Appendix 17
Merrimack River Watershed and Coastal Drainage Area Assessment and Listing Decision Summary

Final Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle

CN: 505.1

November 2021

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2018/20 Cycle Impairment Changes

Waterbody	AU_ID	2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Back River	MA84A-16	5	5	(Fish Passage Barrier*)		Added
Beaver Brook	MA84A-11	5	5	Trash		Changed
Black Brook	MA84A-17	5	5	Trash		Changed
Cobbler Brook	MA84A-22	4c	5	Benthic Macroinvertebrates		Added
Cobbler Brook	MA84A-22	4c	5	Dissolved Oxygen		Added
Cobbler Brook	MA84A-22	4c	5	Lack of a coldwater assemblage		Added
Cobbler Brook	MA84A-22	4c	5	Temperature		Added
Cobbler Brook	MA84A-22	4c	5	Trash		Changed
Deep Brook	MA84A-21	5	5	Fish Bioassessments		Removed
Deep Brook	MA84A-21	5	5	Lack of a coldwater assemblage		Added
Deep Brook	MA84A-21	5	5	Temperature		Added
Flint Pond	MA84012	5	5	(Brittle Naiad, Najas Minor*)		Added
Forge Pond	MA84015	4a	4a	(Curly-leaf Pondweed*)		Added
Forge Pond	MA84015	4a	4a	(Fanwort*)		Added
Forge Pond	MA84015	4a	4a	(Non-Native Aquatic Plants*)		Removed
Forge Pond	MA84015	4a	4a	(Water Chestnut*)		Added
Knops Pond/Lost Lake	MA84084	4a	4a	(Fanwort*)		Added
Lake Gardner	MA84018	--	4c	(Fish Passage Barrier*)		Added
Lake Mascuppic	MA84037	4c	4c	(Curly-leaf Pondweed*)		Added
Lake Mascuppic	MA84037	4c	4c	(Fanwort*)		Added
Lake Mascuppic	MA84037	4c	4c	(Non-Native Aquatic Plants*)		Removed
Little River	MA84A-09	5	5	Trash		Changed
Long Pond	MA84032	5	5	(Curly-leaf Pondweed*)		Added
Long Pond	MA84032	5	5	(Non-Native Aquatic Plants*)		Removed
Massapoag Pond	MA84087	5	5	(Curly-leaf Pondweed*)		Added
Merrimack River	MA84A-01	5	5	(Fish Passage Barrier*)		Added
Merrimack River	MA84A-02	5	5	(Fish Passage Barrier*)		Added
Merrimack River	MA84A-03	5	5	(Fish Passage Barrier*)		Added
Nabnasset Pond	MA84044	5	5	(Curly-leaf Pondweed*)		Added
Newfield Pond	MA84046	5	5	(Curly-leaf Pondweed*)		Added

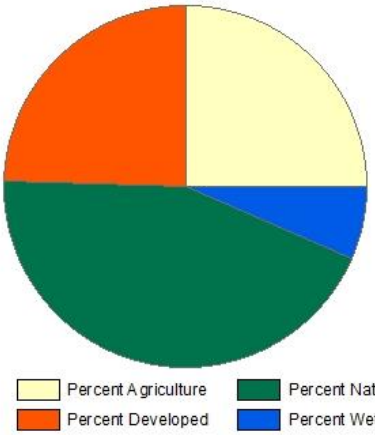
Waterbody	AU_ID	2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Newfield Pond	MA84046	5	5	(Fanwort*)		Added
Peppermint Brook	MA84A-35	5	5	Trash		Changed
Powwow River	MA84A-25	5	5	(Fish Passage Barrier*)		Added
Powwow River	MA84A-28	5	5	(Fish Passage Barrier*)		Added
South Branch Souhegan River	MA84A-31	5	5	Benthic Macroinvertebrates		Added
South Branch Souhegan River	MA84A-31	5	5	Temperature		Added
Spectacle Pond	MA84089	5	5	(Curly-leaf Pondweed*)		Added
Spectacle Pond	MA84089	5	5	(Fanwort*)		Added
Spectacle Pond	MA84089	5	5	(Water Chestnut*)		Added
Spicket River	MA84A-10	5	5	DDT in Fish Tissue		Added
Spicket River	MA84A-10	5	5	(Fish Passage Barrier*)		Added
Spicket River	MA84A-10	5	5	Mercury in Fish Tissue		Added
Spicket River	MA84A-10	5	5	Trash		Changed
Stony Brook	MA84B-04	5	5	(Dewatering*)		Added
Unnamed Tributary	MA84B-01	5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Added

Back River (MA84A-16)

Location:	New Hampshire state line, Amesbury to inlet Clarks Pond, Amesbury (prior to 2010 this segment extended to confluence with Powwow River).
AU Type:	RIVER
AU Size:	2.7 MILES
Classification/Qualifier:	B

Back River - MA84A-16

Watershed Area: 6.22 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.96	2.96	0.86	0.86
Agriculture	24.9%	24.9%	16.5%	16.5%
Developed	24.6%	24.6%	19.4%	19.4%
Natural	44%	44%	48.3%	48.3%
Wetland	6.5%	6.5%	15.8%	15.8%
Impervious Cover	7.46%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Fish Passage Barrier*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Based on MADMF Diadromous Fish Restoration Priority List (Population Status = 1, Passage Score = 10), the dam at the outlet Clark Pond obstructs diadromous fish migration. The Aquatic Life Use for Back River is assessed as not supporting due to fish migration barriers. Historic impairments retained.

Bailey Pond (MA84003)

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

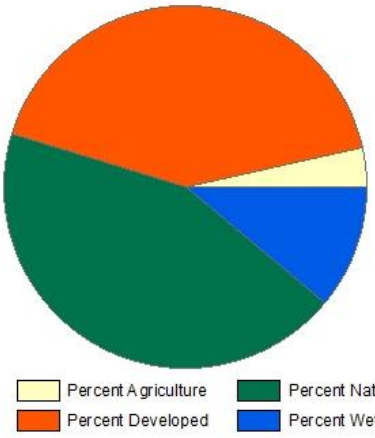
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for 2018.

Bare Meadow Brook (MA84A-18)

Location:	Headwaters, Methuen to confluence with Merrimack River, Methuen.
AU Type:	RIVER
AU Size:	3 MILES
Classification/Qualifier:	B

Bare Meadow Brook - MA84A-18

Watershed Area: 7.83 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	7.66	7.56	1.82	1.82
Agriculture	3.5%	3.5%	1.4%	1.4%
Developed	41.8%	41.9%	29.6%	29.6%
Natural	43.7%	43.5%	42.3%	42.3%
Wetland	11%	11.1%	26.6%	26.6%
Impervious Cover	15.69%			

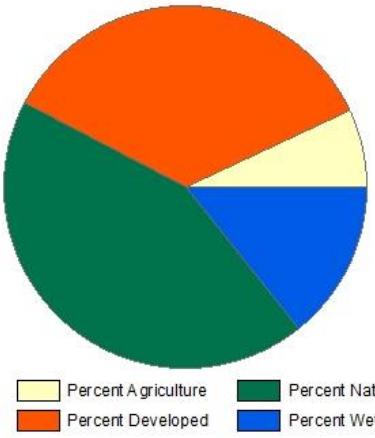
Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. Aquatic Life Use not assessed for Bare Meadow Brook. Historic impairments retained.

Bartlett Brook (MA84A-36)

Location:	New Hampshire state line, Dracut to inlet Mill Pond, Methuen.
AU Type:	RIVER
AU Size:	3.7 MILES
Classification/Qualifier:	B

Bartlett Brook - MA84A-36

Watershed Area: 6.79 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.58	5.58	2.09	2.09
Agriculture	6.9%	6.9%	9.6%	9.6%
Developed	35.4%	35.4%	26.7%	26.7%
Natural	43.5%	43.5%	40.1%	40.1%
Wetland	14.2%	14.2%	23.6%	23.6%
Impervious Cover	11.72%			

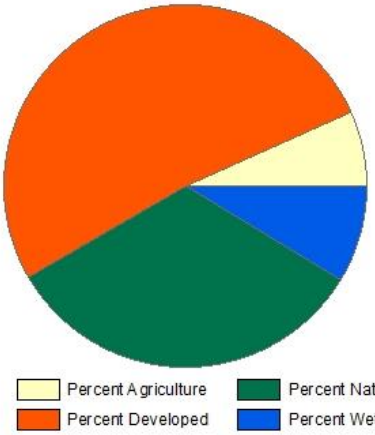
Fish, other Aquatic Life and Wildlife Use: Fully Supporting (Alert)
In 2008, MADFG collected fish community data at two low gradient sites. One site had three fluvial species while the other site had a macrohabitat generalist species which is moderately tolerant to pollution. The Aquatic Life Use for Bartlett Brook is assessed as support based on the MADFG fish data and previous assessments of support. The alert status due to the relatively low number of fluvial fish and habitat quality concerns related to flow and erosion/deposition problems is carried forward from the 2004 assessment report.

Beaver Brook (MA84A-11)

Location:	New Hampshire state line, Dracut to confluence with Merrimack River, Lowell.
AU Type:	RIVER
AU Size:	4.8 MILES
Classification/Qualifier:	B: CWF

Beaver Brook - MA84A-11

Watershed Area: 94.41 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.73	8.38	1.93	1.67
Agriculture	6.7%	6.9%	3.7%	4.2%
Developed	51.7%	53.6%	39.9%	38.7%
Natural	33%	30.1%	35.4%	33.6%
Wetland	8.6%	9.4%	21.1%	23.5%
Impervious Cover	18.89%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Trash		Changed

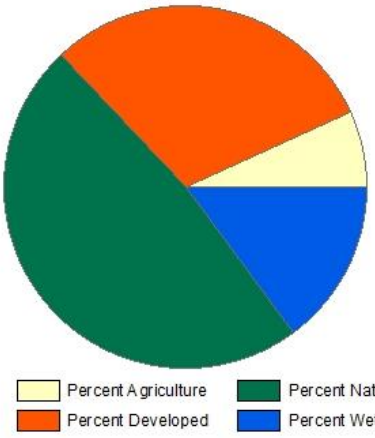
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Insufficient recent information exists to assess Aquatic Life Use for Beaver Brook. Historic impairments are retained

Beaver Brook (MA84B-02)

Location:	Outlet Mill Pond, Littleton to inlet Forge Pond, Westford.
AU Type:	RIVER
AU Size:	4.9 MILES
Classification/Qualifier:	B

Beaver Brook - MA84B-02

Watershed Area: 13.13 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	13.12	5.47	3.21	1.59
Agriculture	6.8%	4.5%	6.1%	4.1%
Developed	30.3%	40.8%	21.2%	26.5%
Natural	48.1%	41.2%	38.5%	36.3%
Wetland	14.8%	13.5%	34.2%	33.1%
Impervious Cover	10.87%			

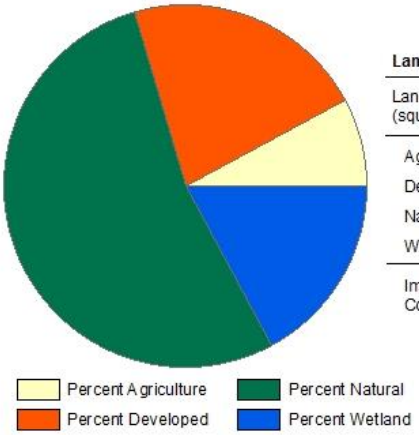
Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. Aquatic Life Use not assessed for Beaver Brook. Historic impairments retained.

