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

Appendix 21
Quinebaug River Basin
Assessment and Listing Decision Summary

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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.

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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.

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2022 Cycle Impairment Changes

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Alum Pond	MA41001	5	5	Dissolved Oxygen		Unchanged
Breakneck Brook	MA41-28	2	2	None		Unchanged
Browns Brook	MA41-20	2	2	None		Unchanged
Cady Brook	MA41-05	5	5	(Dewatering*)		Unchanged
Cady Brook	MA41-05	5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
Cady Brook	MA41-06	5	5	(Dewatering*)		Unchanged
Cady Brook	MA41-06	5	5	Escherichia Coli (E. Coli)		Unchanged
Cady Brook	MA41-06	5	5	Nutrient/Eutrophication Biological Indicators		Unchanged
Cedar Pond	MA41008	4c	5	(Non-Native Aquatic Plants*)		Unchanged
Cedar Pond	MA41008	4c	5	Harmful Algal Blooms		Added
Cohasse Brook	MA41-12	5	5	Benthic Macroinvertebrates		Unchanged
Cohasse Brook	MA41-12	5	5	Escherichia Coli (E. Coli)		Unchanged
Cohasse Brook	MA41-12	5	5	Sedimentation/Siltation		Unchanged
East Brimfield Reservoir	MA41014	4a	4a	(Non-Native Aquatic Plants*)		Unchanged
East Brimfield Reservoir	MA41014	4a	4a	Mercury in Fish Tissue	33880	Unchanged
Glen Echo Lake	MA41017	5	5	Dissolved Oxygen		Unchanged
Hamant Brook	MA41-15	2	2	None		Unchanged
Hamilton Reservoir	MA41019	4c	4c	(Non-Native Aquatic Plants*)		Unchanged
Hatchet Brook	MA41-14	5	5	Temperature		Unchanged
Holland Pond	MA41022	4a	5	Harmful Algal Blooms		Added
Holland Pond	MA41022	4a	5	Mercury in Fish Tissue	33880	Unchanged
Hollow Brook	MA41-24	2	2	None		Unchanged
Lake George	MA41016	3	3	None		Unchanged
Leadmine Brook	MA41-21	3	3	None		Unchanged
Leadmine Pond	MA41027	3	3	None		Unchanged
Lebanon Brook	MA41-11	3	2	None		Unchanged
Little Alum Pond	MA41029	3	3	None		Unchanged
Mcintyre Pond	MA41031	3	3	None		Unchanged
Mckinstry Brook	MA41-13	5	5	(Debris*)		Unchanged
Mckinstry Brook	MA41-13	5	5	Escherichia Coli (E. Coli)		Unchanged
Mckinstry Brook	MA41-13	5	5	Trash		Unchanged
Mill Brook	MA41-07	4c	4c	(Non-Native Aquatic Plants*)		Unchanged
Monson Road Pond	MA41059	3	3	None		Unchanged
Morse Pond	MA41033	5	5	(Aquatic Plants (Macrophytes)*)		Unchanged
Morse Pond	MA41033	5	5	Dissolved Oxygen		Unchanged
Morse Pond	MA41033	5	5	Nutrient/Eutrophication Biological Indicators		Unchanged
Mountain Brook	MA41-18	3	3	None		Unchanged
New Boston Road Pond	MA41035	3	3	None		Unchanged

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
No. 3 Reservoir	MA41038	3	3	None		Unchanged
No. 4 Reservoir	MA41039	3	3	None		Unchanged
No. 5 Reservoir	MA41040	3	3	None		Unchanged
Pistol Pond	MA41057	5	5	(Aquatic Plants (Macrophytes)*)		Changed
Pistol Pond	MA41057	5	5	Dissolved Oxygen		Unchanged
Pistol Pond	MA41057	5	5	Nutrient/Eutrophication Biological Indicators		Added
Pistol Pond	MA41057	5	5	Transparency / Clarity		Unchanged
Prindle Lake	MA41043	3	3	None		Unchanged
Quinebaug River	MA41-01	5	5	(Non-Native Aquatic Plants*)		Unchanged
Quinebaug River	MA41-01	5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
Quinebaug River	MA41-01	5	5	Fish Bioassessments		Unchanged
Quinebaug River	MA41-01	5	5	Lack of a Coldwater Assemblage		Unchanged
Quinebaug River	MA41-01	5	5	Mercury in Fish Tissue		Unchanged
Quinebaug River	MA41-01	5	5	Temperature		Unchanged
Quinebaug River	MA41-02	5	5	(Debris*)		Unchanged
Quinebaug River	MA41-02	5	5	Algae		Unchanged
Quinebaug River	MA41-02	5	5	Lack of a Coldwater Assemblage		Unchanged
Quinebaug River	MA41-02	5	5	Trash		Unchanged
Quinebaug River	MA41-02	5	5	Turbidity		Unchanged
Quinebaug River	MA41-03	5	5	(Physical Substrate Habitat Alterations*)		Unchanged
Quinebaug River	MA41-03	5	5	Dissolved Oxygen		Unchanged
Quinebaug River	MA41-03	5	5	Escherichia Coli (E. Coli)		Unchanged
Quinebaug River	MA41-03	5	5	Fecal Coliform		Unchanged
Quinebaug River	MA41-03	5	5	Nutrients		Unchanged
Quinebaug River	MA41-04	5	5	Fecal Coliform		Unchanged
Quinebaug River	MA41-09	5	5	(Debris*)		Unchanged
Quinebaug River	MA41-09	5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
Quinebaug River	MA41-09	5	5	Benthic Macroinvertebrates		Unchanged
Quinebaug River	MA41-09	5	5	Trash		Unchanged
Quinebaug River	MA41-09	5	5	Turbidity		Unchanged
Railroad Pond	MA41058	4c	4c	(Non-Native Aquatic Plants*)		Unchanged
Rocky Brook	MA41-22	2	2	None		Unchanged
Sherman Pond	MA41046	4c	4c	(Non-Native Aquatic Plants*)		Unchanged
Sibley Pond	MA41047	5	5	Aquatic Plants (Macrophytes)		Removed
Sibley Pond	MA41047	5	5	Dissolved Oxygen		Unchanged
Sibley Pond	MA41047	5	5	Turbidity		Unchanged
Sibley Pond	MA41048	5	5	Aquatic Plants (Macrophytes)		Removed
Sibley Pond	MA41048	5	5	Dissolved Oxygen		Unchanged
Sibley Pond	MA41048	5	5	Turbidity		Unchanged
Stevens Brook	MA41-19	2	2	None		Unchanged
Sylvestri Pond	MA41049	4c	4c	(Non-Native Aquatic Plants*)		Unchanged

Waterbody	AU_ID	2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Tufts Branch	MA41-10	3	3	None		Unchanged
Unnamed Tributary	MA41-16	5	5	Benthic Macroinvertebrates		Unchanged
Unnamed Tributary	MA41-16	5	5	Dissolved Oxygen		Unchanged
Unnamed Tributary	MA41-16	5	5	Escherichia Coli (E. Coli)		Unchanged
Unnamed Tributary	MA41-16	5	5	Sedimentation/Siltation		Unchanged
Unnamed Tributary	MA41-23	2	2	None		Unchanged
Unnamed Tributary	MA41-25	3	3	None		Unchanged
Unnamed Tributary	MA41-26	2	2	None		Unchanged
Unnamed Tributary	MA41-27	3	3	None		Unchanged
Unnamed Tributary	MA41-29	2	5	Escherichia Coli (E. Coli)		Added
Wales Brook	MA41-08	3	3	None		Unchanged
Walker Pond	MA41052	4c	4c	(Non-Native Aquatic Plants*)		Unchanged
West Brook	MA41-17	5	5	Escherichia Coli (E. Coli)		Unchanged

Alum Pond (MA41001)

Location:	Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	198 ACRES
Classification/Qualifier:	B

No usable data were available for Alum Pond (MA41001) 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	Dissolved Oxygen		Unchanged

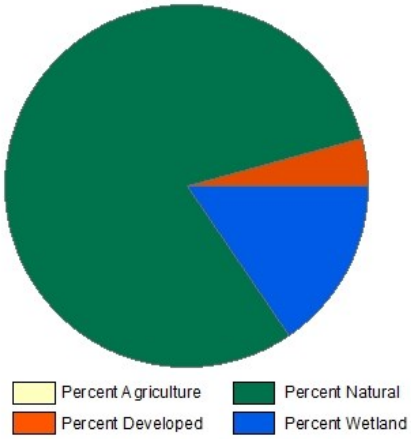
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Dissolved Oxygen	Source Unknown (N)	X				

Breakneck Brook (MA41-28)

Location:	Headwaters outlet Breakneck Pond, Sturbridge to mouth at confluence with Quinebaug River, Sturbridge.
AU Type:	RIVER
AU Size:	3.7 MILES
Classification/Qualifier:	B

BREAKNECK BROOK - MA41-28

Watershed Area: 3.03 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.03	2.58	1.07	0.98
Agriculture	0.9%	1%	1%	1.1%
Developed	4.2%	5%	2.8%	3.1%
Natural	79.6%	78.2%	72.4%	71.1%
Wetland	15.3%	15.8%	23.8%	24.8%
Impervious Cover	1.5%			

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

Recommendations

2022 Recommendations
ALU: MassDFG lists Breakneck Brook as a Coldwater Fishery Resource (CFR). Further investigation into whether or not there is a natural or man-made dam at the outlet of Breakneck Pond is needed to determine if the elevated temperatures are natural or need to be added as an impairment. Additional fish population and water temperature surveys could also be conducted to determine if indeed Breakneck Brook can support coldwater fish. *Potamogeton* species should be identified to assure it is not a non-native.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

MassDEP biologists conducted sampling in Breakneck Brook about one mile downstream of the MA/CT state line as part of the probabilistic stream surveys in 2011 and again for benthic macroinvertebrates as part of the reference site network surveys in 2012. The benthic community (Station B0707) IBI scores were both indicative of exceptional conditions (89 and 86) and the fish sample in this high gradient reach (SampleID 5016), collected in August 2012, was dominated by fluvial fish (77%) including one Eastern brook trout (148mm). As was previously reported in the 2018/2020 IR cycle (MassDEP 2021), physio-chemical water quality monitoring (W2184) during the summer of 2011 documented generally good conditions (minimum DO 7.1 mg/L, maximum DO saturation 97%, good pH, low nutrients (average total phosphorus concentration 0.014 mg/L), and very low chloride (maximum 3mg/L) and ammonia-nitrogen (<0.02 mg/L). A long-term thermistor was deployed from 26 May to 3 October. The long-term temperature deployment data, however, collected during the summer 2011 frequently exceeded 20°C (maximum 27.4, maximum daily average 25.1°C, and 114 exceedances above the 20°C 7DADM). While most of the watershed is well protected, the chronic temperature violations are of concern and likely result from Breakneck Pond. Whether or not there is a natural or man-made dam at the pond's outlet requires further investigation. MassDFG biologists also sampled the downstream section of Breakneck Brook (upstream of the River Road bridge in Sturbridge near the confluence with Quinebaug River) in August 2015 using a backpack electrofisher (SampleID 5651). Although no coldwater species were collected in this low gradient reach the sample was dominated by fluvial fishes (90%). MassDFG does list Breakneck Brook as a CFR and while it is currently not a designated Cold Water stream in the SWQS it needs to be protected as a Tier 1 Cold Water since multiple age classes of Eastern brook trout were collected in the fish sample collected by MassDEP biologists in September 2011 (SampleID: 4612).

The Aquatic Life Use for Breakneck Brook is assessed as Fully Supporting based on the exceptional condition of the benthic community, fish, and water quality monitoring data collected during the summers of 2011, 2012, and/or 2015. The former alert identified for elevated temperature which may or may not result from natural conditions is being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5016	MassDEP	Fish Community	Breakneck Brook	1mi DS of MA/CT state line	42.04216	-72.09715
5651	MassDFG	Fish Community	Breakneck Brook	River Rd US xing, Sturbridge	42.07610	-72.08392
B0707	MassDEP	Benthic	Breakneck Brook/	[approximately 1615 meters downstream from MA/CT state line, Sturbridge, MA]	42.042161	-72.097147
W2184	MassDEP	Water Quality	Breakneck Brook	[approximately 5290 feet downstream from MA/CT state line, Sturbridge]	42.042161	-72.097147

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)

[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
B0707	07/19/11	RBP multihab	Statewide_Low_Gradient	95	89	E
B0707	09/11/12	RBP multihab	Statewide_Low_Gradient	105	86	E

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, CM = Central Mudminnow, CP = Chain Pickerel, EBT = Brook Trout, F = Fallfish, P = Pumpkinseed, SMB = Smallmouth Bass, TD = Tesselated Darter, WS = White Sucker]

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
5016	08/16/12	BP	TP	H	8	35	3%	4	77%	3%	3	17%	No	Yes	B, BND, CM, CP, EBT, P, SMB, WS,
5651	08/26/15	BP	TP	L	7	48	0%	4	90%	0%	1	4%	No	Yes	B, BB, CM, CP, F, TD, WS,

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2184	2011	3	12	7.1	7.2	7.6	1	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2184	05/26/11	10/03/11	6	7.9	8.3	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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]

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
W2184	06/01/11	09/15/11	107	107	25.1	27.4	25.2	23.5	105	6	55	2	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2184	2011	3	12	22.2	24.5	24.0	21.9	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 5) (MassDEP Undated 4)

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

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
W2184	06/01/11	09/15/11	107	5136	25.1	248	119	0
W2184	06/24/11	09/07/11	75	578	22.6	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2184	05/26/11	10/03/11	8	6	22.4	19.6	4	1	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W2184	05/26/11	10/03/11	6	6.4	6.9	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2184	2011	4	0.011	0.016	0.014	1.0	0.7	97.2	6.9	5	0

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

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2184	2011	5	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2184	2011	5	2	3	2	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W2184	05/26/11	10/03/11	6	22	29	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 Breakneck Brook, therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews in Breakneck Brook ~ 5290 feet downstream from MA/CT state line, Sturbridge (W2184) during the summer 2011. The Aesthetics Use for Breakneck Brook will continue to be assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2184	MassDEP	Water Quality	Breakneck Brook	[approximately 5290 feet downstream from MA/CT state line, Sturbridge]	42.042161	-72.097147

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2184	Breakneck Brook	2011	6	MassDEP aesthetics observations for station W2184/MAP2-015 on Breakneck 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2184	2011	6	5	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2184	Breakneck Brook	2011	Color	Light Yellow/Tan	1	6
W2184	Breakneck Brook	2011	Color	None	4	6
W2184	Breakneck Brook	2011	Color	NR	1	6
W2184	Breakneck Brook	2011	Objectionable Deposits	No	6	6
W2184	Breakneck Brook	2011	Odor	None	6	6
W2184	Breakneck Brook	2011	Scum	No	5	6
W2184	Breakneck Brook	2011	Scum	Yes	1	6
W2184	Breakneck 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 Breakneck Brook ~ 5290 feet downstream from MA/CT state line, Sturbridge (W2184) between May and October 2011 (n=6) during the summer of 2011. Data analysis indicated 0% of the intervals had GMs >126 cfu/100ml, and none of the samples exceeded the 410 cfu/100ml STV. The seasonal GM was 36cfu/100ml. Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Primary Contact Recreational Use for Breakneck Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2184	MassDEP	Water Quality	Breakneck Brook	[approximately 5290 feet downstream from MA/CT state line, Sturbridge]	42.042161	-72.097147

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

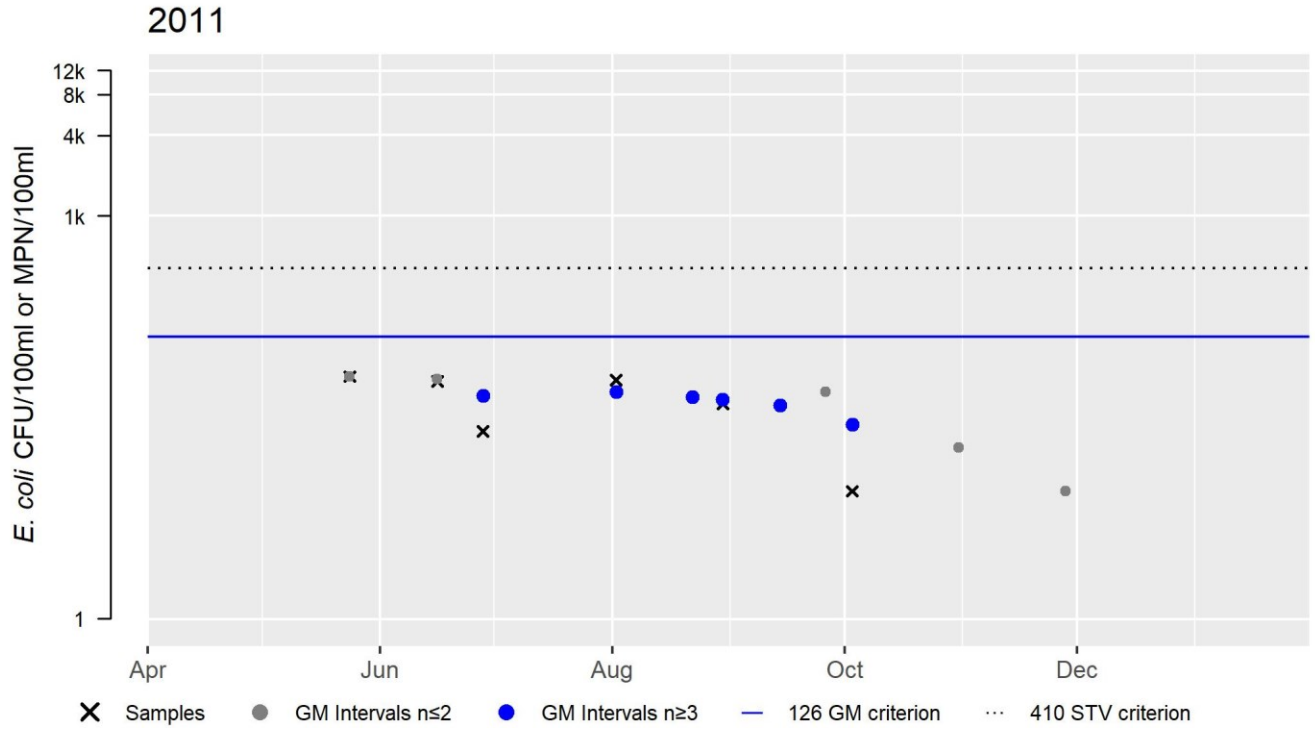
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2184	MassDEP	E. coli	05/24/11	10/03/11	6	9	64	36

W2184 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	36
#GMI	6
#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 Breakneck Brook ~ 5290 feet downstream from MA/CT state line, Sturbridge (W2184) between May and October 2011 (n=6) during the summer of 2011. Data analysis indicated 0% of the intervals had GMs >630 cfu/100ml, and none of the samples exceeded the 1260 cfu/100ml STV. The seasonal GM was 36cfu/100ml.
Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Secondary Contact Recreational Use for Breakneck Brook is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2184	MassDEP	Water Quality	Breakneck Brook	[approximately 5290 feet downstream from MA/CT state line, Sturbridge]	42.042161	-72.097147

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

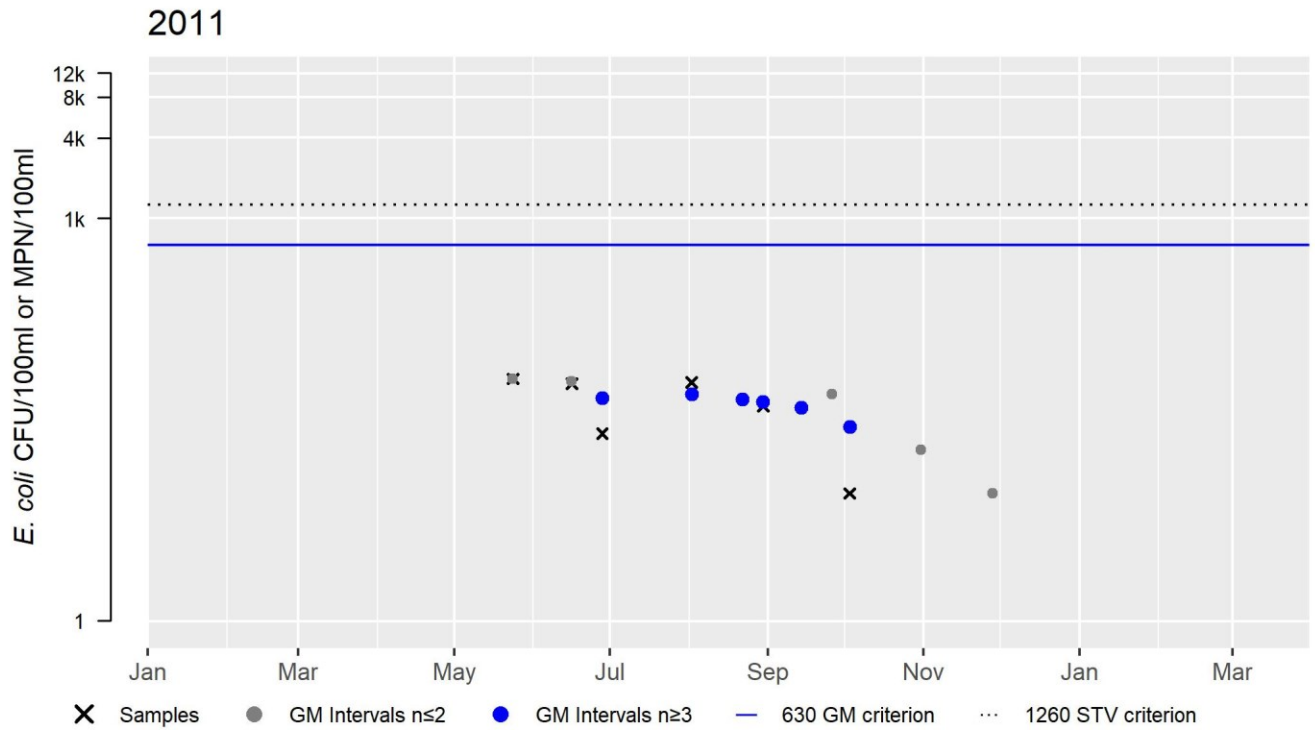
[Result units are CFU/100ml or MPN/100ml]

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)
W2184	MassDEP	E. coli	05/24/11	10/03/11	6	9	64	36

W2184 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	36
#GMI	6
#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

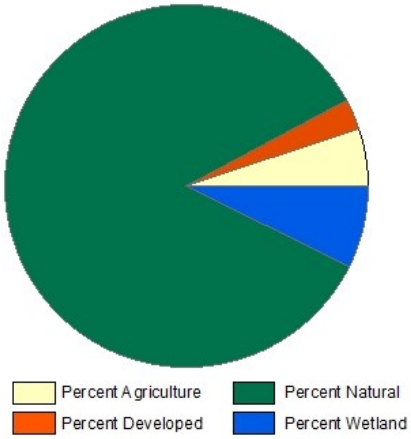


Browns Brook (MA41-20)

Location:	From the state line Holland, MA/Union, CT to mouth at inlet of Hamilton Reservoir, Holland.
AU Type:	RIVER
AU Size:	0.8 MILES
Classification/Qualifier:	B

Browns Brook - MA41-20

Watershed Area: 1.9 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.9	1.9	0.64	0.64
Agriculture	5.1%	5.1%	6.2%	6.2%
Developed	2.8%	2.8%	1.6%	1.6%
Natural	84.9%	84.9%	79.7%	79.7%
Wetland	7.3%	7.3%	12.6%	12.6%
Impervious Cover	0.8%			

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
Fully Supporting	NO
2022 Use Attainment Summary	

As part of the 2011-2015 reference site network (RSN) surveys MassDEP biologists sampled Browns Brook ~0.4mi upstream of May Brook Road in Holland (BB01). Sampling included benthic macroinvertebrates (B0737), fish population sampling (including SampleIDs 4592, 5015, 5088, 6293, 6375), and physico-chemical water quality monitoring (W2220). Of the seven benthic samples collected between May 2011 and September 2015, the IBI scores have all been indicative of exceptional/satisfactory conditions (scores 66 to 95). The fish samples collected by MassDEP biologists at the RSN sampling location between August 2012 and 2015 and slightly further downstream along May Brook Road by DFG biologists in July 2018 (SampleID 7387) were all dominated by fluvial fishes (≥95%) with Eastern brook and/or brown trout collected in four of the five sampling years. DFG biologists commented that habitat included many large deep pools with waterfalls. As was previously reported (MassDEP 2021), one small Eastern brook trout (EBT) ≤140 mm in length was collected at the RSN sampling reach by MassDEP biologists in August 2011. Although Browns Brook is identified as a CFR by MassDFG, summer water temperatures are indicative of a warmwater fishery with maximum summertime temperatures between 2011 and 2015 ranging from 24.7 to 28.5°C. The temperature was above 28.3°C for 2.9 hours in 2011 was ≤27.9°C in all four subsequent sampling years. The MA portion of the watershed area is >90% natural and the impervious cover is estimated as only 1.2%. Google Earth imagery was also reviewed in the CT portion of the drainage area and no dams were visible, so the temperature regime is considered to be naturally occurring. All other water quality monitoring data collected between June 2011 and October 2015 were indicative of good conditions: minimum DO 5.1mg/L, maximum saturation 99%, pH 6.9 to 7.2SU, maximum chloride 4 mg/L, low conductivity, ammonia-nitrogen, and total phosphorus seasonal average concentrations (42 to 60 µS/cm, <0.04 mg/L excluding qualified data, and 0.012 to 0.047 mg/L, respectively).
The Aquatic Life Use of Browns Brook is assessed as Fully Supporting based on the benthic, fish, and water quality monitoring data collected by MassDEP and DFG biologists from 2011 to 2018.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5015	MassDEP	Fish Community	Browns Brook	0.4mi US of May Brook Rd, (just off May Brook Rd(	42.03481	-72.16159
5088	MassDEP	Fish Community	Browns Brook	~2120ft US of May Brook Rd	42.03482	-72.16159
6293	MassDEP	Fish Community	Browns Brook	Approx 2120 ft US from May Brook Rd, Holland	42.03482	-72.16159
6375	MassDEP	Fish Community	Browns Brook	, Holland	42.03482	-72.16159
7387	MassDFG	Fish Community	Browns Brook	Along May Brook Rd. land trust, Holland	42.03441	-72.16079
B0737	MassDEP	Benthic	Browns Brook/	[approximately 645 meters upstream from May Brook Road, Holland, MA]	42.034815	-72.161586
W2220	MassDEP	Water Quality	Browns Brook	[approximately 2120 feet upstream from May Brook Road, Holland]	42.034815	-72.161586

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)
[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
B0737	05/02/11	RBP kicknet	Central_Hills_100ct	104	66	S
B0737	07/26/11	RBP kicknet	Central_Hills_100ct	102	79	E
B0737	04/18/12	RBP kicknet	Central_Hills_100ct	105	95	E
B0737	09/11/12	RBP kicknet	Central_Hills_300ct	319	86	E
B0737	08/08/13	RBP kicknet	Central_Hills_300ct	318	82	E
B0737	07/15/14	RBP kicknet	Central_Hills_300ct	313	80	E
B0737	09/04/15	RBP kicknet	Central_Hills_300ct	332	76	E

Fish Community Data and DELTS

Fish Community Data (2012-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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: BND = Blacknose Dace, BT = Brown Trout, EBT = Brook Trout, F = Fallfish, GS = Golden Shiner, P = Pumpkinseed, WS = White Sucker]

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
5015	08/16/12	BP	TP	H	6	132	1%	4	98%	1%	1	1%	No	Yes	BND, EBT, F, GS, P, WS,
5088	09/26/13	BP	TP		4	205	0%	4	100%	0%	0	0%	No	Yes	BND, BT, F, WS,
6293	08/21/14	BP	TP		5	167	0%	3	99%	0%	1	1%	No	Yes	BND, F, GS, P, WS,
6375	08/27/15	BP	TP		5	176	2%	4	95%	2%	1	5%	No	Yes	BND, BT, F, P, WS,
7387	07/18/18	BP	TP	H	4	62	6%	4	100%	6%	0	0%	Yes	Yes	BND, EBT, F, WS,

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Long-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2220	05/29/13	09/29/13	124	118	95	7.1	7.3	7.6	2	0	0	0	0	0	0	4	0
W2220	05/30/14	09/15/14	107	95	76	5.1	7	7.9	3.5	0	0	0	0	0	0	0	0
W2220	05/29/15	09/21/15	116	110	87	6.1	6.5	7.5	2.3	0	0	0	0	0	0	39	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2220	05/28/13	10/22/13	3	8.2	8.9	0	0	0
W2220	01/15/14	12/16/14	4	8	8.6	0	0	0
W2220	04/24/15	12/10/15	4	7.1	8.3	0	0	0
W2220	03/29/17	12/19/17	1	13.2	13.2	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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]

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
W2220	06/14/11	09/15/11	94	91	25.6	28.5	25.7	23.4	71	4	38	1	0	0
W2220	06/01/12	09/15/12	107	107	24.4	26.5	25.0	23.0	86	3	39	2	0	0
W2220	06/01/13	09/15/13	107	107	26.0	27.8	26.6	25.0	75	12	31	9	0	0
W2220	06/01/13	09/15/13	107	107	26.1	27.9	26.6	25.0	75	12	31	10	0	0
W2220	06/01/14	09/15/14	107	103	22.6	24.7	23.3	21.2	68	0	3	0	0	0
W2220	06/01/14	09/15/14	107	107	22.8	25.2	23.7	21.4	71	0	11	0	0	0
W2220	06/01/15	09/15/15	107	107	23.6	25.0	22.8	21.3	69	1	3	0	0	0
W2220	06/01/15	09/15/15	106	100	23.8	25.3	24.0	21.9	85	1	22	0	0	0
W2220	06/01/16	09/15/16	106	100	24.0	25.8	24.9	23.4	83	3	28	0	0	0
W2220	06/01/17	09/15/17	106	100	23.2	24.7	23.9	22.3	72	0	5	0	0	0
W2220	06/01/18	09/15/18	107	107	25.0	27.0	26.0	24.1	85	11	55	6	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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

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
W2220	06/13/11	09/15/11	94	4479	25.6	182	76	0
W2220	06/01/12	09/15/12	107	5136	24.4	169	70	0
W2220	06/01/13	09/15/13	107	5136	26.4	569	478	0
W2220	06/01/14	09/15/14	107	5136	22.8	0	0	0
W2220	06/01/15	09/15/15	107	5087	23.8	31	0	0
W2220	06/01/16	09/15/16	107	5087	24.2	145	21	0
W2220	06/01/17	09/15/17	107	5087	23.2	0	0	0
W2220	06/01/18	09/15/18	107	5136	25.1	468	325	0
W2220	06/01/13	09/15/13	107	5136	26.3	555	467	0
W2220	06/01/15	09/15/15	107	5136	23.6	2	0	0
W2220	06/01/14	09/15/14	107	5136	22.6	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2220	06/13/11	10/14/11	2	1	17.5	16.5	0	0	0	0
W2220	05/08/12	10/25/12	2	0	13.1	11.1	0	0	0	0
W2220	05/28/13	10/22/13	6	2	22.8	15.6	2	1	0	0
W2220	01/15/14	12/16/14	11	3	22.3	11.1	2	2	0	0
W2220	04/24/15	12/10/15	11	5	21.6	14.5	3	0	0	0
W2220	12/10/15	12/10/15	1	0	5.2	5.2	0	0	0	0
W2220	04/14/16	12/15/16	8	2	18.7	8.1	0	0	0	0
W2220	03/29/17	12/19/17	8	2	14.3	7.7	0	0	0	0
W2220	05/24/18	10/25/18	3	0	15.8	12.5	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W2220	05/28/13	10/22/13	3	7	7.2	0	0
W2220	01/15/14	12/16/14	4	6.9	7.1	0	0
W2220	04/24/15	12/10/15	4	7	7.2	0	0
W2220	03/29/17	12/19/17	1	6.1	6.1	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2220	2011	3	0.017	0.098	0.047	--	--	--	--	2	0
W2220	2012	4	0.013	0.020	0.016	--	--	--	--	4	0
W2220	2013	4	0.008	0.018	0.014	2.0	0.6	96.3	7.2	4	0
W2220	2014	4	0.01	0.027	0.019	3.5	1.0	94.5	7.1	4	0
W2220	2015	4	0.005	0.016	0.012	2.3	1.1	98.6	7.2	4	0
W2220	2017	--	--	--	--	--	--	94.4	6.1	--	--

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

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2220	2011	3	0.020	0.020	0.020	0	0
W2220	2012	5	0.020	0.020	0.020	0	0

Station Code	Data Year	TAN Count	TAN Min (mg/L)	TAN Max (mg/L)	TAN Avg (mg/L)	Count TAN >Chronic	Count TAN >Acute
W2220	2013	4	0.020	0.020	0.020	0	0
W2220	2014	4	0.020	0.020	0.020	0	0
W2220	2015	4	0.040	0.054	0.044	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2220	2011	3	3	3	3	0	0
W2220	2012	5	2	4	3	0	0
W2220	2013	4	3	4	4	0	0
W2220	2014	4	3	3	3	0	0
W2220	2015	4	2	4	3	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W2220	05/28/13	10/22/13	3	42	55	0	0	0	0	0	0
W2220	01/15/14	12/16/14	4	51	60	0	0	0	0	0	0
W2220	04/24/15	12/10/15	4	43	56	0	0	0	0	0	0
W2220	03/29/17	12/19/17	1	48	48	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 Browns Brook; therefore the Fish Consumption Use is Not Assessed	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews in Browns Brook ~2120 feet upstream from May Brook Road, Holland during the summers of 2011, 2012, 2013, 2014, or 2015. The Aesthetics Use for Browns Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2220	MassDEP	Water Quality	Browns Brook	[approximately 2120 feet upstream from May Brook Road, Holland]	42.034815	-72.161586

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2220	Browns Brook	2011	3	MassDEP aesthetics observations for station W2220 on Browns 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.
W2220	Browns Brook	2012	5	MassDEP aesthetics observations for station W2220 on Browns 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.
W2220	Browns Brook	2013	5	MassDEP aesthetics observations for station W2220 on Browns 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.
W2220	Browns Brook	2014	4	MassDEP aesthetics observations for station W2220 on Browns 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.
W2220	Browns Brook	2015	4	MassDEP aesthetics observations for station W2220 on Browns 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.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2220	2011	3	2	0
W2220	2012	5	4	0
W2220	2013	5	4	0
W2220	2014	4	4	0
W2220	2015	4	4	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2220	Browns Brook	2011	Color	Brownish	2	3
W2220	Browns Brook	2011	Color	Light Yellow/Tan	1	3
W2220	Browns Brook	2011	Objectionable Deposits	No	3	3

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2220	Browns Brook	2011	Odor	None	3	3
W2220	Browns Brook	2011	Scum	No	3	3
W2220	Browns Brook	2011	Turbidity	Highly Turbid	1	3
W2220	Browns Brook	2011	Turbidity	None	2	3
W2220	Browns Brook	2012	Color	Light Yellow/Tan	4	5
W2220	Browns Brook	2012	Color	None	1	5
W2220	Browns Brook	2012	Objectionable Deposits	No	5	5
W2220	Browns Brook	2012	Odor	None	5	5
W2220	Browns Brook	2012	Scum	No	5	5
W2220	Browns Brook	2012	Turbidity	None	5	5
W2220	Browns Brook	2013	Color	Light Yellow/Tan	3	5
W2220	Browns Brook	2013	Color	None	1	5
W2220	Browns Brook	2013	Color	NR	1	5
W2220	Browns Brook	2013	Objectionable Deposits	No	4	5
W2220	Browns Brook	2013	Objectionable Deposits	Yes	1	5
W2220	Browns Brook	2013	Odor	None	5	5
W2220	Browns Brook	2013	Scum	No	5	5
W2220	Browns Brook	2013	Turbidity	None	4	5
W2220	Browns Brook	2013	Turbidity	Slightly Turbid	1	5
W2220	Browns Brook	2014	Color	Brownish	1	4
W2220	Browns Brook	2014	Color	Light Yellow/Tan	2	4
W2220	Browns Brook	2014	Color	None	1	4
W2220	Browns Brook	2014	Objectionable Deposits	No	3	4
W2220	Browns Brook	2014	Objectionable Deposits	Yes	1	4
W2220	Browns Brook	2014	Odor	None	4	4
W2220	Browns Brook	2014	Scum	No	2	4
W2220	Browns Brook	2014	Scum	Yes	2	4
W2220	Browns Brook	2014	Turbidity	Moderately Turbid	2	4
W2220	Browns Brook	2014	Turbidity	None	1	4
W2220	Browns Brook	2014	Turbidity	Slightly Turbid	1	4
W2220	Browns Brook	2015	Color	Light Yellow/Tan	4	4
W2220	Browns Brook	2015	Objectionable Deposits	No	4	4
W2220	Browns Brook	2015	Odor	None	4	4
W2220	Browns Brook	2015	Scum	No	4	4
W2220	Browns Brook	2015	Turbidity	None	2	4
W2220	Browns Brook	2015	Turbidity	Slightly Turbid	2	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 Browns Brook, so it is Not Assessed.	

Secondary Contact Recreation

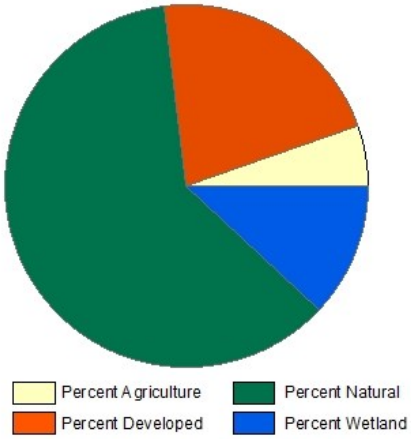
2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data are available to assess the status of the Secondary Contact Recreational Use for Browns Brook, so it is Not Assessed.	

