model:

Table A9. Species percent composition for reference rivers used to develop the Millers River target fish community model. Species are ordered by mean rank. Non-native, stocked, and out-of-range species were deleted from the ranking and calculation of expected proportion in the target fish model. The ranks were converted to expected proportions (as a percent) using a rank-weighting technique as outlined by Bain and Meixler (2008).

Species	EB Westfield River	Third Branch White River	Tenmile River	Ashuelot River	Ammonoosuc River	Piscataquog River	Total	Rank	Expected Proportions
Blacknose dace	41.3	25.0	14.9	19.8	24.1	22.5	147.6	1	32.6
Longnose dace	18.7	19.9	9.3	12.7	38.5	15.2	114.2	2	16.3
Common shiner	7.8	2.6	13.8	22.3	1.4	15.8	63.7	3	10.9
Fallfish	0.5	0.0	18.7	26.8	0.0	2.8	48.8	4	8.1
Atlantic Salmon	9.7	0.0	0.0	2.2	24.1	3.4	39.4		
Slimy sculpin	0.0	33.1	0.0	0.0	6.0	0.0	39.1	6	5.4
White sucker	8.2	0.3	15.8	7.9	0.5	2.8	35.5	7	4.7
Smallmouth bass	9.6	0.0	12.2	1.3	0.0	12.0	35.1		
Longnose sucker	0.0	5.6	0.0	0.0	4.8	2.8	13.2		
Tessellated darter	0.0	0.1	7.3	3.8	0.2	0.0	11.4	10	3.3
Rainbow trout	0.1	7.5	0.1	0.0	0.0	0.2	7.8		
Creek chub	2.7	1.4	0.6	0.2	0.0	0.0	4.9	12	2.7
Cutlips minnow	0.0	0.0	4.6	0.0	0.0	0.0	4.6		
Brown trout	0.0	3.3	0.1	0.3	0.0	0.4	4.1		
Yellow bullhead	0.0	0.0	0.1	1.0	0.0	3.0	4.1		
Redbreast sunfish	0.0	0.0	0.0	0.0	0.0	2.7	2.7	16	2.0
Pumpkinseed	0.1	0.0	0.6	0.3	0.0	1.4	2.4	17	1.9
Brook trout	0.5	1.2	0.1	0.0	0.6	0.0	2.3	18	1.8
American eel	0.0	0.0	0.0	0.2	0.0	1.4	1.6	19	1.7
Bluegill	0.2	0.0	1.3	0.0	0.0	0.0	1.5		
Largemouth bass	0.0	0.0	0.0	0.0	0.0	1.4	1.4		
Golden shiner	0.1	0.0	0.3	0.0	0.0	0.5	0.9	22	1.5
Spottail shiner	0.0	0.0	0.0	0.0	0.0	0.5	0.5	23	1.4
Brown bullhead	0.0	0.0	0.0	0.2	0.0	0.2	0.4	24	1.4
Bluntnose minnow	0.0	0.0	0.4	0.0	0.0	0.0	0.4		
Rock bass	0.0	0.0	0.3	0.1	0.0	0.0	0.4		
Chain pickerel	0.0	0.0	0.0	0.1	0.0	0.2	0.3	27	1.2
Yellow perch	0.0	0.0	0.0	0.3	0.0	0.0	0.3	28	1.2
Bridle shiner	0.1	0.0	0.0	0.0	0.0	0.0	0.1	29	1.1

Fish Community Analysis:

Combined fish community analysis for all 6 AUs (MA35-20, MA35-01, MA35-02, MA35-03, MA35-04, MA35-05); samples 1570 and 5919 were excluded because of low sampling efficiency

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	0.61%	2.0	1.4	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	42	1.29%	-	1.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	7	0.21%	33.0	32.8	
Millers	Bluegill	27	0.83%	-	0.8	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	36	1.11%	1.0	0.1	
Millers	Brown Trout	7	0.21%	-	0.2	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	37	1.14%	1.0	0.1	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	663	20.36%	11.0	9.4	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	10	0.31%	-	0.3	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	1135	34.85%	8.0	26.8	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	0.61%	2.0	1.4	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	21	0.64%	-	0.6	
Millers	Longnose Dace	116	3.56%	16.0	12.4	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	14	0.43%	2.0	1.6	
Millers	Rainbow Trout	2	0.06%	-	0.1	
Millers	Redbreast Sunfish	240	7.37%	2.0	5.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	1.44%	-	1.4	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	5.96%	-	6.0	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	229	7.03%	-	7.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	273	8.38%	5.0	3.4	
Millers	Yellow Bullhead	61	1.87%	-	1.9	
Millers	Yellow Perch	56	1.72%	1.0	0.7	
Millers	(blank)		0.00%	-	-	36.43
Grand Total		3257	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Analysis of samples from WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05) alone, excluding sample 5919

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	1.05%	2.0	1.0	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	6	0.31%	-	0.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	4	0.21%	33.0	32.8	
Millers	Bluegill	9	0.47%	-	0.5	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	9	0.47%	1.0	0.5	
Millers	Brown Trout	7	0.37%	-	0.4	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	26	1.36%	1.0	0.4	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	578	30.25%	11.0	19.2	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	8	0.42%	-	0.4	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	410	21.45%	8.0	13.5	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	1.05%	2.0	1.0	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	7	0.37%	-	0.4	
Millers	Longnose Dace	46	2.41%	16.0	13.6	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	6	0.31%	2.0	1.7	
Millers	Rainbow Trout	2	0.10%	-	0.1	
Millers	Redbreast Sunfish	219	11.46%	2.0	9.5	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	2.46%	-	2.5	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	10.15%	-	10.2	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	95	4.97%	-	5.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	133	6.96%	5.0	2.0	
Millers	Yellow Bullhead	37	1.94%	-	1.9	
Millers	Yellow Perch	28	1.47%	1.0	0.5	
Millers	(blank)		0.00%	-	-	35.49
Grand Total		1911	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP Undated 1)

Summary Statement
MassDEP staff noted an infestation of the non-native aquatic macrophyte, curly-leaf pondweed (*Potamogeton crispus*), in the Millers River in the vicinity of water quality station W0690 in 2008, 2009 and 2012.

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0690	01/25/11	11/15/11	6	8.8	11.6	0	0	0
W0690	02/21/12	10/23/12	5	8.7	11	0	0	0
W0690	01/29/13	03/25/13	2	13.5	14	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W0690	01/25/11	11/15/11	6	1	23.7	10.5	1	1	0	0
W0690	02/21/12	10/23/12	5	2	21.6	12.0	1	0	0	0
W0690	01/29/13	03/25/13	2	0	3.1	1.5	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W0690	01/25/11	11/15/11	6	6	7.5	3	0
W0690	02/21/12	10/23/12	5	6.8	7.4	0	0
W0690	01/29/13	03/25/13	2	6.6	6.8	0	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0690	2011	3	0.024	0.026	0.025	--	--	103.8	7.5	5	0
W0690	2012	2	0.025	0.027	0.026	--	--	105.0	7.4	5	0
W0690	2013	--	--	--	--	--	--	100.6	6.8	1	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W0690	2011	6	0.020	0.110	0.042	0	0
W0690	2012	5	0.020	0.070	0.032	0	0
W0690	2013	2	0.030	0.040	0.035	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0690	2011	6	13	38	26	0	0
W0690	2012	5	22	40	28	0	0
W0690	2013	2	28	31	30	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W0690	01/25/11	11/15/11	6	75	190	0	0	0	0	0	0
W0690	02/21/12	10/23/12	5	121	211	0	0	0	0	0	0
W0690	01/29/13	03/25/13	2	143	171	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020).

The Fish Consumption Use for this Millers River AU (MA35-05) will continue to be assessed as Not Supporting because of the site-specific Fish Consumption Advisory for PCBs in Fish Tissue. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff surveyed one site along this Millers River AU (MA35-05) at USGS flow gaging station #01166500 near Bridge Street/Farley Road in Erving/Wendell (W0690) between January 2011 and March 2013 as part of the SMART monitoring project. There were generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) observed during the surveys.

The Aesthetics Use for this Millers River AU (MA35-05) is assessed as Fully Supporting based on the general lack of objectionable conditions documented by MassDEP staff at the site surveyed between January 2011 and March 2013.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0690	MassDEP	Water Quality	Millers River	[at USGS flow gaging station #01166500 near Bridge Street/Farley Road, Erving/Wendell]	42.597511	-72.437840

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0690	Millers River	2011	6	MassDEP aesthetics observations for station W0690 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0690	Millers River	2012	5	MassDEP aesthetics observations for station W0690 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2012.
W0690	Millers River	2013	2	MassDEP aesthetics observations for station W0690 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2013. However, there is insufficient information to assess the Aesthetics Use since data were limited (n=2).

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0690	2011	6	5	0
W0690	2012	5	5	0
W0690	2013	2	1	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0690	Millers River	2011	Color	None	2	6
W0690	Millers River	2011	Color	Reddish	4	6
W0690	Millers River	2011	Objectionable Deposits	No	4	6
W0690	Millers River	2011	Objectionable Deposits	Unobservable	1	6
W0690	Millers River	2011	Objectionable Deposits	Yes	1	6
W0690	Millers River	2011	Odor	Musty (Basement)	2	6
W0690	Millers River	2011	Odor	None	4	6
W0690	Millers River	2011	Scum	No	2	6
W0690	Millers River	2011	Scum	Yes	4	6
W0690	Millers River	2011	Turbidity	None	5	6
W0690	Millers River	2011	Turbidity	Unobservable	1	6
W0690	Millers River	2012	Color	Reddish	5	5

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0690	Millers River	2012	Objectionable Deposits	No	4	5
W0690	Millers River	2012	Objectionable Deposits	Yes	1	5
W0690	Millers River	2012	Odor	Effluent (Treated)	1	5
W0690	Millers River	2012	Odor	Musty (Basement)	1	5
W0690	Millers River	2012	Odor	None	1	5
W0690	Millers River	2012	Odor	Other	2	5
W0690	Millers River	2012	Scum	No	1	5
W0690	Millers River	2012	Scum	Yes	4	5
W0690	Millers River	2012	Turbidity	None	5	5
W0690	Millers River	2013	Color	Reddish	2	2
W0690	Millers River	2013	Objectionable Deposits	Unobservable	2	2
W0690	Millers River	2013	Odor	None	2	2
W0690	Millers River	2013	Scum	No	1	2
W0690	Millers River	2013	Scum	Unobservable	1	2
W0690	Millers River	2013	Turbidity	None	2	2

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

MassDEP staff and the Millers River Watershed Council staff/volunteers collected *E. coli* bacteria samples from this Millers River AU (MA35-05) at the Erving access (MRWC_MEr1) between June and September 2014 (n = 7) and June and September 2015 (n = 7), near the middle of the AU at the USGS flow gaging station #01166500 near Bridge Street and Farley Road in Erving/Wendell (W0690) between May and September 2011 (n = 3) and April and October 2012 (n = 4), and at the lower end of the AU near the confluence with the Connecticut River (MRWC_MCf1) between June and September 2014 (n = 7) and June and September 2015 (n = 7). Data analysis indicated at the most upstream sampling site (MRWC_MEr1) that 27 and 56% GM intervals (2014 and 2015, respectively) had GMs >126 cfu/100ml with a 41% cumulative %GM interval exceedance, although no samples exceeded the 410 cfu/100ml STV. The seasonal GMs were 106 and 144cfu/100ml. Too limited data were collected at W0690 to assess although there was one STV exceedance in 2011. At the most downstream sampling station, near the confluence with the Connecticut River (MRWC_MCf1), there were 0% GM interval exceedances >126 cfu/100ml, and no samples exceeded the 410 cfu/100ml STV in either 2014 or 2015. The seasonal GMs at this site were 58 and 67 in 2014 and 2015, respectively. there was only one STV exceedance of 35 total samples (~3%) which only occurred in 2011 (no STV exceedances in 2014 or 2015).
The Primary Contact Recreational Use for this Millers River AU (MA35-05) is assessed as Fully Supporting since the *E. coli* concentrations were below the use attainment impairment thresholds overall for the multi-year moderate frequency datasets at the two MRWC sites sampled in the summers 2014 and 2015. Since the most upstream sampling site MRWC_MEr1, did have GM interval exceedances, an alert for *E. coli* is being identified and additional sampling is being recommended.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0690	MassDEP	Water Quality	Millers River	[at USGS flow gaging station #01166500 near Bridge Street/Farley Road, Erving/Wendell]	42.597511	-72.437840

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
MRWC_MCf1	Millers River Watershed Council	Water Quality	Millers River	confluence w/CT river	42.595808	-72.495839
MRWC_MEr1	Millers River Watershed Council	Water Quality	Millers River	Erving access	42.598533	-72.402639

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0690	MassDEP	E. coli	05/16/11	09/20/11	3	33	461	96
W0690	MassDEP	E. coli	04/10/12	10/23/12	4	16	249	60
MRWC_MCf1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	34.1	99	58
MRWC_MCf1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	37.3	193.5	67
MRWC_MEr1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	48	261.3	106
MRWC_MEr1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	41.7	344.8	144

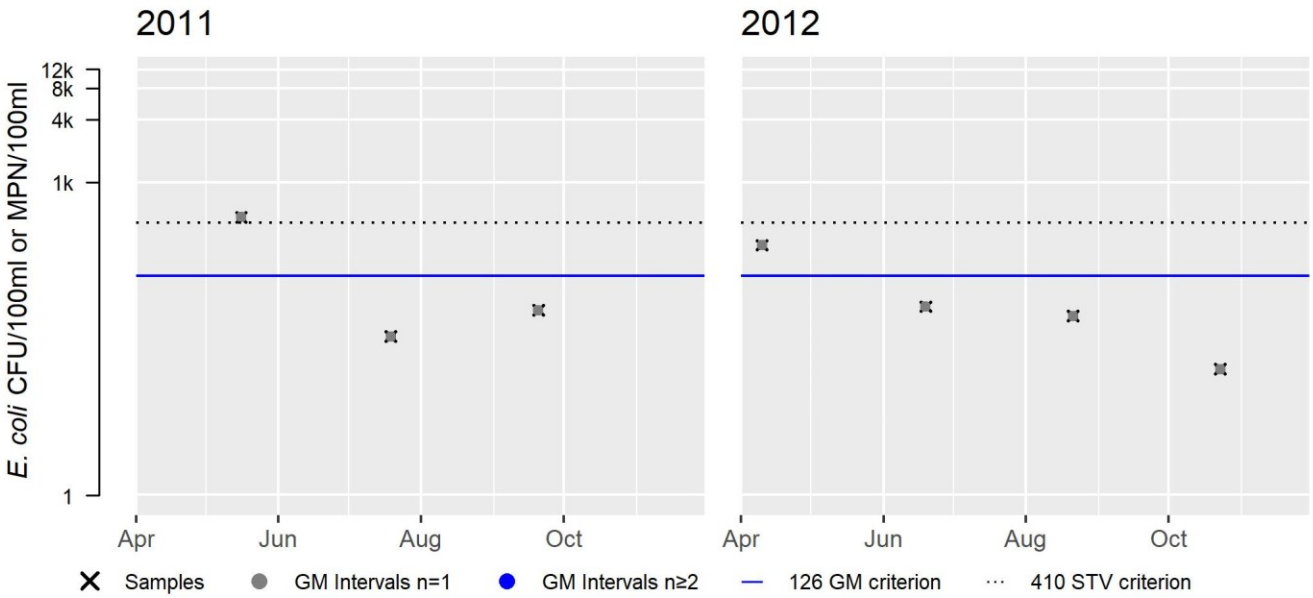
W0690 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	3
SeasGM	96
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	33

Var	Res
Samples	4
SeasGM	60
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



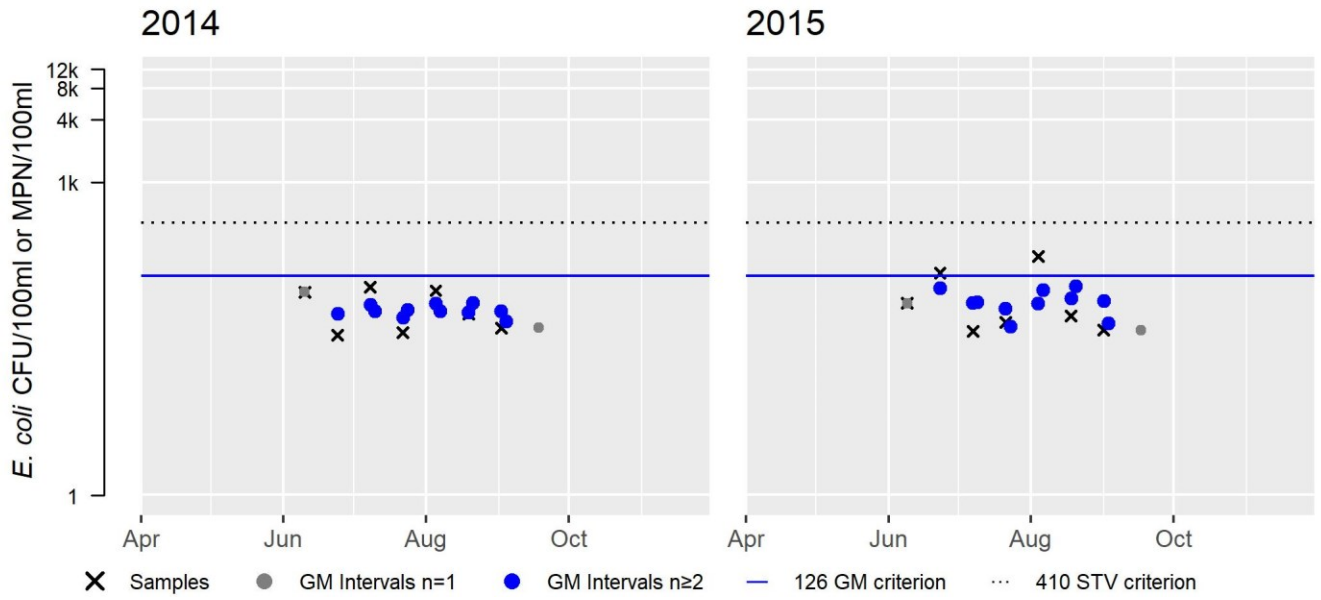
MRWC_MCf1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	58
#GMI	11
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	67
#GMI	11
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



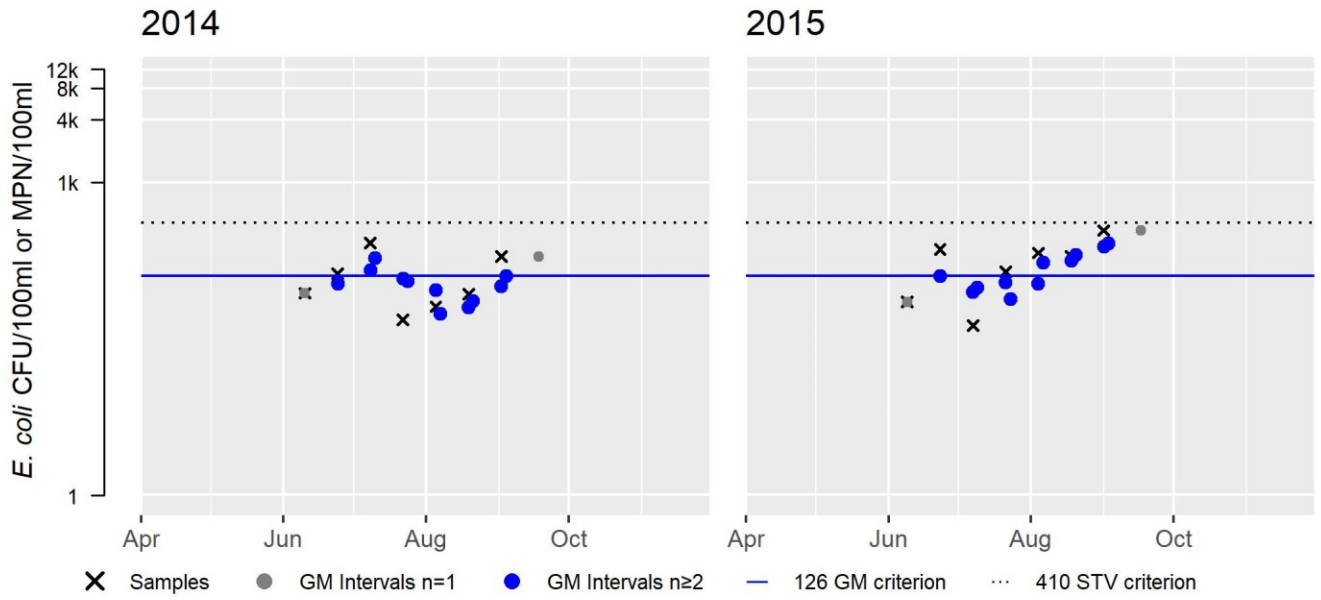
MRWC_MEr1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	106
#GMI	11
#GMI Ex	3
%GMI Ex	27
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	144
#GMI	11
#GMI Ex	6
%GMI Ex	55
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	41



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff and the Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Millers River AU (MA35-05) at the Erving access (MRWC_MEr1) between June and September 2014 (n = 7) and June and September 2015 (n = 7), near the middle of the AU at the USGS flow gaging station #01166500 near Bridge Street and Farley Road in Erving/Wendell (W0690) between May and September 2011 (n = 3) and April and October 2012 (n = 4), and farthest downstream at the confluence with the Connecticut River (MRWC_MCf1) between June and September 2014 (n = 7) and June and September 2015 (n = 7). Data analysis indicated neither of two sites sampled by MRWC had GMs intervals >630 cfu/100ml, none of the samples exceeded the 1260 cfu/100ml STV, and the overall GMs at these two sites ranged from 58 to 152 cfu/100ml. Too limited *E. coli* data at W0690 were available to assess the use although none of the samples had any STV exceedances.
The Secondary Contact Recreational Use for this Millers River AU (MA35-05) is assessed as Fully Supporting since the *E. coli* concentrations were all below the use attainment impairment thresholds for the multi-year moderate frequency datasets at the two MRWC sites sampled in the summers 2014 and 2015.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0690	MassDEP	Water Quality	Millers River	[at USGS flow gaging station #01166500 near Bridge Street/Farley Road, Erving/Wendell]	42.597511	-72.437840
MRWC_MCf1	Millers River Watershed Council	Water Quality	Millers River	confluence w/CT river	42.595808	-72.495839
MRWC_MEr1	Millers River Watershed Council	Water Quality	Millers River	Erving access	42.598533	-72.402639

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0690	MassDEP	E. coli	01/25/11	11/15/11	6	19	461	66
W0690	MassDEP	E. coli	02/21/12	10/23/12	5	16	249	54
W0690	MassDEP	E. coli	01/29/13	03/25/13	2	93	248	152
MRWC_MCf1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	34.1	99	58
MRWC_MCf1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	37.3	193.5	67
MRWC_MEr1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	48	261.3	106
MRWC_MEr1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	41.7	344.8	144

W0690 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

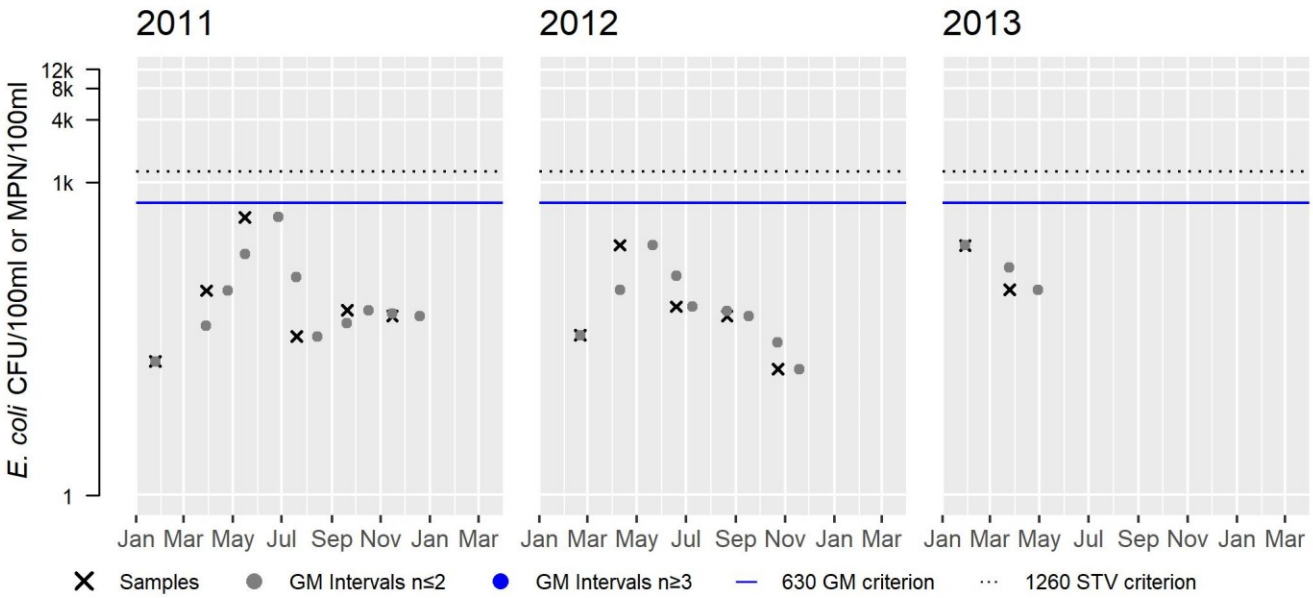
Var	Res
Samples	6
SeasGM	66
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	5
SeasGM	54
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	2
SeasGM	152
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



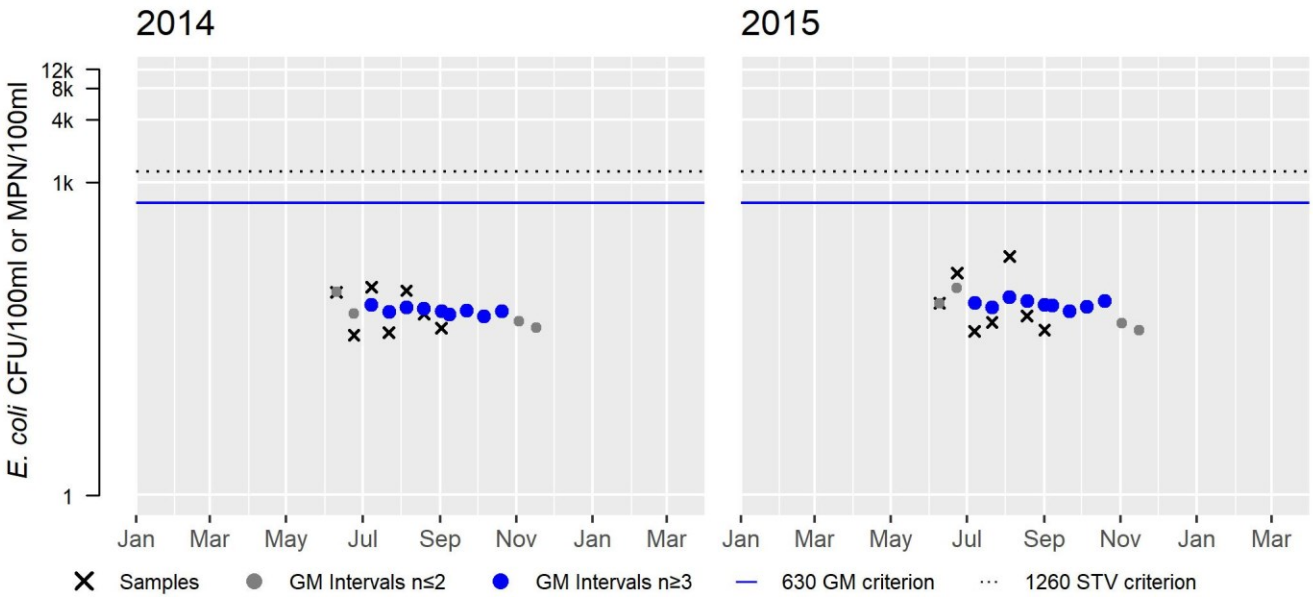
MRWC_MCf1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	58
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	67
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



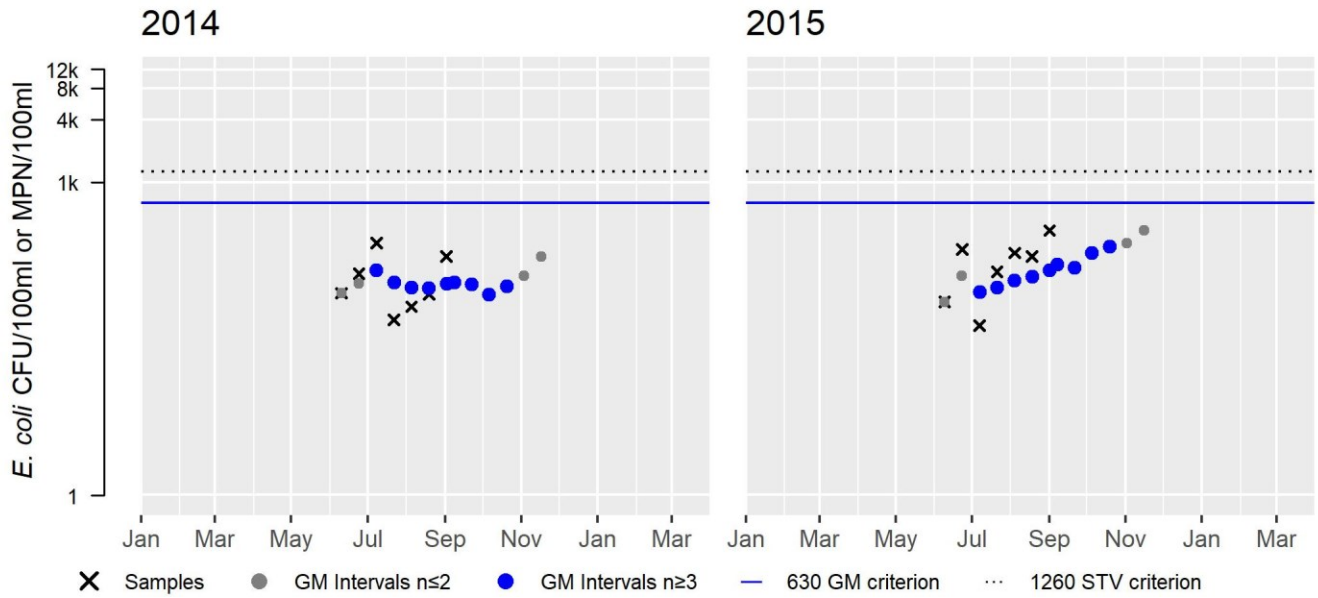
MRWC_MEr1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	106
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	144
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0

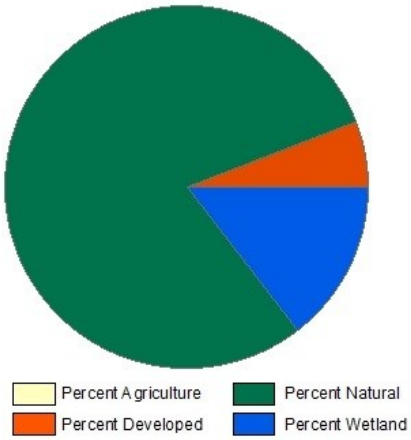


Millers River (MA35-20)

Location:	Headwaters, outlet of Sunset Lake, Ashburnham to inlet of Whitney Pond, Winchendon.
AU Type:	RIVER
AU Size:	6.4 MILES
Classification/Qualifier:	B: CWF

Millers River - MA35-20

Watershed Area: 28.66 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	25.69	8.42	5.84	1.93
Agriculture	0.4%	0.3%	0.2%	0%
Developed	5.9%	8.2%	7.1%	8.7%
Natural	79.3%	77.8%	66.4%	67.7%
Wetland	14.4%	13.8%	26.3%	23.6%
Impervious Cover	2.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Benthic Macroinvertebrates		Added
5	5	Fish Bioassessments		Added
5	5	Lack of a Coldwater Assemblage		Unchanged
5	5	Lead		Added
5	5	Temperature		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Benthic Macroinvertebrates	Source Unknown (N)	X				
Fish Bioassessments	Dam or Impoundment (Y)	X				
Fish Bioassessments	Source Unknown (N)	X				
Lack of a Coldwater Assemblage	Dam or Impoundment (Y)	X				
Lead	Source Unknown (N)	X				
Temperature	Dam or Impoundment (Y)	X				

Recommendations

2022 Recommendations
ALU: Conduct additional clean metals sampling in this Millers River AU (MA35-20) to better evaluate criteria exceedances (both aluminum and copper did have some limited exceedances) as well as to try to better evaluate lead toxicity concerns in this area of the watershed.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
MA DFG biologists conducted backpack electrofishing at two sites in the upper reach of this Millers River AU (MA35-30) in July 2014 (SampleID 5387) downstream Sherbert Road at the outlet of Sunset Lake in Ashburnham and upstream of the bridge at Route 12/Spring Street in Winchendon (SampleID 5921) in August 2016. Both samples were dominated by fluvial fish but no cold water species were collected. Farther downstream, near the mid point of this AU downstream from the Route 12 crossing nearest North Ashburnham Road in Winchendon MassDEP biologists conducted benthic and water quality sampling during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community (B0731) sample, collected in July 2011, had an IBI score of 50 (indicative of moderately degraded conditions for a high gradient Central Hills region stream). Water quality sampling data including both deployed probe and discrete sampling efforts (W2211) can be summarized as follows: minimum dissolved oxygen 4.3mg/L during three short term DO deploys, maximum temperature 29.6°C between June 1st and September 15th with 7DADM exceeding 20°C 102 times. The maximum 24-hour rolling average temperature was 27.0°C, pH ranged from 5.3 to 5.6SU (n=6), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was 0.067mg/L, max diel DO shift only 1.1mg/L, maximum saturation 89%, maximum pH 5.6SU, and only one observations of any dense/very dense filamentous algae during six site visits). There were a few metals criteria exceedances as follows from the three clean metals sampling rounds: two chronic aluminum criteria exceedances compared to the Millers River Watershed default criterion (maximum 1.6TU), one acute and one chronic copper criteria exceedance (TU 1.5 and 1.78, respectively), and three chronic lead criteria exceedances (TUs ranging from 4.5 to 11.5). There were no other toxicant issues (maximum total ammonia-nitrogen concentration was 0.05mg/L, chloride was 25mg/L (n=5), and there were no other exceedances of any of clean metals samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out). The overall Target Fish Community evaluation can be summarized as follows: Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the percent similarity was 31.71% for the 2 CWF AUs alone). Of the five most common species in the TFC, only two of the species (fallfish, common shiner) were also in the top five among the study samples (combined among all AUs), and in a different ranked order. The Aquatic Life Use of this Millers River AU (MA35-20) will continue to be assessed as Not Supporting with the Lack of a Coldwater Assemblage and Temperature impairments being carried forward. Additionally, because of the degraded benthic community, the low similarity of the overall fish community (36%) with the Millers River TFC model, and chronic lead criteria exceedances during all three clean sampling rounds, impairments are being added for Benthic Macroinvertebrates, Fish Bioassessments, and Lead.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5387	MassDFG	Fish Community	Millers River	Sunset Lake outflow DS of Sherbert Rd, Ashburnham	42.67395	-71.97898
5921	MassDFG	Fish Community	Millers River	Rt 12/Spring St, upstream of bridge., Winchendon	42.65586	-71.98755
B0731	MassDEP	Benthic	Millers River/	[approximately 1045 meters downstream from the Route 12 crossing nearest North Ashburnham Road, Winchendon, MA]	42.667408	-72.004141
W2211	MassDEP	Water Quality	Millers River	[approximately 3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road, Winchendon]	42.667407	-72.004141

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0731	07/20/11	RBP kicknet	Central_Hills_100ct	100	50	MD