Beaver Brook (MA84B-05)

Location:	Headwaters, outlet of "Wolf Swamp", Boxborough to inlet of Mill Pond, Littleton.
AU Type:	RIVER
AU Size:	5.5 MILES
Classification/Qualifier:	B

Beaver Brook - MA84B-05

Watershed Area: 5.96 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.95	3.91	1.41	0.79
Agriculture	7.9%	8.8%	7.4%	1.2%
Developed	21.7%	20.9%	16.7%	17.4%
Natural	53.4%	54.9%	40.2%	43.2%
Wetland	17.1%	15.3%	35.7%	38.2%
Impervious Cover	8.77%			

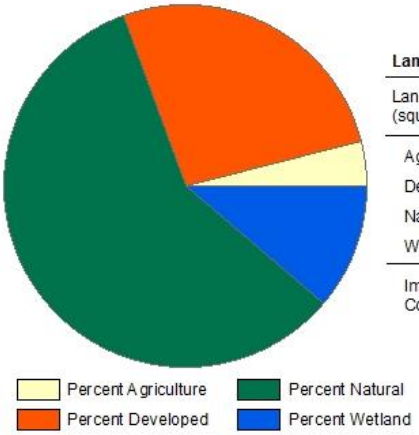
Fish, other Aquatic Life and Wildlife Use: Insufficient Information
Insufficient recent information exists to assess Aquatic Life Use for Beaver Brook.

Bennetts Brook (MA84B-06)

Location:	Headwaters, north of Route 2, Harvard to the inlet of Spectacle Pond, Ayer/Littleton.
AU Type:	RIVER
AU Size:	4.3 MILES
Classification/Qualifier:	B

Bennetts Brook - MA84B-06

Watershed Area: 4.66 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.65	4.15	1	1
Agriculture	4%	3.6%	2.6%	2.6%
Developed	26.5%	27.1%	19.3%	19.3%
Natural	58.2%	57%	46.8%	46.8%
Wetland	11.2%	12.3%	31.3%	31.3%
Impervious Cover	10.21%			

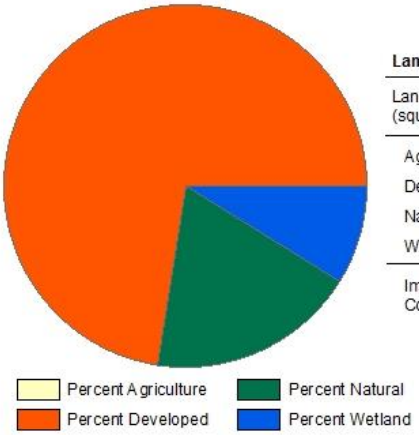
Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information. Aquatic Life Use not assessed for Bennetts Brook. Alert status due to the absence of any fluvial fish species is carried forward from the 2004 assessment report.

Black Brook (MA84A-17)

Location:	Headwaters, Chelmsford to confluence with Merrimack River, Lowell (approximately 500 feet culverted near mouth).
AU Type:	RIVER
AU Size:	2.3 MILES
Classification/Qualifier:	B

Black Brook - MA84A-17

Watershed Area: 3.28 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.28	3.28	0.53	0.53
Agriculture	0.4%	0.4%	0%	0%
Developed	72.3%	72.3%	61.3%	61.3%
Natural	18.6%	18.6%	22.6%	22.6%
Wetland	8.7%	8.7%	16.1%	16.1%
Impervious Cover	29.78%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Trash		Changed

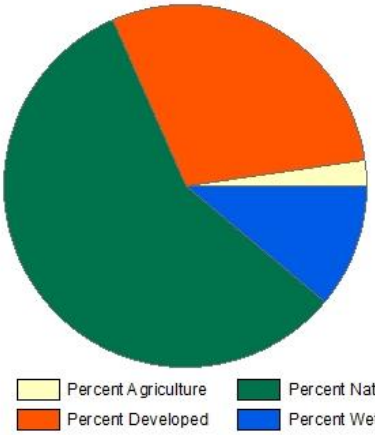
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Insufficient recent information exists to assess Aquatic Life Use for Black Brook. Historic impairments retained.

Bridge Meadow Brook (MA84A-34)

Location:	Headwaters, north of Chestnut Road, Tyngsborough to inlet Flint Pond, Tyngsborough.
AU Type:	RIVER
AU Size:	4 MILES
Classification/Qualifier:	B

Bridge Meadow Brook - MA84A-34

Watershed Area: 5.89 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.89	5.89	1.48	1.48
Agriculture	2.3%	2.3%	1.2%	1.2%
Developed	29.3%	29.3%	20.6%	20.6%
Natural	57.4%	57.4%	58.6%	58.6%
Wetland	11%	11%	19.6%	19.6%
Impervious Cover	9.18%			

Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information. Aquatic Life Use not assessed for Bridge Meadow Brook. The alert status due to low dissolved oxygen and the absence of any fluvial fish species is carried forward from the 2004 assessment report.

Chadwicks Pond (MA84006)

Location:	Haverhill/Boxford.
AU Type:	FRESHWATER LAKE
AU Size:	173 ACRES
Classification/Qualifier:	A: PWS, ORW

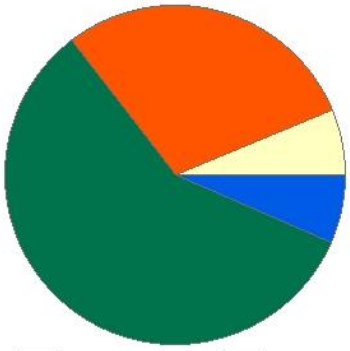
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for Chadwicks Pond

Cobbler Brook (MA84A-22)

Location:	Headwaters, Merrimac to confluence with Merrimack River, Merrimac.
AU Type:	RIVER
AU Size:	4.4 MILES
Classification/Qualifier:	B: CWF

Cobbler Brook - MA84A-22

Watershed Area: 3.43 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.4	3.17	0.99	0.92
Agriculture	6.2%	6%	4.6%	4.9%
Developed	29.2%	30%	23.2%	24.1%
Natural	58.1%	57.8%	59.3%	58.3%
Wetland	6.5%	6.1%	12.9%	12.7%
Impervious Cover	12.42%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	5	Benthic Macroinvertebrates		Added
4c	5	Dissolved Oxygen		Added
4c	5	Lack of a coldwater assemblage		Added
4c	5	Temperature		Added
4c	5	Trash		Changed

Fish, other Aquatic Life and Wildlife Use: Not Supporting

In 2010, MassDEP WPP collected physiochemical (W2160) and biological (fish - P0193 & macroinvertebrate - B0677) data at one site on Cobbler Brook. A multiprobe was deployed at the site on three occasions (June, July, August) for a duration of 5 days on each deploy to measure continuous dissolved oxygen. The mean daily minimum DO concentration violated the CALM cold water DO criterion (6.0 mg/L) on all three deployments (3.5, 4.1, and 4.8 mg/L, respectively). A temperature probe was deployed at the site for 118 days (approx. June through Sept.) to measure continuous temperature. The 7-DADM chronic CWF criterion (20 C) was violated on 98 times with a maximum 7-DADM of 32.6 C. The acute Tier 1 criterion (23.5 C) was also violated at 26.7 C. The benthic macroinvertebrate community was sampled and evaluated to be moderately impacted at the site. The fish community was sampled and no cold water species were collected at the site.

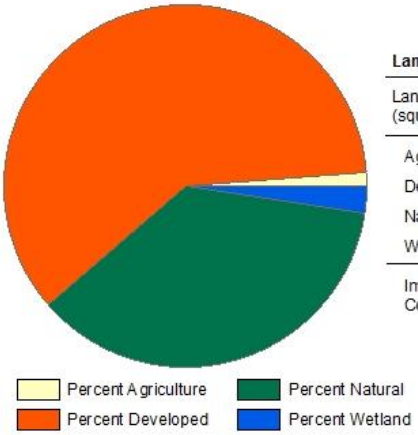
The Aquatic Life Use for Cobbler Brook is assessed as not supporting due to high temperatures, low dissolved oxygen, an impaired benthic community and an impaired fish community. **Note on source:** There are two impoundments on Cobbler Brook that are likely a contributing source to the impairments (e.g. riparian wetland creation - lower DO, higher temperature). One is an extremely undersized crossing (very old keystone bridge) just upstream of the site and the other to a lesser extent is a dam at East Main Street, downstream of the site.

COW POND BROOK (MA84A-41)

Location:	Headwaters outlet Whitney Pond, Groton to mouth at inlet Upper Massapoag Pond, Groton.
AU Type:	RIVER
AU Size:	2.3 MILES
Classification/Qualifier:	B

COW POND BROOK - MA84A-41

Watershed Area: 1.07 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.07	1.07	0.26	0.26
Agriculture	1.2%	1.2%	0%	0%
Developed	60.2%	60.2%	45.6%	45.6%
Natural	36.3%	36.3%	49.5%	49.5%
Wetland	2.4%	2.4%	4.9%	4.9%
Impervious Cover	15.94%			

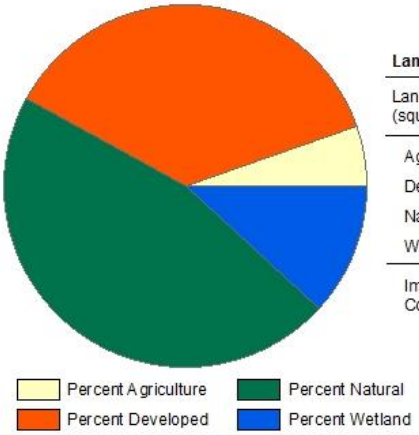
Fish, other Aquatic Life and Wildlife Use: Insufficient Information
Insufficient recent information exists to assess Aquatic Life Use for Cow Pond Brook.

Creek Brook (MA84A-37)

Location:	Headwaters, outlet Crystal Lake, Haverhill to confluence with Merrimack River, Haverhill.
AU Type:	RIVER
AU Size:	2.3 MILES
Classification/Qualifier:	B

Creek Brook - MA84A-37

Watershed Area: 5.5 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.96	4.96	1.66	1.66
Agriculture	5.3%	5.3%	2.8%	2.8%
Developed	36.7%	36.7%	23.4%	23.4%
Natural	46.2%	46.2%	55%	55%
Wetland	11.8%	11.8%	18.8%	18.8%
Impervious Cover	12.41%			

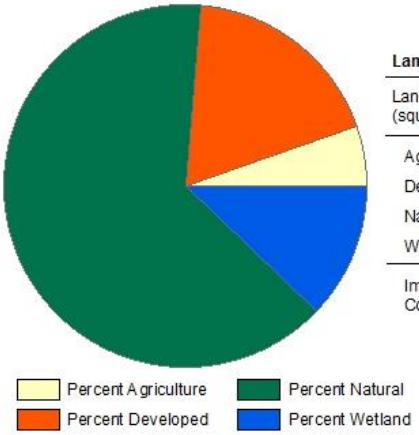
Fish, other Aquatic Life and Wildlife Use: Insufficient Information
Insufficient recent information exists to assess the Aquatic Life Use for Creek Brook.

