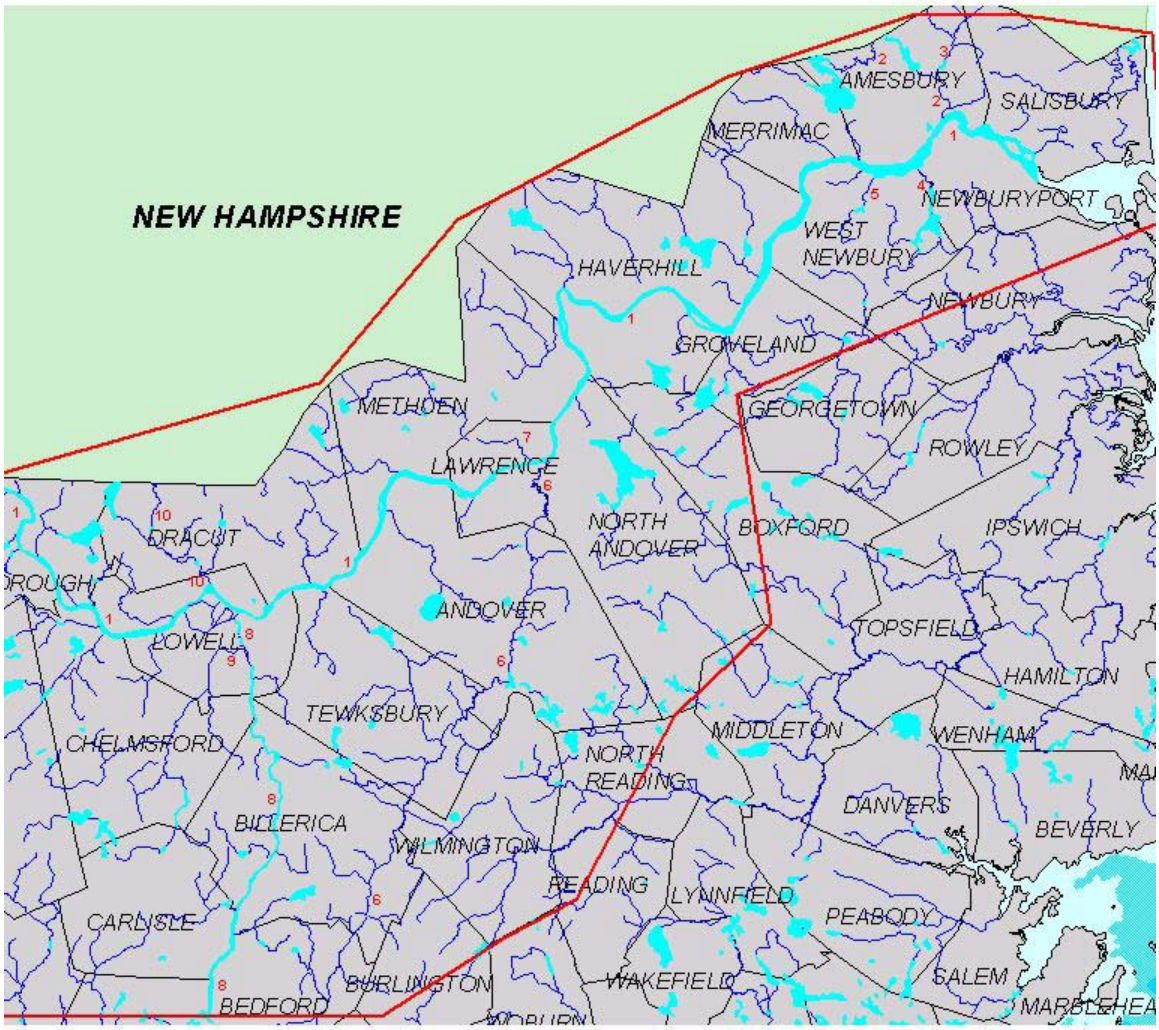
MERRIMACK RIVER WATERSHED



Area outlined in red represents the towns included in this report as part of the Merrimack River Watershed.

Stream Names:

1 - Merrimack River
2 - Powwow River
3 - Back River
4 - Artichoke River
5 - Indian River
6 - Shawsheen River
7 - Spickett River
8 - Concord River
9 - River Meadow Brook
10 - Beaver Brook

Merrimack River Watershed

Merrimack River

Newburyport, Amesbury, Merrimack, Haverhill, Groveland, Methuen, Lawrence, N. Andover, Andover, Dracut, Tewksbury, Lowell, Chelmsford, Tyngsboro, cont'd.