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: B = Bluegill, BB = Brown Bullhead, BS = Banded Sunfish, CCS = Creek Chubsucker, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, LMB = Largemouth Bass, P = Pumpkinseed, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead, YP = Yellow Perch]

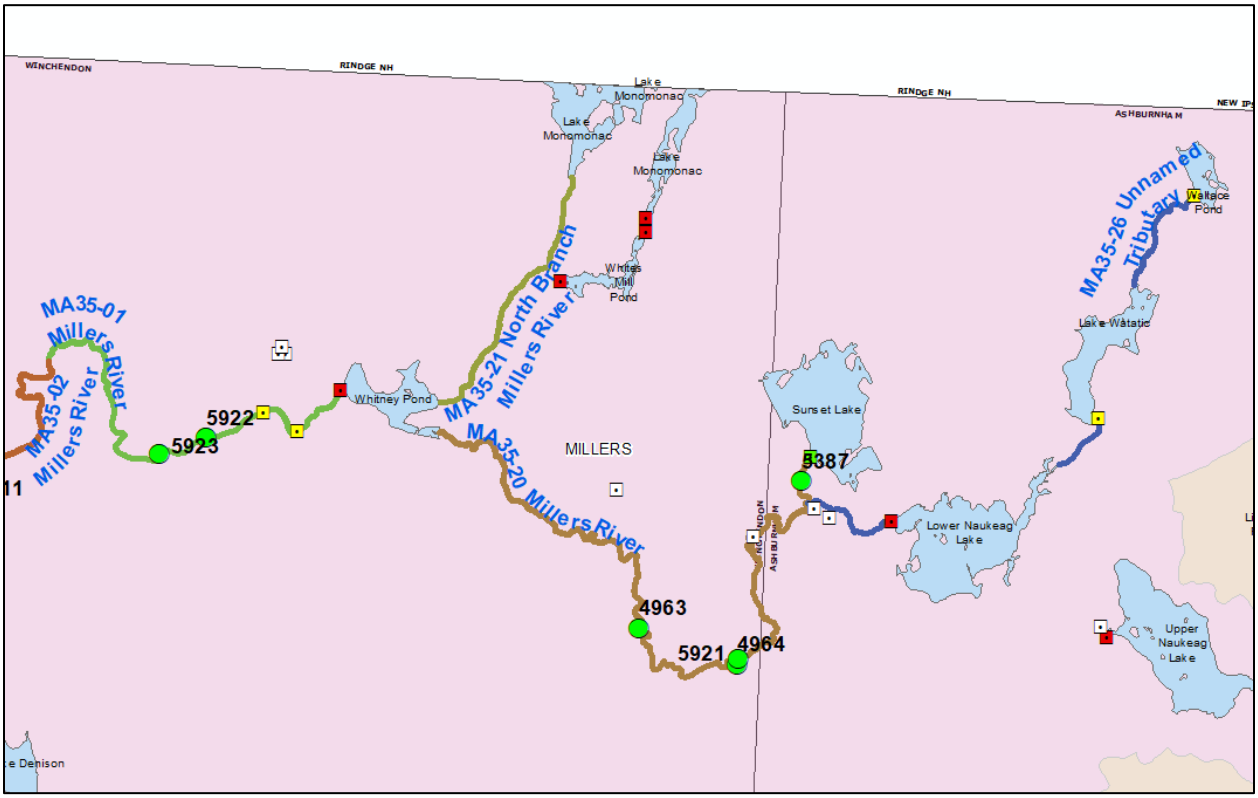
Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5387	07/24/14	BP	TP		11	523	0%	4	83%	0%	4	8%	No	No	B, BB, CP, CS, F, LMB, P, TD, WS, YB, YP,
5921	08/18/16	BP	TP		9	178	0%	4	75%	21%	3	22%	No	No	B, BS, CCS, CP, F, LMB, TD, WS, YB,

Data Sources: (MassDFG 2018, MassDEP Undated 2, Kashiwagi and Richards 2009)

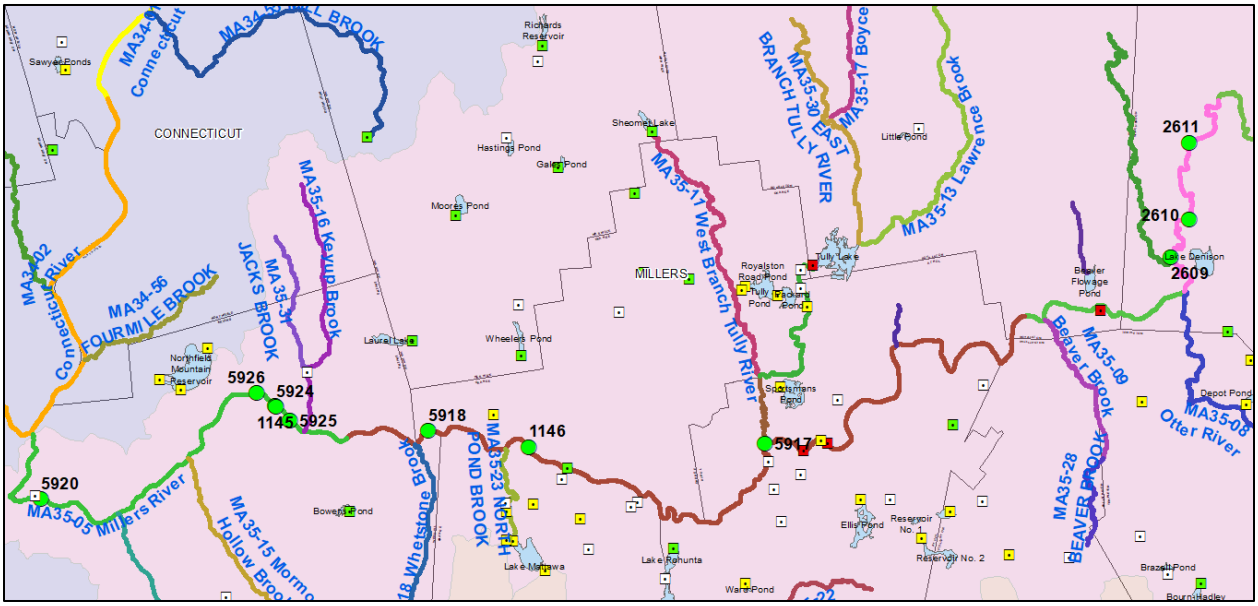
Seventeen fish community samples were collected in the Millers River from 2005-2016: sample IDs 4963, 4964, 5387, 5921, 5922, 5923 in the CWF AUs (MA35-20, MA35-01) and samples 1145, 1146, 2609, 2610, 2611, 5917, 5918, 5920, 5924, 5925, 5926 in the WWF AUs (MA35-02, MA35-03, MA35-04, MA35-05). Two additional samples (#1570, July 2006; #5919, Aug 2016) were excluded from the analysis due to low sampling efficiency which resulted in low fish abundance and/or species diversity. The overall percent similarity with the Millers River Target Fish Community model was 36.43% (note that the

percent similarity was 31.71% for the 2 CWF AUs alone). Of the 5 most common species in the TFC, only 2 of the species (fallfish, common shiner) were also in the top 5 among the study samples (combined among all AUs), and in a different ranked order. Given the lack of wild individuals from coldwater species among the study samples, the Aquatic Life Use of these Millers River AUs (MA35-20, MA35-01) should remain assessed as Not Supporting for "Lack of a coldwater assemblage." Additionally, the low similarity of the overall fish community (36%) with the Millers River TFC model indicates the need to add a Fish Bioassessments impairment.

Fish Community Samples in the Millers River (From upstream to downstream and right to left, CWF AUs MA35-20, MA35-01):



Fish Community Samples in the Millers River (From upstream to downstream and right to left, WWF AUs MA35-02 in pink, MA35-03 in green, MA35-04 in red, MA35-05 in green):



Millers TFC Model:

Table A9. Species percent composition for reference rivers used to develop the Millers River target fish community model. Species are ordered by mean rank. Non-native, stocked, and out-of-range species were deleted from the ranking and calculation of expected proportion in the target fish model. The ranks were converted to expected proportions (as a percent) using a rank-weighting technique as outlined by Bain and Meixler (2008).

Species	EB Westfield River	Third Branch White River	Tenmile River	Ashuelot River	Ammonoosuc River	Piscataquog River	Total	Rank	Expected Proportions
Blacknose dace	41.3	25.0	14.9	19.8	24.1	22.5	147.6	1	32.6
Longnose dace	18.7	19.9	9.3	12.7	38.5	15.2	114.2	2	16.3
Common shiner	7.8	2.6	13.8	22.3	1.4	15.8	63.7	3	10.9
Fallfish	0.5	0.0	18.7	26.8	0.0	2.8	48.8	4	8.1
Atlantic Salmon	9.7	0.0	0.0	2.2	24.1	3.4	39.4		
Slimy sculpin	0.0	33.1	0.0	0.0	6.0	0.0	39.1	6	5.4
White sucker	8.2	0.3	15.8	7.9	0.5	2.8	35.5	7	4.7
Smallmouth bass	9.6	0.0	12.2	1.3	0.0	12.0	35.1		
Longnose sucker	0.0	5.6	0.0	0.0	4.8	2.8	13.2		
Tessellated darter	0.0	0.1	7.3	3.8	0.2	0.0	11.4	10	3.3
Rainbow trout	0.1	7.5	0.1	0.0	0.0	0.2	7.8		
Creek chub	2.7	1.4	0.6	0.2	0.0	0.0	4.9	12	2.7
Cutlips minnow	0.0	0.0	4.6	0.0	0.0	0.0	4.6		
Brown trout	0.0	3.3	0.1	0.3	0.0	0.4	4.1		
Yellow bullhead	0.0	0.0	0.1	1.0	0.0	3.0	4.1		
Redbreast sunfish	0.0	0.0	0.0	0.0	0.0	2.7	2.7	16	2.0
Pumpkinseed	0.1	0.0	0.6	0.3	0.0	1.4	2.4	17	1.9
Brook trout	0.5	1.2	0.1	0.0	0.6	0.0	2.3	18	1.8
American eel	0.0	0.0	0.0	0.2	0.0	1.4	1.6	19	1.7
Bluegill	0.2	0.0	1.3	0.0	0.0	0.0	1.5		
Largemouth bass	0.0	0.0	0.0	0.0	0.0	1.4	1.4		
Golden shiner	0.1	0.0	0.3	0.0	0.0	0.5	0.9	22	1.5
Spottail shiner	0.0	0.0	0.0	0.0	0.0	0.5	0.5	23	1.4
Brown bullhead	0.0	0.0	0.0	0.2	0.0	0.2	0.4	24	1.4
Bluntnose minnow	0.0	0.0	0.4	0.0	0.0	0.0	0.4		
Rock bass	0.0	0.0	0.3	0.1	0.0	0.0	0.4		
Chain pickerel	0.0	0.0	0.0	0.1	0.0	0.2	0.3	27	1.2
Yellow perch	0.0	0.0	0.0	0.3	0.0	0.0	0.3	28	1.2
Bridle shiner	0.1	0.0	0.0	0.0	0.0	0.0	0.1	29	1.1

Fish Community Analysis:

Combined fish community analysis for all 6 AUs (MA35-20, MA35-01, MA35-02, MA35-03, MA35-04, MA35-05); samples 1570 and 5919 were excluded because of low sampling efficiency

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel	20	0.61%	2.0	1.4	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	42	1.29%	-	1.3	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	7	0.21%	33.0	32.8	
Millers	Bluegill	27	0.83%	-	0.8	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	36	1.11%	1.0	0.1	
Millers	Brown Trout	7	0.21%	-	0.2	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	37	1.14%	1.0	0.1	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	663	20.36%	11.0	9.4	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	10	0.31%	-	0.3	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	1135	34.85%	8.0	26.8	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner	20	0.61%	2.0	1.4	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	21	0.64%	-	0.6	
Millers	Longnose Dace	116	3.56%	16.0	12.4	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	14	0.43%	2.0	1.6	
Millers	Rainbow Trout	2	0.06%	-	0.1	
Millers	Redbreast Sunfish	240	7.37%	2.0	5.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey	47	1.44%	-	1.4	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass	194	5.96%	-	6.0	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	229	7.03%	-	7.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	273	8.38%	5.0	3.4	
Millers	Yellow Bullhead	61	1.87%	-	1.9	
Millers	Yellow Perch	56	1.72%	1.0	0.7	
Millers	(blank)		0.00%	-	-	36.43
Grand Total		3257	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Analysis of samples from CWF AUs (MA35-20, MA35-01) alone, excluding sample 1570

Watershed	Common Name	Values # of Fish	% of catch	Applicable TFC	TFC Difference	% Sim to TFC
Millers	American Brook Lamprey		0.00%	-	-	
Millers	American Eel		0.00%	2.0	2.0	
Millers	Atlantic Salmon		0.00%	-	-	
Millers	Banded Killifish		0.00%	-	-	
Millers	Banded Sunfish	36	2.67%	-	2.7	
Millers	Black Crappie		0.00%	-	-	
Millers	Blacknose Dace	3	0.22%	33.0	32.8	
Millers	Bluegill	18	1.34%	-	1.3	
Millers	Bluntnose Minnow		0.00%	-	-	
Millers	Bridle Shiner		0.00%	1.0	1.0	
Millers	Brook Trout		0.00%	2.0	2.0	
Millers	Brown Bullhead	27	2.01%	1.0	1.0	
Millers	Brown Trout		0.00%	-	-	
Millers	Central Mudminnow		0.00%	-	-	
Millers	Chain Pickerel	11	0.82%	1.0	0.2	
Millers	Channel Catfish		0.00%	-	-	
Millers	Common Carp		0.00%	-	-	
Millers	Common Shiner	85	6.32%	11.0	4.7	
Millers	Creek Chub		0.00%	3.0	3.0	
Millers	Creek Chubsucker	2	0.15%	-	0.1	
Millers	Cutlips Minnow		0.00%	-	-	
Millers	Fallfish	725	53.86%	8.0	45.9	
Millers	Fathead Minnow		0.00%	-	-	
Millers	Golden Shiner		0.00%	2.0	2.0	
Millers	Green Sunfish		0.00%	-	-	
Millers	Lake Chub		0.00%	-	-	
Millers	Largemouth Bass	14	1.04%	-	1.0	
Millers	Longnose Dace	70	5.20%	16.0	10.8	
Millers	Longnose Sucker		0.00%	-	-	
Millers	Northern Pike		0.00%	-	-	
Millers	Pumpkinseed	8	0.59%	2.0	1.4	
Millers	Rainbow Trout		0.00%	-	-	
Millers	Redbreast Sunfish	21	1.56%	2.0	0.4	
Millers	Redfin Pickerel		0.00%	-	-	
Millers	Rock Bass		0.00%	-	-	
Millers	Sea Lamprey		0.00%	-	-	
Millers	Slimy Sculpin		0.00%	5.0	5.0	
Millers	Smallmouth Bass		0.00%	-	-	
Millers	Spottail Shiner		0.00%	1.0	1.0	
Millers	Swamp Darter		0.00%	-	-	
Millers	Tadpole Madtom		0.00%	-	-	
Millers	Tesselated Darter	134	9.96%	-	10.0	
Millers	White Catfish		0.00%	-	-	
Millers	White Perch		0.00%	-	-	
Millers	White Sucker	140	10.40%	5.0	5.4	
Millers	Yellow Bullhead	24	1.78%	-	1.8	
Millers	Yellow Perch	28	2.08%	1.0	1.1	
Millers	(blank)		0.00%	-	-	31.71
Grand Total		1346	#####	-	100.0	

Row Labels
Millers
1145
1146
1570
2609
2610
2611
4963
4964
5387
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
Grand Total

Individuals from coldwater species (brown trout, rainbow trout) were not collected in the 2 CWF AUs and were all >140 mm in length, indicating they were likely stocked:

Sample	Brown Trout Length (mm)	Rainbow Trout Length (mm)
1145		350
2610	305	
2611	257	200
2611	250	
2611	306	
2611	355	
5918	196	
5918	234	

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2211	2011	3	12	4.3	4.8	5.2	1.1	1	2	1	2	1	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2211	05/12/11	10/06/11	6	4.5	6.7	1	1	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2211	06/01/11	09/15/11	107	107	26.9	29.6	26.7	24.7	102	9	51	6	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2211	2011	3	12	23.6	25.7	24.9	23.0	2	1	1	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2211	06/01/11	09/15/11	107	5136	27.0	468	258	0
W2211	06/10/11	08/17/11	68	576	23.9	38	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2211	05/12/11	10/06/11	8	6	21.6	18.0	3	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2211	05/12/11	10/06/11	6	5.3	5.7	6	6

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2211	2011	5	0.022	0.067	0.037	1.1	0.7	88.8	5.7	1	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2211	2011	3	0	0	0	1	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)
[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2211	2011	3	0	0	0	1	3	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)
[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2211	07/13/11	0.9	0.0	0.7	0.90	0.2	6.2
W2211	08/02/11	0.4	0.7	0.5	0.62	0.2	4.5
W2211	09/07/11	0.7	0.0	1.5	1.78	0.4	11.5

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2211	2011	3	0.160	0.32	0.230	1.0	1.6	0	2

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2211	2011	5	0.020	0.050	0.030	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2211	2011	5	17	25	20	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2211	05/12/11	10/06/11	6	79	116	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in this Millers River AU (MA35-20), therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff surveyed this Millers River AU (MA35-20) ~ 3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road in Winchendon (W2211) during the summer of 2011. There were generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) observed during the surveys. The Aesthetics Use for this Millers River AU (MA35-20) is assessed as Fully Supporting based on the general lack of objectionable conditions documented by MassDEP staff at the sampling site during the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2211	MassDEP	Water Quality	Millers River	[approximately 3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road, Winchendon]	42.667407	-72.004141

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2211	Millers River	2011	6	MassDEP aesthetics observations for station W2211/MAP2-069 on Millers River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2211	2011	6	1	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2211	Millers River	2011	Color	Light Yellow/Tan	3	6
W2211	Millers River	2011	Color	Reddish	2	6
W2211	Millers River	2011	Color	Rusty	1	6
W2211	Millers River	2011	Objectionable Deposits	No	4	6
W2211	Millers River	2011	Objectionable Deposits	Unobservable	2	6
W2211	Millers River	2011	Odor	None	6	6
W2211	Millers River	2011	Scum	No	5	6
W2211	Millers River	2011	Scum	Yes	1	6
W2211	Millers River	2011	Turbidity	None	2	6
W2211	Millers River	2011	Turbidity	Slightly Turbid	2	6
W2211	Millers River	2011	Turbidity	Unobservable	2	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples from this Millers River AU (MA35-20) ~3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road in Winchendon (W2211) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals had GMs > 126 cfu/100 ml and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 39 cfu/100 ml.

Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year low frequency dataset, the Primary Contact Recreational Use for this Millers River AU (MA35-20) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2211	MassDEP	Water Quality	Millers River	[approximately 3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road, Winchendon]	42.667407	-72.004141

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

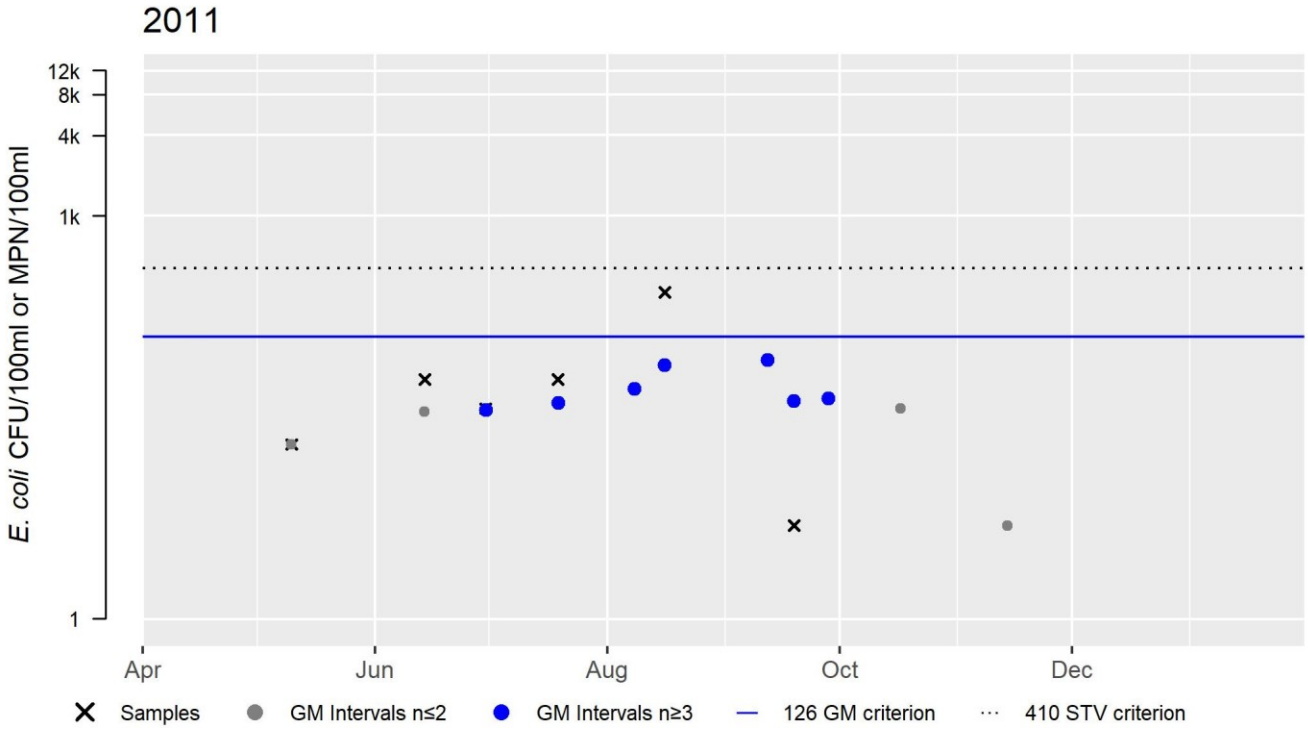
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2211	MassDEP	E. coli	05/10/11	09/19/11	6	5	270	39

W2211 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	39
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff collected *E. coli* bacteria samples from this Millers River AU (MA35-20) ~3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road in Winchendon (W2211) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals had GMs > 630 cfu/100 ml and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 39 cfu/100 ml.
Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year low frequency dataset, the Secondary Contact Recreational Use for this Millers River AU (MA35-20) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2211	MassDEP	Water Quality	Millers River	[approximately 3430 feet downstream from the Route 12 crossing nearest North Ashburnham Road, Winchendon]	42.667407	-72.004141

Bacteria Data

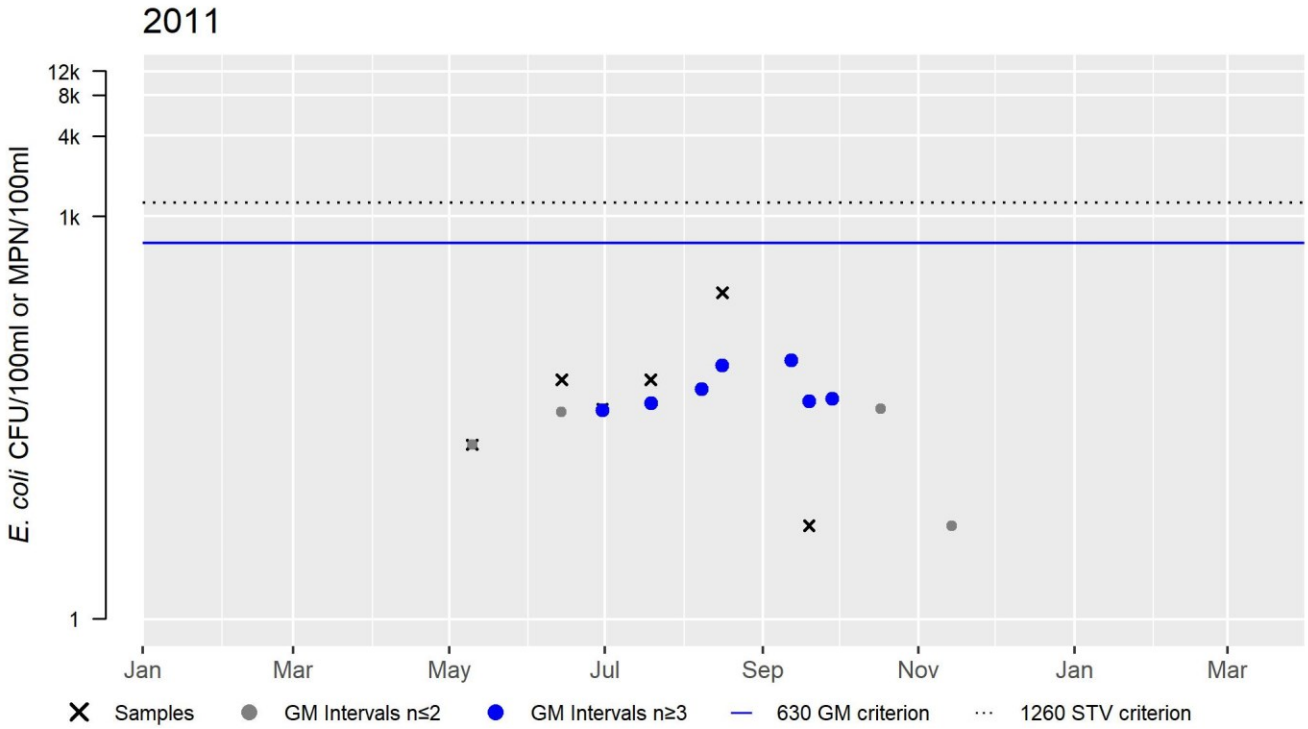
Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2211	MassDEP	E. coli	05/10/11	09/19/11	6	5	270	39

W2211 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	39
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Minott Pond (MA35046)

Location:	Westminster.
AU Type:	FRESHWATER LAKE
AU Size:	8 ACRES
Classification/Qualifier:	B

No usable data were available for Minott Pond (MA35046) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Minott Pond South (MA35045)

Location:	Westminster.
AU Type:	FRESHWATER LAKE
AU Size:	27 ACRES
Classification/Qualifier:	B

No usable data were available for Minott Pond South (MA35045) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Moores Pond (MA35048)

Location:	Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	39 ACRES
Classification/Qualifier:	B

No usable data were available for Moores Pond (MA35048) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	Mercury in Fish Tissue	42398	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Mormon Hollow Brook (MA35-15)

Location:	Headwaters just north of Montague Road, Wendell to confluence with Millers River, Wendell.
AU Type:	RIVER
AU Size:	3.8 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Mormon Hollow Brook (MA35-15) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

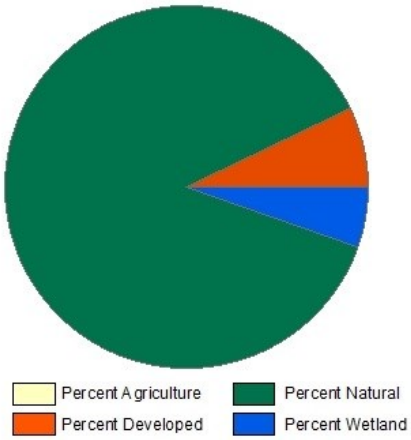
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

North Branch Millers River (MA35-21)

Location:	Outlet of Lake Mononomac, Winchendon to inlet of Whitney Pond, Winchendon.
AU Type:	RIVER
AU Size:	2 MILES
Classification/Qualifier:	B

North Branch Millers River - MA35-21

Watershed Area: 20.93 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.45	4.33	0.9	0.9
Agriculture	0.2%	0.2%	0.1%	0.1%
Developed	7.1%	7.3%	17.6%	17.6%
Natural	87.4%	87.1%	70.5%	70.5%
Wetland	5.3%	5.4%	11.8%	11.8%
Impervious Cover	2.9%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Mercury in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Mercury in Fish Tissue	Source Unknown (N)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

MA DFG biologists conducted backpack electrofishing in a high gradient reach of the North Branch Millers River upstream of the Maple Street (Route 202) crossing in Winchendon (SampleID 5324) in July 2014. While overall only a few fish were collected (14), the sample did contain fluvial fish (fallfish and tessellated darter) that comprised half of the sample. The Aquatic Life Use for the North Branch Millers River will continue to be assessed as Fully Supporting based on the very limited fish sample data from July 2014. The Alert for the dam operations that may be affecting instream habitat (flow) is being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5324	MassDFG	Fish Community	North Branch Millers River	Maple St (Rt 202) crossing US, Winchedon	42.69270	-72.01927

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: CP = Chain Pickerel, F = Fallfish, P = Pumpkinseed, RBS = Redbreast Sunfish, TD = Tesselated Darter, YB = Yellow Bullhead, YP = Yellow Perch]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5324	07/14/14	BP	TP	H	7	14	0%	2	50%	0%	4	43%	No	No	CP, F, P, RBS, TD, YB, YP,

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for the North Branch Millers River will continue to be assessed as Not Supporting with the Mercury in Fish Tissue impairment being carried forward. MA DPH advises Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the North Branch Millers River (between the outlet of Lake Monomonac and the inlet of Whitney Pond) while the general public should limit consumption of all fish to two meals/month due to elevated mercury (MassDPH 2020).	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent data are available to assess the status of the Aesthetics Use for the North Branch Millers River, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent bacteria data are available to assess the status of the Primary Contact Recreational Use for the North Branch Millers River, so it is Not Assessed.	

Secondary Contact Recreation

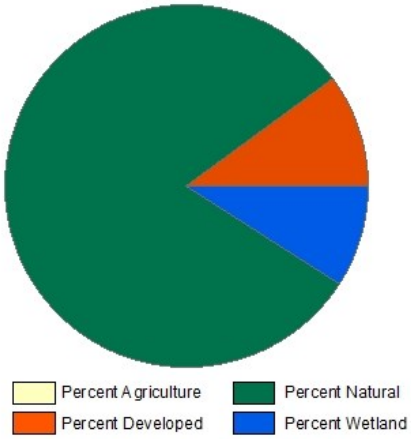
2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent bacteria data are available to assess the status of the Secondary Contact Recreational Use for the North Branch Millers River, so it is Not Assessed.	

North Pond Brook (MA35-23)

Location:	Headwaters, from northern outlet of Lake Mattawa, Orange to confluence with Millers River, Orange.
AU Type:	RIVER
AU Size:	2.1 MILES
Classification/Qualifier:	B

North Pond Brook - MA35-23

Watershed Area: 1.81 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.81	1.81	0.47	0.47
Agriculture	0.3%	0.3%	0.7%	0.7%
Developed	10.1%	10.1%	9.5%	9.5%
Natural	80.6%	80.6%	73.8%	73.8%
Wetland	9%	9%	16%	16%
Impervious Cover	3.9%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

MassDEP biologists sampled North Pond Brook ~ 1280 meters upstream of the onramp at Holtshire Road to Route 2 eastbound in Orange during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community (B0723) sample, collected in July 2011, had an IBI score of 67 (indicative of satisfactory conditions compared to the low gradient statewide index). Backpack electrofishing (Sample ID 4573) in August 2011 documented a sample that was well represented (42%) by multiple age classes of Eastern brook trout indicative of excellent habitat conditions. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2102) can be summarized as follows: minimum dissolved oxygen 6.2mg/L during three short term DO deploys, maximum temperature 21.6°C between June 1st and September 15th with 7DADMs never exceeding 20°C and a maximum 24-hour rolling average temperature of 18.9°C, pH was low (range from 5.9 to 6.0SU (n=6) with four of six measurements <6.0SU), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations 0.006mg/L, max diel DO shift 2.2mg/L, maximum saturation 96%, maximum pH 6.0SU, and no observations of any dense/very dense filamentous algae during six site visits). There were no toxicant issues (maximum total ammonia-nitrogen concentration was 0.02mg/L, chloride was 74mg/L (n=5), and there were no exceedances of any of clean metals or aluminum samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out).
The Aquatic Life Use for North Pond Brook will continue to be assessed as Fully Supporting based on the benthic macroinvertebrate, fish population, and water quality monitoring data collected by MassDEP during the summer of 2011. Dams and water withdrawals, however, were identified as Alerts during the 2016 reporting cycle so they are being carried forward since no cold water fish were collected by DFG biologists at two other sampling locations in the brook during August 2007 surveys (MassDEP Undated 7).

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4573	MassDEP	Fish Community	North Pond Brook	0.8mi US of Rt 2E on-ramp (Holtshire Rd). Access off filration plant access rd. DEP station MAP2-049, Orange	42.58178	-72.32696
B0723	MassDEP	Benthic	North Pond Brook/	[approximately 1280 meters upstream of the onramp - Holtshire Road to Route 2 eastbound, Orange, MA]	42.581789	-72.326963
W2202	MassDEP	Water Quality	North Pond Brook	[approximately 4200 feet upstream of the onramp - Holtshire Road to Route 2 eastbound, Orange]	42.581789	-72.326963

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0723	07/20/11	RBP multihab	Statewide_Low_Gradient	108	67	S

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	North Pond Brook -- 0.8mi US of Rt 2E on-ramp (Holtshire Rd). Access off filration plant access rd. DEP station MAP2-049, Orange (42.58178, 72.32696)		
Habitat Comments	DEP survey. Sand w/ ground water flow. Flow on one braid. Not sure what it is. Few add'l lampreys seen but not collected		
Efficiency	(Seconds Shocked - 1091)		
Sample Date	**Species**	2	
08/04/11	**Total Ind**	31	
Method	**% Dom**	58%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	1	42%
3522700	FD	0	0%
	MG	0	0%
	Tolerant	**Species**	**% Ind**
	I	1	42%
	M	1	58%
	T	0	0%
	SampleID	4573	

Common Name	**Fish Code**	**Count**	**Min Length**	**Max Length**	**Temp**	**FG**	**PT**	**Function**
Brook trout	EBT	13	61	175	C	FS	I	Top Carnivore
Sea Lamprey	SL	18	85	130	CW	0	M	Parasitic Filterer

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2202	2011	3	11	6.2	6.4	7.2	2.2	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2202	05/11/11	10/05/11	6	7	7.6	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2202	06/01/11	09/15/11	107	107	18.6	21.6	19.9	17.0	0	0	0	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2202	2011	3	12	17.5	20.5	18.9	16.5	0	0	0	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2202	06/01/11	09/15/11	107	5136	18.9	0	0	0
W2202	06/03/11	08/10/11	68	572	17.6	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2202	05/11/11	10/05/11	7	6	15.4	13.6	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2202	05/11/11	10/05/11	6	5.9	6	6	4

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2202	2011	5	0.005	0.009	0.006	2.2	1.8	96.2	6.0	6	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2202	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2202	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2202	07/06/11	0.3	0.7	0.3	0.35	0.0	0.8
W2202	07/28/11	0.3	0.5	0.2	0.23	0.0	0.8
W2202	09/01/11	0.3	0.6	0.2	0.26	0.0	0.9

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2202	2011	3	0.018	0.026	0.022	0.1	0.1	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2202	2011	5	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2202	2011	5	60	74	66	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2202	05/11/11	10/05/11	6	211	250	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in North Pond Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020) .