Cady Brook (MA41-05)

Location:	Headwaters, outlet of Glen Echo Lake, Charlton to Charlton WWTP outfall (NPDES: MA0101141), Charlton.
AU Type:	RIVER
AU Size:	1.5 MILES
Classification/Qualifier:	B: WWF, HQW

Cady Brook - MA41-05

Watershed Area: 4.88 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.88	4.51	1.79	1.67
Agriculture	5.4%	5.2%	2.6%	2.1%
Developed	21.6%	22.7%	22.2%	23.6%
Natural	61.1%	60.1%	56.2%	56%
Wetland	11.9%	12%	19%	18.3%
Impervious Cover	8.1%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Dewatering*)		Unchanged
5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Dewatering*)	Dam or Impoundment (Y)	X				
Ambient Bioassays - Chronic Aquatic Toxicity	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
There were no observations made of any dense/very dense filamentous algae by MassDEP staff in Cady Brook at Route 20 bridge, Charlton (W0065) during the summer of 2011. Too limited data are available to assess the Aquatic Life Use of this Cady Brook AU (MA41-05) so it will continue to be assessed as Not Supporting with the Ambient Bioassays - Chronic Aquatic Toxicity and Dewatering impairments being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0065	MassDEP	Water Quality	Cady Brook	[at Route 20 bridge, Charlton, upstream of Charlton WWTP discharge]	42.144748	-71.993801

Physico-chemical Water Quality Information

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0065	2011	--	--	--	--	--	--	--	--	7	0

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff surveyed Cady Brook at the Route 20 bridge, Charlton, upstream of Charlton WWTP discharge (W0065) during the summer of 2011 as part of a Targeted Bacteria Monitoring Project. There were generally no objectionable conditions (i.e., odors, deposits, growths, or turbidity) observed during any of the surveys. The Aesthetics Use for this Cady Brook AU (MA41-05) is assessed as Fully Supporting based on the lack of objectionable conditions documented by MassDEP staff during the summer of 2011.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0065	MassDEP	Water Quality	Cady Brook	[at Route 20 bridge, Charlton, upstream of Charlton WWTP discharge]	42.144748	-71.993801

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0065	Cady Brook	2011	8	MassDEP aesthetics observations for station W0065 on Cady 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0065	2011	8	7	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0065	Cady Brook	2011	Color	Light Yellow/Tan	5	8
W0065	Cady Brook	2011	Color	None	3	8
W0065	Cady Brook	2011	Objectionable Deposits	No	6	8
W0065	Cady Brook	2011	Objectionable Deposits	Unobservable	1	8
W0065	Cady Brook	2011	Objectionable Deposits	Yes	1	8
W0065	Cady Brook	2011	Odor	Musty (Basement)	1	8
W0065	Cady Brook	2011	Odor	None	7	8
W0065	Cady Brook	2011	Scum	No	4	8
W0065	Cady Brook	2011	Scum	Yes	4	8
W0065	Cady Brook	2011	Turbidity	None	5	8
W0065	Cady Brook	2011	Turbidity	Slightly Turbid	3	8

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Cady Brook at the Route 20 bridge, Charlton, upstream of Charlton WWTP discharge (W0065) between May and October 2011 (n=7) during the summer of 2011 as part of a Targeted Bacteria Monitoring Project. Data analysis indicated 22% of the intervals had GMs >126 cfu/100ml, and only one of the samples exceeded the 410 cfu/100ml STV. The seasonal GM was 87 cfu/100ml. Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year moderate frequency dataset, the Primary Contact Recreational Use for Cady Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0065	MassDEP	Water Quality	Cady Brook	[at Route 20 bridge, Charlton, upstream of Charlton WWTP discharge]	42.144748	-71.993801

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

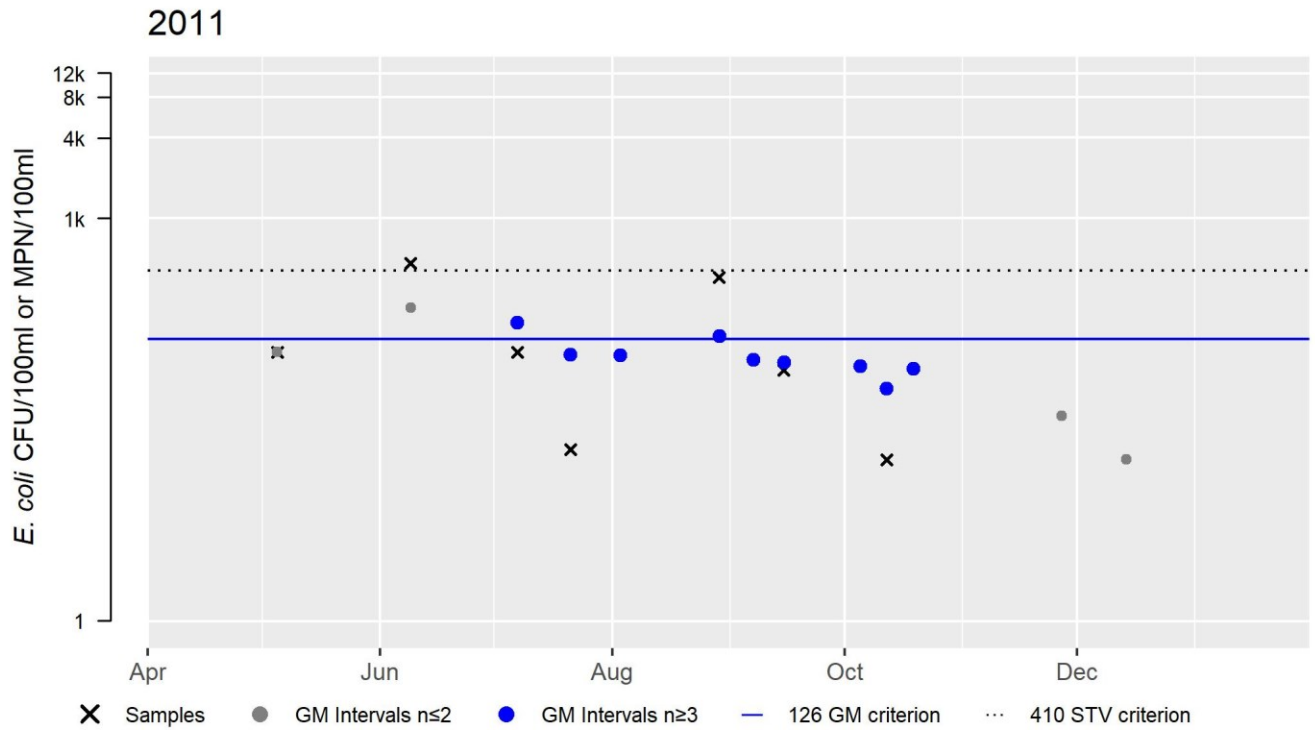
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0065	MassDEP	E. coli	05/05/11	10/12/11	7	16	461	87

W0065 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	87
#GMI	9
#GMI Ex	2
%GMI Ex	22
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



Secondary Contact Recreation

2022 Use Attainment	**Alert**
Fully Supporting	NO
2022 Use Attainment Summary	
MassDEP staff collected *E. coli* bacteria samples from Cady Brook at the Route 20 bridge, Charlton, upstream of Charlton WWTP discharge (W0065) between May and October 2011 (n=7) during the summer of 2011 as part of a Targeted Bacteria Monitoring Project. Data analysis indicated none of the intervals had GMs >630 cfu/100ml, none of the samples exceeded the 1260 cfu/100ml STV, and the seasonal GM was 87 cfu/100ml. Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year moderate frequency dataset, the Secondary Contact Recreational Use for Cady Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0065	MassDEP	Water Quality	Cady Brook	[at Route 20 bridge, Charlton, upstream of Charlton WWTP discharge]	42.144748	-71.993801

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

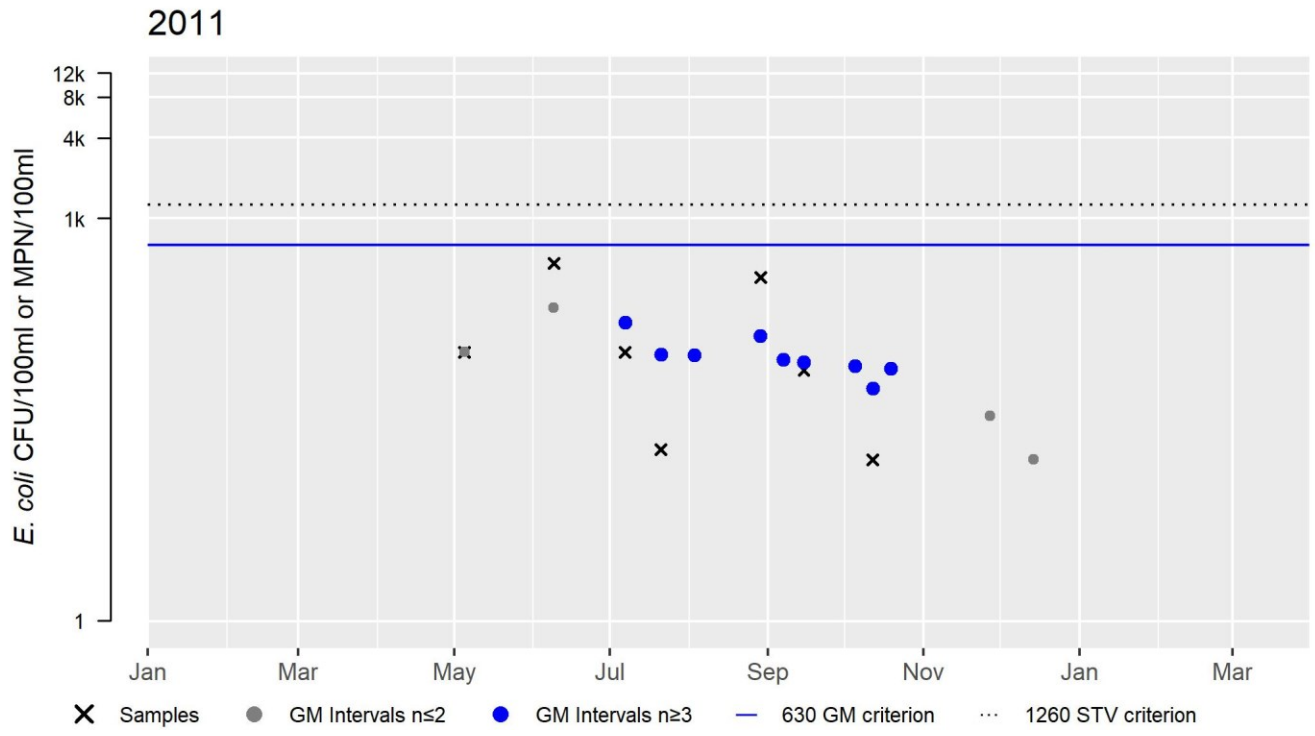
[Result units are CFU/100ml or MPN/100ml]

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)
W0065	MassDEP	E. coli	05/05/11	10/12/11	7	16	461	87

W0065 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	87
#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

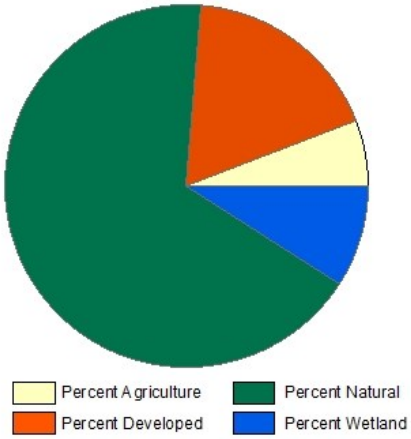


Cady Brook (MA41-06)

Location:	Charlton WWTP outfall (NPDES: MA0101141), Charlton to mouth at confluence with the Quinebaug River, Southbridge.
AU Type:	RIVER
AU Size:	5.1 MILES
Classification/Qualifier:	B: WWF

Cady Brook - MA41-06

Watershed Area: 12.25 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	12.25	2.65	4.69	1.12
Agriculture	5.9%	1.2%	3.1%	1.8%
Developed	17.8%	19.7%	19.1%	24.4%
Natural	67.1%	73.6%	64%	66.2%
Wetland	9.1%	5.5%	13.8%	7.6%
Impervious Cover	7.1%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Dewatering*)		Unchanged
5	5	Escherichia Coli (E. Coli)		Unchanged
5	5	Nutrient/Eutrophication Biological Indicators		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Dewatering*)	Impacts from Hydrostructure Flow Regulation/Modification (Y)	X				
Escherichia Coli (E. Coli)	Discharges from Municipal Separate Storm Sewer Systems (MS4) (N)				X	
Escherichia Coli (E. Coli)	Source Unknown (N)				X	
Nutrient/Eutrophication Biological Indicators	Municipal Point Source Discharges (Y)	X				

Recommendations

2022 Recommendations
ALU: Water quality monitoring should be conducted in Cady Brook bracketing the Charlton WWTP discharge (MA0101141) to document improvements since the facility was upgraded (nutrient reduction with improved WWTP treatment in place during 2010) (delisting of the Nutrient/Eutrophication Biological Indicators impairment may be warranted). Sporadic chronic toxicity in Charlton WWTP (failed tests in winters of 2016, 2017 and 2018) so TRE should be conducted if these failures continue.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	YES

2022 Use Attainment Summary

Water quality sampling was conducted in this Cady Brook AU (MA41-06) near the pipeline crossing at the Route 169 bridge, Charlton (W0615) in 2011, 2012, 2013 as part of the SMART monitoring project and further downstream just upstream of the confluence with the Quinebaug River, Southbridge (W2189, B0711) during the summer of 2011 as part of the MAP2 wadeable streams monitoring project. Survey results of this Warm Water habitat can be briefly summarized as follows: near the pipeline (Station W0615) there were indications of generally good water quality conditions (discrete sampling summary: minimum dissolved oxygen 9.6mg/L, maximum temperature 20.1°C, pH 6.7 to 7.7SU, little indication of any nutrient enrichment problems [seasonal average total phosphorus concentrations 0.03 and 0.031mg/L 2011 and 2012, respectively, maximum saturation 116%, maximum pH 7.7SU, few observations of any dense/very dense filamentous algae], low concentrations of ammonia-nitrogen (≤0.08mg/L), and generally low chloride concentrations (the maximum was 280mg/L which was the only individual chloride concentration exceeding the chronic four-day average criterion of the 13 samples collected between 2011 and 2013). Near the mouth of Cady Brook, the benthic community was sampled in July 2011 (Station B0711). The IBI score was indicative of satisfactory conditions (61). As was previously reported in the 2018/2020 IR cycle (MassDEP 2021) barge electrofishing was also conducted by MassDEP biologists at this same location in September 2011 (SampleID: 4603). The fish sample was dominated by fluvial specialist/dependant species. Except for one brown trout which was deemed to be "stocked", other coldwater fish were absent. Water quality monitoring at this site (W2189) was indicative of good conditions (minimum DO 6.8mg/L, long-term temperature thermistor (26 May to 3 October 2011) maximum temperature 26.5°C, good pH, low ammonia-nitrogen concentrations, average total phosphorus concentration 0.023mg/L, maximum chloride 150mg/L, and no exceedances of any acute or chronic metals criteria during any of the three sampling events). Lastly a statistically significant decreasing trend of total phosphorus, both annually and seasonally, was calculated between 1994 and 2012/2013 for sites in this Cady Brook AU.

Despite the recent indicators of good conditions in this Cady Brook AU (MA41-06), the Aquatic Life Use will continue to be assessed as Not Supporting with the impairments for both Nutrient/Eutrophication Biological Indicators and Dewatering being carried forward. These impairments were based on data collected during the MassDEP 1999 survey in the upper 0.3-mile reach so will remain listed until newer data are collected in the brook nearer to the Charlton WWTP discharge. The Alert for occasional chronic WET in the Charlton WWTP discharge (MA0101141) identified in the 2018/2020 reporting cycle is also being carried forward. Note that upgrades to the facility went on-line in 2010 (a CoMag treatment system to provide improved removal of pollutants, most notably phosphorus).

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
B0711	MassDEP	Benthic	Cady Brook/	[at the confluence with the Quinebaug River, Southbridge, MA]	42.076742	-72.025410
W0615	MassDEP	Water Quality	Cady Brook	[Route 169 bridge (near pipeline crossing), Charlton]	42.119473	-72.008704

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2189	MassDEP	Water Quality	Cady Brook	[at the confluence with the Quinebaug River, Southbridge]	42.076742	-72.025410

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)

[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
B0711	07/13/11	RBP kicknet	Central_Hills_100ct	102	61	S

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2189	2011	3	12	6.8	7	7.8	2.4	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0615	03/23/11	10/26/11	5	8.8	10.6	0	0	0
W0615	01/25/12	11/14/12	6	8.6	11.2	0	0	0
W0615	02/27/13	04/24/13	2	13.4	14	0	0	0
W2189	05/26/11	10/03/11	6	8.6	9	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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]

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
W2189	06/01/11	09/15/11	107	107	24.1	26.5	24.1	22.2	82	1	16	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2189	2011	3	12	21.1	23.4	22.7	20.8	3	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 5) (MassDEP Undated 4)

[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
W2189	06/01/11	09/15/11	107	5136	24.1	47	0	0
W2189	06/24/11	09/07/11	75	577	21.2	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0615	03/23/11	10/26/11	5	2	19.9	13.5	0	0	0	0
W0615	01/25/12	11/14/12	6	1	20.1	11.2	1	0	0	0
W0615	02/27/13	04/24/13	2	0	8.7	5.2	0	0	0	0
W2189	05/26/11	10/03/11	8	6	21.6	18.9	2	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W0615	03/23/11	10/26/11	5	6.8	7.3	0	0
W0615	01/25/12	11/14/12	6	6.7	7.4	0	0

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
W0615	02/27/13	04/24/13	2	7	7.7	0	0
W2189	05/26/11	10/03/11	6	7	7.3	0	0

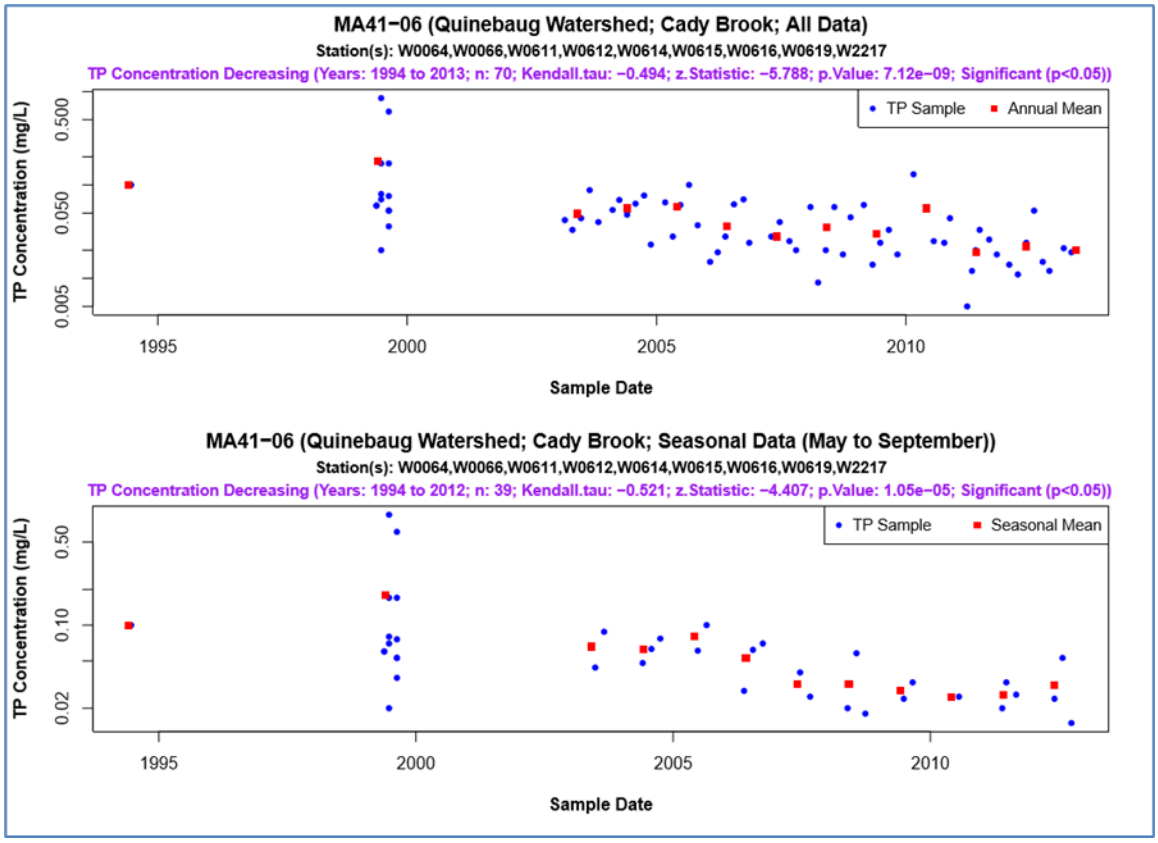
Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0615	2011	2	0.026	0.033	0.030	--	--	103.9	7.3	5	0
W0615	2012	3	0.015	0.053	0.031	--	--	104.9	7.4	6	2
W0615	2013	--	--	--	--	--	--	115.5	7.7	2	1
W2189	2011	4	0.017	0.033	0.023	2.4	1.1	108.3	7.3	5	1

Long Term Trend analysis for MassDEP total phosphorus data (MassDEP Undated 5)



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

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2189	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2189	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2189	07/27/11	0.2	0.4	0.4	0.53	0.0	0.6
W2189	08/31/11	0.2	0.4	0.5	0.69	0.0	0.8
W2189	09/12/11	0.3	0.6	0.5	0.63	0.0	0.9

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2189	2011	3	0.021	0.041	0.034	0.1	0.2	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0615	2011	5	0.020	0.060	0.040	0	0
W0615	2012	6	0.020	0.080	0.048	0	0
W0615	2013	2	0.020	0.040	0.030	0	0
W2189	2011	5	0.020	0.050	0.028	0	0

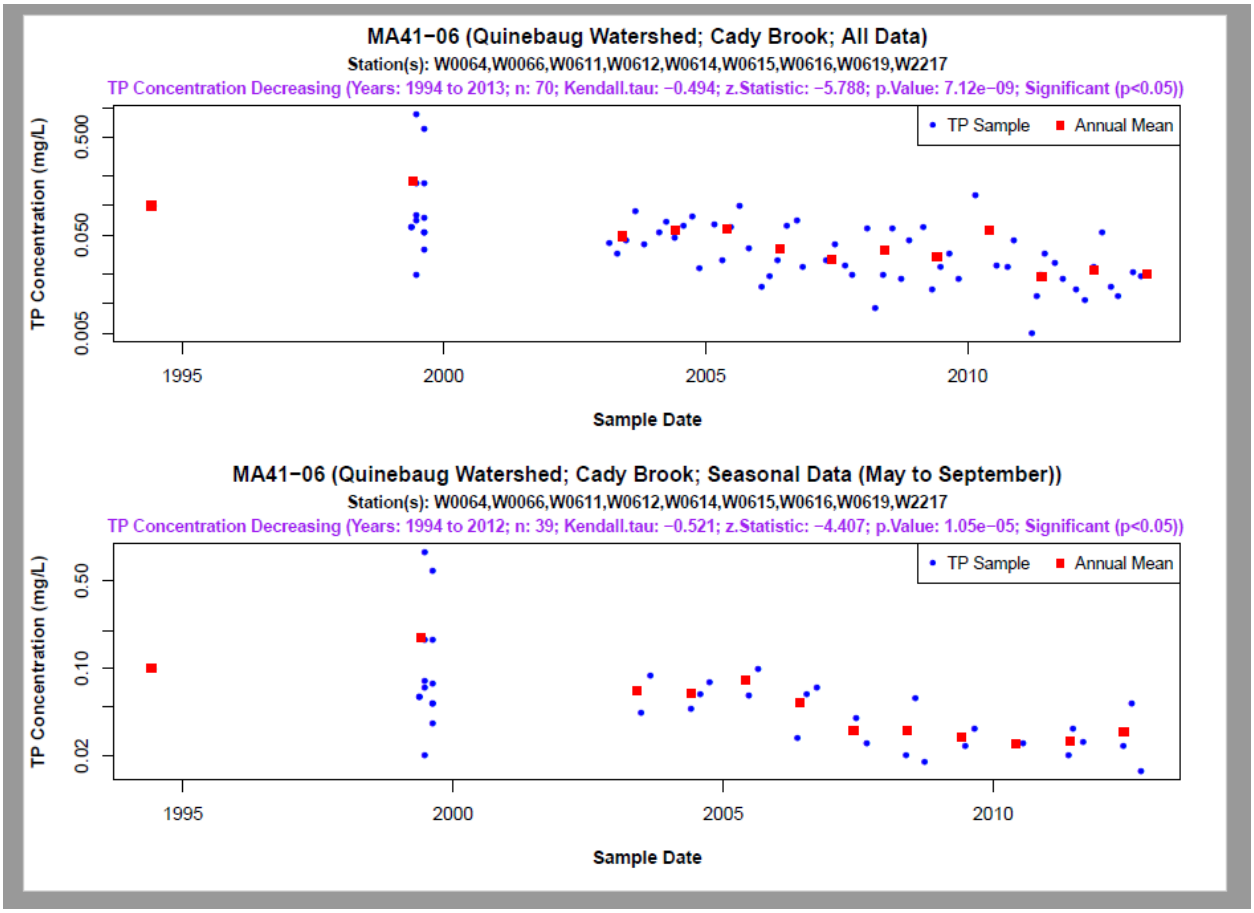
MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0615	2011	5	33	83	59	0	0
W0615	2012	6	69	130	97	0	0
W0615	2013	2	130	280	205	1	0
W2189	2011	5	36	150	72	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W0615	03/23/11	10/26/11	5	168	337	0	0	0	0	0	0
W0615	01/25/12	11/14/12	6	293	537	0	0	0	0	0	0
W0615	02/27/13	04/24/13	2	474	1088	1	1	0	0	0	0
W2189	05/26/11	10/03/11	6	196	603	0	0	0	0	0	0

Trend Analysis for Total Phosphorus (MassDEP Undated 5)



Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in this Cady Brook AU (MA41-06), therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert

Fully Supporting	YES
2022 Use Attainment Summary	
MassDEP staff surveyed this Cady Brook AU (MA41-06) near the pipeline crossing at the Route 169 bridge, Charlton (W0615) in 2011, 2012, 2013 as part of the SMART monitoring project and further downstream just upstream of the confluence with the Quinebaug River, Southbridge (W2189, B0711) during the summer of 2011 as part of the MAP2 wadeable streams monitoring project. There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DWM-WPP field sampling crews during the surveys. The Aesthetics Use for this Cady Brook AU (MA41-06) is assessed as Fully Supporting based on the general lack of any objectionable conditions documented by MassDEP staff during the summers of 2011, 2012, 2013. The former Alert associated with historical observations of trash/debris in the brook along its course through the densely developed portion of Southbridge is being carried forward.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0615	MassDEP	Water Quality	Cady Brook	[Route 169 bridge (near pipeline crossing), Charlton]	42.119473	-72.008704
W2189	MassDEP	Water Quality	Cady Brook	[at the confluence with the Quinebaug River, Southbridge]	42.076742	-72.025410

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0615	Cady Brook	2011	5	MassDEP aesthetics observations for station W0615 on Cady 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.
W0615	Cady Brook	2012	6	MassDEP aesthetics observations for station W0615 on Cady 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.
W0615	Cady Brook	2013	2	MassDEP aesthetics observations for station W0615 on Cady 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).
W2189	Cady Brook	2011	6	MassDEP aesthetics observations for station W2189/MAP2-027 on Cady 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0615	2011	5	5	0
W0615	2012	6	6	2
W0615	2013	2	2	1
W2189	2011	6	5	1

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0615	Cady Brook	2011	Color	Light Yellow/Tan	1	5
W0615	Cady Brook	2011	Color	None	3	5
W0615	Cady Brook	2011	Color	Reddish	1	5
W0615	Cady Brook	2011	Objectionable Deposits	No	4	5
W0615	Cady Brook	2011	Objectionable Deposits	Yes	1	5
W0615	Cady Brook	2011	Odor	None	5	5
W0615	Cady Brook	2011	Scum	Yes	5	5
W0615	Cady Brook	2011	Turbidity	None	5	5
W0615	Cady Brook	2012	Color	Light Yellow/Tan	4	6
W0615	Cady Brook	2012	Color	None	2	6
W0615	Cady Brook	2012	Objectionable Deposits	No	6	6
W0615	Cady Brook	2012	Odor	None	6	6
W0615	Cady Brook	2012	Scum	No	1	6
W0615	Cady Brook	2012	Scum	Yes	5	6
W0615	Cady Brook	2012	Turbidity	None	5	6
W0615	Cady Brook	2012	Turbidity	Slightly Turbid	1	6
W0615	Cady Brook	2013	Color	None	2	2
W0615	Cady Brook	2013	Objectionable Deposits	No	2	2
W0615	Cady Brook	2013	Odor	None	2	2
W0615	Cady Brook	2013	Scum	Yes	2	2
W0615	Cady Brook	2013	Turbidity	None	2	2
W2189	Cady Brook	2011	Color	Light Yellow/Tan	1	6
W2189	Cady Brook	2011	Color	None	3	6
W2189	Cady Brook	2011	Color	NR	2	6
W2189	Cady Brook	2011	Objectionable Deposits	No	5	6
W2189	Cady Brook	2011	Objectionable Deposits	Yes	1	6
W2189	Cady Brook	2011	Odor	Chlorine	1	6
W2189	Cady Brook	2011	Odor	None	5	6
W2189	Cady Brook	2011	Scum	No	4	6
W2189	Cady Brook	2011	Scum	Yes	2	6
W2189	Cady Brook	2011	Turbidity	None	6	6

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	YES

2022 Use Attainment Summary
MassDEP staff collected *E. coli* bacteria samples from this Cady Brook AU (MA41-06) near the pipeline crossing at the Route 169 bridge, Charlton (W0615) in 2011, 2012, 2013 as part of the SMART monitoring project and further downstream just upstream of the confluence with the Quinebaug River, Southbridge (W2189) during the summer of 2011 as part of the MAP2 wadeable streams monitoring project. Insufficient sampling was conducted at the pipeline crossing site to analyze while just upstream from the confluence with the Quinebaug River (W2189) *E. coli* samples were collected between May and October (n=6). Data analysis indicated 100% of the intervals had GMs >126 cfu/100ml, and only one of the samples exceeded the 410 cfu/100ml STV. The seasonal GM was 218cfu/100ml. Since the *E. coli* concentrations exceeded the use attainment impairment thresholds for this single year low frequency dataset, the Primary Contact Recreational Use for this Cady Brook AU (MA41-06) is assessed as Not Supporting. The former Alert associated with historical observations of trash/debris in the brook along its course through the densely developed portion of Southbridge is also being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0615	MassDEP	Water Quality	Cady Brook	[Route 169 bridge (near pipeline crossing), Charlton]	42.119473	-72.008704
W2189	MassDEP	Water Quality	Cady Brook	[at the confluence with the Quinebaug River, Southbridge]	42.076742	-72.025410

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0615	MassDEP	E. coli	04/27/11	10/26/11	4	2	118	20
W0615	MassDEP	E. coli	05/29/12	09/26/12	3	37	488	135
W0615	MassDEP	E. coli	04/24/13	04/24/13	1	23	23	23
W2189	MassDEP	E. coli	05/24/11	10/03/11	6	76	980	218

W0615 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

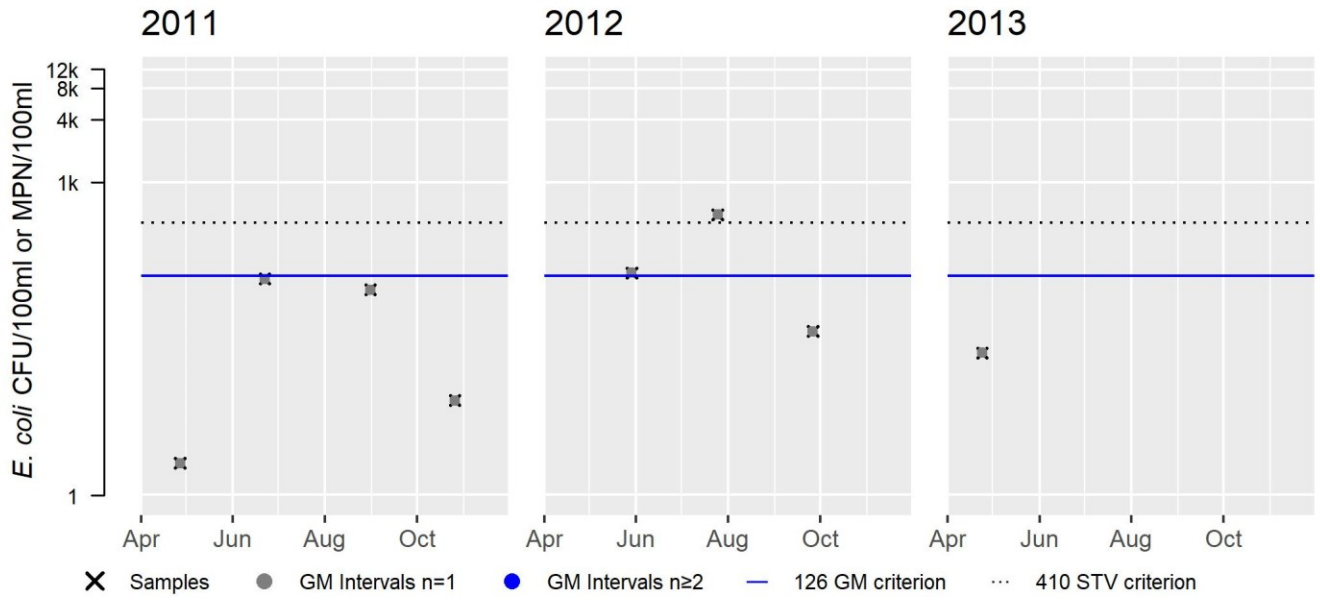
Var	Res
Samples	4
SeasGM	20
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	3
SeasGM	135
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	33

Var	Res
Samples	1
SeasGM	23
#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

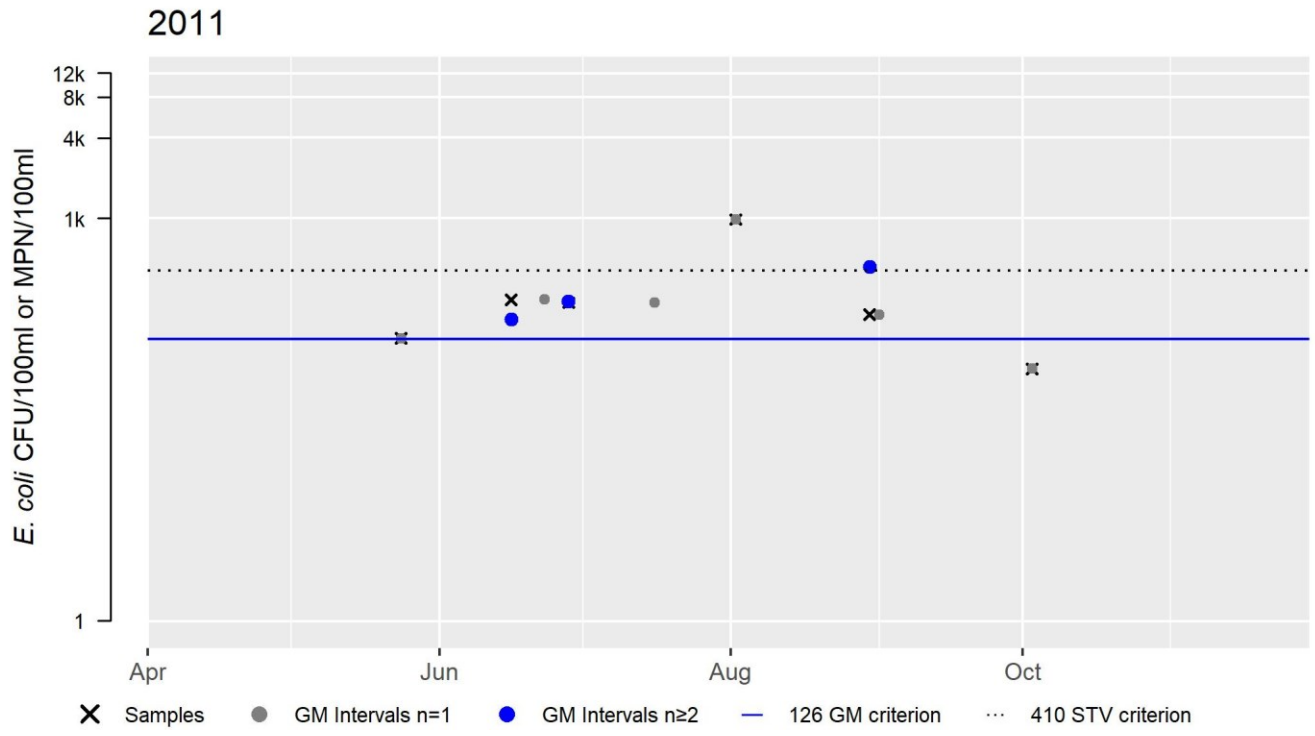
Variable	Cumulative %GMI Ex (all years)
Result	0



W2189 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	218
#GMI	3
#GMI Ex	3
%GMI Ex	100
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	YES
2022 Use Attainment Summary	

MassDEP staff collected *E. coli* bacteria samples from this Cady Brook AU (MA41-06) near the pipeline crossing at the Route 169 bridge, Charlton (W0615) in 2011, 2012, 2013 as part of the SMART monitoring project and further downstream just upstream of the confluence with the Quinebaug River, Southbridge (W2189) during the summer of 2011 as part of the MAP2 wadeable streams monitoring project. Insufficient sampling was conducted at the pipeline crossing site to analyze while just upstream from the confluence with the Quinebaug River (W2189) samples were collected between May and October (n=6). Data analysis indicated none of the intervals had GMs >630 cfu/100ml, none of the samples exceeded the 1260 cfu/100ml STV, and the seasonal GM was 218cfu/100ml.
Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year low frequency dataset, the Secondary Contact Recreational Use for this Cady Brook AU (MA41-06) is assessed as Fully Supporting. The former Alert associated with historical observations of trash/debris in the brook along its course through the densely developed portion of Southbridge is also being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0615	MassDEP	Water Quality	Cady Brook	[Route 169 bridge (near pipeline crossing), Charlton]	42.119473	-72.008704
W2189	MassDEP	Water Quality	Cady Brook	[at the confluence with the Quinebaug River, Southbridge]	42.076742	-72.025410

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

[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)
W0615	MassDEP	E. coli	03/23/11	10/26/11	5	2	118	19
W0615	MassDEP	E. coli	01/25/12	11/14/12	6	5	488	49
W0615	MassDEP	E. coli	02/27/13	04/24/13	2	23	35	28
W2189	MassDEP	E. coli	05/24/11	10/03/11	6	76	980	218

W0615 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

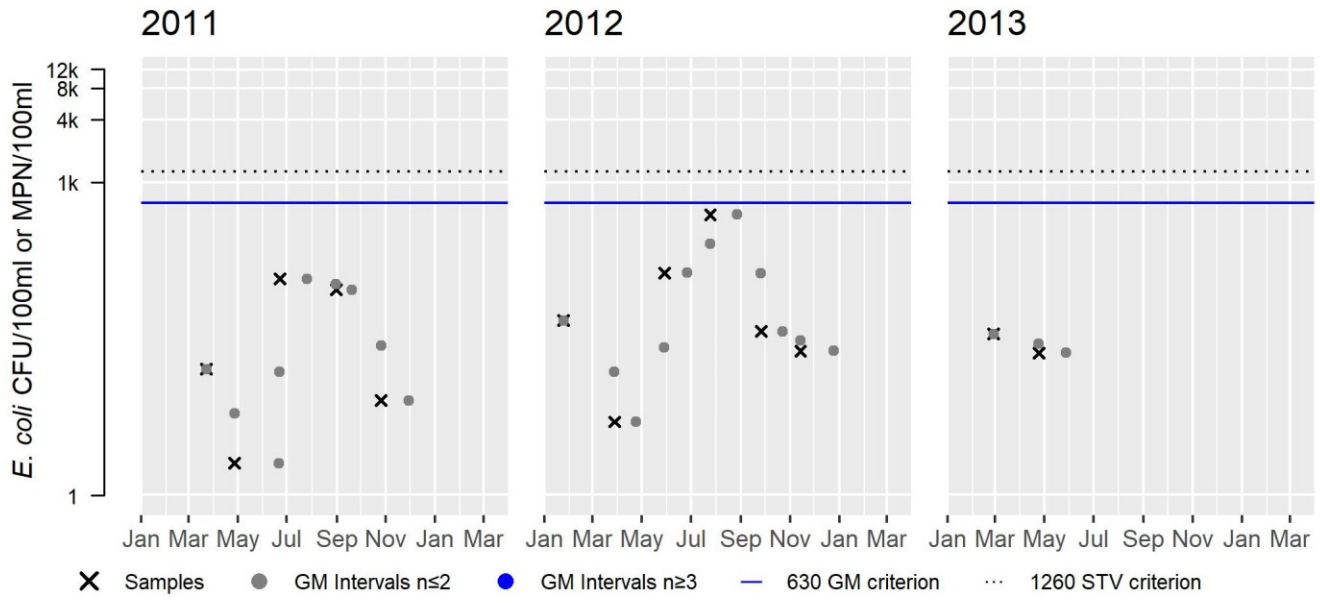
Var	Res
Samples	5
SeasGM	19
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

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

Var	Res
Samples	2
SeasGM	28
#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

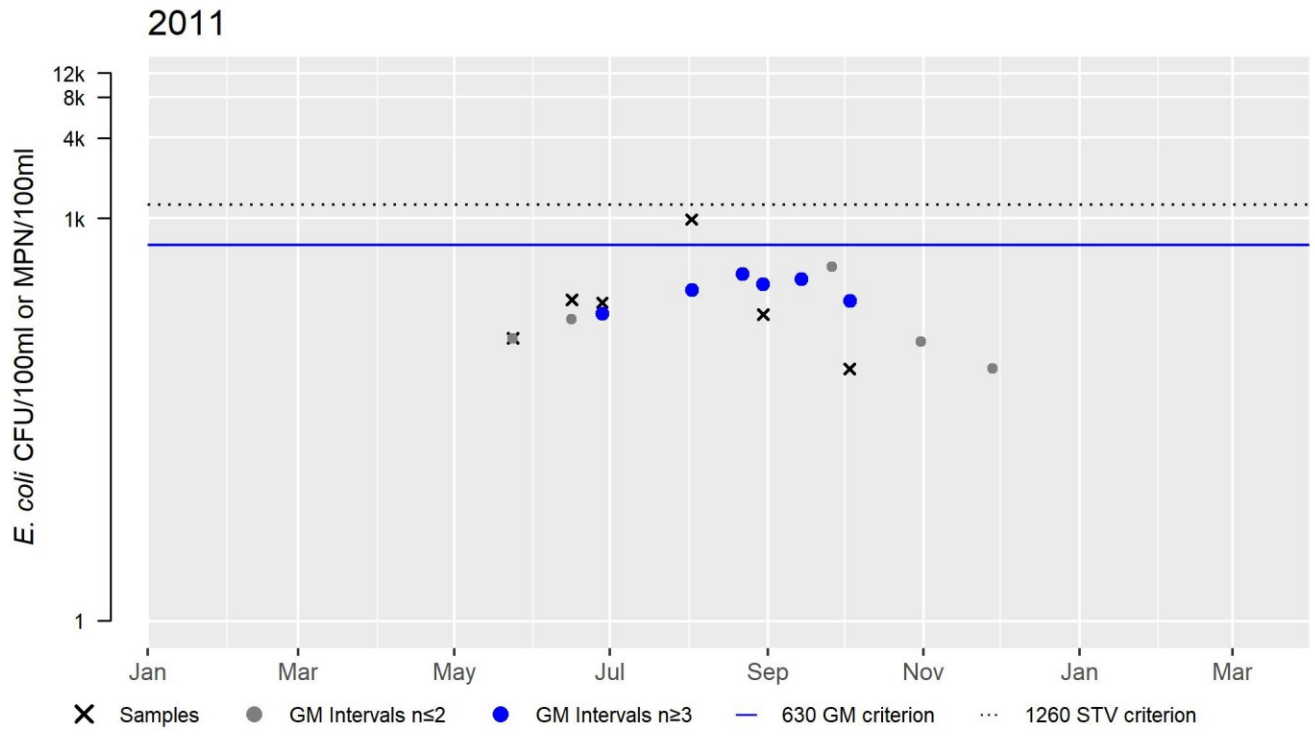
Variable	Cumulative %GMI Ex (all years)
Result	0



W2189 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	218
#GMI	6
#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



Cedar Pond (MA41008)

Location:	Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	149 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	5	(Non-Native Aquatic Plants*)		Unchanged
4c	5	Harmful Algal Blooms		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				
Harmful Algal Blooms	Source Unknown (N)			X	X	X

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
The Aquatic Life Use for Cedar Pond will continue to be assessed as Not Supporting with the non-native aquatic macrophyte impairment for *Myriophyllum heterophyllum* being carried forward.	

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Cedar Pond (MA41008) were reported to MassDPH for 64 days in 2018. The Aesthetics Use for Cedar Pond is assessed as Not Supporting since blooms >20 days in length were reported in a recent year.	

Algal Bloom Information

Cyanobacteria Harmful Algal Bloom (C-HAB) Summary Statements for 2015-2019 MassDPH Data (Bailey, Logan April 15, 2021) (MassDEP Undated 2)

C-HAB Summary Statement
C-HAB postings for Cedar Lake* (MA41008) were reported to MassDPH for 64 days in 2018. Since blooms >20 days in length were reported in a recent year, the Primary/Secondary Contact Recreational Uses and Aesthetics Use are assessed as Not Supporting.

* also known as Cedar Pond

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
Cedar Lake*	Not issued or confirmed by sampling				64		1	no

* also known as Cedar Pond

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Cedar Pond (MA41008) were reported to MassDPH for 64 days in 2018. The Primary Contact Recreational Use for Cedar Pond is assessed as Not Supporting since blooms >20 days in length were reported in a recent year.	

Secondary Contact Recreation

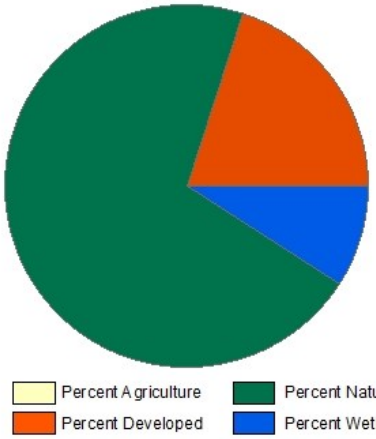
2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Cedar Pond (MA41008) were reported to MassDPH for 64 days in 2018. The Secondary Contact Recreational Use for Cedar Pond is assessed as Not Supporting since blooms >20 days in length were reported in a recent year.	

Cohasse Brook (MA41-12)

Location:	From the outlet of Cohasse Brook Reservoir, Southbridge to mouth at confluence with the Quinebaug River, Southbridge (through former 2008 segment: Wells Pond MA41053).
AU Type:	RIVER
AU Size:	2.7 MILES
Classification/Qualifier:	B

Cohasse Brook - MA41-12

Watershed Area: 2.75 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.75	2.23	0.92	0.81
Agriculture	0.1%	0.2%	0.2%	0.2%
Developed	19.9%	24.2%	20%	22.4%
Natural	70.8%	67.8%	67.3%	64.4%
Wetland	9.1%	7.8%	12.5%	13%
Impervious Cover	8.7%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Benthic Macroinvertebrates		Unchanged
5	5	Escherichia Coli (E. Coli)		Unchanged
5	5	Sedimentation/Siltation		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Benthic Macroinvertebrates	Loss of Riparian Habitat (Y)	X				
Benthic Macroinvertebrates	Unspecified Urban Stormwater (Y)	X				
Escherichia Coli (E. Coli)	Unspecified Urban Stormwater (Y)				X	X
Sedimentation/Siltation	Loss of Riparian Habitat (Y)	X				
Sedimentation/Siltation	Unspecified Urban Stormwater (Y)	X				

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	YES
2022 Use Attainment Summary	
DFG biologists conducted backpack electrofishing at two locations in Cohasse Brook in September 2015: DS Cohasse Br Reservoir at Rt 198 Southbridge Water Dept, Southbridge (SampleID 5654) and further downstream at Route 198 crossing, Southbridge (SampleID 5653). Fish were captured in pools as there was very little flow although the fluvial species blacknose dace were collected at both locations. The Aquatic Life Use for Cohasse Brook will continue to be assessed as Not Supporting with the benthic macroinvertebrate and sedimentation/siltation impairments being carried forward. An Alert is being added for low flow conditions.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5653	MassDFG	Fish Community	Cohasse Brook	Rt 198 crossing DS (golf course), Southbridge	42.06192	-72.04562
5654	MassDFG	Fish Community	Cohasse Brook	Rt 198 Southbridge water dept DS Cohasse Br Reservoir, Southbridge	42.04715	-72.05190

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, GS = Golden Shiner, LMB = Largemouth Bass, 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
5653	09/02/15	BP	TP	L	4	53	0%	1	87%	0%	1	2%	Yes	No	BB, BND, GS, LMB,
5654	09/02/15	BP	TP	L	5	14	0%	1	21%	0%	2	36%	Yes	No	B, BB, BND, LMB, YP,

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Cohasse Brook, 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 Cohasse Brook, so it is Not Assessed

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No bacteria data are available to reevaluate the status of the Primary Contact Recreational Use for Cohasse Brook. The Primary Contact Recreational Use for Cohasse Brook will continue to be assessed as Not Supporting with the *E. coli* impairment being carried forward (2004 survey *E. coli* data (geometric mean did not meet criteria) in the lower 1.6 mile reach of this segment (downstream from Wells Pond; Counts were elevated under both wet and dry sampling conditions) (MassDEP 2009).	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No bacteria data are available to reevaluate the status of the Secondary Contact Recreational Use for Cohasse Brook. The Secondary Contact Recreational Use for Cohasse Brook will continue to be assessed as Not Supporting with the *E. coli* impairment being carried forward (2004 survey *E. coli* data (geometric mean did not meet criteria) in the lower 1.6 mile reach of this segment (downstream from Wells Pond; Counts were elevated under both wet and dry sampling conditions) (MassDEP 2009).	