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
126.8	Fifth	6.6	Alewife, blueback, American shad, smelt, white perch, lamprey, gizzard shad

Obstruction # 1 Essex Dam Lawrence

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
28.8	Dam	Stone with plywood	920	31	0.0	1848	Consolidated Hydro, Inc. Energy	42° 41' 57.942" N 71° 09' 57.086" W

Essex Dam

Fishway Present

Design	Material	Length (ft)	Inside W (ft)	Outside W (ft)	# of Baffles	Baffle H (ft)	Notch W (ft)	Pool L (ft)	Condition/ Function
Fish lift	Concrete and aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Good Passable

Obstruction # 2 Pawtucket Dam Lowell

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
40.2	Dam	Stone with splash boards	1086	15	0.0	1847	Consolidated Hydro, Inc. (CHI) Energy	42° 38’ 54.800” N 71° 20’ 01.095” W

Pawtucket lift and powerhouse

Pawtucket Dam

Fishway Present

Design	Material	Length (ft)	Inside W (ft)	Outside W (ft)	# of Baffles	Baffle H (ft)	Notch W (ft)	Pool L (ft)	Condition/ Function
Modified Ice Harbor	Concrete	292	14	15	16	Varied (0.0-4.0)	-	12	Good inefficient
Fish Lift	Concrete, aluminum and wood								Good Passable

Modified Ice Harbor Fishway at Pawtucket Dam

Remarks:

The Merrimack River is formed by the confluence of the Pemigewasset and Winnipesaukee Rivers in New Hampshire and flows 127 miles to the Atlantic Ocean. The lower 49 miles of the river are within Massachusetts. Anadromous fish, specifically Atlantic salmon, American shad and river herring, are managed by a Merrimack River Anadromous Fish Committee comprised of the Massachusetts Division of Marine Fisheries, Massachusetts Division of Fisheries and Wildlife, New Hampshire Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service and U. S. Forest Service. Management strategies are implemented by the mutual consent of these agencies.

The first two obstructions on the river, the Essex Dam in Lawrence and the Pawtucket Dam in Lowell, have been equipped with fish passage facilities since the mid-19th century. These ladders have been upgraded on several occasions, the latest being in the 1980's when fish lifts were installed at the two dams. The Essex lift is designed specifically to pass 840,000 shad annually. The lift at the Pawtucket Dam is designed for an annual capacity of 720,000 shad. In addition, a modified Ice Harbor fishway at the Pawtucket Dam is functional during high flow periods.

River herring counts made through the viewing window at the Lawrence fish lift from 1983 to 2002 have varied widely but reached a high of 379,225 in 1991. American shad counts have been more stable and peaked at 76,717 in 2001. Numbers counted at the Pawtucket Dam passage facilities in Lowell drop off dramatically for like years. Due to problems with attraction flows at the fish lifts and ladder, which are inherent in fish passage facilities on large rivers as well as behavioral differences of the species, the counts may not be an accurate representation of the numbers or relative abundance of anadromous fish utilizing the system.

Powwow River

Amesbury, South Hampton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
7.1	Second	6.5	Blueback, smelt

Obstruction # 1 Mill Street Dam Amesbury

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.6	Dam	N/A	N/A	N/A	0.0	1900	Town of Amesbury	42º 51’ 24.608” N 70º 55’ 46.359” W

View of Mill Street Dam through the trees (structure is under the building).

Fishway None

Obstruction # 2 Lake Gardiner Dam Amesbury

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.1	Dam	Concrete	73	18	71.0	1872, rebuilt 2000	Town of Amesbury	42º 51’ 33.094” N 70º 56’ 17.240” W

Lake Gardiner Dam

Fishway None

Remarks:

The Powwow River enters the Merrimack River in Amesbury. A dam at Mill Street presents a very difficult fish passage problem and, when combined with the cost of providing passage at the large dam at Lake Gardner, eliminates any development potential here. Bluebacks are known to enter the system in small numbers.

Back River

Amesbury, South Hampton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
5.4	Second	6.5	Blueback

Obstruction # 1 Clarks Pond Dam Amesbury

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.4	Dam	Concrete with wooden stop logs	70	3	6.8	-	Merrimac Hat Co., Inc.	42º 51’ 37.663” N 70º 55’ 35.866” W

Clarks Pond Dam, partial view.