Until site-specific data are generated, the Fish Consumption Use for North Pond Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary
MassDEP staff conducted sampling in North Pond Brook upstream of the onramp at Holtshire Road to Route 2 eastbound in Orange (W2202) during the summer of 2011. There were no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded. The Aesthetics Use for North Pond Brook will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the site sampled in the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2202	MassDEP	Water Quality	North Pond Brook	[approximately 4200 feet upstream of the onramp - Holtshire Road to Route 2 eastbound, Orange]	42.581789	-72.326963

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2202	North Pond Brook	2011	6	MassDEP aesthetics observations for station W2202/MAP2-049 on North Pond Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2202	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2202	North Pond Brook	2011	Color	Light Yellow/Tan	2	6
W2202	North Pond Brook	2011	Color	None	4	6
W2202	North Pond Brook	2011	Objectionable Deposits	No	6	6
W2202	North Pond Brook	2011	Odor	None	6	6
W2202	North Pond Brook	2011	Scum	No	6	6
W2202	North Pond Brook	2011	Turbidity	None	5	6
W2202	North Pond Brook	2011	Turbidity	Slightly Turbid	1	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff collected E. coli bacteria samples from North Pond Brook ~4200 feet upstream of the onramp at Holtshire Road to Route 2 eastbound in Orange (W2202) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 23 cfu/100 ml. Since the E. coli concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for North Pond Brook is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2202	MassDEP	Water Quality	North Pond Brook	[approximately 4200 feet upstream of the onramp - Holtshire Road to Route 2 eastbound, Orange]	42.581789	-72.326963

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

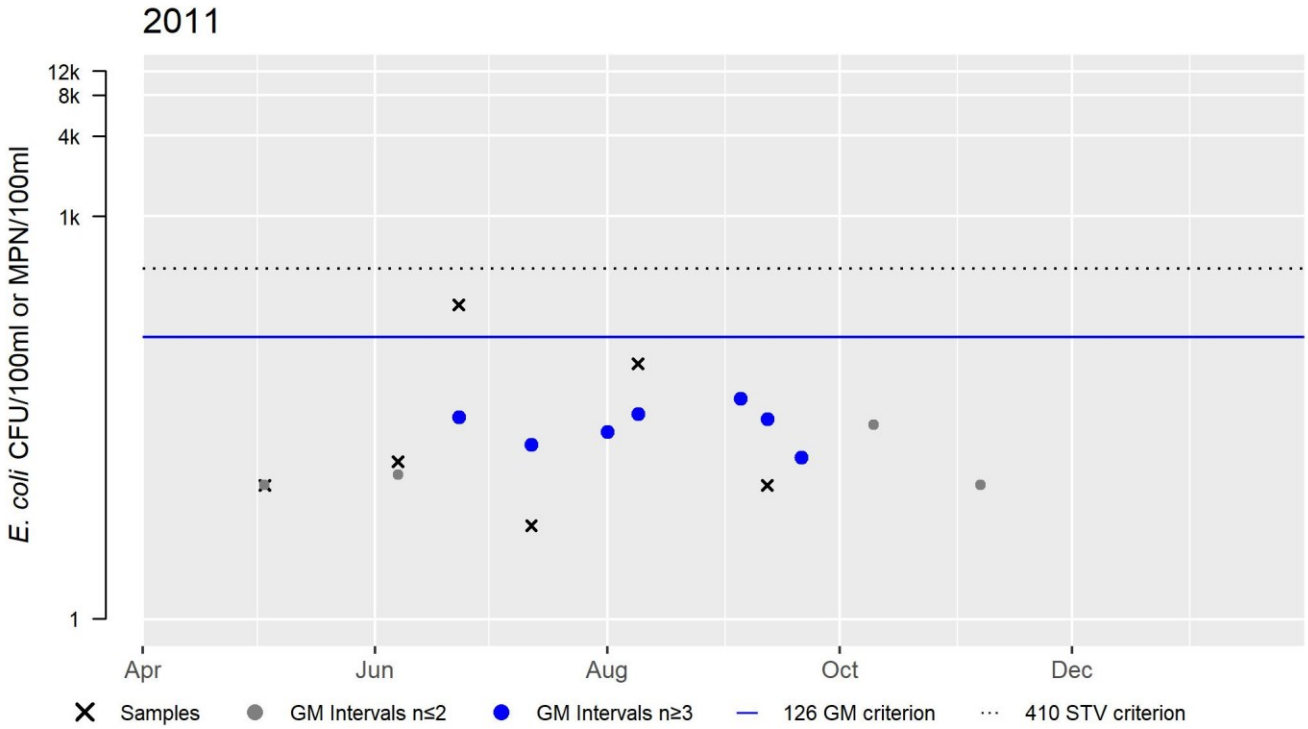
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2202	MassDEP	E. coli	05/03/11	09/12/11	6	5	220	23

W2202 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	23
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from North Pond Brook approximately 4200 feet upstream of the onramp at Holtshire Road to Route 2 eastbound in Orange (W2202) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals has GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 23cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for North Pond Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2202	MassDEP	Water Quality	North Pond Brook	[approximately 4200 feet upstream of the onramp - Holtshire Road to Route 2 eastbound, Orange]	42.581789	-72.326963

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

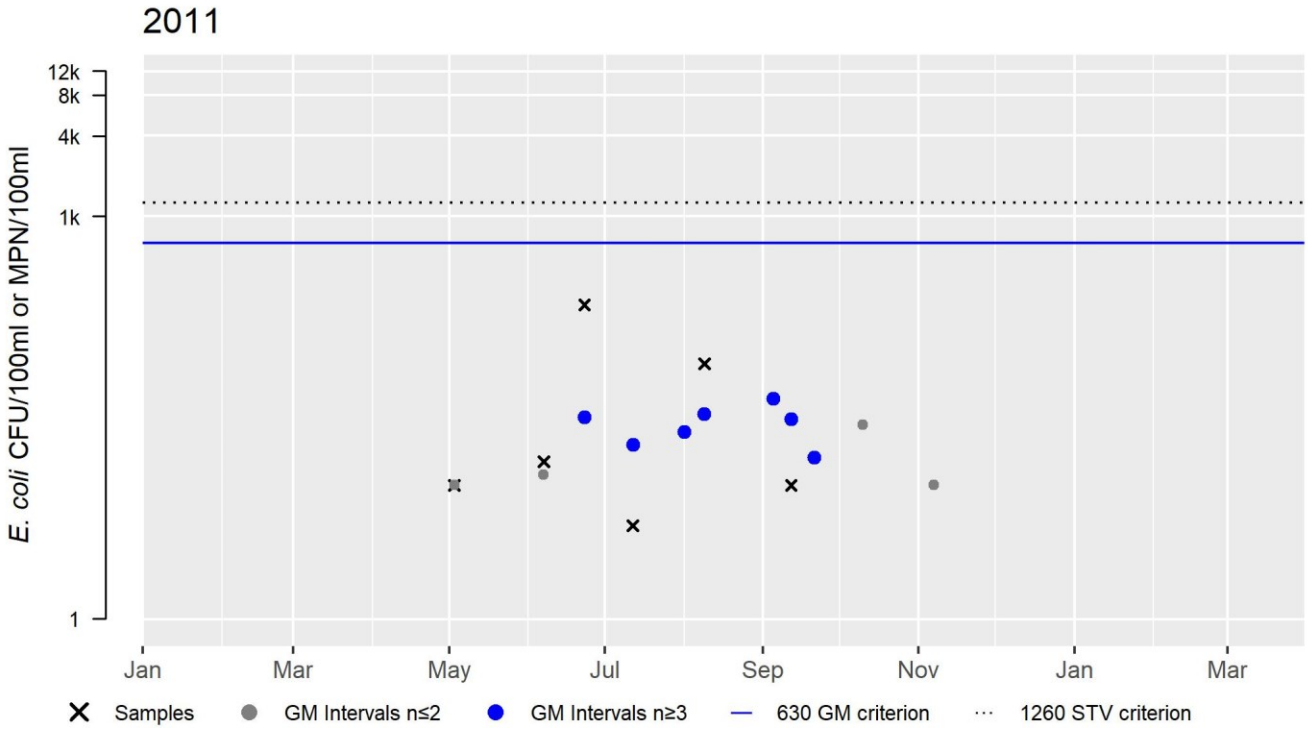
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2202	MassDEP	E. coli	05/03/11	09/12/11	6	5	220	23

W2202 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	23
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



North Spectacle Pond (MA35052)

Location:	New Salem.
AU Type:	FRESHWATER LAKE
AU Size:	43 ACRES
Classification/Qualifier:	B

No usable data were available for North Spectacle Pond (MA35052) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

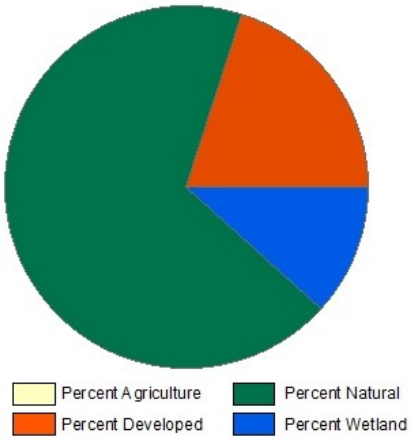
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Otter River (MA35-06)

Location:	Source, Hubbardston (north of Pitcherville Road) to Gardner WWTP, Gardner/Templeton.
AU Type:	RIVER
AU Size:	4.3 MILES
Classification/Qualifier:	B: AQL

Otter River - MA35-06

Watershed Area: 20.86 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	20.86	13.04	4.66	3.3
Agriculture	0.8%	0.7%	0.2%	0.3%
Developed	19.9%	25.2%	15.7%	18%
Natural	67.7%	62.1%	60.2%	57.8%
Wetland	11.6%	12%	23.9%	23.9%
Impervious Cover	9.5%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
5	5	Dissolved Oxygen		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Ambient Bioassays - Chronic Aquatic Toxicity	Source Unknown (N)	X				
Dissolved Oxygen	Source Unknown (N)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

No new/recent data are available so the Aquatic Life Use for this Otter River AU (MA35-06) will continue to be assessed as Not Supporting with the Ambient Bioassays-Chronic Aquatic Toxicity and Dissolved Oxygen impairments being carried forward (use attainment decision documented in 2016 IR cycle update (MassDEP 2017).

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in this Otter River AU (MA35-06), therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for this Otter River AU (MA35-06), so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Otter River AU (MA35-06) at Whitney Street in Templeton (MRWC_OHWW1) between June and August 2011 (n=6) and farther downstream at the Rt 2A crossing (MRWC_OR2A1) between June and September 2011, 2014, and 2015 (n=7 samples/year). Data analysis indicated 0% of the intervals had GMs >126 cfu/100ml, no samples exceeded the 410 cfu/100ml STV, and the seasonal GM was 43 cfu/100ml at the upstream sampling location MRWC_OHWW1. At the downstream station MRWC_OR2A1 data analysis of the multi-year low frequency dataset indicated only one of three years with GMs that exceeded>20% and only one year had one sample that exceeded the STV of 410cfu/100mls. The seasonal GMs were 115, 105, and 67cfu/100ml in 2011, 2014, and 2015, respectively. Since the *E. coli* concentrations were below the use attainment impairment thresholds for these single and multi-year low frequency datasets (2011 to 2015), the Primary Contact Recreational Use for this Otter River AU (MA35-06) is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
MRWC_OHWW1	Millers River Watershed Council	Water Quality	Otter River	Whitney St Templeton	42.54857	-72.0092
MRWC_OR2A1	Millers River Watershed Council	Water Quality	Otter River	Rt 2A crossing	42.564472	-72.011756

Bacteria Data

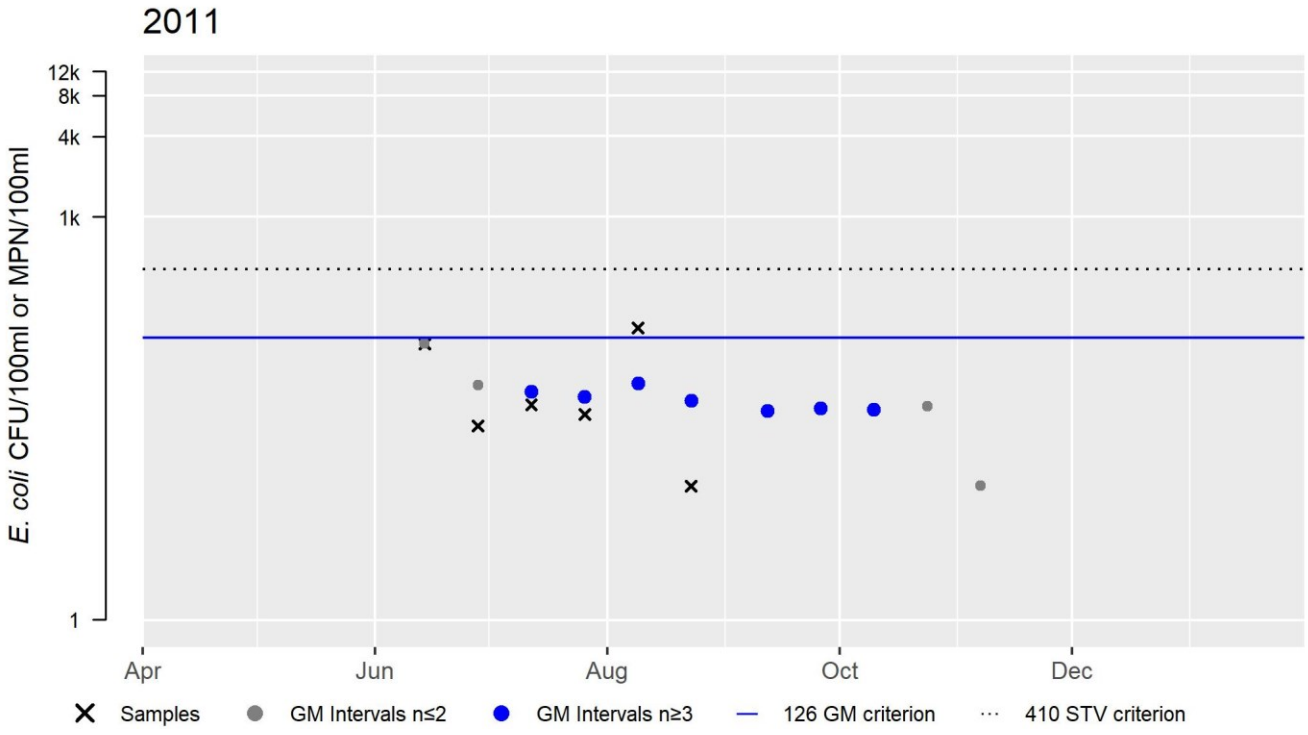
Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MRWC 2015)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
MRWC_OHWW1	Millers River Watershed Council	E. coli	06/14/11	08/23/11	6	10	150	43
MRWC_OR2A1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	34	580	115
MRWC_OR2A1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	70.8	235.9	105
MRWC_OR2A1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	47.3	99	67

MRWC_OHWW1 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	43
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_OR2A1 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

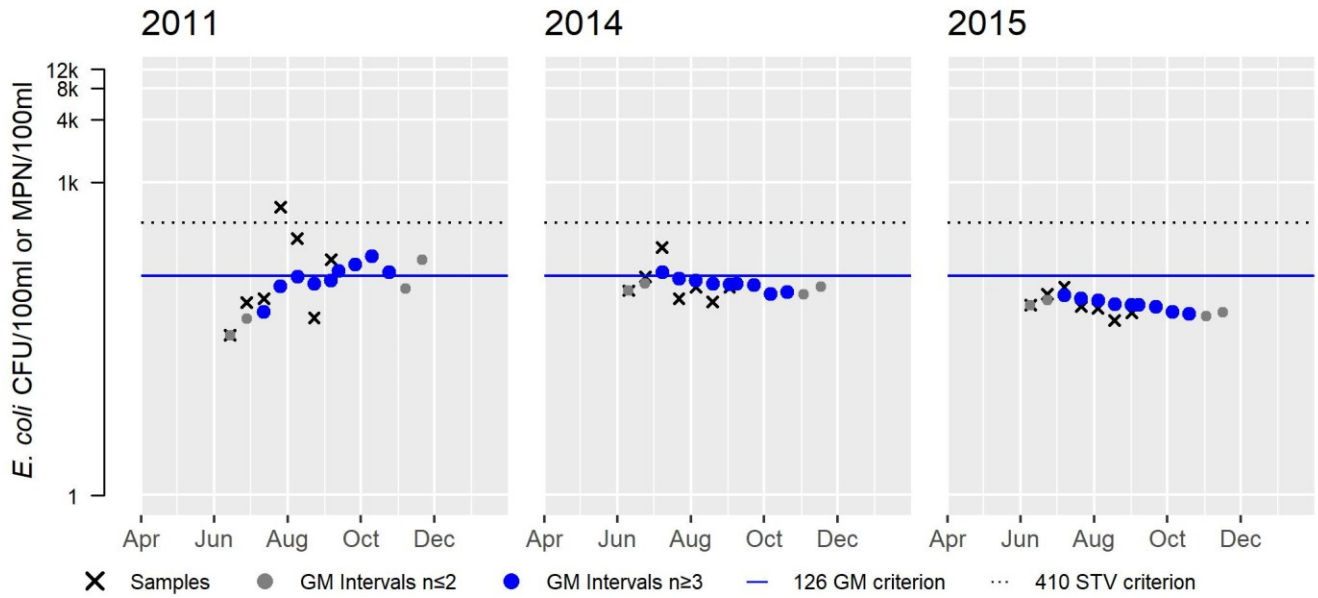
Var	Res
Samples	7
SeasGM	115
#GMI	9
#GMI Ex	4
%GMI Ex	44
n>STV	1
%n>STV	14

Var	Res
Samples	7
SeasGM	105
#GMI	9
#GMI Ex	1
%GMI Ex	11
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	67
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	19



Secondary Contact Recreation

2022 Use Attainment	**Alert**
Fully Supporting	NO

2022 Use Attainment Summary

Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Otter River AU (MA35-06) at Whitney Street in Templeton (MRWC_OHWW1) between June and August 2011 (n=6) and farther downstream at the Rt 2A crossing (MRWC_OR2A1) between June and September 2011, 2014, and 2015 (n=7 samples/year). Data analysis indicated 0% of the intervals had GMs >630 cfu/100ml, and no samples exceeded the 1260 cfu/100ml STV at either site in any year. The seasonal GM was 43 cfu/100ml at the upstream sampling location MRWC_OHWW1 and were 115, 105, and 67cfu/100ml in 2011, 2014, and 2015, respectively, at MRWC_OR2A1.
Since the *E. coli* concentrations were below the use attainment impairment thresholds for these single and multi-year low frequency datasets (2011 to 2015), the Secondary Contact Recreational Use for this Otter River AU (MA35-06) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
MRWC_OHWW1	Millers River Watershed Council	Water Quality	Otter River	Whitney St Templeton	42.54857	-72.0092
MRWC_OR2A1	Millers River Watershed Council	Water Quality	Otter River	Rt 2A crossing	42.564472	-72.011756

Bacteria Data

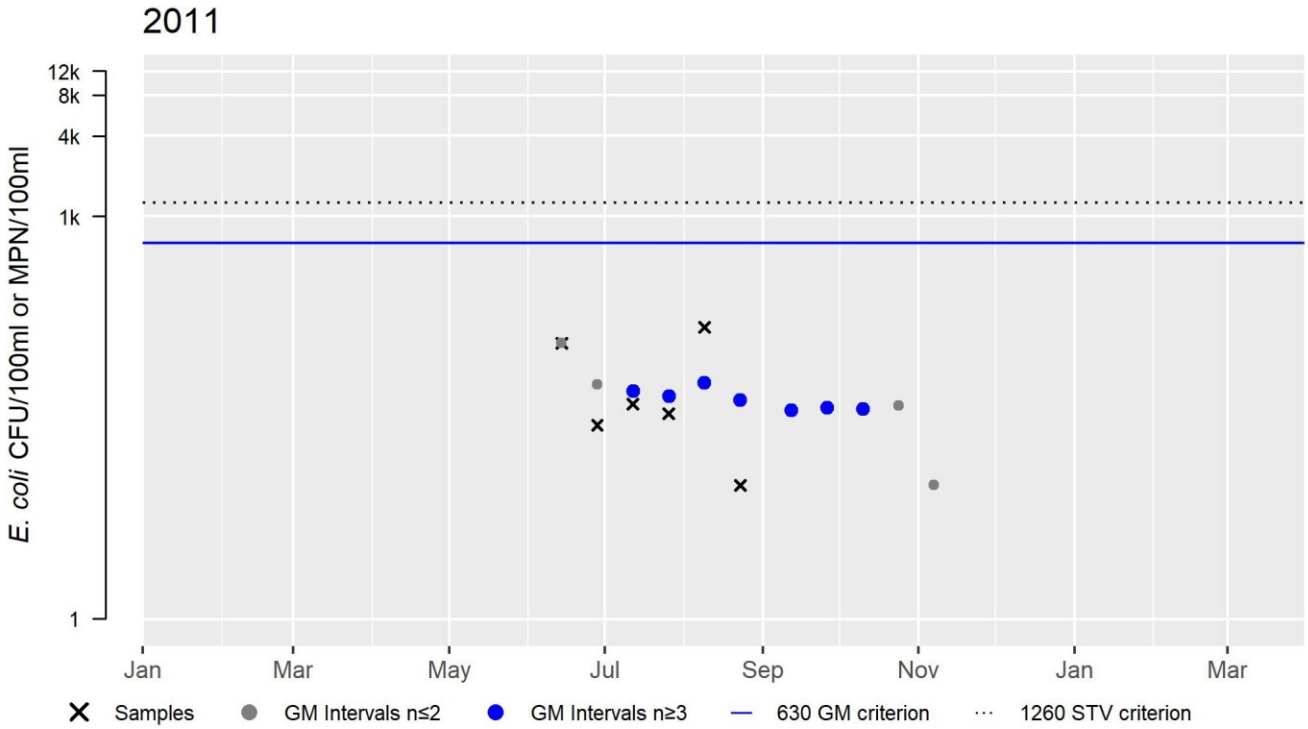
Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MRWC 2015)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
MRWC_OHWW1	Millers River Watershed Council	E. coli	06/14/11	08/23/11	6	10	150	43
MRWC_OR2A1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	34	580	115
MRWC_OR2A1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	70.8	235.9	105
MRWC_OR2A1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	47.3	99	67

MRWC_OHWW1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	43
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_OR2A1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

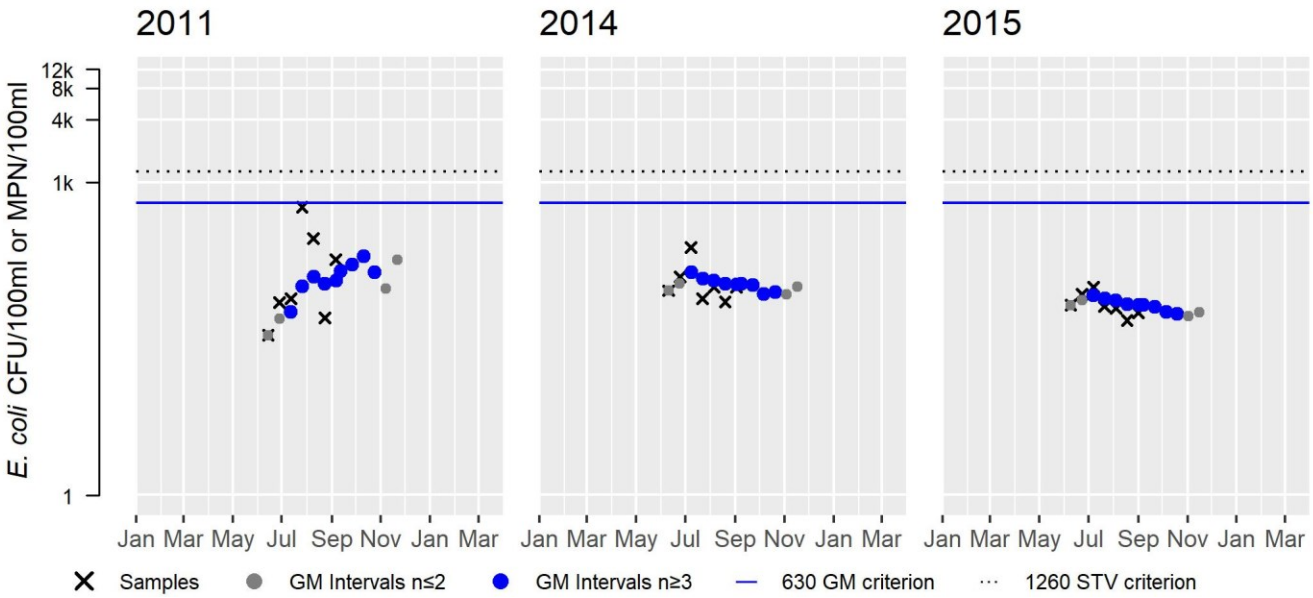
Var	Res
Samples	7
SeasGM	115
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	105
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	67
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0

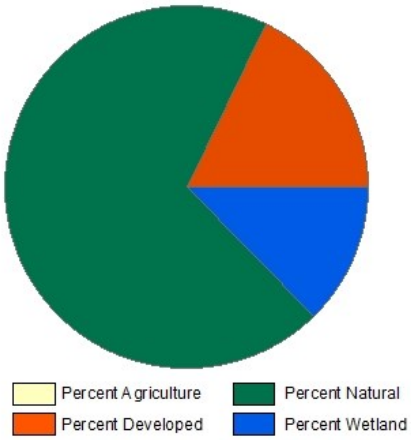


Otter River (MA35-07)

Location:	Gardner WWTP, Gardner/Templeton to Seaman Paper Dam, Templeton.
AU Type:	RIVER
AU Size:	4.4 MILES
Classification/Qualifier:	B: WWF

Otter River - MA35-07

Watershed Area: 37.88 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	37.88	12.47	9.65	3.57
Agriculture	0.9%	0.9%	0.3%	0.3%
Developed	17.6%	19.1%	13.1%	13.6%
Natural	69%	64.2%	63.8%	60.8%
Wetland	12.5%	15.9%	22.8%	25.3%
Impervious Cover	7.9%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
2	5	Escherichia Coli (E. Coli)		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Escherichia Coli (E. Coli)	Source Unknown (N)				X	

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff conducted discrete water quality sampling in this Otter River AU (MA35-07) at Turner Street in Templeton (near USGS flow gaging station #01163200 (W0691) as part of the SMART monitoring project between January 2011 and	

March 2013. The discrete water quality sampling data can be briefly summarized as follows: the minimum DO was 7.5mg/L (n=13 measurements), the maximum temperature was 23.3°C (n=13), pH ranged from 6.2 to 7.1SU, n=13), there were few indications of nutrient enrichment problems (seasonal average total phosphorus concentrations 0.063 in 2011 and 0.07mg/L in 2012, maximum saturation 102%, maximum pH 7.1SU, although there were four observations of dense/very dense filamentous algae of the five 2012 site visits whereas there were none noted in either 2011 or 2013 with 10 observations in total). The total ammonia nitrogen and chloride concentrations were not high (maximum TAN 0.43 and 96mg/L, respectively, n=13 for both analytes). MA DFG biologists also conducted backpack electrofishing in river downstream of Hamlet Mill Res. Crossing in Templeton in August 2017 (SampleID 6988). The sample in this low gradient reach was dominated (91%) by fluvial fish.
The Aquatic Life Use for this Otter River AU (MA35-07) will continue to be assessed as Fully Supporting based on the generally good water quality conditions documented in the river at Turner Street in Templeton between January 2011 and March 2013 and the dominance of fluvial fish in the river further downstream near Hamlet Mill Res. Crossing in August 2017.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6988	MassDFG	Fish Community	Otter River	Hamlet Mill Res. Crossing- DS, Templeton	42.59358	-72.04709
W0691	MassDEP	Water Quality	Otter River	[Turner Street, Templeton (near USGS flow gaging station #01163200)]	42.588125	-72.040995

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)
[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]
[Species List: B = Bluegill, BT = Brown Trout, CCS = Creek Chubsucker, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, LMB = Largemouth Bass, LND = Longnose Dace, P = Pumpkinseed, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
6988	08/31/17	BP	TP	L	12	397	0%	7	91%	1%	3	6%	Yes	No	B, BT, CCS, CP, CS, F, LMB, LND, P, TD, WS, YB,

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0691	01/25/11	11/15/11	6	7.8	10.3	0	0	0
W0691	02/21/12	10/23/12	5	7.5	9.9	0	0	0
W0691	01/29/13	03/25/13	2	12.5	12.7	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W0691	01/25/11	11/15/11	6	1	23.3	10.6	1	1	0	0
W0691	02/21/12	10/23/12	5	2	20.7	12.1	1	0	0	0
W0691	01/29/13	03/25/13	2	0	2.3	1.1	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W0691	01/25/11	11/15/11	6	6.2	7.1	3	0
W0691	02/21/12	10/23/12	5	6.5	7	0	0
W0691	01/29/13	03/25/13	2	6.5	6.5	0	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0691	2011	3	0.058	0.071	0.063	--	--	97.2	7.1	4	0
W0691	2012	2	0.069	0.070	0.070	--	--	101.5	7.0	5	4
W0691	2013	--	--	--	--	--	--	93.4	6.5	1	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W0691	2011	6	0.020	0.430	0.127	0	0
W0691	2012	5	0.020	0.050	0.036	0	0
W0691	2013	2	0.090	0.120	0.105	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0691	2011	6	40	96	72	0	0
W0691	2012	5	60	70	65	0	0
W0691	2013	2	82	83	83	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W0691	01/25/11	11/15/11	6	198	462	0	0	0	0	0	0
W0691	02/21/12	10/23/12	5	278	331	0	0	0	0	0	0
W0691	01/29/13	03/25/13	2	349	405	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No recent fish toxics sampling has been conducted in this Otter River AU (MA35-07), and since no site-specific advisory has been issued the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	
MassDEP staff surveyed this Otter River AU (MA35-07) at Turner Street in Templeton (near USGS flow gaging station #01163200 (W0691) as part of the SMART monitoring project between January 2011 and March 2013. There were generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) observed during most of the surveys although there were two observations each of very dense filamentous and film algae and a treated effluent odor. The Aesthetics Use of this Otter River AU (MA35-07) will continue to be assessed as Fully Supporting and the Alert for odor and filamentous algae will be carried forward.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0691	MassDEP	Water Quality	Otter River	[Turner Street, Templeton (near USGS flow gaging station #01163200)]	42.588125	-72.040995

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0691	Otter River	2011	6	The Aesthetics use for this Otter River AU (MA35-07) is assessed as Fully Supporting based on observations (generally no odors, deposits, growths, or turbidity) by MassDEP staff during field surveys at station W0691 in summer 2011 (n=6), 2012 (n=5), and 2013 (n=2). However, the Alerts for odor and filamentous algae are being carried forward due to observations of some objectionable conditions observed during 2012 (2 observations each of very dense filamentous and film algae, and 2 notations of a treated effluent odor).
W0691	Otter River	2012	5	The Aesthetics use for this Otter River AU (MA35-07) is assessed as Fully Supporting based on observations (generally no odors, deposits, growths, or turbidity) by MassDEP staff during field surveys at station W0691 in summer 2011 (n=6), 2012 (n=5), and 2013 (n=2). However, the Alerts for odor and filamentous algae are being carried forward due to observations of some objectionable conditions observed during 2012 (2 observations each of very dense filamentous and film algae, and 2 notations of a treated effluent odor).
W0691	Otter River	2013	2	The Aesthetics use for this Otter River AU (MA35-07) is assessed as Fully Supporting based on observations (generally no odors, deposits, growths, or turbidity) by MassDEP staff during field surveys at station W0691 in summer 2011 (n=6), 2012 (n=5), and 2013 (n=2). However, the Alerts for odor and filamentous algae are being carried forward due to observations of some objectionable conditions observed during 2012 (2 observations each of very dense filamentous and film algae, and 2 notations of a treated effluent odor).

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0691	2011	6	4	0
W0691	2012	5	5	4
W0691	2013	2	1	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0691	Otter River	2011	Color	Brownish	2	6
W0691	Otter River	2011	Color	None	1	6
W0691	Otter River	2011	Color	Reddish	3	6
W0691	Otter River	2011	Objectionable Deposits	No	1	6
W0691	Otter River	2011	Objectionable Deposits	Unobservable	3	6
W0691	Otter River	2011	Objectionable Deposits	Yes	2	6
W0691	Otter River	2011	Odor	Effluent (Treated)	1	6
W0691	Otter River	2011	Odor	Musty (Basement)	2	6
W0691	Otter River	2011	Odor	None	3	6

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0691	Otter River	2011	Scum	No	1	6
W0691	Otter River	2011	Scum	Yes	5	6
W0691	Otter River	2011	Turbidity	Moderately Turbid	1	6
W0691	Otter River	2011	Turbidity	None	3	6
W0691	Otter River	2011	Turbidity	Unobservable	2	6
W0691	Otter River	2012	Color	Reddish	4	5
W0691	Otter River	2012	Color	Rusty	1	5
W0691	Otter River	2012	Objectionable Deposits	No	1	5
W0691	Otter River	2012	Objectionable Deposits	Yes	4	5
W0691	Otter River	2012	Odor	Effluent (Treated)	2	5
W0691	Otter River	2012	Odor	Musty (Basement)	1	5
W0691	Otter River	2012	Odor	None	2	5
W0691	Otter River	2012	Scum	Yes	5	5
W0691	Otter River	2012	Turbidity	Moderately Turbid	1	5
W0691	Otter River	2012	Turbidity	None	2	5
W0691	Otter River	2012	Turbidity	Slightly Turbid	2	5
W0691	Otter River	2013	Color	Reddish	2	2
W0691	Otter River	2013	Objectionable Deposits	No	1	2
W0691	Otter River	2013	Objectionable Deposits	Unobservable	1	2
W0691	Otter River	2013	Odor	None	2	2
W0691	Otter River	2013	Scum	Yes	2	2
W0691	Otter River	2013	Turbidity	None	1	2
W0691	Otter River	2013	Turbidity	Unobservable	1	2

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	YES

2022 Use Attainment Summary

Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Otter River AU (MA35-07) at the Route 101 crossing near Plant Road (MRWC_OR101) between June and September 2011, June and September 2014, and June and September 2015 (n = 7 samples each year) and MassDEP staff collected *E. coli* samples farther downstream at Turner Street in Templeton (near USGS flow gaging station #01163200) (W0691) between May and September 2011 (n = 3) and April and October (n = 4). Data analysis of the moderate frequency MRWC multi-year dataset indicated that all three years had GMs intervals with >20% exceedance and the cumulative GM exceedance was 61% although only one year had two or more samples that exceeded the STV of 410cfu/100mls. The seasonal GMs were 198, 139, and 122cfu/100ml in 2011, 2014, and 2015, respectively. Too limited data were collected further downstream at Turner Street (W0691) to evaluate.