East Brimfield Reservoir (MA41014)

Location:	Brimfield/Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	313 ACRES
Classification/Qualifier:	B: HQW (impoundment on river designated B/CWF/HQW)

No usable data were available for East Brimfield Reservoir (MA41014) 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	(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
(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			

Glen Echo Lake (MA41017)

Location:	Charlton.
AU Type:	FRESHWATER LAKE
AU Size:	115 ACRES
Classification/Qualifier:	B

No usable data were available for Glen Echo Lake (MA41017) 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	Dissolved Oxygen		Unchanged

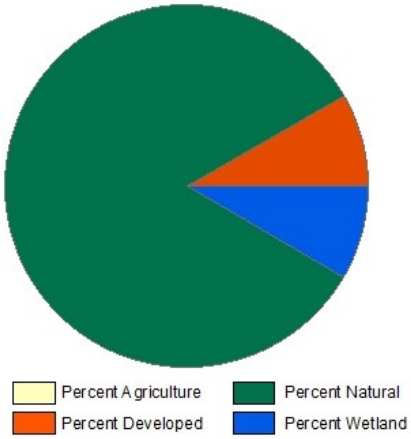
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Dissolved Oxygen	Source Unknown (N)	X				

Hamant Brook (MA41-15)

Location:	Headwaters, outlet unnamed pond, Sturbridge to mouth at confluence with the Quinebaug River, Sturbridge.
AU Type:	RIVER
AU Size:	3.1 MILES
Classification/Qualifier:	B

Hamant Brook - MA41-15

Watershed Area: 3.69 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.69	2.44	1.36	0.88
Agriculture	0.4%	0.6%	0.7%	1%
Developed	8.2%	8.1%	7%	6.6%
Natural	83.1%	81.4%	80.4%	79.3%
Wetland	8.3%	9.8%	11.9%	13%
Impervious Cover	4.6%			

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

Recommendations

2022 Recommendations
ALU: Hamant Brook should be considered for reclassification in the SWQS as a Class B coldwater. Efforts should be made to replace the perched box culvert near confluence with the Quinebaug River which impedes upstream movement of fishes under certain flow conditions. Monitoring of the thermal regime as well as continued monitoring of the fish population in the brook should be conducted to document the effect of removing the dams/barriers to fish passage.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

According to the information in the 2018/2020 IR (MassDEP 2021) three dams located between the lowermost section of Hamant Brook and the upper section which supports reproducing brook trout were removed in late 2017. This provides continuity throughout the brook and MassDFG biologists expect that brook trout will soon inhabit the lowermost section of Hamant Brook. DFG biologists conducted backpack electrofishing at three stations off Old Sturbridge Village Road in Sturbridge (from upstream to downstream SampleIDs 7404, 7402, and 7403) in July and August 2018 and at four additional sites (SampleIDs 8281, 8279, 8280 at the former upper dam site, middle pond dam site, and lower pond dam sites, respectively) in September 2019 as well as one site (SampleID 8337) near the lower end of the brook along Old Sturbridge Village Road in Sturbridge in July 2019. All samples were dominated by fluvial fishes (83 to 100%), and five Eastern brook trout ranging in size from 140 to 241mm and two brown trout were collected at the most upstream site (SampleID 7404)

Based on the recent fish population information and the habitat restoration efforts (three dam removals) the Aquatic Life Use for Hamant Brook is assessed as Fully Supporting. The Alert for the remaining perched box culvert that impedes upstream movement of fishes under certain flow conditions near the confluence with the Quinebaug River will continue to be carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
7402	MassDFG	Fish Community	Hamant Brook	Old Sturbridge Village Rd., Sturbridge	42.09621	-72.09397
7403	MassDFG	Fish Community	Hamant Brook	Old Sturbridge Village Rd., Sturbridge	42.09817	-72.09185
7404	MassDFG	Fish Community	Hamant Brook	Old Sturbridge Village Rd., Sturbridge	42.08892	-72.09802
8279	MassDFG	Fish Community	Hamant Brook	middle pond dam site , Sturbridge	42.09515	-72.09447
8280	MassDFG	Fish Community	Hamant Brook	lower pond dam site (start is at riffle below), Sturbridge	42.09818	-72.09189
8281	MassDFG	Fish Community	Hamant Brook	upper dam site , Sturbridge	42.09293	-72.09547
8337	MassDFG	Fish Community	Hamant Brk.	Old Sturbridge Village Rd., Sturbridge	42.09769	-72.09178

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, BT = Brown Trout, CP = Chain Pickerel, EBT = Brook Trout, F = Fallfish, GS = Golden Shiner, LMB = Largemouth Bass, P = Pumpkinseed, WS = White Sucker]

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
7402	07/31/18	BP	TP	H	6	63	0%	3	83%	0%	2	13%	No	Yes	B, BND, F, LMB, P, WS,
7403	07/31/18	BP	TP	H	3	82	0%	2	96%	0%	1	4%	Yes	Yes	BND, LMB, WS,

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
7404	08/01/18	BP	TP	H	6	36	19%	5	97%	19%	1	3%	Yes	Yes	BND, BT, CP, EBT, F, WS,
8279	09/13/19	BP	TP		3	273	0%	2	100%	0%	1	0%	No	Yes	BND, LMB, WS,
8280	09/13/19	BP	TP		7	291	0%	3	95%	0%	3	4%	No	Yes	B, BND, CP, F, LMB, P, WS,
8281	09/13/19	BP	TP		6	210	0%	3	96%	0%	3	4%	No	Yes	BND, CP, F, LMB, P, WS,
8337	07/08/19	BP	TP	H	6	130	0%	2	93%	0%	2	3%	No	Yes	B, BND, CP, GS, LMB, WS,

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Assessed	YES
2022 Use Attainment Summary	
The Aesthetics Use for Hamant Brook is Not Assessed. The former Alert for moderate turbidity observed by DWM biologists during the 2004 survey (Kennedy 2009) is being carried forward.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	YES
2022 Use Attainment Summary	
The Primary Contact Recreational Use for Hamant Brook is Not Assessed. The former Alert for moderate turbidity observed by DWM biologists during the 2004 survey (Kennedy 2009) is being carried forward.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	YES
2022 Use Attainment Summary	
The Secondary Contact Recreational Use for Hamant Brook is Not Assessed. The former Alert for moderate turbidity observed by DWM biologists during the 2004 survey (Kennedy 2009) is being carried forward.	

Hamilton Reservoir (MA41019)

Location:	Holland (size indicates portion in Massachusetts).
AU Type:	FRESHWATER LAKE
AU Size:	386 ACRES
Classification/Qualifier:	B

No usable data were available for Hamilton Reservoir (MA41019) 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	(Non-Native Aquatic Plants*)		Unchanged

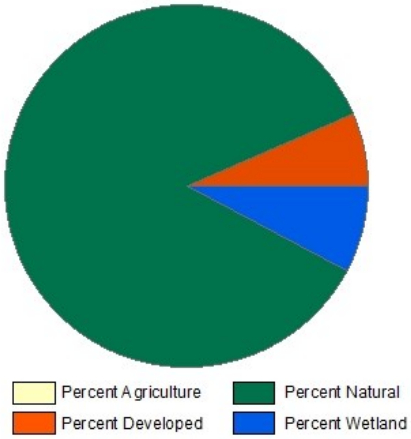
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Hatchet Brook (MA41-14)

Location:	From the outlet of No. 3 Reservoir, Southbridge to mouth at confluence with the Quinebaug River, Southbridge.
AU Type:	RIVER
AU Size:	1.3 MILES
Classification/Qualifier:	B

Hatchet Brook - MA41-14

Watershed Area: 3.51 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.51	3.39	1.43	1.4
Agriculture	0.6%	0.7%	0.4%	0.4%
Developed	6.5%	6.7%	4.4%	4.5%
Natural	85.2%	84.7%	83.1%	82.7%
Wetland	7.7%	8%	12.1%	12.4%
Impervious Cover	2.3%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Temperature		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Temperature	Dam or Impoundment (Y)	X				

Recommendations

2022 Recommendations
ALU: Additional water quality monitoring for metals (particularly copper) should be conducted in Hatchet Brook. Hatchet Brook seems to be supporting a brook trout population and MassDFG lists Hatchet as a CFR additional summertime temperature and fish population monitoring should be conducted to locate refugia for coldwater fish species.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	YES

2022 Use Attainment Summary

As part of the 2011 probabilistic streams survey MassDEP biologists sampled Hatchet Brook (MA41-14) near Dennison Cross Road in Southbridge. Sampling included benthic macroinvertebrates, fish population, and physiochemical water quality monitoring (W2214). The benthic sample (Station B0734) IBI score was indicative of satisfactory conditions (73). As was previously reported in the 2018/2020 IR cycle (MassDEP 2021), the other survey results can be briefly summarized as follows: backpack electrofishing (SampleID 4597) was conducted in September 2011. The fish sample was dominated by fluvial specialist/dependant species and included multiple age classes of Eastern brook trout so the water quality data were evaluated as a Tier 1 Existing Use Cold Water. Water quality monitoring at this site (W2214) except for temperature was indicative of good conditions (minimum DO 6.4 mg/L, maximum saturation 97%, maximum DO diel shift 1.6 mg/L, good pH, low chloride and ammonia- nitrogen concentrations, average total phosphorus concentration 0.016 mg/L, and with the exception of copper no exceedances of any acute or chronic metals criteria during any of the three sampling events. Copper slightly exceeded the acute criterion once and the chronic criterion twice. These excursions do not warrant an impairment decision but will be identified with an Alert. MassDFG does list Hatchet Brook as a CFR and while it is currently not a designated Cold Water stream in the SWQS it needs to be protected as a Tier 1 Cold Water since multiple age classes of Eastern brook trout were collected. The long-term temperature deployment data, however, collected during the summer 2011 frequently exceeded 20°C (maximum 24.2, maximum daily average 22.5°C, and 73 exceedances above the 20°C 7DADM). While most of the watershed is well protected, the chronic temperature violations are not considered natural since there are at least three public water supply reservoir dams in the upper watershed.

The Aquatic Life Use for Hatchet Brook is assessed as Not Supporting because of elevated water temperatures resulting from the water supply dams/impoundments. The Alert for chronic copper criteria exceedances is being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
B0734	MassDEP	Benthic	Hatchet Brook/	[Dennison Cross Road, Southbridge, MA]	42.061511	-72.064542
W2214	MassDEP	Water Quality	Hatchet Brook	[Dennison Cross Road, Southbridge]	42.061511	-72.064542

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)

[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
B0734	07/13/11	RBP kicknet	Central_Hills_100ct	102	73	S

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2214	2011	3	12	6.4	7.1	7.7	1.6	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2214	05/26/11	10/03/11	6	7.9	8.5	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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]

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
W2214	06/01/11	09/15/11	107	107	22.5	24.2	22.6	21.2	70	0	2	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2214	2011	3	12	22.3	23.7	22.1	20.4	3	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 5) (MassDEP Undated 4)

[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
W2214	06/01/11	09/15/11	107	5136	22.7	0	0	0
W2214	06/24/11	09/07/11	75	576	22.5	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2214	05/26/11	10/03/11	8	6	23.4	18.9	1	1	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W2214	05/26/11	10/03/11	6	6.7	7	0	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2214	2011	4	0.013	0.017	0.015	1.6	0.7	97.0	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 5) (MassDEP Undated 4)

[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
W2214	2011	3	0	0	0	1	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2214	2011	3	0	0	0	2	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2214	07/27/11	0.2	0.4	0.3	0.36	0.0	0.8
W2214	08/31/11	0.5	0.8	1.1	1.38	0.1	0.0
W2214	09/12/11	0.6	0.0	0.8	1.05	0.1	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2214	2011	3	0.027	0.054	0.043	0.1	0.2	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2214	2011	5	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2214	2011	5	5	32	14	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W2214	05/26/11	10/03/11	6	53	165	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 Hatchet Brook, therefore the Fish Consumption Use is Not Assessed.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews in Hatchet Brook at Dennison Cross Road, Southbridge (W2214) during the summer 2011. The Aesthetics Use for Hatchet Brook will continue to be assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2214	MassDEP	Water Quality	Hatchet Brook	[Dennison Cross Road, Southbridge]	42.061511	-72.064542

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2214	Hatchet Brook	2011	6	MassDEP aesthetics observations for station W2214/MAP2-075 on Hatchet 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2214	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2214	Hatchet Brook	2011	Color	Light Yellow/Tan	3	6
W2214	Hatchet Brook	2011	Color	None	2	6
W2214	Hatchet Brook	2011	Color	NR	1	6
W2214	Hatchet Brook	2011	Objectionable Deposits	No	6	6
W2214	Hatchet Brook	2011	Odor	None	6	6
W2214	Hatchet Brook	2011	Scum	No	5	6
W2214	Hatchet Brook	2011	Scum	Yes	1	6
W2214	Hatchet 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 Hatchet Brook Dennison Cross Road, Southbridge (W2214) between May and October 2011 (n=6) during the summer of 2011. Data analysis indicated 17% of the intervals had GMs >126 cfu/100ml, and none of the samples exceeded the 410 cfu/100ml STV. The seasonal GM was 85 cfu/100ml. Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Primary Contact Recreational Use for Hatchet Brook is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2214	MassDEP	Water Quality	Hatchet Brook	[Dennison Cross Road, Southbridge]	42.061511	-72.064542

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

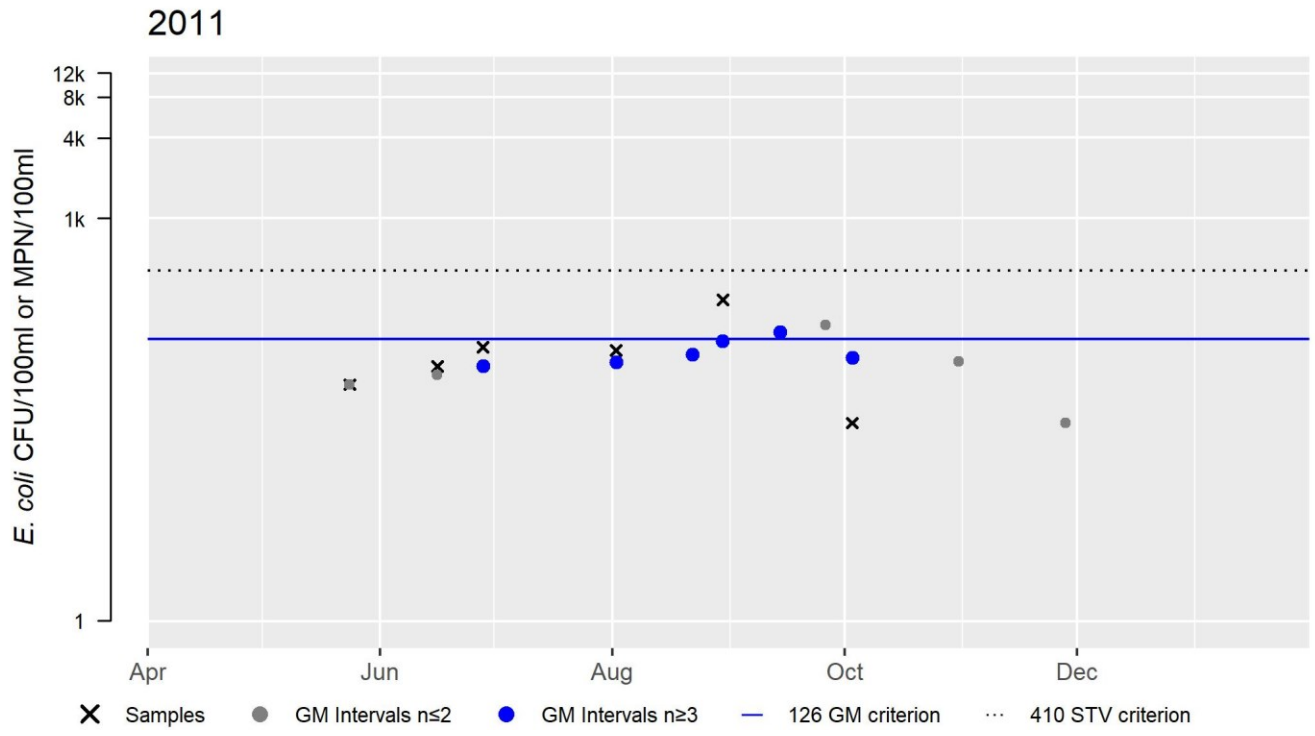
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2214	MassDEP	E. coli	05/24/11	10/03/11	6	30	248	85

W2214 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	85
#GMI	6
#GMI Ex	1
%GMI Ex	17
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 Hatchet Brook Dennison Cross Road, Southbridge (W2214) between May and October 2011 (n=6) during the summer of 2011. Data analysis indicated 0% of the intervals had GMs >630 cfu/100ml, and none of the samples exceeded the 1260 cfu/100ml STV. The seasonal GM was 85cfu/100ml. Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Secondary Contact Recreational Use for Hatchet Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2214	MassDEP	Water Quality	Hatchet Brook	[Dennison Cross Road, Southbridge]	42.061511	-72.064542

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

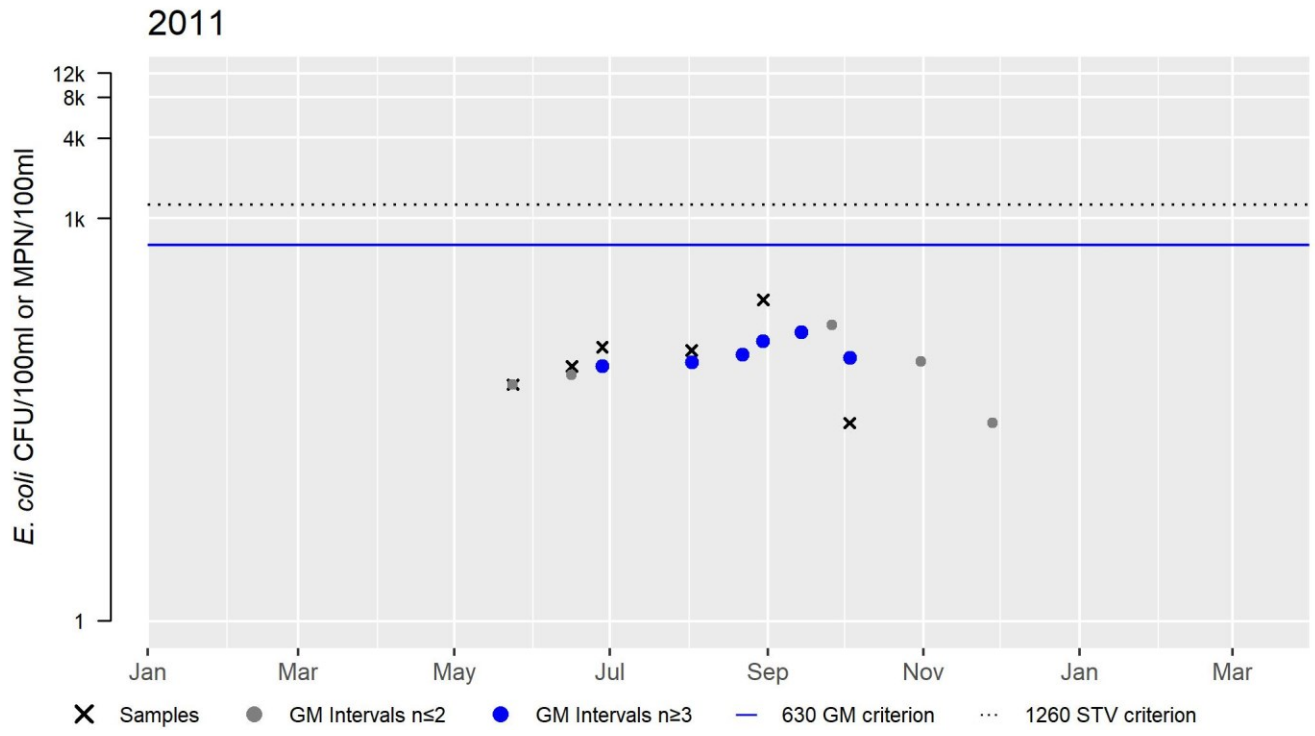
[Result units are CFU/100ml or MPN/100ml]

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)
W2214	MassDEP	E. coli	05/24/11	10/03/11	6	30	248	85

W2214 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	85
#GMI	6
#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



Holland Pond (MA41022)

Location:	Holland.
AU Type:	FRESHWATER LAKE
AU Size:	66 ACRES
Classification/Qualifier:	B: HQW (impoundment on river designated B/CWF/HQW)

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	5	Harmful Algal Blooms		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
Harmful Algal Blooms	Source Unknown (N)			X	X	X
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Mercury in Fish Tissue	Source Unknown (N)		X			

Recommendations

2022 Recommendations
ALU: Conduct an aquatic macrophyte survey in Holland Pond (MA41022) to confirm the presence of any non-native aquatic species including *Myriophyllum heterophyllum* (note: confirmation of any non-native species should be made by a qualified state agency representative/taxonomist).

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Assessed	YES
2022 Use Attainment Summary	
No new information is available to assess the Aquatic Life Use for Holland Pond. The Aquatic Life Use for Holland Pond is Not Assessed however the alert is being carried forward based on MassDEP 1994 synoptic survey notes of a "potential" infestation of the non-native aquatic macrophyte, *Myriophyllum heterophyllum*.	

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
The Fish Consumption Use for Holland Pond will continue to be assessed as Not Supporting with the Mercury in Fish Tissue impairment being carried forward (site-specific advisory in place).	

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Lake Siog (Holland Pond) (MA41022) were reported to MassDPH for 18 days in 2015, 35 days in 2016, 75 days in 2017, and 3 days in 2018. The Aesthetics Use for Holland Pond is assessed as Not Supporting since blooms >20 days in length were reported in two recent years. The former Alert identified for algal blooms is being removed.	

Algal Bloom Information

Cyanobacteria Harmful Algal Bloom (C-HAB) Summary Statements for 2015-2019 MassDPH Data (Bailey, Logan April 15, 2021) (MassDEP Undated 2)

C-HAB Summary Statement
C-HAB postings for Lake Siog (Holland Pond) (MA41022) were reported to MassDPH for 18 days in 2015, 35 days in 2016, 75 days in 2017, and 3 days in 2018. Since blooms >20 days in length were reported in 2 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
Lake Siog (Holland Pond)	Not issued or confirmed by sampling	18	35	75	3		2	yes

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Lake Siog (Holland Pond) (MA41022) were reported to MassDPH for 18 days in 2015, 35 days in 2016, 75 days in 2017, and 3 days in 2018. The Primary Contact Recreational Use for Holland Pond is assessed as Not Supporting since blooms >20 days in length were reported in two recent years. The former Alert identified for algal blooms is being removed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
C-HAB postings for Lake Siog (Holland Pond) (MA41022) were reported to MassDPH for 18 days in 2015, 35 days in 2016, 75 days in 2017, and 3 days in 2018. The Secondary Contact Recreational Use for Holland Pond is assessed as Not Supporting since blooms >20 days in length were reported in two recent years. The former Alert identified for algal blooms is being removed.	

Hollow Brook (MA41-24)

Location:	Headwaters, west of Hollow Road, Wales to mouth at confluence with Mill Brook, Brimfield.
AU Type:	RIVER
AU Size:	2.7 MILES
Classification/Qualifier:	B

No usable data were available for Hollow Brook (MA41-24) 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
2	2	None		Unchanged

Lake George (MA41016)

Location:	Wales.
AU Type:	FRESHWATER LAKE
AU Size:	93 ACRES
Classification/Qualifier:	B

No usable data were available for Lake George (MA41016) 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

Leadmine Brook (MA41-21)

Location:	Headwaters, outlet Leadmine Pond, Sturbridge to the state line, Sturbridge, MA/Union, CT.
AU Type:	RIVER
AU Size:	2.5 MILES
Classification/Qualifier:	B

No usable data were available for Leadmine Brook (MA41-21) 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

Leadmine Pond (MA41027)

Location:	Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	52 ACRES
Classification/Qualifier:	B

No usable data were available for Leadmine Pond (MA41027) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

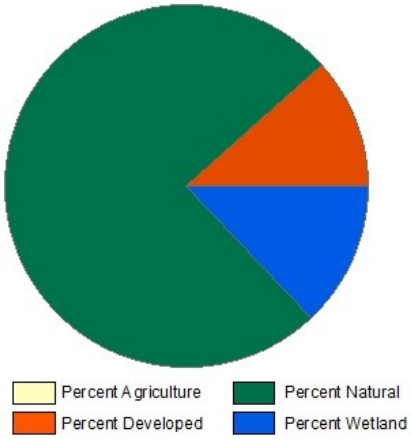
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Lebanon Brook (MA41-11)

Location:	From the state line, Southbridge, MA/Woodstock, CT, to mouth at confluence with the Quinebaug River, Southbridge.
AU Type:	RIVER
AU Size:	4.7 MILES
Classification/Qualifier:	B

Lebanon Brook - MA41-11

Watershed Area: 3.41 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.41	2.99	1.34	1.14
Agriculture	0.8%	0.9%	0.5%	0.6%
Developed	11.6%	13%	8.1%	9.1%
Natural	74.9%	74.3%	72.7%	72.7%
Wetland	12.8%	11.8%	18.8%	17.6%
Impervious Cover	4%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	2	None		Unchanged

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
DFG biologists conducted backpack electrofishing at two sites along Lebanon Brook in Southbridge: downstream of Alpine Dr crossing (SampleID 5650) in August 2015 and upstream of Sawyers Path (SampleID 6169) in August 2016. Both samples were dominated by fluvial fishes (85 and 94%). The Aquatic Life Use for Lebanon Brook is assessed as Fully Supporting based on the presence/dominance of fluvial fishes.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5650	MassDFG	Fish Community	Lebanon Brook	Alpine Dr xing DS, Southbridge	42.04205	-72.04306
6169	MassDFG	Fish Community	Lebanon Brook	Sawyers Path-US, Southbridge	42.05538	-72.01905

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, CS = Common Shiner, F = Fallfish, LMB = Largemouth Bass, P = Pumpkinseed, 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
5650	08/26/15	BP	TP	H	4	66	0%	1	85%	0%	1	3%	No	No	B, F, LMB, YB,
6169	08/23/16	BP	TP		6	139	0%	4	94%	0%	1	2%	No	No	BND, CS, F, P, WS, YB,

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No aesthetics observation data have been collected in Lebanon Brook, therefore the Aesthetic Use is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data have been collected in Lebanon Brook, therefore the Primary Contact Recreational Use is Not Assessed.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No bacteria data have been collected in Lebanon Brook, therefore the Secondary Contact Recreational Use is Not Assessed.	

Little Alum Pond (MA41029)

Location:	Brimfield.
AU Type:	FRESHWATER LAKE
AU Size:	73 ACRES
Classification/Qualifier:	B

No usable data were available for Little Alum Pond (MA41029) 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

Mcintyre Pond (MA41031)

Location:	Charlton.
AU Type:	FRESHWATER LAKE
AU Size:	11 ACRES
Classification/Qualifier:	B

No usable data were available for Mcintyre Pond (MA41031) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

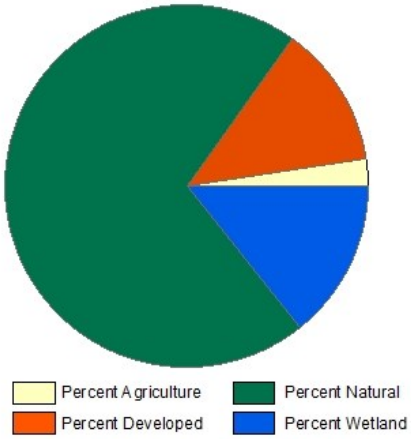
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Mckinstry Brook (MA41-13)

Location:	Headwaters, east of Brookfield Road, Charlton (excluding intermittent portion) to mouth at confluence with the Quinebaug River, Southbridge.
AU Type:	RIVER
AU Size:	7.3 MILES
Classification/Qualifier:	B

McKinstry Brook - MA41-13

Watershed Area: 8.01 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	8.01	4.39	2.71	1.46
Agriculture	2.4%	1.9%	0.6%	0.5%
Developed	12.7%	14.2%	9.4%	9%
Natural	70.6%	69.1%	67.1%	68.3%
Wetland	14.3%	14.8%	22.9%	22.2%
Impervious Cover	4%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Debris*)		Unchanged
5	5	Escherichia Coli (E. Coli)		Unchanged
5	5	Trash		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Debris*)	Illegal Dumps or Other Inappropriate Waste Disposal (Y)			X	X	X
Escherichia Coli (E. Coli)	Source Unknown (N)				X	
Trash	Illegal Dumps or Other Inappropriate Waste Disposal (Y)			X	X	X

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	
DFG biologists conducted backpack electrofishing in Mckinstry Brook off Sawmill Circle in Charlton (SampleID 5471) in July 2015. The sample was dominated by fluvial fishes (96%). The Aquatic Life Use for Mckinstry Brook is assessed as Fully Supporting based on the presence/dominance of fluvial fishes. The former Alert because of hyperdominance of filter feeders in the summer 2004 benthic sample is being carried forward.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
5471	MassDFG	Fish Community	McKinstry Brook	Off Sawmill Circle, Charlton	42.12238	-72.03278

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, BND = Blacknose Dace, CP = Chain Pickerel, F = Fallfish, GS = Golden Shiner, P = Pumpkinseed, 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
5471	07/17/15	BP	TP	H	8	259	0%	3	96%	0%	2	3%	No	Yes	BB, BND, CP, F, GS, P, WS, YB,

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new information related to aesthetics has been collected in Mckinstry Brook. The Aesthetics Use for Mckinstry Brook will continue to be assessed as Not Supporting with the impairments for trash and debris identified for the lower 0.3 miles being carried forward from the 2004 survey (MassDEP 2009).	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new information or bacteria data has been collected in Mckinstry Brook. The Primary Contact Recreational Use for Mckinstry Brook will continue to be assessed as Not Supporting with the *E. coli* and aesthetic impairments for trash and debris identified for the lower 0.3 miles being carried forward from the 2004 survey (MassDEP 2009).	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new information or bacteria data has been collected in Mckinstry Brook. The Secondary Contact Recreational Use for Mckinstry Brook will continue to be assessed as Not Supporting with the aesthetic impairments for trash and debris identified for the lower 0.3 miles being carried forward from the 2004 survey (MassDEP 2009).	

Mill Brook (MA41-07)

Location:	From inlet of Mill Road Pond, Brimfield to mouth at confluence with Quinebaug River, Brimfield (through former 2008 segment: Mill Road Pond MA41032).
AU Type:	RIVER
AU Size:	4.7 MILES
Classification/Qualifier:	B

No usable data were available for Mill Brook (MA41-07) 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	(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
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Monson Road Pond (MA41059)

Location:	Wales.
AU Type:	FRESHWATER LAKE
AU Size:	4 ACRES
Classification/Qualifier:	B

No usable data were available for Monson Road Pond (MA41059) 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

Morse Pond (MA41033)

Location:	Southbridge.
AU Type:	FRESHWATER LAKE
AU Size:	41 ACRES
Classification/Qualifier:	B

No usable data were available for Morse Pond (MA41033) 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	Dissolved Oxygen		Unchanged
5	5	Nutrient/Eutrophication Biological Indicators		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	X
Dissolved Oxygen	Source Unknown (N)	X				
Nutrient/Eutrophication Biological Indicators	Source Unknown (N)	X		X	X	X

Mountain Brook (MA41-18)

Location:	Headwaters, east of Steerage Rock Road (excluding intermittent portion), Brimfield to mouth at confluence with Mill Brook, Brimfield.
AU Type:	RIVER
AU Size:	1.9 MILES
Classification/Qualifier:	B

No usable data were available for Mountain Brook (MA41-18) 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

New Boston Road Pond (MA41035)

Location:	Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	13 ACRES
Classification/Qualifier:	B

No usable data were available for New Boston Road Pond (MA41035) 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

No. 3 Reservoir (MA41038)

Location:	Southbridge.
AU Type:	FRESHWATER LAKE
AU Size:	23 ACRES
Classification/Qualifier:	A: PWS, ORW

No usable data were available for No. 3 Reservoir (MA41038) 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

No. 4 Reservoir (MA41039)

Location:	Southbridge.
AU Type:	FRESHWATER LAKE
AU Size:	69 ACRES
Classification/Qualifier:	A: PWS, ORW (Tributary)

No usable data were available for No. 4 Reservoir (MA41039) 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

No. 5 Reservoir (MA41040)

Location:	Southbridge.
AU Type:	FRESHWATER LAKE
AU Size:	30 ACRES
Classification/Qualifier:	A: PWS, ORW (Tributary)

No usable data were available for No. 5 Reservoir (MA41040) 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

Pistol Pond (MA41057)

Location:	Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	5 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	Dissolved Oxygen		Unchanged
5	5	Nutrient/Eutrophication Biological Indicators		Added
5	5	Transparency / Clarity		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
Dissolved Oxygen	Source Unknown (N)	X				
Nutrient/Eutrophication Biological Indicators	Source Unknown (N)			X	X	X
Transparency / Clarity	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. Pistol Pond (MA41057) was first listed as impaired for Noxious Aquatic Plants in 1996 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a September 1994 synoptic survey conducted by MassDEP staff in which it was noted that the entire pond was covered in very dense floating vegetation, including the non-rooted, floating species, *Lemna minor* and *Ceratophyllum echinatum* (MassDEP 1994, MassDEP 2002). Google Earth images from September 2010, August 2016, and September 2019 show high amounts of plant coverage over roughly 25% or more of the pond (Google Earth Pro Undated). Nutrient/Eutrophication Biological Indicators is being added as an impairment based on the presence of several non-rooted, floating, aquatic macrophyte species. 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)

1996 WBS Coding Sheet (MassDEP 2002):

WBID: MA41057 WATERSHED: Quinebaug (41) (Printed 02/03/98)
NAME: TYPE: Lake/Pond
CODE: 41057 SIZE: 6.00(acres) CLASS: B

LATITUDE:
LONGITUDE: ()
Lake/Pond Name: ,
Ecoregion Name: ()
Description:

Assessment Date: 9609 **Begin Sampling:** 9409 **303(d) List?:** Yes
Cycle: 96 **End Sampling:** 9409 **Pathogens Only?:** No

Lake Specific Information
Lake size greater than 10 acres?: No
Significantly Publicly Owned: xxxx
Trophic Status: Hypereutrophic
Trophic Trend: Unknown
Acidity/Toxics Trend: Unknown
Acidity Effects: Unknown

Uses	Support	Threat	Partial	Non-Sup	Not-Asses	Not-Attain
OVERALL USE SUPPORT				6.00		
ALUS					6.00	
FISH CONSUMPTION					6.00	
PRIMARY CONTACT				6.00		
SECONDARY CONTACT				6.00		
Aesthetics					6.00	

Nonattainment Causes

Code	Size	Magnitude
2200- Noxious aquatic plants	6.00	H

"New"

Code	Size	Magnitude

Nonattainment Sources

Code	Size	Magnitude
9000- SOURCE UNKNOWN	6.00	H

"New"

Code	Size	Magnitude

Assessment Type
(Assessment Category = > Monitored)
R35- Primary Producer Surveys

"New" Assessment Category = > M E NA

Media/Pollutants Assessed (Toxics Monitoring = > N)

"New" Toxics Monitoring = > YES or NO

Comments:
1996:
A 8 SEPTEMBER 1994 SYNOPTIC SURVEY INDICATES THAT THERE WAS A VERY DENSE FLOATING LEAF COVER OVER THE ENTIRE POND. SUBMERGENTS WERE VERY DENSE IN DRAG SAMPLES AND THE SUBMERGED PLANTS WERE OFTEN BLACKENED. NO OTHER DATA WAS AVAILABLE TO MAKE ASSESSMENTS.

1994 Synoptic Survey Field Sheet (MassDEP 1994):

10/11/94. 10/6/94

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Lake/Pond Pistol Pond **Date** 8 Sept 94

Town/City Sturbridge **Observers** R. Haynes

River Basin Quinebaug R. R. McVoy

USGS Topo _____ **PALIS NO.** MA 41057 ~6 acres

Location/type of access (be specific, e.g., public boat ramp at west cove area off Simpson Street):
None -
Observation over guard rail + down bank from Rt. 20.

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

Posted signs (re aquatic plants, fish advisories, access, etc.):
None

Water quality observations (clarity, dissolved organic staining, blooms, et cetera):
Turbid brown/green

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

Nymphaea, Polygonum, Ceratophyllum echinatum, (possibly) Nuphar, Sparganium, Typha latifolia + T. angustifolia (also apparently hybrids), Potamogeton sp. (thin leaf), Pontederia, Lemna minor, Phragmites, Potamogeton oakesiensus or natans (21 veins, no floating/free stipules - thin submersed)

Proserpinaca palustris, green periphytic algae

Najas flexilis

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

Very dense floating leaf cover over entire pond; submergents very dense in drag samples - submerged plants often blackened

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

305 b - Hypereutrophic

1° Contact - 100% Non-support

2° Contact - 100% Non-Support

Cause Noxious plants - IH - 100%

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

Google Earth image of Pistol Pond while clear, 4/29/2005 (Google Earth Pro Undated):

Google Earth image of Pistol Pond, 9/20/2010 (Google Earth Pro Undated):

Google Earth image of Pistol Pond, 8/23/2016 (Google Earth Pro Undated):

Google Earth image of Pistol Pond, 9/20/2019 (Google Earth Pro Undated):

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

2022 Use Attainment	Alert
No new data/information is available so the Aquatic Life Use for Pistol Pond will continue to be assessed as Not Supporting with the Dissolved Oxygen impairment being carried forward.	

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
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. Pistol Pond (MA41057) was first listed as impaired for Noxious Aquatic Plants in 1996 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a September 1994 synoptic survey conducted by MassDEP staff in which it was noted that the entire pond was covered in very dense floating vegetation, including the non-rooted, floating species, *Lemna minor* and *Ceratophyllum echinatum* (MassDEP 1994, MassDEP 2002). Google Earth images from September 2010, August 2016, and September 2019 show high amounts of plant coverage over roughly 25% or more of the pond (Google Earth Pro Undated). Nutrient/Eutrophication Biological Indicators is being added as an impairment based on the presence of several non-rooted, floating, aquatic macrophyte species. 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. The Transparency impairment is being carried forward.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
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. Pistol Pond (MA41057) was first listed as impaired for Noxious Aquatic Plants in 1996 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a September 1994 synoptic survey conducted by MassDEP staff in which it was noted that the entire pond was covered in very dense floating vegetation, including the non-rooted, floating species, Lemna minor and Ceratophyllum echinatum (MassDEP 1994, MassDEP 2002). Google Earth images from September 2010, August 2016, and September 2019 show high amounts of plant coverage over roughly 25% or more of the pond (Google Earth Pro Undated). Nutrient/Eutrophication Biological Indicators is being added as an impairment based on the presence of several non-rooted, floating, aquatic macrophyte species. 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. The Transparency impairment is being carried forward.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

2022 Use Attainment	Alert
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. Pistol Pond (MA41057) was first listed as impaired for Noxious Aquatic Plants in 1996 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a September 1994 synoptic survey conducted by MassDEP staff in which it was noted that the entire pond was covered in very dense floating vegetation, including the non-rooted, floating species, Lemna minor and Ceratophyllum echinatum (MassDEP 1994, MassDEP 2002). Google Earth images from September 2010, August 2016, and September 2019 show high amounts of plant coverage over roughly 25% or more of the pond (Google Earth Pro Undated). Nutrient/Eutrophication Biological Indicators is being added as an impairment based on the presence of several non-rooted, floating, aquatic macrophyte species. 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. The Transparency impairment is being carried forward.	