Fishway None

Remarks:

Back River is a tributary to the Powwow River and joins it below the Mill Street dam. A relatively low head dam blocks passage into the 6.8 acres of potential habitat provided by Clarks Pond. Small numbers of river herring have been observed in the stream and a fishway could be installed at a reasonable cost. The small size of the impoundment, however, relegates the stream to a low priority for development.

Artichoke River — Newburyport, W. Newbury

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
1.2	First	6.7	None known

Obstruction # 1 — Emery Lane Dam (Curzon's Mill Dam) Newburyport, W. Newbury

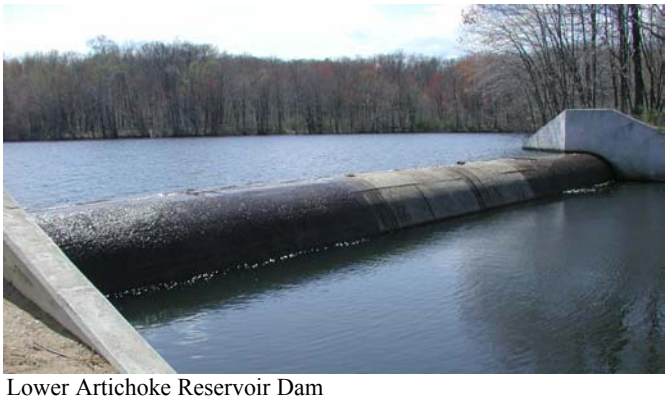
River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.1	Dam	Concrete	36.0	8.1	15.8	1950	Private	42° 49’ 09.330” N 70° 56’ 14.603” W

Emory Lane Dam (aka Curzon’s Mill Dam)

Fishway None

Obstruction # 2 — Lower Artichoke Reservoir Dam W. Newbury, Newburyport

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.7	Dam	Concrete	81	7.5	49.0	1920	City of Newburyport	42° 48’ 47.706” N 70° 55’ 53.467” W



Lower Artichoke Reservoir Dam

Fishway None

Obstruction # 3 Upper Artichoke Reservoir Dam W. Newbury, Newburyport

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.2	Dam	Concrete	136	5.8	196.0	1920	City of Newburyport	42º 48’ 22.436” N 70º 55’ 54.895” W

Upper Artichoke Reservoir Dam

Fishway

Remarks:

The Artichoke River is a tributary of the Merrimack River and enters it well downstream of the dam at Lawrence. Although the stream's three impoundments offer a total of 261 acres of potential habitat, the upper two are used as public water supplies resulting in reduced and inconsistent outflow. This and the cost of passage at three large dams severely limits the development potential.

Indian River West Newbury

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.9	First	7.0	None known

Obstruction # 1 Mill Pond Dam West Newbury

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.0	Dam	Concrete with steel stop logs	4	8	14.8	1937	Town of West Newbury	42° 48’ 23.727” N 70° 58’ 01.553” W

Dam at Mill Pond

Fishway None

Remarks:

This small stream enters the Merrimack River in West Newbury. It forms a 14.8 acre impoundment called Mill Pond. While the pond offers an attractive habitat, the spillway configuration and its proximity to the Rt. 113 road culvert make fishway installation difficult and lower the site's priority for development.