CROOKED SPRINGS BROOK (MA84B-09)

Location:	Headwaters, perennial portion east of Eagle Nest Road, Chelmsford to mouth at confluence with Stony Brook, Chelmsford.
AU Type:	RIVER
AU Size:	1.3 MILES
Classification/Qualifier:	B

CROOKED SPRINGS BROOK - MA84B-09

Watershed Area: 9.94 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.93	9.93	1.49	1.49
Agriculture	5.3%	5.3%	3.3%	3.3%
Developed	18.3%	18.3%	17.1%	17.1%
Natural	64.3%	64.3%	58.6%	58.6%
Wetland	12.1%	12.1%	21%	21%
Impervious Cover	5.74%			

Fish, other Aquatic Life and Wildlife Use: Fully Supporting
In 2010, MADFG collected fish community data at two sites. Both sites were dominated by eastern brook trout (83% and 93% of samples) of varying size classes. Eastern brook trout are a cold water species classified as a fluvial specialist and pollution intolerant and the presence of a reproducing eastern brook trout population is indicative of excellent water quality. The Aquatic Life Use for Crooked Springs Brook is assessed as support based on the presence of a reproducing eastern brook trout population.

Crystal Lake (MA84010)

Location:	Haverhill.
AU Type:	FRESHWATER LAKE
AU Size:	161 ACRES
Classification/Qualifier:	A: PWS, ORW

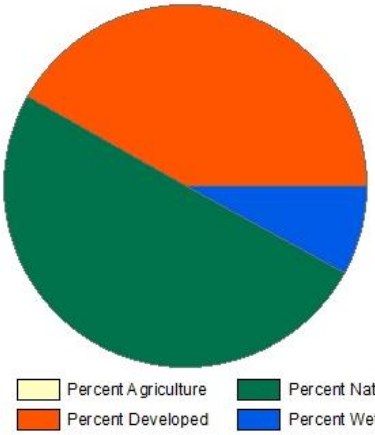
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for Crystal Lake.

Deep Brook (MA84A-21)

Location:	Headwaters east of Everett Turnpike, Tyngsborough to confluence with Merrimack River, Chelmsford.
AU Type:	RIVER
AU Size:	2.9 MILES
Classification/Qualifier:	B

Deep Brook - MA84A-21

Watershed Area: 2.62 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.62	2.62	0.72	0.72
Agriculture	0.2%	0.2%	0.9%	0.9%
Developed	41.7%	41.7%	32.9%	32.9%
Natural	50.1%	50.1%	49.4%	49.4%
Wetland	7.9%	7.9%	16.7%	16.7%
Impervious Cover	19.66%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Fish Bioassessments		Removed
5	5	Lack of a coldwater assemblage		Added
5	5	Temperature		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting

In 2010, MassDEP WPP collected physiochemical (W2159) and biological (fish - P0192 & macroinvertebrate - B0676) data at one site on Deep Brook. In addition, MA DFG collected fish community sampling in 2010 at one site and 2011 at one site. Historical fish data from 1990 indicated a reproducing eastern brook trout population once existed in Deep Brook. As a result, this segment is Tier 1 existing use water. None of the three fish community samples collected by MA DFG and MassDEP from 2010 and 2011 contained coldwater species. A multiprobe was deployed at the site on three occasions (June, August) for a duration of 5 days on each deploy to measure continuous dissolved oxygen. There were no violations of the CWF DO criteria. A temperature probe was deployed at the site for 121 days (approx. June through Sept.) to measure continuous temperature. The 7-DADM chronic Tier 1 criterion (20 C) was violated 14 times with a maximum 7-DADM of 20.9 C. The acute Tier 1 criterion (23.5 C) was not violated at the site. The benthic macroinvertebrate community was sampled and evaluated to be slightly/not impacted (85% comparable) at the site compared to the Johnson Creek reference site (B0688).

The Aquatic Life Use for Deep Brook is assessed as not supporting due to elevated temperatures and the lack of a coldwater assemblage. The benthic macroinvertebrate bioassessment impairment is also being carried forward until more recent data are collected to confirm the appropriateness of delisting.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Fish Bioassessments	Clarification of listing cause	Historical fish data from 1990 indicated a reproducing eastern brook trout population once existed in Deep Brook. As a result, this segment is Tier 1 existing use water. It was determined that Lack of a coldwater assemblage was a more accurate cause and replaces the previous Fishes Bioassessment cause.

Supporting Information for Delisted Impairments

Fish Bioassessments

More recent data (below) continue to show a lack of cold water species. Since historical fish data from 1990 indicated a reproducing eastern brook trout population once existed in Deep Brook the impairment is being changed to "Lack of a coldwater assemblage" rather than "Fishes Bioassessment".

Data Source (MassDFG 2014):

MA84A-21 - Deep Brook

Merrimack Fish Population Data from DFG Database

Station Description	Deep Brook -- Ledge Rd downstream, just S of Dunstable Rd, Chelmsford (42.6468, 71.40664)							
Habitat Comments								
Efficiency	(Seconds Shocked - 364)							
Sample Date	**Species**	3						
07/19/11	**Total Ind**	5						
Method	**% Dom**	40%						
Backpack Shocking	**Habitat**	**Species**	**% Ind**		**Temp**	**Species**	**%Ind**	
Saris/Palis	FS	0	0%		C	0	0%	
8451550	FD	0	0%		CW	0	0%	
	MG	3	100%		W	1	20%	
	Tolerant	**Species**	**% Ind**		WB	2	80%	
	I	1	40%					
	M	0	0%					
	T	2	60%					
	SampleID	3734						

Common Name	Fish Code	Count	Min Length	Max Length	Temp	FG	PT	Function

Brown bullhead	BB	1	88	88	W	MG	T	Generalist Feeder
Yellow bullhead	YB	2	130	138	WB	MG	T	Generalist Feeder
Banded sunfish	BS	2	71	76	WB	MG	I	Water Column Insectivore

Data Source (MassDFG 2014):

MA84A-21 - Deep Brook

Merrimack Fish Population Data from DFG Database

Station Description	Deep Brook -- Stone Hill Rd xing downstream, Chelmsford (42.6459, 71.41094)
Habitat Comments	One big, deep pool at culvert
Efficiency	(Seconds Shocked - 538)

Sample Date	**Species**	5
07/19/11	**Total Ind**	27
Method	**% Dom**	48%
Backpack Shocking		
Saris/Palis		
8451550		

Habitat	**Species**	**% Ind**
FS	1	7%
FD	0	0%
MG	4	93%

Tolerant	**Species**	**% Ind**
I	1	22%
M	2	56%
T	2	22%

SampleID	3735

Temp	**Species**	**%Ind**
C	0	0%
CW	1	7%
W	2	52%
WB	2	41%

Common Name	**Fish Code**	**Count**	**Min Length**	**Max Length**	**Temp**	**FG**	**PT**	**Function**
Fallfish	F	2	105	123	CW	FS	M	Generalist Feeder
Golden shiner	GS	1	98	98	W	MG	T	Generalist Feeder
Pumpkinseed	P	13	58	100	W	MG	M	Generalist Feeder
Yellow bullhead	YB	5	123	148	WB	MG	T	Generalist Feeder
Banded sunfish	BS	6	55	70	WB	MG	I	Water Column Insectivore

Data Source (MassDFG 2014):

MA84A-21 - Deep Brook

Merrimack Fish Population Data from DFG Database

Station Description	Deep Brook -- ~500ft DS of Ledge Rd, DEP station MA109A-118, Chelmsford (42.64642, 71.40504)

Habitat Comments	DEP survey.
Efficiency	(Seconds Shocked - 997)

Sample Date	**Species**	5
08/13/10	**Total Ind**	28
Method	**% Dom**	82%

DEP Backpack Shocking

Saris/Palis

8451550

Habitat	**Species**	**% Ind**
FS	0	0%
FD	1	7%
MG	4	93%

Tolerant	**Species**	**% Ind**
I	1	82%
M	1	4%
T	3	14%

SampleID	4554

Temp	**Species**	**%Ind**
C	0	0%
CW	1	7%
W	3	11%
WB	1	82%

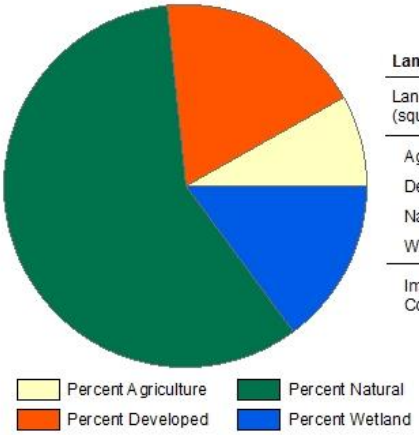
Common Name	**Fish Code**	**Count**	**Min Length**	**Max Length**	**Temp**	**FG**	**PT**	**Function**
Brown bullhead	BB	1	96	96	W	MG	T	Generalist Feeder
Golden shiner	GS	1	49	49	W	MG	T	Generalist Feeder
Pumpkinseed	P	1	160	160	W	MG	M	Generalist Feeder
White sucker	WS	2	72	78	CW	FD	T	Generalist Feeder
Banded sunfish	BS	23	49	72	WB	MG	I	Water Column Insectivore

East Meadow River (MA84A-39)

Location:	Headwaters, outlet Neal Pond, Haverhill to inlet Millvale Reservoir, Haverhill.
AU Type:	RIVER
AU Size:	3 MILES
Classification/Qualifier:	A: PWS, ORW

East Meadow River - MA84A-39

Watershed Area: 7.08 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.85	5.67	3.39	3.28
Agriculture	8.1%	8%	6.3%	6.1%
Developed	18.5%	18.7%	16.4%	16.5%
Natural	58.5%	58.1%	54.4%	54%
Wetland	14.9%	15.2%	22.9%	23.4%
Impervious Cover	8.26%			

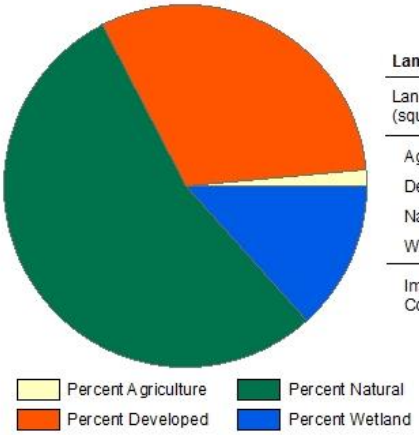
Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information. Aquatic Life Use not assessed for 2018. The alert status due to low dissolved oxygen is carried forward from the 2004 assessment report.

Fish Brook (MA84A-40)

Location:	Headwaters, east of Greenwood Road, Andover to confluence with Merrimack River at Fish Brook Dam (NAT ID: MA02265), Andover.
AU Type:	RIVER
AU Size:	4.1 MILES
Classification/Qualifier:	A: PWS, ORW

Fish Brook - MA84A-40

Watershed Area: 6.11 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	6.01	4.56	3.05	2.35
Agriculture	1.4%	1.2%	1.3%	1.2%
Developed	31.2%	25.3%	24.1%	18.6%
Natural	54.2%	58.6%	53.4%	56.7%
Wetland	13.3%	14.8%	21.2%	23.6%
Impervious Cover	11.65%			

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Insufficient recent information exists to assess Aquatic Life Use for Fish Brook. Historic impairments are retained.