The Primary Contact Recreational Use for this Otter River AU (MA35-07) is assessed as Not Supporting since the *E. coli* concentrations in the river at the Route 101 crossing (MRWC_OR101) exceeded the use attainment impairment thresholds for the multi-year moderate frequency dataset. An *E. coli* impairment is being added and the Aesthetic Alert issues (odor and filamentous algae) are also being noted as they should also be applied to this use.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0691	MassDEP	Water Quality	Otter River	[Turner Street, Templeton (near USGS flow gaging station #01163200)]	42.588125	-72.040995
MRWC_OR101	Millers River Watershed Council	Water Quality	Otter River	Rt 101 crossing/plant rd	42.573881	-72.016231

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0691	MassDEP	E. coli	05/16/11	09/20/11	3	44	613	137
W0691	MassDEP	E. coli	04/10/12	10/23/12	4	10	77	31
MRWC_OR101	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	70	670	198
MRWC_OR101	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	66.3	517.2	139
MRWC_OR101	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	71.2	178.5	122

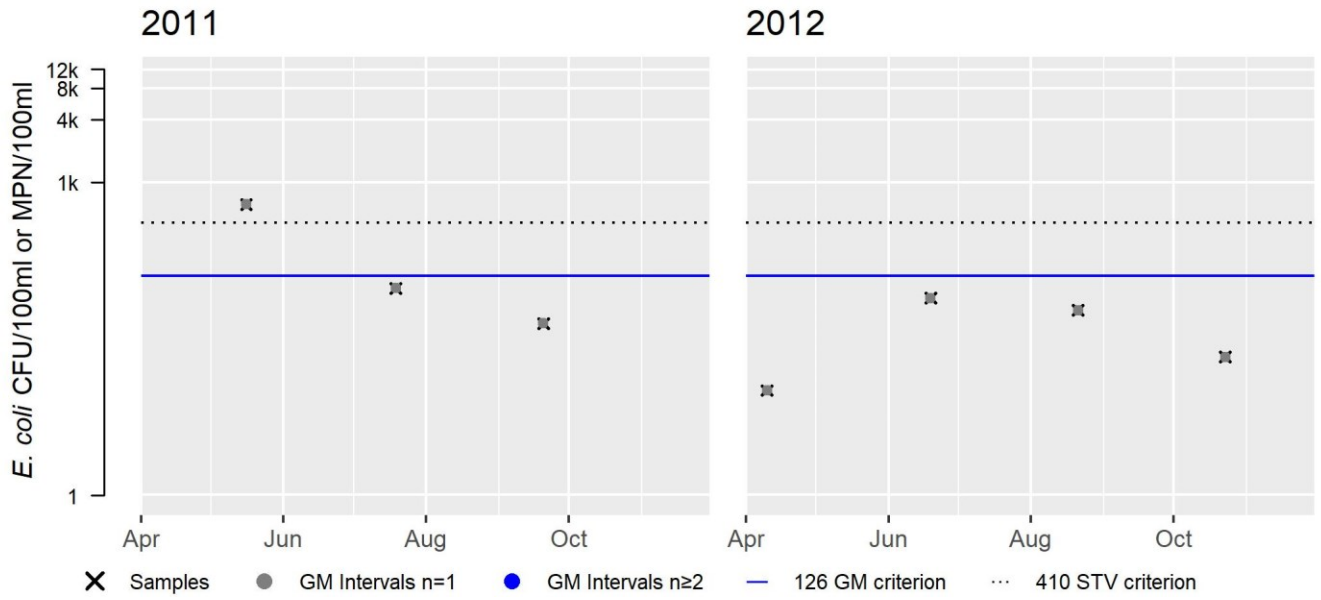
W0691 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	3
SeasGM	137
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	33

Var	Res
Samples	4
SeasGM	31
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



MRWC_OR101 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

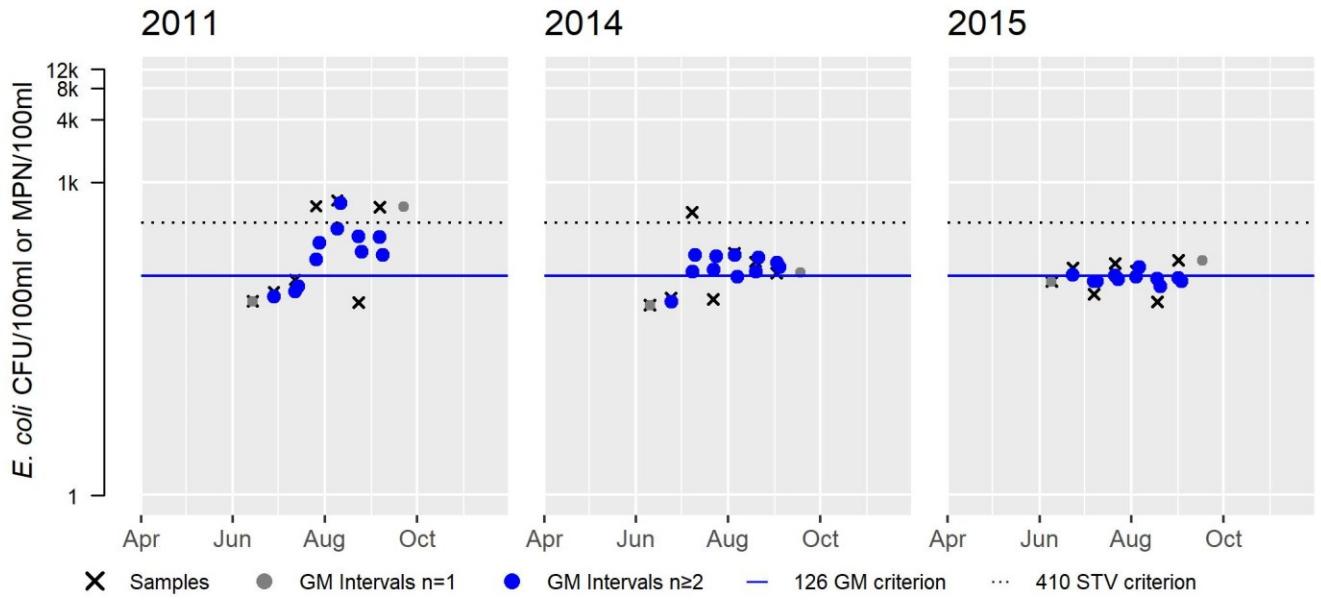
Var	Res
Samples	7
SeasGM	198
#GMI	11
#GMI Ex	8
%GMI Ex	73
n>STV	3
%n>STV	43

Var	Res
Samples	7
SeasGM	139
#GMI	11
#GMI Ex	9
%GMI Ex	82
n>STV	1
%n>STV	14

Var	Res
Samples	7
SeasGM	122
#GMI	11
#GMI Ex	3
%GMI Ex	27
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	61



Secondary Contact Recreation

2022 Use Attainment	**Alert**
Fully Supporting	YES
2022 Use Attainment Summary	

Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Otter River AU (MA35-07) at the Route 101 crossing near Plant Road (MRWC_OR101) between June and September 2011, June and September 2014, and June and September 2015 (n = 7 samples each year) and MassDEP staff collected *E. coli* samples farther downstream at Turner Street in Templeton (near USGS flow gaging station #01163200) (W0691) between January and November 2011 (n = 6), February and October 2012 (n = 5), and January and March 2013 (n = 2). Data analysis that none of the intervals had GMs >630 cfu/100 ml and no samples exceeded the 1260 cfu/100 ml STV except for one sample at site W0691 in 2011. The seasonal GMs were 198, 139, and 122cfu/100ml in 2011, 2014, and 2015, respectively. Too limited data were collected further downstream at Turner Street (W0691) to evaluate.
The Secondary Contact Recreational Use for this Otter River AU (MA35-07) is assessed as Fully Supporting since the *E. coli* concentrations in the river at the Route 101 crossing (MRWC_OR101) did not exceed the use attainment impairment thresholds for the multi-year moderate frequency dataset (2011, 2014, or 2015). The Aesthetic Alert issues (odor and filamentous algae) are being noted, however, as they should also be applied to this use.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0691	MassDEP	Water Quality	Otter River	[Turner Street, Templeton (near USGS flow gaging station #01163200)]	42.588125	-72.040995
MRWC_OR101	Millers River Watershed Council	Water Quality	Otter River	Rt 101 crossing/plant rd	42.573881	-72.016231

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0691	MassDEP	E. coli	01/25/11	11/15/11	6	44	2419.6	244
W0691	MassDEP	E. coli	02/21/12	10/23/12	5	10	77	31
W0691	MassDEP	E. coli	01/29/13	03/25/13	2	4	32	11
MRWC_OR101	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	70	670	198
MRWC_OR101	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	66.3	517.2	139
MRWC_OR101	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	71.2	178.5	122

W0691 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

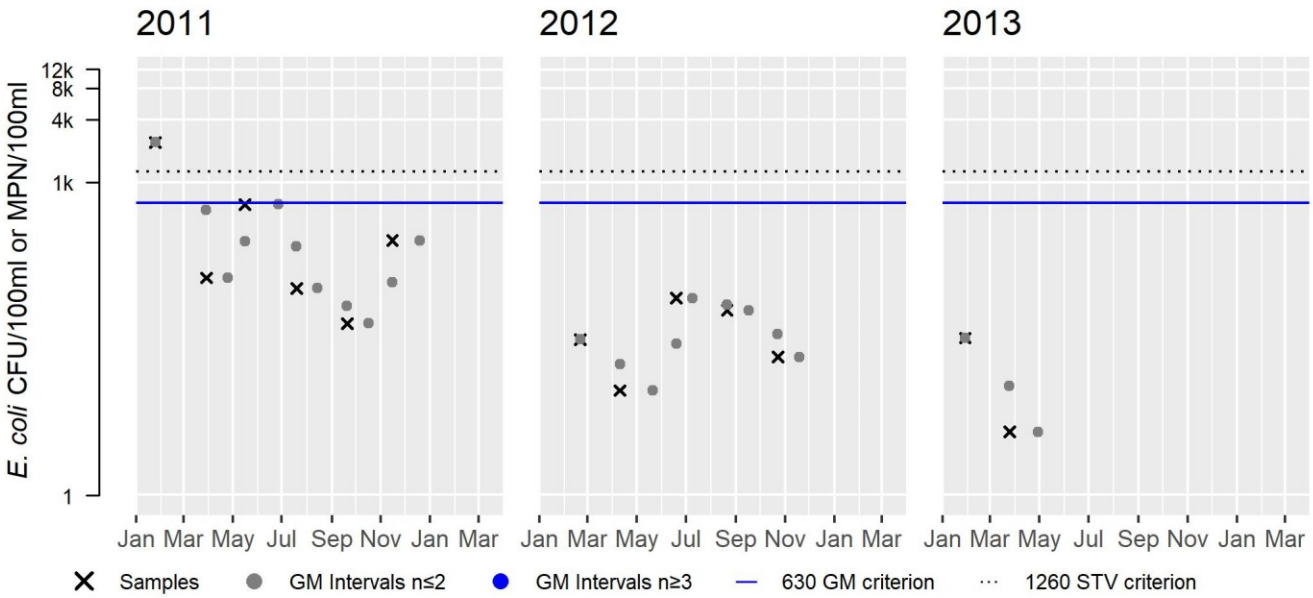
Var	Res
Samples	6
SeasGM	244
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	17

Var	Res
Samples	5
SeasGM	31
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	2
SeasGM	11
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



MRWC_OR101 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

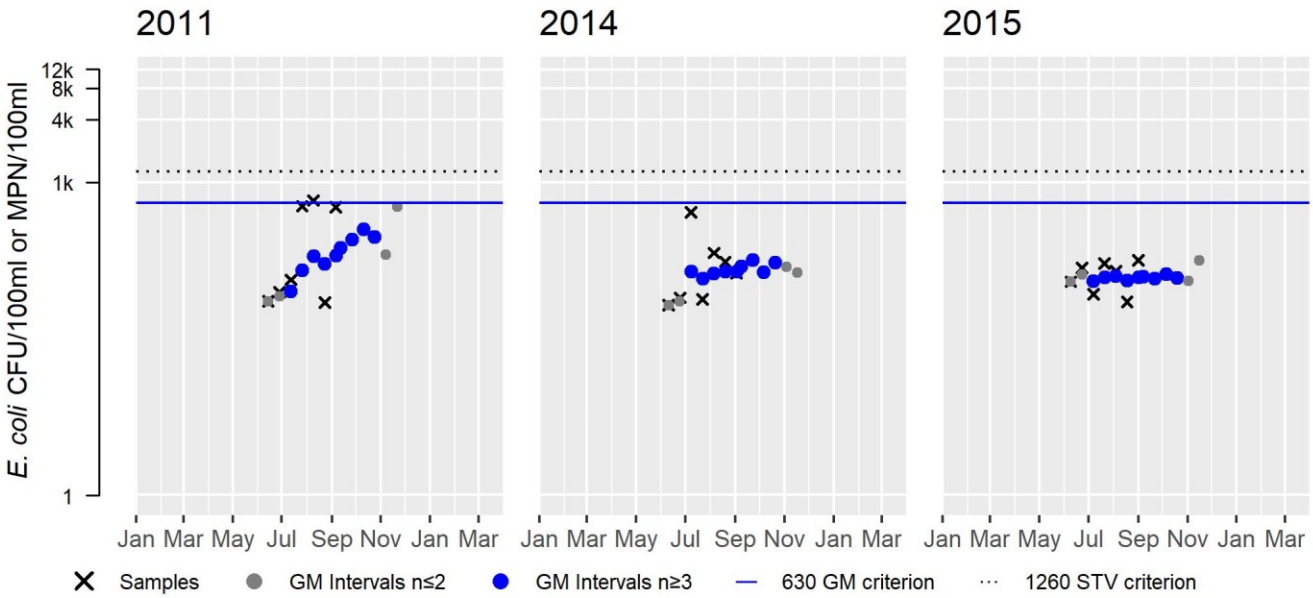
Var	Res
Samples	7
SeasGM	198
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	139
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	122
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0

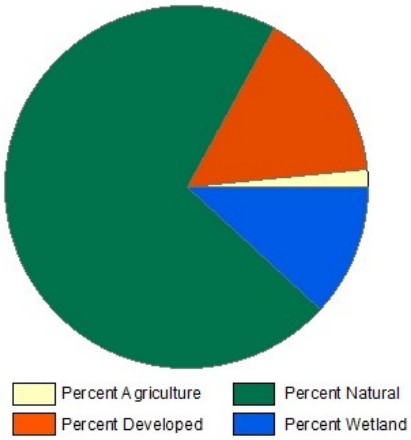


Otter River (MA35-08)

Location:	Seaman Paper Dam, Templeton to confluence with Millers River, Winchendon.
AU Type:	RIVER
AU Size:	5.5 MILES
Classification/Qualifier:	B: WWF

Otter River - MA35-08

Watershed Area: 61.62 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	61.62	12.59	14.73	2.87
Agriculture	1.6%	3.3%	0.6%	1.4%
Developed	15.4%	9.6%	11.4%	5.4%
Natural	71.1%	75.9%	64.8%	66.7%
Wetland	11.8%	11.2%	23.2%	26.4%
Impervious Cover	6.4%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added
5	5	Escherichia Coli (E. Coli)		Added
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Curly-leaf Pondweed*)	Introduction of Non-native Organisms (Accidental or Intentional) (N)	X				
Escherichia Coli (E. Coli)	Source Unknown (N)				X	
PCBs in Fish Tissue	Contaminated Sediments (Y)	X	X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)	X	X			

Recommendations

2022 Recommendations
REC: Conduct additional *E. coli* bacteria sampling in this Otter River AU (MA35-08) particularly at Route 202 bridge (W0047 and MRWC_OBW1) since concentrations fluctuate (an *E. coli* impairment added 2022 IR cycle after being delisted in 2016 IR cycle.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
MA DFG biologists conducted backpack electrofishing in a low gradient reach of this Otter River AU (MA35-08) upstream of the Route 202 crossing in August 2017 (SampleID 6989). The sample was dominated by fluvial fish (83%). MassDEP staff identified an infestation of the non-native aquatic macrophyte, curly-leaf pondweed (*Potamogeton crispus*), in the Otter River near the abandoned RR bridge in Winchendon (~ 0.2 miles upstream from confluence with Millers River) (W0045) in 2011. Although limited recent data are available, the Aquatic Life Use for this Otter River AU (MA35-08) will continue to be assessed as Not Supporting with the PCB in Fish Tissue impairment (historical whole fish study data (Kennedy and Rojko 2004)) being carried forward. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River. An impairment for Curly-leaf Pondweed (*P. crispus*) is also being added.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6989	MassDFG	Fish Community	Otter River	RTE 202 xing - US, Templeton	42.60628	-72.07458
W0045	MassDEP	Water Quality	Otter River	[abandoned RR bridge (approximatley 0.2 miles upstream from confluence with Millers River), Winchendon]	42.633838	-72.094246

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]

[Species List: B = Bluegill, BT = Brown Trout, CCS = Creek Chubsucker, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, GS = Golden Shiner, LMB = Largemouth Bass, LND = Longnose Dace, P = Pumpkinseed, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
6989	08/31/17	BP	TP	L	13	316	0%	7	83%	2%	3	3%	Yes	No	B, BT, CCS, CP, CS, F, GS, LMB, LND, P, TD, WS, YB,

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP Undated 1)

Summary Statement
MassDEP staff identified an infestation of the non-native aquatic macrophyte, curly-leaf pondweed (*Potamogeton crispus*), in the Otter River in the vicinity of water quality station W0045 in 2011.

Physico-chemical Water Quality Information

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0045	2011	--	--	--	--	--	--	--	--	1	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for this Otter River AU (MA35-08) will continue to be assessed as Not Supporting with the PCB in Fish Tissue impairment being carried forward. MA DPH advises Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Otter River (between the Seaman Paper Dam in Templeton and the confluence with the Millers River in Winchendon) while the general public should not eat brown bullhead or white sucker and limit other species to 2 meals/month due to elevated PCBs (MassDPH 2021).	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff conducted very limited sampling at two sites in this Otter River AU (MA35-08) during the summer of 2011 downstream of Route 202 bridge in Templeton (W0047) and farther downstream near the abandoned RR bridge (~0.2 miles upstream from confluence with Millers River) in Winchendon (W0045). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at either of these two sampling sites.
The Aesthetics Use for this Otter River AU (MA35-08) will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the two sites sampled in the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0045	MassDEP	Water Quality	Otter River	[abandoned RR bridge (approximatley 0.2 miles upstream from confluence with Millers River), Winchendon]	42.633838	-72.094246
W0047	MassDEP	Water Quality	Otter River	[immediately downstream of Route 202 bridge, Templeton]	42.606609	-72.075803

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0045	Otter River	2011	6	MassDEP aesthetics observations for station W0045 on Otter River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0047	Otter River	2011	6	MassDEP aesthetics observations for station W0047 on Otter River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0045	2011	6	1	0
W0047	2011	6	0	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0045	Otter River	2011	Color	Dark Tan	1	6
W0045	Otter River	2011	Color	Light Yellow/Tan	4	6
W0045	Otter River	2011	Color	NR	1	6
W0045	Otter River	2011	Objectionable Deposits	No	5	6
W0045	Otter River	2011	Objectionable Deposits	Unobservable	1	6

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0045	Otter River	2011	Odor	Musty (Basement)	1	6
W0045	Otter River	2011	Odor	None	5	6
W0045	Otter River	2011	Scum	No	6	6
W0045	Otter River	2011	Turbidity	None	2	6
W0045	Otter River	2011	Turbidity	Slightly Turbid	2	6
W0045	Otter River	2011	Turbidity	Unobservable	2	6
W0047	Otter River	2011	Color	Dark Tan	1	6
W0047	Otter River	2011	Color	Light Yellow/Tan	5	6
W0047	Otter River	2011	Objectionable Deposits	No	3	6
W0047	Otter River	2011	Objectionable Deposits	Unobservable	2	6
W0047	Otter River	2011	Objectionable Deposits	Yes	1	6
W0047	Otter River	2011	Odor	Effluent (Treated)	1	6
W0047	Otter River	2011	Odor	Musty (Basement)	2	6
W0047	Otter River	2011	Odor	None	3	6
W0047	Otter River	2011	Scum	No	3	6
W0047	Otter River	2011	Scum	Unobservable	1	6
W0047	Otter River	2011	Scum	Yes	2	6
W0047	Otter River	2011	Turbidity	Moderately Turbid	1	6
W0047	Otter River	2011	Turbidity	None	3	6
W0047	Otter River	2011	Turbidity	Slightly Turbid	2	6

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Millers River Watershed Council (MRWC) staff/volunteers collected *E. coli* bacteria samples from this Otter River AU (MA35-08) at Route 202 in Baldwinville/Templeton (MRWC_OBW1) between June and September 2011, June and September 2014, and June and September (n = 7samples each year) while MassDEP staff also sampled immediately downstream of the Route 202 bridge (W0047) between May and September 2011 (n = 6) as well as at the abandoned RR bridge (~0.2 miles upstream from confluence with Millers River) in Winchendon (W0045) between May and September 2011 (n = 6). Data analysis indicated that when the MassDEP and MRWC data were combined for the Route 202 sampling location (W0047 and MRWC_OBW1) the % GM interval exceedances of the moderate frequency multi-year dataset were 47, 27, and 18% in 2011, 2014, 2015, respectively with a cumulative GM interval exceedance of 34% and only one year had 2 samples exceed the 410 cfu/100 ml STV. None of the intervals near the mouth of the river (W0045) in 2011 (low frequency dataset) had GMs > 126 cfu/100 ml, and none of the samples at that site exceeded the 410 cfu/100 ml STV either. The seasonal GMs were 126, 101, and 108 cfu/100 ml for the combined (W0047 and MRWC_OBW1) sampling location in 2011, 2014, and 2015, respectively, and 88 cfu/100 ml at W0045.
Since the *E. coli* concentrations exceeded the use attainment impairment thresholds in the Otter River at the Route 202 bridge (multi-year moderate frequency dataset), the Primary Contact Recreational Use for this Otter River AU (MA35-08) is assessed as Not Supporting even though the downstream sampling location near the mouth of the river did not have any bacteria exceedances. An *E. coli* impairment is being added.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0045	MassDEP	Water Quality	Otter River	[abandoned RR bridge (approximatley 0.2 miles upstream from confluence with Millers River), Winchendon]	42.633838	-72.094246
W0047	MassDEP	Water Quality	Otter River	[immediately downstream of Route 202 bridge, Templeton]	42.606609	-72.075803
MRWC_OBW1	Millers River Watershed Council	Water Quality	Otter River	Baldwinville rt 202	42.606531	-72.075094

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

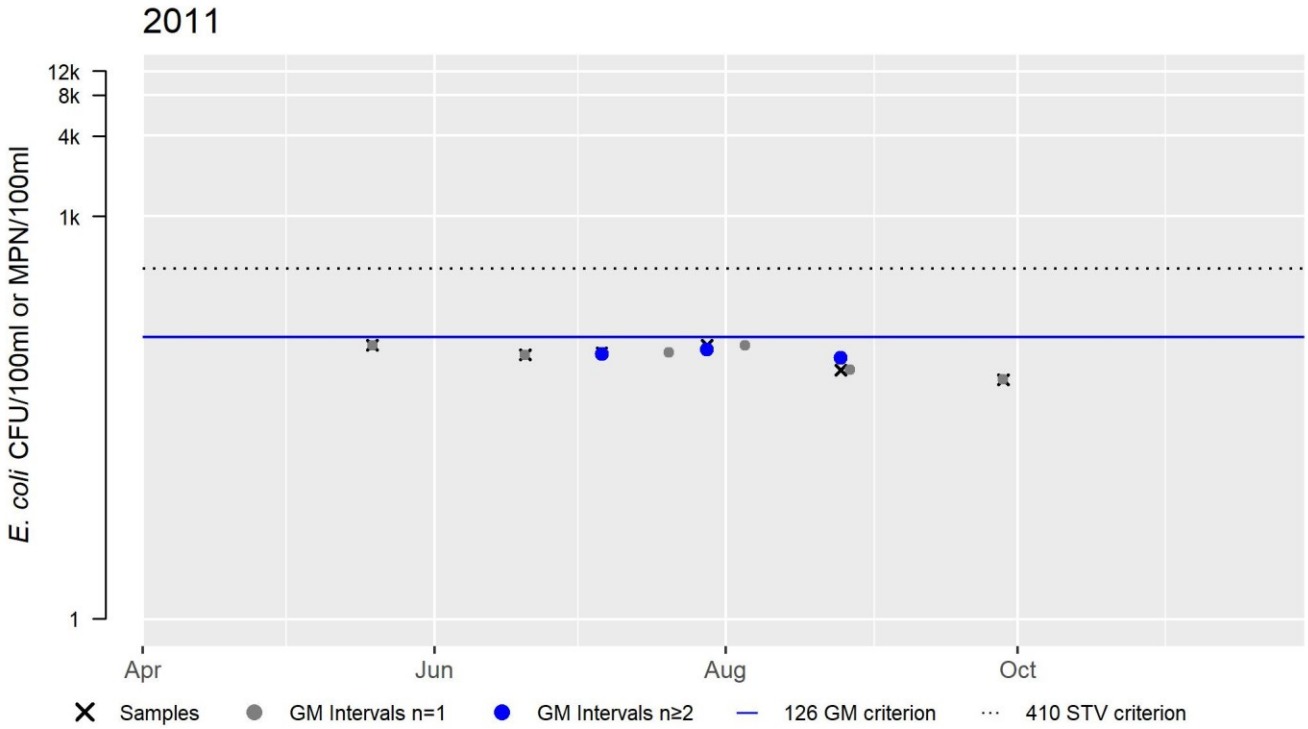
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0045	MassDEP	E. coli	05/19/11	09/28/11	6	61	110	88
W0047	MassDEP	E. coli	05/19/11	09/28/11	6	43	110	65
MRWC_OBW1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	64	1400	219
MRWC_OBW1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	58.3	290.9	101
MRWC_OBW1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	72.2	201.4	108

W0045 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	88
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

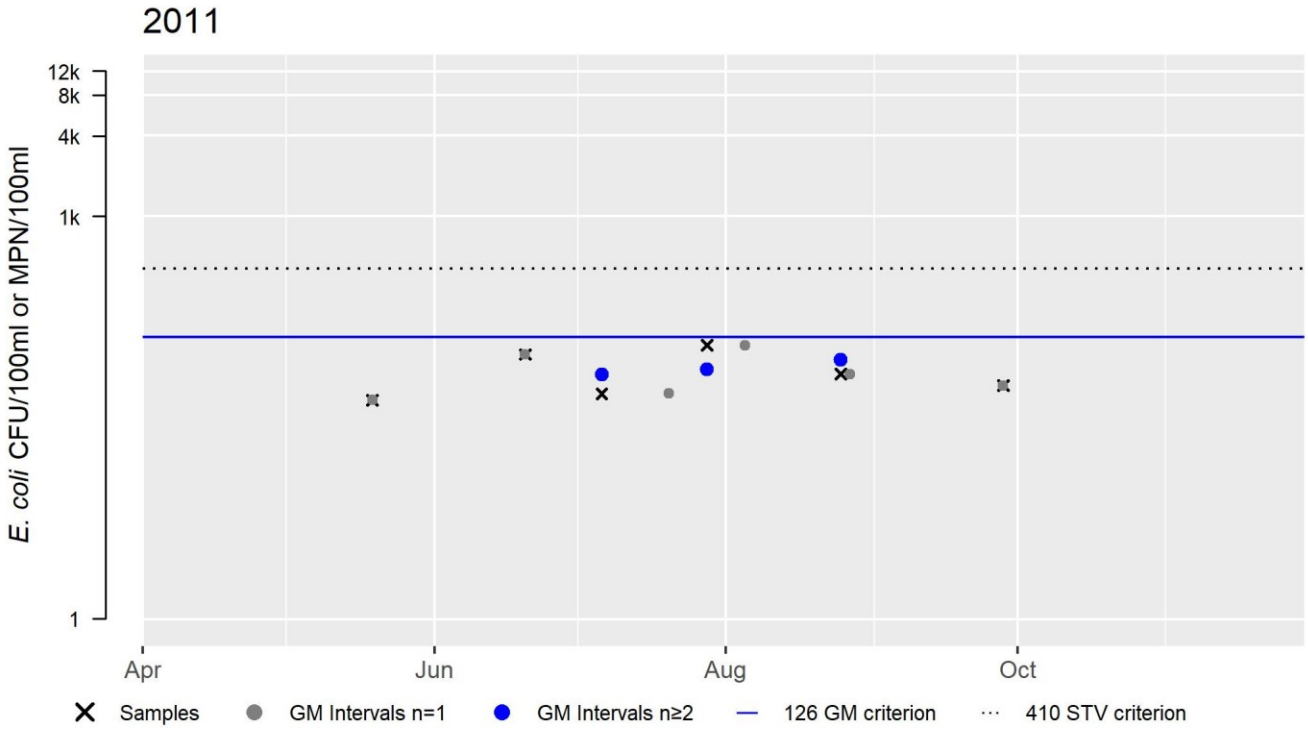
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W0047 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	65
#GMI	3
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_OBW1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

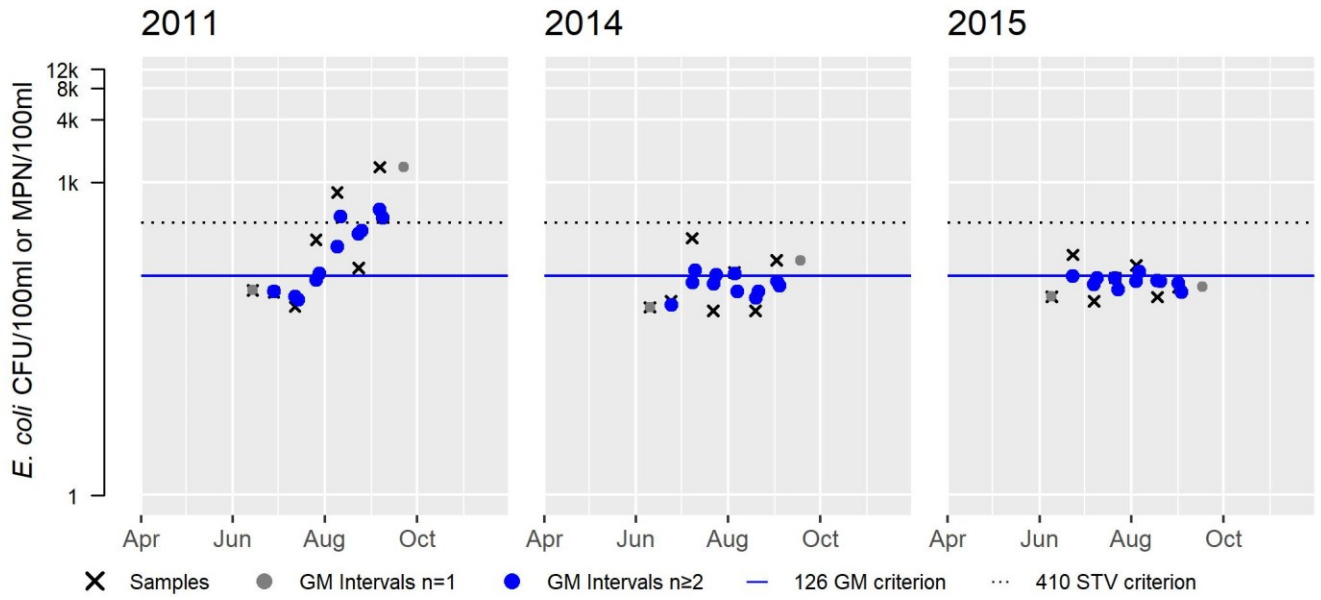
Var	Res
Samples	7
SeasGM	219
#GMI	11
#GMI Ex	7
%GMI Ex	64
n>STV	2
%n>STV	29

Var	Res
Samples	7
SeasGM	101
#GMI	11
#GMI Ex	3
%GMI Ex	27
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	108
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	36



W0047 and MRWC_OBW1 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

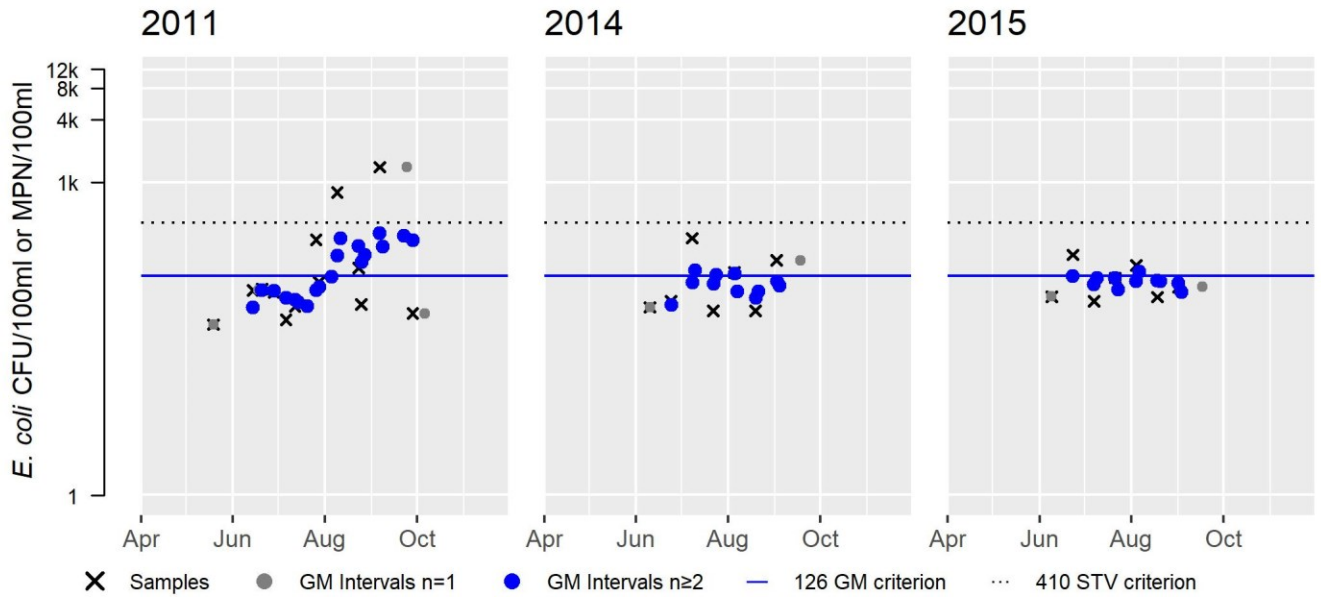
Var	Res
Samples	13
SeasGM	126
#GMI	19
#GMI Ex	9
%GMI Ex	47
n>STV	2
%n>STV	15

Var	Res
Samples	7
SeasGM	101
#GMI	11
#GMI Ex	3
%GMI Ex	27
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	108
#GMI	11
#GMI Ex	2
%GMI Ex	18
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	34



Secondary Contact Recreation

2022 Use Attainment	**Alert**
Fully Supporting	NO
2022 Use Attainment Summary	
Millers River Watershed Council (MRWC) staff/volunteers collected E. coli bacteria samples from this Otter River AU (MA35-08) at Route 202 in Baldwinville/Templeton (MRWC_OBW1) between June and September 2011, June and September 2014, and June and September (n = 7samples each year) while MassDEP staff also sampled immediately downstream of the Route 202 bridge (W0047) between May and September 2011 (n = 6) as well as at the abandoned RR bridge (~0.2 miles upstream from confluence with Millers River) in Winchendon (W0045) between May and September 2011 (n = 6). Data analysis indicated that none of the intervals had GM's > 630 cfu/100 ml and no samples exceeded the 1260 cfu/100 ml STV except for one sample in 2011 at site MRWC_OBW1. The seasonal GM's were 219, 101, and 108 cfu/100 ml (2011, 2014, and 2015, respectively) at MRWC_OBW1, 65 cfu/100 ml at W0047, and 88 cfu/100 ml at W0045. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for either the multi-year moderate frequency or single year low frequency datasets, the Secondary Contact Recreational Use for this Otter River AU (MA35-08) is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0045	MassDEP	Water Quality	Otter River	[abandoned RR bridge (approximatley 0.2 miles upstream from confluence with Millers River), Winchendon]	42.633838	-72.094246
W0047	MassDEP	Water Quality	Otter River	[immediately downstream of Route 202 bridge, Templeton]	42.606609	-72.075803
MRWC_OBW1	Millers River Watershed Council	Water Quality	Otter River	Baldwinville rt 202	42.606531	-72.075094

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6) (MRWC 2015)