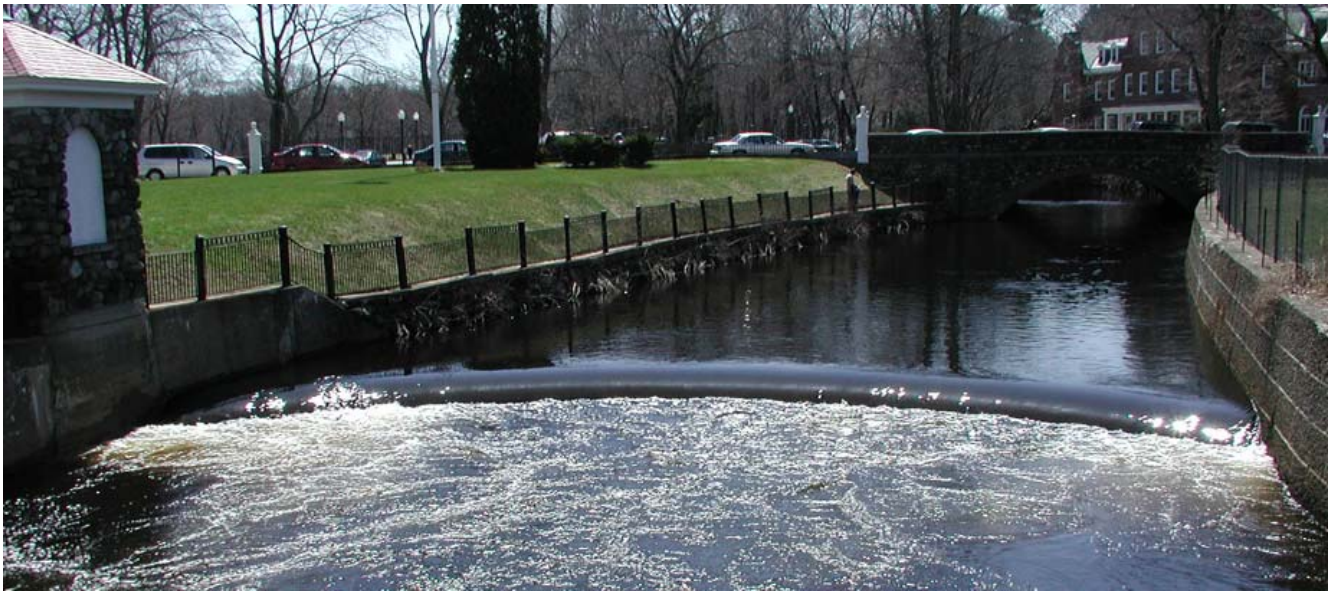
Shawsheen River

North Andover, Lawrence, Andover, Wilmington, Billerica, Bedford

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
25.0	Second	N/A	River herring, American shad

Obstruction # 1 Dam at Rt. 133 Andover

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.8	Dam	N/A	N/A	N/A	0.0	-	-	42º 40’ 20.522” N 71º 08’ 58.243” W



Dam at Route 133, Andover

Fishway None

Remarks:

The Shawsheen River enters the Merrimack just below the Essex Dam in Lawrence. A culvert under Rt. 495 is passable but may collect debris, which could hinder fish movement. A low head dam at Rt. 133 in Andover presents the first real obstruction. Passage could easily be achieved at this point with a ladder or a partial breach. However, two dams immediately upstream present costly fishway installation issues which reduce the restoration potential of this stream. River herring and American shad have been observed in the lower river.

Spickett River

Lawrence, Methuen, Salem NH

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
12.7	Second	N/A	American shad

Obstruction # 1 Spickett River Dam Lawrence

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.1	Dam	Concrete	N/A	N/A	0.0	-	City of Lawrence	42° 42’ 26.609” N 71° 08’ 52.669” W

Spickett River Dam

Fishway None

Remarks:

Spickett River flows through the City of Lawrence and joins the Merrimack below the Essex Dam. Although American shad have been observed at the mouth, a large dam just upstream of the confluence with the Merrimack River as well as several other obstructions preclude any anadromous fish development.

Concord River

Lowell, Tewksbury, Billerica, Carlisle, Bedford, Concord

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
16.2	Fourth	6.7	Alewife, blueback, American shad

Obstruction # 1 Centennial Island Dam Lowell

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.4	Dam	Concrete and rebar with wooden boards	250	5	2.7	1900	Wamesit Real Estate Trust	42º 37’ 44.544” N 71º 17’ 53.144” W