Flint Pond (MA84012)

Location:	Tyngsborough.
AU Type:	FRESHWATER LAKE
AU Size:	72 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Brittle Naiad, Najas Minor*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. Aquatic Life Use not assessed for Flint Pond. Historic impairments (non-native aquatic macrophytes, *Myriophyllum heterophyllum* and *Najas minor*) retained.

Forest Lake (MA84014)

Location:	Methuen.
AU Type:	FRESHWATER LAKE
AU Size:	48 ACRES
Classification/Qualifier:	B

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for Forest Lake.

Forge Pond (MA84015)

Location:	Westford/Littleton.
AU Type:	FRESHWATER LAKE
AU Size:	203 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	(Curly-leaf Pondweed*)		Added
4a	4a	(Fanwort*)		Added
4a	4a	(Non-Native Aquatic Plants*)		Removed
4a	4a	(Water Chestnut*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting (Alert)
No recent information. Aquatic Life Use not assessed for Forge Pond. Historic impairments (non-native aquatic macrophytes, *Potamogeton crispus, Cabomba caroliniana*, *Trapa natans*) retained. Alert added due to potential infestation of *Myriophyllum spicatum*.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Non-Native Aquatic Plants	Clarification of listing cause	The generic "Non-Native Aquatic Plants" is not needed since the specific macrophytes Curly-leaf pondweed (Potamogeton crispus), Cabomba caroliniana (fanwort), and Water chestnut (Trapa natans) have been utilized.

Supporting Information for Delisted Impairments

Non-Native Aquatic Plants

The non-native aquatic macrophytes, *Potamogeton crispus* and *Cabomba caroliniana*, were observed in Forge Pond (MA84015) during a diagnostic/feasibility study (Baystate Environmental 1987). DCR records also indicate that *Trapa natans* and *Myriophyllum spicatum* are present in the pond, (MassDCR 2008) but confirmation by DEP staff is needed in the case of *Myriophyllum spicatum*. The generic "Non-Native Aquatic Plants" impairment is not needed since the specific macrophytes Curly-leaf pondweed (Potamogeton crispus), Cabomba caroliniana (fanwort), and Water chestnut (Trapa natans) have been utilized.

Haggets Pond (MA84022)

Location:	Andover.
AU Type:	FRESHWATER LAKE
AU Size:	211 ACRES
Classification/Qualifier:	A: PWS, ORW

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for Haggets Pond.

Hoveys Pond (MA84025)

Location:	Boxford.
AU Type:	FRESHWATER LAKE
AU Size:	36 ACRES
Classification/Qualifier:	A: PWS, ORW

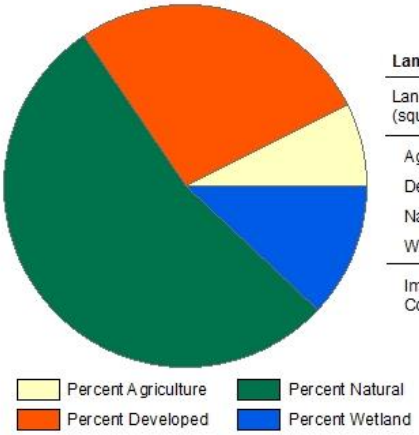
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for Hoveys Pond.

Johnson Creek (MA84A-15)

Location:	Headwaters, Groveland (excluding intermittent portion) to confluence with Merrimack River, Groveland/Haverhill.
AU Type:	RIVER
AU Size:	1.1 MILES
Classification/Qualifier:	B

Johnson Creek - MA84A-15

Watershed Area: 9.5 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	9.48	9.27	3.9	3.76
Agriculture	7.4%	7.5%	10%	10.2%
Developed	27.1%	27.2%	20.8%	20.8%
Natural	53.5%	53.2%	52.8%	52.4%
Wetland	12%	12.1%	16.3%	16.6%
Impervious Cover	8.91%			

Fish, other Aquatic Life and Wildlife Use: Fully Supporting
In 2010, MassDEP WPP collected physiochemical (W2161) and biological (fish - P0194 & macroinvertebrate - B0688) data at one site on Johnson Creek. A multiprobe was deployed at the site on three occasions (June, July, August) for a duration of 5 days on each deploy to measure continuous dissolved oxygen. There were no violations of the WWF DO criteria. A temperature probe was deployed at the site for 118 days (approx. June through Sept.) to measure continuous temperature. There were no violations of the WWF temperature criteria. The benthic macroinvertebrate community was sampled and evaluated to be not impacted at the site. The fish community was sampled and multiple fluvial species (24% of individuals) were collected at the site. Aquatic Life Use for Johnson Creek is assessed as supporting due to the physiochemical and biological data.

Johnsons Pond (MA84027)

Location:	Groveland/Boxford.
AU Type:	FRESHWATER LAKE
AU Size:	194 ACRES
Classification/Qualifier:	A: PWS, ORW

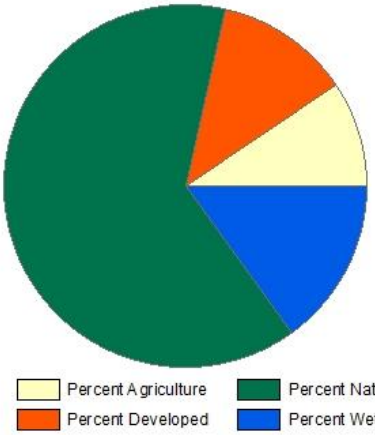
Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. Aquatic Life Use not assessed for Johnsons Pond. Historic impairments retained.

Joint Grass Brook (MA84A-32)

Location:	Headwaters, between Hollis Street and Hauk Swamp, Dunstable to the confluence with Salmon Brook, Dunstable.
AU Type:	RIVER
AU Size:	3.2 MILES
Classification/Qualifier:	B

Joint Grass Brook - MA84A-32

Watershed Area: 2.89 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.78	2.78	0.62	0.62
Agriculture	9.4%	9.4%	8.5%	8.5%
Developed	12.1%	12.1%	7.6%	7.6%
Natural	63.5%	63.5%	54.5%	54.5%
Wetland	15%	15%	29.4%	29.4%
Impervious Cover	2.86%			

Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information. Aquatic Life Use not assessed for Joint Grass Brook. The alert status due to the absence of any fluvial fish species is carried forward from the 2004 assessment report.

Kenoza Lake (MA84028)

Location:	Haverhill.
AU Type:	FRESHWATER LAKE
AU Size:	240 ACRES
Classification/Qualifier:	A: PWS, ORW

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. Aquatic Life Use not assessed for Kenoza Lake.

Knops Pond/Lost Lake (MA84084)

Location:	Groton.
AU Type:	FRESHWATER LAKE
AU Size:	187 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4a	4a	(Fanwort*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. Aquatic Life Use not assessed for Knops Pond/Lost Lake. Historic impairments (non-native aquatic macrophytes, *Cabomba caroliniana, Myriophyllum heterophyllum, Myriophyllum spicatum*) retained.

Lake Attitash (MA84002)

Location:	Amesbury/Merrimac.
AU Type:	FRESHWATER LAKE
AU Size:	369 ACRES
Classification/Qualifier:	A: PWS, ORW

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. The Aquatic Life Use is not assessed for Lake Attitash.

Lake Cochichewick (MA84008)

Location:	North Andover.
AU Type:	FRESHWATER LAKE
AU Size:	575 ACRES
Classification/Qualifier:	A: PWS, ORW

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. The Aquatic Life Use is not assessed for Lake Cochichewick.

Lake Gardner (MA84018)

Location:	Amesbury (size indicates portion in Massachusetts) (formerly part of 2000 segment: Powwow River MA84A-07).
AU Type:	FRESHWATER LAKE
AU Size:	96 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
--	4c	(Fish Passage Barrier*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Based on MADMF Diadromous Fish Restoration Priority List, the Mill Street Dam (Population Status = 1, Passage Score = 8) and Lake Gardner Dam (Population Status = 0 *[0 because of Mill Street Dam*], Passage Score = 10) obstructs diadromous fish migration into this segment. The Aquatic Life Use for Lake Gardner is assessed as not supporting due to fish migration barriers.

Lake Mascuppic (MA84037)

Location:	Tyngsborough/Dracut.
AU Type:	FRESHWATER LAKE
AU Size:	210 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
4c	4c	(Curly-leaf Pondweed*)		Added
4c	4c	(Fanwort*)		Added
4c	4c	(Non-Native Aquatic Plants*)		Removed

Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. Aquatic Life Use not assessed for Lake Mascuppic. Historic impairment (non-native aquatic macrophytes, *Potamogeton crispus* and *Cabomba caroliniana*) retained.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Non-Native Aquatic Plants	Clarification of listing cause	The generic "Non-Native Aquatic Plants" is not needed since the specific macrophytes "Curly-leaf pondweed (Potamogeton crispus) and Fanwort (Cabomba caroliniana) have been utilized.

Supporting Information for Delisted Impairments

Non-Native Aquatic Plants

According to the MassDEP herbicide database, the Town of Tyngsborough treated Lake Mascuppic (MA84037) for two non-native aquatic macrophytes, *Potamogeton crispus* and *Cabomba caroliniana*, every year from 2006 to 2016 (MassDEP 2017). The generic impairment "Non-Native Aquatic Plants" is not needed since the specific macrophytes "Curly-leaf pondweed" (Potamogeton crispus) and "Fanwort" (Cabomba caroliniana) have been utilized.

Lake Pentucket (MA84051)

Location:	Haverhill.
AU Type:	FRESHWATER LAKE
AU Size:	38 ACRES
Classification/Qualifier:	A: PWS, ORW

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. The Aquatic Life Use is not assessed for Lake Pentucket.

Lake Saltonstall (MA84059)

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

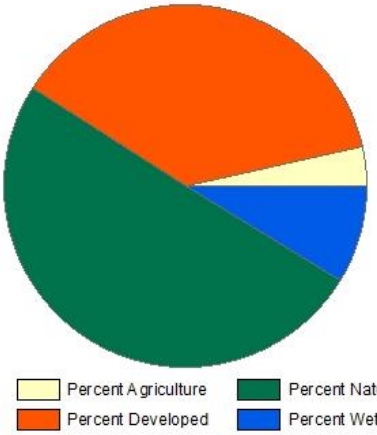
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. The Aquatic Life Use is not assessed for Lake Saltonstall.

Lawrence Brook (MA84A-20)

Location:	Headwaters, Tyngsborough (excluding intermittent portion) to confluence with Merrimack River, Tyngsborough.
AU Type:	RIVER
AU Size:	2 MILES
Classification/Qualifier:	B

Lawrence Brook - MA84A-20

Watershed Area: 3.38 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	3.38	3.38	0.9	0.9
Agriculture	3.5%	3.5%	5.5%	5.5%
Developed	37.5%	37.5%	34.4%	34.4%
Natural	50.4%	50.4%	44.7%	44.7%
Wetland	8.7%	8.7%	15.5%	15.5%
Impervious Cover	12.37%			

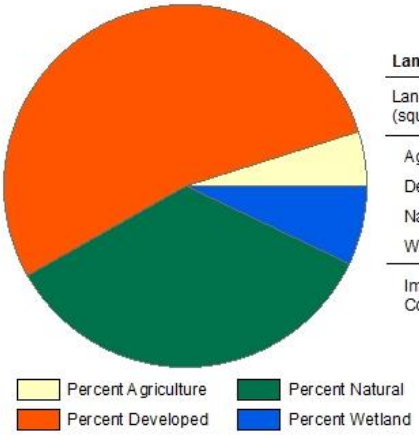
Fish, other Aquatic Life and Wildlife Use: Insufficient Information (Alert)
Insufficient recent information exists to assess Aquatic Life Use for Lawrence Brook. In 2012, MADFG attempted to collected fish community data at one site. The site was located in the upper reaches of the stream and may not be representative of the segment. No fish were collected during the survey. It was noted that the water levels in the stream were low at the time of the survey so it is uncertain if the lack of fish may be due to pollution or the naturally low water levels observed in the upper reaches. Alert.