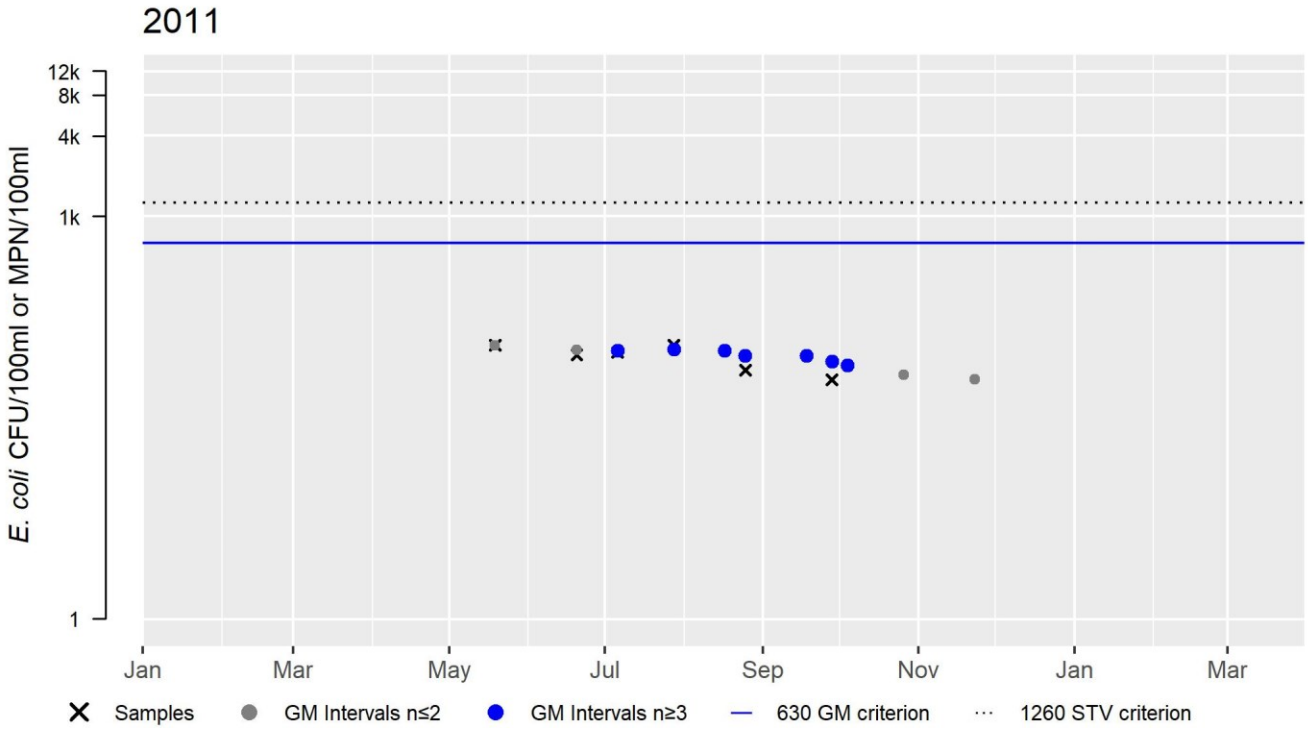
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0045	MassDEP	E. coli	05/19/11	09/28/11	6	61	110	88
W0047	MassDEP	E. coli	05/19/11	09/28/11	6	43	110	65
MRWC_OBW1	Millers River Watershed Council	E. coli	06/14/11	09/06/11	7	64	1400	219
MRWC_OBW1	Millers River Watershed Council	E. coli	06/10/14	09/02/14	7	58.3	290.9	101
MRWC_OBW1	Millers River Watershed Council	E. coli	06/09/15	09/01/15	7	72.2	201.4	108

W0045 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	88
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

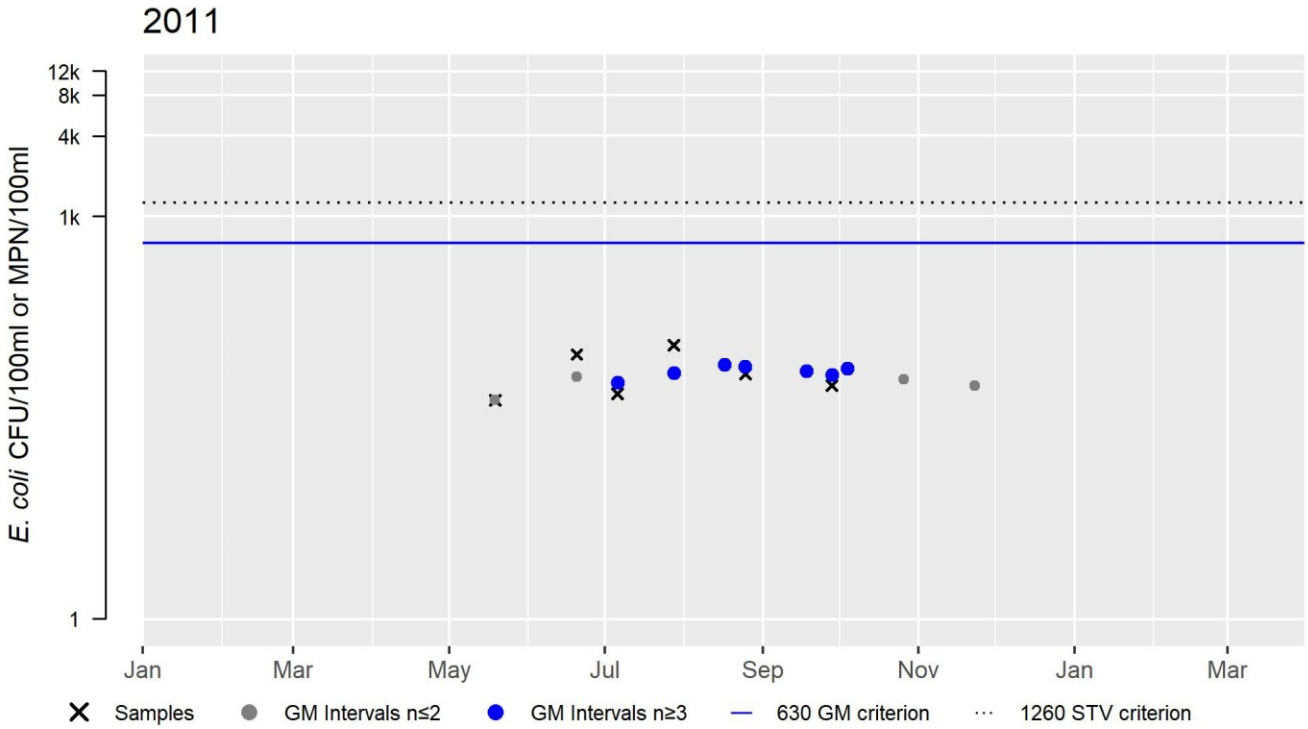
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W0047 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	65
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



MRWC_OBW1 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

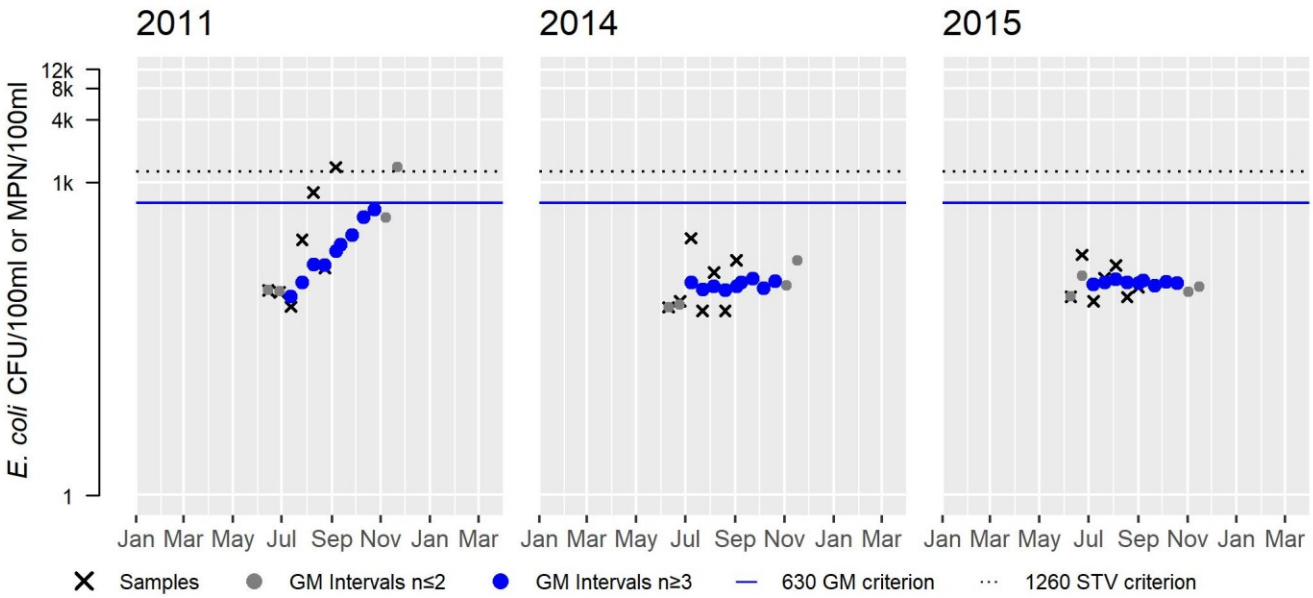
Var	Res
Samples	7
SeasGM	219
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	14

Var	Res
Samples	7
SeasGM	101
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	7
SeasGM	108
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



Packard Pond (MA35053)

Location:	Orange.
AU Type:	FRESHWATER LAKE
AU Size:	43 ACRES
Classification/Qualifier:	B

No usable data were available for Packard Pond (MA35053) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Parker Pond (MA35056)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	32 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	(Aquatic Plants (Macrophytes)*)		Unchanged
4a	4a	(Fanwort*)		Added
4a	4a	(Non-Native Aquatic Plants*)		Removed
4a	4a	Nutrient/Eutrophication Biological Indicators	4134	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Discharges from Municipal Separate Storm Sewer Systems (MS4) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Nutrient/Eutrophication Biological Indicators	Agriculture (Y)			X	X	X
Nutrient/Eutrophication Biological Indicators	Discharges from Municipal Separate Storm Sewer Systems (MS4) (Y)			X	X	X
Nutrient/Eutrophication Biological Indicators	Rural (Residential Areas) (Y)			X	X	X

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Non-Native Aquatic Plants	Clarification of listing cause	The generic "Non-Native Aquatic Plants" is not needed since the specific macrophyte Fanwort (*Cabomba caroliniana*), has been utilized.

Non-Native Aquatic Plants

The generic "Non-Native Aquatic Plants" impairment is being removed since the specific macrophyte Fanwort (*Cabomba caroliniana*) impairment is being added.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in Parker Pond during an August 1995 synoptic survey. The Aquatic Life Use for Parker Pond will continue to be assessed as Not Supporting. The generic Non-Native Aquatic Plants impairment is being removed since the Fanwort (*C. caroliniana*) is being added.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995)

Summary Statement
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in Parker Pond during an August 1995 synoptic survey.

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Parker Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No recent data are available to evaluate the status of the Aesthetics Use for Parker Pond so it will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) and Nutrient/Eutrophication Biological Indicators impairments being carried forward.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No recent data are available to evaluate the status of the Primary Contact Recreational Use for Parker Pond so it will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) and Nutrient/Eutrophication Biological Indicators impairments being carried forward.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

No recent data are available to evaluate the status of the Secondary Contact Recreational Use for Parker Pond so it will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) and Nutrient/Eutrophication Biological Indicators impairments being carried forward.

Partridgeville Pond (MA35057)

Location:	Templeton.
AU Type:	FRESHWATER LAKE
AU Size:	38 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	4c	(Non-Native Aquatic Plants*)		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
MA DCR Lakes and Ponds staff observed an infestation of the non-native aquatic macrophyte, variable milfoil (*Myriophyllum heterophyllum*), in Partridgeville Pond during a survey in 2007. The Aquatic Life Use for Partridgeville Pond is assessed as Not Supporting because of the infestation of the non-native aquatic macrophyte *M. heterophyllum*. The generic the Non-Native Aquatic Plants impairment is being added.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDCR 2008)

Summary Statement
MassDCR Lakes and Ponds staff observed an infestation of the non-native aquatic macrophyte, variable milfoil (*Myriophyllum heterophyllum*), in Partridgeville Pond during a survey in 2007.

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	

No fish toxics sampling has been conducted in Partridgeville Pond, therefore the Fish Consumption Use is Not Assessed.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Partridgeville Pond, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Primary Contact Recreational Use for Partridgeville Pond, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Secondary Contact Recreational Use for Partridgeville Pond, so it is Not Assessed.	

Perley Brook Reservoir (MA35059)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	55 ACRES
Classification/Qualifier:	A: PWS, ORW

No usable data were available for Perley Brook Reservoir (MA35059) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Phillipston Reservoir (MA35060)

Location:	Philipston/Athol.
AU Type:	FRESHWATER LAKE
AU Size:	20 ACRES
Classification/Qualifier:	A: PWS, ORW

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Recommendations

2022 Recommendations
OTHER: Habitat restoration projects in the Thousand Acre Brook subwatershed included Phillipston Reservoir Dam removal in 2012. The Phillipston Reservoir AU (MA35060) will therefore be removed as part a future IR cycle update.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
The Town of Athol, the Massachusetts Division of Ecological Restoration, the Massachusetts Environmental Trust, and other partners completed the removal of several dams as part of the Thousand Acre Brook Restoration project (Thousand Acre Brook is not an AU for the 2022 IR reporting cycle). The Phillipston Reservoir Dam (Phillipston Reservoir is MA35060) and a nearby unnamed dam structure were removed in 2012 in order to improve public safety, eliminate future maintenance costs, and improve ecological habitat. The effort opened five miles of riverine habitat (Wildman June 14, 2021, MA EOEEA 2013). The Phillipston Reservoir AU (MA35060) is Not Assessed for the Aquatic Life Use at this time and will be removed as part of a future IR cycle update since it no longer has sustained open water habitat and does not function as a lake.	

Biological Monitoring Information

Habitat and Flow Data (anthropogenic alterations)

The Town of Athol, the Massachusetts Division of Ecological Restoration, the Massachusetts Environmental Trust, and other partners completed the removal of several dams as part of the Thousand Acre Brook Restoration project (Thousand Acre Brook is not an AU). The Phillipston Reservoir Dam (Phillipston Reservoir is MA35060) and a nearby unnamed dam structure were removed in 2012 in order to improve public safety, eliminate future maintenance costs, and improve ecological habitat. The effort opened 5 miles of riverine habitat (Wildman June 14, 2021, MA EOEEA 2013) .

Fish Consumption

2022 Use Attainment	Alert

Not Assessed	NO
2022 Use Attainment Summary	
The Phillipston Reservoir AU (MA35060) is Not Assessed for the Fish Consumption Use at this time and will be removed as part of a future IR cycle update since it no longer has sustained open water habitat and does not function as a lake.	

Aesthetic

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
The Phillipston Reservoir AU (MA35060) is Not Assessed for the Aesthetics Use at this time and will be removed as part of a future IR cycle update since it no longer has sustained open water habitat and does not function as a lake.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
The Phillipston Reservoir AU (MA35060) is Not Assessed for the Primary Contact Recreational Use at this time and will be removed as part of a future IR cycle update since it no longer has sustained open water habitat and does not function as a lake.	

Secondary Contact Recreation

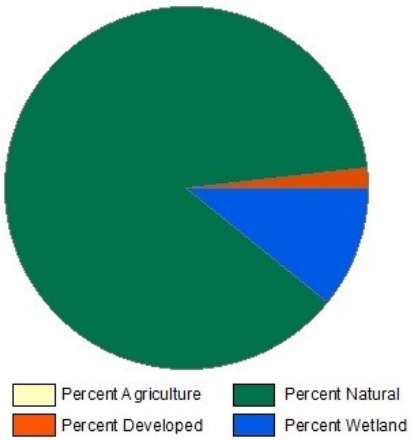
2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
The Phillipston Reservoir AU (MA35060) is Not Assessed for the Secondary Contact Recreational Use at this time and will be removed as part of a future IR cycle update since it no longer has sustained open water habitat and does not function as a lake.	

Priest Brook (MA35-10)

Location:	Headwaters at the confluence of Towne and Scott Brooks, Royalston to the confluence with the Millers River, Winchendon. (According to SARIS includes lower portion of Scott Brook.).
AU Type:	RIVER
AU Size:	6.8 MILES
Classification/Qualifier:	B

Priest Brook - MA35-10

Watershed Area: 23.59 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.62	4.66	1.72	1
Agriculture	0.7%	0.1%	0%	0%
Developed	1.8%	1.7%	1.7%	1.7%
Natural	86.8%	86.3%	72.7%	75.2%
Wetland	10.7%	11.9%	25.5%	23.1%
Impervious Cover	0.7%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
2	2	None		Unchanged

Recommendations

2022 Recommendations
ALU: Conduct an aquatic macrophyte survey in Priest Brook when flowering heads are present to determine whether any of the non-native species of *Myriophyllum* are infesting the brook. Confirmation of any non-native species should be made by a qualified state agency staff/taxonomist.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

MassDEP staff conducted discrete water quality sampling in Priest Brook near Winchendon Road in Royalston (at USGS flow gaging station #01162500) (W0693) as part of the SMART monitoring project between January 2011 and March 2013. Water quality sampling data can be briefly summarized as follows: the minimum DO was 4.9mg/L (n=13 measurements with only one <5.0mg/L), the maximum temperature was 23.4°C, pH was low (range 5.0 to 5.9SU, n=13), there were generally no indications of nutrient enrichment problems (seasonal average total phosphorus concentrations 0.03 in 2011 and 0.027 in 2012, maximum saturation 92%, maximum pH 5.9SU, and only one observation of dense/very dense filamentous algae during 11 site visits). The total ammonia nitrogen concentrations were low (maximum TAN 0.03mg/L) and chloride concentrations were also low (maximum 12mg/L) (n=13 for both analytes). MassDEP staff noted the presence of Myriophyllum sp. during field surveys in 2008 and 2017 in the vicinity of water quality station W0693 in Priest Brook. An aquatic macrophyte survey should be conducted to determine whether any of the non-native Myriophyllum species are infesting the brook so an Alert is being identified in the interim. MA DFG biologists also conducted fish sampling in four low gradient reaches of Priest Brook in Winchendon in August 2017 from up to downstream as follows: upstream of Winchendon Rd crossing (SampleID 7001), at the New Boston Rd Pullout (SampleID 6683), at Burgess Rd crossing (SampleID 6991), and upstream of Middle Road (SampleID 6682). The samples were all dominated by fluvial fish including some intolerant/moderately tolerant taxa.
The Aquatic Life Use for Priest Brook is assessed as Fully Supporting based on the general good water quality conditions documented by MassDEP staff between Jan 2011 and March 2013 and MA DFG biologists documenting fluvial species dominating the fish samples in this low gradient warm water stream. The former alert for extremely low pH/hardness/alkalinity is being carried forward (although these conditions are considered to be naturally occurring) and a new Alert for the potential infestation of a non-native aquatic Myriophyllum macrophyte species is being added.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6682	MassDFG	Fish Community	Priest Brook	Middle Rd; reach ended at beaver dam US of rd, Winchendon	42.64439	-72.10249
6683	MassDFG	Fish Community	Priest Brook	New Boston Rd Pullout,	42.66685	-72.11282
6991	MassDFG	Fish Community	Priest Brook	Burgess Rd xing, Winchendon	42.65293	-72.11020
7001	MassDFG	Fish Community	Priest Brook	Winchendon Rd crossing - US, Winchendon/Royalston	42.68383	-72.11581
W0693	MassDEP	Water Quality	Priest Brook	[Winchendon Road, Royalston (at USGS flow gaging station #01162500)]	42.682796	-72.115037

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)
[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]
[Species List: AE = American Eel, B = Bluegill, BB = Brown Bullhead, BS = Banded Sunfish, BT = Brown Trout, CCS = Creek Chubsucker, CP = Chain Pickerel, CRC = Creek Chub, CS = Common Shiner, F = Fallfish, GS = Golden Shiner, LMB = Largemouth Bass, LND = Longnose Dace, P = Pumpkinseed, RBS = Redbreast Sunfish, TD = Tesselated Darter, WS = White Sucker, YB = Yellow Bullhead]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
6682	08/11/17	BP	TP	L	7	133	0%	3	71%	6%	3	14%	No	No	BS, CP, F, RBS, TD, WS, YB,
6683	08/11/17	BP	TP	L	10	112	0%	5	61%	14%	3	23%	No	No	BB, BS, CCS, CP, F, LND, P, TD, WS, YB,
6991	08/30/17	BT	TP	L	11	185	0%	4	75%	0%	3	12%	No	No	AE, B, BB, CP, CRC, CS, F, GS, LMB, P, WS,
7001	08/22/17	BP	TP	L	8	34	3%	5	76%	6%	1	18%	Yes	No	B, BB, BT*, CCS, CP, F, LND, WS,

*Sampling note indicated stocked BT.

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP Undated 1)

Summary Statement	Assessment Recommendation
MassDEP staff noted the presence of *Myriophyllum* sp. during field surveys in 2008 and 2017 in the vicinity of water quality station W0693 in Priest Brook. An aquatic macrophyte survey should be conducted to determine whether any of the non-native *Myriophyllum* species are infesting the brook and an Alert status should be issued in the interim.	Conduct an aquatic macrophyte survey in Priest Brook when flowering heads are present to determine whether any of the non-native species of *Myriophyllum* are infesting the brook.

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0693	01/25/11	11/15/11	6	4.9	9	1	1	0
W0693	02/21/12	10/23/12	5	5.7	9.1	0	0	0
W0693	01/29/13	03/25/13	2	10.8	11.6	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W0693	01/25/11	11/15/11	6	1	23.4	10.0	1	1	0	0
W0693	02/21/12	10/23/12	5	2	20.5	11.3	1	0	0	0
W0693	01/29/13	03/25/13	2	0	0.4	0.2	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W0693	01/25/11	11/15/11	6	5	5.6	6	6
W0693	02/21/12	10/23/12	5	5.3	5.9	5	5
W0693	01/29/13	03/25/13	2	5.6	5.6	2	2

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0693	2011	3	0.017	0.050	0.030	--	--	90.3	5.6	5	1
W0693	2012	2	0.023	0.031	0.027	--	--	92.1	5.9	5	0
W0693	2013	--	--	--	--	--	--	86.1	5.6	1	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W0693	2011	6	0.020	0.030	0.022	0	0
W0693	2012	5	0.020	0.020	0.020	0	0
W0693	2013	2	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0693	2011	6	5	8	7	0	0
W0693	2012	5	7	12	8	0	0
W0693	2013	2	7	10	9	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W0693	01/25/11	11/15/11	6	36	57	0	0	0	0	0	0
W0693	02/21/12	10/23/12	5	42	63	0	0	0	0	0	0
W0693	01/29/13	03/25/13	2	52	66	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Priest Brook, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff surveyed Priest Brook at Winchendon Road in Royalston (at USGS flow gaging station #01162500) between January 2011 and March 2013 as part of the SMART monitoring project (n= 13 surveys). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at this sampling location. The Aesthetics Use for Priest Brook is assessed as Fully Supporting based on the general lack of objectionable conditions documented by MassDEP staff at the site sampled in Priest Brook between January 2011 and March 2013.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0693	MassDEP	Water Quality	Priest Brook	[Winchendon Road, Royalston (at USGS flow gaging station #01162500)]	42.682796	-72.115037

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0693	Priest Brook	2011	6	MassDEP aesthetics observations for station W0693 on Priest Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0693	Priest Brook	2012	5	MassDEP aesthetics observations for station W0693 on Priest Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2012.
W0693	Priest Brook	2013	2	MassDEP aesthetics observations for station W0693 on Priest Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2013. However, there is insufficient information to assess the Aesthetics Use since data were limited (n=2).

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0693	2011	6	5	1
W0693	2012	5	5	0
W0693	2013	2	1	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0693	Priest Brook	2011	Color	Reddish	6	6
W0693	Priest Brook	2011	Objectionable Deposits	No	5	6
W0693	Priest Brook	2011	Objectionable Deposits	Unobservable	1	6
W0693	Priest Brook	2011	Odor	Musty (Basement)	2	6
W0693	Priest Brook	2011	Odor	None	4	6
W0693	Priest Brook	2011	Scum	No	2	6
W0693	Priest Brook	2011	Scum	Yes	4	6
W0693	Priest Brook	2011	Turbidity	None	5	6
W0693	Priest Brook	2011	Turbidity	Unobservable	1	6
W0693	Priest Brook	2012	Color	Reddish	5	5
W0693	Priest Brook	2012	Objectionable Deposits	No	3	5
W0693	Priest Brook	2012	Objectionable Deposits	Unobservable	2	5
W0693	Priest Brook	2012	Odor	Fishy	1	5
W0693	Priest Brook	2012	Odor	Musty (Basement)	1	5
W0693	Priest Brook	2012	Odor	None	3	5
W0693	Priest Brook	2012	Scum	No	1	5
W0693	Priest Brook	2012	Scum	Yes	4	5
W0693	Priest Brook	2012	Turbidity	Moderately Turbid	1	5
W0693	Priest Brook	2012	Turbidity	None	4	5
W0693	Priest Brook	2013	Color	Reddish	2	2
W0693	Priest Brook	2013	Objectionable Deposits	No	1	2
W0693	Priest Brook	2013	Objectionable Deposits	Unobservable	1	2
W0693	Priest Brook	2013	Odor	None	2	2
W0693	Priest Brook	2013	Scum	No	1	2
W0693	Priest Brook	2013	Scum	Yes	1	2
W0693	Priest Brook	2013	Turbidity	None	2	2

Primary Contact Recreation

2022 Use Attainment	Alert
Insufficient Information	NO
2022 Use Attainment Summary	
MassDEP staff collected some *E. coli* bacteria samples from Priest Brook at Winchendon Road in Royalston (at USGS flow gaging station #01162500) between May 2011 and September 2011 and April and October 2012 (n= 7 samples). Counts ranged from 2 to 231 cfu/100mls but samples are too temporally spaced to be able to calculate useable 90-day GM intervals. Too limited *E. coli* bacteria data are available to assess the status of the Primary Contact Recreational Use for Priest Brook, so it is assessed as having Insufficient Information.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0693	MassDEP	Water Quality	Priest Brook	[Winchendon Road, Royalston (at USGS flow gaging station #01162500)]	42.682796	-72.115037

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0693	MassDEP	E. coli	05/16/11	09/20/11	3	29	231	63
W0693	MassDEP	E. coli	04/10/12	10/23/12	4	2	118	22

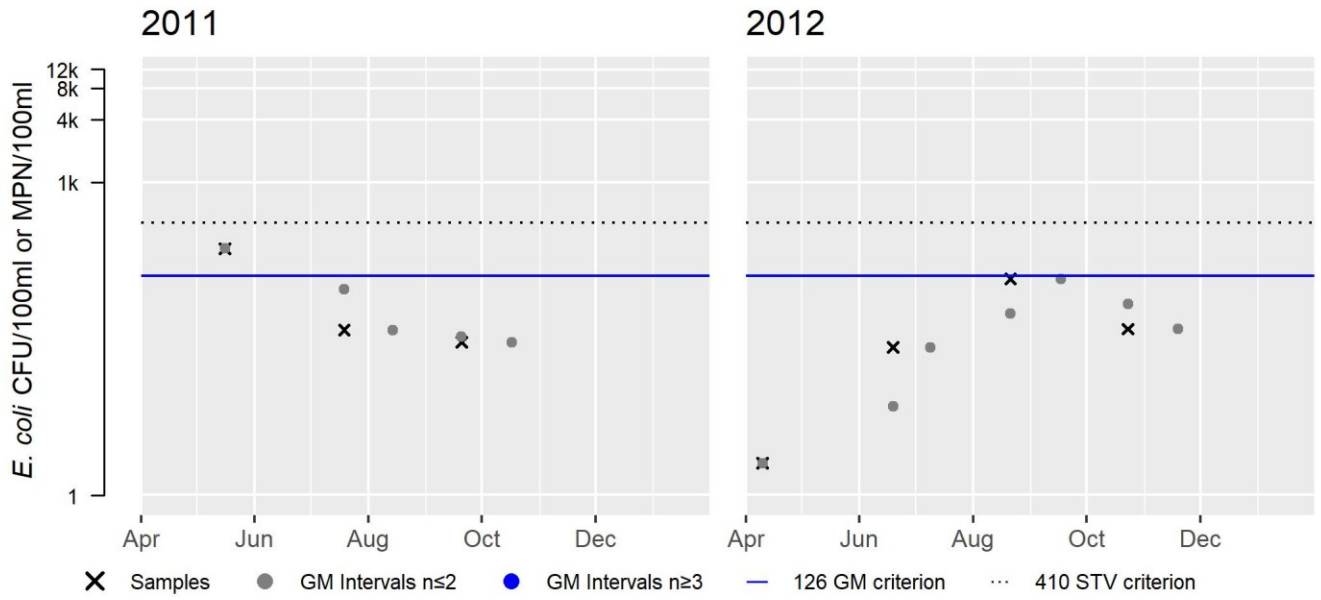
W0693 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	3
SeasGM	63
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	4
SeasGM	22
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



Secondary Contact Recreation

2022 Use Attainment	**Alert**
Insufficient Information	NO
2022 Use Attainment Summary	
MassDEP staff collected some *E. coli* bacteria samples from Priest Brook at Winchendon Road in Royalston (at USGS flow gaging station #01162500) between January 2011 and March 2013 (n= 13 samples). Counts ranged from 1 to 231 cfu/100mls but samples are too temporally spaced to be able to calculate useable 90-day GM intervals. Too limited *E. coli* bacteria data are available to assess the status of the Secondary Contact Recreational Use for Priest Brook, so it is assessed as having Insufficient Information.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0693	MassDEP	Water Quality	Priest Brook	[Winchendon Road, Royalston (at USGS flow gaging station #01162500)]	42.682796	-72.115037

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W0693	MassDEP	E. coli	01/25/11	11/15/11	6	1	231	12
W0693	MassDEP	E. coli	02/21/12	10/23/12	5	1	118	12
W0693	MassDEP	E. coli	01/29/13	03/25/13	2	1	2	1

W0693 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

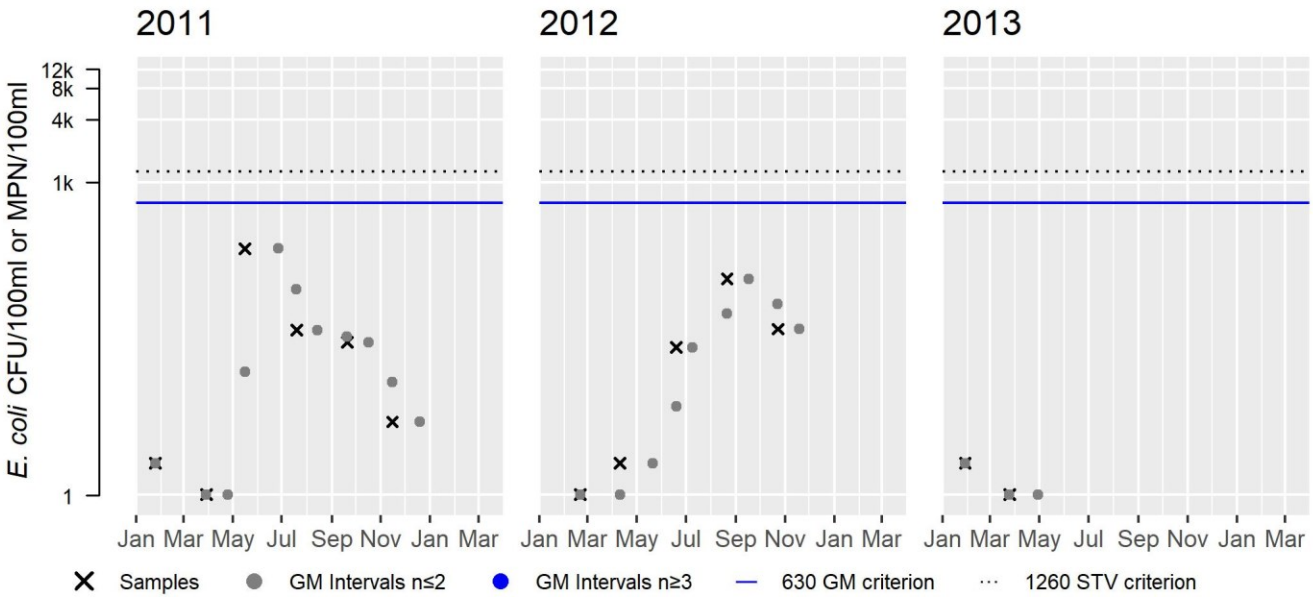
Var	Res
Samples	6
SeasGM	12
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	5
SeasGM	12
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	2
SeasGM	1
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

Variable	Cumulative %GMI Ex (all years)
Result	0



Ramsdall Pond (MA35062)

Location:	Gardner.
AU Type:	FRESHWATER LAKE
AU Size:	16 ACRES
Classification/Qualifier:	B

No usable data were available for Ramsdall Pond (MA35062) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Reservoir No. 1 (MA35063)

Location:	Athol.
AU Type:	FRESHWATER LAKE
AU Size:	8 ACRES
Classification/Qualifier:	A: PWS, ORW (Tributary)

No usable data were available for Reservoir No. 1 (MA35063) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	(Aquatic Plants (Macrophytes)*)		Unchanged
4a	4a	Nutrient/Eutrophication Biological Indicators	4137	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Unspecified Urban Stormwater (Y)			X	X	X
Nutrient/Eutrophication Biological Indicators	Rural (Residential Areas) (Y)			X	X	X
Nutrient/Eutrophication Biological Indicators	Unspecified Urban Stormwater (Y)			X	X	X

Reservoir No. 2 (MA35064)

Location:	Phillipston/Athol (Secret Lake).
AU Type:	FRESHWATER LAKE
AU Size:	48 ACRES
Classification/Qualifier:	A: PWS, ORW (Tributary)

No usable data were available for Reservoir No. 2 (MA35064) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Riceville Pond (MA35065)

Location:	Athol/Petersham.
AU Type:	FRESHWATER LAKE
AU Size:	61 ACRES
Classification/Qualifier:	B

No usable data were available for Riceville Pond (MA35065) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

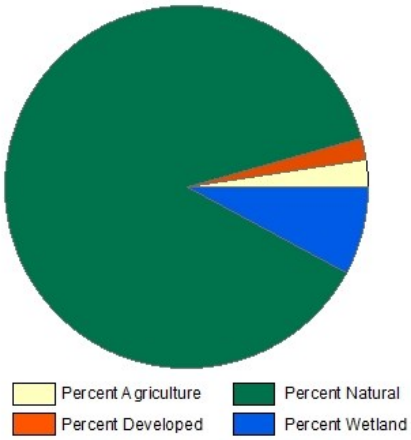
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Rich Brook (MA35-42)

Location:	Headwaters west of Route 68, Royalston to mouth at confluence with Millers River, Athol.
AU Type:	RIVER
AU Size:	2.2 MILES
Classification/Qualifier:	B: CWF

Rich Brook - MA35-42

Watershed Area: 1.13 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.13	1.13	0.28	0.28
Agriculture	2.4%	2.4%	0%	0%
Developed	2%	2%	0.6%	0.6%
Natural	87.7%	87.7%	78.1%	78.1%
Wetland	7.9%	7.9%	21.3%	21.3%
Impervious Cover	0.7%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	5	PCBs in Fish Tissue		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Insufficient Information	NO
2022 Use Attainment Summary	

MA DFG biologists conducted backpack electrofishing in Rich Brook at Gulf Road crossing in Athol in July and August 2014 (SampleIDs 5342 downstream of the road and 5395 upstream of the road, respectively). Only one small (136mm) Eastern brook trout was collected upstream of the road. No fish were collected downstream of the road crossing. The Rich Brook subwatershed area is extremely small (1.13 mi^2) with very little development (IC only 0.7% and % natural/wetland 95.6 and 99 in the subwatershed and proximal stream buffer, respectively).
Since only one fish (although a small Eastern brook trout) was documented in Rich Brook, too limited data are available to assess the Aquatic Life Use so it is assessed as having Insufficient Information. It is noted, however, that anthropogenic influences are extremely limited in this small subwatershed so no Alert issues are being identified.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5342	MassDFG	Fish Community	Rich Brook	Gulf Rd crossing DS, Athol	42.63002	-72.16438
5395	MassDFG	Fish Community	Rich Brook	US of Gulf Rd xing, Athol	42.62996	-72.16374

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)
[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net, Gradient: H = High, L = Low; I/MT MG= Intolerant/Moderately Tolerant Macrohabitat Generalist]
[Species List: EBT = Brook Trout]

Sample ID	Sample Date	Method	Sample Type	Gradient	Total Taxa	Total Ind	Cold Ind %	Fluvial Taxa	Fluvial Ind %	Intol Ind %	I/MT MG Taxa	I/MT MG Ind %	Notables	CFR	Species List
5395	08/15/14	BP	TP		1	1	100%	1	100%	100%	0	0%	Yes	Yes	EBT,

Fish Community Data (2012-2019) Provided by MassDFG: Fishless Samples. (MassDFG 2020)
[Method: BP= Backpack Shocking, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net]

Sample ID	Sample Date	Method	No Fish Reason
5342	07/07/14	BP	Sample Attempted - No Fish

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

Athough no fish toxics monitoring has been conducted in Rich Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for Rich Brook will be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Rich Brook, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Rich Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Rich Brook, so it is Not Assessed.	