Centennial Island Dam

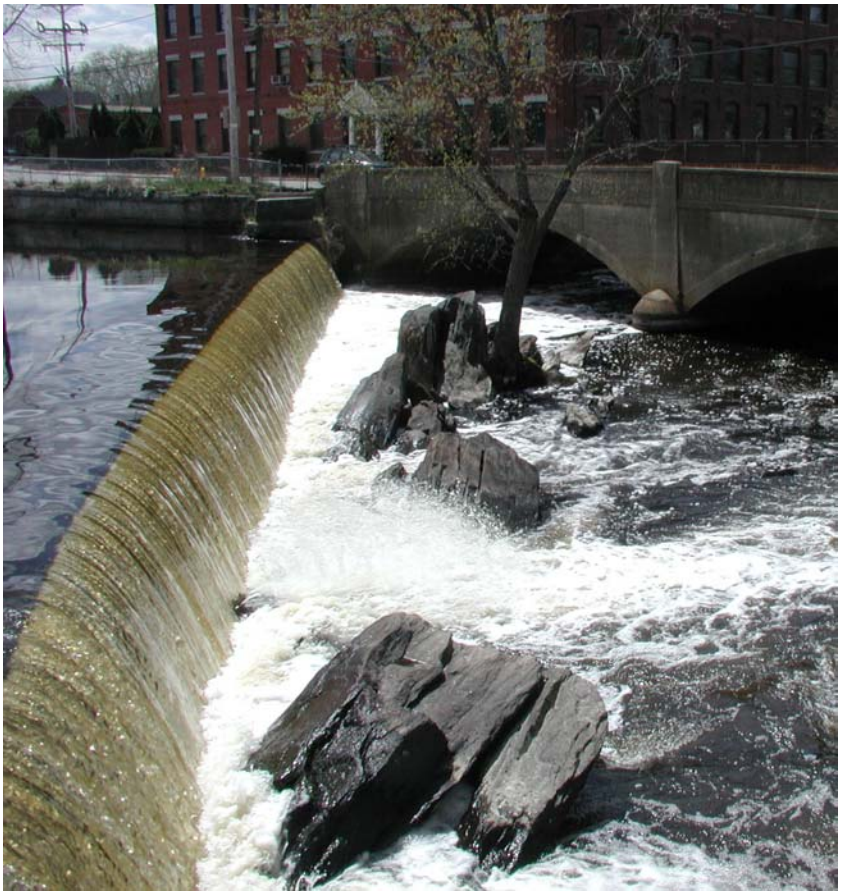
Fishway Present

Design	Material	Length (ft)	Inside W (ft)	Outside W (ft)	# of Baffles	Baffle H (ft)	Notch W (ft)	Pool L (ft)	Condition/ Function
Denil	Concrete with wooden baffles	79.5	4.0	6.3	19	4.0	-	-	Good Passable

Fishway at Centennial Island Dam

Obstruction # 2 Talbots Mills Dam (Faulkner Mills Dam) Billerica

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.7	Dam	Stone and concrete	130	6.7	9.0	1850	Laggeat and Platt, Inc.	42º 35’ 31.320” N 71º 17’ 01.106” W



Talbots Mills Dam

Fishway None

Remarks:

The Concord River enters the Merrimack River just downstream of the Pawtucket Dam in Lowell. Consequently, fish successfully passed at the Lawrence lift have access to the lower Concord River. A breached dam at river mile 0.37 is passable at normal spring flows and is not considered an obstruction. The first obstruction is equipped with a relatively new Denil fishway but the second, a dam at Talbot Mills, is impassable. A fishway will be considered for this site when substantial numbers of fish have reached the dam on an annual basis. The USFWS has been monitoring returns here.

The Division of Marine Fisheries and the US Fish and Wildlife Service have been stocking the Concord River with adult river herring since 2000 in numbers that have ranged from 5600 to 7550 annually. American shad have been observed in the lower river.

River Meadow Brook Lowell, Chelmsford

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
6.3	Second	N/A	Unknown

Obstruction # 1 River Meadow Brook dam Lowell

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.6	Dam	Concrete	~40	~6	0.0	-	-	42° 37’ 54.400” N 71° 18’ 31.700” W

River Meadow Brook Dam

Fishway None

Remarks:

River Meadow Brook is a tributary to the Concord River, which it enters at river mile 1.04. Fish ascending the Concord are free to enter River Meadow Brook but a dam 0.55 miles from the mouth prevents further access. Development of fish passage facilities on this stream would not contribute substantially to anadromous fish populations of the Concord River watershed due to limited potential spawning habitat.

Beaver Brook — Lowell, Dracut, Pelham NH

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
4.6	Second	N/A	Unknown

Obstruction # 1 — Beaver Brook Dam — Dracut

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.5	Dam	Stone and concrete	~50	15	0.0	1850	Gold-Kauf Realty	42º 39’ 51.971” N 71º 19’ 22.569” W

Beaver Brook Dam

Fishway None

Remarks:

Beaver Brook flows into the Merrimack River below the Pawtucket Dam in the city of Lowell. Although it appears to offer substantial potential riverine habitat, a large dam just upstream from the mouth as well as other obstructions on the lower river, diminishes any potential for development of anadromous fish in this system.

Merrimack River Watershed Recommendations:

1. Continue to support the development and restoration efforts of the Central New England Anadromous Fish Program.

2. Continue to stock and monitor river herring in the Concord River. If substantial numbers consistently reach Talbot Mills Dam, a fishway should be considered at that site.