Little River (MA84A-09)

Location:	New Hampshire state line, Haverhill to confluence with Merrimack River, Haverhill (approximately 200 feet culverted at mouth).
AU Type:	RIVER
AU Size:	4.6 MILES
Classification/Qualifier:	B: WWF

Little River - MA84A-09

Watershed Area: 28.15 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	6.64	5.13	1.47	1.03
Agriculture	4.8%	2.4%	6.1%	3.4%
Developed	53.4%	63.9%	29%	35.5%
Natural	34.8%	27.2%	47.4%	42.8%
Wetland	7%	6.5%	17.5%	18.3%
Impervious Cover	23.16%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Trash		Changed

Fish, other Aquatic Life and Wildlife Use: Not Supporting

In 2010, MassDEP WPP collected physiochemical (W2162) and biological (fish - P0195 & macroinvertebrate - B0693) data at one site on Little River ~300m US of I-495 in Haverhill. A multiprobe was deployed at the site on three occasions (June, July, August) for a duration of 5 days on each deploy to measure continuous dissolved oxygen. There were no violations of the WWF DO criteria. A temperature probe was deployed at the site for 118 days (approx. June through Sept.) to measure continuous temperature. There were no violations of the WWF temperature criteria. The benthic macroinvertebrate community was sampled and evaluated to be slightly impacted at the site. The fish community was sampled and multiple fluvial species (67% of individuals) were collected at the site.

Although the majority of the Little River supports the Aquatic Life Use, the lower 0.4 mi. is culverted underground and, therefore the Aquatic Life Use will continue to be assessed as Not Supporting due to "Habitat Assessment".

Locust Pond (MA84031)

Location:	Tyngsborough.
AU Type:	FRESHWATER LAKE
AU Size:	16 ACRES
Classification/Qualifier:	B

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information. The Aquatic Life Use is not assessed for Locust Pond.

Long Pond (MA84032)

Location:	Dracut/Tyngsborough (size indicates portion in Massachusetts).
AU Type:	FRESHWATER LAKE
AU Size:	137 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added
5	5	(Non-Native Aquatic Plants*)		Removed

Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. The Aquatic Life Use for Long Pond is assessed as not supporting since the historic impairment (non-native aquatic macrophyte, *Potamogeton crispus*) is being retained.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Non-Native Aquatic Plants	Clarification of listing cause	Impairment changed from the generic "Non-Native Aquatic Plants" to the specific macrophyte "Curly-leaf Pondweed" (Potamogeton crispus).

Supporting Information for Delisted Impairments

Non-Native Aquatic Plants

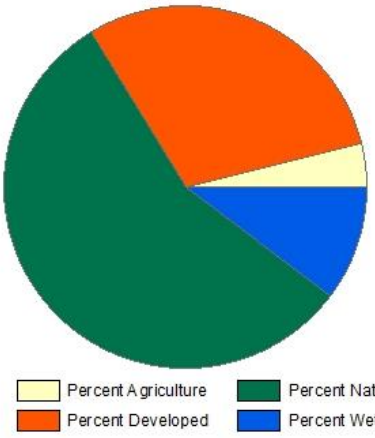
The MassDEP Herbicide Database indicates that the non-native aquatic macrophyte, *Potamogeton crispus*, has been treated by the town of Dracut from 2005-2009 (MassDEP 2017). The impairment was changed from the generic "Non-Native Aquatic Plants" to the specific macrophyte "Curly-leaf Pondweed" (Potamogeton crispus).

Lowell Canals (MA84A-29)

Location:	Canal system near Pawtucket Falls, Lowell.
AU Type:	RIVER
AU Size:	4.9 MILES
Classification/Qualifier:	B: TWS, WWF, CSO

Lowell Canals - MA84A-29

Watershed Area: 361.75 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	107.37	6.25	27.31	2.08
Agriculture	3.9%	0.2%	3.4%	0.1%
Developed	29.8%	65.3%	24.4%	53.8%
Natural	56.1%	26.2%	51.6%	34.3%
Wetland	10.2%	8.3%	20.5%	11.8%
Impervious Cover	11.34%			

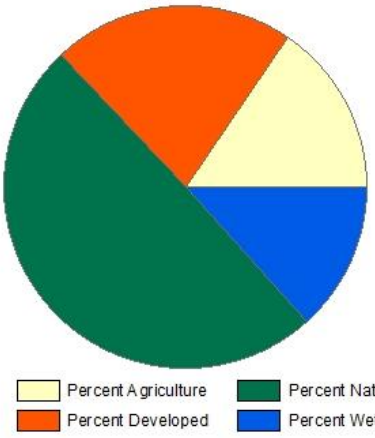
Fish, other Aquatic Life and Wildlife Use: Insufficient Information
Insufficient recent information exists to assess the Aquatic Life Use for the Lowell Canals.

Martins Pond Brook (MA84A-19)

Location:	Headwaters outlet Martins Pond, Groton to inlet Lost Lake, Groton.
AU Type:	RIVER
AU Size:	2.3 MILES
Classification/Qualifier:	B

Martins Pond Brook - MA84A-19

Watershed Area: 2.1 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.1	2.1	0.39	0.39
Agriculture	15.4%	15.4%	4.9%	4.9%
Developed	21.6%	21.6%	14.1%	14.1%
Natural	49.7%	49.7%	52.2%	52.2%
Wetland	13.3%	13.3%	28.8%	28.8%
Impervious Cover	5.61%			

Fish, other Aquatic Life and Wildlife Use: Insufficient Information
Insufficient recent information exists to assess Aquatic Life Use for Martins Pond Brook.

Massapoag Pond (MA84087)

Location:	Dunstable/Groton/Tyngsborough.
AU Type:	FRESHWATER LAKE
AU Size:	111 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added

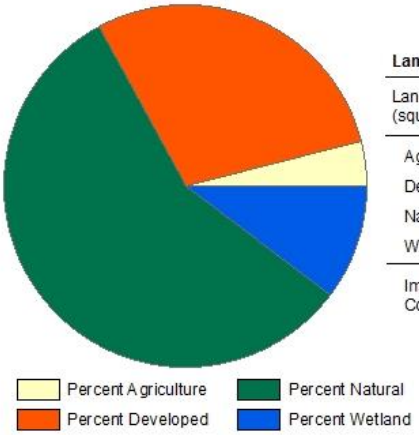
Fish, other Aquatic Life and Wildlife Use: Not Supporting
No recent information. The Aquatic Life Use for Massapoag Pond assessed as not supporting based on the historic impairments (low DO, non-native aquatic macrophytes, *Potamogeton crispus* and *Myriophyllum heterophyllum*) which are being retained.

Merrimack River (MA84A-01)

Location:	State line at Hudson, NH/Tyngsborough, MA to Pawtucket Dam (NAT ID: MA00837), Lowell.
AU Type:	RIVER
AU Size:	9 MILES
Classification/Qualifier:	B: TWS, WWF, CSO

Merrimack River - MA84A-01

Watershed Area: 360.09 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	105.71	10.59	26.7	3
Agriculture	4%	0.7%	3.5%	0.6%
Developed	28.9%	51.3%	23.1%	38.5%
Natural	56.8%	38%	52.3%	45.1%
Wetland	10.3%	10%	21%	15.7%
Impervious Cover	10.54%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Fish Passage Barrier*)		Added

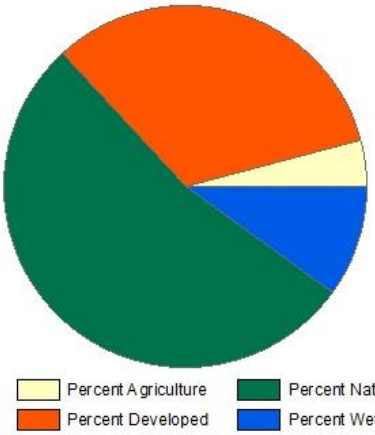
Fish, other Aquatic Life and Wildlife Use: Not Supporting (Alert)
Based on MADMF Diadromous Fish Restoration Priority List (Population Status = 8, Passage Score = 5), the Pawtucket Dam obstructs diadromous fish migration. The Aquatic Life Use is assessed as not supporting for this Merrimack River AU (MA84A-01) due to fish migration barriers. The alert status for total phosphorus is being retained (see 2004 Merrimack assessment report).

Merrimack River (MA84A-02)

Location:	Pawtucket Dam (NAT ID: MA00837), Lowell to Lowell Regional Wastewater Utilities (NPDES# MA0100633) outfall at Duck Island, Lowell.
AU Type:	RIVER
AU Size:	3.2 MILES
Classification/Qualifier:	B: TWS, WWF, CSO

Merrimack River - MA84A-02

Watershed Area: 458.96 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	119.9	9.09	29.72	2.38
Agriculture	4.1%	2.1%	3.4%	0.6%
Developed	32.7%	70.8%	25.6%	52.8%
Natural	53.3%	21.9%	50.7%	36.1%
Wetland	9.9%	5.3%	20.2%	10.5%
Impervious Cover	12.58%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Fish Passage Barrier*)		Added

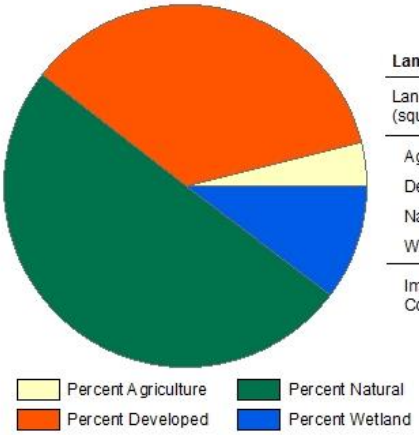
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Based on MADMF Diadromous Fish Restoration Priority List, the Essex Dam (Population Status = 8, Passage Score = 5) obstructs diadromous fish migration on the downstream Merrimack River AU (MA84A-03) thus migration is obstructed for this AU (MA84A-02). In addition, the Pawtucket Dam (Population Status = 8, Passage Score = 5) obstructs fish migration into the upstream Merrimack River AU (MA84A-01). The Aquatic Life Use is assessed as not supporting as a result of these fish migration barriers as well as the historic impairments which are being retained. [Note: the dewatering impairment was remapped from low flow alterations during the 2016 IR reporting cycle as part of the conversion from the ADB to the ATTAINS database.]