Richards Reservoir (MA35067)

Location:	Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	21 ACRES
Classification/Qualifier:	B

No usable data were available for Richards Reservoir (MA35067) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Royalston Road Pond (MA35071)

Location:	Orange.
AU Type:	FRESHWATER LAKE
AU Size:	5 ACRES
Classification/Qualifier:	B

No usable data were available for Royalston Road Pond (MA35071) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Ruggles Pond (MA35072)

Location:	Wendell.
AU Type:	FRESHWATER LAKE
AU Size:	15 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
2	2	None		Unchanged

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the Aquatic Life Use for Ruggles Pond, so it is Not Assessed.	

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Ruggles Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Ruggles Pond, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
The Ruggles Pond (DCR) Beach in Wendell was rarely, if at all, posted for swimming between 2014 and 2019 (the only posting was in the 2019 swimming season and was <10%). The Primary Contact Recreational Use for Ruggles Pond is assessed as Fully Supporting since there were few, if any, swimming advisory postings at the Ruggles Pond (DCR) Beach in the Wendell State Forest.	

Beach Postings

MassDPH Beach Posting Data Summary (% Bathing Season Posted 2014-2019) (Bailey, Logan Feb. 2, 2021) (MassDEP Undated 4)

Beach ID	Beach Name/Town	Left Boundary (Latitude)	Left Boundary (Longitude)	Right Boundary (Latitude)	Right Boundary (Longitude)	2014	2015	2016	2017	2018	2019	# years> 10%
5187	Ruggles Pond (DCR)/Wendell	42.55100	-72.44900	42.55118	-72.44810	0%	0%	0%	0%	0%	7%	0

Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

The Ruggles Pond (DCR) Beach in Wendell was rarely, if at all, posted for swimming between 2014 and 2019 (the only posting was in the 2019 swimming season and was <10%).
The Secondary Contact Recreational Use for Ruggles Pond is assessed as Fully Supporting since there were few, if any, swimming advisory postings at the Ruggles Pond (DCR) Beach in the Wendell State Forest

Sheomet Lake (MA35074)

Location:	Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	30 ACRES
Classification/Qualifier:	B

No usable data were available for Sheomet Lake (MA35074) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

South Athol Pond (MA35078)

Location:	Athol.
AU Type:	FRESHWATER LAKE
AU Size:	83 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged
4c	4c	(Fanwort*)		Added
4c	4c	(Non-Native Aquatic Plants*)		Removed

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Sand/Gravel/Rock Mining or Quarries (N)			X	X	X
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X		X	X	X

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Non-Native Aquatic Plants	Clarification of listing cause	The generic "Non-Native Aquatic Plants" is not needed since the specific macrophyte Fanwort (*Cabomba caroliniana*), has been utilized.

Non-Native Aquatic Plants

The generic "Non-Native Aquatic Plants" impairment is being removed since the specific macrophyte Fanwort (*Cabomba caroliniana*) impairment is being added.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in South Athol Pond during an August 1995 synoptic survey. The Aquatic Life Use for South Athol Pond will continue to be assessed as Not Supporting. The generic Non-Native Aquatic Plants impairment is being removed since the Fanwort (*C. caroliniana*) is being added.	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995)

Summary Statement
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in South Athol Pond during an August 1995 synoptic survey.

Fish Consumption

2022 Use Attainment	**Alert**
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in South Athol Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
No recent data are available to evaluate the status of the Aesthetics Use for South Athol Pond so it will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward, the generic Non-Native Aquatic Plants impairment is being removed since the specific species, Fanwort (*C. caroliniana*) is being added.	

Primary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
No recent data are available to evaluate the status of the Primary Contact Recreational Use for South Athol Pond so it will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward, the generic Non-Native Aquatic Plants impairment is being removed since the specific species, Fanwort (*C. caroliniana*) is being added.	

Secondary Contact Recreation

2022 Use Attainment	**Alert**
Not Supporting	NO
2022 Use Attainment Summary	
No recent data are available to evaluate the status of the Secondary Contact Recreational Use for South Athol Pond so it will continue to be assessed as Not Supporting with the Aquatic Plants (Macrophytes) impairment being carried forward, the generic Non-Native Aquatic Plants impairment is being removed since the specific species, Fanwort (*C. caroliniana*) is being added.	

South Spectacle Pond (MA35081)

Location:	New Salem.
AU Type:	FRESHWATER LAKE
AU Size:	38 ACRES
Classification/Qualifier:	B

No usable data were available for South Spectacle Pond (MA35081) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Sportsmans Pond (MA35082)

Location:	Athol.
AU Type:	FRESHWATER LAKE
AU Size:	93 ACRES
Classification/Qualifier:	B

No usable data were available for Sportsmans Pond (MA35082) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

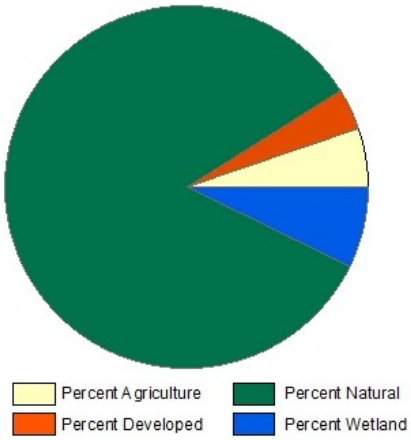
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Stockwell Brook (MA35-25)

Location:	Headwaters east of Norcross Road, Royalston to mouth at Beaver Pond inlet, Royalston.
AU Type:	RIVER
AU Size:	1.3 MILES
Classification/Qualifier:	B

Stockwell Brook - MA35-25

Watershed Area: 0.82 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	0.82	0.82	0.26	0.26
Agriculture	5.2%	5.2%	3.3%	3.3%
Developed	3.7%	3.7%	3.6%	3.6%
Natural	83.9%	83.9%	81.6%	81.6%
Wetland	7.2%	7.2%	11.4%	11.4%
Impervious Cover	1.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Insufficient Information	NO
2022 Use Attainment Summary	

MassDEP biologists sampled Stockwell Brook upstream of Norcross Road in Royalston during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. It is noted here that this brook's watershed is extremely small (0.82 square miles) and the sampling reach was also way up near the headwater portion of the brook. The subwatershed landuse is 91% natural/wetland with 93% natural/wetland in the proximal stream buffer. The impervious cover is also low (1.6%). The benthic community (B0735) sample, collected in July 2011, had an IBI score of 30 (indicative of severely degraded conditions for a high gradient Central Hills region stream). Backpack electrofishing (Sample ID 4575) in August 2011 documented only three tolerant macrohabitat fish. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2215) can be summarized as follows: minimum dissolved oxygen 1.7mg/L during two short term DO deploys, maximum temperature 27.8°C during three short-term temperature deploys (12 days between 3 June and 10 August) with a maximum 24-hour rolling average temperature was 26.0°C, pH ranged from 5.7 to 5.9SU (n=6), and there was little indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was 0.074mg/L, max diel DO shift 2.1mg/L, maximum saturation 70%, maximum pH 5.9SU, and no observations of any dense/very dense filamentous algae of five site visits). With the exception of one chronic lead and one chronic Al criteria exceedance (TU 3.0 and 1.3, respectively), there were no other toxicant issues (maximum total ammonia-nitrogen concentration was 0.013mg/L, chloride was 14mg/L (n=5), and there were no other exceedances of any of clean metals or aluminum samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out).
Despite a suite of benthic macroinvertebrate, fish population, and water quality monitoring data collected by MassDEP during the summer of 2011, since the sampling location in this extremely small watershed was so close to the headwater reach and situated just downstream from a large wetland/beaver dam, too limited data are considered available to assess the Aquatic Life Use for Stockwell Brook so it will continue to be assessed as having Insufficient Information. It is also noted that the watershed area is ~91% natural/wetland with 1.6% Impervious Cover, and the proximal stream buffer is also minimally disturbed (93% natural/wetland), nor are their dams or water withdrawals in this subwatershed, so the conditions documented are considered naturally occurring.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4575	MassDEP	Fish Community	Stockwell Brook	~230ft US of Norcross Rd. DEP station MAP2-077, Royalston	42.65715	-72.13291
B0735	MassDEP	Benthic	Stockwell Brook/	[approximately 70 meters upstream of Norcross Road, Royalston, MA]	42.657151	-72.132910
W2215	MassDEP	Water Quality	Stockwell Brook	[approximately 230 feet upstream of Norcross Road, Royalston]	42.657151	-72.132910

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0735	07/06/11	RBP kicknet	Central_Hills_100ct	101	30	SD

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	Stockwell Brook -- ~230ft US of Norcross Rd. DEP station MAP2-077, Royalston (42.65715, 72.13291)		
Habitat Comments	DEP survey.		
Efficiency	(Seconds Shocked - 504)		
Sample Date	**Species**	2	
08/05/11	**Total Ind**	3	
Method	**% Dom**	67%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	0	0%
3523775	FD	0	0%
	MG	2	100%
	Tolerant	**Species**	**% Ind**
	I	0	0%
	M	0	0%
	T	2	100%
	SampleID	4575	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
Brown bullhead	BB	2	48	75	W	MG	T	Generalist Feeder
Golden shiner	GS	1	70	70	W	MG	T	Generalist Feeder

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2215	2011	2	8	1.7	2.7	3.5	2.1	2	8	1	4	2	6

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2215	05/11/11	10/05/11	6	3.3	4.7	4	4	1

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2215	2011	3	12	26.0	27.8	27.2	24.6	3	6	2	3	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2215	06/03/11	08/10/11	68	569	26.0	260	160	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2215	05/11/11	10/05/11	7	6	25.0	21.4	5	4	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2215	05/11/11	10/05/11	6	5.7	5.9	6	6

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2215	2011	5	0.034	0.094	0.074	2.1	1.0	70.3	5.9	5	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2215	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2215	2011	3	0	0	0	0	1	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2215	07/06/11	0.0	0.0	0.4	0.52	0.1	3.0
W2215	07/28/11	0.4	0.7	0.3	0.41	0.1	0.0
W2215	09/01/11	0.5	0.8	0.4	0.52	0.1	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2215	2011	3	0.200	0.26	0.220	0.8	1.3	0	1

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2215	2011	5	0.030	0.130	0.074	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2215	2011	5	10	18	14	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2215	05/11/11	10/05/11	6	74	92	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in Stockwell Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020).

Until site-specific data are generated, the Fish Consumption Use for Stockwell Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff conducted sampling in Stockwell Brook during the summer of 2011 upstream of Norcross Road in Royalston (W2215). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at this sampling site.

The Aesthetics Use for Stockwell Brook will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the site sampled in the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2215	MassDEP	Water Quality	Stockwell Brook	[approximately 230 feet upstream of Norcross Road, Royalston]	42.657151	-72.132910

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2215	Stockwell Brook	2011	6	MassDEP aesthetics observations for station W2215/MAP2-077 on Stockwell Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2215	2011	6	5	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2215	Stockwell Brook	2011	Color	Light Yellow/Tan	2	6
W2215	Stockwell Brook	2011	Color	NR	1	6
W2215	Stockwell Brook	2011	Color	Reddish	3	6
W2215	Stockwell Brook	2011	Objectionable Deposits	No	5	6
W2215	Stockwell Brook	2011	Objectionable Deposits	Unobservable	1	6
W2215	Stockwell Brook	2011	Odor	Musty (Basement)	2	6
W2215	Stockwell Brook	2011	Odor	None	4	6
W2215	Stockwell Brook	2011	Scum	No	5	6
W2215	Stockwell Brook	2011	Scum	Yes	1	6
W2215	Stockwell Brook	2011	Turbidity	Highly Turbid	1	6
W2215	Stockwell Brook	2011	Turbidity	None	5	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Stockwell Brook ~230 feet upstream of Norcross Road in Royalston (W2215) between May and September 2011 (n = 6). Data analysis indicated that 71% of the intervals had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 81 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for Stockwell Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2215	MassDEP	Water Quality	Stockwell Brook	[approximately 230 feet upstream of Norcross Road, Royalston]	42.657151	-72.132910

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

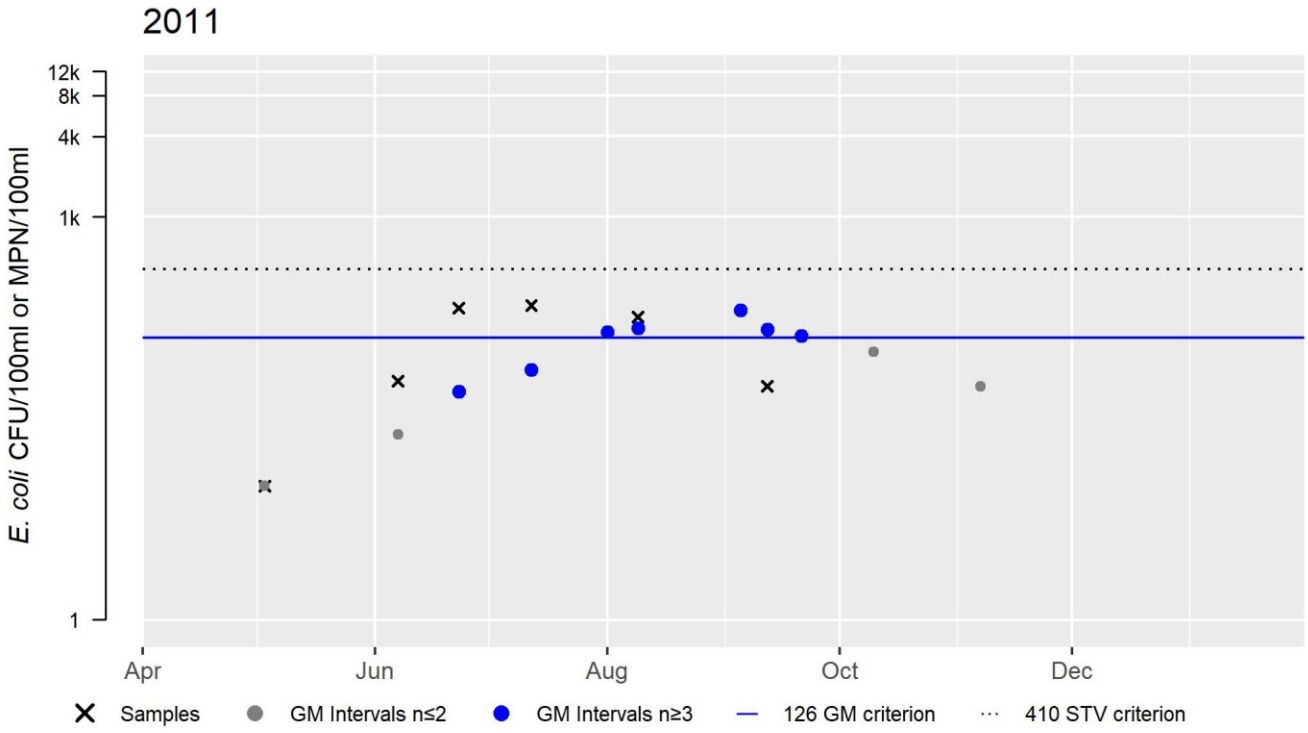
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2215	MassDEP	E. coli	05/03/11	09/12/11	6	10	220	81

W2215 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	81
#GMI	7
#GMI Ex	5
%GMI Ex	71
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary
MassDEP staff collected *E. coli* bacteria samples from Stockwell Brook ~230 feet upstream of Norcross Road in Royalston (W2215) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 81 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for Stockwell Brook is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2215	MassDEP	Water Quality	Stockwell Brook	[approximately 230 feet upstream of Norcross Road, Royalston]	42.657151	-72.132910

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

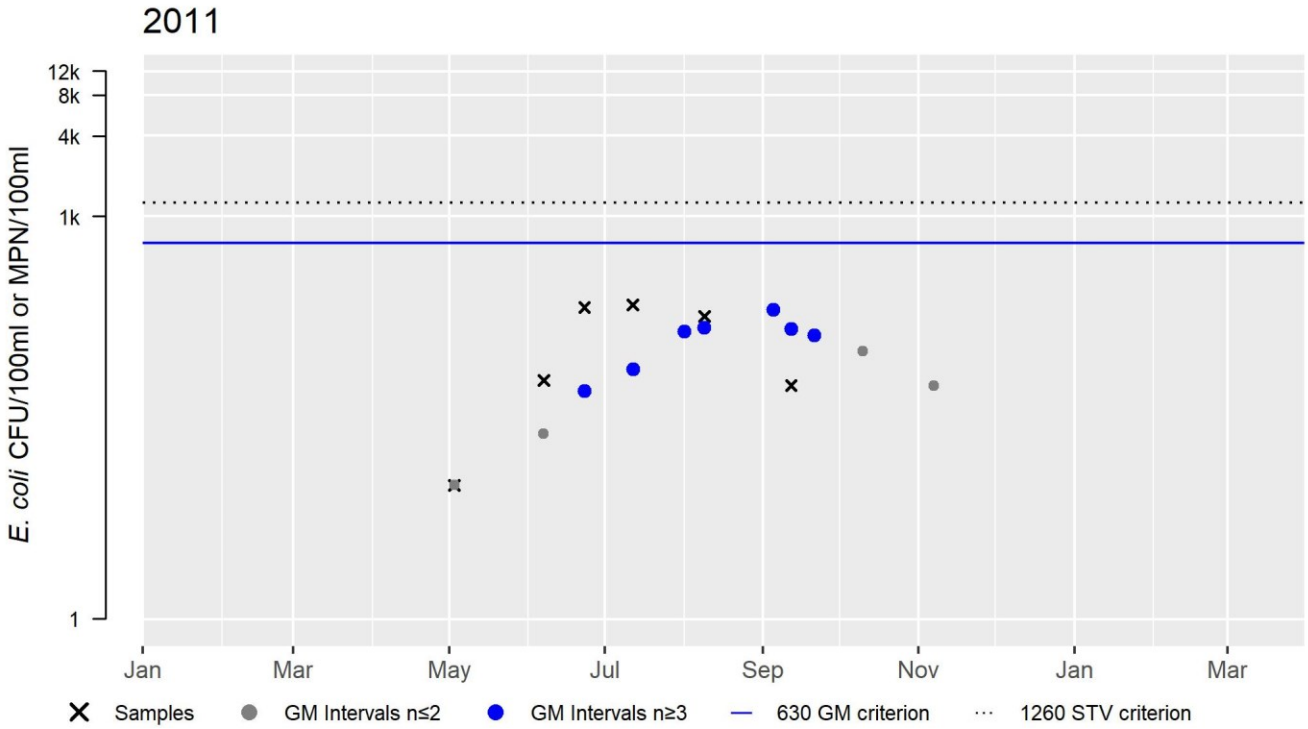
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2215	MassDEP	E. coli	05/03/11	09/12/11	6	10	220	81

W2215 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	81
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Stoddard Pond (MA35083)

Location:	Winchendon.
AU Type:	FRESHWATER LAKE
AU Size:	52 ACRES
Classification/Qualifier:	B

No usable data were available for Stoddard Pond (MA35083) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Aquatic Plants (Macrophytes)*)		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Unspecified Urban Stormwater (Y)			X	X	X

Sunset Lake (MA35086)

Location:	Ashburnham/Winchendon.
AU Type:	FRESHWATER LAKE
AU Size:	274 ACRES
Classification/Qualifier:	B

No usable data were available for Sunset Lake (MA35086) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Thrower Brook (MA35-43)

Location:	Headwaters, New Sherborn Road, Athol to mouth at inlet of South Athol Pond, Athol.
AU Type:	RIVER
AU Size:	2.6 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Thrower Brook (MA35-43) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Tully Brook (MA35-44)

Location:	Headwaters, portion in Massachusetts north of Falls Road, Royalston to mouth at confluence with Fall Brook forming headwater of East Branch Tully River, Royalston.
AU Type:	RIVER
AU Size:	1.1 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Tully Brook (MA35-44) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Tully Lake (MA35111)

Location:	Royalston/Athol.
AU Type:	FRESHWATER LAKE
AU Size:	214 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Harmful Algal Blooms		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Harmful Algal Blooms	Source Unknown (N)			X	X	X

Recommendations

2022 Recommendations
ALU: An aquatic macrophyte survey of Tully Lake should be conducted to confirm the presence of any non-native aquatic macrophyte species (of concern is fanwort (*Cabomba caroliniana*). Confirmation of any non-native species should be made by a qualified state agency/taxonomist.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Insufficient Information	YES
2022 Use Attainment Summary	
MassDEP's Freshwater Aquatic Invasive Species database contains three observations from a member of the public (2004-2008) of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in Tully Lake. The presence of this species should be confirmed by DEP biologists and an Alert will be issued in the interim. Too limited data are available to assess the Aquatic Life Use for Tully Lake so it is assessed as having Insufficient Information. An Alert is being identified for the possible infestation of fanwort (*C. caroliniana*).	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP Undated 1)

Summary Statement	Assessment Recommendation
MassDEP's Freshwater Aquatic Invasive Species database contains three observations from a member of the public (2004-2008) of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in Tully Lake. The presence of this species should be confirmed by DEP biologists and an Alert will be issued in the interim.	Conduct an aquatic macrophyte survey in Tully Lake to determine whether *Cabomba caroliniana* has infested the Lake.

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Tully Lake, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Tully Lake (MA35111) were reported to MA DPH for 76 days in 2015, 73 days in 2016, 29 days in 2017, and 24 days in 2018. Since blooms >20 days in length were reported in four recent years, the Aesthetics Use of Tully Lake will continue to be assessed as Not Supporting with the Harmful Algal Blooms impairment being carried forward.	

Algal Bloom Information

Cyanobacteria Harmful Algal Bloom (C-HAB) Summary Statements for 2015-2019 MassDPH Data (Bailey, Logan April 15, 2021) (MassDEP Undated 4)

C-HAB Summary Statement
C-HAB postings for Tully Lake (MA35111) were reported to MassDPH for 76 days in 2015, 73 days in 2016, 29 days in 2017, and 24 days in 2018. Since blooms >20 days in length were reported in 4 years, the Primary/Secondary Contact Recreational Uses and Aesthetics Use are assessed as Not Supporting.

Cyanobacteria Harmful Algal Bloom (C-HAB) Data (2015-2019) Provided by MassDPH (Bailey, Logan April 15, 2021)

Waterbody	Sample Analysis Used in Issuing Advisory	Bloom Days, 2015	Bloom Days, 2016	Bloom Days, 2017	Bloom Days, 2018	Bloom Days, 2019	# Years with >20 Days of Closure	>1 Posting Per Year
Tully Lake	Not issued or confirmed by sampling	76	73	29	24		4	yes

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

C-HAB postings for Tully Lake (MA35111) were reported to MA DPH for 76 days in 2015, 73 days in 2016, 29 days in 2017, and 24 days in 2018. Since blooms >20 days in length were reported in four recent years, the Primary Contact Recreational Use of Tully Lake will continue to be assessed as Not Supporting with the Harmful Algal Blooms impairment being carried forward.

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Tully Lake (MA35111) were reported to MA DPH for 76 days in 2015, 73 days in 2016, 29 days in 2017, and 24 days in 2018. Since blooms >20 days in length were reported in four recent years, the Secondary Contact Recreational Use of Tully Lake will continue to be assessed as Not Supporting with the Harmful Algal Blooms impairment being carried forward	

Tully Pond (MA35089)

Location:	Orange.
AU Type:	FRESHWATER LAKE
AU Size:	70 ACRES
Classification/Qualifier:	B

No usable data were available for Tully Pond (MA35089) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Tully River (MA35-14)

Location:	Confluence East and West Branches Tully River, Orange/Athol to confluence with Millers River, Athol.
AU Type:	RIVER
AU Size:	1.6 MILES
Classification/Qualifier:	B

No usable data were available for Tully River (MA35-14) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

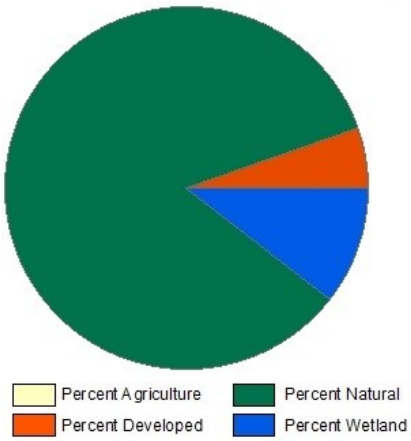
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Unnamed Tributary (MA35-26)

Location:	Unnamed tributary to Millers River from the outlet of Lake Wallace to the mouth at confluence with Millers River, Ashburnham (excluding Lake Watatic segment MA35095 and Lower Naukeag Lake segment MA35041).
AU Type:	RIVER
AU Size:	2.1 MILES
Classification/Qualifier:	B

Unnamed Tributary - MA35-26

Watershed Area: 11.27 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.51	5.64	2.21	1.52
Agriculture	0.9%	0.9%	0.6%	0.3%
Developed	5.3%	7.3%	9.1%	11%
Natural	83.4%	80%	71.2%	67%
Wetland	10.4%	11.8%	19.2%	21.7%
Impervious Cover	2.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Copper		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Copper	Source Unknown (N)	X				

Recommendations

2022 Recommendations
ALU: Additional metal sampling, given the acute and chronic copper criteria exceedances/impairment as well as the chronic lead and aluminum criteria exceedances (lead TUs ranged 9.1 to 14.0 and aluminum TUs 1.2 above default freshwater criteria in 2011 clean technique samples site W2195, n=3), should be a high priority to better evaluate both the acute and chronic (four-day average) metals concentrations (particularly copper, aluminum, and lead) in this Unnamed Tributary (MA35-26).

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	YES
2022 Use Attainment Summary	
MassDEP biologists sampled this Unnamed Tributary AU (MA35-26) between the outlet of Lake Watatic and the inlet of Lower Naukeag Lake, ~ 20 meters downstream of Cross Road in Ashburnham during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community (B0717) sample, collected in July 2011, had an IBI score of 64 (indicative of satisfactory conditions for a high gradient Central Hills region stream). Backpack electrofishing (Sample ID 4577) in August 2011 documented a sample that was dominated by white sucker, a tolerant fluvial dependent species. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2195) can be summarized as follows: minimum dissolved oxygen 6.9mg/L during two short term DO deploys, maximum temperature 27.1°C between June 1st and September 15th and a maximum 24-hour rolling average 25.2°C, pH ranged from 5.6 to 6.0SU (n=), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was 0.022mg/L, max diel DO shift only 0.8mg/L, maximum saturation 96%, maximum pH 6.0SU, and no observations of any dense/very dense filamentous algae during six site visits). There were three toxicants that exceeded either acute and/or chronic criteria during the three clean metals sampling surveys as follows: Copper exceeded acute and chronic criteria (TUs 1.0 to 1.8 acute, 1.2 to 2.0 chronic in all three samples), lead exceeded chronic criteria (TUs 9.1 to 14.0 in all three samples), and aluminum exceeded the default freshwater chronic criteria twice (max TU1.2) otherwise there were no other clean metals or other toxicant issues (maximum total ammonia-nitrogen concentration was 0.05mg/L, chloride was 16mg/L (n=5), although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out). The Aquatic Life Use for this Unnamed Tributary AU (MA35-26) will continue to be assessed as Not Supporting with the copper impairment being carried forward. In general, the other data collected by MassDEP during the summer of 2011 (benthic macroinvertebrate, fish population, and most of the water quality monitoring data), were indicative of generally good conditions in this warm water stream. Alerts for the chronic lead and aluminum criteria exceedances are being identified and additional sampling is being recommended to better evaluate these toxicant concerns.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4577	MassDEP	Fish Community	UNT* to Millers River (4)	~70ft DS of Cross Rd. DEP station: MAP2-037, Ashburnham	42.67731	-71.94077
B0717	MassDEP	Benthic	Unnamed And/Or Undefined Saris/	[unnamed tributary, outlet Lake Watatic/inlet Lower Naukeag Lake, approximately 20 meters downstream of Cross Road, Ashburnham, MA]	42.677311	-71.940768

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4577	MassDEP	Fish Community	UNT* to Millers River (4)	~70ft DS of Cross Rd. DEP station: MAP2-037, Ashburnham	42.67731	-71.94077
W2195	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary, outlet Lake Watatic/inlet Lower Naukeag Lake, approximately 70 feet downstream of Cross Road, Ashburnham]	42.677311	-71.940768

*Unnamed tributary

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0717	07/05/11	RBP kicknet	Central_Hills_100ct	101	64	S

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	UNT to Millers River (4) -- ~70ft DS of Cross Rd. DEP station: MAP2-037, Ashburnham (42.67731, 71.94077)		
Habitat Comments	DEP backpack survey. Top of reach mostly new type habitat. Lower end mosly pool & plunge pool habitat. Very few fish for habitat available.		
Efficiency	(Seconds Shocked - 1045)		
Sample Date	**Species**	2	
08/09/11	**Total Ind**	29	
Method	**% Dom**	79%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	0	0%
3524320	FD	1	79%
	MG	1	21%
	Tolerant	**Species**	**% Ind**
	I	0	0%
	M	1	21%
	T	1	79%
	SampleID	4577	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
White sucker	WS	23	46	80	CW	FD	T	Generalist Feeder
Yellow perch	YP	6	99	110	CW	MG	M	Top Carnivore

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2195	2011	2	8	6.9	6.9	7.2	0.8	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2195	05/12/11	10/06/11	6	7.6	8.1	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2195	06/01/11	09/15/11	107	107	25.2	27.1	25.7	23.7	107	9	66	3	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2195	2011	3	12	22.8	25.0	24.4	22.5	3	0	1	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2195	06/01/11	09/15/11	107	5136	25.2	441	213	0
W2195	06/10/11	08/17/11	68	575	23.3	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2195	05/12/11	10/06/11	8	6	22.2	19.0	5	1	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2195	05/12/11	10/06/11	6	5.6	6	6	5

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2195	2011	5	0.017	0.029	0.022	0.8	0.5	95.5	6.0	6	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2195	2011	3	0	0	0	3	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2195	2011	3	0	0	0	3	3	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2195	07/13/11	0.0	0.0	1.1	1.33	0.4	9.2
W2195	08/02/11	0.7	0.0	1.0	1.24	0.4	9.1
W2195	09/07/11	1.0	0.0	1.8	2.01	0.5	14.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2195	2011	3	0.200	0.23	0.213	0.7	1.2	0	2

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2195	2011	5	0.020	0.050	0.034	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2195	2011	5	11	16	14	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2195	05/12/11	10/06/11	6	67	70	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in this Unnamed Tributary AU (MA35-26), therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff conducted sampling in this Unnamed Tributary AU (MA35-26) between the outlet of Lake Watatic and the inlet of Lower Naukeag Lake, ~20 meters downstream of Cross Road in Ashburnham (W2195) during the summer of 2011. There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at this sampling site. The Aesthetics Use for this Unnamed Tributary AU (MA35-26) will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the site sampled in the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2195	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary, outlet Lake Watatic/inlet Lower Naukeag Lake, approximately 70 feet downstream of Cross Road, Ashburnham]	42.677311	-71.940768

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2195	Unnamed Tributary	2011	6	MassDEP aesthetics observations for station W2195/MAP2-037 on Unnamed Tributary can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2195	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2195	Unnamed Tributary	2011	Color	Light Yellow/Tan	4	6
W2195	Unnamed Tributary	2011	Color	None	1	6
W2195	Unnamed Tributary	2011	Color	Reddish	1	6
W2195	Unnamed Tributary	2011	Objectionable Deposits	No	6	6
W2195	Unnamed Tributary	2011	Odor	None	6	6
W2195	Unnamed Tributary	2011	Scum	No	1	6
W2195	Unnamed Tributary	2011	Scum	Yes	5	6
W2195	Unnamed Tributary	2011	Turbidity	None	6	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from this Unnamed Tributary AU (MA35-26) between the outlet of Lake Watatic and the inlet of Lower Naukeag Lake, ~20 meters downstream of Cross Road in Ashburnham (W2195) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 16 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for this Unnamed Tributary (MA35-26) is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2195	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary, outlet Lake Watatic/inlet Lower Naukeag Lake, approximately 70 feet downstream of Cross Road, Ashburnham]	42.677311	-71.940768

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

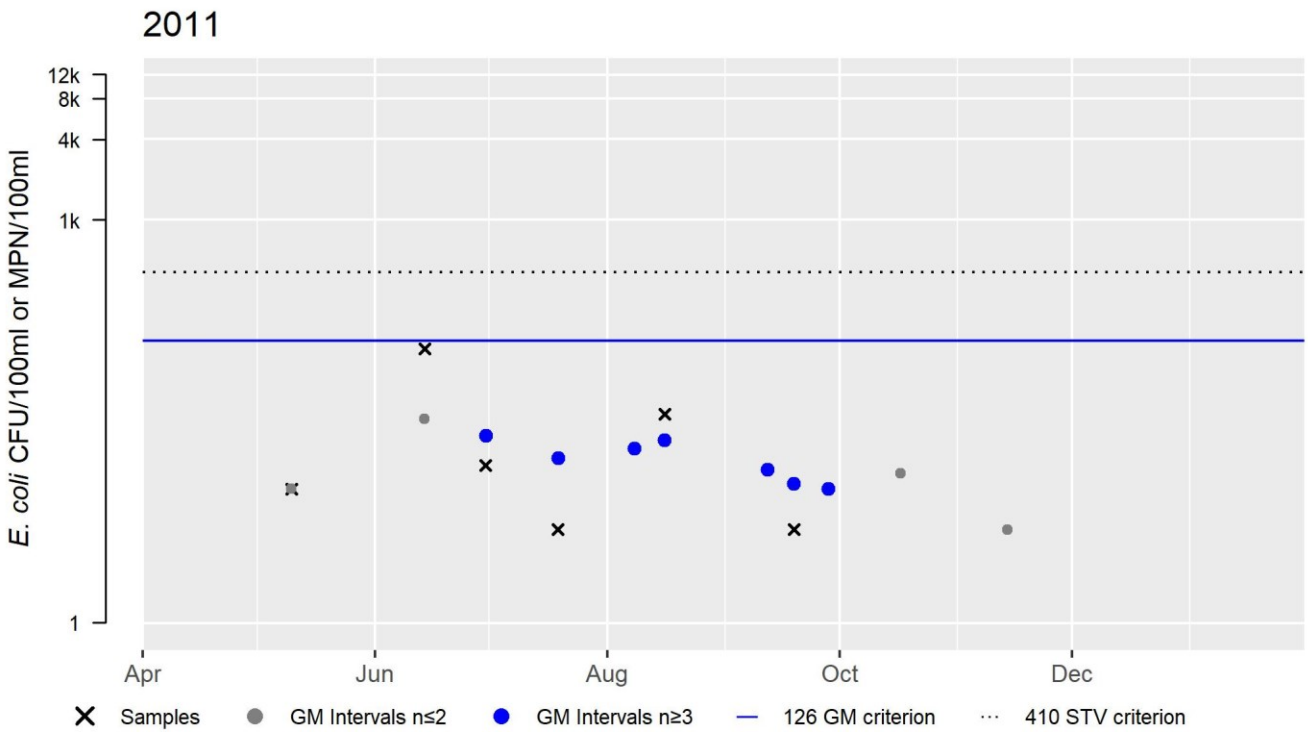
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2195	MassDEP	E. coli	05/10/11	09/19/11	6	5	110	16