Prindle Lake (MA41043)

Location:	Charlton.
AU Type:	FRESHWATER LAKE
AU Size:	75 ACRES
Classification/Qualifier:	B

No usable data were available for Prindle Lake (MA41043) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

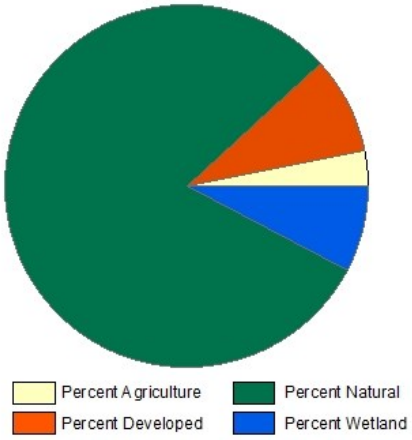
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Quinebaug River (MA41-01)

Location:	Outlet Hamilton Reservoir, Holland, to Sturbridge WWTP outfall (NPDES: MA0100421), Sturbridge (excluding Holland Pond segment MA41022 and East Brimfield Reservoir segment MA41014).
AU Type:	RIVER
AU Size:	8.2 MILES
Classification/Qualifier:	B: CWF, HQW

Quinebaug River - MA41-01

Watershed Area: 64.96 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	64.96	12.85	23.07	4.83
Agriculture	3.1%	1.5%	3%	0.9%
Developed	8.7%	13.2%	9.8%	14.8%
Natural	80.5%	79.3%	72.8%	75%
Wetland	7.7%	6.1%	14.4%	9.3%
Impervious Cover	3.5%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Non-Native Aquatic Plants*)		Unchanged
5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
5	5	Fish Bioassessments		Unchanged
5	5	Lack of a Coldwater Assemblage		Unchanged
5	5	Mercury 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
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				
Ambient Bioassays - Chronic Aquatic Toxicity	Source Unknown (N)	X				
Fish Bioassessments	Dam or Impoundment (Y)	X				
Fish Bioassessments	Source Unknown (N)	X				

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Lack of a Coldwater Assemblage	Dam or Impoundment (Y)	X				
Lack of a Coldwater Assemblage	Source Unknown (N)	X				
Mercury in Fish Tissue	Atmospheric Deposition - Toxics (Y)		X			
Temperature	Dam or Impoundment (Y)	X				
Temperature	Source Unknown (N)	X				

Recommendations

2022 Recommendations
ALU: Three ponds/impoundments/flood control projects (Hamilton Reservoir, Holland Pond, and East Brimfield Reservoir) and some smaller dams affect the flow and thermal regime of this Quinebaug River AU which is currently designated Cold Water in the SWQS. Since the Cold Water Aquatic Life Use goal is not currently being met, it is recommended that DFG biologists should be consulted with and asked to provide all fish sampling records for the Quinebaug River in the area currently designated Cold Water. Based on the findings and in consultation with DFG biologists the appropriateness of the Cold Water SWQS designation should be considered/reevaluated. If needed a use attainability study should be conducted to ascertain if reclassification of this Quinebaug River AU (MA41-01) is warranted to Class B Warm Water. Non-native aquatic macrophyte control(s) should also be pursued. An instream toxicity testing study using *P. promelas* should also be developed for the Quinebaug River to determine whether or not there is evidence of instream toxicity. If instream toxicity is found then a plan to identify the causes/sources of the impairment should be developed. If no evidence is found the Ambient Bioassays - Chronic Aquatic Toxicity impairment should be delisted.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	

DFG biologists conducted boat electrofishing in four reaches along the Quinebaug River Canoe Trail (between Holland Pond and East Brimfield Reservoir, SampleIDs from up to downstream 7367, 7366, 7368, 7365) in August 2018. Three of four samples contained fluvial species (range 2 to 19% of the samples) with intolerant/moderately tolerate macrohabitat generalist species comprised between 23 to 49% of the samples. No cold water fish were collected. Physio-chemical water quality monitoring in this Quinebaug River AU (MA41-01) was conducted by MassDEP staff at Holland Road bridge, Sturbridge (W0601) from 2011 through April 2013 as part of the SMART monitoring project. Except for temperature, these data were generally indicative of generally good conditions (i.e., DO >7.2 mg/L, maximum saturation 103%, pH slightly low [5.7 – 7.0SU with two of 13 measurements below 6.0SU], maximum specific conductance 118µS/cm, and low concentrations of total phosphorus (seasonal) and toxics such as ammonia and chloride [maximum 0.024, 0.03, and 23 mg/L, respectively). The maximum temperature was 24°C. The following data and information was also summarized for this Quinebaug River AU (MA41-01) for the 2018/2020 IR reporting cycle (MassDEP 2021): a statistically significant decreasing trend in the annual total phosphorus concentration was found but not for the summer average (likely an effect from the 2011 tornado which affected the area). MassDFG biologists backpack electrofishing downstream from the old Mill (Fiskdale) Dam behind the Millyard Marketplace at Route 20 in Sturbridge in August 2016 (SampleID 6165) resulted in the capture of a fish sample dominated by fluvial fishes. Data from this site (SampleIDs 50 and 6165) were determined to be 42.6 percent similar to the Quinebaug River Targeted Fish Community (TFC). Although this segment (MA41-01) is classified as a Class B Cold Water in the Massachusetts SWQS and is designated as a CFR by MassDFG, coldwater species were absent from all fish population samples. MassDEP staff reported infestations of the non-native aquatic macrophyte *Myriophyllum heterophyllum* in the river during field surveys conducted between 2009 and 2012. Water from the Quinebaug River was for use as either dilution water or as a site control in the Sturbridge WWTP's modified and/or definitive acute and chronic WET tests. Survival of *C. dubia* exposed (either 48 hours or ~7 days) to the river water collected approximately 2300 feet upstream (west) from Old Sturbridge Village Road in Sturbridge was >80% in all 28 of the tests conducted between February 2015 and November 2018. Between August 2008 and November 2018 survival of *P. promelas* exposed (either 48 hours or ~7 days) to the river water was >78% in 31 of 35 tests (89%) but was <75% (ranging from 58 to 73%) in 4 tests (May 2012, May 2014, November 2014, and November 2015) (11% of tests <75% survival).

The Aquatic Life Use for this Quinebaug River AU (MA41-01) will continue to be assessed as Not Supporting based on the absence of coldwater fishes, the low percent similarity of the fish community to the TFC model, elevated temperatures, low survival of *P. promelas* in exposed to river water as part of Sturbridge WWTP toxicity tests, and the presence of the non-native aquatic macrophyte species *Myriophyllum heterophyllum.*

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6165	MassDFG	Fish Community	Quinebaug River	Rte 20 Access behind old Mill, Sturbridge	42.11528	-72.11356
7365	MassDFG	Fish Community	Quinebaug River	Quinebaug Canoe Trail. Site #1., Brimfield	42.10569	-72.15128
7366	MassDFG	Fish Community	Quinebaug River	Quinebaug Canoe Trail. Site #2., Brimfield	42.09883	-72.15343
7367	MassDFG	Fish Community	Quinebaug River	Quinebaug Canoe Trail. Site #3., Brimfield	42.09808	-72.15554
7368	MassDFG	Fish Community	Quinebaug River	Quinebaug Canoe Trail. Site #4., Brimfield	42.10133	-72.15299
W0063	MassDEP	Water Quality	Quinebaug River	[upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge]	42.110552	-72.096377
W0601	MassDEP	Water Quality	Quinebaug River	[Holland Road bridge, Sturbridge]	42.109561	-72.118569
W2232	MassDEP	Water Quality	Quinebaug River	[East Brimfield Road, Holland]	42.079545	-72.157257

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2233	MassDEP	Water Quality	Quinebaug River	[Holland East Brimfield Road, Brimfield]	42.106759	-72.148597

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, C = Common Carp, CCS = Creek Chubsucker, CM = Central Mudminnow, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, GS = Golden Shiner, LMB = Largemouth Bass, P = Pumpkinseed, RBS = Redbreast Sunfish, 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
6165	08/24/16	BP	TP		7	130	0%	3	78%	0%	2	13%	No	No	B, F, LMB, RBS, TD, WS, YB,
7365	08/02/18	BT	TP		10	57	0%	2	19%	0%	4	23%	No	No	B, BB, C, CP, CS, GS, LMB, P, WS, YP,
7366	08/02/18	BT	TP		7	24	0%	1	4%	0%	3	42%	No	No	B, BB, CM, LMB, P, YB, YP,
7367	08/02/18	BT	TP		8	52	0%	1	2%	2%	4	37%	Yes	No	B, CCS, CP, GS, LMB, P, YB, YP,
7368	08/02/18	BT	TP		7	37	0%	0	0%	0%	4	49%	Yes	No	B, CP, GS, LMB, P, YB, YP,

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0601	03/23/11	10/26/11	5	7.2	9.8	0	0	0
W0601	01/25/12	11/14/12	6	7.2	10.2	0	0	0
W0601	02/27/13	04/24/13	2	11	12.6	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0601	03/23/11	10/26/11	5	2	22.7	14.6	2	1	0	0

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
W0601	01/25/12	11/14/12	6	1	24.0	14.1	2	2	0	0
W0601	02/27/13	04/24/13	2	0	11.5	6.8	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W0601	03/23/11	10/26/11	5	5.7	6.6	3	1
W0601	01/25/12	11/14/12	6	5.9	7	1	1
W0601	02/27/13	04/24/13	2	6.6	7	0	0

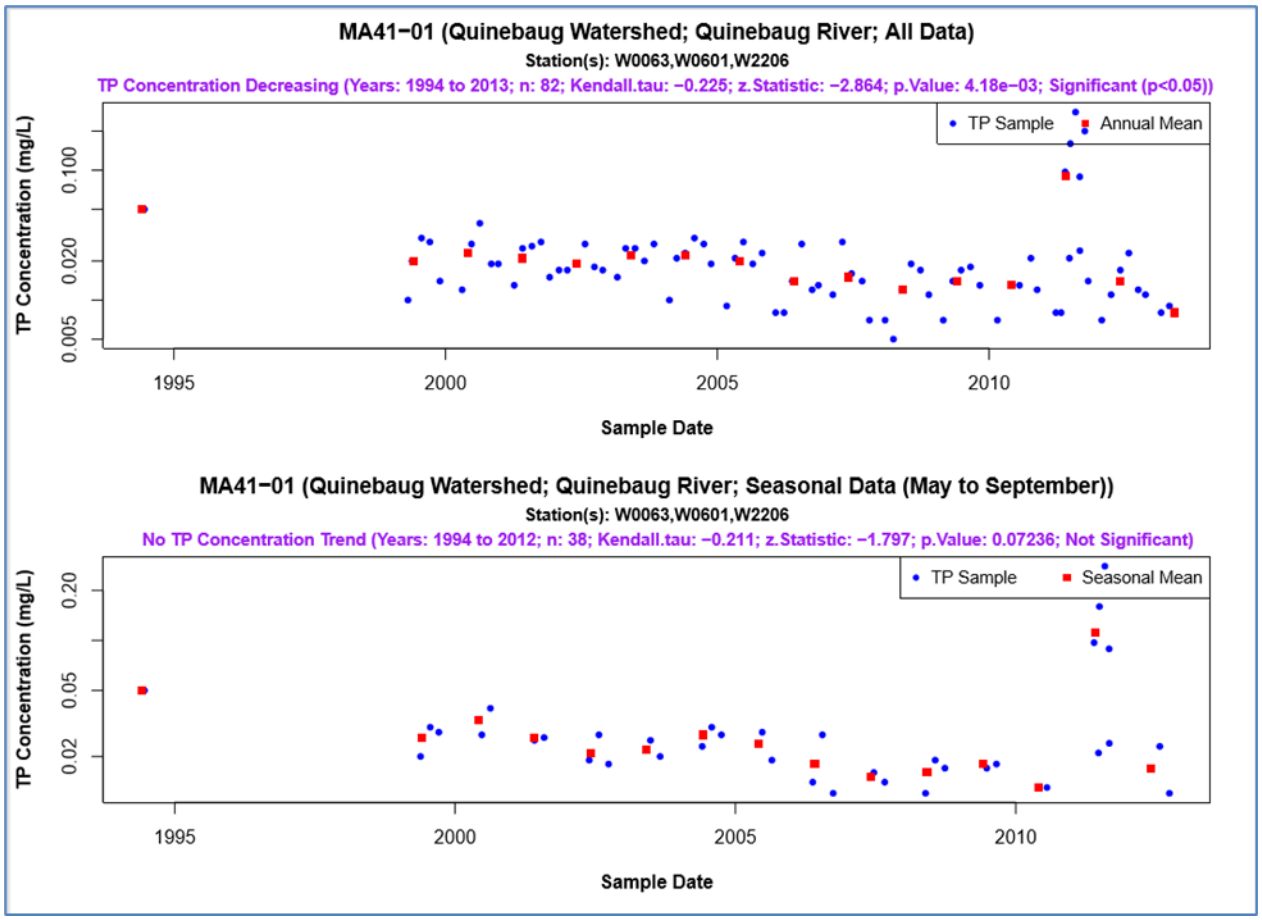
Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0063	2011	--	--	--	--	--	--	--	--	2	1
W0601	2011	2	0.021	0.024	0.023	--	--	101.7	6.6	7	0
W0601	2012	3	0.012	0.023	0.017	--	--	102.7	7.0	5	1
W0601	2013	--	--	--	--	--	--	102.7	7.0	2	0
W2232	2011	--	--	--	--	--	--	--	--	3	0
W2233	2011	--	--	--	--	--	--	--	--	4	0

Long Term Trend analysis for MassDEP total phosphorus data (MassDEP Undated 5)



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

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W0601	2011	5	0.020	0.030	0.022	0	0
W0601	2012	6	0.020	0.030	0.022	0	0
W0601	2013	2	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0601	2011	5	13	21	17	0	0
W0601	2012	6	16	23	20	0	0
W0601	2013	2	21	22	22	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W0601	03/23/11	10/26/11	5	72	115	0	0	0	0	0	0
W0601	01/25/12	11/14/12	6	92	118	0	0	0	0	0	0
W0601	02/27/13	04/24/13	2	116	118	0	0	0	0	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

In September 1998 fish toxics monitoring was conducted by DWM in this segment of the Quinebaug River. Based on these data, the MA DPH issued a fish consumption advisory due to mercury contamination for the Quinebaug River (Holland/Brimfield including Holland Pond and East Brimfield Reservoir):

1. "Children younger than 12 years, pregnant women, and nursing mothers should not eat any fish from this water body."
2. "The general public should limit consumption of all fish from this water body to two meals per month."

The Fish Consumption Use for this Quinebaug River AU (MA41-01) is assessed as Not Supporting because of the site-specific MA DPH fish consumption advisory that in effect due to mercury contamination (Quinebaug River from dam at Hamilton Reservoir through East Brimfield Reservoir/Long Pond, including Holland Pond—the upper 4.7miles). It should also be noted that the statewide fish consumption advisory is also in effect.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DWM-WPP field sampling crews during the surveys conducted at four sites along this reach of the Quinebaug River in the summer of 2011 from up to downstream as follows: East Brimfield Road, Holland (W2232), Holland East Brimfield Road, Brimfield (W2233), Holland Road bridge, Sturbridge (W0601), and upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge (W0063). The aesthetics of the river at Holland Road bridge in Sturbridge (W0601) in 2012 and 2013 were also noted as generally good.

The Aesthetics Use for this Quinebaug River AU (MA41-01) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0063	MassDEP	Water Quality	Quinebaug River	[upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge]	42.110552	-72.096377
W0601	MassDEP	Water Quality	Quinebaug River	[Holland Road bridge, Sturbridge]	42.109561	-72.118569
W2232	MassDEP	Water Quality	Quinebaug River	[East Brimfield Road, Holland]	42.079545	-72.157257
W2233	MassDEP	Water Quality	Quinebaug River	[Holland East Brimfield Road, Brimfield]	42.106759	-72.148597

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0063	Quinebaug River	2011	8	MassDEP aesthetics observations for station W0063 on Quinebaug 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.
W0601	Quinebaug River	2011	13	MassDEP aesthetics observations for station W0601 on Quinebaug 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.
W0601	Quinebaug River	2012	6	MassDEP aesthetics observations for station W0601 on Quinebaug 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.
W0601	Quinebaug River	2013	2	MassDEP aesthetics observations for station W0601 on Quinebaug 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).
W2232	Quinebaug River	2011	8	MassDEP aesthetics observations for station W2232 on Quinebaug 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.
W2233	Quinebaug River	2011	8	MassDEP aesthetics observations for station W2233 on Quinebaug 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0063	2011	8	2	1
W0601	2011	13	7	0
W0601	2012	6	5	1
W0601	2013	2	2	0
W2232	2011	8	3	0
W2233	2011	8	4	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0063	Quinebaug River	2011	Color	Light Yellow/Tan	7	8

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0063	Quinebaug River	2011	Color	NR	1	8
W0063	Quinebaug River	2011	Objectionable Deposits	No	7	8
W0063	Quinebaug River	2011	Objectionable Deposits	Unobservable	1	8
W0063	Quinebaug River	2011	Odor	None	7	8
W0063	Quinebaug River	2011	Odor	NR	1	8
W0063	Quinebaug River	2011	Scum	No	4	8
W0063	Quinebaug River	2011	Scum	Yes	4	8
W0063	Quinebaug River	2011	Turbidity	Highly Turbid	1	8
W0063	Quinebaug River	2011	Turbidity	None	4	8
W0063	Quinebaug River	2011	Turbidity	Slightly Turbid	3	8
W0601	Quinebaug River	2011	Color	Light Yellow/Tan	9	13
W0601	Quinebaug River	2011	Color	None	2	13
W0601	Quinebaug River	2011	Color	Reddish	2	13
W0601	Quinebaug River	2011	Objectionable Deposits	No	6	13
W0601	Quinebaug River	2011	Objectionable Deposits	Unobservable	6	13
W0601	Quinebaug River	2011	Objectionable Deposits	Yes	1	13
W0601	Quinebaug River	2011	Odor	Musty (Basement)	2	13
W0601	Quinebaug River	2011	Odor	None	10	13
W0601	Quinebaug River	2011	Odor	NR	1	13
W0601	Quinebaug River	2011	Scum	No	2	13
W0601	Quinebaug River	2011	Scum	Yes	11	13
W0601	Quinebaug River	2011	Turbidity	Moderately Turbid	1	13
W0601	Quinebaug River	2011	Turbidity	None	4	13
W0601	Quinebaug River	2011	Turbidity	Slightly Turbid	4	13
W0601	Quinebaug River	2011	Turbidity	Unobservable	4	13
W0601	Quinebaug River	2012	Color	Reddish	6	6
W0601	Quinebaug River	2012	Objectionable Deposits	No	5	6
W0601	Quinebaug River	2012	Objectionable Deposits	Unobservable	1	6
W0601	Quinebaug River	2012	Odor	Fishy	1	6
W0601	Quinebaug River	2012	Odor	None	3	6
W0601	Quinebaug River	2012	Odor	Other	2	6
W0601	Quinebaug River	2012	Scum	No	3	6
W0601	Quinebaug River	2012	Scum	Yes	3	6
W0601	Quinebaug River	2012	Turbidity	None	5	6
W0601	Quinebaug River	2012	Turbidity	Slightly Turbid	1	6
W0601	Quinebaug River	2013	Color	None	2	2
W0601	Quinebaug River	2013	Objectionable Deposits	No	2	2
W0601	Quinebaug River	2013	Odor	None	2	2
W0601	Quinebaug River	2013	Scum	No	1	2
W0601	Quinebaug River	2013	Scum	Yes	1	2
W0601	Quinebaug River	2013	Turbidity	None	2	2
W2232	Quinebaug River	2011	Color	Light Yellow/Tan	6	8
W2232	Quinebaug River	2011	Color	None	1	8
W2232	Quinebaug River	2011	Color	NR	1	8
W2232	Quinebaug River	2011	Objectionable Deposits	No	7	8
W2232	Quinebaug River	2011	Objectionable Deposits	Unobservable	1	8

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2232	Quinebaug River	2011	Odor	None	8	8
W2232	Quinebaug River	2011	Scum	No	4	8
W2232	Quinebaug River	2011	Scum	Yes	4	8
W2232	Quinebaug River	2011	Turbidity	Moderately Turbid	1	8
W2232	Quinebaug River	2011	Turbidity	None	6	8
W2232	Quinebaug River	2011	Turbidity	Slightly Turbid	1	8
W2233	Quinebaug River	2011	Color	Brownish	1	8
W2233	Quinebaug River	2011	Color	Light Yellow/Tan	4	8
W2233	Quinebaug River	2011	Color	None	1	8
W2233	Quinebaug River	2011	Color	NR	2	8
W2233	Quinebaug River	2011	Objectionable Deposits	No	7	8
W2233	Quinebaug River	2011	Objectionable Deposits	Unobservable	1	8
W2233	Quinebaug River	2011	Odor	None	6	8
W2233	Quinebaug River	2011	Odor	NR	2	8
W2233	Quinebaug River	2011	Scum	No	8	8
W2233	Quinebaug River	2011	Turbidity	Moderately Turbid	1	8
W2233	Quinebaug River	2011	Turbidity	None	6	8
W2233	Quinebaug River	2011	Turbidity	NR	1	8

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

E. coli bacteria sampling was conducted by MassDEP DWM-WPP field sampling crews at four sites along this reach of the Quinebaug River in the summer of 2011 from up to downstream as follows: East Brimfield Road, Holland (W2232), Holland East Brimfield Road, Brimfield (W2233), Holland Road bridge, Sturbridge (W0601), and upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge (W0063). Some very limited *E. coli* sampling was also conducted in 2012, and 2013 at the Holland Road bridge, Sturbridge (W0601) sampling location. Data analysis indicated that three of the four sites had 0% of the intervals with GMs >126 cfu/100ml, the fourth site (W2233) had 80% GMs >126 cfu/100ml. None of the samples at any of the four sites exceeded the 410 cfu/100ml STV. The seasonal GMs from up to downstream in the summer 2011 were 36, 134, 15, and 47 cfu/100ml.
The Primary Contact Recreational Use for this Quinebaug River AU (MA41-01) is assessed as Fully Supporting since the *E. coli* concentrations were almost all below the use attainment impairment thresholds for the single year low and moderate frequency datasets.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0063	MassDEP	Water Quality	Quinebaug River	[upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge]	42.110552	-72.096377
W0601	MassDEP	Water Quality	Quinebaug River	[Holland Road bridge, Sturbridge]	42.109561	-72.118569
W2232	MassDEP	Water Quality	Quinebaug River	[East Brimfield Road, Holland]	42.079545	-72.157257

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2233	MassDEP	Water Quality	Quinebaug River	[Holland East Brimfield Road, Brimfield]	42.106759	-72.148597

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

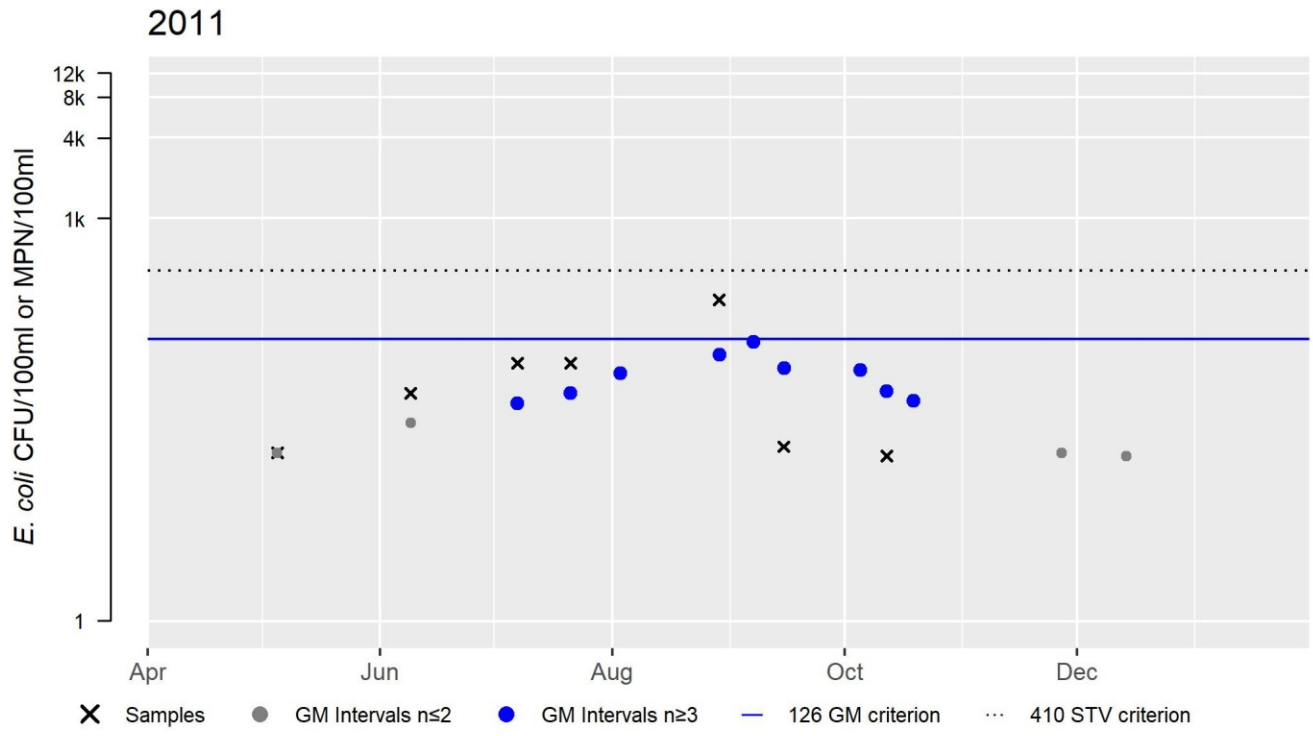
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0063	MassDEP	E. coli	05/05/11	10/12/11	7	17	248	47
W0601	MassDEP	E. coli	04/27/11	10/26/11	11	5	196	15
W0601	MassDEP	E. coli	05/29/12	09/26/12	3	2	47	13
W0601	MassDEP	E. coli	04/24/13	04/24/13	1	2	2	2
W2232	MassDEP	E. coli	05/05/11	10/12/11	7	8	365	36
W2233	MassDEP	E. coli	05/05/11	10/12/11	6	34	291	134

W0063 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	47
#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



W0601 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

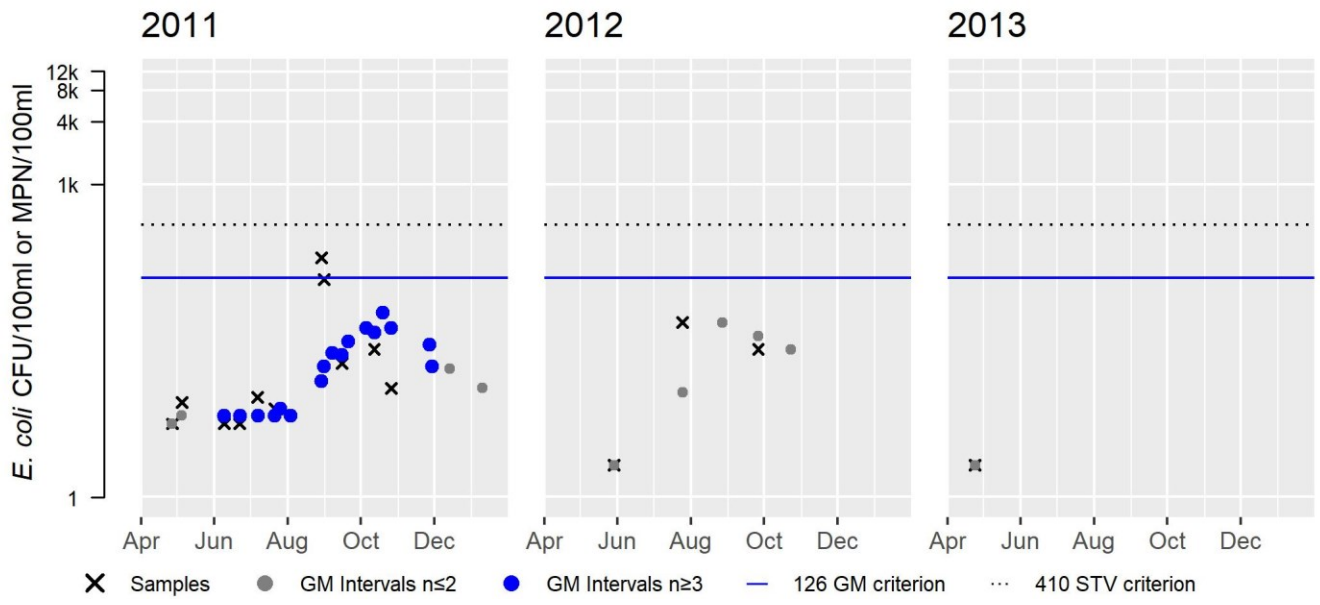
Var	Res
Samples	11
SeasGM	15
#GMI	17
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	3
SeasGM	13
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	1
SeasGM	2
#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

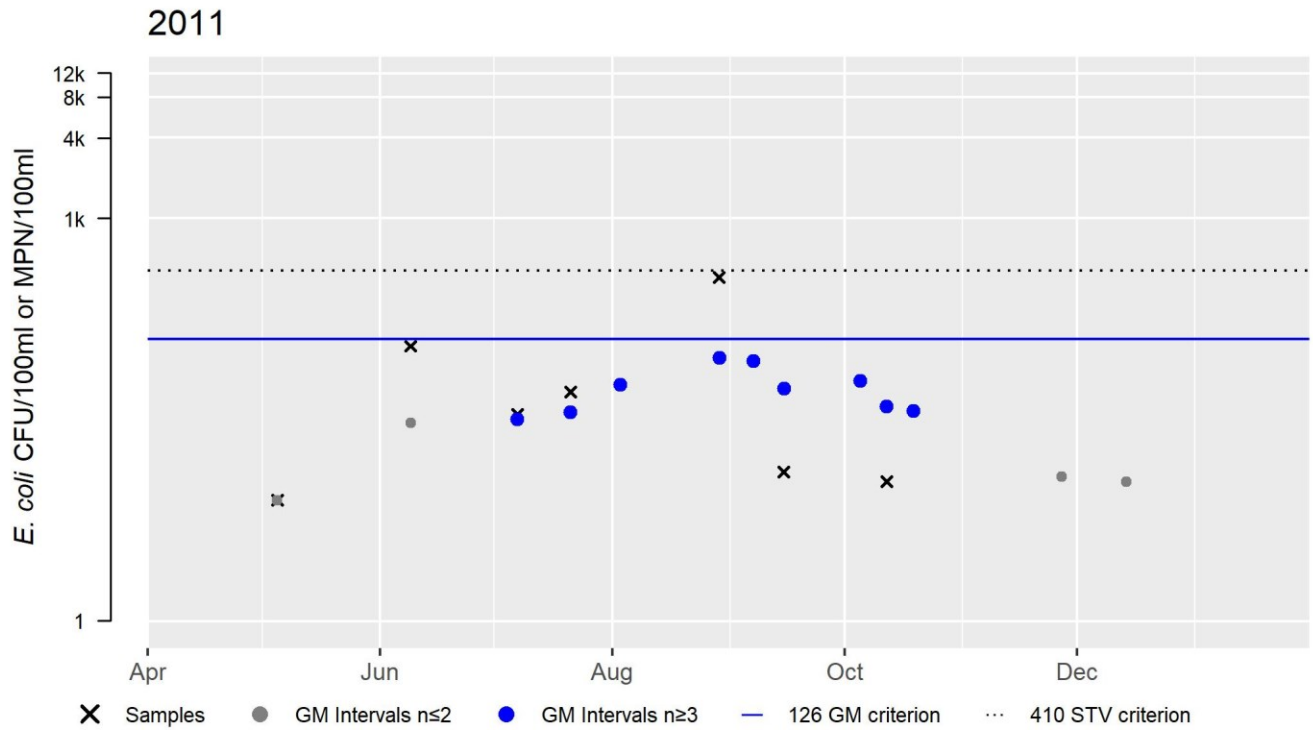
Variable	Cumulative %GMI Ex (all years)
Result	0



W2232 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	36
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

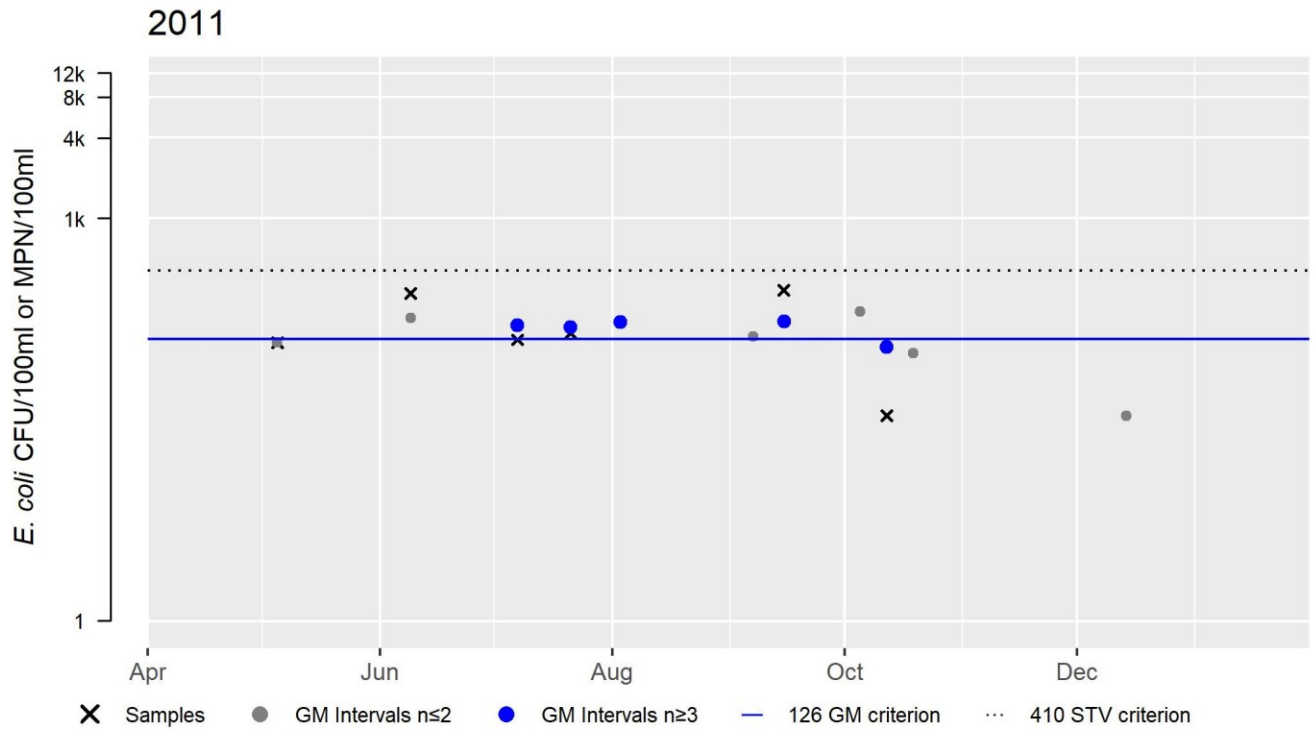
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2233 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	134
#GMI	5
#GMI Ex	4
%GMI Ex	80
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	

E. coli bacteria sampling was conducted by MassDEP DWM-WPP field sampling crews at four sites along this reach of the Quinebaug River in 2011 from up to downstream as follows: East Brimfield Road, Holland (W2232), Holland East Brimfield Road, Brimfield (W2233), Holland Road bridge, Sturbridge (W0601), and upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge (W0063). Some very limited *E. coli* sampling was also conducted in 2012, and 2013 at the Holland Road bridge, Sturbridge (W0601) sampling location. Data analysis indicated that the four sites had 0% of the intervals with GMs >630 cfu/100ml, and none of the samples at any of the four sites exceeded the 1260 cfu/100ml STV. The seasonal (yearly) GMs from up to downstream in 2011 were 36, 134, 13, and 47 cfu/100ml.
The Secondary Contact Recreational Use for this Quinebaug River AU (MA41-01) is assessed as Fully Supporting since the *E. coli* concentrations were all below the use attainment impairment thresholds for the single year low and moderate frequency datasets.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0063	MassDEP	Water Quality	Quinebaug River	[upstream of Sturbridge WWTP on the Old Sturbridge Village access road (Stallion Hill Road), Sturbridge]	42.110552	-72.096377
W0601	MassDEP	Water Quality	Quinebaug River	[Holland Road bridge, Sturbridge]	42.109561	-72.118569
W2232	MassDEP	Water Quality	Quinebaug River	[East Brimfield Road, Holland]	42.079545	-72.157257
W2233	MassDEP	Water Quality	Quinebaug River	[Holland East Brimfield Road, Brimfield]	42.106759	-72.148597

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

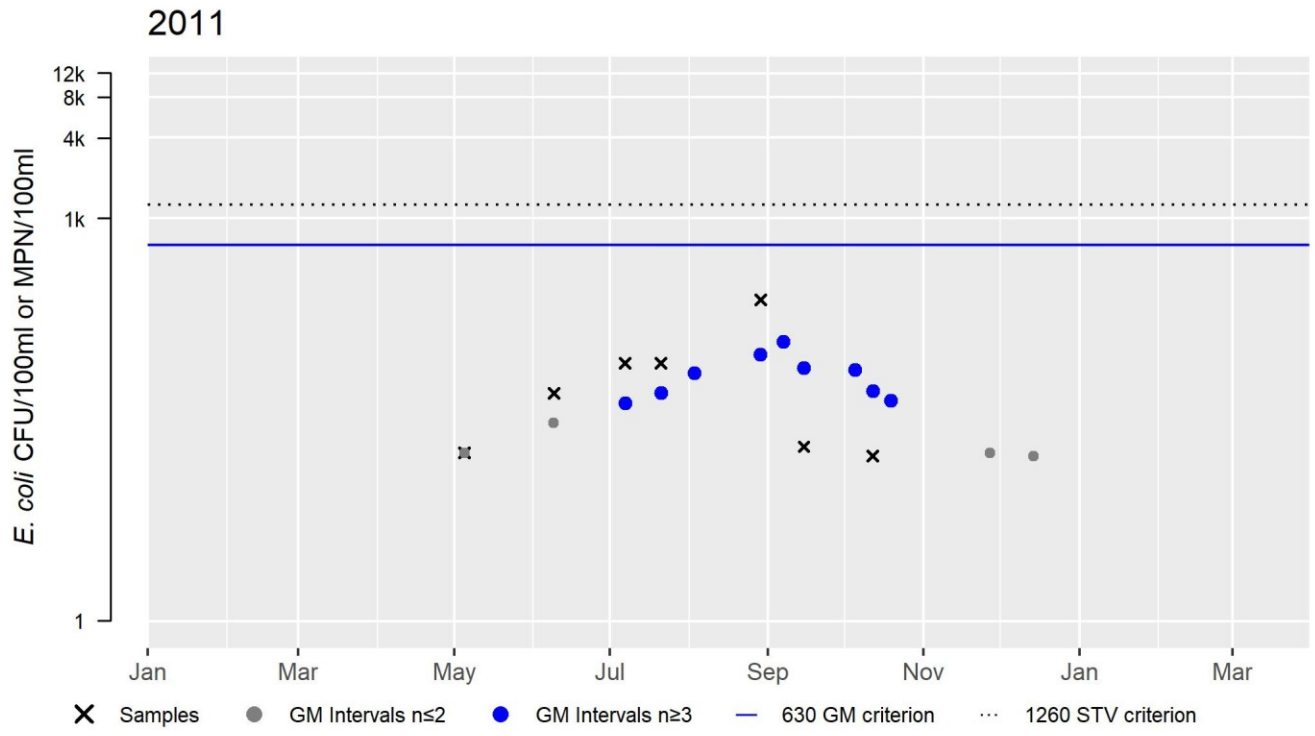
[Result units are CFU/100ml or MPN/100ml]

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)
W0063	MassDEP	E. coli	05/05/11	10/12/11	7	17	248	47
W0601	MassDEP	E. coli	03/23/11	10/26/11	12	4	196	13
W0601	MassDEP	E. coli	01/25/12	11/14/12	6	1	47	4
W0601	MassDEP	E. coli	02/27/13	04/24/13	2	2	8	4
W2232	MassDEP	E. coli	05/05/11	10/12/11	7	8	365	36
W2233	MassDEP	E. coli	05/05/11	10/12/11	6	34	291	134

W0063 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	47
#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



W0601 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

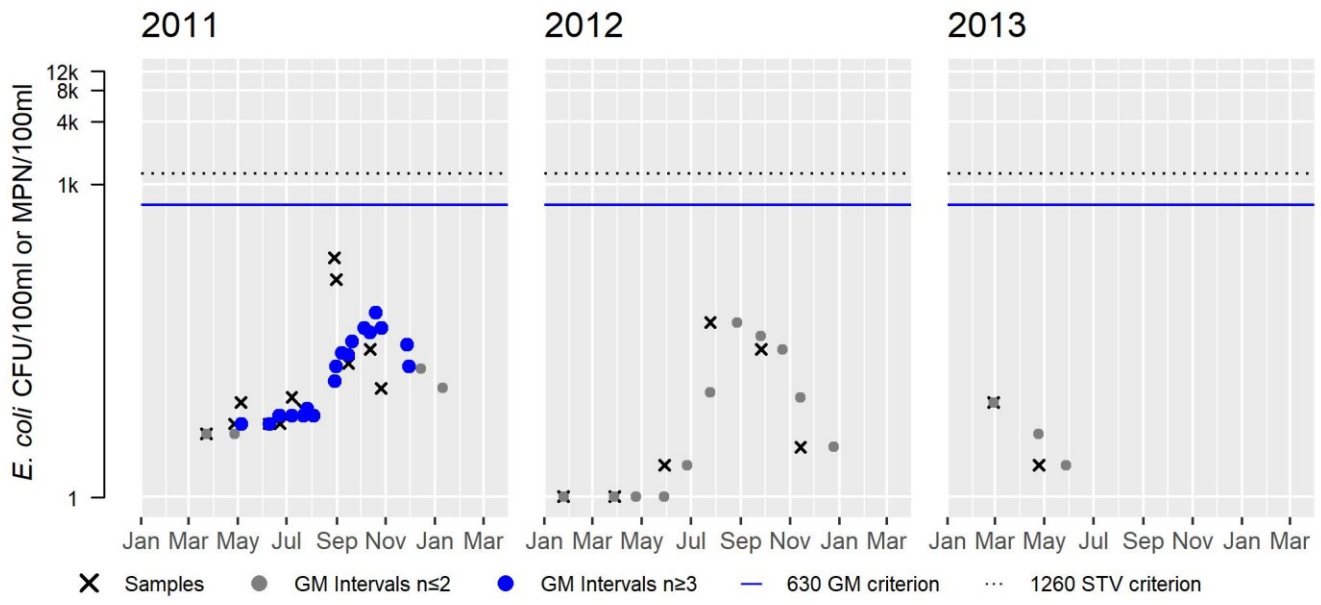
Var	Res
Samples	12
SeasGM	13
#GMI	19
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	6
SeasGM	4
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	2
SeasGM	4
#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

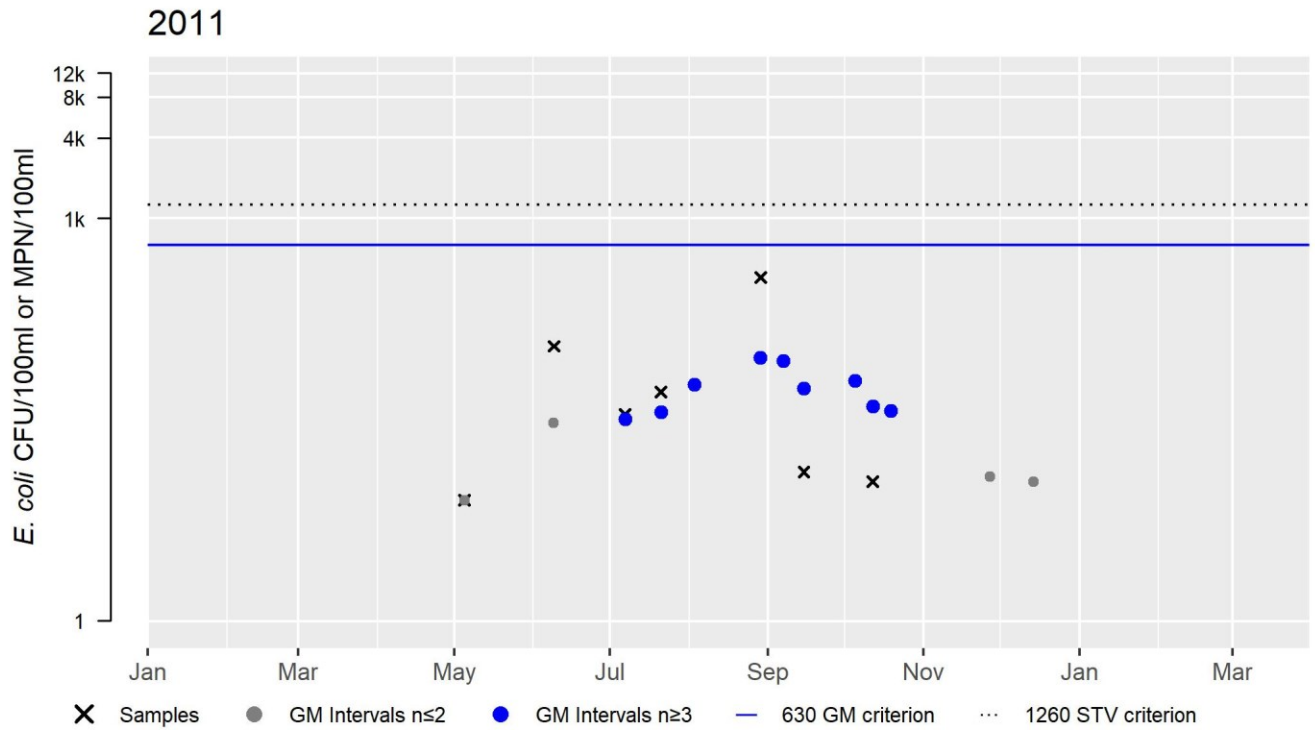
Variable	Cumulative %GMI Ex (all years)
Result	0