Merrimack River (MA84A-03)

Location:	Lowell Regional Wastewater Utilities (NPDES# MA0100633) outfall at Duck Island, Lowell to Essex Dam (NAT ID: MA00234), Lawrence.
AU Type:	RIVER
AU Size:	8.8 MILES
Classification/Qualifier:	B: TWS, WWF, CSO

Merrimack River - MA84A-03

Watershed Area: 494.23 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	153.83	8.7	41.91	2.82
Agriculture	3.9%	0.8%	3.5%	0.9%
Developed	35.6%	59.5%	26.4%	28.3%
Natural	50.3%	33%	50.2%	57.3%
Wetland	10.2%	6.7%	19.9%	13.6%
Impervious Cover	14.03%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Fish Passage Barrier*)		Added

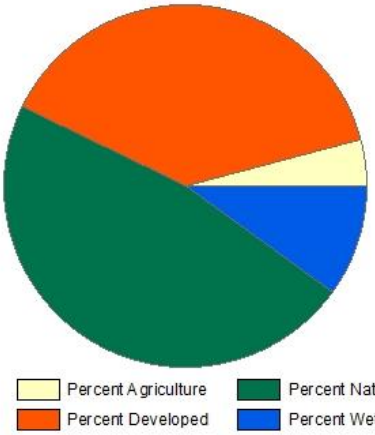
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Based on MADMF Diadromous Fish Restoration Priority List (Population Status = 8, Passage Score = 5), the Essex Dam obstructs diadromous fish migration. The Aquatic Life Use is assessed as not supporting for this Merrimack River AU (MA84A-03) due to the fish migration barrier as well as the historic impairments which are being retained.

Merrimack River (MA84A-04)

Location:	Essex Dam (NAT ID: MA00234), Lawrence to confluence with Little River, Haverhill.
AU Type:	RIVER
AU Size:	10 MILES
Classification/Qualifier:	B: WWF, CSO

Merrimack River - MA84A-04

Watershed Area: 682.67 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	197.68	9.95	54.99	3.16
Agriculture	4.1%	7.3%	3.8%	6.2%
Developed	38.7%	48.8%	27.8%	30.8%
Natural	47.3%	39.3%	49.7%	55%
Wetland	9.9%	4.6%	18.8%	8%
Impervious Cover	15.93%			

Fish, other Aquatic Life and Wildlife Use: Not Supporting
There are too limited recent data available to assess the Aquatic Life Use for this Merrimack River AU (MA84A-04) but the historic impairments are being retained.

Merrimack River (MA84A-05)

Location:	Confluence Little River, Haverhill to confluence Indian River, West Newbury/Amesbury.
AU Type:	ESTUARY
AU Size:	1.83 SQUARE MILES
Classification/Qualifier:	SB: SFR, CSO

Fish, other Aquatic Life and Wildlife Use: Not Supporting
There is insufficient recent information to assess the Aquatic Life Use for this Merrimack River AU (MA84A-05) but the historic impairment is being retained.

Merrimack River (MA84A-06)

Location:	Confluence Indian River, West Newbury/Amesbury to mouth at Atlantic Ocean, Newburyport/Salisbury (includes Back River, Salisbury).
AU Type:	ESTUARY
AU Size:	4.46 SQUARE MILES
Classification/Qualifier:	SB: SFR, CSO

Fish, other Aquatic Life and Wildlife Use: Not Supporting
There is insufficient recent information to assess the Aquatic Life Use for this Merrimack River AU (MA84A-06) but the historic impairment is being retained.

Merrimack River (MA84A-26)

Location:	The Basin in the Merrimack River Estuary, Newbury/Newburyport.
AU Type:	ESTUARY
AU Size:	0.17 SQUARE MILES
Classification/Qualifier:	SA: SFO

Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information is available to assess the Aquatic Life Use for this Merrimack River AU (MA84A-26). The alert status for PCB in fish tissue is being retained (1999 assessment report).

Mill Pond (MA84038)

Location:	[North Basin] Littleton.
AU Type:	FRESHWATER LAKE
AU Size:	30 ACRES
Classification/Qualifier:	B

Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
There is a report in the USGS Non-Indigenous Aquatic Species database of an infestation of the non-native aquatic macrophyte, *Potamogeton crispus*, in Mill Pond (MA84038). This should be confirmed by MassDEP biologists. The Aquatic Life Use is not assessed for Mill Pond but an Alert for a potential infestation of *P. crispus* is being identified.

Mill Pond (MA84039)

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

Fish, other Aquatic Life and Wildlife Use: Not Assessed
There are no recent data to assess the Aquatic Life Use for this Mill Pond AU (MA84039).

Mill Pond (MA84081)

Location:	[South Basin] Littleton.
AU Type:	FRESHWATER LAKE
AU Size:	12 ACRES
Classification/Qualifier:	B

Fish, other Aquatic Life and Wildlife Use: Not Assessed
There are no recent data to assess the Aquatic Life Use for this Mill Pond AU (MA84081).

Millvale Reservoir (MA84041)

Location:	Haverhill.
AU Type:	FRESHWATER LAKE
AU Size:	44 ACRES
Classification/Qualifier:	A: PWS, ORW

Fish, other Aquatic Life and Wildlife Use: Not Assessed
Since no recent information is available the Aquatic Life Use is not assessed for Millvale Reservoir.

Nabnasset Pond (MA84044)

Location:	Westford.
AU Type:	FRESHWATER LAKE
AU Size:	134 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Although no recent data have been collected the Aquatic Life Use for Nabnasset Pond is assessed as not supporting because of the infestation of the non-native aquatic macrophytes, *Potamogeton crispus* and *Myriophyllum heterophyllum*.

Newfield Pond (MA84046)

Location:	Chelmsford.
AU Type:	FRESHWATER LAKE
AU Size:	77 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added
5	5	(Fanwort*)		Added

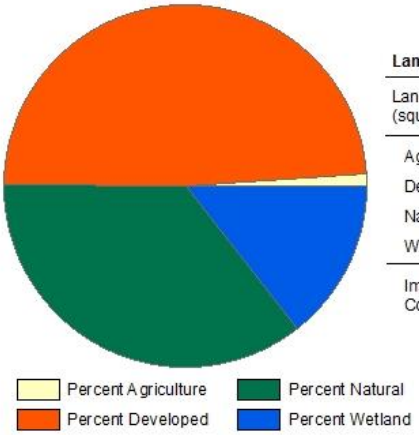
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Although no recent data have been collected the Aquatic Life Use for Newfield Pond is assessed as not supporting based on the historic impairments (low DO, and non-native aquatic macrophyte species *Potamogeton crispus*, *Myriophyllum spicatum*, and *Cabomba caroliniana*) identified during the 1999 MassDEP Lakes Baseline project are being retained.

Peppermint Brook (MA84A-35)

Location:	Headwaters, outlet of unnamed pond east of Route 38, Dracut to confluence with Beaver Brook, Dracut.
AU Type:	RIVER
AU Size:	2.7 MILES
Classification/Qualifier:	B

Peppermint Brook - MA84A-35

Watershed Area: 1.8 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.8	1.8	0.43	0.43
Agriculture	1.1%	1.1%	0.5%	0.5%
Developed	48.8%	48.8%	41.3%	41.3%
Natural	35.7%	35.7%	26.4%	26.4%
Wetland	14.4%	14.4%	31.8%	31.8%
Impervious Cover	17.97%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Trash		Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting (Alert)
In 2008, MADFG biologists collected fish community data at two low gradient sites in Peppermint Brook. Both samples contained fluvial species and macrohabitat generalist species moderately tolerant to pollution. The Aquatic Life Use for Peppermint Brook is assessed as support based on the MADFG fish data and previous assessments of support. Low dissolved oxygen and habitat quality alerts are being carried forward from the 2004 assessment report.

Plum Island River (MA84A-27)

Location:	From Chaces Island, Merimack River Estuary, to the "high sandy" sand bar just north of the confluence with Pine Island Creek, Newbury (formerly part of 2000 segment: Plum Island River MA84A-23).
AU Type:	ESTUARY
AU Size:	0.13 SQUARE MILES
Classification/Qualifier:	SA: ORW, SFO

Fish, other Aquatic Life and Wildlife Use: Not Assessed
Since no recent information is available the Aquatic Life Use for the Plum Island River is not assessed.

Powwow River (MA84A-08)

Location:	Tidal portion, just downstream of Main Street, Amesbury to confluence with Merrimack River, Amesbury.
AU Type:	ESTUARY
AU Size:	0.06 SQUARE MILES
Classification/Qualifier:	SB: SFR

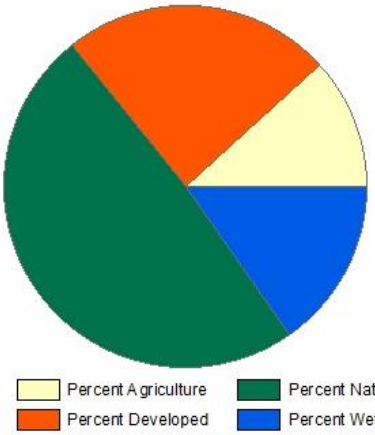
Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
Since no recent information is available the Aquatic Life Use for this Powwow River AU (MA84A-08) is not assessed. The alert status due to elevated total phosphorus and chlorophyll-a concentrations is carried forward from the 2004 assessment report.

Powwow River (MA84A-25)

Location:	Outlet of Lake Gardner, Amesbury to tidal portion, just downstream of Main Street, Amesbury (formerly part of 2000 segment: Powwow River MA84A-07).
AU Type:	RIVER
AU Size:	0.6 MILES
Classification/Qualifier:	B: WWF

Powwow River - MA84A-25

Watershed Area: 50.34 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	6.51	4.52	2.48	1.39
Agriculture	11.7%	10.7%	8.6%	7.5%
Developed	24.1%	27.2%	23.8%	30.2%
Natural	48.9%	45.8%	39.5%	30.1%
Wetland	15.3%	16.3%	28%	32.2%
Impervious Cover	8.57%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Fish Passage Barrier*)		Added

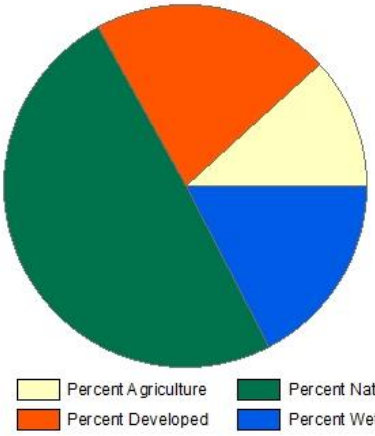
Fish, other Aquatic Life and Wildlife Use: Not Supporting (Alert)
Based on MADMF Diadromous Fish Restoration Priority List (Population Status = 1, Passage Score = 8), the Mill Street Dam obstructs diadromous fish migration. The Aquatic Life Use for this Powwow River AU (MA84A-25) is assessed as not supporting due to fish migration barriers. The alert status due to habitat quality and enrichment condition is carried forward from the 2004 assessment report.