W2195 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	16
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff collected *E. coli* bacteria samples from this Unnamed Tributary AU (MA35-26) between the outlet of Lake Watatic and the inlet of Lower Naukeag Lake, ~20 meters downstream of Cross Road in Ashburnham (W2195) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 16 cfu/100 ml.
Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for this Unnamed Tributary (MA35-26) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2195	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary, outlet Lake Watatic/inlet Lower Naukeag Lake, approximately 70 feet downstream of Cross Road, Ashburnham]	42.677311	-71.940768

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

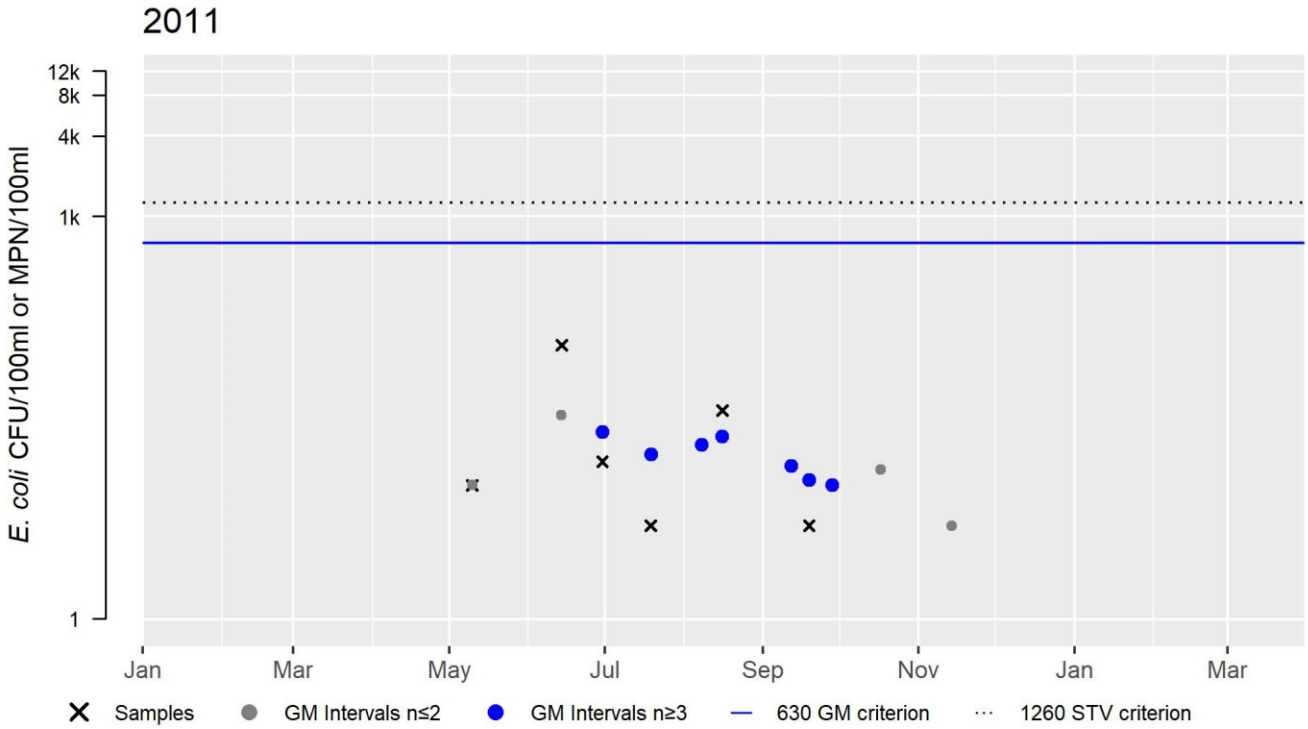
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2195	MassDEP	E. coli	05/10/11	09/19/11	6	5	110	16

W2195 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	16
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Upper Naukeag Lake (MA35090)

Location:	Ashburnham.
AU Type:	FRESHWATER LAKE
AU Size:	305 ACRES
Classification/Qualifier:	A: PWS, ORW

No usable data were available for Upper Naukeag Lake (MA35090) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	Mercury in Fish Tissue	33880	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Upper Reservoir (MA35091)

Location:	Westminster.
AU Type:	FRESHWATER LAKE
AU Size:	42 ACRES
Classification/Qualifier:	B

No usable data were available for Upper Reservoir (MA35091) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	Mercury in Fish Tissue	33880	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Wallace Pond (MA35092)

Location:	Ashburnham.
AU Type:	FRESHWATER LAKE
AU Size:	46 ACRES
Classification/Qualifier:	B

No usable data were available for Wallace Pond (MA35092) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Ward Pond (MA35093)

Location:	Athol.
AU Type:	FRESHWATER LAKE
AU Size:	6 ACRES
Classification/Qualifier:	B

No usable data were available for Ward Pond (MA35093) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

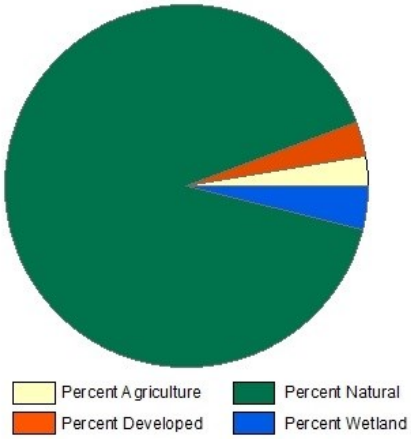
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

West Branch Tully River (MA35-11)

Location:	Outlet Sheomet Lake, Warwick to confluence with East Branch Tully River forming headwaters Tully River, Orange/Athol.
AU Type:	RIVER
AU Size:	6.6 MILES
Classification/Qualifier:	B

West Branch Tully River - MA35-11

Watershed Area: 18.08 sq Miles including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	17.88	5.14	3.57	1.2
Agriculture	2.6%	5.1%	2.5%	6.6%
Developed	3.1%	5%	3.7%	6.8%
Natural	90.4%	85%	81.9%	70.8%
Wetland	3.9%	4.9%	11.9%	15.8%
Impervious Cover	1%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged
5	5	Temperature		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			
Temperature	Dam or Impoundment (Y)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert

Not Supporting	NO
2022 Use Attainment Summary	
MassDEP biologists sampled the West Branch Tully River ~1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road in Orange during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community (B0718) sample, collected in July 2011, had an IBI score of 61 (indicative of satisfactory conditions for a high gradient Central Hills region stream). Barge electrofishing (Sample ID 4579) in August 2011 documented a sample that was well represented (90%) by seven fluvial specialist/dependent species although only one Eastern brook trout was in the sample (161mm). Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2197) can be summarized as follows: minimum dissolved oxygen 6.4mg/L during three short term DO deploys, maximum temperature 23.6°C between June 1st and September 15th with 7DADM exceeding 20°C 70 times. The maximum 24-hour rolling average temperature was 22.7°C, pH ranged from 6.1 to 6.5SU (n=6), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was 0.011mg/L, max diel DO shift only 0.8mg/L, maximum saturation 92%, maximum pH 6.5SU, and no observations of any dense/very dense filamentous algae during five site visits). There were no toxicant issues (maximum total ammonia-nitrogen concentration was 0.02mg/L, chloride was 6mg/L (n=5), and there were no exceedances of any of clean metals or aluminum samples (n=3) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out). While the benthic macroinvertebrate and most of the water quality monitoring data collected by MassDEP biologists during the summer of 2011 were indicative of good conditions, the Aquatic Life Use for the West Branch Tully River will continue to be assessed as Not Supporting with the Temperature impairment being carried forward. Although not a designated Cold Water fishery in the SWQS, this river supported an Existing Tier 1 Cold Water Fishery use since multiple age classes of Eastern brook trout were collected by DFG biologists in the river in July 2000 (MassDEP Undated 7). One Eastern brook trout was in the August 2011 sample but temperature frequently exceeded 20°C (maximum temperature 23.6°C between June 1st and September 15th with 7DADM exceeding 20°C 70 times) and since there is a dam at the outlet of Sheomet Lake, the elevated temperature cannot be considered naturally occurring in this otherwise mostly undeveloped watershed.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4579	MassDEP	Fish Community	West Branch Tully River	Downstream Tully Rd, nearest Creamery Hill Rd, Orange	42.64254	-72.25737
B0718	MassDEP	Benthic	West Branch Tully River/	[approximately 370 meters downstream from the Tully Road crossing nearest Creamery Hill Road, Orange, MA]	42.642539	-72.257365
W2197	MassDEP	Water Quality	West Branch Tully River	[approximately 1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road, Orange]	42.642539	-72.257365

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0718	07/07/11	RBP kicknet	Central_Hills_100ct	109	61	S

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	West Branch Tully River -- Downstream Tully Rd, nearest Creamery Hill Rd, Orange (42.64254, 72.25737)		
Habitat Comments	DEP barge survey. Fair efficiency shocking		
Efficiency	(Seconds Shocked -)		
Sample Date	**Species**	11	
08/11/11	**Total Ind**	134	
Method	**% Dom**	30%	
DEP Barge Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	5	74%
3523175	FD	2	16%
	MG	4	10%
	Tolerant	**Species**	**% Ind**
	I	1	1%
	M	8	66%
	T	2	33%
	SampleID	4579	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
Blacknose dace	BND	31	49	80	CW	FS	T	Generalist Feeder
Chain pickerel	CP	1	80	80	W	MG	M	Top Carnivore
Common shiner	CS	8	82	122	CW	FD	M	Generalist Feeder
Brook trout	EBT	1	161	161	C	FS	I	Top Carnivore
Fallfish	F	40	84	161	CW	FS	M	Generalist Feeder
Largemouth bass	LMB	2	61	80	W	MG	M	Top Carnivore
Longnose dace	LND	25	60	119	CW	FS	M	Benthic Insectivore
Pumpkinseed	P	1	60	60	W	MG	M	Generalist Feeder
Tesselated darter	TD	2	50	68	CW	FS	M	Benthic Insectivore
White sucker	WS	13	47	130	CW	FD	T	Generalist Feeder
Yellow perch	YP	10	92	110	CW	MG	M	Top Carnivore

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2197	2011	3	12	6.4	6.6	6.8	0.8	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2197	05/11/11	10/05/11	6	6.7	7.3	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2197	06/01/11	09/15/11	107	107	22.4	23.6	22.3	21.3	70	0	6	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2197	2011	3	12	22.3	23.5	22.1	21.0	2	0	0	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2197	06/01/11	09/15/11	107	5136	22.7	0	0	0
W2197	06/03/11	08/10/11	68	569	22.6	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2197	05/11/11	10/05/11	7	6	21.8	18.7	4	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2197	05/11/11	10/05/11	6	6.1	6.5	2	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2197	2011	5	0.008	0.016	0.011	0.8	0.4	91.6	6.5	5	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)
[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2197	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)
[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2197	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)
[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2197	07/06/11	0.9	0.0	0.4	0.45	0.1	0.0
W2197	07/28/11	0.4	0.6	0.2	0.25	0.1	0.0
W2197	09/01/11	0.6	0.9	0.5	0.64	0.1	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2197	2011	3	0.047	0.065	0.056	0.2	0.3	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2197	2011	5	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2197	2011	5	5	6	6	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2197	05/11/11	10/05/11	6	43	52	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary
Athough no fish toxics monitoring has been conducted in the West Branch Tully River, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020). Until site-specific data are generated, the Fish Consumption Use for West Branch Tully River will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff conducted sampling in the West Branch Tully River during the summer of 2011 ~1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road in Orange (W2197). There were no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at this sampling site. The Aesthetics Use for the West Branch Tully River will continue to be assessed as Fully Supporting based on the lack of objectionable conditions noted by MassDEP staff at the site sampled in the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2197	MassDEP	Water Quality	West Branch Tully River	[approximately 1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road, Orange]	42.642539	-72.257365

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2197	West Branch Tully River	2011	6	MassDEP aesthetics observations for station W2197/MAP2-041 on West Branch Tully River can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2197	2011	6	5	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2197	West Branch Tully River	2011	Color	Light Yellow/Tan	2	6
W2197	West Branch Tully River	2011	Color	None	3	6
W2197	West Branch Tully River	2011	Color	Reddish	1	6
W2197	West Branch Tully River	2011	Objectionable Deposits	No	6	6
W2197	West Branch Tully River	2011	Odor	None	6	6
W2197	West Branch Tully River	2011	Scum	No	6	6
W2197	West Branch Tully River	2011	Turbidity	None	4	6
W2197	West Branch Tully River	2011	Turbidity	Slightly Turbid	2	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples from the West Branch Tully River ~1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road in Orange (W2197) between May and September 2011 (n = 6). Data analysis indicated that 57% of the intervals had GMs > 126 cfu/100 ml, and one sample exceeded the 410 cfu/100 ml STV. The seasonal GM was 88 cfu/100 ml.
Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for the West Branch Tully River is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2197	MassDEP	Water Quality	West Branch Tully River	[approximately 1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road, Orange]	42.642539	-72.257365

Bacteria Data

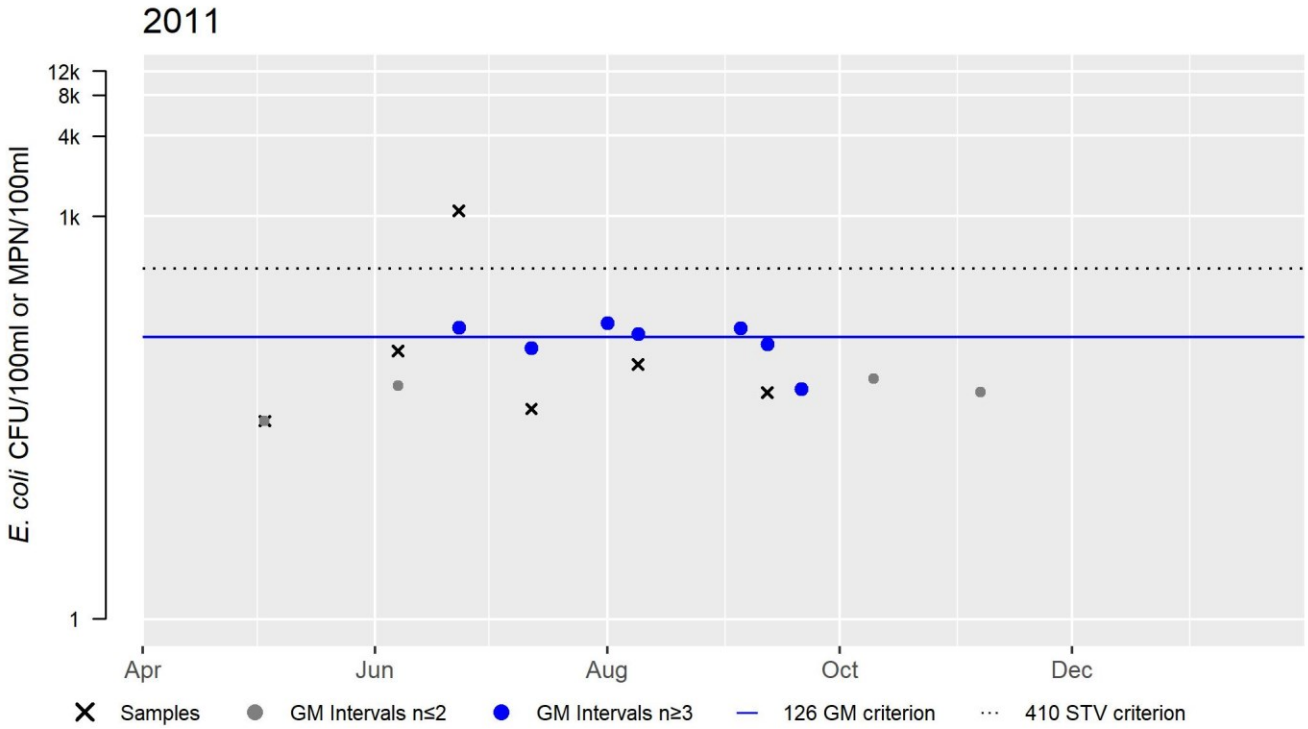
Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2197	MassDEP	E. coli	05/03/11	09/12/11	6	30	1100	88

W2197 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	88
#GMI	7
#GMI Ex	4
%GMI Ex	57
n>STV	1
%n>STV	17

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary
MassDEP staff collected *E. coli* bacteria samples from the West Branch Tully River ~1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road in Orange (W2197) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 88 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for the West Branch Tully River is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2197	MassDEP	Water Quality	West Branch Tully River	[approximately 1200 feet downstream from the Tully Road crossing nearest Creamery Hill Road, Orange]	42.642539	-72.257365

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

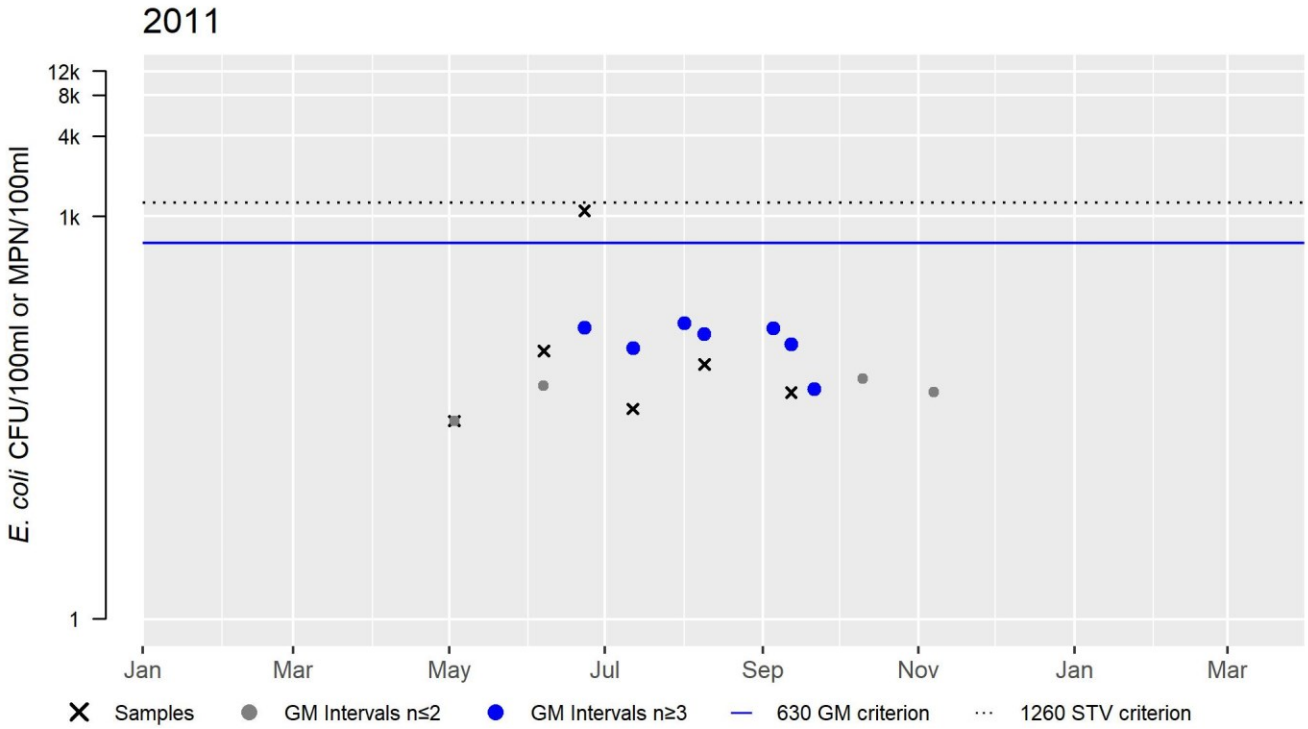
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2197	MassDEP	E. coli	05/03/11	09/12/11	6	30	1100	88

W2197 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	88
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV

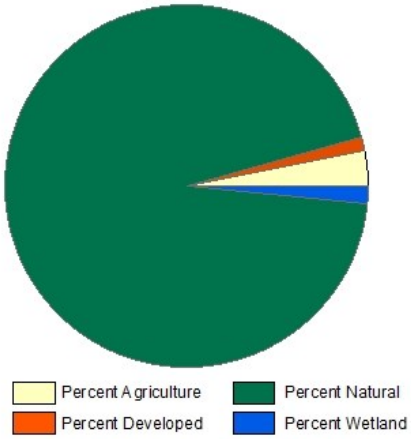


West Gulf Brook (MA35-24)

Location:	From headwaters west of Paine Swamp Road, Athol to confluence with Millers River, Athol.
AU Type:	RIVER
AU Size:	0.8 MILES
Classification/Qualifier:	B

West Gulf Brook - MA35-24

Watershed Area: 0.82 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	0.82	0.82	0.1	0.1
Agriculture	3.1%	3.1%	0%	0%
Developed	1.2%	1.2%	0.2%	0.2%
Natural	94.1%	94.1%	98.9%	98.9%
Wetland	1.6%	1.6%	0.9%	0.9%
Impervious Cover	0.3%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Recommendations

2022 Recommendations
ALU: Additional metal sampling, particularly given the several criteria exceedances (aluminum, copper, and lead chronic criteria TUs 1.1, 1.23, and 4.1, respectively) in July and September 2011 clean technique samples site W2183, n=2), should be a high priority to better evaluate potential metals toxicity in West Gulf Brook (MA35-24).

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

MassDEP biologists sampled West Gulf Brook downstream from Gulf Road in Athol during the summer of 2011 as part of the MAP2 Probabilistic Wadeable Streams monitoring project. Some of this information was previously reported (MassDEP Undated) although not all was available for the 2016 IR update. The benthic community (B0706) sample, collected in July 2011, had an IBI score of 77 (indicative of excellent conditions for a high gradient Central Hills region stream). Backpack electrofishing (SampleIDs 4574 and 4184) in August 2011 and July 2012 (that sample by DFG biologists) documented multiple age classes of Eastern brook trout indicative of excellent habitat conditions and both samples were comprised entirely by fluvial fish. Water quality sampling data including both deployed probe and discrete sampling efforts (Station W2183) can be summarized as follows: minimum dissolved oxygen 8.0mg/L during two short term DO deploys, maximum temperature 22.8°C between June 1st and September 15th with 7DADMs exceeding 20°C five times. The maximum 24-hour rolling average temperature was 21.4°C, pH ranged from 6.3 to 6.7U (n=6), and there was no indication of any nutrient enrichment problems (seasonal average total phosphorus concentrations was 0.017mg/L, max diel DO shift only 0.8mg/L, maximum saturation 97%, maximum pH 6.7SU, and no observations of any dense/very dense filamentous algae during six site visits). With the exception of one acute copper criteria exceedance (TU 1.0) and one of two sample chronic aluminum, copper, and lead criteria exceedances (TUs 1.1, 1.23, and 4.1, respectively), there were no other toxicant issues (maximum total ammonia-nitrogen concentration was 0.02mg/L, chloride was 3mg/L, n=5), and there were no other exceedances of any other clean metals or aluminum samples (n=2) although it should be noted that dissolved Al data were compared to total recoverable Al criteria, so exceedances cannot be ruled out).

The Aquatic Life Use for West Gulf Brook will continue to be assessed as Fully Supporting based on the benthic macroinvertebrate, fish population, and water quality monitoring data collected by MassDEP during the summer of 2011 and DFG fish sample data from July 2012. The former Alert for copper and lead criteria exceedances is being carried forward and aluminum is being added. Additional clean metals sampling is being recommended to better evaluate toxicity concerns.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4184	MassDEP	Fish Community	West Gulf Brook	Gulf Rd DS crossing, Athol	42.62597	-72.19433
4575	MassDEP	Fish Community	West Gulf Brook	~440ft DS of Gulf Rd, Athol	42.62532	-72.19503
B0706	MassDEP	Benthic	West Gulf Brook/	[approximately 135 meters downstream from Gulf Road, Athol, MA]	42.625320	-72.195029
W2183	MassDEP	Water Quality	West Gulf Brook	[approximately 440 feet downstream from Gulf Road, Athol]	42.625320	-72.195029

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)

[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0706	07/12/11	RBP kicknet	Central_Hills_100ct	100	77	E

Fish Community Data and DELTS

Fish Community Data (2011-2019) Provided by MassDFG. (MassDFG 2018) (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	West Gulf Brook -- Gulf Rd DS crossing, Athol (42.62597, 72.19433)		
Habitat Comments	Many small pools w/ mixed substrate. No crawfish, many frogs. Fish spread throughout stream. Many rocks causing small gradual step pools. Little sediment. Brookies ranging from 130-44 with a total of 33. vegetation growth to stream, w/ hemlock & hardwood		
Efficiency	(Seconds Shocked - 626)		
Sample Date	**Species**	2	
07/25/12	**Total Ind**	70	
Method	**% Dom**	53%	
Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	2	100%
3523475	FD	0	0%
	MG	0	0%
	Tolerant	**Species**	**% Ind**
	I	1	47%
	M	0	0%
	T	1	53%
	SampleID	4184	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
Blacknose dace	BND	37	37	62	CW	FS	T	Generalist Feeder
Brook trout	EBT	33	41	115	C	FS	I	Top Carnivore

Station Description	West Gulf Brook -- ~440ft DS of Gulf Rd, Athol (42.62532, 72.19503)		
Habitat Comments	DEP survey. Upper half reach higher quality than lower reach. Riffles more prevelant in upper reach than lower.		
Efficiency	(Seconds Shocked - 1196)		
Sample Date	**Species**	3	
08/05/11	**Total Ind**	29	
Method	**% Dom**	83%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**

Saris/Palis	FS	3	100%
3523475	FD	0	0%
	MG	0	0%
	Tolerant	**Species**	**% Ind**
	I	1	83%
	M	1	14%
	T	1	3%
	SampleID	4574	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
Blacknose dace	BND	1	60	60	CW	FS	T	Generalist Feeder
Brook trout	EBT	24	50	148	C	FS	I	Top Carnivore
Longnose dace	LND	4	69	92	CW	FS	M	Benthic Insectivore

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W2183	2011	2	8	8	8.4	8.6	0.8	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W2183	05/11/11	10/05/11	6	8.4	8.9	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W2183	06/01/11	09/15/11	107	107	21.4	22.8	20.7	19.6	5	0	0	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W2183	2011	3	12	19.6	21.4	20.3	19.2	1	0	0	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W2183	06/01/11	09/15/11	107	5136	21.4	0	0	0
W2183	06/03/11	08/10/11	68	570	20.1	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W2183	05/11/11	10/05/11	7	6	19.1	16.3	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W2183	05/11/11	10/05/11	6	6.3	6.7	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W2183	2011	5	0.006	0.028	0.017	0.8	0.6	96.8	6.7	6	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CMC TU >1	Cd CMC TU >1	Cr III CMC TU >1	Cu CMC TU >1	Pb CMC TU >1	Ni CMC TU >1	Ag CMC TU >1	Zn CMC TU >1
W2183	2011	2	0	0	0	1	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 8) (MassDEP Undated 6)

[CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Metals Count	As CCC TU >1	Cd CCC TU >1	Cr III CCC TU >1	Cu CCC TU >1	Pb CCC TU >1	Ni CCC TU >1	Se CCC TU >1	Zn CCC TU >1
W2183	2011	2	0	0	0	1	1	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 8) (MassDEP Undated 6)

[CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Sample Date	Cd CMC TU	Cd CCC TU	Cu CMC TU	Cu CCC TU	Pb CMC TU	Pb CCC TU
W2183	07/28/11	0.6	0.0	0.7	0.78	0.2	4.1
W2183	09/01/11	0.8	0.0	1.0	1.23	0.2	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Since only dissolved aluminum data were available, these data were compared to the default freshwater criteria for total recoverable aluminum (TRA), presented in Appendix E of MassDEP's 2022 CALM. As dissolved Al is a fraction of TRA, an exceedance count of 0 does not rule out violations of the TRA criteria. CMC= Criterion Maximum Concentration, CCC= Criterion Continuous Concentration, TU= Toxic Unit]

Station Code	Data Year	Dissolved Al Count	Al Min (mg/L)	Al Max (mg/L)	Al Avg (mg/L)	Al CMC TU Max	Al CCC TU Max	Al CMC TU >1	Al CCC TU >1
W2183	2011	2	0.130	0.22	0.175	0.7	1.1	0	1

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2183	2011	5	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2183	2011	5	2	3	2	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W2183	05/11/11	10/05/11	6	22	26	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

Athough no fish toxics monitoring has been conducted in West Gulf Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020) .

Until site-specific data are generated, the Fish Consumption Use for West Gulf Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

MassDEP staff conducted sampling in the West Gulf Brook during the summer of 2011 downstream from Gulf Road in Athol (W2183). There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews at this sampling site.

The Aesthetics Use for West Gulf Brook will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions noted by MassDEP staff at the site sampled in the summer of 2011.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2183	MassDEP	Water Quality	West Gulf Brook	[approximately 440 feet downstream from Gulf Road, Athol]	42.625320	-72.195029

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2183	West Gulf Brook	2011	6	MassDEP aesthetics observations for station W2183/MAP2-013 on West Gulf Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2183	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2183	West Gulf Brook	2011	Color	Light Yellow/Tan	2	6
W2183	West Gulf Brook	2011	Color	None	3	6
W2183	West Gulf Brook	2011	Color	Reddish	1	6
W2183	West Gulf Brook	2011	Objectionable Deposits	No	6	6
W2183	West Gulf Brook	2011	Odor	None	6	6
W2183	West Gulf Brook	2011	Scum	No	5	6
W2183	West Gulf Brook	2011	Scum	Yes	1	6
W2183	West Gulf Brook	2011	Turbidity	None	6	6

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from West Gulf Brook downstream from Gulf Road in Athol (W2183) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 126 cfu/100 ml, and no samples exceeded the 410 cfu/100 ml STV. The seasonal GM was 45 cfu/100 ml. Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Primary Contact Recreational Use for West Gulf Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2183	MassDEP	Water Quality	West Gulf Brook	[approximately 440 feet downstream from Gulf Road, Athol]	42.625320	-72.195029

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

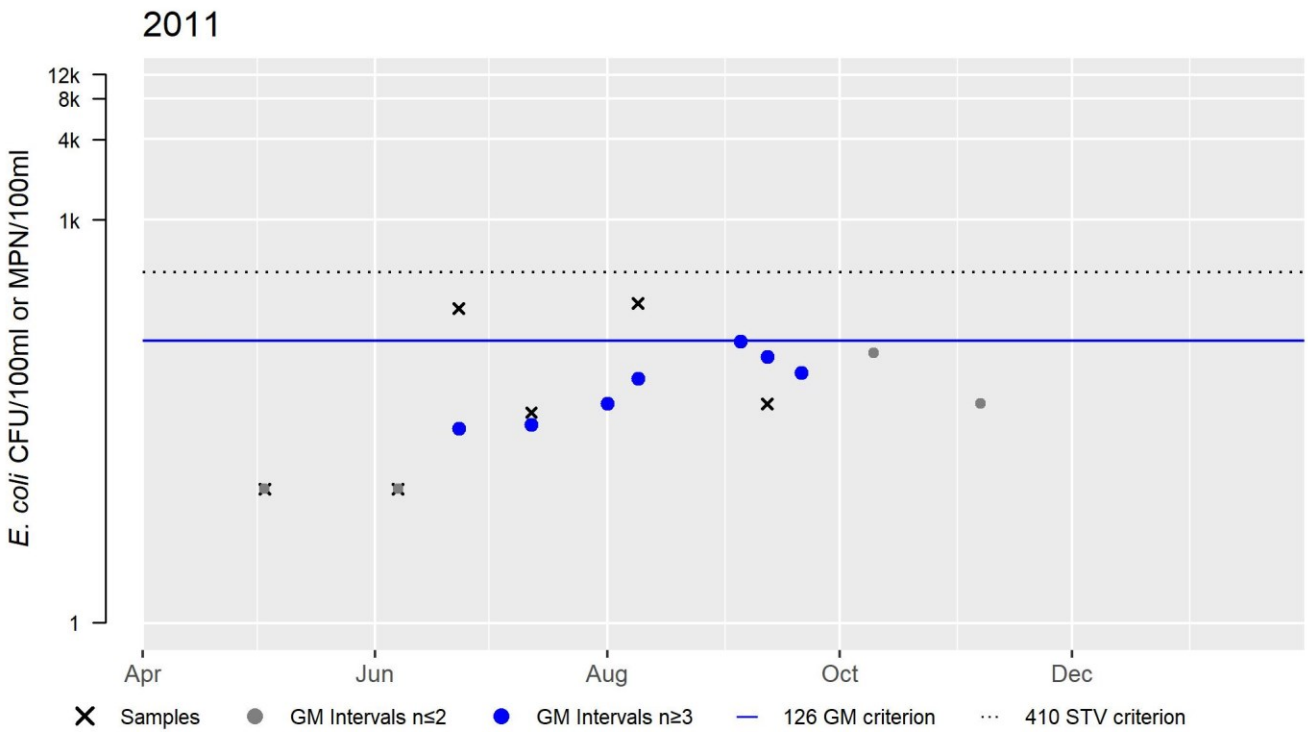
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2183	MassDEP	E. coli	05/03/11	09/12/11	6	10	240	45

W2183 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	45
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

MassDEP staff collected *E. coli* bacteria samples from West Gulf Brook downstream from Gulf Road in Athol (W2183) between May and September 2011 (n = 6). Data analysis indicated that 0% of the intervals had GMs > 630 cfu/100 ml, and no samples exceeded the 1260 cfu/100 ml STV. The seasonal GM was 45 cfu/100 ml.
Since the *E. coli* concentrations did not exceed the use attainment impairment threshold for this single year limited low frequency dataset, the Secondary Contact Recreational Use for West Gulf Brook is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2183	MassDEP	Water Quality	West Gulf Brook	[approximately 440 feet downstream from Gulf Road, Athol]	42.625320	-72.195029

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 8) (MassDEP Undated 6)

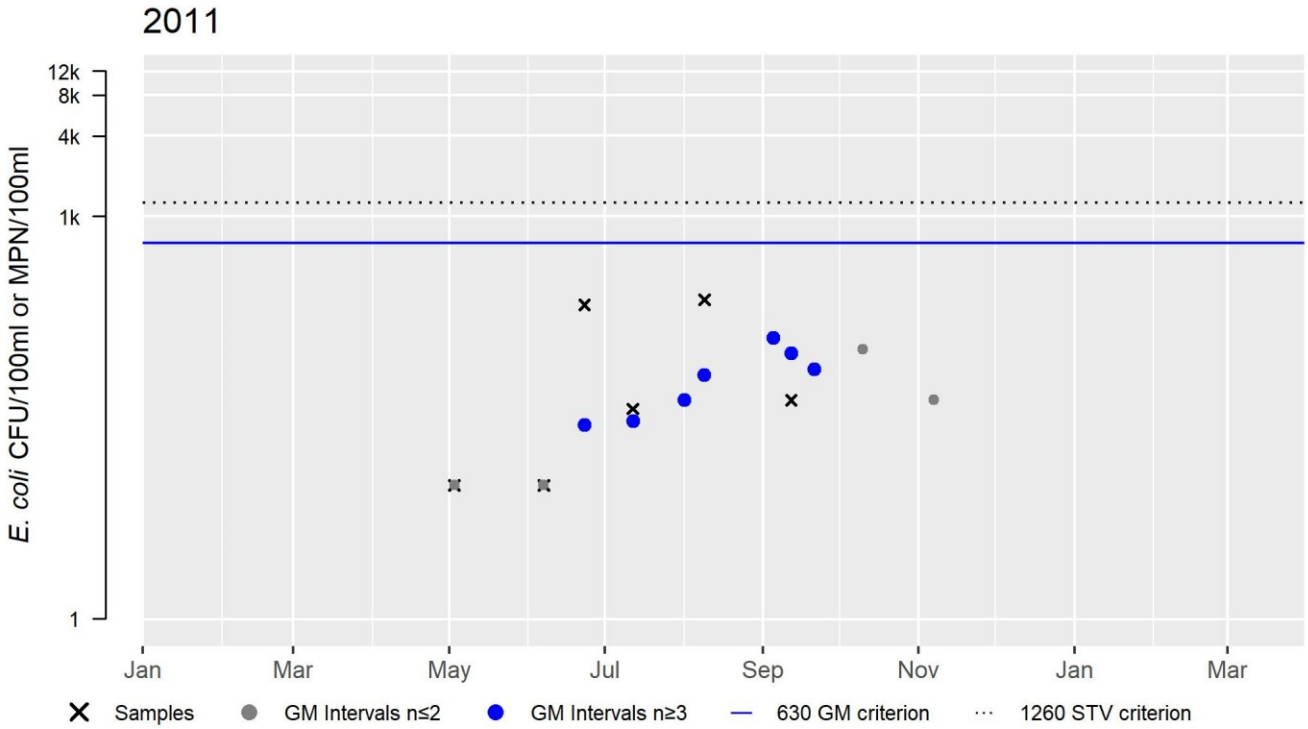
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result (CFU/100ml or MPN/100ml)	Maximum Sample Result (CFU/100ml or MPN/100ml)	Seasonal Geometric Mean (CFU/100ml or MPN/100ml)
W2183	MassDEP	E. coli	05/03/11	09/12/11	6	10	240	45