W2232 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	36
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

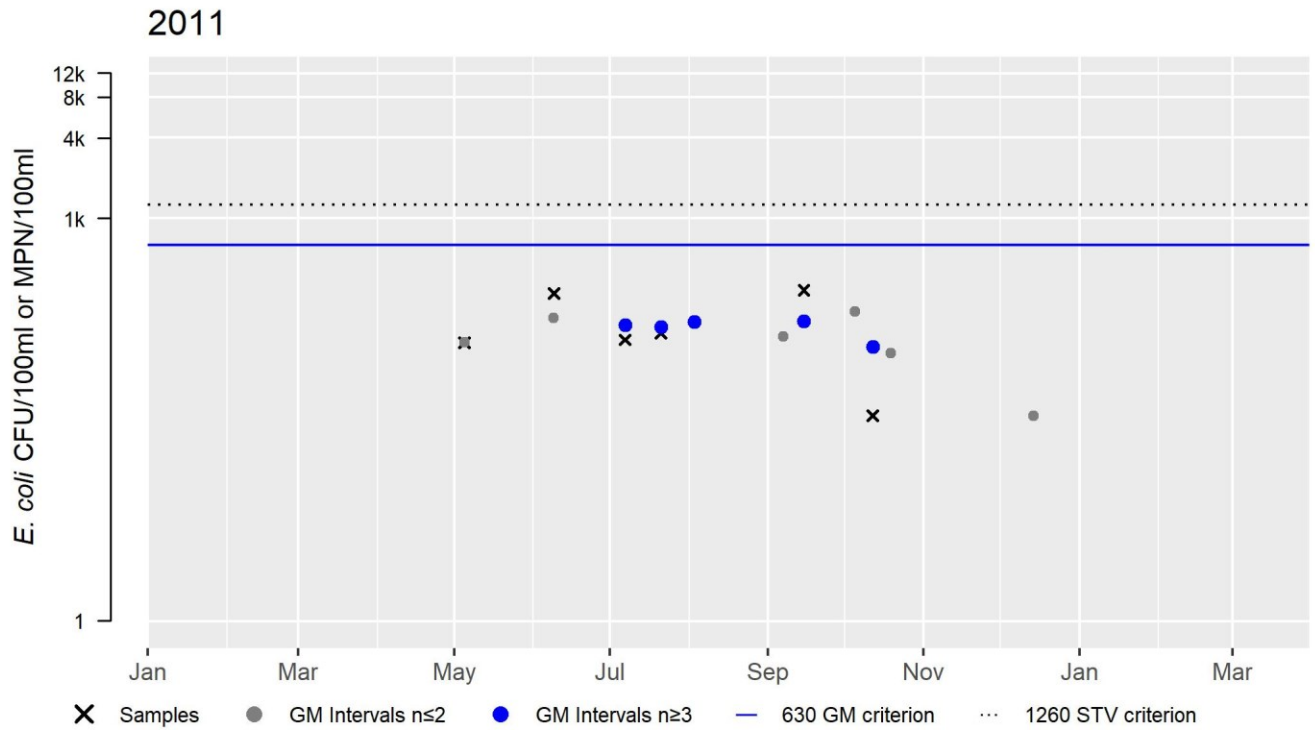
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2233 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	134
#GMI	5
#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

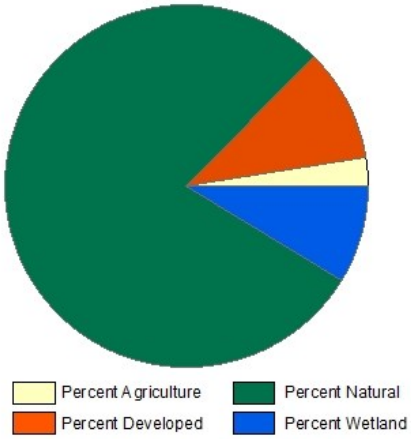


Quinebaug River (MA41-02)

Location:	Sturbridge WWTP outfall (NPDES: MA0100421), Sturbridge to confluence with Cady Brook, Southbridge.
AU Type:	RIVER
AU Size:	6.5 MILES
Classification/Qualifier:	B: CWF

Quinebaug River - MA41-02

Watershed Area: 96.77 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	96.77	11.13	34.65	3.76
Agriculture	2.5%	1.9%	2.2%	1.1%
Developed	10.2%	20.7%	9.8%	14.3%
Natural	78.6%	68.2%	72.5%	69.1%
Wetland	8.7%	9.2%	15.5%	15.6%
Impervious Cover	4.2%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Debris*)		Unchanged
5	5	Algae		Unchanged
5	5	Lack of a Coldwater Assemblage		Unchanged
5	5	Trash		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
(Debris*)	Illegal Dumps or Other Inappropriate Waste Disposal (Y)			X	X	X
(Debris*)	Unspecified Urban Stormwater (N)			X	X	X
Algae	Discharges from Municipal Separate Storm Sewer Systems (MS4) (N)			X	X	X
Algae	Municipal Point Source Discharges (N)			X	X	X
Lack of a Coldwater Assemblage	Dam or Impoundment (Y)	X				

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Lack of a Coldwater Assemblage	Source Unknown (N)	X				
Trash	Illegal Dumps or Other Inappropriate Waste Disposal (Y)			X	X	X
Trash	Unspecified Urban Stormwater (N)			X	X	X
Turbidity	Discharges from Municipal Separate Storm Sewer Systems (MS4) (N)			X	X	X
Turbidity	Municipal Point Source Discharges (N)			X	X	X

Recommendations

2022 Recommendations
ALU: Four ponds/impoundments/flood control projects (Hamilton Reservoir, Holland Pond, East Brimfield Reservoir, Westville Lake) and some smaller dams affect the flow and thermal regime of this Quinebaug River AU which is currently designated Cold Water and this Aquatic Life Use goal is not currently being met. Since the Cold Water Aquatic Life Use goal is not currently being met, it is recommended that DFG biologists should be consulted with and asked to provide all fish sampling records for the Quinebaug River in the area currently designated Cold Water. Based on the findings and in consultation with DFG biologists the appropriateness of the Cold Water SWQS designation should be considered/reevaluated. If needed a use attainability study should be conducted to ascertain if reclassification of this Quinebaug River AU (MA41-01) is warranted to Class B Warm Water. Confirmation of the *Myriophyllum* species (likely *heterophyllum*) in Westville Lake is needed. AES: Surveys should be conducted to reevaluate aesthetic conditions in the Quinebaug River as follows: at Farquhar Road in Sturbridge (turbidity and filamentous and matted algae) and downstream from the Westville Dam in the vicinity of the West Street School fields, the Quinebaug River (turbidity and an abundance of trash and debris in the river channel) for potential removal of impairments if warranted.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	YES
2022 Use Attainment Summary	

DFG biologists conducted backpack electrofishing at three sites along this Quinebaug River AU (MA41-02) in August 2016 from upstream to downstream as follows: Old Sturbridge Rd (stocking access) in Sturbridge, Westville Dam Park Access in Sturbridge, and downstream of the Mill St crossing in Southbridge (SampleIDs 6164, 6166, and 6167, respectively). All three samples contained fluvial species (range 32 to 92% of the samples) with intolerant/moderately tolerate macrohabitat generalist species comprising between 7 to 17% of the samples. As was previously reported (MassDEP 2021), these samples were 68.35% comparable to the Quinebaug Targeted Fish Community TFC model (indicative of good conditions) but while the combined fish community compared favorably with the Quinebaug TFC model, coldwater fishes were absent from all samples in this designated Cold Water portion of the river. Additionally, there is a potential (likely) infestation of the non-native aquatic macrophyte, *Myriophyllum heterophyllum*, in Westville Lake which is part of this Quinebaug River AU which needs species confirmation.
The Aquatic Life Use for this designated Cold Water portion of the Quinebaug River (MA41-02) will continue to be assessed as Not Supporting based on the absence of coldwater fish. The Alerts for the potential non-native macrophyte *M. heterophyllum* infestation in Westville Lake and evidence of instream toxicity to *P. promelas* upstream from the Sturbridge WWTP discharge are being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6164	MassDFG	Fish Community	Quinebaug River	Old Sturbridge Rd (stocking access), Sturbridge	42.09809	-72.08973
6166	MassDFG	Fish Community	Quinebaug River	Westville Dam Park Access, Sturbridge	42.07211	-72.06725
6167	MassDFG	Fish Community	Quinebaug River	Mill St xing-DS, Southbridge	42.08131	-72.04340

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)
[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, CM = Central Mudminnow, CP = Chain Pickerel, CS = Common Shiner, F = Fallfish, LMB = Largemouth Bass, LND = Longnose Dace, P = Pumpkinseed, RB = Rock Bass, RBS = Redbreast Sunfish, SMB = Smallmouth Bass, SS = Spottail Shiner, 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
6164	08/26/16	BP	TP		10	207	0%	5	92%	0%	4	7%	No	No	BND, CP, CS, F, LMB, LND, RBS, SS, TD, YB,
6166	08/24/16	BP	TP		9	66	0%	3	32%	0%	3	17%	No	No	B, BB, CM, F, LMB, P, RB, TD, YB,
6167	08/24/16	BP	TP		8	132	0%	5	85%	0%	2	14%	No	No	BND, CS, F, LND, RBS, SMB, WS, YB,

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in the portion of the Quinebaug River (MA41-02), 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 to evaluate the Aesthetics Use for this Quinebaug River AU (MA41-02). The Aesthetics Use will continue to be assessed as Not Supporting with the algae, turbidity, trash, and debris impairments being carried forward. Original documentation from surveys conducted in August 1999 as follows : *"Visible turbidity (slight), an oil slick, and a relatively high percentage of filamentous and matted algae were observed in the Quinebaug River at Farquhar Road in Sturbridge. DWM biologists, however, did not observe these objectionable conditions at their sampling station near Breakneck Road in Sturbridge (station QR01C) … Downstream from the Westville Dam in the vicinity of the West Street School fields, the Quinebaug River is channelized and enters the urbanized area of Southbridge. Here the river was slightly turbid and there was an abundance of trash and debris in the river channel."*	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new data are available to evaluate the Primary Contact Recreational Use for this Quinebaug River AU (MA41-02). The Primary Contact Recreational Use will continue to be assessed as Not Supporting with the aesthetic impairments (algae, turbidity, trash, and debris) being carried forward.	

Secondary Contact Recreation

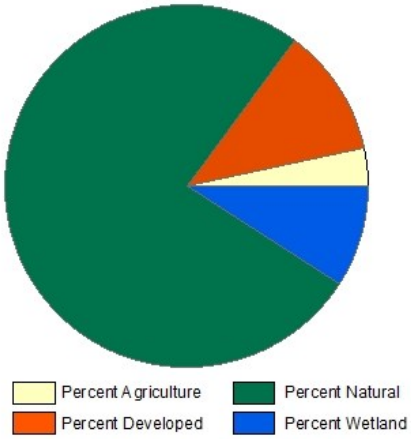
2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
No new data are available to evaluate the Secondary Contact Recreational Use for this Quinebaug River AU (MA41-02). The Secondary Contact Recreational Use will continue to be assessed as Not Supporting with the aesthetic impairments (algae, turbidity, trash, and debris) being carried forward.	

Quinebaug River (MA41-03)

Location:	Southbridge WWTP outfall (NPDES: MA0100901), Southbridge to dam (NATID: MA00114) just upstream of West Dudley Road, Dudley.
AU Type:	RIVER
AU Size:	2.2 MILES
Classification/Qualifier:	B: WWF

Quinebaug River - MA41-03

Watershed Area: 131.01 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	131.01	12.55	47.35	4.6
Agriculture	3.4%	8.6%	2.6%	5.4%
Developed	11.4%	14.7%	11.1%	16.8%
Natural	76%	67.9%	70.7%	63.2%
Wetland	9.1%	8.8%	15.6%	14.5%
Impervious Cover	4.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Physical Substrate Habitat Alterations*)		Unchanged
5	5	Dissolved Oxygen		Unchanged
5	5	Escherichia Coli (E. Coli)		Unchanged
5	5	Fecal Coliform		Unchanged
5	5	Nutrients		Unchanged

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Physical Substrate Habitat Alterations*)	Dam or Impoundment (Y)	X				
(Physical Substrate Habitat Alterations*)	Unspecified Urban Stormwater (Y)	X				
Dissolved Oxygen	Dam or Impoundment (Y)	X				
Dissolved Oxygen	Municipal Point Source Discharges (Y)	X				
Dissolved Oxygen	Unspecified Urban Stormwater (Y)	X				
Escherichia Coli (E. Coli)	Municipal (Urbanized High Density Area) (N)				X	
Escherichia Coli (E. Coli)	Unspecified Urban Stormwater (Y)				X	

Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
Fecal Coliform	Municipal (Urbanized High Density Area) (N)				X	
Fecal Coliform	Unspecified Urban Stormwater (Y)				X	
Nutrients	Municipal Point Source Discharges (Y)	X				
Nutrients	Unspecified Urban Stormwater (Y)	X				

Recommendations

2022 Recommendations
ALU: Water quality monitoring including deployed probe and nutrient sampling in the West Dudley impoundment as well as benthic macroinvertebrate sampling should be conducted in the Quinebaug River downstream from the Southbridge WWTP discharge (MA41-03) since upgrades/improvements at upstream municipal WWTPs (Sturbridge, Charlton, and Southbridge) have been implemented, the American Optical Company discharges have been eliminated, and MS4 permits for Sturbridge and Southbridge are in place. Improved conditions and delisting of the Dissolved Oxygen, Nutrients, and the Physical Substrate Habitat Alterations impairments should be warranted.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

During the summer of 2011 observations were made by MassDEP staff of some dense/very dense filamentous algae in the Quinebaug River at Dresser Hill Road bridge, downstream of the Southbridge WWTP in Southbridge (W0058) on three of six survey dates. In August 2016 DFG biologists conducted backpack electrofishing in this Quinebaug River AU (MA41-03) upstream from West Dudley Road in Southbridge (SampleID 6163) specifically to assess the current fish community in comparison to the Quinebaug River Targeted Fish Community (TFC) model. The sample was dominated by fluvial fishes and the percent similarity to the TFC was 63% (indicative of good conditions). No other recent data are available to assess the status of the Aquatic Life Use.

The Aquatic Life Use for this Quinebaug River AU (MA41-03) will continue to be assessed as Not Supporting with the impairments for low dissolved oxygen, nutrients, and physical substrate habitat alterations being carried forward pending data collection showing these impairment removals are warranted. The nutrient impairment was originally listed in the 1992 reporting cycle while the dissolved oxygen (remapped from organic enrichment/low DO) and the physical substrate habitat alteration (remapped from other habitat alteration) were first listed in the 2002 reporting cycle based on the extrapolation of the benthic sampling data from the upstream AU (MA41-09) that "*exhibited the lowest percent comparability to the regional reference station of any of the Quinebaug River benthic macroinvertebrate stations. Water quality appears to be affected by highly productive waterbodies upstream, as well as various nonpoint source-related nutrient/organic loadings to the Quinebaug River. In addition, instream deposits of FPOM and the hyperdominance of filter-feeding organisms corroborate the effects of organic enrichment here"* (Kennedy, Kiras and McVoy 2002). The nutrient impairment appears to have been inappropriately added during the 1992 IR reporting cycle based on effluent (Sturbridge, Charlton, Southbridge WWTPs) nutrient sample data from a 1985 survey (MassDEP 2002).

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
6163	MassDFG	Fish Community	Quinebaug River	W. Dudley Rd xing-US, Southbridge	42.06741	-72.00779
W0058	MassDEP	Water Quality	Quinebaug River	[at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge]	42.067394	-72.007756

Biological Monitoring Information

Fish Community Data and DELTS

Fish Community Data (2014-2019) Provided by MassDFG. (MassDFG 2020) (MassDEP Undated 1)

[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, CS = Common Shiner, F = Fallfish, LND = Longnose Dace, P = Pumpkinseed, RBS = Redbreast Sunfish, 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
6163	08/26/16	BP	TP		11	305	0%	6	91%	0%	3	5%	No	No	B, BND, CS, F, LND, P, RBS, SMB, TD, WS, YB,

Physico-chemical Water Quality Information

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0058	2011	--	--	--	--	--	--	--	--	6	3

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in the portion of the Quinebaug River (MA41-03), therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary
MassDEP staff conducted sampling at two locations in this Quinebaug River AU (MA41-03) during the summer of 2011. The sampling locations were at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge (W0058) and ~3650 feet downstream from Dresser Hill Road (~250 feet downstream of the confluence of the unnamed tributary exiting Sylvestri Pond), Dudley (W2234). While there were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by MassDEP DWM-WPP field sampling crews at two sampling locations during surveys conducted during the summer of 2011 there were a few observations of trash and/or dense/very dense filamentous algae in the river at Dresser Hill Road bridge. The Aesthetics Use for this Quinebaug River AU (MA41-03) will continue to be assessed as Fully Supporting with an Alert being added for the trash and observations of dense/very dense filamentous algae in the river at Dresser Hill Road bridge in Southbridge.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0058	MassDEP	Water Quality	Quinebaug River	[at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge]	42.067394	-72.007756
W2234	MassDEP	Water Quality	Quinebaug River	[approximately 3650 feet downstream from Dresser Hill Road (approximately 250 feet downstream of the confluence of the unnamed tributary exiting Sylvestri Pond), Dudley]	42.060218	-71.998509

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0058	Quinebaug River	2011	8	Although the Aesthetics use for the Quinebaug River is assessed as Fully Supporting, it is identified with an Alert status due to observations by MassDEP staff during field surveys at station W0058 in summer 2011. Objectionable conditions observed include objectionable deposits such as trash (n=3 of 8), and film algae dense or very dense (n=3 of 8).
W2234	Quinebaug River	2011	8	MassDEP aesthetics observations for station W2234 on Quinebaug 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0058	2011	8	6	3
W2234	2011	8	0	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0058	Quinebaug River	2011	Color	Light Yellow/Tan	5	8
W0058	Quinebaug River	2011	Color	None	1	8
W0058	Quinebaug River	2011	Color	NR	2	8
W0058	Quinebaug River	2011	Objectionable Deposits	No	3	8
W0058	Quinebaug River	2011	Objectionable Deposits	Unobservable	2	8
W0058	Quinebaug River	2011	Objectionable Deposits	Yes	3	8
W0058	Quinebaug River	2011	Odor	Effluent (Treated)	3	8
W0058	Quinebaug River	2011	Odor	Musty (Basement)	1	8
W0058	Quinebaug River	2011	Odor	None	4	8
W0058	Quinebaug River	2011	Scum	No	3	8
W0058	Quinebaug River	2011	Scum	Yes	5	8
W0058	Quinebaug River	2011	Turbidity	Highly Turbid	1	8
W0058	Quinebaug River	2011	Turbidity	None	5	8
W0058	Quinebaug River	2011	Turbidity	Slightly Turbid	2	8
W2234	Quinebaug River	2011	Color	Brownish	1	8
W2234	Quinebaug River	2011	Color	Light Yellow/Tan	5	8
W2234	Quinebaug River	2011	Color	None	1	8
W2234	Quinebaug River	2011	Color	NR	1	8
W2234	Quinebaug River	2011	Objectionable Deposits	No	6	8
W2234	Quinebaug River	2011	Objectionable Deposits	Unobservable	1	8
W2234	Quinebaug River	2011	Objectionable Deposits	Yes	1	8
W2234	Quinebaug River	2011	Odor	None	8	8
W2234	Quinebaug River	2011	Scum	No	3	8
W2234	Quinebaug River	2011	Scum	Yes	5	8
W2234	Quinebaug River	2011	Turbidity	Highly Turbid	1	8
W2234	Quinebaug River	2011	Turbidity	Moderately Turbid	1	8
W2234	Quinebaug River	2011	Turbidity	None	3	8
W2234	Quinebaug River	2011	Turbidity	Slightly Turbid	3	8

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	YES

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples at two locations in this Quinebaug River AU (MA41-03) between May and October 2011. The sampling locations were at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge (W0058) and ~3650 feet downstream from Dresser Hill Road (~250 feet downstream of the confluence of the unnamed tributary exiting Sylvestri Pond), Dudley (W2234). Data analysis of these moderate frequency single year datasets indicated both sites with >60% of the intervals with GMs >126 cfu/100ml (100 and 75%), and both sites had three samples that exceeded the 410 cfu/100ml STV. The seasonal GMs were 323 and 293 cfu/100ml.

The Primary Contact Recreational Use for this Quinebaug River AU (MA41-03) will continue to be assessed as Not Supporting with the *E. coli* and Fecal Coliform bacteria impairments being carried forward. Alerts for two aesthetic concerns (trash and dense/very dense filamentous algae) in the river at Dresser Hill Road bridge in Southbridge are being added.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0058	MassDEP	Water Quality	Quinebaug River	[at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge]	42.067394	-72.007756
W2234	MassDEP	Water Quality	Quinebaug River	[approximately 3650 feet downstream from Dresser Hill Road (approximately 250 feet downstream of the confluence of the unnamed tributary exiting Sylvestri Pond), Dudley]	42.060218	-71.998509

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (30-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

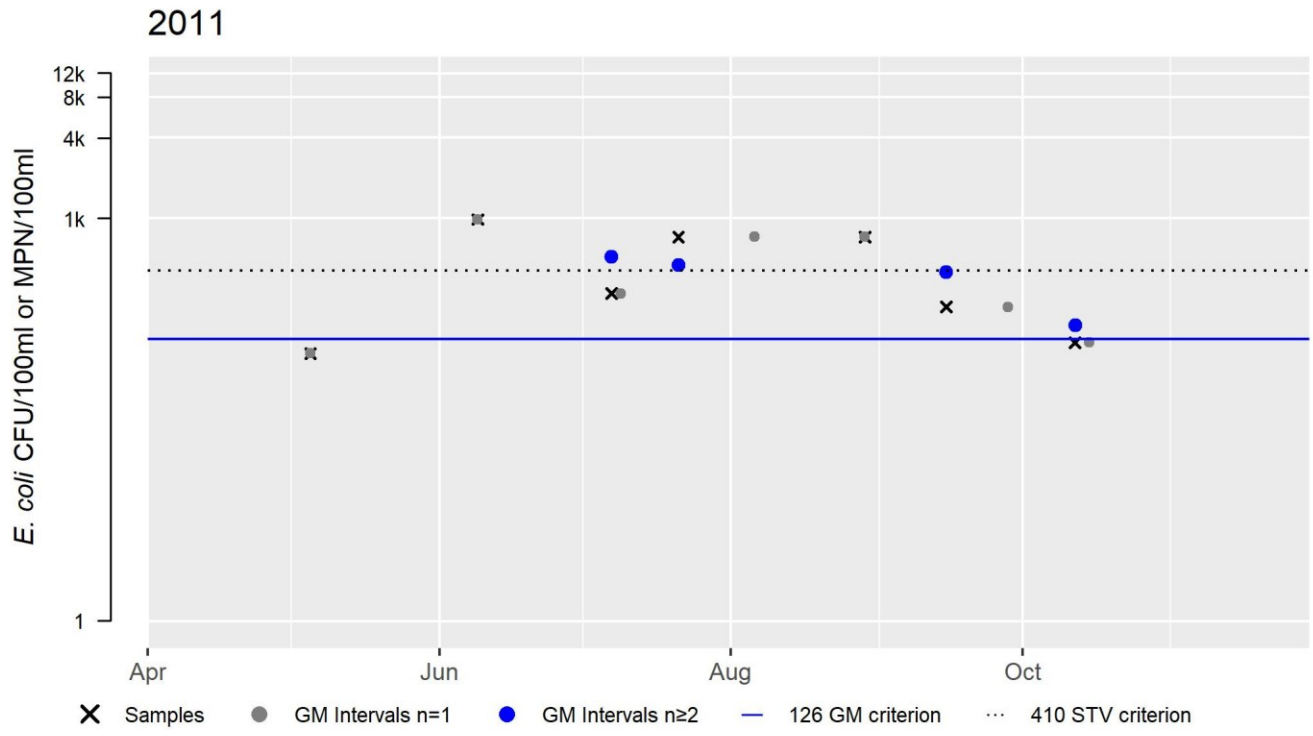
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W0058	MassDEP	E. coli	05/05/11	10/12/11	7	99	980	323
W2234	MassDEP	E. coli	05/05/11	10/12/11	7	99	770	293

W0058 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	323
#GMI	4
#GMI Ex	4
%GMI Ex	100
n>STV	3
%n>STV	43

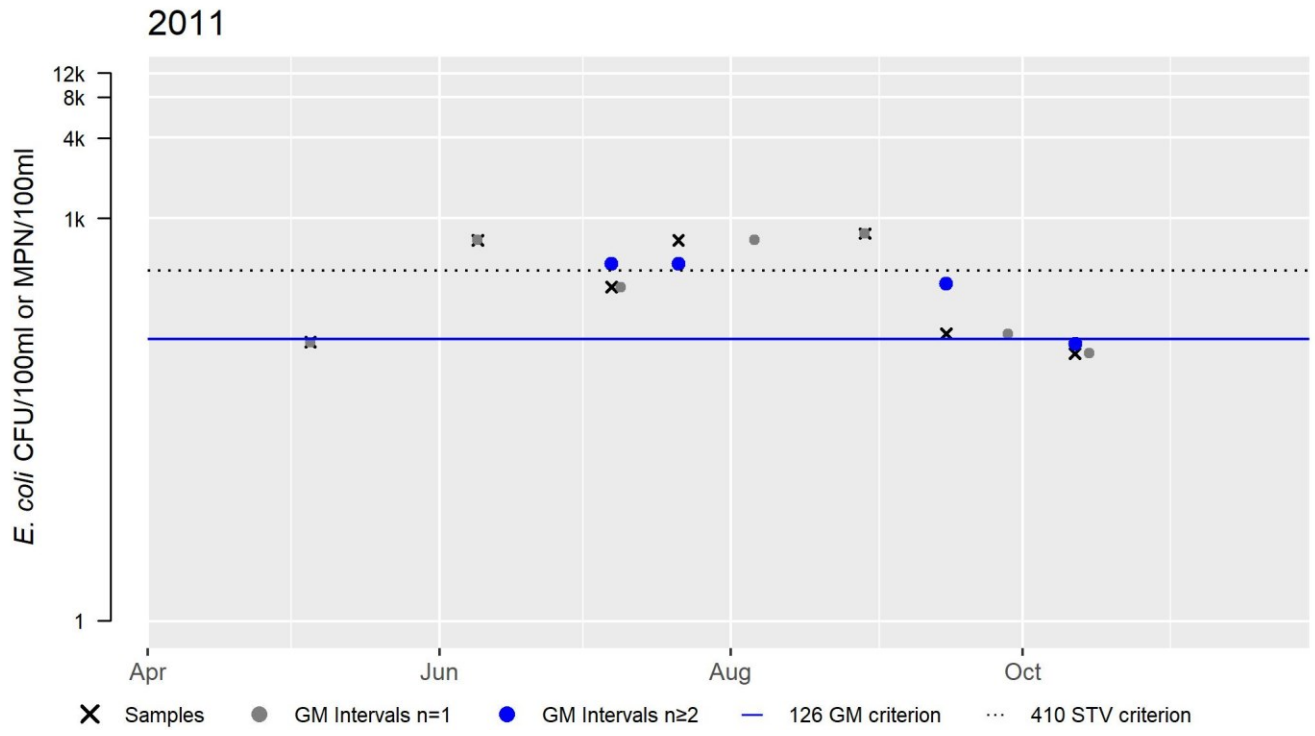
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2234 *E. coli* (30-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	293
#GMI	4
#GMI Ex	3
%GMI Ex	75
n>STV	3
%n>STV	43

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	YES

2022 Use Attainment Summary

MassDEP staff collected *E. coli* bacteria samples at two locations in this Quinebaug River AU (MA41-03) between May and October 2011. The sampling locations were at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge (W0058) and ~3650 feet downstream from Dresser Hill Road (~250 feet downstream of the confluence of the unnamed tributary exiting Sylvestri Pond), Dudley (W2234). Data analysis of these moderate frequency single year datasets indicated neither site with >60% of the intervals with GMs >630 cfu/100ml (they were both 0%), and neither site had any samples that exceeded the 1260 cfu/100ml STV. The yearly GMs were 323 and 293 cfu/100ml.
The Secondary Contact Recreational Use for this Quinebaug River AU (MA41-03) will continue to be assessed as Fully Supporting. Alerts for two aesthetic concerns (trash and dense/very dense filamentous algae) in the river at Dresser Hill Road bridge in Southbridge are being added.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0058	MassDEP	Water Quality	Quinebaug River	[at Dresser Hill Road bridge, downstream of the Southbridge WWTP, Southbridge]	42.067394	-72.007756
W2234	MassDEP	Water Quality	Quinebaug River	[approximately 3650 feet downstream from Dresser Hill Road (approximately 250 feet downstream of the confluence of the unnamed tributary exiting Sylvestri Pond), Dudley]	42.060218	-71.998509

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

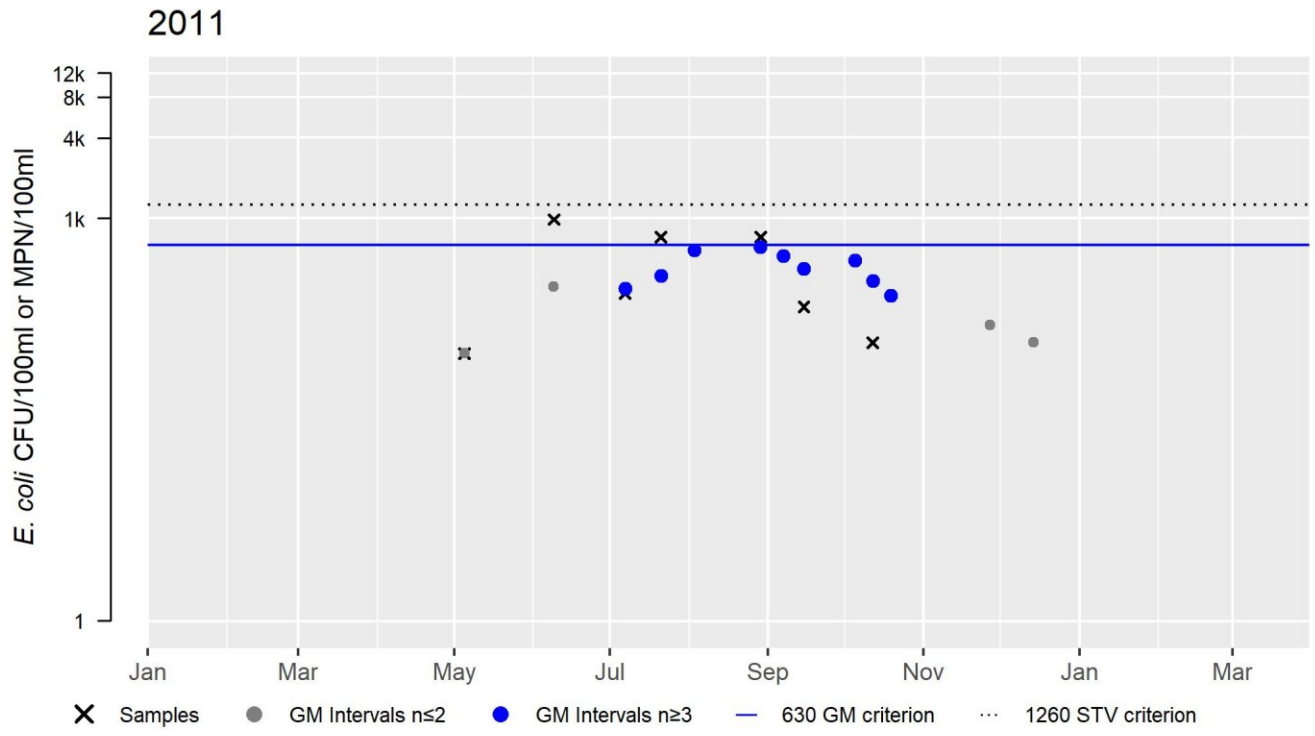
[Result units are CFU/100ml or MPN/100ml]

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)
W0058	MassDEP	E. coli	05/05/11	10/12/11	7	99	980	323
W2234	MassDEP	E. coli	05/05/11	10/12/11	7	99	770	293

W0058 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	323
#GMI	9
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

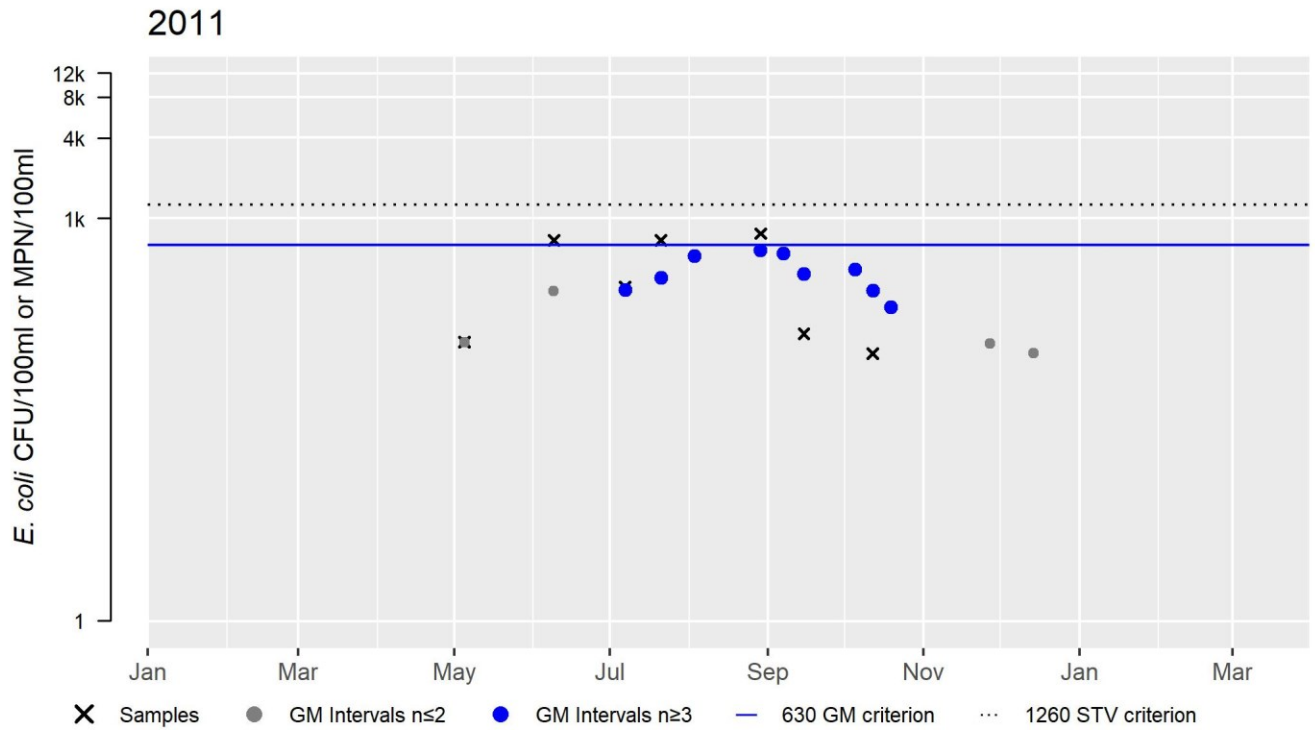
Abbreviations: Samples = #samples; SeasGM = Seasonal Geometric Mean (GM); #GMI = number GM Intervals; #GMI Ex = number GMI Exeedances; %GMI Ex = percent GMI Exeedances; n>STV = #samples>Statistical Threshold Value (STV); %n>STV = percent samples>STV



W2234 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	7
SeasGM	293
#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

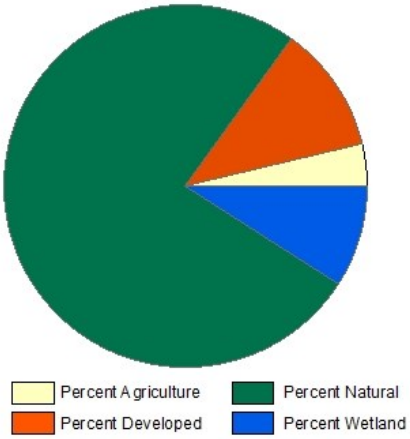


Quinebaug River (MA41-04)

Location:	From dam (NATID: MA00114) just upstream of West Dudley Road, Dudley to Connecticut state line, Dudley.
AU Type:	RIVER
AU Size:	2.2 MILES
Classification/Qualifier:	B: WWF

Quinebaug River - MA41-04

Watershed Area: 134.35 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	134.35	6.58	48.6	2.5
Agriculture	3.7%	11%	2.8%	9.2%
Developed	11.4%	10.2%	11.1%	10.5%
Natural	75.9%	69.5%	70.6%	65.1%
Wetland	9.1%	9.3%	15.5%	15.2%
Impervious Cover	4.6%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Fecal Coliform		Unchanged

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

Recommendations

2022 Recommendations
REC: Conduct sufficient *E. coli* bacteria sampling to evaluate status of the Primary Contact Recreational Use in this Quinebaug River AU (MA41-04) (note the sampling location at the Route 197 bridge, Thompson, Connecticut (W0600) just downstream of the Massachusetts/Connecticut State line is appropriate) as well as to determine if Fecal Coliform impairment removal is warranted.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES

2022 Use Attainment Summary

Monitoring of the Quinebaug River was conducted by MassDEP staff just downstream of the Massachusetts/Connecticut State line and the USGS stream gage (W0600) as part of the SMART monitoring project. Between March 2011 and September 2013 sampling included in-situ measurements of DO, temperature, pH, and specific conductance (n=15), as well as chloride and nutrient sampling (total phosphorus, total nitrogen, ammonia) (n=13). Water quality monitoring data were indicative of good conditions (minimum DO 8.3mg/L, maximum temperature 23.3°C, pH 6.5 to 7.5SU, maximum specific conductance 342µs/cm, low concentrations of ammonia- nitrogen [0.02- 0.10], chloride [23-71mg/L, and seasonal average total phosphorus [0.021 -0.028mg/L] with statistically significant decreasing trends of total phosphorus concentrations between 1994 and 2013 for both annual and summer seasonal means. As was previously reported (MassDEP 2021)USGS also collected continuous DO data at their gage in Quinebaug CT (01124000) in the summers of 2015, 16, and 17. The minimum DO was 6.5mg/L and the maximum diel shift was 2.8mg/L. The other water quality data (pH, saturation, conductivity) were also indicative of good conditions.

The Aquatic Life Use for this Quinebaug River AU (MA41-04) will continue to be assessed as Fully Supporting. The former Alert issues (the impounded and productive nature of the watershed, hydromodification (streamflow fluctuation) associated with the West Dudley Project Number 7254, elevated heavy metals in sediment and PCB in whole fish in Sandersdale section of Southbridge) are being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0600	MassDEP	Water Quality	Quinebaug River	[Route 197 bridge, Thompson, Connecticut]	42.022027	-71.954356

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0600	03/23/11	10/26/11	5	8.3	10.6	0	0	0
W0600	01/25/12	11/14/12	6	8.5	10.9	0	0	0
W0600	02/27/13	09/23/13	4	8.7	11.3	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0600	03/23/11	10/26/11	5	2	22.1	14.3	1	1	0	0
W0600	01/25/12	11/14/12	6	1	23.3	13.2	2	2	0	0

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
W0600	02/27/13	09/23/13	4	1	21.8	12.9	1	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W0600	03/23/11	10/26/11	5	6.5	7.1	0	0
W0600	01/25/12	11/14/12	6	6.9	7.5	0	0
W0600	02/27/13	09/23/13	4	7	7.4	0	0

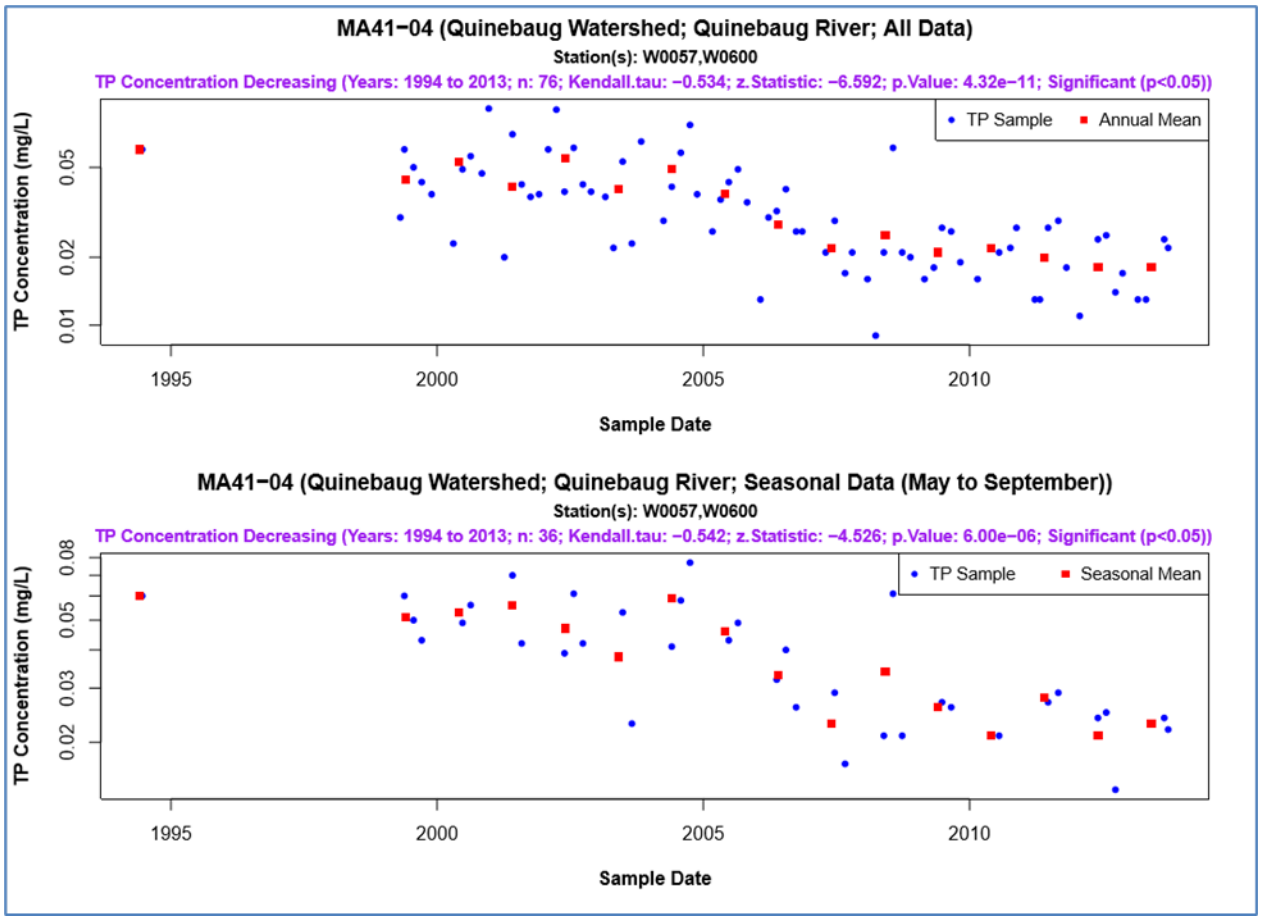
Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0600	2011	2	0.027	0.029	0.028	--	--	105.8	7.1	1	0
W0600	2012	3	0.014	0.025	0.021	--	--	105.2	7.5	4	0
W0600	2013	2	0.022	0.024	0.023	--	--	108.5	7.4	4	0

Long Term Trend analysis for MassDEP total phosphorus data (MassDEP Undated 5)



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

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W0600	2011	5	0.020	0.040	0.032	0	0
W0600	2012	5	0.020	0.020	0.020	0	0
W0600	2013	3	0.020	0.100	0.070	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W0600	2011	5	23	40	31	0	0
W0600	2012	5	37	71	48	0	0
W0600	2013	3	48	61	55	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W0600	03/23/11	10/26/11	5	116	191	0	0	0	0	0	0
W0600	01/25/12	11/14/12	6	170	342	0	0	0	0	0	0
W0600	02/27/13	09/23/13	4	218	301	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 the portion of the Quinebaug River (MA41-04), therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DWM-WPP field sampling crews during the surveys conducted between March 2011 and September 2013 just downstream from this Quinebaug River AU (MA41-04) at the Route 197 bridge, Thompson, Connecticut (W0600). The Aesthetics Use for this Quinebaug River AU (MA41-04) will continue to be assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0600	MassDEP	Water Quality	Quinebaug River	[Route 197 bridge, Thompson, Connecticut]	42.022027	-71.954356

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0600	Quinebaug River	2011	5	MassDEP aesthetics observations for station W0600 on Quinebaug 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.
W0600	Quinebaug River	2012	6	MassDEP aesthetics observations for station W0600 on Quinebaug 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.