Powwow River (MA84A-28)

Location:	Outlet Tuxbury Pond, Amesbury to New Hampshire state line, Amesbury (A/PWS/ORW only applies to upper approximate 1 mile reach; to the Amesbury DPW Water Division intake (Source ID 3007000-01S) (formerly part of 2000 segment: Powwow River MA84A-07).
AU Type:	RIVER
AU Size:	2.9 MILES
Classification/Qualifier:	A: PWS, ORW

Powwow River - MA84A-28

Watershed Area: 48.85 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	5.53	5.2	2.39	2.22
Agriculture	11.7%	11.1%	8.9%	8.5%
Developed	21.3%	21.5%	21.9%	22.8%
Natural	49.6%	49.8%	40.4%	40%
Wetland	17.4%	17.6%	28.7%	28.8%
Impervious Cover	7.14%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Fish Passage Barrier*)		Added

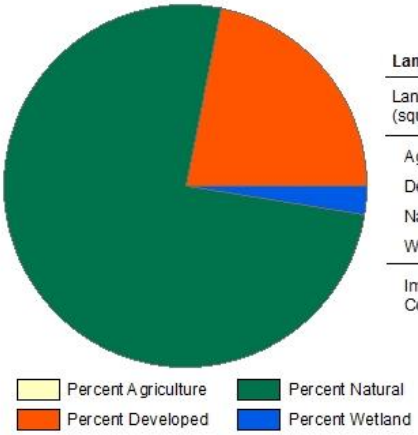
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Based on MADMF Diadromous Fish Restoration Priority List, the Mill Street Dam (Population Status = 1, Passage Score = 8) and Lake Gardner Dam (Population Status = 0 *[0 because of Mill Street Dam*], Passage Score = 10) obstructs diadromous fish migration in this portion of the Powwow River. The Aquatic Life Use for this Powwow River AU (MA84A-28) is assessed as not supporting due to fish migration barriers.

Reed Brook (MA84B-08)

Location:	Headwaters, south of the West Street/Cowdry Hill Road intersection, Westford to the confluence with Stony Brook, Westford.
AU Type:	RIVER
AU Size:	0.6 MILES
Classification/Qualifier:	B

Reed Brook - MA84B-08

Watershed Area: 0.65 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	0.65	0.65	0.12	0.12
Agriculture	0%	0%	0%	0%
Developed	21.8%	21.8%	49.3%	49.3%
Natural	75.7%	75.7%	43.1%	43.1%
Wetland	2.5%	2.5%	7.6%	7.6%
Impervious Cover	7.86%			

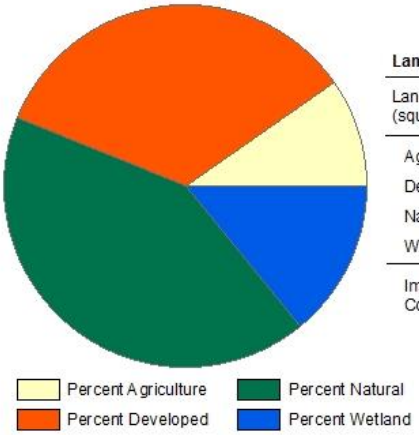
Fish, other Aquatic Life and Wildlife Use: Not Assessed
Since no recent information is available the Aquatic Life Use is not assessed for Reed Brook.

Richardson Brook (MA84A-12)

Location:	Headwaters, Dracut (excluding intermittent portion) to confluence with Merrimack River, Dracut.
AU Type:	RIVER
AU Size:	1.9 MILES
Classification/Qualifier:	B

Richardson Brook - MA84A-12

Watershed Area: 4.26 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.26	4.26	1.49	1.49
Agriculture	9.7%	9.7%	8.9%	8.9%
Developed	34.2%	34.2%	25.4%	25.4%
Natural	42%	42%	42.3%	42.3%
Wetland	14%	14%	23.4%	23.4%
Impervious Cover	11.02%			

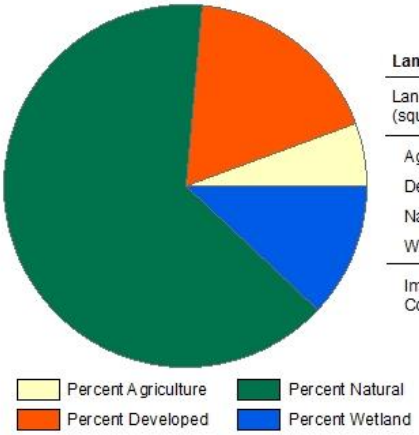
Fish, other Aquatic Life and Wildlife Use: Insufficient Information (Alert)
Insufficient recent information exists to assess the Aquatic Life Use for Richardson Brook. The alert status due to the low number of fluvial fish is carried forward from the 2004 assessment report.

Salmon Brook (MA84A-33)

Location:	Headwaters, outlet Lower Massapoag Pond, Dunstable to New Hampshire state line, Dunstable.
AU Type:	RIVER
AU Size:	2.9 MILES
Classification/Qualifier:	B

Salmon Brook - MA84A-33

Watershed Area: 22.15 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	22.03	8.57	4.63	2.03
Agriculture	5.6%	7.9%	4.6%	7.8%
Developed	17.9%	17.2%	14.4%	11.3%
Natural	64.5%	61%	59.5%	53.2%
Wetland	12%	13.9%	21.5%	27.6%
Impervious Cover	5.05%			

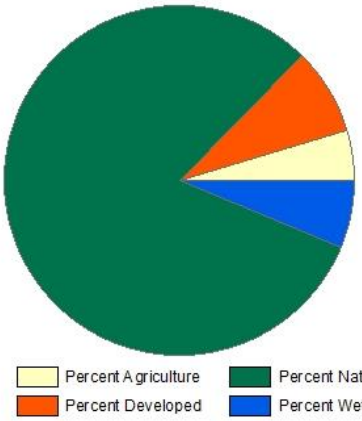
Fish, other Aquatic Life and Wildlife Use: Insufficient Information
Insufficient recent information exists to assess the Aquatic Life Use for Salmon Brook.

South Branch Souhegan River (MA84A-31)

Location:	Headwaters, outlet Watatic Pond, Ashburnham to New Hampshire state line, Ashby.
AU Type:	RIVER
AU Size:	3 MILES
Classification/Qualifier:	B

South Branch Souhegan River - MA84A-31

Watershed Area: 8.66 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	8.51	6.88	1.96	1.72
Agriculture	4.6%	4.8%	6.7%	6.4%
Developed	8.1%	8%	12.4%	9.9%
Natural	81.1%	81.3%	65.3%	67.3%
Wetland	6.2%	5.9%	15.6%	16.4%
Impervious Cover	3.56%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Benthic Macroinvertebrates		Added
5	5	Temperature		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting

In 2010, MassDEP WPP biologists collected physiochemical (W2158) and biological (fish - P0191 & macroinvertebrate - B0671) data at one site on South Branch Souhegan River. The fish community was sampled and eastern brook trout (18% of individuals) of various size classes were collected at the site. As a result, this segment is Tier 1 existing use water. A multiprobe was deployed at the site on three occasions (June, July, August) for a duration of 5 days on each deploy to measure continuous dissolved oxygen. There were no violations of the CWF DO criteria. A temperature probe was deployed at the site for 118 days (approx. June through Sept.) to measure continuous temperature. The 7-DADM chronic Tier 1 criterion (20°C) was violated 80 times with a maximum 7-DADM of 25.5°C. The acute Tier 1 criterion (23.5°C) was also violated at 23.8°C. The benthic macroinvertebrate community was sampled and evaluated to be not impacted. The fish community was sampled and multiple fluvial species (all individuals) were collected. The Aquatic Life Use for the South Branch Souhegan River is assessed as not supporting due to elevated temperatures. The level of development in the proximal riparian area (only 67% natural land) did not allow the classification of the elevated temperatures to be considered natural but based on the entire water quality and biological data set, this is a possibility. In addition, the duration, frequency and magnitude of the temperature violations seem more than would be expected based on the level of anthropogenic disturbances in the watershed.

Spectacle Pond (MA84089)

Location:	Littleton/Ayer.
AU Type:	FRESHWATER LAKE
AU Size:	79 ACRES
Classification/Qualifier:	B

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Curly-leaf Pondweed*)		Added
5	5	(Fanwort*)		Added
5	5	(Water Chestnut*)		Added

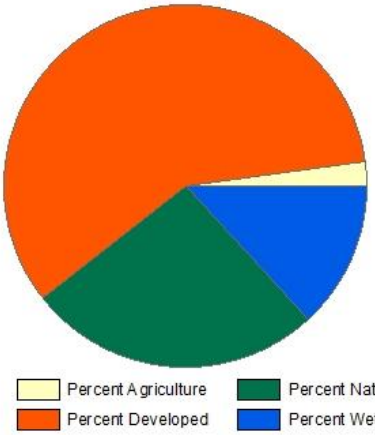
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Although no recent information is available the Aquatic Life Use is assessed as not supporting for Spectacle Pond based on the historic impairments including low DO and non-native aquatic macrophytes (*Trapa natans*, *Potamogeton crispus*, *Cabomba caroliniana*, and *Myriophyllum heterophyllum*) which are being retained.

Spicket River (MA84A-10)

Location:	New Hampshire state line, Methuen to confluence with Merrimack River, Lawrence.
AU Type:	RIVER
AU Size:	5.8 MILES
Classification/Qualifier:	B: WWF

Spicket River - MA84A-10

Watershed Area: 77.41 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	11.42	4.91	2.56	0.92
Agriculture	2.1%	0.2%	1.7%	0%
Developed	58.5%	81.7%	41.6%	65.1%
Natural	26.2%	13.6%	32.6%	25.1%
Wetland	13.2%	4.4%	24.1%	9.8%
Impervious Cover	27.93%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	DDT in Fish Tissue		Added
5	5	(Fish Passage Barrier*)		Added
5	5	Mercury in Fish Tissue		Added
5	5	Trash		Changed

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Based on MADMF Diadromous Fish Restoration Priority List (Population Status = 2, Passage Score = 10), the Spickett River Dam obstructs diadromous fish migration. The Aquatic Life Use for the Spicket River is assessed as not supporting due to fish migration barriers as well as the historic impairments which are being retained.
Fish Consumption Use: Not Supporting

Following a public request, MassDEP biologists conducted fish toxics sampling at the Spicket River in May 2015. Because of elevated mercury and DDT measured in carp, largemouth bass, and white sucker filets, MassDPH issued the following fish consumption advisories:

- *"Children younger than 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any of the affected fish species (carp, largemouth bass, and white sucker) from this water body."*
- *"The general public should limit consumption of affected fish species (carp, largemouth bass, and white sucker) to two meals per month."*

Since there is a site specific DPH advisory for elevated mercury and DDT in fish tissue, the Fish Consumption Use for Spicket River (MA84A-10) is assessed as Not Supporting. The sources are unknown. Data Source: (MassDPH 2019)

Stevens Pond (MA84064)

Location:	North Andover.
AU Type:	FRESHWATER LAKE
AU Size:	23 ACRES
Classification/Qualifier:	B

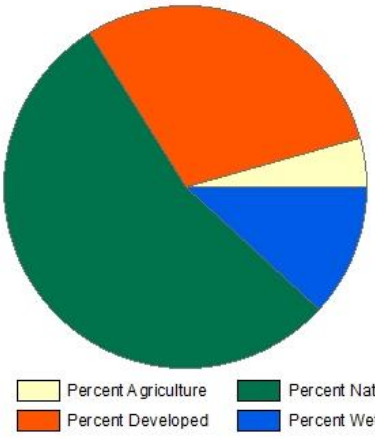
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information is available so the Aquatic Life Use is not assessed for Stevens Pond.