W2183 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	45
#GMI	7
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



Wheelers Pond (MA35097)

Location:	Warwick.
AU Type:	FRESHWATER LAKE
AU Size:	28 ACRES
Classification/Qualifier:	B

No usable data were available for Wheelers Pond (MA35097) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

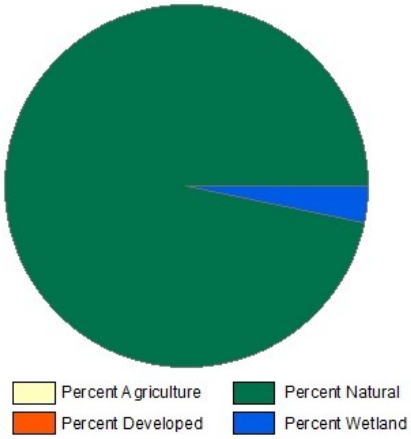
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Whetstone Brook (MA35-18)

Location:	Headwaters northeast of Orcutt Hill near New Salem Rd, Wendell to confluence with Millers River, Wendell.
AU Type:	RIVER
AU Size:	4.9 MILES
Classification/Qualifier:	B

Whetstone Brook - MA35-18

Watershed Area: 5.25 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.25	3.5	1.3	0.94
Agriculture	0%	0%	0%	0%
Developed	0.6%	0.4%	0.7%	0.8%
Natural	96.2%	97.8%	92.5%	94.2%
Wetland	3.2%	1.7%	6.8%	5.1%
Impervious Cover	0.3%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	PCBs in Fish Tissue		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
PCBs in Fish Tissue	Contaminated Sediments (Y)		X			
PCBs in Fish Tissue	Releases from Waste Sites or Dumps (Y)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

MassDEP biologists sampled Whetstone Brook downstream of Kentfield Road (Kempfield Road) in Wendell MA during the summers of 2011, 2012, 2013, 2014, 2015, and 2017 as part of the Reference Site Network monitoring project. Survey results of this Existing Use Tier 1 Cold Water habitat can be briefly summarized as follows: the benthic community (Station B0699) IBI scores were all indicative of excellent/satisfactory conditions compared to the Central_Hills_100ct Index (61 to 81, n=8), backpack electrofishing samples in August/September documented samples comprised almost entirely by fluvial fish including multiple age classes of Eastern brook trout (SampleIDs 4594, 5012, 5086, 6325, 6380, 7064), and water quality sampling data including both deployed probe and discrete sampling efforts (Station W0293) were indicative of generally excellent conditions. A brief summary of the water quality data is as follows: (minimum dissolved oxygen 8.0mg/L during short-term deploy summer 2011 and longer-term (May to September) deploys summers 2012, 2013, 2014, 2015, and 2017, maximum temperature 23.6°C during long term deploys summer deploys (June to September) with only one year (2012) that 7DADMs exceeded 20°C more than 11 times and a maximum 24 hour rolling average of 22.1°C. The pH was generally low (range 5.6 to 6.8SU and below 6.0SU five of 21 measurements), and there were no indications of any nutrient enrichment problems (seasonal average total phosphorus concentrations ranged from 0.005to 0.019mg/L, max diel DO shift 1.4mg/L, maximum saturation 101%, maximum pH 6.8SU, and no observations of any dense/very dense filamentous algae during the 25 site visits). There were low concentrations of total ammonia-nitrogen (0.098mg/L) and chloride (maximum 4mg/L) (n=23 measurements).
The Aquatic Life Use of Whetstone Brook is assessed as Fully Supporting based on benthic macroinvertebrate, fish population, and water quality monitoring data collected by MassDEP and MA DFG biologists between 2011 and 2017. The former Alert for low pH will be carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
4594	MassDEP	Fish Community	Whetstone Brook	~160ft DS of Kentfield Rd, DEP reference site WB01, Wendell	42.58709	-72.35719
5012	MassDEP	Fish Community	Whetstone Brook	~160ft DS of Kempfield Rd	42.58709	-72.35719
5086	MassDEP	Fish Community	Whetstone Brook	~160 ft DS of Kempfield Rd @ northern most xing on Kempfield rd	42.58709	-72.35719
6325	MassDEP	Fish Community	Whetstone Brook	Approx 160 ft DS of Kentfield Rd (Kempfield Rd), Wendell	42.58709	-72.35719
6380	MassDEP	Fish Community	Whetstone Brook	From above (site?) to US end of bridge, Wendell	42.58709	-72.35719
7064	MassDEP	Fish Community	Whetstone Brook	Kentfield Rd, Wendell	42.58709	-72.35720
B0699	MassDEP	Benthic	Whetstone Brook/	[approximately 50 meters downstream of Kentfield Road (Kempfield Road), Wendell, MA]	42.587089	-72.357188
W0293	MassDEP	Water Quality	Whetstone Brook	[approximately 160 feet downstream of Kentfield Road (Kempfield Road), Wendell]	42.587089	-72.357188

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 5)
[Index Biological Condition Class: E= Exceptional, S= Satisfactory, MD= Moderately Degraded, SD= Severely Degraded; High Gradient IBI Thresholds: E= 100-75, S= 74-55, MD= 54-35, SD= 34-0; Low Gradient IBI Thresholds: E= 100-81, S= 80-62, MD= 61-38, SD= 37-0; R qualifier = Rarefaction (100ct) <55]

Station Code	Collection Date	Collection Method	Index Type	Organism Count	Index Score	Index Biological Condition Class
B0699	04/28/11	RBP kicknet	Central_Hills_100ct	99	81	E
B0699	07/27/11	RBP kicknet	Central_Hills_100ct	103	61	S
B0699	04/24/12	RBP kicknet	Central_Hills_100ct	88	73	S
B0699	09/06/12	RBP kicknet	Central_Hills_100ct	107	79	E
B0699	08/07/13	RBP kicknet	Central_Hills_300ct	278	77	E
B0699	08/12/14	RBP kicknet	Central_Hills_300ct	291	76	E
B0699	07/28/15	RBP kicknet	Central_Hills_300ct	290	74	S
B0699	07/14/17	RBP kicknet	Central_Hills_300ct	300	70	S

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 3)

[Sample Type: TP= Total Pickup, SP= Selective Pickup, Method: BT=Boat Shocking, BP= Backpack Shocking, BG= Barge Shocking, SE= Seine, SL= Snorkel, NS= Not Stated, MT= Minnow Trap, GN= Gillnet, FY= Fyke Net]

[Species List: BT = Brown Trout, EBT = Brook Trout, LND = Longnose Dace, SL = Sea Lamprey, WS = White Sucker]

Sample ID	Sample Date	Method	Sample Type	Total Taxa	Total Ind	EBT Ind	EBT Min Length (mm)	EBT Max Length (mm)	EBT ≤140mm Ind	SC Ind	Cold Ind %	Fluvial Ind %	Notables	CFR	Species List
5012	08/08/12	BP	TP	3	81	74	50	225	64	0	91%	99%	No	Yes	EBT, SL, WS,
5086	09/24/13	NS	TP	3	77	62	46	251	56	0	82%	100%	No	Yes	BT, EBT, WS,
6325	09/23/14	NS	TP	2	64	55	60	190	51	0	86%	100%	No	Yes	EBT, WS,
6380	09/01/15	BP	TP	3	53	46	46	235	41	0	87%	94%	No	Yes	EBT, SL, WS,
7064	08/02/17	BP	TP	2	29	28	58	162	22	0	97%	100%	No	Yes	EBT, LND,

Fish Community Data (2011-2019) Provided by MassDFG. (MassDEP Undated 7)

[Habitat: FD = Fluvial Dependent, FS = Fluvial Specialist, MG = Macrohabitat Generalist; Tolerance: I = Intolerant, M = Moderately Tolerant, and T = Tolerant]

Station Description	Whetstone Brook -- ~160ft DS of Kentfield Rd, DEP reference site WB01, Wendell (42.58709, 72.35719)		
Habitat Comments	DEP survey. Road along entire right bank. Most fish caught, highest efficiency. A few EBT missed (~3-4).		
Efficiency	(Seconds Shocked - 1588)		
Sample Date	**Species**	4	
08/26/11	**Total Ind**	39	
Method	**% Dom**	85%	
DEP Backpack Shocking	**Habitat**	**Species**	**% Ind**
Saris/Palis	FS	2	87%
3522450	FD	1	10%
	MG	0	0%
	Tolerant	**Species**	**% Ind**
	I	2	87%
	M	1	3%

T	1	10%
SampleID	4594	

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function
Brown trout	BT	1	280	280	C	FS	I	Top Carnivore
Brook trout	EBT	33	51	190	C	FS	I	Top Carnivore
White sucker	WS	4	140	230	CW	FD	T	Generalist Feeder
Sea Lamprey	SL	1	160	160	CW	0	M	Parasitic Filterer

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Long-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[7DADMin= 7-Day Average of the Daily Minima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Day Count	7day Count	30day Count	DO Min (mg/L)	Min 7DADMin (mg/L)	Min 7DADA (mg/L)	Delta DO Max (mg/L)	Count CW 7DADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages 7DADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages 7DADMin <5.0	Count WW Other Life Stages 1Day Min <4.0	Count CW 30DADA <8.0	Count WW Other Life Stages 30DADA <6.0
W0293	05/22/13	10/07/13	139	133	110	8.4	8.7	8.9	1.3	0	0	0	0	0	0	0	0
W0293	06/04/14	09/10/14	99	93	70	8.8	9.2	9.4	0.7	0	0	0	0	0	0	0	0
W0293	05/22/15	09/15/15	117	111	88	8	8.4	8.8	1.4	0	0	0	0	0	0	0	0
W0293	05/18/17	09/26/17	132	126	103	8.5	8.8	9	1	0	0	0	0	0	0	0	0

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Note: Most deploys 3-5 days in length; Day Count= total # of days over all deploys; XDADMin= 3-5 Day Average of the Daily Minima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	DO Min (mg/L)	Min XDADMin (mg/L)	Min XDADA (mg/L)	Delta DO Max (mg/L)	Count CW XDADMin <6.0	Count CW 1Day Min <5.0	Count WW Early Life Stages XDADA <6.5	Count WW Early Life Stages 1Day Min <5.0	Count WW Other Life Stages XDADMin <5.0	Count WW Other Life Stages 1Day Min <4.0
W0293	2011	1	6	8.8	9	9.3	0.6	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0293	06/13/11	10/13/11	2	9	9.2	0	0	0
W0293	05/21/13	10/08/13	4	8.9	9.8	0	0	0

Station Code	Start Date	End Date	DO Count	DO Min (mg/L)	DO Avg (mg/L)	Count CW <5.0	Count WW Early Life Stages <5.0	Count WW Other Life Stages <4.0
W0293	06/16/14	09/11/14	4	9.1	9.9	0	0	0
W0293	06/18/15	09/16/15	4	8.9	9.5	0	0	0
W0293	06/28/17	09/27/17	4	8.8	9.3	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Max Daily Mean= Maximum 24-Hour Average, 7DADM= 7-Day Average of the Daily Maxima, 7DADA= 7-Day Average of the Daily Average, CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Index Count	7day Count	Max Daily Mean (°C)	Max Temp (°C)	Max 7DADM (°C)	Max 7DADA (°C)	Count CWTier1 7DADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 7DADA >21	Count CWTier2 Daily Mean >24.1	Count WW 7DADM >27.7	Count WW Daily Mean >28.3
W0293	06/14/11	09/15/11	94	91	20.9	22.9	20.8	19.4	7	0	0	0	0	0
W0293	06/01/12	09/15/12	107	107	20.7	22.1	20.8	19.4	11	0	0	0	0	0
W0293	06/01/13	09/15/13	107	107	21.9	23.6	22.3	21.0	23	0	0	0	0	0
W0293	06/01/13	09/15/13	107	107	21.9	23.6	22.3	21.0	23	0	0	0	0	0
W0293	06/04/14	09/10/14	99	93	19.6	20.8	19.3	18.2	0	0	0	0	0	0
W0293	06/01/15	09/15/15	107	104	19.6	21.1	20.4	19.0	4	0	0	0	0	0
W0293	06/01/17	09/15/17	107	107	19.2	20.5	19.7	18.6	0	0	0	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; Most Deploys 3-5 Days in Length; Day Count= total # of days over all deploys; Max Daily Mean= Maximum 24-Hour Average, XDADM= 3-5 Day Average of the Daily Maxima, XDADA= 3-5 Day Average of the Daily Average, CW= Coldwater, WW= Warmwater]

Station Code	Data Year	Deploys Count	Day Count	Max Daily Mean (°C)	Max Temp (°C)	Max XDADM (°C)	Max XDADA (°C)	Count CWTier1 XDADM >20	Count CWTier1 Daily Mean >23.5	Count CWTier2 XDADA >21	Count CWTier2 Daily Mean >24.1	Count WW XDADM >27.7	Count WW Daily Mean >28.3
W0293	2011	1	6	18.2	19.4	18.3	17.3	0	0	0	0	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater; NOTE: In the case of more than one row of data in the same year for a site, different types of temperature probes were deployed.]

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W0293	06/13/11	09/15/11	94	4482	20.9	0	0	0

Station Code	Start Date	End Date	Count Days Deployed	24hr Rolling Count	Max 24hr Avg Rolling Temp (°C)	Count CWTier1 24hr Avg Rolling >23.5 °C	Count CWTier2 24hr Avg Rolling >24.1 °C	Count WW 24hr Avg Rolling >28.3°C
W0293	06/01/12	09/15/12	107	5136	20.7	0	0	0
W0293	06/01/13	09/15/13	107	5136	22.0	0	0	0
W0293	06/01/13	09/15/13	107	5136	22.1	0	0	0
W0293	08/15/11	08/22/11	7	284	18.2	0	0	0
W0293	06/01/15	09/15/15	107	5136	19.6	0	0	0
W0293	06/03/14	09/11/14	100	4753	19.6	0	0	0
W0293	06/01/17	09/15/17	107	5136	19.2	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer Index is June 1 – Sept 15; CW= Coldwater, WW= Warmwater]

Station Code	Start Date	End Date	Temp Count	Index Count	Temp Max (°C)	Temp Avg (°C)	Count CW >20	Count CW >22	Count WW >28.3	Count WW >30.3
W0293	06/13/11	10/13/11	4	3	17.1	15.2	0	0	0	0
W0293	05/01/12	10/01/12	2	0	11.8	10.0	0	0	0	0
W0293	05/21/13	10/08/13	6	3	19.8	14.8	0	0	0	0
W0293	06/16/14	09/11/14	4	4	18.2	14.7	0	0	0	0
W0293	06/18/15	09/16/15	4	3	19.6	16.8	0	0	0	0
W0293	06/28/17	09/27/17	4	3	19.0	17.2	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	pH Count	pH Min (SU)	pH Max (SU)	pH Count <6.5 & >8.3	pH Count <6.0 & >8.8
W0293	06/13/11	10/13/11	1	6.6	6.6	0	0
W0293	05/21/13	10/08/13	4	5.6	6.4	4	3
W0293	06/16/14	09/11/14	4	5.6	6.2	4	2
W0293	06/18/15	09/16/15	4	6.4	6.8	2	0
W0293	06/28/17	09/27/17	4	6.2	6.8	3	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[Summer seasonal total phosphorus data collected May-Sept]

Station Code	Data Year	Seasonal TP Count	Seasonal TP Min (mg/L)	Seasonal TP Max (mg/L)	Seasonal TP Avg (mg/L)	Delta DO Max (mg/L)	Delta DO Avg (mg/L)	DO Sat Max (%)	pH Max (SU)	Count Algal Obsv.	Dense/V. Dense Film/Fila. Algae
W0293	2011	3	0.005	0.019	0.010	0.6	0.5	100.6	6.6	3	0
W0293	2012	4	0.005	0.007	0.006	--	--	--	--	5	0
W0293	2013	3	0.006	0.011	0.008	1.3	0.5	100.6	6.4	3	0
W0293	2014	4	0.005	0.005	0.005	0.7	0.5	99.3	6.2	4	0
W0293	2015	4	0.005	0.014	0.008	1.4	0.6	100.6	6.8	4	0
W0293	2017	4	0.0078	0.014	0.011	1.0	0.5	99.5	6.8	5	0

Toxics and other pollutants (metals, ammonia, chloride, chlorine)

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)
[TAN= NH3 + NH4+]

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W0293	2011	3	0.020	0.020	0.020	0	0
W0293	2012	5	0.020	0.020	0.020	0	0
W0293	2013	3	0.020	0.020	0.020	0	0
W0293	2014	4	0.020	0.020	0.020	0	0
W0293	2015	4	0.040	0.098	0.055	0	0
W0293	2017	4	0.040	0.040	0.040	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0293	2011	3	2	2	2	0	0
W0293	2012	5	2	2	2	0	0
W0293	2013	3	3	3	3	0	0
W0293	2014	4	2	2	2	0	0
W0293	2015	4	2	4	3	0	0
W0293	2017	4	4	4	4	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Start Date	End Date	SpCond Count	SpCond Min (µs/cm)	SpCond Max (µs/cm)	Count SpCond >904	Count SpCond >994	Count SpCond >3193	Count SpCond >3512	Consecutive sets >904	Consecutive sets >994
W0293	06/13/11	10/13/11	1	16	16	0	0	0	0	0	0
W0293	05/21/13	10/08/13	4	17	20	0	0	0	0	0	0
W0293	06/16/14	09/11/14	4	18	21	0	0	0	0	0	0
W0293	06/18/15	09/16/15	4	21	23	0	0	0	0	0	0
W0293	06/28/17	09/27/17	4	19	23	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

Athough no fish toxics monitoring has been conducted in Whetstone Brook, all tributaries to the Millers River are included in the current Millers River Fish Consumption Advisory. MA DPH advises "Children under 12, pregnant women, nursing mothers, women of child-bearing age not to eat any fish from the Millers River and its tributaries (between the confluence with the Otter River in Winchendon and the Connecticut River in Erving/Montague) while the general public should not eat American Eel or Brown Trout and limit other species to two meals/month due to PCB contamination" (MassDPH 2020) . Until site-specific data are generated, the Fish Consumption Use for Whetstone Brook will continue to be assessed as Not Supporting because of PCBs. The current source of PCBs in the watershed is contaminated sediments in the Otter and Millers Rivers. The original source of sediment contamination is believed to be located near the former Baldwinville Products Mill (property currently owned by American Tissue Mills, Inc.) and the Templeton WWTP and probably is related to historic discharge from the former Baldwinville Products Mill to the Otter River.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff conducted sampling in the Whetstone Brook during the summers of 2011 downstream of Kentfield Road (Kempfield Road) in Wendell (W0293) during the summers of 2011, 2012, 2013, 2014, 2015, and 2017 as part of the Reference Site Network monitoring project. Generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) were observed during the surveys. The Aesthetics Use for Whetstone Brook is assessed as Fully Supporting based on the general lack of any objectionable conditions at the sampling site documented by MassDEP staff during the summers of 2011, 2012, 2013, 2014, 2015, and 2017.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0293	MassDEP	Water Quality	Whetstone Brook	[approximately 160 feet downstream of Kentfield Road (Kempfield Road), Wendell]	42.587089	-72.357188

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 6)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0293	Whetstone Brook	2011	3	MassDEP aesthetics observations for station W0293 on Whetstone Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2011.
W0293	Whetstone Brook	2012	5	MassDEP aesthetics observations for station W0293 on Whetstone Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2012.
W0293	Whetstone Brook	2013	5	MassDEP aesthetics observations for station W0293 on Whetstone Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2013.

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0293	Whetstone Brook	2014	4	MassDEP aesthetics observations for station W0293 on Whetstone Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2014.
W0293	Whetstone Brook	2015	4	MassDEP aesthetics observations for station W0293 on Whetstone Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2015.
W0293	Whetstone Brook	2017	5	MassDEP aesthetics observations for station W0293 on Whetstone Brook can be summarized as follows: there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews during summer 2017.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 8) (MassDEP Undated 6)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0293	2011	3	3	0
W0293	2012	5	5	0
W0293	2013	5	3	0
W0293	2014	4	4	0
W0293	2015	4	4	0
W0293	2017	5	5	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 8)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0293	Whetstone Brook	2011	Color	Light Yellow/Tan	2	3
W0293	Whetstone Brook	2011	Color	None	1	3
W0293	Whetstone Brook	2011	Objectionable Deposits	No	3	3
W0293	Whetstone Brook	2011	Odor	None	3	3
W0293	Whetstone Brook	2011	Scum	No	2	3
W0293	Whetstone Brook	2011	Scum	Yes	1	3
W0293	Whetstone Brook	2011	Turbidity	None	3	3
W0293	Whetstone Brook	2012	Color	Light Yellow/Tan	3	5
W0293	Whetstone Brook	2012	Color	None	2	5
W0293	Whetstone Brook	2012	Objectionable Deposits	No	5	5
W0293	Whetstone Brook	2012	Odor	None	5	5
W0293	Whetstone Brook	2012	Scum	No	5	5
W0293	Whetstone Brook	2012	Turbidity	None	5	5
W0293	Whetstone Brook	2013	Color	Light Yellow/Tan	4	5
W0293	Whetstone Brook	2013	Color	None	1	5
W0293	Whetstone Brook	2013	Objectionable Deposits	No	5	5
W0293	Whetstone Brook	2013	Odor	None	5	5
W0293	Whetstone Brook	2013	Scum	No	3	5

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0293	Whetstone Brook	2013	Scum	Yes	2	5
W0293	Whetstone Brook	2013	Turbidity	None	5	5
W0293	Whetstone Brook	2014	Color	Light Yellow/Tan	1	4
W0293	Whetstone Brook	2014	Color	None	3	4
W0293	Whetstone Brook	2014	Objectionable Deposits	No	4	4
W0293	Whetstone Brook	2014	Odor	None	4	4
W0293	Whetstone Brook	2014	Scum	No	2	4
W0293	Whetstone Brook	2014	Scum	Yes	2	4
W0293	Whetstone Brook	2014	Turbidity	None	4	4
W0293	Whetstone Brook	2015	Color	Light Yellow/Tan	3	4
W0293	Whetstone Brook	2015	Color	None	1	4
W0293	Whetstone Brook	2015	Objectionable Deposits	No	4	4
W0293	Whetstone Brook	2015	Odor	None	4	4
W0293	Whetstone Brook	2015	Scum	No	4	4
W0293	Whetstone Brook	2015	Turbidity	None	4	4
W0293	Whetstone Brook	2017	Color	Light Yellow/Tan	2	5
W0293	Whetstone Brook	2017	Color	Reddish	3	5
W0293	Whetstone Brook	2017	Objectionable Deposits	No	5	5
W0293	Whetstone Brook	2017	Odor	None	5	5
W0293	Whetstone Brook	2017	Scum	No	3	5
W0293	Whetstone Brook	2017	Scum	Yes	2	5
W0293	Whetstone Brook	2017	Turbidity	None	4	5
W0293	Whetstone Brook	2017	Turbidity	Slightly Turbid	1	5

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Whetstone Brook, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Whetstone Brook, so it is Not Assessed.	

White Pond (MA35098)

Location:	Athol.
AU Type:	FRESHWATER LAKE
AU Size:	63 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Fanwort*)		Added
4c	4c	(Non-Native Aquatic Plants*)		Removed

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Fanwort*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Non-Native Aquatic Plants	Clarification of listing cause	The generic "Non-Native Aquatic Plants" impairment is being removed since the specific macrophyte Fanwort (Cabomba caroliniana) impairment is being added.

Non-Native Aquatic Plants

The generic "Non-Native Aquatic Plants" impairment is being removed since the specific macrophyte Fanwort (*Cabomba caroliniana*) impairment is being added.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (Cabomba caroliniana), in White Pond during an August 1995 synoptic survey. The Aquatic Life Use for White Pond will continue to be assessed as Not Supporting but the generic Non-Native Aquatic Plants impairment is being replaced with the species specific impairment Fanwort (*C. caroliniana*).	

Biological Monitoring Information

Non-native Aquatic Species Presence

MassDEP Non-Native Aquatic Invasive Species Records as of May 2021. (MassDEP 1995)

Summary Statement
As was previously reported, MassDEP staff identified an infestation of the non-native aquatic macrophyte, fanwort (*Cabomba caroliniana*), in White Pond during an August 1995 synoptic survey.

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in White Pond, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for White Pond, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for White Pond, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for White Pond, so it is Not Assessed.	

Whites Mill Pond (MA35099)

Location:	Winchendon.
AU Type:	FRESHWATER LAKE
AU Size:	42 ACRES
Classification/Qualifier:	B

No usable data were available for Whites Mill Pond (MA35099) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	(Aquatic Plants (Macrophytes)*)		Unchanged
4a	4a	Nutrient/Eutrophication Biological Indicators	4144	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
Nutrient/Eutrophication Biological Indicators	Agriculture (Y)			X	X	X
Nutrient/Eutrophication Biological Indicators	Rural (Residential Areas) (Y)			X	X	X

Whitney Pond (MA35101)

Location:	Winchendon.
AU Type:	FRESHWATER LAKE
AU Size:	97 ACRES
Classification/Qualifier:	B

No usable data were available for Whitney Pond (MA35101) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Aquatic Plants (Macrophytes)*)		Unchanged
5	5	Mercury in Fish Tissue		Unchanged
5	5	Turbidity	4145	Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Aquatic Plants (Macrophytes)*)	Agriculture (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Rural (Residential Areas) (Y)			X	X	X
(Aquatic Plants (Macrophytes)*)	Unspecified Urban Stormwater (Y)			X	X	X
Mercury in Fish Tissue	Source Unknown (N)		X			
Turbidity	Agriculture (Y)			X	X	X
Turbidity	Rural (Residential Areas) (Y)			X	X	X
Turbidity	Unspecified Urban Stormwater (Y)			X	X	X

Wickett Pond (MA35102)

Location:	Wendell.
AU Type:	FRESHWATER LAKE
AU Size:	30 ACRES
Classification/Qualifier:	B

No usable data were available for Wickett Pond (MA35102) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Wilson Brook (MA35-45)

Location:	Headwaters, Chestnut Hill Road, Warwick to mouth at confluence with Darling Brook, Warwick.
AU Type:	RIVER
AU Size:	1 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Wilson Brook (MA35-45) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	3	None		Unchanged

Wrights Reservoir (MA35104)

Location:	Gardner/Westminster.
AU Type:	FRESHWATER LAKE
AU Size:	131 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	5	Mercury in Fish Tissue		Added

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (N)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the Aquatic Life Use for Wrights Reservoir, so it is Not Assessed.	

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
MassDEP biologists conducted fish toxics sampling at Wrights Reservoir in Gardner/Westminster in May 2016 as part of the probabilistic lake surveys (MAP2). Because of elevated mercury measured in fish fillets, MassDPH issued the following fish consumption advisories: "Children younger than 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body." and "The general public should limit consumption of all fish from this water body to two meals per month." Since there is a site specific DPH advisory for elevated mercury in fish tissue, the Fish Consumption Use for Wrights Reservoir (MA35104) is assessed as Not Supporting. The likely source, although not confirmed, is atmospheric deposition.	

Data Sources: (MassDPH 2019, MassDEP 2016, MassDEP Undated 8)

MassDEP biologists conducted fish toxics sampling at Wrights Reservoir in Gardner/Westminster in May 2016 as part of the probabilistic lake surveys (MAP2). Because of elevated mercury measured in fish fillets, MassDPH issued the following fish consumption advisories:

- *"Children younger than 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body."*
- *"The general public should limit consumption of all fish from this water body to two meals per month."*

Since there is a site specific DPH advisory for elevated mercury in fish tissue, the Fish Consumption Use for Wrights Reservoir (MA35104) is assessed as Not Supporting. The likely source, although not confirmed, is atmospheric deposition.

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No data are available to assess the status of the Aesthetics Use for Wrights Reservoir, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Primary Contact Recreational Use for Wrights Reservoir, so it is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Wrights Reservoir, so it is Not Assessed.	

Data Sources

Bailey, Logan. "Email providing Harmful Algal Bloom advisory data (2015-2019) in the attached spreadsheet "HAB_Advisory_Data_forDEP"." Email to Laurie Kennedy (MassDEP Watershed Planning Program) and others with subject line "RE: Beaches Bill reporting data", Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA, April 15, 2021.

Bailey, Logan. "RE: Beaches Bill reporting data." Email to Dan Davis (MassDEP Watershed Planning Program) providing an Excel file (DEP_BeachDataRequest) with data for marine and DCR freshwater beaches, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA, MA, Feb. 2, 2021.

Baystate Environmental. "A Diagnostic/Feasibility Study for the Management of Lake Ellis." Prepared for the Town of Athol and the Massachusetts Division of Water Pollution Control, Baystate Environmental Consultants, Inc., East Longmeadow, MA, 1987.

Google Earth Pro. "Satellite Imagery of selected stream and lake/pond segments." Massachusetts, Undated.

Kashiwagi, M., and T. Richards. "Development of Target Fish Community Models for Massachusetts Mainstem Rivers Technical Report." Division of Fisheries and Wildlife, Massachusetts Department of Fish and Game, Westborough, Massachusetts, 2009.

Kennedy, Laurie E., and Alice M. Rojko. "Millers River Watershed 2000 Water Quality Assessment Report." CN 89.0, Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, 2004.

MA EOEEA. "Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form, Bowen's Pond Dam Removal and Osgood Brook Restoration, EEA #16209." The Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs, Boston, MA. June 26, 2020. https://eeaonline.eea.state.ma.us/EEA/emepa/mepadocs/2020/070820em/sc/enf/16209%20EENF%20Bowens%20Pond%20Dam%20Removal%20-%20Final%20SKT%20signed.pdf (accessed May 2021).

—. "State Environmental Officials Announce Completion of Dam Removal Projects in Athol and Phillipston." Massachusetts Office of Energy and Environmental Affairs. January 24, 2013. https://archives.lib.state.ma.us/bitstream/handle/2452/218687/ocn898221737-2013-01-24.pdf?sequence=1&isAllowed=y (accessed December 2021).

MassDCR. "Excel spreadsheet of non-native aquatic and wetland species in Massacusetts lakes and ponds (entitled "MA Waterbodies July 2008 Robinson working") revised July 17, 2008." Working version corrected by MassDEP Division of Watershed Management staff Laurie Kennedy and Richard McVoy as of April 23, 2009, Lakes and Ponds Program, Massachusetts Department of Conservation and Recreation, Boston, MA, 2008.

MassDEP. "2015 Scanned Project Files, Millers watershed *lake survey* data, 1995, D01-22.PDF." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, 1995.

—. "2016 DWM Environmental Monitoring Overview ." CN 442.0. 2016. https://www.mass.gov/doc/2016-environmental-monitoring-overview-0/download (accessed July 2021).

MassDEP. "Basis and rationale for assessing and listing waters in the MIllers River Watershed pursuant to the requirements of sections 305(b), 314 and 303(d) of the Clean Water Act: 2016 Reporting Cycle." Watershed Planning Program, Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, 2017.

MassDEP. *"Freshwater Aquatic Invasive* Species Database Open Project Files." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 1.

MassDEP. "Integrated Listing History 1992-2014 INTLIST_HISTORY.xlsx." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, 2015.

MassDEP. "Massachusetts Consolidated Assessment and Listing Methodology (CALM) Guidance Manual for the 2022 Reporting Cycle." CN 564.0, Watershed Planning Program, Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, 2022.

MassDEP. "Open file analysis of 2005-2017 fish community data in comparison with the Target Fish Community model." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, Massachusetts, Undated 2.

MassDEP. "Open file analysis of DFG 2012-2019 fish community data using 2022 CALM guidance." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 3.

MassDEP. "Open file analysis of external water quality data (potential date range 2011-2020) using 2022 CALM guidance." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 4.

MassDEP. "Open file analysis of MassDEP WPP benthic survey data (2011-2018) using 2022 CALM guidance." Watershed Planning Program, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 5.

MassDEP. "Open file analysis of MassDEP WPP water quality data collected between 2011 and 2018 using 2022 CALM guidance." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 6.

MassDEP. "Open files of repository documents for the 2016 Integrated Report cycle." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 7.

MassDEP. "Open files of unpublished, validated water quality monitoring data, field sheet data, and GIS datalayers in development." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, Undated 8.

MassDEP. "Scanned historical 305(b) and 303(d) coding sheets Millers1991_2002.pdf." Division of Watershed Management, Massachusetts Department of Environmental Protection, Worcester, MA, 2002.

MassDFG. Fish Community Data 1964-2019. Database submitted to MassDEP on 24 November 2020. Division of Fisheries and Wildlife, Massachusetts Department of Fish and Game. Westborough, MA, November 24, 2020.

MassDFG. *Fish Population Data 1998-2017.* Database. Prod. Division of Fisheries and Wildlife, Massachusetts Department of Fish and Game. Westborough, Massachusetts, 2018.

MassDPH. "Freshwater Fish Consumption Advisory List." Bureau of Environmental Health, Massachusetts Department of Public Health. July 2019. https://www.mass.gov/doc/public-health-freshwater-fish-consumption-advisories-2019-0/download (accessed 2020).

MassDPH. *"Freshwater Fish Consumption* Advisory List." Bureau of Environmental Health, Massachusetts Department of Public Health, 2020.

MassDPH. "Water quality at Massachusetts swimming beaches." 2016 and 2019 annual beach reports available at https://www.mass.gov/lists/water-quality-at-massachusetts-swimming-beaches, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA, Undated.

MRWC. *"2011-2015 water quality* monitoring data submitted to MassDEP WPP portal on 11/12/2015." Millers River Watershed Council, Athol, MA, 2015.

Straub, James. "Re: questions on several non-native species records." Email to Jenny Peet (MassDEP Watershed Planning Program), Lakes & Ponds Program, Department of Conservation & Recreation, Boston, MA, March 25, 2021.

Wildman, Nick. "Re: DER Dam Removals/Culvert Replacements: Islands, Millers, and Taunton." Email to Shannon Miranda (MassDEP Watershed Planning Program), Division of Ecological Restoration, Massachusetts Department of Fish and Game, Boston, MA, June 14, 2021.

Wildman, Nick. "Re: Millers: Bowen's Pond Dam Removal." Email to Shannon Miranda (MassDEP Watershed Planning Program) regarding Bowen's Pond Dam removal on Osgood Brook, Division of Ecological Restoration, Massachusetts Department of Fish and Game, Boston, MA, May 30, 2021.