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W0600	Quinebaug River	2013	4	MassDEP aesthetics observations for station W0600 on Quinebaug 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.

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W0600	2011	5	1	0
W0600	2012	6	4	0
W0600	2013	4	4	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W0600	Quinebaug River	2011	Color	None	2	5
W0600	Quinebaug River	2011	Color	Reddish	3	5
W0600	Quinebaug River	2011	Objectionable Deposits	No	1	5
W0600	Quinebaug River	2011	Objectionable Deposits	Unobservable	4	5
W0600	Quinebaug River	2011	Odor	Musty (Basement)	1	5
W0600	Quinebaug River	2011	Odor	None	4	5
W0600	Quinebaug River	2011	Scum	Yes	5	5
W0600	Quinebaug River	2011	Turbidity	None	2	5
W0600	Quinebaug River	2011	Turbidity	Unobservable	3	5
W0600	Quinebaug River	2012	Color	Light Yellow/Tan	2	6
W0600	Quinebaug River	2012	Color	None	2	6
W0600	Quinebaug River	2012	Color	Reddish	2	6
W0600	Quinebaug River	2012	Objectionable Deposits	No	2	6
W0600	Quinebaug River	2012	Objectionable Deposits	Unobservable	2	6
W0600	Quinebaug River	2012	Objectionable Deposits	Yes	2	6
W0600	Quinebaug River	2012	Odor	None	6	6
W0600	Quinebaug River	2012	Scum	No	1	6
W0600	Quinebaug River	2012	Scum	Yes	5	6
W0600	Quinebaug River	2012	Turbidity	None	4	6
W0600	Quinebaug River	2012	Turbidity	Slightly Turbid	1	6
W0600	Quinebaug River	2012	Turbidity	Unobservable	1	6
W0600	Quinebaug River	2013	Color	None	4	4
W0600	Quinebaug River	2013	Objectionable Deposits	No	1	4
W0600	Quinebaug River	2013	Objectionable Deposits	Yes	3	4
W0600	Quinebaug River	2013	Odor	None	4	4
W0600	Quinebaug River	2013	Scum	No	1	4
W0600	Quinebaug River	2013	Scum	Yes	3	4
W0600	Quinebaug River	2013	Turbidity	None	4	4

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

MassDEP staff collected 10 *E. coli* bacteria samples during the primary contact seasons between April 2011 and September 2013 just downstream from this Quinebaug River AU (MA41-04) at the Route 197 bridge, Thompson, Connecticut (W0600). Data analysis of this low frequency multi-year dataset indicated insufficient samples to calculate usable GMs and two samples in only one of the three years exceeded the STV of 410cfu/100mls. The seasonal GMs were 68, 100, and 276 cfu/100ml in 2011, 2012, and 2013, respectively.
Since there were insufficient data to evaluate, the Primary Contact Recreational Use for this Quinebaug River AU (MA41-03) will continue to be assessed as Not Supporting with the Fecal Coliform bacteria impairment being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0600	MassDEP	Water Quality	Quinebaug River	[Route 197 bridge, Thompson, Connecticut]	42.022027	-71.954356

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

[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
W0600	MassDEP	E. coli	04/27/11	10/26/11	4	19	172	68
W0600	MassDEP	E. coli	05/29/12	09/26/12	3	68	152	100
W0600	MassDEP	E. coli	04/24/13	09/23/13	3	20	2419.6	276

W0600 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

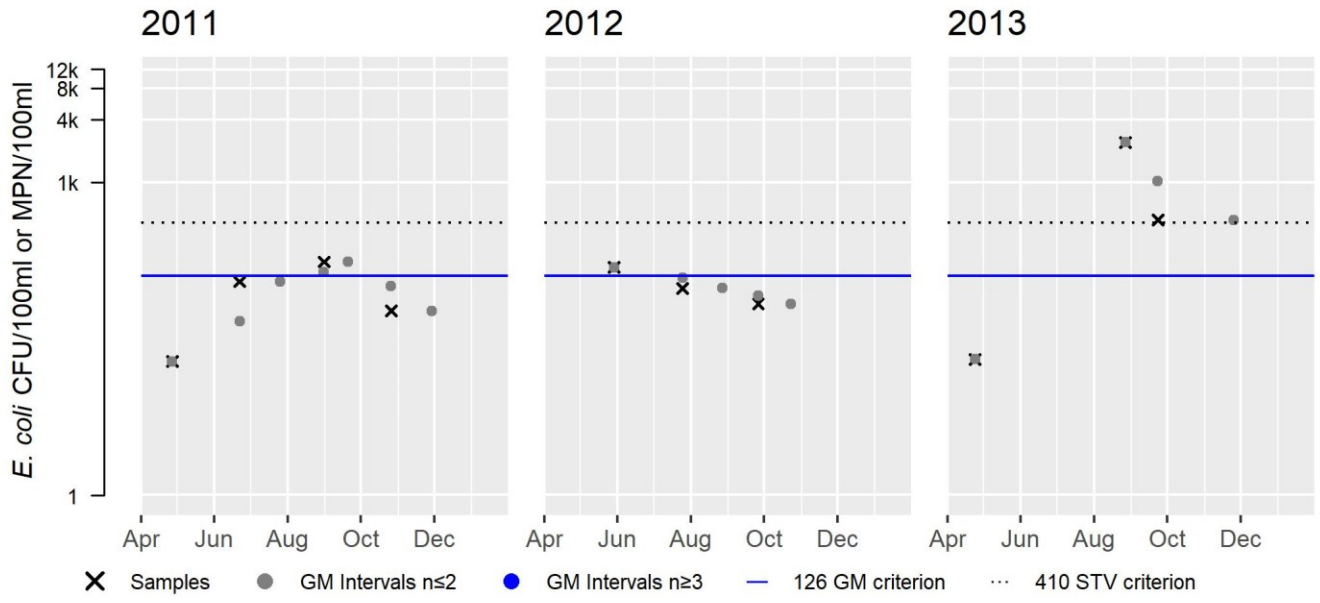
Var	Res
Samples	4
SeasGM	68
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	3
SeasGM	100
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	3
SeasGM	276
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	2
%n>STV	67

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 15 *E. coli* bacteria samples during the secondary contact seasons between March 2011 and September 2013 just downstream from this Quinebaug River AU (MA41-04) at the Route 197 bridge, Thompson, Connecticut (W0600). Data analysis of this low frequency multi-year dataset indicated insufficient samples to calculate usable GMs and only one sample in the three years exceeded the STV of 1260cfu/100mls. The yearly seasonal GMs were 75, 62, and 292 cfu/100ml in 2011, 2012, and 2013, respectively. There is Insufficient Information to assess the Secondary Contact Recreational Use for this Quinebaug River AU (MA41-03).	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W0600	MassDEP	Water Quality	Quinebaug River	[Route 197 bridge, Thompson, Connecticut]	42.022027	-71.954356

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

[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)
W0600	MassDEP	E. coli	03/23/11	10/26/11	5	19	172	75
W0600	MassDEP	E. coli	01/25/12	11/14/12	6	23	152	62
W0600	MassDEP	E. coli	02/27/13	09/23/13	4	20	2419.6	292

W0600 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

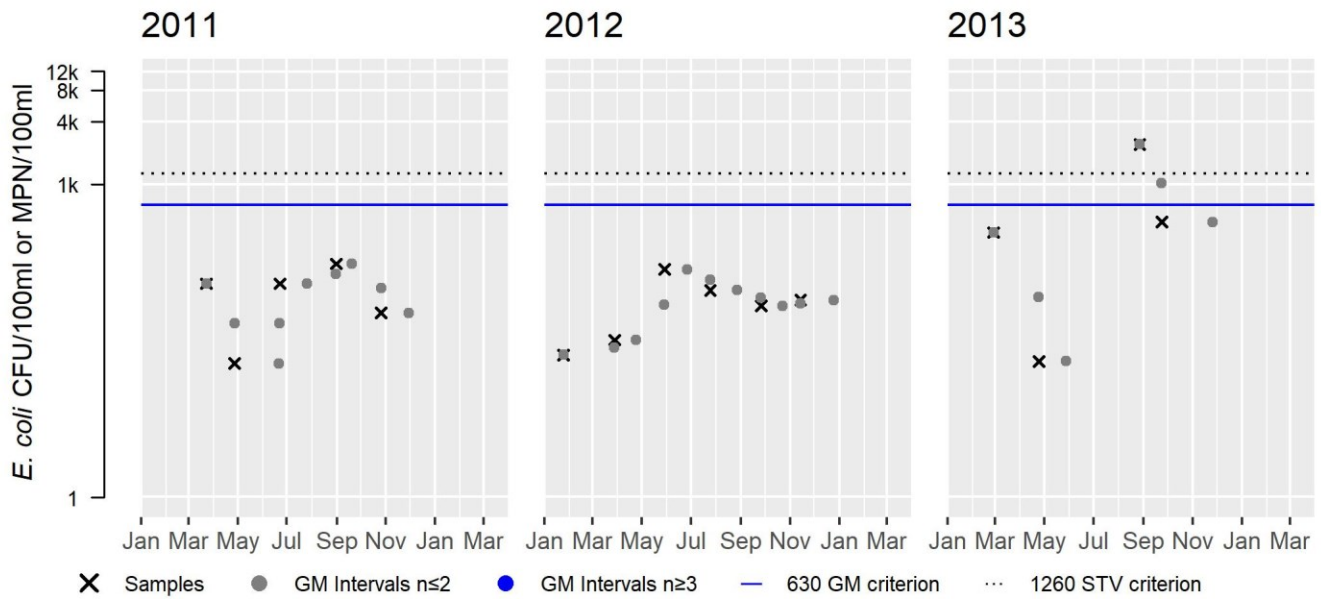
Var	Res
Samples	5
SeasGM	75
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	6
SeasGM	62
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	0
%n>STV	0

Var	Res
Samples	4
SeasGM	292
#GMI	0
#GMI Ex	0
%GMI Ex	0
n>STV	1
%n>STV	25

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



Quinebaug River (MA41-09)

Location:	From confluence with Cady Brook, Southbridge to Southbridge WWTP outfall (NPDES: MA0100901), Southbridge.
AU Type:	RIVER
AU Size:	1.3 MILES
Classification/Qualifier:	B: WWF

No usable data were available for Quinebaug River (MA41-09) 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	(Debris*)		Unchanged
5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Unchanged
5	5	Benthic Macroinvertebrates		Unchanged
5	5	Trash		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
(Debris*)	Unspecified Urban Stormwater (Y)			X	X	X
Ambient Bioassays - Chronic Aquatic Toxicity	Source Unknown (N)	X				
Benthic Macroinvertebrates	Dam or Impoundment (Y)	X				
Benthic Macroinvertebrates	Unspecified Urban Stormwater (Y)	X				
Trash	Unspecified Urban Stormwater (Y)			X	X	X
Turbidity	Unspecified Urban Stormwater (Y)			X	X	X

Railroad Pond (MA41058)

Location:	Charlton.
AU Type:	FRESHWATER LAKE
AU Size:	7 ACRES
Classification/Qualifier:	B

No usable data were available for Railroad Pond (MA41058) 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	(Non-Native Aquatic Plants*)		Unchanged

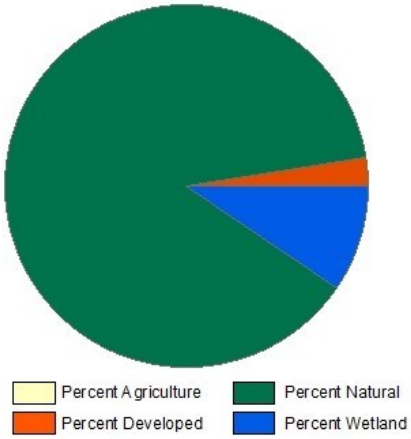
Impairment	Source (Confirmed Y/N)	Fish, other Aquatic Life and Wildlife	Fish Consumption	Aesthetic	Primary Contact Recreation	Secondary Contact Recreation
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Rocky Brook (MA41-22)

Location:	Headwaters east of Chamberlain Pond (excluding intermittent portion), Douglas to the state line Douglas, MA/Thompson, CT.
AU Type:	RIVER
AU Size:	1.9 MILES
Classification/Qualifier:	B

Rocky Brook - MA41-22

Watershed Area: 4.51 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.51	4.51	1.59	1.59
Agriculture	0.1%	0.1%	0%	0%
Developed	2.5%	2.5%	0.9%	0.9%
Natural	87.9%	87.9%	79.4%	79.4%
Wetland	9.5%	9.5%	19.7%	19.7%
Impervious Cover	1.2%			

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
Insufficient Information	NO
2022 Use Attainment Summary	
As was previously reported as part of the 2018/2020 IR reporting cycle (MassDEP 2021) during the summer of 2011 MassDEP biologists sampled Rocky Brook as part of their Reference Site Network (RSN) project at one site downstream from a footbridge near the extension of High Street in the Douglas State Forest in Douglas. Over the course of the summer streamflow was reduced to a trickle because of a beaver dam upstream and therefore the representativeness of these data (biological data including both benthic and fish population data) were considered compromised. Water temperatures from a long-term thermistor deployed in the brook (W2221) from June 13th until November 18th of 2011 ranged from 10.4 to 28.0°C. Temperatures were above 20°C for much of June, July, and August. Nutrient and chloride samples were collected on three dates. These data were indicative of good conditions (i.e., ammonia-nitrogen, total phosphorus, and chloride concentrations -- <0.02, <0.02, and <6 mg/L, respectively). There is Insufficient Information to assess the Aquatic Life Use for Rocky Brook.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
B0738	MassDEP	Benthic	Rocky Brook/	[in Douglas State Forest approximately 105 meters downstream of footbridge on the unnamed easterly extension of High Street, Douglas, MA]	42.019941	-71.794344
W2221	MassDEP	Water Quality	Rocky Brook	[in Douglas State Forest approximately 350 feet downstream of footbridge on the unnamed easterly extension of High Street, Douglas]	42.019941	-71.794344

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)

[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
B0738	05/02/11	RBP kicknet	Central_Hills_100ct	100	29	SD

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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]

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
W2221	06/14/11	09/15/11	94	91	25.4	28.0	25.5	23.3	63	2	28	1	0	0

24-hour Rolling Average Calculations for MassDEP Short- and Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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

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
W2221	06/13/11	09/15/11	94	4476	25.5	95	67	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2221	06/13/11	10/18/11	2	1	17.6	14.5	0	0	0	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2221	2011	3	0.01	0.021	0.016	--	--	--	--	3	0

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

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2221	2011	3	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2221	2011	3	5	6	5	0	0

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Rocky Brook; therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	

There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews in Rocky Brook in Douglas State Forest ~350 feet downstream of footbridge on the unnamed easterly extension of High Street, Douglas (W2221) during the summer 2011.
The Aesthetics Use for Rocky Brook will continue to be assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2221	MassDEP	Water Quality	Rocky Brook	[in Douglas State Forest approximately 350 feet downstream of footbridge on the unnamed easterly extension of High Street, Douglas]	42.019941	-71.794344

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2221	Rocky Brook	2011	3	MassDEP aesthetics observations for station W2221 on Rocky 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2221	2011	3	3	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2221	Rocky Brook	2011	Color	Brownish	1	3
W2221	Rocky Brook	2011	Color	Light Yellow/Tan	2	3
W2221	Rocky Brook	2011	Objectionable Deposits	No	3	3
W2221	Rocky Brook	2011	Odor	None	3	3
W2221	Rocky Brook	2011	Scum	No	2	3
W2221	Rocky Brook	2011	Scum	Yes	1	3
W2221	Rocky Brook	2011	Turbidity	None	2	3
W2221	Rocky Brook	2011	Turbidity	Slightly Turbid	1	3

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 Rocky 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 Rocky Brook, so it is Not Assessed.	

Sherman Pond (MA41046)

Location:	Brimfield.
AU Type:	FRESHWATER LAKE
AU Size:	76 ACRES
Classification/Qualifier:	B

No usable data were available for Sherman Pond (MA41046) 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	(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
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Sibley Pond (MA41047)

Location:	North Basin, Charlton.
AU Type:	FRESHWATER LAKE
AU Size:	22 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Aquatic Plants (Macrophytes)		Removed
5	5	Dissolved Oxygen		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
Dissolved Oxygen	Source Unknown (N)	X				
Turbidity	Source Unknown (N)			X	X	X

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Aquatic Plants (Macrophytes)	Applicable WQS attained; based on new data	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. The north basin of Sibley Pond (MA41047) was first listed as impaired for Noxious Aquatic Plants in 2002 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a July 1999 baseline lakes survey conducted by MassDEP staff in which it was noted that <10% of the pond was covered with dense or very dense aquatic plants (the field sheet indicates lilies and Brasenia sp.). Among the aquatic plants listed on the field sheet, the non-rooted, floating species, *Lemna*/*Wolffia*/*Ceratophyllum* spp. were noted (MassDEP 1999, MassDEP 2002). Although most Google Earth images over the years depict little, if any dense/very dense aquatic vegetation (e.g., the image from September 2019 shows dense plant coverage at the northern tip of the basin, encompassing <10% of the pond), the image from September 2010 is one exception that shows dense plant coverage over roughly 1/4 to 1/3 of the pond (Google Earth Pro Undated). Since there was less than 25% plant coverage during the survey that triggered the initial listing, as well as in most satellite images since then (including all images after 2010), the Aquatic Plants (Macrophytes) impairment for the north basin of Sibley Pond (MA41047) is being delisted.

Aquatic Plants (Macrophytes)

2002 WBS Coding Sheet (MassDEP 2002):

OK RSM 6/15/02 EJCR 3 July 02

WBID: MA41047 WATERSHED: Quinebaug (41) (Printed 05/17/01)
NAME: Sibley Ponds TYPE: Lake/Pond
CODE: 41047 SIZE: 21.00(acres) CLASS: B

LATITUDE: 42.16306
LONGITUDE: 72.02639 (420947/720135)
Lake/Pond Name: Sibley Ponds[North Basin], Charlton
Ecoregion Name: ()
Description:

Assessment Date: 9912 ~~0109~~ Begin Sampling: ~~9407~~ 9907
Cycle: 9902 End Sampling: ~~9407~~ ~~9709~~ (Assessment Category = > Evaluated)

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 11.0	Non-Sup 10.0	Not-Asses	Not-Attain
OVERALL USE SUPPORT			~~21.00~~			
ALUS	11.0			10.0	~~21.00~~	
FISH CONSUMPTION					~~21.00~~ 21.0	21.0
PRIMARY CONTACT			~~21.00~~ 16.0	5.0		
SECONDARY CONTACT	~~21.00~~		~~21.00~~ 16.0	5.0		
Aesthetics			16.0	5.0	~~21.00~~	

Nonattainment Causes

Code	Size	Magnitude	"New" Code	Size	Magnitude
2500- Turbidity	21.00	M	1200	10.0	M
			2200	~~5.0~~ 5.0	M
			2500	21.0	M

Nonattainment Sources

Code	Size	Magnitude	"New" Code	Size	Magnitude
9000- SOURCE UNKNOWN	21.00	M	9000	21.0	H

Assessment Type

(Assessment Category = > Evaluated)
ACO-Carryover (Change from Monitored to Evaluated only)
R35- Primary Producer Surveys
R45- Synoptic Physical/Chemical Monitoring

"New" Assessment Category = > M E NA

B05, B25, C15, C35, R20, R35, R45

Media/Pollutants Assessed (Toxics Monitoring = > N)

"New" Toxics Monitoring = > YES or NO

Comments:

A 28 JULY 1994 SYNOPTIC SURVEY INDICATES THAT THE AQUATIC PLANTS WERE SPARSE. THERE WERE A FEW PATCHES OF FLOATING LEAF PLANTS ACROSS THE POND AND VERY DENSE FLOATING LEAF PLANTS IN SMALL COVE ACROSS POND. ONE POSSIBLE CAUSE FOR THE PARTIALLY SUPPORTING PRIMARY CONTACT WAS TURBIDITY. THE SECCHI DISK READING ON THIS DATE AT 1345 HRS WAS 0.8 m. NO OTHER DATA WAS AVAILABLE TO MAKE ASSESSMENTS.

1996:
Adujustment in cause and source based on EPA guidance changes.

2002: DWM macrophyte mapping on 26 July 1999 indicated about 25% of the lake covered by dense to very dense floating leaf and submergent vegetation. Three DWM water quality surveys conducted from July through September 1999 indicated occasionally low transparency (secchi disk < 4ft) and dissolved oxygen depletion throughout the summer at depths greater than about 2 meters.

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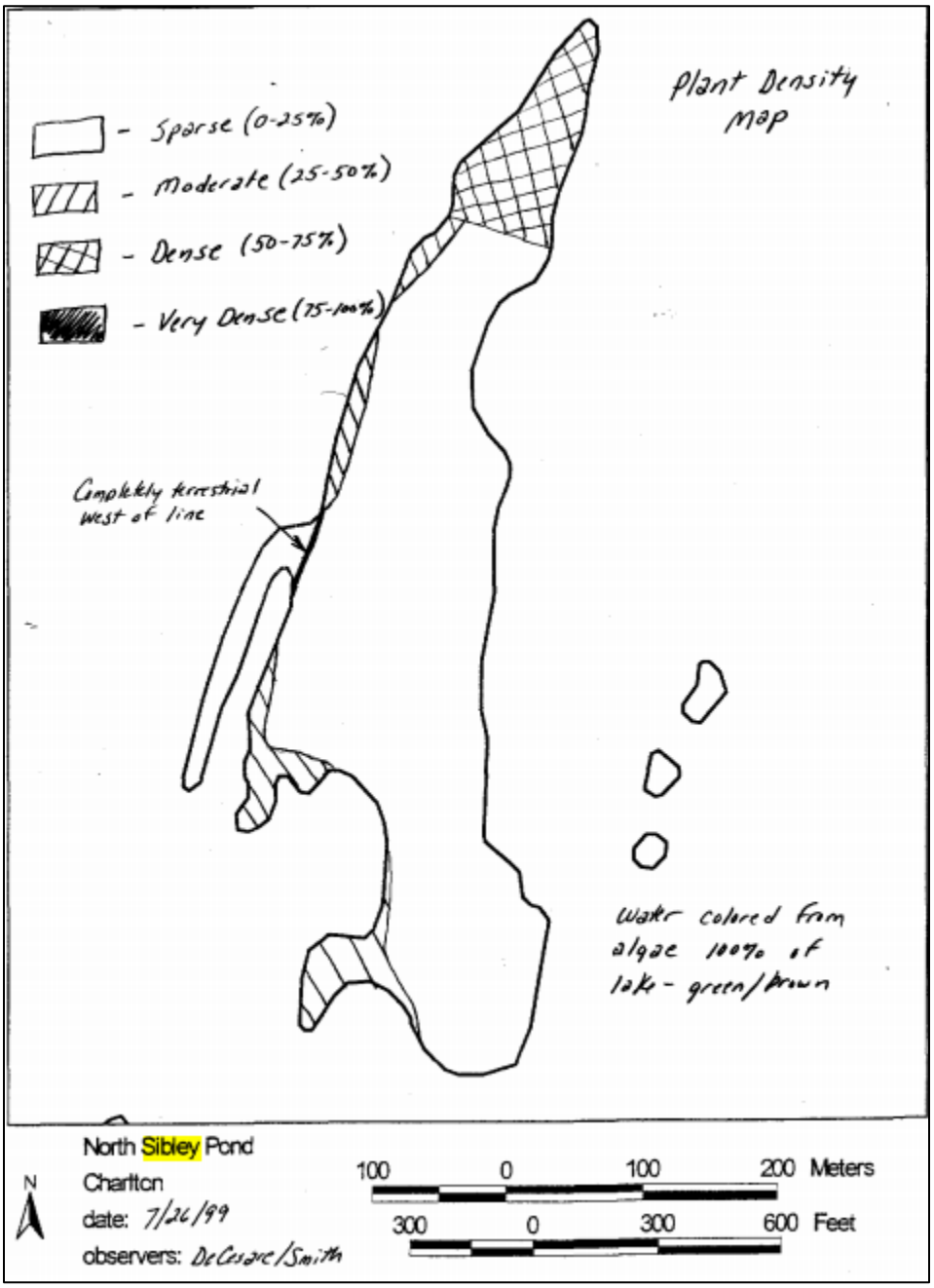
1999 Baseline Lakes Survey of Sibley Pond (north basin)- data sheets and bathymetric map (MassDEP 1999):

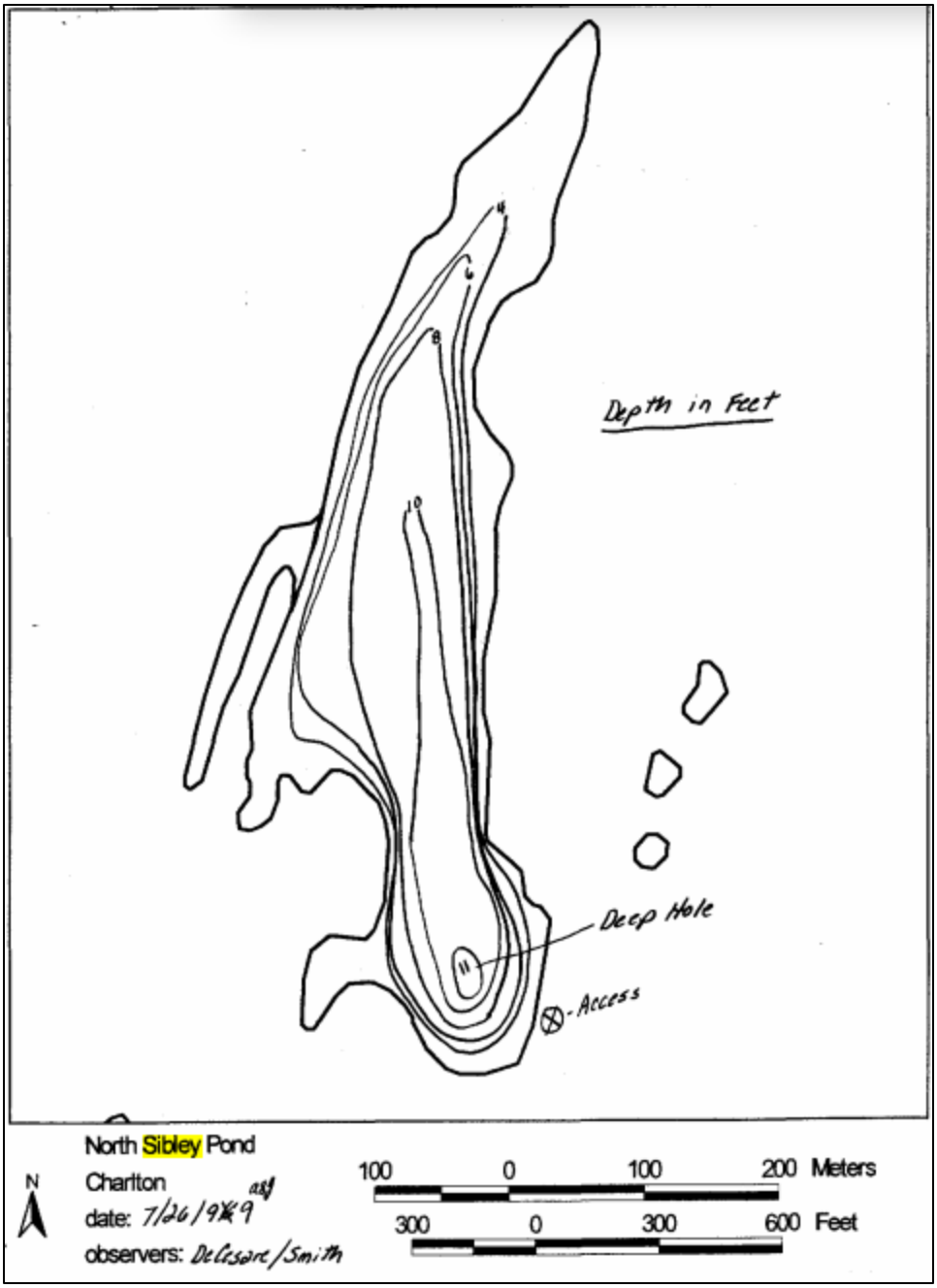


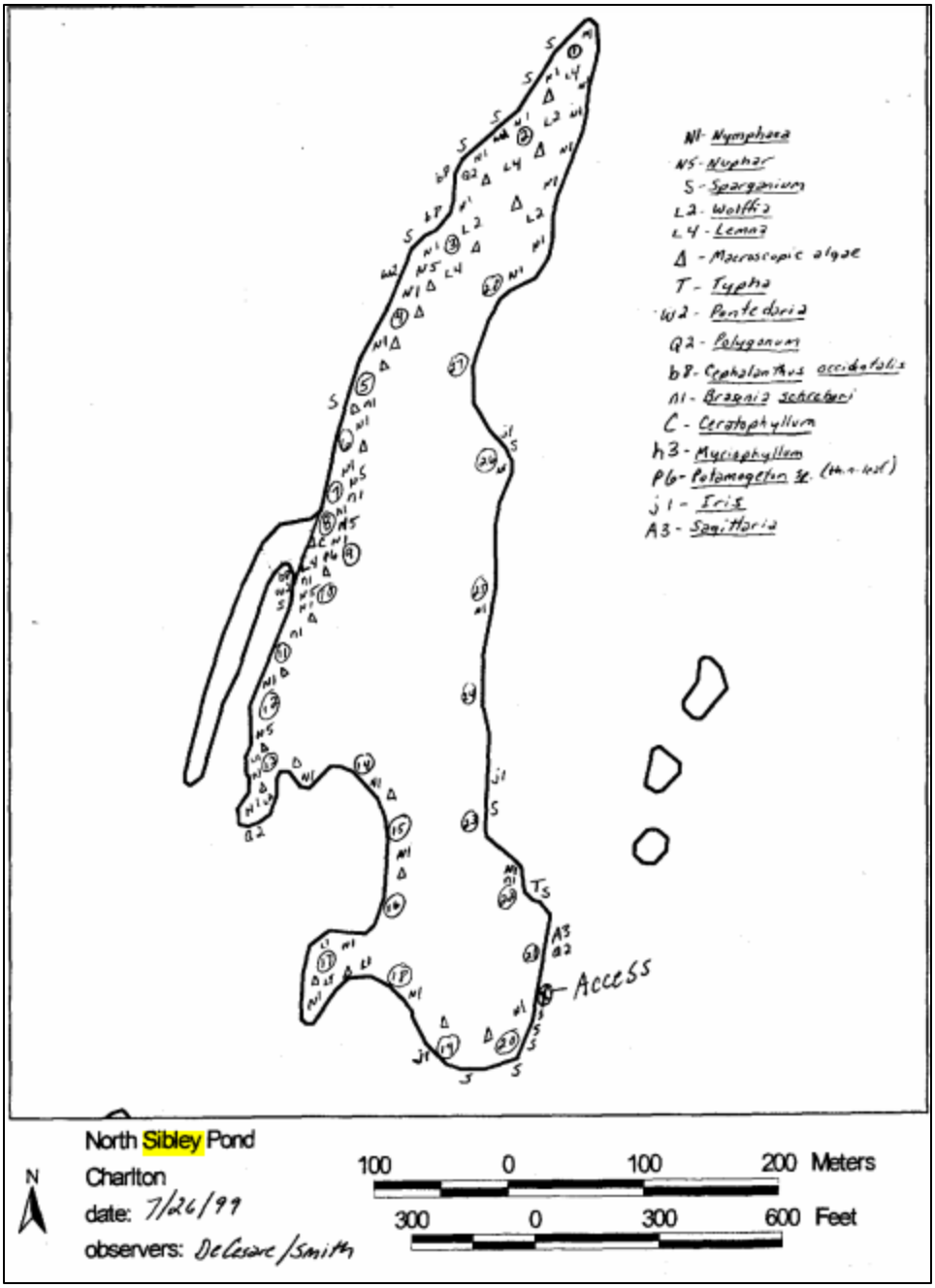
Baseline Lake Survey
Quality Assurance Project Plan
Date: 5/4/99 page 50 of 50

DWM AQUATIC MACROPHYTE
OBSERVATION TALLY SHEET

LAKE/POND: North Sibley Pond Town: Charlton PALIS:
COLLECTORS: DeCesare/Smith DATE: 7/26/99
TOTAL OBSERVATIONS: 28

SPECIES NAME	OBSERVATION TALLYS	TOTAL
Nymphaea	𝍸 𝍸 𝍸 𝍸	20
Nuphar	𝍸 𝍸 II	12
Sparganium	𝍸 IIII	9
Wolffia	𝍸 IIII	9
Lemna	𝍸 III	8
Macroscopic algae	𝍸 𝍸 𝍸 I	16
Pontederea	III	3
Polygonum	III	3
Typha	I	1
Cephalanthus occidentalis	III	3
Brasenia schreberi	𝍸 III	8
Ceratophyllum	I	1
Myriophyllum spp	I	1
Potamogeton sp (Thinleaf)	I	1
Iris	III	3
Sagittaria	II	2


Depth in Feet
Deep Hole
Access
North Sibley Pond
Charlton
date: 7/26/99
observers: DeCesare/Smith
N
100 0 100 200 Meters
300 0 300 600 Feet


Nl- Nymphaea
NS- Nuphar
S - Sparganium
L2 - Wolffia
L4 - Lemna
Δ - Macroscopic algae
T - Typha
W2 - Pontederia
Q2 - Polygonum
b8 - Cephalanthus occidentalis
Al - Brasenia schreberi
C - Ceratophyllum
h3 - Myriophyllum
P6 - Potamogeton sp. (floating leaf)
j1 - Iris
A3 - Sagittaria
Access
North Sibley Pond
Charlton
date: 7/26/99
observers: DeCesare/Smith
N
100 0 100 200 Meters
300 0 300 600 Feet

LAKE/POND: North Sibley Pond SIZE (acres): _____ PALIS NO. 4047

TOWN/CITY: Charlton USGS TOPO. SHEET: _____

DATE: 7/26/99 WATERSHED: F & Q OBSERVERS: DeCesare / Smith

ACCESS – Location [describe each observation site and assign sequential numbers (1, 2, 3, etc.) to use in subsequent records; be specific in descriptions (e.g., public boat ramp at west cove area off Simpson St., etc.)]

Site (1) Sullivan Rd to SE Corner @ Dam

Site (2) _____

Site (3) _____

ACCESS – Type (for multiple observation sites use numbers in boxes that apply)

Formal Boat Ramp ☐☐☐ and/or Beach ☐☐☐ Informal Boat Ramp ☑☐☐ and/or Beach ☐☐☐

Park ☐☐☐ Conservation Area ☐☐☐ Right-of-Way: Road ☐☐☐ Other ☐☐☐ _____

Other (describe): ☐ _____

☐ _____

☐ _____

ACCESS – Ownership (for multiple observation sites use numbers in boxes that apply)

Public ☐☐☐ Private ☑☐☐ Uncertain ☐☐☐

Names of Owners ☐ _____ No. & Street Name ☐ _____

☐ _____ No. & Street Name ☐ _____

☐ _____ No. & Street Name ☐ _____

SIGN POSTINGS –

☐☐☐ Warning: Stop Aquatic Plant Spread ☐☐☐ Fishing Advisory or Ban

☐☐☐ Public Access without Restrictions ☐☐☐ Public Access with Restrictions

Describe any restrictions (or other notes) ☐ NO TRESPASSING

☐ _____

☐ _____

WATER /LAKE QUALITY OBSERVATIONS –

Turbidity: ☐☐☐ Slight ☐☐☐ Moderate ☑☐☐ Excessive

Diss. Organics: ☐☐☐ Slight ☐☐☐ Moderate ☐☐☐ Dark

Algal Bloom: ☐☐☐ Slight ☐☐☐ Moderate ☑☐☐ Dense

Transparency: ☐☐☐ < 1.2 m.(4 ft.) ☐☐☐ > 1.2 m. (4 ft.)

☐☐☐ Estimated visually

☐☐☑ Measured w/ Secchi Disk ☐ 1 - 4 meters

☐ _____ meters

☐ _____ meters

Bottom Type: ☐☐☐ Undecomposed matter ☐☐☑ Muck/silt ☐☐☐ Sand ☐☐☐ Gravel ☐☐☐ Cobble ☑☐☐ Boulders

☐☐☐ Vegetation Other ☐ _____ ☐ _____ ☐ _____

Other Observations: ☐ _____

☐ _____

☐ _____

AESTHETICALLY OBJECTIONABLE – Substances attributable to wastewater or other discharges (point or nonpoint) that:

☐☐☐ Settle to form objectionable deposits

Describe: _____

☐☐☐ Produce objectionable odor, color, taste, or turbidity

Describe: _____

☐☐☑ Float as debris, scum or other matter to form a nuisance

Describe: Algal mats

☐☐☐ Produce undesirable nuisance species of aquatic life

Describe: _____

RECORD OF AQUATIC PLANT "SPECIES" OBSERVED –

NON-NATIVE WETLANDS SPECIES PRESENT: ☐☐☐ *Lythrum Salicaria* ☐☐☐ *Phragmites* sp.

NON-NATIVE AQUATIC SPECIES PRESENT: ☐☐☐ *Butomus umbellatus* ☐☐☐ *Cabomba caroliniana* ☐☐☐ *Egeria densa*

☐☐☐ *Eichornia crassipes* ☐☐☐ *Hydrilla verticillata* ☐☐☐ *Hydrocharis morsus-ranae* ☐☐☐ *Marsilea quadrifolia*

☐☐☐ *Myriophyllum aquaticum* ☐☐☐ *Myriophyllum heterophyllum* ☐☐☐ *Myriophyllum spicatum*

☐☐☐ *M.* sp. (*M. heterophyllum* requiring further confirmation when flowering heads are evident) _____

☐☐☐ *Najas minor* ☐☐☐ *Nelumbo lutea* ☐☐☐ *Nymphoides peltata* ☐☐☐ *Potamogeton crispus* ☐☐☐ *Trapa natans*

NATIVE SPECIES POPULATIONS:

Emergent Plants	Floating Leaf Plants	Submergent Plants
☐☐☐ Sparganium	☐☐☐ Nymphaea	☐☐☐ ceratophyllum
☐☐☐ Typha	☐☐☐ Nuphar	☐☐☐ Myriophyllum sp.
☐☐☐ Pontederia	☐☐☐ Brasenia	☐☐☐ Potamogeton sp. (min var)
☐☐☐ Polygonum	☐☐☐ Wolffia	☐☐☐ _____
☐☐☐ Cephalanthus	☐☐☐ Lemna	☐☐☐ _____
☐☐☐ Iris	☐☐☐ _____	☐☐☐ _____
☐☐☐ Sagittaria	☐☐☐ _____	☐☐☐ _____
☐☐☐ _____	☐☐☐ _____	☐☐☐ _____
☐☐☐ _____	☐☐☐ _____	☐☐☐ _____
☐☐☐ _____	☐☐☐ _____	☐☐☐ _____
☐☐☐ _____	☐☐☐ _____	☐☐☐ _____
☐☐☐ _____	☐☐☐ _____	☐☐☐ _____

AQUATIC PLANT DENSITY –

Percent of suface area (at observation site) with dense (50 - 75 %) aquatic plant cover ☐ _____ % ☐ _____ % ☐ _____ %

Forms [(E)mergent, (F)loating, or (S)ubmerent] present ☐ _____ ☐ _____ ☐ _____

Percent of surface area (observation site) with very dense (75 - 100 %) plant cover ☐ _____ % ☐ _____ % ☐ _____ %

Forms [(E)mergent, (F)loating, or (S)ubmerent) present ☐ _____ ☐ _____ ☐ _____

Percent of entire lake surface covered with dense or very dense aquatic plants <10 % Forms lilies/Brasenia

Describe locations of dense and/or very dense plant beds _____

Loss of open water habitat over entire lake (estimated): ☐ >90 - 100 % ☐ >60 - 90 % ☐ >25 - 60 % ☑ < 25 %

ASSESSMENTS –

TROPHIC STATUS ESTIMATE: ☐ Oligotrophic ☐ Mesotrophic ☑ Eutrophic ☐ Hypereutrophic ☐ Dystrophic ☐ Undetermined

305(b) USE IMPAIRMENT ASSESSMENTS (Acres):

USES	Full Support	Threatened	Partial Support	Non-support	Not Assessed	Not Attainable
Aquatic Life						
Fish Consumption						
Primary Contact						
Secondary Contact						
Aesthetics						

CAUSES: ☐ Noxious plants (2200) – Size _____ acres / Magnitude ____ ☐ Exotic plants (2600) – Size _____ acres / Magnitude ____
☐ Turbidity (2500) – Size _____ acres / Magnitude ____ ☐ Flow alteration (1500) – Size _____ acres / Magnitude ____
☐ Metals (0500) ☐ Hg (0501) – Size _____ acres / Magnitude ____ ☐ Siltation (1100) – Size _____ acres / Magnitude ____
☐ _____ ( ) – Size _____ acres / Magnitude ____ ☐ _____ ( ) – Size _____ acres / Magnitude ____

SOURCES: Describe any obvious sources of impairment _____

Google Earth image of Sibley Pond (north basin, MA41047) while relatively clear, 7/2/2008 (Google Earth Pro Undated):

Google Earth image of Sibley Pond (north basin, MA41047), 9/20/2010 (Google Earth Pro Undated):

Google Earth image of Sibley Pond (north basin, MA41047) with a small amount of vegetation visible at the northern tip of the 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	
No new data/information is available so the Aquatic Life Use for Sibley Pond (North Basin) will continue to be assessed as Not Supporting with the Dissolved Oxygen impairment being carried forward.	

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary
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. The north basin of Sibley Pond (MA41047) was first listed as impaired for Noxious Aquatic Plants in 2002 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a July 1999 baseline lakes survey conducted by MassDEP staff in which it was noted that <10% of the pond was covered with dense or very dense aquatic plants (the field sheet indicates lilies and Brasenia sp.). Among the aquatic plants listed on the field sheet, the non-rooted, floating species, Lemna/Wolffia/Ceratophyllum spp. were noted (MassDEP 1999, MassDEP 2002). Although most Google Earth images over the years depict little, if any dense/very dense aquatic vegetation (e.g., the image from September 2019 shows dense plant coverage at the northern tip of the basin, encompassing <10% of the pond), the image from September 2010 is one exception that shows dense plant coverage over roughly 1/4 to 1/3 of the pond (Google Earth Pro Undated). Since there was less than 25% plant coverage during the survey that triggered the initial listing, as well as in most satellite images since then (including all images after 2010), the Aquatic Plants (Macrophytes) impairment for the north basin of Sibley Pond (MA41047) is being delisted. The Turbidity impairment is being carried forward.