Stony Brook (MA84B-03)

Location:	Headwaters outlet Forge Pond, Westford to Brookside Road, Westford.
AU Type:	RIVER
AU Size:	6.5 MILES
Classification/Qualifier:	B: WWF

Stony Brook - MA84B-03

Watershed Area: 37.81 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	37.79	8.79	9.55	2.75
Agriculture	4.4%	3.1%	4%	3.5%
Developed	29.5%	32.2%	21.6%	22.6%
Natural	54.2%	53.7%	45.6%	48.6%
Wetland	11.8%	11%	28.8%	25.3%
Impervious Cover	10.97%			

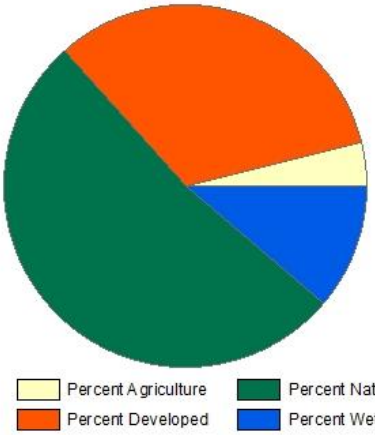
Fish, other Aquatic Life and Wildlife Use: Not Supporting
Without any recent data the Aquatic Life Use for Stony Brook will continue to be assessed as not supporting based on the historic impairments which are being retained.

Stony Brook (MA84B-04)

Location:	Brookside Road, Westford to confluence with Merrimack River, Chelmsford.
AU Type:	RIVER
AU Size:	3.4 MILES
Classification/Qualifier:	B: WWF

Stony Brook - MA84B-04

Watershed Area: 45.32 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	45.3	6.45	11.65	1.9
Agriculture	3.9%	0.7%	3.5%	0.6%
Developed	32.7%	52.2%	24.6%	40.7%
Natural	52.2%	39.7%	45.2%	41.5%
Wetland	11.2%	7.4%	26.7%	17.1%
Impervious Cover	11.83%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	(Dewatering*)		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting

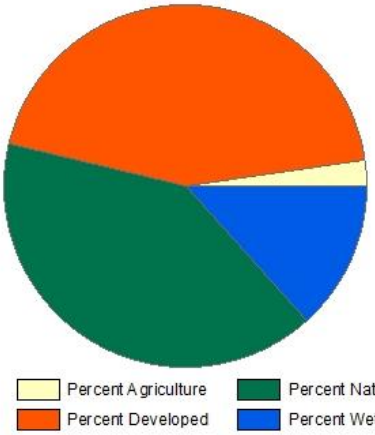
In 2010, MassDEP WPP staff collected physiochemical (W2167) and planned to collect biological (fish & macroinvertebrate) data at one site on Stony Brook upstream of Route 3 in Chelmsford. In late June/early July, the stream became completely dewatered and maintained that state throughout the remainder of the summer so no biological samples were collected. Stony Brook at the site is a 3rd order stream and quite large. This combined with the groundwater withdrawal adjacent to the stream makes it extremely unlikely that dewatering is natural and so the Aquatic Life Use is assessed as not supporting based on the dewatering. Note: While this area of the state was under a drought advisory between August and mid November 2010, the depletion of the stream earlier in the year is considered to be the result of ground water withdrawals. The former benthic macroinvertebrate impairment is also being carried forward.

Tadmuck Brook (MA84B-07)

Location:	Headwaters south of Main Street, Westford to confluence with Stony Brook, Westford.
AU Type:	RIVER
AU Size:	1.4 MILES
Classification/Qualifier:	B

Tadmuck Brook - MA84B-07

Watershed Area: 2 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.98	1.98	0.69	0.69
Agriculture	2.3%	2.3%	2.9%	2.9%
Developed	44%	44%	26.6%	26.6%
Natural	40.4%	40.4%	42.6%	42.6%
Wetland	13.3%	13.3%	27.8%	27.8%
Impervious Cover	12.58%			

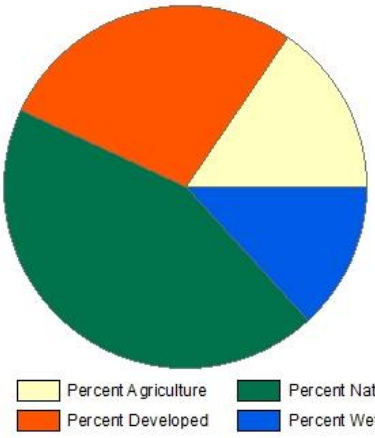
Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information is available so the Aquatic Life Use is not assessed for Tadmuck Brook. The alert status due to the low number of fish is carried forward from the 2004 assessment report.

Trout Brook (MA84A-13)

Location:	Headwaters, Dracut to confluence with Richardson Brook, Dracut.
AU Type:	RIVER
AU Size:	2.6 MILES
Classification/Qualifier:	B

Trout Brook - MA84A-13

Watershed Area: 2.42 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.42	2.42	0.88	0.88
Agriculture	15.4%	15.4%	12.7%	12.7%
Developed	27.7%	27.7%	19.6%	19.6%
Natural	43.9%	43.9%	46.6%	46.6%
Wetland	13.1%	13.1%	21.2%	21.2%
Impervious Cover	8.54%			

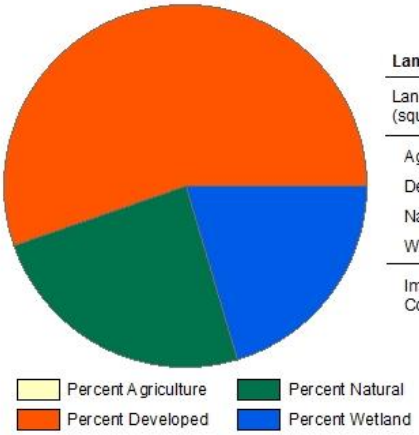
Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information is available so the Aquatic Life Use is not assessed for Trout Brook. The alert status due to the low numbers and diversity of fish and the concerns related to habitat quality conditions (e.g., sediment deposition and limited flow regimes) and the absence of brook trout is carried forward from the 2004 assessment report.

Trull Brook (MA84A-14)

Location:	Source, Tewksbury (excluding intermittent portion) to confluence with Merrimack River, Tewksbury.
AU Type:	RIVER
AU Size:	2.1 MILES
Classification/Qualifier:	B

Trull Brook - MA84A-14

Watershed Area: 4.79 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	4.77	4.71	1.16	1.14
Agriculture	0%	0%	0%	0%
Developed	55.3%	55.5%	36.6%	36.9%
Natural	24.4%	24.4%	26.1%	25.9%
Wetland	20.3%	20.1%	37.3%	37.2%
Impervious Cover	24.02%			

Fish, other Aquatic Life and Wildlife Use: Insufficient Information (Alert)
Insufficient recent information exists to assess the Aquatic Life Use for Trull Brook. The alert status due to low number of fish is carried forward from the 2004 assessment report.

Unnamed Tributary (MA84A-30)

Location:	Unnamed tributary to Powwow River locally considered portion of Back River from outlet of Clarks Pond, Amesbury to confluence with Powwow River, Amesbury (formerly part of 2008 segment: Back River MA84A-16).
AU Type:	ESTUARY
AU Size:	0.003 SQUARE MILES
Classification/Qualifier:	SA: SFO

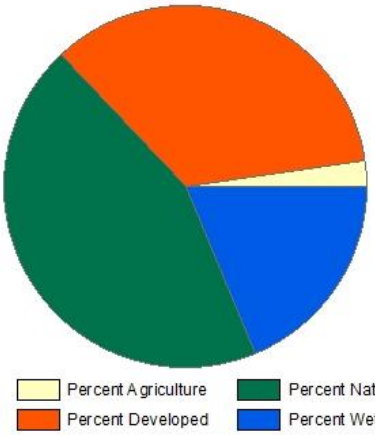
Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information is available so the Aquatic Life Use is not assessed for unnamed tributary (MA84A-30).

Unnamed Tributary (MA84A-38)

Location:	(Locally known as Argilla Brook) Unnamed tributary to Johnson Creek (excluding intermittent portion) from Center Street, Groveland to confluence with Johnson Creek, Groveland.
AU Type:	RIVER
AU Size:	1.3 MILES
Classification/Qualifier:	B

Unnamed Tributary - MA84A-38

Watershed Area: 2.25 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	2.24	2.24	0.49	0.49
Agriculture	2.3%	2.3%	6.1%	6.1%
Developed	34.7%	34.7%	26.9%	26.9%
Natural	44.3%	44.3%	44.6%	44.6%
Wetland	18.7%	18.7%	22.4%	22.4%
Impervious Cover	13.27%			

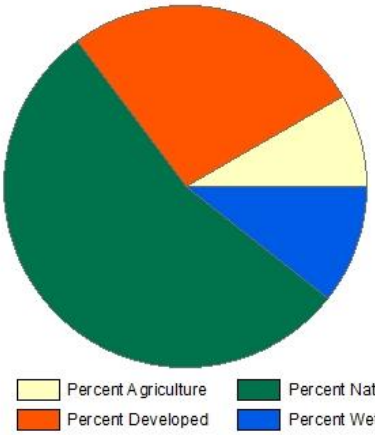
Fish, other Aquatic Life and Wildlife Use: Not Assessed (Alert)
No recent information is available so the Aquatic Life Use is not assessed for this Unnamed Tributary (MA84A-38). The alert status due to the absence of trout species in the most recent MassDEP WPP survey is carried forward from the 2004 assessment report.

Unnamed Tributary (MA84B-01)

Location:	(Locally known as Reedy Meadow Brook) Headwaters, outlet of small unnamed impoundment upstream of Bruce Street, Littleton to inlet Mill Pond, Littleton.
AU Type:	RIVER
AU Size:	1.5 MILES
Classification/Qualifier:	B

Unnamed Tributary - MA84B-01

Watershed Area: 1.31 square miles



Landuse Type	Entire Basin	5km Radius Proximal Subbasin	100m Stream Buffer	Proximal Stream Buffer
Land Use Area (square miles)	1.31	1.31	0.2	0.2
Agriculture	8.3%	8.3%	2.4%	2.4%
Developed	26.8%	26.8%	33.4%	33.4%
Natural	54.2%	54.2%	29%	29%
Wetland	10.6%	10.6%	35.2%	35.2%
Impervious Cover	12.11%			

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Ambient Bioassays - Chronic Aquatic Toxicity		Added

Fish, other Aquatic Life and Wildlife Use: Not Supporting

Between 2005 and 2015, 42 *Pimephales promelas* whole effluent toxicity tests were conducted on the Sunny Delight Beverages Company discharge (formerly Veryfine and New England Apple Products Co) using river water collected from this unnamed tributary (locally known as Reedy Meadow Brook -- MA84B-01) as the dilution water. The water was collected upstream from the discharge behind the property at 80 Ayer Road in Littleton. Survival of *P. promelas* exposed (~7-day) was below 75% in 18 (43%) of the toxicity tests. Survival was most often lowest during the January and April test events.

The Aquatic Life Use for this unnamed tributary (MA84B-01) is assessed as not supporting due to chronic aquatic toxicity to *P. promelas*. This impairment replaces a previous Alert Status for ambient toxicity.

Uptons Pond (MA84075)

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

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No recent information is available so the Aquatic Life Use is not assessed for Uptons Pond.

Ward Pond (MA84096)

Location:	Ashburnham (formerly reported as 1996 segment: Ward Pond MA35094).
AU Type:	FRESHWATER LAKE
AU Size:	54 ACRES
Classification/Qualifier:	B

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Although no recent information is available the Aquatic Life Use is assessed as not supporting for Ward Pond based on the historic impairment which is being retained.

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