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary
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. The north basin of Sibley Pond (MA41047) was first listed as impaired for Noxious Aquatic Plants in 2002 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a July 1999 baseline lakes survey conducted by MassDEP staff in which it was noted that <10% of the pond was covered with dense or very dense aquatic plants (the field sheet indicates lilies and Brasenia sp.). Among the aquatic plants listed on the field sheet, the non-rooted, floating species, Lemna/Wolffia/Ceratophyllum spp. were noted (MassDEP 1999, MassDEP 2002). Although most Google Earth images over the years depict little, if any dense/very dense aquatic vegetation (e.g., the image from September 2019 shows dense plant coverage at the northern tip of the basin, encompassing <10% of the pond), the image from September 2010 is one exception that shows dense plant coverage over roughly 1/4 to 1/3 of the pond (Google Earth Pro Undated). Since there was less than 25% plant coverage during the survey that triggered the initial listing, as well as in most satellite images since then (including all images after 2010), the Aquatic Plants (Macrophytes) impairment for the north basin of Sibley Pond (MA41047) is being delisted. The Turbidity impairment is being carried forward.

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

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. The north basin of Sibley Pond (MA41047) was first listed as impaired for Noxious Aquatic Plants in 2002 and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). The original impairment was based on a July 1999 baseline lakes survey conducted by MassDEP staff in which it was noted that <10% of the pond was covered with dense or very dense aquatic plants (the field sheet indicates lilies and Brasenia sp.). Among the aquatic plants listed on the field sheet, the non-rooted, floating species, Lemna/Wolffia/Ceratophyllum spp. were noted (MassDEP 1999, MassDEP 2002). Although most Google Earth images over the years depict little, if any dense/very dense aquatic vegetation (e.g., the image from September 2019 shows dense plant coverage at the northern tip of the basin, encompassing <10% of the pond), the image from September 2010 is one exception that shows dense plant coverage over roughly 1/4 to 1/3 of the pond (Google Earth Pro Undated). Since there was less than 25% plant coverage during the survey that triggered the initial listing, as well as in most satellite images since then (including all images after 2010), the Aquatic Plants (Macrophytes) impairment for the north basin of Sibley Pond (MA41047) is being delisted. The Turbidity impairment is being carried forward.

Sibley Pond (MA41048)

Location:	South Basin, Charlton.
AU Type:	FRESHWATER LAKE
AU Size:	19 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Aquatic Plants (Macrophytes)		Removed
5	5	Dissolved Oxygen		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
Dissolved Oxygen	Source Unknown (N)	X				
Turbidity	Source Unknown (N)			X	X	X

Supporting Information for Removed Impairments

2018/20 Removed Impairment	Removal Reason	Removal Comment
Aquatic Plants (Macrophytes)	Applicable WQS attained; based on new data	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. The south basin of Sibley Pond (MA41048) was first listed as impaired for Noxious Aquatic Plants in 1992 (and then there was a gap for several IR cycles) and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). Although it is not clear on what data the 1992 impairment was based, an aquatic macrophyte mapping survey was conducted in August 1999 by MassDEP staff; at that time, roughly 15% of the pond was covered with dense or very dense aquatic plants, including the non-rooted, floating species, *Lemna/Wolffia/Spirodela* spp. (MassDEP 1999, MassDEP 2002). Aside from being slightly turbid at times, Google Earth images do not appear to show any large growths of aquatic macrophytes after 2004 (Google Earth Pro Undated). According to CALM guidelines (MassDEP 2022), Aquatic Plants (Macrophytes) is being delisted since <25% of the pond was covered in aquatic macrophytes, during both the 1990s and in recent years.

Aquatic Plants (Macrophytes)

1994/1996 WBS Coding Sheet (MassDEP 2002):

WBID: MA41048 WATERSHED: Quinebaug(41) (Printed 05/13/96)
NAME: Sibley Ponds TYPE: Lake/Pond
CODE: 41048 SIZE: 19.00(acres)
CLASS: B
ORW?: Yes or No
Water Supply?: Yes or No

LATITUDE:
LONGITUDE: (420938/720015)
Lake/Pond Name: Sibley Ponds[South Basin], Charlton
Ecoregion Name: ()
Description:

Assessment Date: 9112 9607 Begin Sampling: 8407 Water Quality Limited?: YES or NO
Cycle: 94 96 End Sampling: 8407 303(d) List?: YES or NO

Lake Specific Information		1996	
Significantly Publicly Owned:	Y	Significantly Publicly Owned:	Y or N
Trophic Status:	H	Trophic Status:	O M E H D U
Trophic Trend:		Trophic Trend:	I S D U
Acidity/Toxics Trend:		Acidity/Toxics Trend:	I S D U
Acidity Effects:		Acidity Effects:	I V N U

Uses	Support	Threat	Partial	Non-Sup	Not-Asses	Not-Attain
OVERALL USE SUPPORT			19.00		19.0	
ALUS			19.00		19.0	
FISH CONSUMPTION					19.00	
PRIMARY CONTACT			19.00		19.0	
SECONDARY CONTACT			19.00		19.0	
Aesthetics			19.00		19.0	

Nonattainment Causes			1996		
Code	Size	Magnitude	Code	Size	Magnitude
0900- Nutrients	19.00	H			
2200- Noxious aquatic plants	19.00	M			

Nonattainment Sources			1996		
Code	Size	Magnitude	Code	Size	Magnitude
9000- SOURCE UNKNOWN	19.00	H			

Assessment Type (Assessment Category = > Evaluated)
1996 Assessment Category = > M E NA

Media/Pollutants Assessed (Toxics Monitoring = > N)
1996 Toxics Monitoring = > YES or NO

Comments:
HISTORICALLY HIGH TOTAL PHOSPHORUS LEVELS, LOW DISSOLVED OXYGEN IN THE BOTTOM WATERS, AND BLUE-GREEN "BLOOMS" THAT REDUCED TRANSPARENCY TO BELOW SAFETY CRITERIA (4 FT. SECCHI DISK). RECENT (JUNE 1990) VISUAL SURVEYS, PHYTOPLANKTON GRABS, AND LOCAL COMPLAINTS INDICATE THAT CONDITIONS HAVE NOT CHANGED.

ARE: RSV 10/31/96

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2002 WBS Coding Sheet (mentions 1999 aquatic macrophyte survey) (MassDEP 2002):

WBID: MA41048 WATERSHED: Quinebaug (41) (Printed 05/17/01)
NAME: Sibley Ponds TYPE: Lake/Pond
CODE: 41048 SIZE: 19.00(acres) CLASS: B

LATITUDE:
LONGITUDE: (420938/720015)
Lake/Pond Name: Sibley Ponds[South Basin], Charlton
Ecoregion Name: ()
Description:

Assessment Date: 9912 ~~9901~~ **Begin Sampling:** ~~9407~~ 9907
Cycle: 99 02 **End Sampling:** ~~9407~~ 9909 (Assessment Category = > Evaluated)

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

Uses	Support	Threat	Partial	Non-Sup	Not-Asses	Not-Attain
OVERALL USE SUPPORT			~~19.00~~	19.0		
ALUS			19.0	~~19.0~~	~~19.00~~	
FISH CONSUMPTION					19.00	
PRIMARY CONTACT			~~19.00~~	19.0		
SECONDARY CONTACT	~~19.00~~			19.0		
Aesthetics				19.0	~~19.00~~	

Nonattainment Causes

Code	Size	Magnitude	"New" Code	Size	Magnitude
2500- Turbidity	19.00	M	1200	19.0	~~M~~ S
			2200	4.0	M
			2500	19.0	M

Nonattainment Sources

Code	Size	Magnitude	"New" Code	Size	Magnitude
9000- SOURCE UNKNOWN	19.00	M	9000	19.0	M

Assessment Type ("New" Assessment Category = > M E NA)
(Assessment Category = > Evaluated)
ACO-Carryover (Change from Monitored to Evaluated only)
R35- Primary Producer Surveys
R45- Synoptic Physical/Chemical Monitoring

B05, B25, C15, C35, R20, R35, R45

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

Comments:
HISTORICALLY HIGH TOTAL PHOSPHORUS LEVELS, LOW DISSOLVED OXYGEN IN THE BOTTOM WATERS, AND BLUE-GREEN "BLOOMS" THAT REDUCED TRANSPARENCY TO BELOW SAFETY CRITERIA (4 FT. SECCHI DISK). RECENT (JUNE 1990) VISUAL SURVEYS, PHYTOPLANKTON GRABS, AND LOCAL COMPLAINTS INDICATE THAT CONDITIONS HAVE NOT CHANGED. 28 JULY 1994 SYNOPTIC SURVEY INDICATED THAT TURBIDITY WAS HIGH AND THE POND WAS VERY PRODUCTIVE (FILAMENTOUS ALGAE) SUGGESTING THAT CONDITIONS ARE LARGELY UNCHANGED.

1996:
Adjustment in cause and source based on EPA guidance changes.

2002: DWM macrophyte mapping on 17 August 1999 indicated about 20% coverage of dense to very dense floating leaf and submergent vegetation. Three water quality surveys conducted by DWM ~~from~~ from July through September indicated low turbidity (< 4 ft Secchi disk) over the growing season and oxygen depletion below about 1 meter depth.

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1994 Synoptic Survey Field Sheet (MassDEP 1994):

Entered 8/24/94
Entered WBS 10/19/94
41048

Page 1 of 2

Lake/Pond Sibley Pond (South Basin) **Date** 7/28/94

Town/City Charlton **Observers** R. Haynes
R. McVoy

Location/type of access **(be specific, e.g., public boat ramp at west cove area off Simpson Street):**
Over guardrail off Rt 20 -

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

Posted signs (re aquatic plants, fish advisories, access, etc.):
None

Water quality observations **(clarity, dissolved organic staining, blooms, et cetera):**
- V. Turbid; leaf litter on bottom
- no stain

Good flow coming in from left ([illegible] off Rt. 20 from Stormwater)

[illegible] productive; [illegible]

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

Lemna minor, filamentous green algae, Sagittaria?, Elodea, Nuphar, Typha latifolia, Potamogeton sp. (thin leaf)

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

A few patches of floating leaf (~~75~~ 100%) at south end - Submerged not certain.

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

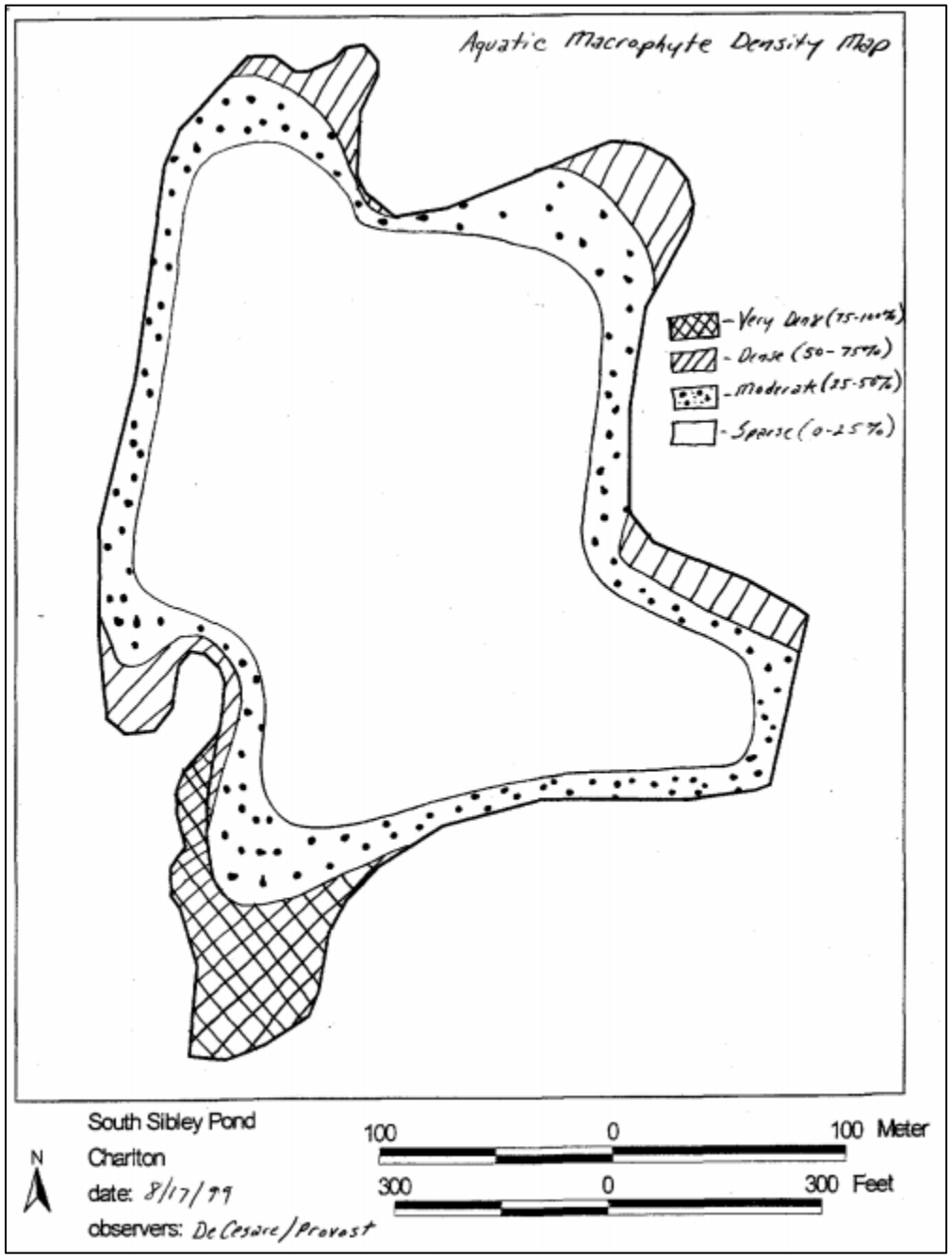
305 b - Eutrophic
1° Contact - 100% Threatened
2° Contact - 100% Fully support

Combine with old assessment

Cause - Turbidity - T

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

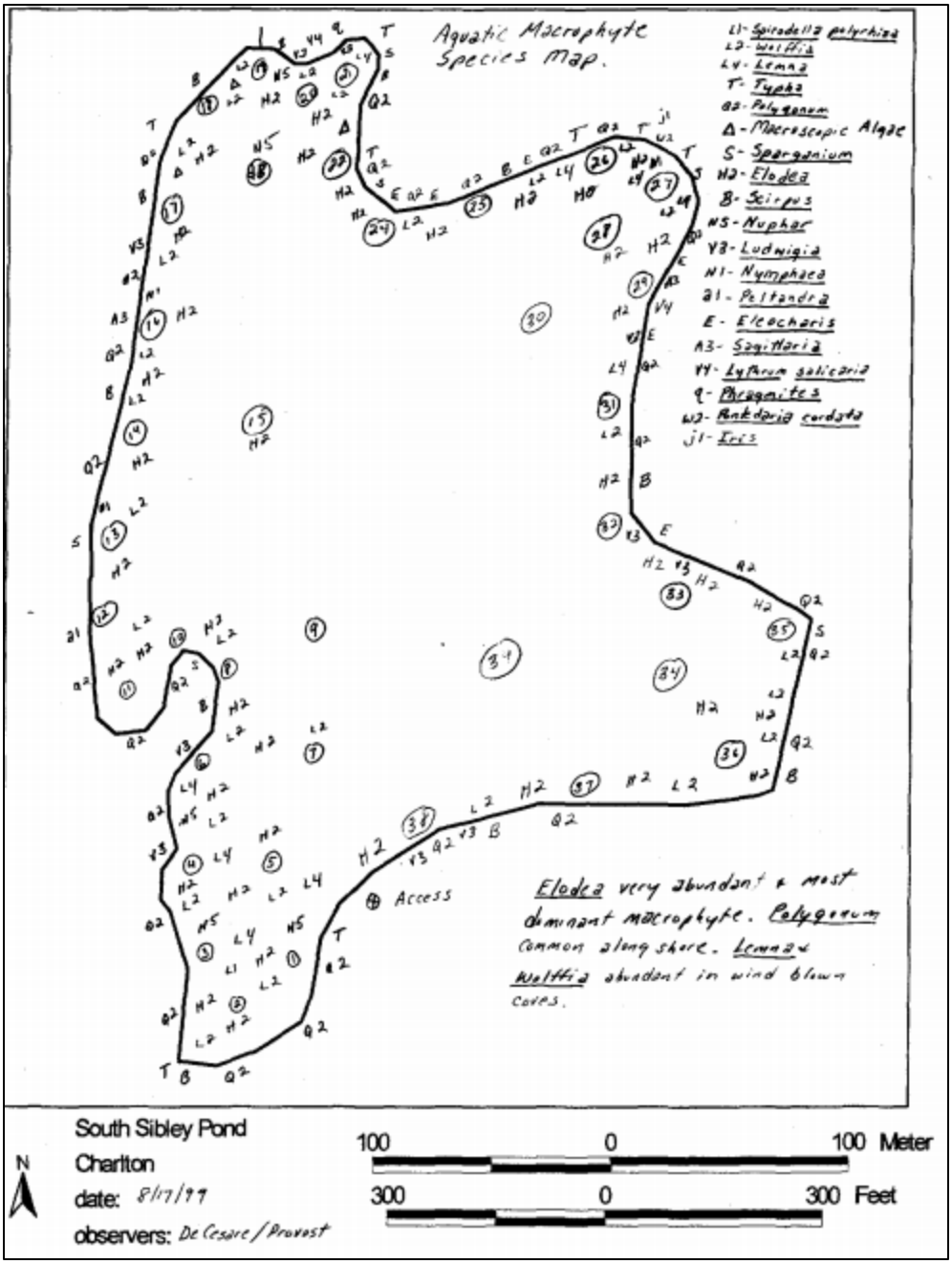
1999 Baseline Lakes Survey of Sibley Pond (south basin), data sheets (MassDEP 1999):



DWM AQUATIC MACROPHYTE
OBSERVATION TALLY SHEET

LAKE/POND: South Sibley Pond Town Charlton PALIS
COLLECTORS: Decesare | Provost DATE: 8/17/99
TOTAL OBSERVATIONS: 39

SPECIES NAME	OBSERVATION TALLYS	TOTAL
Typha	𝍸 III	8
Lemna	𝍸 𝍸 II	12
Wolffia	𝍸 𝍸 𝍸 𝍸 II	22
Spirodela polyrhiza	II	2
Polygonum	𝍸 𝍸 𝍸 𝍸 III	23
Macroscopic Algae	𝍸 𝍸 I	11
Sparganium	IIII	4
Elodea	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 III	33
Scirpus	𝍸 𝍸 II	12
Nuphar	𝍸 II	7
Ludwigia	𝍸 𝍸	10
Nymphia	III	3
Eleocharis	𝍸 I	6
Peltandra	III	3
Sagittaria	III	3
Lythrum salicaria	𝍸	5
Phragmites	II	2
Iris	I	1
Pontederia Cordata	I	1


Aquatic Macrophyte Species Map.
L1- Spirodella polyrhiza
L2- Wolffia
L4- Lemna
T- Typha
Q2- Polygonum
Δ- Macroscopic Algae
S- Sparganium
H2- Elodea
B- Scirpus
NS- Nuphar
V3- Ludwigia
N1- Nymphaea
21- Peltandra
E- Eleocharis
A3- Sagittaria
V4- Lythrum salicaria
q- Phragmites
W2- Pontederia cordata
J1- Iris
Elodea very abundant & most dominant macrophyte. Polygonum common along shore. Lemna & Wolffia abundant in wind blown coves.
Access
South Sibley Pond
Charlton
date: 8/17/99
observers: DeCesare / Provost
N
100 0 100 Meter
300 0 300 Feet

LAKE/POND: South Sibley Pond SIZE (acres): _____ PALIS NO. 41048

TOWN/CITY: Charlton USGS TOPO. SHEET: _____

DATE: 8/17/99 WATERSHED: F + Q OBSERVERS: DeCesare / Provost

ACCESS – Location [describe each observation site and assign sequential numbers (1, 2, 3, etc.) to use in subsequent records; be specific in descriptions (e.g., public boat ramp at west cove area off Simpson St., etc.)]

Site (1) Lakeside Trailer Park - South end of Pond

Site (2) _____

Site (3) _____

ACCESS – Type (for multiple observation sites use numbers in boxes that apply)

Formal Boat Ramp ☐☐☐ and/or Beach ☐☐☐ Informal Boat Ramp ☐☐☐ and/or Beach ☐☐☐

Park ☐☐☐ Conservation Area ☐☐☐ Right-of-Way: Road ☐☐☐ Other ☑☐☐ _____

Other (describe): ☐ Grassy / Beach area @ trailer park

☐ _____

☐ _____

ACCESS – Ownership (for multiple observation sites use numbers in boxes that apply)

Public ☐☐☐ Private ☑☐☐ Uncertain ☐☐☐

Names of Owners ☐ Lakeside Trailer Park No. & Street Name ☐ RT 20 - Eastbound lane

☐ _____ No. & Street Name ☐ _____

☐ _____ No. & Street Name ☐ _____

SIGN POSTINGS –

☐☐☐ Warning: Stop Aquatic Plant Spread ☐☐☐ Fishing Advisory or Ban

☐☐☐ Public Access without Restrictions ☐☐☐ Public Access with Restrictions

Describe any restrictions (or other notes) ☐ _____

☐ _____

☐ _____

WATER / LAKE QUALITY OBSERVATIONS –

Turbidity: ☐☐☐ Slight ☐☐☐ Moderate ☑☐☐ Excessive

Diss. Organics: ☐☐☑ Slight ☐☐☐ Moderate ☐☐☐ Dark

Algal Bloom: ☐☐☑ Slight ☐☐☐ Moderate ☐☐☐ Dense

Transparency: ☐☐☐ < 1.2 m. (4 ft.) ☐☐☐ > 1.2 m. (4 ft.)

☐☐☐ Estimated visually

☐☐☑ Measured w/ Secchi Disk ☑ 1.2 meters

☐ _____ meters

☐ _____ meters

Bottom Type: ☐☐☐ Undecomposed matter ☐☐☑ Muck/silt ☐☐☐ Sand ☐☐☐ Gravel ☐☐☐ Cobble ☐☐☐ Boulders

☐☐☐ Vegetation Other ☐ _____ ☐ _____ ☐ _____

Other Observations: ☐ Water very brown

☐ _____

☐ _____

AESTHETICALLY OBJECTIONABLE – Substances attributable to wastewater or other discharges (point or nonpoint) that:

☐☐☐ Settle to form objectionable deposits

Describe: _____

☐☐☑ Produce objectionable odor, color, taste, or turbidity

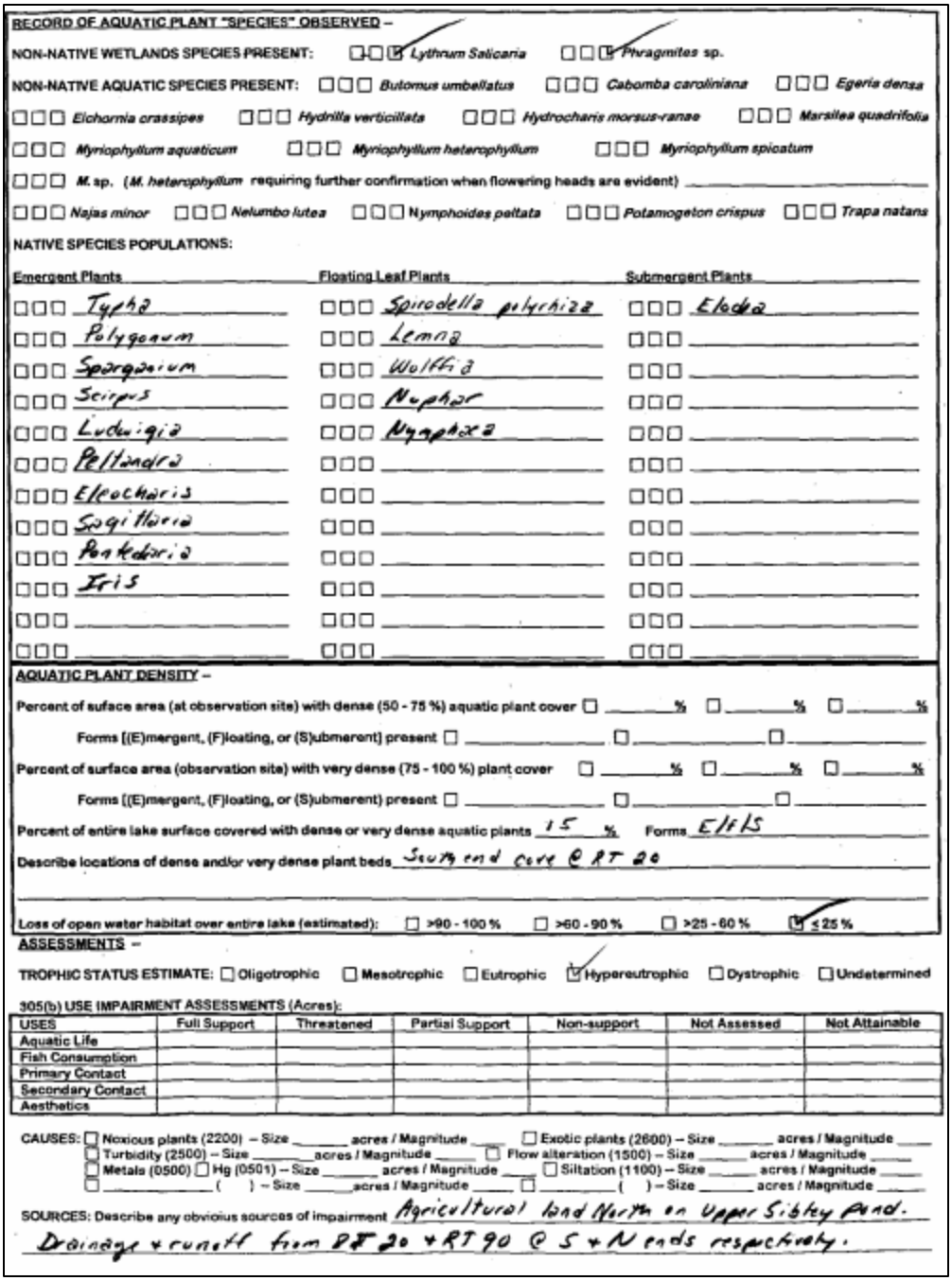
Describe: Brown

☐☐☐ Float as debris, scum or other matter to form a nuisance

Describe: _____

☐☐☐ Produce undesirable nuisance species of aquatic life

Describe: _____



RECORD OF AQUATIC PLANT "SPECIES" OBSERVED –

NON-NATIVE WETLANDS SPECIES PRESENT: ☐☐☑ *Lythrum Salicaria* ☐☐☑ *Phragmites* sp.

NON-NATIVE AQUATIC SPECIES PRESENT: ☐☐☐ *Butomus umbellatus* ☐☐☐ *Cabomba caroliniana* ☐☐☐ *Egeria densa*

☐☐☐ *Eichornia crassipes* ☐☐☐ *Hydrilla verticillata* ☐☐☐ *Hydrocharis morsus-ranae* ☐☐☐ *Marsilea quadrifolia*

☐☐☐ *Myriophyllum aquaticum* ☐☐☐ *Myriophyllum heterophyllum* ☐☐☐ *Myriophyllum spicatum*

☐☐☐ *M.* sp. (*M. heterophyllum* requiring further confirmation when flowering heads are evident) _____

☐☐☐ *Najas minor* ☐☐☐ *Nelumbo lutea* ☐☐☐ *Nymphoides peltata* ☐☐☐ *Potamogeton crispus* ☐☐☐ *Trapa natans*

NATIVE SPECIES POPULATIONS:

Emergent Plants	Floating Leaf Plants	Submergent Plants
☐☐☐ Typha	☐☐☐ Spirodella polyrhiza	☐☐☐ Elodea
☐☐☐ Polygonum	☐☐☐ Lemna	☐☐☐
☐☐☐ Sparganium	☐☐☐ Wolffia	☐☐☐
☐☐☐ Scirpus	☐☐☐ Nuphar	☐☐☐
☐☐☐ Ludwigia	☐☐☐ Nymphaea	☐☐☐
☐☐☐ Peltandra	☐☐☐	☐☐☐
☐☐☐ Eleocharis	☐☐☐	☐☐☐
☐☐☐ Sagittaria	☐☐☐	☐☐☐
☐☐☐ Pontederia	☐☐☐	☐☐☐
☐☐☐ Iris	☐☐☐	☐☐☐
☐☐☐	☐☐☐	☐☐☐
☐☐☐	☐☐☐	☐☐☐

AQUATIC PLANT DENSITY –

Percent of suface area (at observation site) with dense (50 - 75 %) aquatic plant cover ☐ ____ % ☐ ____ % ☐ ____ %

Forms [(E)mergent, (F)loating, or (S)ubmerent] present ☐ ____ ☐ ____ ☐ ____

Percent of surface area (observation site) with very dense (75 - 100 %) plant cover ☐ ____ % ☐ ____ % ☐ ____ %

Forms [(E)mergent, (F)loating, or (S)ubmerent) present ☐ ____ ☐ ____ ☐ ____

Percent of entire lake surface covered with dense or very dense aquatic plants 15 % Forms E/F/S

Describe locations of dense and/or very dense plant beds South end core @ RT 20

Loss of open water habitat over entire lake (estimated): ☐ >90 - 100 % ☐ >60 - 90 % ☐ >25 - 60 % ☑ ≤ 25 %

ASSESSMENTS –

TROPHIC STATUS ESTIMATE: ☐ Oligotrophic ☐ Mesotrophic ☐ Eutrophic ☑ Hypereutrophic ☐ Dystrophic ☐ Undetermined

305(b) USE IMPAIRMENT ASSESSMENTS (Acres):

USES	Full Support	Threatened	Partial Support	Non-support	Not Assessed	Not Attainable
Aquatic Life						
Fish Consumption						
Primary Contact						
Secondary Contact						
Aesthetics						

CAUSES: ☐ Noxious plants (2200) – Size ____ acres / Magnitude ____ ☐ Exotic plants (2600) – Size ____ acres / Magnitude ____
☐ Turbidity (2500) – Size ____ acres / Magnitude ____ ☐ Flow alteration (1500) – Size ____ acres / Magnitude ____
☐ Metals (0500) ☐ Hg (0501) – Size ____ acres / Magnitude ____ ☐ Siltation (1100) – Size ____ acres / Magnitude ____
☐ ____ ( ) – Size ____ acres / Magnitude ____ ☐ ____ ( ) – Size ____ acres / Magnitude ____

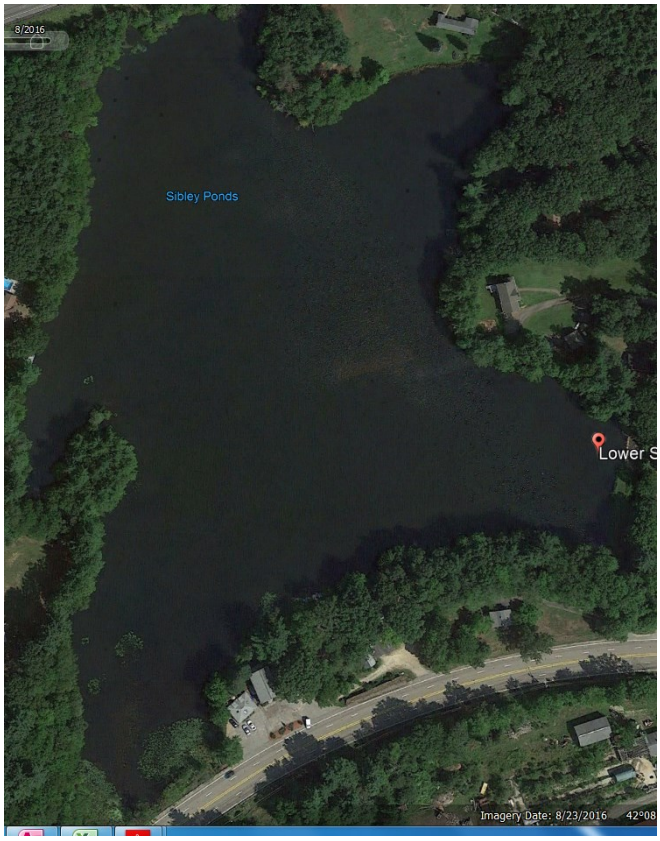
SOURCES: Describe any obvious sources of impairment Agricultural land North on Upper Sibley Pond.
Drainage + runoff from RT 20 + RT 90 @ S + N ends respectively.

Google Earth image of Sibley Pond (south basin), 7/2/2008 (Google Earth Pro Undated):

Google Earth image of Sibley Pond (south basin), 9/20/2010 (Google Earth Pro Undated):

Google Earth image of Sibley Pond (south basin), 5/6/2015 (Google Earth Pro Undated):

Google Earth image of Sibley Pond (south basin), 8/23/2016 (Google Earth Pro Undated):



Google Earth image of Sibley Pond (south basin), 9/12/2017 (Google Earth Pro Undated):

Google Earth image of Sibley Pond (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	
No new data/information is available so the Aquatic Life Use for Sibley Pond (South Basin) will continue to be assessed as Not Supporting with the Dissolved Oxygen impairment being carried forward.	

Fish Consumption

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

Aesthetic

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
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. The south basin of Sibley Pond (MA41048) was first listed as impaired for Noxious Aquatic Plants in 1992 (and then there was a gap for several IR cycles) and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). Although it is not clear on what data the 1992 impairment was based, an aquatic macrophyte mapping survey was conducted in August 1999 by MassDEP staff; at that time, roughly 15% of the pond was covered with dense or very dense aquatic plants, including the non-rooted, floating species, Lemna/Wolffia/Spirodela spp. (MassDEP 1999, MassDEP 2002). Aside from being slightly turbid at times, Google Earth images do not appear to show any large growths of aquatic macrophytes after 2004 (Google Earth Pro Undated). According to CALM guidelines (MassDEP 2022), Aquatic Plants (Macrophytes) is being delisted since <25% of the pond was covered in aquatic macrophytes, during both the 1990s and in recent years. The turbidity impairment is being carried forward.	

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO
2022 Use Attainment Summary	
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. The south basin of Sibley Pond (MA41048) was first listed as impaired for Noxious Aquatic Plants in 1992 (and then there was a gap for several IR cycles) and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). Although it is not clear on what data the 1992 impairment was based, an aquatic macrophyte mapping survey was conducted in August 1999 by MassDEP staff; at that time, roughly 15% of the pond was covered with dense or very dense aquatic plants, including the non-rooted, floating species, Lemna/Wolffia/Spirodela spp. (MassDEP 1999, MassDEP 2002). Aside from being slightly turbid at times, Google Earth images do not appear to show any large growths of aquatic macrophytes after 2004 (Google Earth Pro Undated). According to CALM guidelines (MassDEP 2022), Aquatic Plants (Macrophytes) is being delisted since <25% of the pond was covered in aquatic macrophytes, during both the 1990s and in recent years. The Turbidity impairment is being carried forward.	

Secondary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

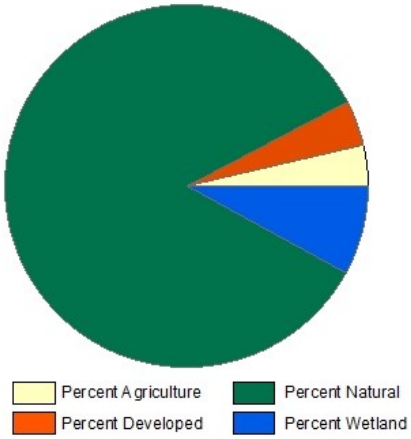
As described in detail in the 2022 CALM guidance document (MassDEP 2022), the mapping of Aquatic Plants (Macrophytes) impairments as a pollutant is being reevaluated. The south basin of Sibley Pond (MA41048) was first listed as impaired for Noxious Aquatic Plants in 1992 (and then there was a gap for several IR cycles) and this cause was remapped to Aquatic Plants (Macrophytes) during the 2010 IR cycle (MassDEP 2015). Although it is not clear on what data the 1992 impairment was based, an aquatic macrophyte mapping survey was conducted in August 1999 by MassDEP staff; at that time, roughly 15% of the pond was covered with dense or very dense aquatic plants, including the non-rooted, floating species, Lemna/Wolffia/Spirodela spp. (MassDEP 1999, MassDEP 2002). Aside from being slightly turbid at times, Google Earth images do not appear to show any large growths of aquatic macrophytes after 2004 (Google Earth Pro Undated). According to CALM guidelines (MassDEP 2022), Aquatic Plants (Macrophytes) is being delisted since <25% of the pond was covered in aquatic macrophytes, during both the 1990s and in recent years. The Turbidity impairment is being carried forward.

Stevens Brook (MA41-19)

Location:	From the state line Wales, MA/Stafford, CT to mouth at inlet of Hamilton Reservoir, Holland.
AU Type:	RIVER
AU Size:	4.7 MILES
Classification/Qualifier:	B

Stevens Brook - MA41-19

Watershed Area: 3.86 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.86	3.55	1.36	1.26
Agriculture	3.6%	3.8%	4.1%	4%
Developed	4.1%	4.5%	4.6%	4.9%
Natural	84.3%	83.4%	75.9%	74.7%
Wetland	7.9%	8.4%	15.3%	16.4%
Impervious Cover	1.8%			

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

Recommendations

2022 Recommendations
ALU: Steven Brook is listed as a CFR by MassWildlife and the presence of reproducing brook trout confirms this designation. Dissolved oxygen exceeded Class B coldwater standards at all times during the summer of 2011 although water temperatures violated coldwater standards at times. Additional temperature monitoring may help to identify thermal refugia and/or opportunities to reduce thermal stress(es). Re-classification of Steven Brook as a coldwater should be considered.

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

As was previously reported as part of the 2018/2020 IR reporting cycle (MassDEP 2021) MassDFG biologists conducted backpack electrofishing at three locations on Stevens Brook (MA41-19) in July 2006 near the corner of Union and Stafford roads in Wales (SampleD 1980) and further downstream in June 2000 upstream of Old Stafford Road and near the mouth in Holland (SampleIDs 121 and 122, respectively). As part of the 2011 probabilistic streams survey MassDEP biologists sampled in the middle portion of Stevens Brook in the summer of 2011 downstream from Old Stafford Road crossing nearest Howlett Road in Holland. Biological sampling was conducted at this MAP2-031 site (both benthic macroinvertebrates B0713 and fish (SampleID 4598), as well as water quality (W2191). The benthic sample (B0713) IBI score was indicative of exceptional conditions (81). Additionally, and as previously reported (MassDEP 2021), three of four fish sampling locations were dominated by fluvial dependants and specialists and included reproducing brook trout populations. The fish population at the downstream location near Hamilton Reservoir was comprised of 45 percent fluvial species and included brown trout which were most likely stocked. Physio-chemical water quality monitoring included temperature, pH, turbidity, dissolved oxygen, specific conductivity, chloride, total phosphorus, nitrate/nitrite, total nitrogen, ammonia, and metals. At no time was dissolved oxygen below 6.0mg/l during the probe deployed from June 24, 2011 until September 7, 2011. Two temperature probes were deployed by MassDEP in 2011. One was deployed for the whole season and one was deployed on three separate occasions for 3-5 days on each occasion. Combining data from both probes, temperatures from early May to late October ranged between 10.7–26.1°C (mean 18.5°C). Stevens Brook is a Class B water however it is considered a CFR by MassWildlife. Water temperatures exceeded coldwater criteria of 20°C for at least some period in May, June, July and August 2011 with most occurring in July and short-term small exceedances happening during the other months. Nutrient concentrations were low (total phosphorus 0.014-0.040 mg/L, total nitrogen 0.26--0.49 mg/L) and there were no indicators of nutrient enrichment (maximum diel DO shift 0.8mg/L). There were no exceedances of acute or chronic criteria for ammonia, chloride, or metals (n= 3 sampling events for Cd, Cr, Cu, Pb, Ni, Ag, Zn, As, Se).
The Aquatic Life Use for Stevens Brook (MA41-19) is assessed as Fully Supporting based on good biological condition (benthic and fish sampling data), and with the exception of temperature during the summer months, the water quality data were also indicative of excellent conditions. The Alert for temperature is being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
B0713	MassDEP	Benthic	Stevens Brook/	[approximately 155 meters downstream from the Old Stafford Road crossing nearest Howlett Road, Holland, MA]	42.057726	-72.187518
W2191	MassDEP	Water Quality	Stevens Brook	[approximately 510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland]	42.057726	-72.187518

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)

[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
B0713	07/18/11	RBP kicknet	Central_Hills_100ct	106	81	E

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2191	2011	3	12	7.7	7.7	8	0.8	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2191	05/26/11	10/03/11	6	8.6	9.2	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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]

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
W2191	06/01/11	09/15/11	107	107	24.0	26.1	23.5	21.9	43	1	7	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2191	2011	3	12	20.9	22.4	22.1	20.6	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 5) (MassDEP Undated 4)

[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
W2191	06/01/11	09/15/11	107	5136	24.0	36	0	0
W2191	06/24/11	09/07/11	75	577	20.9	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	05/26/11	10/03/11	8	6	19.8	16.7	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W2191	05/26/11	10/03/11	6	6.4	7	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	2011	4	0.014	0.040	0.023	0.8	0.6	98.7	7.0	5	0

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

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	07/27/11	0.3	0.5	0.3	0.34	0.1	0.0
W2191	08/31/11	0.6	0.9	0.4	0.52	0.1	0.0
W2191	09/12/11	0.8	0.0	0.3	0.38	0.1	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	2011	3	0.056	0.065	0.062	0.1	0.2	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2191	2011	5	0.020	0.020	0.020	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2191	2011	5	5	12	9	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W2191	05/26/11	10/03/11	6	48	78	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 Stevens Brook; therefore the Fish Consumption Use is Not Assessed.

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews in Stevens Brook ~ 510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland (W2191) during the summer 2011. The Aesthetics Use for Stevens Brook will continue to be assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2191	MassDEP	Water Quality	Stevens Brook	[approximately 510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland]	42.057726	-72.187518

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2191	Stevens Brook	2011	6	MassDEP aesthetics observations for station W2191/MAP2-031 on Stevens 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2191	2011	6	5	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2191	Stevens Brook	2011	Color	Brownish	1	6
W2191	Stevens Brook	2011	Color	Dark Tan	1	6
W2191	Stevens Brook	2011	Color	Light Yellow/Tan	4	6
W2191	Stevens Brook	2011	Objectionable Deposits	No	6	6
W2191	Stevens Brook	2011	Odor	None	6	6
W2191	Stevens Brook	2011	Scum	No	3	6
W2191	Stevens Brook	2011	Scum	Yes	3	6
W2191	Stevens 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 Stevens Brook ~510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland (W2191) between May and October 2011 (n=6) during the summer of 2011. Data analysis indicated 0% of the intervals had GMs >126 cfu/100ml, and none of the samples exceeded the 410 cfu/100ml STV. The seasonal GM was 55 cfu/100ml.
Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Primary Contact Recreational Use for Stevens Brook is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2191	MassDEP	Water Quality	Stevens Brook	[approximately 510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland]	42.057726	-72.187518

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

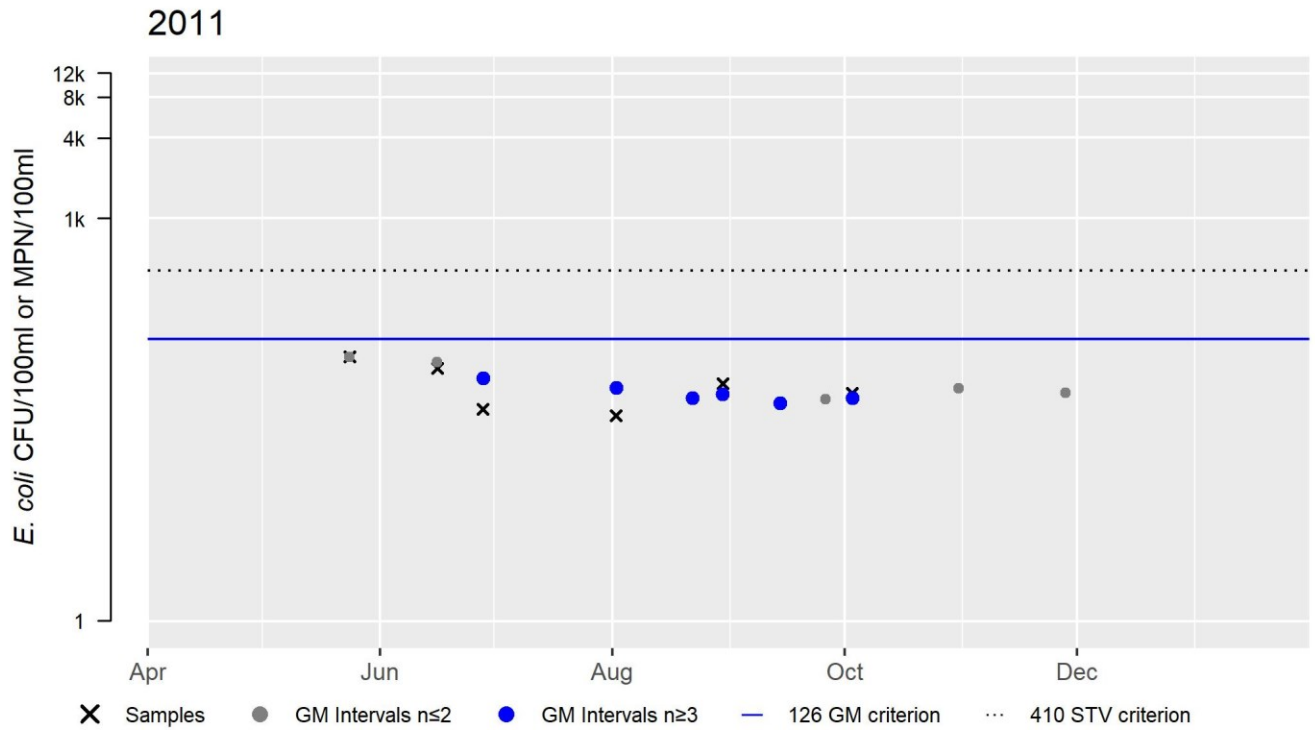
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2191	MassDEP	E. coli	05/24/11	10/03/11	6	34	93	55

W2191 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	55
#GMI	6
#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 Stevens Brook ~510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland (W2191) between May and October 2011 (n=6) during the summer of 2011. Data analysis indicated 0% of the intervals had GMs >630 cfu/100ml, and none of the samples exceeded the 1260 cfu/100ml STV. The seasonal GM was 55 cfu/100ml. Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Secondary Contact Recreational Use for Stevens Brook is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2191	MassDEP	Water Quality	Stevens Brook	[approximately 510 feet downstream from the Old Stafford Road crossing nearest Howlett Road, Holland]	42.057726	-72.187518

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

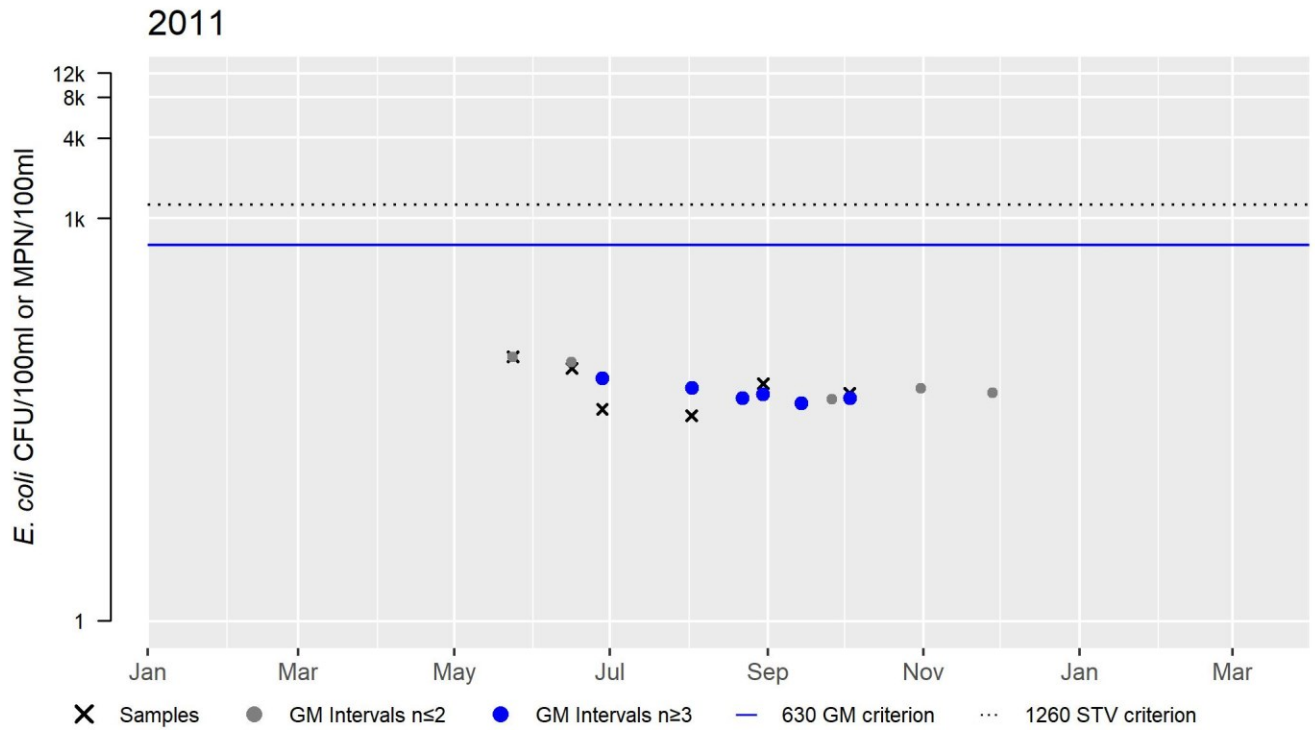
[Result units are CFU/100ml or MPN/100ml]

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)
W2191	MassDEP	E. coli	05/24/11	10/03/11	6	34	93	55

W2191 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	55
#GMI	6
#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



Sylvestri Pond (MA41049)

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

No usable data were available for Sylvestri Pond (MA41049) 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	(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
(Non-Native Aquatic Plants*)	Introduction of Non-native Organisms (Accidental or Intentional) (Y)	X				

Tufts Branch (MA41-10)

Location:	Headwaters, north of Dudley-Southbridge Road, Dudley to the state line, Dudley, MA/Thompson, CT.
AU Type:	RIVER
AU Size:	2.8 MILES
Classification/Qualifier:	B: CWF

No usable data were available for Tufts Branch (MA41-10) 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

Unnamed Tributary (MA41-16)

Location:	Unnamed tributary to Mill Brook, headwaters, outlet Sherman Pond, Brimfield to mouth at confluence with Mill Brook, Brimfield.
AU Type:	RIVER
AU Size:	1.2 MILES
Classification/Qualifier:	B

No usable data were available for Unnamed Tributary (MA41-16) 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	Benthic Macroinvertebrates		Unchanged
5	5	Dissolved Oxygen		Unchanged
5	5	Escherichia Coli (E. Coli)		Unchanged
5	5	Sedimentation/Siltation		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				
Dissolved Oxygen	Source Unknown (N)	X				
Escherichia Coli (E. Coli)	Non-Point Source (Y)				X	X
Sedimentation/Siltation	Source Unknown (N)	X				

Unnamed Tributary (MA41-23)

Location:	Unnamed tributary to the Quinebaug River from headwaters at the outlet of an unnamed pond on the Southbridge/Charlton border to mouth at confluence with the Quinebaug River, Southbridge.
AU Type:	RIVER
AU Size:	1.9 MILES
Classification/Qualifier:	B

No usable data were available for Unnamed Tributary (MA41-23) 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
2	2	None		Unchanged

Unnamed Tributary (MA41-25)

Location:	Unnamed tributary to Tufts Branch, headwaters, former Wielock Pond Dam (NATID# MA00218) outlet, Dudley to mouth at confluence with Tufts Branch, Dudley.
AU Type:	RIVER
AU Size:	0.2 MILES
Classification/Qualifier:	B

No usable data were available for Unnamed Tributary (MA41-25) 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

Unnamed Tributary (MA41-26)

Location:	Unnamed tributary locally known as 'Freeman's Brook' from headwaters west of Cronin Road, Warren to an unnamed tributary to Long Pond, Sturbridge.
AU Type:	RIVER
AU Size:	2.6 MILES
Classification/Qualifier:	B

No usable data were available for Unnamed Tributary (MA41-26) 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
2	2	None		Unchanged

Unnamed Tributary (MA41-27)

Location:	Unnamed tributary to Mill Brook, headwaters south of East Hill Road, Brimfield to mouth at confluence with Mill Brook, Brimfield.
AU Type:	RIVER
AU Size:	1.7 MILES
Classification/Qualifier:	B

No usable data were available for Unnamed Tributary (MA41-27) for the 2022 Integrated Reporting cycle, therefore its category, use attainments, impairments, associated actions, and sources remain unchanged from the previous cycle.

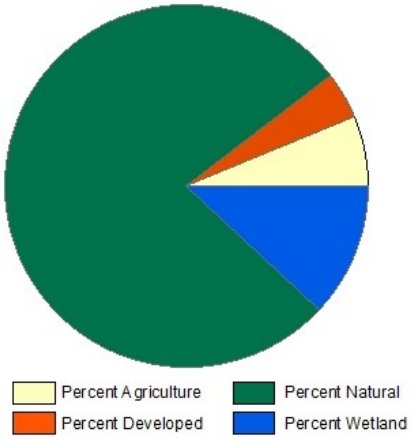
2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
3	3	None		Unchanged

Unnamed Tributary (MA41-29)

Location:	Unnamed tributary to unnamed pond (eventually to Quinebaug River), headwaters (perennial portion) east of Arnold Road, Sturbridge to mouth at inlet unnamed pond north of Route 90, Sturbridge.
AU Type:	RIVER
AU Size:	0.6 MILES
Classification/Qualifier:	B

Unnamed Tributary - MA41-29

Watershed Area: 0.54 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	0.54	0.54	0.15	0.15
Agriculture	6.3%	6.3%	0.6%	0.6%
Developed	4.1%	4.1%	1.3%	1.3%
Natural	77.6%	77.6%	69.2%	69.2%
Wetland	12%	12%	28.9%	28.9%
Impervious Cover	3%			

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	YES
2022 Use Attainment Summary	

As part of the 2011 probabilistic streams survey MassDEP biologists sampled the Unnamed Tributary (MA41-29) ~900 feet upstream from the Massachusetts Turnpike (Route 90) in Sturbridge. Sampling included fish population (SampleID 4596), benthic macroinvertebrates (B0726), and physiochemical water quality monitoring (W2206). Benthic macroinvertebrate sampling was conducted in July 2011 and backpack electrofishing was conducted in September 2011 just four days after Hurricane Irene. The benthic sample (B0726) IBI score was indicative of satisfactory conditions (74). As was previously reported (MassDEP 2021), the fish sample was comprised entirely of blacknose dace, a tolerant fluvial specialist species. Physio-chemical water quality data collected on six surveys between 5/26 and 10/3 were indicative of good conditions: temperature (15.1- 19.5°C), dissolved oxygen (7.0-8.3 mg/l), pH (6.4-7.0 SU). An unattended probe measuring DO and temperature was deployed on three separate occasions for three to four days between 6/24-9/7/2011. An additional unattended temperature probe was also deployed from 5/26 to 10/3/2011. Temperatures ranged between 12.1-26.3°C and DO ranged between 5.5-8.4 mg/L (average 7.3 mg/L) with a maximum diel shift of 2.6 mg/L. Nutrient sampling was conducted on five occasions including analysis for total phosphorus and total nitrogen. Total phosphorus concentrations were elevated ranged from 0.089-0.28mg/l while total nitrogen concentrations were low (0.41--0.84 mg/l). Ammonia and chloride concentrations were also low. Samples were also collected and analyzed for metals on three occasions during the summer and early fall of 2011. There were no exceedances of acute or chronic criteria.

The Aquatic Life Use for this Unnamed Tributary (MA41-29) is assessed as Fully Supporting based on the biological (benthic, fish) and water quality data collected from the brook upstream from the Massachusetts Turnpike during the summer/fall of 2011. The alert for elevated total phosphorus concentrations is being carried forward although there were no other indicators of nutrient enrichment.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
B0726	MassDEP	Benthic	Unnamed And/Or Undefined Saris/	[unnamed tributary eventually to the Quinebaug River approximately 275 meters upstream from the Massachusetts Turnpike (Route 90), Sturbridge, MA]	42.136934	-72.103133
W2206	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary eventually to the Quinebaug River approximately 900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge]	42.136934	-72.103133

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)

[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
B0726	07/18/11	RBP kicknet	Central_Hills_100ct	107	74	S

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2206	2011	3	11	5.5	6.1	7.1	2.6	0	0	0	0	0	0

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2206	05/26/11	10/03/11	6	7	7.8	0	0	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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]

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
W2206	06/01/11	09/15/11	107	107	23.8	26.3	23.9	21.8	48	1	7	0	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2206	2011	3	12	21.1	23.0	22.6	20.7	3	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 5) (MassDEP Undated 4)

[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
W2206	06/01/11	09/15/11	107	5136	23.8	28	0	0
W2206	06/24/11	09/07/11	75	576	21.1	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2206	05/26/11	10/03/11	8	6	19.5	17.3	0	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W2206	05/26/11	10/03/11	6	6.4	7	1	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2206	2011	4	0.089	0.280	0.157	2.6	1.1	89.3	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 5) (MassDEP Undated 4)

[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
W2206	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2206	2011	3	0	0	0	0	0	0	0	0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2206	2011	3	0.029	0.042	0.035	0.1	0.2	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2206	2011	5	0.020	0.080	0.040	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2206	2011	5	6	16	12	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W2206	05/26/11	10/03/11	6	82	141	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 (MA41-29); therefore the Fish Consumption Use is Not Assessed.	

Aesthetic

2022 Use Attainment	Alert
Fully Supporting	NO
2022 Use Attainment Summary	
There were generally no noted objectionable conditions (odors, deposits, growths, or turbidity) recorded by DEP field sampling crews in this Unnamed Tributary (MA41-29) ~900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge (W2206) during the summer 2011. The Aesthetics Use for this Unnamed Tributary (MA41-29) is assessed as Fully Supporting.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2206	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary eventually to the Quinebaug River approximately 900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge]	42.136934	-72.103133

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2206	Unnamed Tributary	2011	6	MassDEP aesthetics observations for station W2206/MAP2-059 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 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2206	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2206	Unnamed Tributary	2011	Color	Light Yellow/Tan	5	6
W2206	Unnamed Tributary	2011	Color	NR	1	6
W2206	Unnamed Tributary	2011	Objectionable Deposits	No	6	6
W2206	Unnamed Tributary	2011	Odor	None	6	6
W2206	Unnamed Tributary	2011	Scum	No	3	6
W2206	Unnamed Tributary	2011	Scum	Yes	3	6
W2206	Unnamed Tributary	2011	Turbidity	None	5	6
W2206	Unnamed Tributary	2011	Turbidity	Slightly Turbid	1	6

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	NO

2022 Use Attainment Summary

E. coli bacteria data were collected in this Unnamed Tributary (MA41-29) ~900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge (W2206) between May and October 2011 (n=6) during the summer of 2011. Analysis of this single years' worth of limited frequency data indicated 100% of intervals had GMs >126 cfu/100ml, and one sample exceeded the 410 cfu/100ml STV. The seasonal GM was 174 cfu/100ml.
Since the *E. coli* concentrations exceeded the use attainment impairment thresholds for this single year limited frequency dataset, the Primary Contact Recreational Use for this Unnamed Tributary (MA41-29) is assessed as Not Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2206	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary eventually to the Quinebaug River approximately 900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge]	42.136934	-72.103133

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

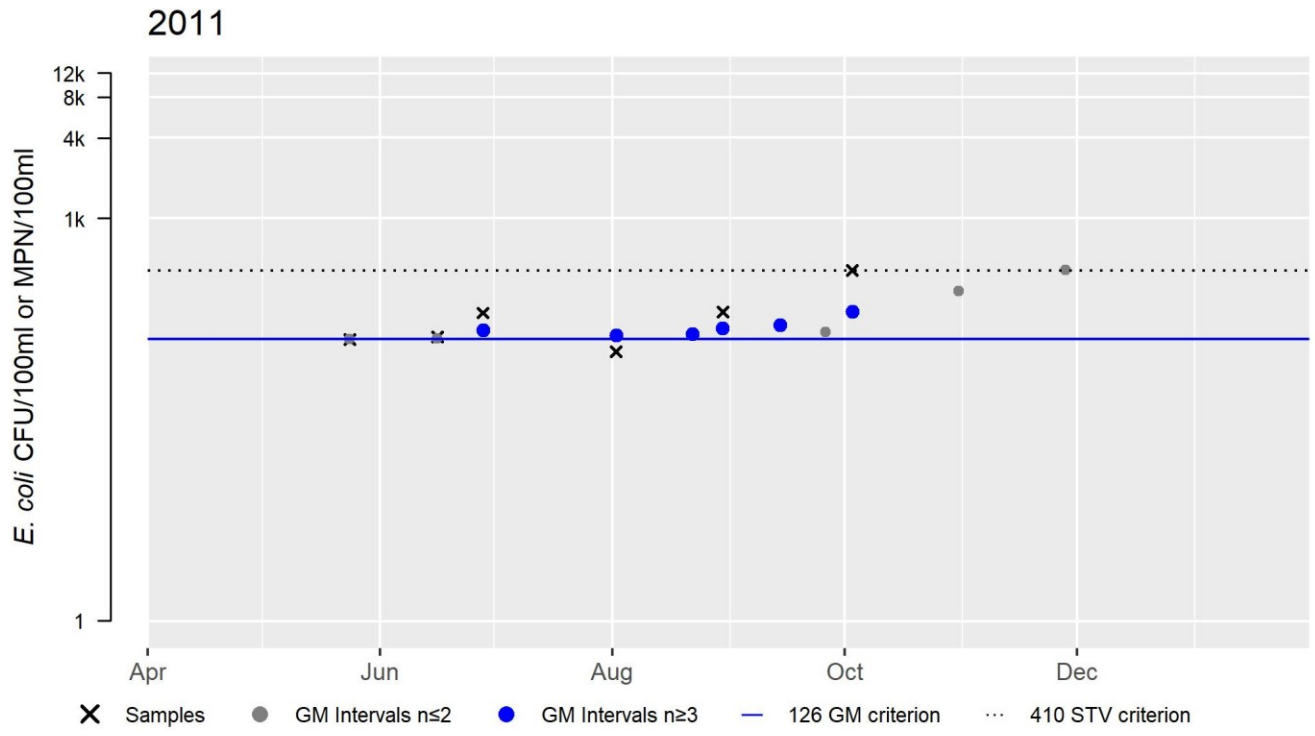
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2206	MassDEP	E. coli	05/24/11	10/03/11	6	102	411	174

W2206 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	174
#GMI	6
#GMI Ex	6
%GMI Ex	100
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

E. coli bacteria data were collected in this Unnamed Tributary (MA41-29) ~900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge (W2206) between May and October 2011 (n=6) during the summer of 2011. Analysis of this single years' worth of limited frequency data indicated 0% of intervals had GMs >630 cfu/100ml, and no samples exceeded the 1260 cfu/100ml STV. The seasonal GM was 174 cfu/100ml.
Since the *E. coli* concentrations were below the use attainment impairment thresholds for this single year limited frequency dataset, the Secondary Contact Recreational Use for this Unnamed Tributary (MA41-29) is assessed as Fully Supporting.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2206	MassDEP	Water Quality	Unnamed Tributary	[unnamed tributary eventually to the Quinebaug River approximately 900 feet upstream from the Massachusetts Turnpike (Route 90), Sturbridge]	42.136934	-72.103133

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

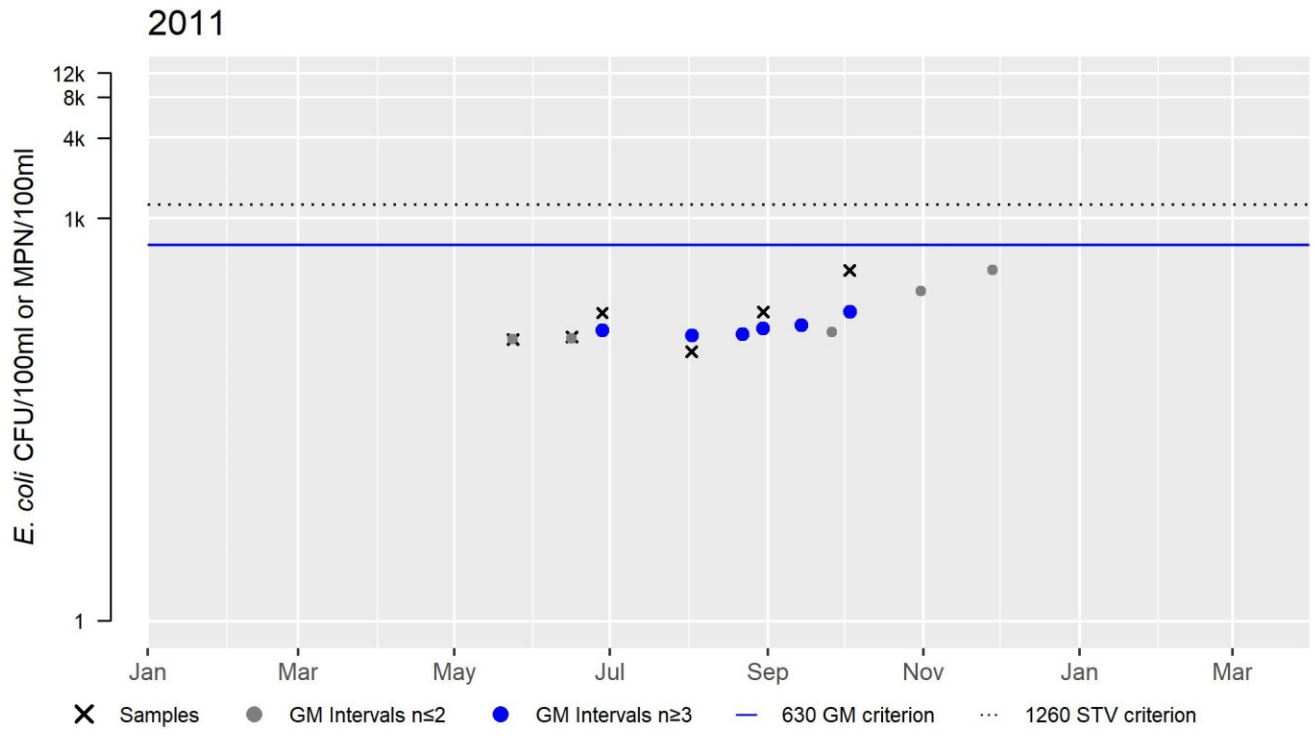
[Result units are CFU/100ml or MPN/100ml]

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)
W2206	MassDEP	E. coli	05/24/11	10/03/11	6	102	411	174

W2206 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	174
#GMI	6
#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



Wales Brook (MA41-08)

Location:	Headwaters, outlet Lake George, Wales to mouth at confluence with Mill Brook, Brimfield.
AU Type:	RIVER
AU Size:	5.2 MILES
Classification/Qualifier:	B

No usable data were available for Wales Brook (MA41-08) 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

Walker Pond (MA41052)

Location:	Sturbridge.
AU Type:	FRESHWATER LAKE
AU Size:	104 ACRES
Classification/Qualifier:	B

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
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
(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	
Because of the infestation of the non-native aquatic macrophyte *M. heterophyllum*, the Aquatic Life Use for Walker Pond will continue to be assessed as Not Supporting.	

Fish Consumption

2022 Use Attainment	Alert
Not Assessed	NO
2022 Use Attainment Summary	
No fish toxics sampling has been conducted in Walker 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 Walker Pond, so it is Not Assessed.	

Primary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

The Wells State Park Walker Pond Beach was rarely, if at all, posted for swimming between 2014 and 2019 except during the summer of 2017 when posting exceeded 10% (was 47%).
The Primary Contact Recreational Use for Walker Pond is assessed as Fully Supporting since there were few, if any, swimming advisory postings at the Wells State Park Walker Pond Beach, but an Alert is being identified since there was one year that postings exceeded 10% of the swimming season.

Beach Postings

MassDPH Beach Posting Data Summary (% Bathing Season Posted 2014-2019) (Bailey, Logan Feb. 2, 2021) (MassDEP Undated 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%
5186	Wells State Park - Walker Pond Beach (DCR)/Sturbridge	42.14353	-72.06090	42.14454	-72.06000	2%	0%	4%	47%	2%	0%	1

Secondary Contact Recreation

2022 Use Attainment	Alert
Fully Supporting	NO

2022 Use Attainment Summary

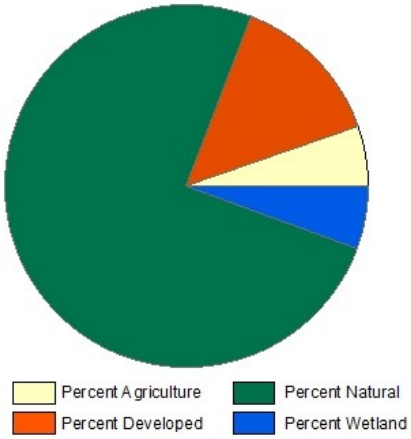
The Wells State Park Walker Pond Beach was rarely, if at all, posted for swimming between 2014 and 2019 except during the summer of 2017 when posting exceeded 10%.
The Secondary Contact Recreational Use for Walker Pond is assessed as Fully Supporting since there were few, if any, swimming advisory postings at the Wells State Park Walker Pond Beach.

West Brook (MA41-17)

Location:	Headwaters, west of the Dix Hill Road/Route 19 intersection (excluding intermittent portion), Brimfield to mouth at confluence with Mill Brook, Brimfield.
AU Type:	RIVER
AU Size:	1.8 MILES
Classification/Qualifier:	B

West Brook - MA41-17

Watershed Area: 1.41 square miles not including areas outside Massachusetts



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.41	1.41	0.51	0.51
Agriculture	5.3%	5.3%	7.2%	7.2%
Developed	13.9%	13.9%	10.3%	10.3%
Natural	75.3%	75.3%	71.4%	71.4%
Wetland	5.6%	5.6%	11.1%	11.1%
Impervious Cover	4.2%			

2018/20 AU Category	2022 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Escherichia Coli (E. Coli)		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	

Designated Use Attainment Decisions

Fish, other Aquatic Life and Wildlife

2022 Use Attainment	Alert
Fully Supporting	YES
2022 Use Attainment Summary	

In the summer of 2011, MassDEP biologists conducted benthic macroinvertebrate, fish, and water quality sampling in West Brook just upstream from Route 20 in Brimfield (W2198). The benthic community (Station B0719) IBI score was indicative of the low end of satisfactory conditions (62). As was previously reported as part of the 2018/2020 IR reporting cycle (MassDEP 2021), fish population data (SampleID 4593) from August documented five species of fish including two moderately tolerant macrohabitat generalists. Water quality data (including dissolved oxygen and temperature were collected during five-day deploys as well as temperature only during a longer deploy) using unattended probes at the water quality sampling location (W2198). The mean of the daily minimum dissolved oxygen (DO) concentration during the two 5-day deployments was 4.7 mg/l which is slightly below the USEPA 7 day mean minimum of 5.0 mg/ although the minimum DO was 3.8 mg/L. The average DO concentration was 5.1 mg/l and the maximum diel shift was 2.14 mg/L. Attended dissolved oxygen measurements averaged 4.9 mg/l. Temperatures ranged between 15.2 – 28.1 °C between 5/26 and 10/3, with a maximum 7-DADM of 26.8 °C. Water quality samples were collected on 5 occasions and the data are summarized as follows: chloride (8-15 mg/l), ammonia (<0.02-0.12 mg/l), turbidity, total phosphorus (0.019-0.034 mg/l), total nitrogen (0.34-0.55 mg/l) and there were no exceedances of any acute or chronic metals criteria.
The Aquatic Life Use for West Brook will continue to be assessed as Fully Supporting. The former alert for low DO, although may be associated with natural conditions resulting from the presence of beaver activity and the low gradient nature of the brook in the reach sampled, is being carried forward.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
B0719	MassDEP	Benthic	West Brook/	[approximately 180 meters upstream from Palmer Road (Route 20), Brimfield, MA]	42.123355	-72.206693
W2198	MassDEP	Water Quality	West Brook	[approximately 600 feet upstream from Palmer Road (Route 20), Brimfield]	42.123355	-72.206693

Biological Monitoring Information

Benthic Macroinvertebrate Data

MassDEP Benthic Macroinvertebrate Data (2011-2017). (MassDEP Undated 3)
[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
B0719	07/18/11	RBP multihab	Statewide_Low_Gradient	100	62	S

Physico-chemical Water Quality Information

DO, pH, Temperature

MassDEP Short-term Continuous Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2198	2011	2	8	3.8	4.3	4.8	2.1	2	5	1	3	1	1

MassDEP Discrete Dissolved Oxygen Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2198	05/26/11	10/03/11	4	4.6	4.9	3	3	0

MassDEP Long-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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]

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
W2198	06/01/11	09/15/11	107	107	26.5	28.1	26.8	25.0	107	25	85	14	0	0

MassDEP Short-term Continuous Temperature Data (Summer Index 2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2198	2011	2	8	23.1	24.9	24.4	22.4	2	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 5) (MassDEP Undated 4)

[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
W2198	06/01/11	09/15/11	107	5136	26.5	1253	755	0
W2198	06/24/11	08/03/11	40	385	23.0	0	0	0

MassDEP Discrete Temperature Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2198	05/26/11	10/03/11	6	4	22.0	19.7	2	0	0	0

MassDEP Discrete pH Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

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
W2198	05/26/11	10/03/11	4	6.4	6.5	2	0

Nutrients (Primary Producer Screening, Physico-chemical Screening)

MassDEP Nutrient Enrichment Indicator Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2198	2011	4	0.019	0.034	0.027	2.1	0.9	76.9	6.5	6	0

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

MassDEP Clean Metals Water Column Data (2011-2018), Acute Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2198	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Chronic Criteria Violations. (MassDEP Undated 5) (MassDEP Undated 4)
[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
W2198	2011	3	0	0	0	0	0	0	0	0

MassDEP Clean Metals Water Column Data (2011-2018), Selected TU Calculations. (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2198	07/27/11	0.2	0.4	0.2	0.24	0.0	0.8
W2198	08/31/11	0.3	0.6	0.5	0.60	0.1	0.0
W2198	09/12/11	0.5	0.8	0.3	0.44	0.1	0.0

MassDEP Dissolved Aluminum Water Column Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2198	2011	3	0.030	0.078	0.054	0.1	0.3	0	0

MassDEP Total Ammonia Nitrogen (TAN) Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

[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
W2198	2011	5	0.020	0.120	0.056	0	0

MassDEP Chloride Data (2011-2018). (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Chloride Count	Chloride Min (mg/L)	Chloride Max (mg/L)	Chloride Avg (mg/L)	Count Chloride >230	Count Chloride >860
W2198	2011	5	8	15	12	0	0

MassDEP Discrete Specific Conductance Data (2011-2018) Compared to Estimated Chloride Criteria. (MassDEP Undated 5) (MassDEP Undated 4)

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
W2198	05/26/11	10/03/11	4	81	113	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 West Brook, therefore the Fish Consumption Use is Not Assessed	

Aesthetic

2022 Use Attainment	Alert

Fully Supporting	YES
2022 Use Attainment Summary	
There were generally no odors, growths, or turbidity observed by MassDEP staff during field surveys of West Brook just upstream from Route 20 in Brimfield (W2198) during the summer 2011. The Aesthetics use for West Brook will continue to be assessed as Fully Supporting based on the general lack of objectionable conditions observed by MassDEP staff during the summer of 2011. However, an Alert is being identified due to four observations of objectionable deposits (either minor trash or "trash, gravel from fairground pile going into stream").	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2198	MassDEP	Water Quality	West Brook	[approximately 600 feet upstream from Palmer Road (Route 20), Brimfield]	42.123355	-72.206693

Aesthetic Observations

Aesthetics Summary Statements for MassDEP Stations (2011-2018) (MassDEP Undated 4)

Station Code	Waterbody	Data Year	Field Sheet Count	Aesthetics Summary Statement
W2198	West Brook	2011	6	The Aesthetics use for West Brook is assessed as Fully Supporting based on observations (generally no odors, growths, or turbidity) by MassDEP staff during field surveys at station W2198/MAP2-043 in summer 2011 (n=6). However, the use is identified with an Alert status due to 4 observations of objectionable deposits (either minor trash or "trash, gravel from fairground pile going into stream").

Observations of Filamentous/Film Algae at MassDEP Stations (2011-2018) (MassDEP Undated 5) (MassDEP Undated 4)

Station Code	Data Year	Field Sheet Count	Field Sheet Count w/ Film & Filamentous Algae Observations	Dense/ Very Dense Film/ Filamentous Algae
W2198	2011	6	6	0

MassDEP Aesthetics Observations (2011-2018) (MassDEP Undated 5)

Station Code	Waterbody	Data Year	Parameter	Result	Result Count	Total Field Sheet Count
W2198	West Brook	2011	Color	Light Yellow/Tan	6	6
W2198	West Brook	2011	Objectionable Deposits	No	2	6
W2198	West Brook	2011	Objectionable Deposits	Yes	4	6
W2198	West Brook	2011	Odor	None	6	6
W2198	West Brook	2011	Scum	No	4	6
W2198	West Brook	2011	Scum	Yes	2	6
W2198	West Brook	2011	Turbidity	None	5	6
W2198	West Brook	2011	Turbidity	Slightly Turbid	1	6

Primary Contact Recreation

2022 Use Attainment	Alert
Not Supporting	YES

2022 Use Attainment Summary

E. coli bacteria data were collected in West Brook approximately 600 feet upstream from Palmer Road (Route 20), Brimfield in the summer 2011 (W2198). Analysis of this single years' worth of limited frequency data indicated 67% of intervals had GMs >126 cfu/100ml, two samples exceeded the 410 cfu/100ml STV, with an overall/seasonal GM of 127 cfu/100ml.

The Primary Contact Recreational Use for West Brook will continue to be assessed as Not Supporting based on the elevated *E. coli* bacteria concentrations so that impairment is being carried forward. An Alert for the aesthetic issue (four observations of objectionable deposits --either minor trash or "trash, gravel from fairground pile going into stream) is also being identified.

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2198	MassDEP	Water Quality	West Brook	[approximately 600 feet upstream from Palmer Road (Route 20), Brimfield]	42.123355	-72.206693

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

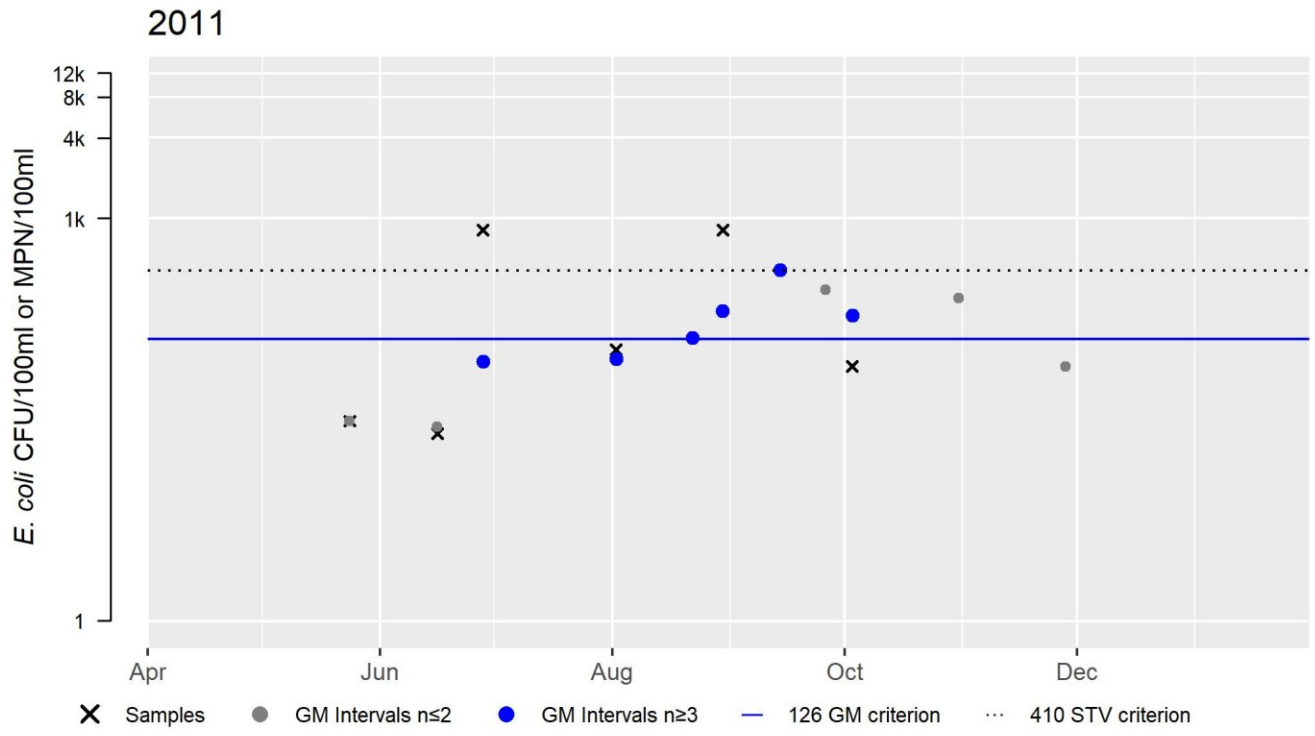
[Result units are CFU/100ml or MPN/100ml]

Station Code	Organization	Indicator	Start Date	End Date	Sample Count	Minimum Sample Result	Maximum Sample Result	Seasonal Geometric Mean
W2198	MassDEP	E. coli	05/24/11	10/03/11	6	25	816	127

W2198 *E. coli* (90-day Interval), Primary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	127
#GMI	6
#GMI Ex	4
%GMI Ex	67
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	YES
2022 Use Attainment Summary	
E. coli bacteria data were collected in West Brook approximately 600 feet upstream from Palmer Road (Route 20), Brimfield in the summer 2011 (W2198). Analysis of this single years' worth of limited frequency data indicated 0% of intervals had GMs >630 cfu/100ml, no samples exceed the 1260 cfu/100ml STV, with an overall GM of 127cfu/100ml. The Secondary Contact Recreational Use for West Brook will continue to be assessed as Fully Supporting based on the *E. coli* bacteria sample data. An Alert for the aesthetic issue, however, (four observations of objectionable deposits --either minor trash or "trash, gravel from fairground pile going into stream) is being identified.	

Monitoring Stations

Station Code	Organization	Type	Water Body	Station Description	Latitude	Longitude
W2198	MassDEP	Water Quality	West Brook	[approximately 600 feet upstream from Palmer Road (Route 20), Brimfield]	42.123355	-72.206693

Bacteria Data

Bacteria Data Collected by MassDEP and External Data Providers 2011-2020 (90-day Interval Analysis) (MassDEP Undated 5) (MassDEP Undated 4)

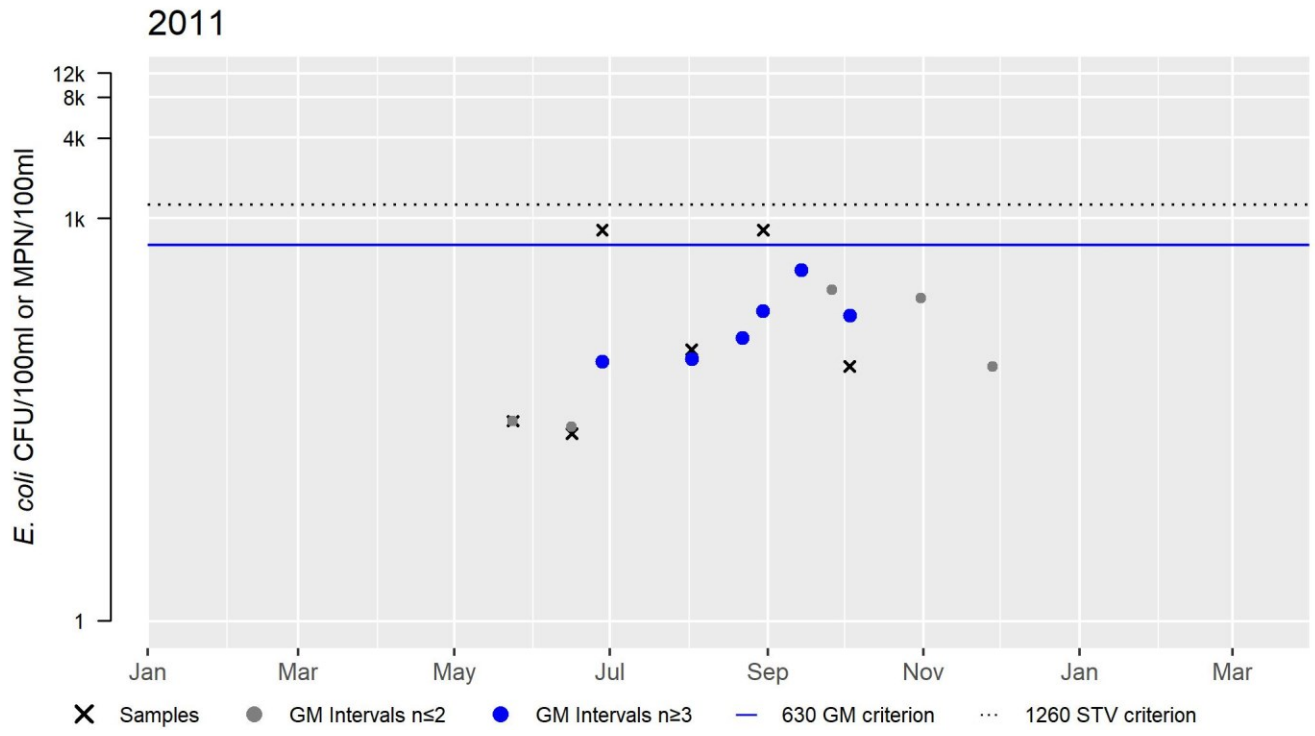
[Result units are CFU/100ml or MPN/100ml]

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)
W2198	MassDEP	E. coli	05/24/11	10/03/11	6	25	816	127

W2198 *E. coli* (90-day Interval), Secondary Contact Recreational Use Season

Var	Res
Samples	6
SeasGM	127
#GMI	6
#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



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