Technical Report

Massachusetts Division of Marine Fisheries
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A Survey of Anadromous Fish Passage in Coastal Massachusetts

Part 1. Southeastern Massachusetts

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Massachusetts Division of Marine Fisheries
Department of Fisheries and Game
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

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Part 1. Southeastern Massachusetts

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Part 1: Southeastern Massachusetts

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ABSTRACT

Anadromous fish species such as alewife, blueback herring, rainbow smelt, American shad, and white perch are important members of the coastal and freshwater fish faunas of Massachusetts. Providing passage through numerous man-made blockages allowing for the spawning migration of these fishes is essential to maintaining healthy populations. Information on blockages (primarily dams) and fish passage structures (fishways) has not been updated since the early 1970s. In order to update this information, a survey was conducted by the Massachusetts Division of Marine Fisheries during 2001-2002. The purpose was to provide information on the present state of fish passage in Massachusetts coastal streams and rivers and to provide guidance for future restoration efforts. The results of this survey are presented in this report.

All rivers and streams flowing into Massachusetts' coastal waters were examined. The presence of anadromous species in a system was determined from a variety of sources including past Division surveys, regional biologists, harbormasters, and local herring and shellfish wardens. If alewives or blueback herring were not specifically identified, the generic term river herring was used in the species present listing.

Most rivers and streams were surveyed from mouth to headwaters. General physical characteristics of the water bodies and data of specific importance to anadromous fish were noted. All obstructions and fishways were photographed and their locations were recorded using handheld GPS units. Site specific details were documented for the first impassable obstruction and its impoundment area to assist in the evaluation of future alterations or fish passage possibilities. On some streams, information was gathered on additional impassable obstructions as well. River obstruction type, construction material, and structural and hydraulic heights were recorded. When a fishway was present, the type of design, dimensions, construction materials, and number of baffles, pools and weirs were recorded. Fishways were rated based on their condition and function. Condition (poor, fair, good or excellent) described the physical structure and referred to the level of deterioration of the ladder. Function (not passable, inefficient passage, or passable) described how well the structure passed fish. A brief description of the state of fish passage and the potential for further improvements were provided for each river and stream.

The survey included 215 coastal streams. Along these streams, 493 lakes, ponds or reservoirs and 380 obstructions to migratory fish passage were documented. The majority of the obstructions are man-made dams that in many cases have long ceased to perform the functions for which they were originally constructed. About 68% of the dams are six feet or under in height and only 3% were 24 feet tall or greater. The survey identified 175 existing fish passage structures and more than 100 active river herring runs. Weir pool and notched weir pool fishways were by far the most common designs employed in Massachusetts followed by the denil ladder, stream baffles, Alaskan Steeppass, combination designs, vertical slot and fish lifts. About 46% of the existing fishways were judged to be in deteriorated condition and 50% were judged to function inadequately.

The survey clearly demonstrates that Massachusetts has a large investment in fish passage along our coastal rivers and streams. The survey and associated recommendations identify numerous projects that should be undertaken over the next several years. These projects include the maintenance, repair, and re-design of failing or inefficient existing fishways, and the construction of new fishways to provide access to additional spawning grounds. The information provided by this survey will guide the planning and implementation of future infrastructure work by the Massachusetts Division of Marine Fisheries necessary for the management and improvement of Massachusetts' anadromous fish populations.

This report is Part 1 in a four part series that covers the coast of Massachusetts. The information provided in this report covers the watersheds within Southeastern Massachusetts. The other parts in the series are: Part 2 – Cape Cod and the Islands; Part 3 – South Shore; Part 4 – Boston Harbor, North Shore, and Merrimack River.

INTRODUCTION

Anadromous fishes in Massachusetts coastal waters have undergone a striking decline in abundance over the past 400 years. The combined effects of impassable dams, gross pollution, water diversion and overfishing had drastically reduced or eliminated anadromous fish populations. Twentieth century efforts at restoring depleted stocks through focused care and management led to a significant recovery in the Commonwealth. Today more than 100 coastal rivers and streams are the sites of active herring runs.

During the fall of 1967, the Massachusetts Division of Marine Fisheries (DMF) began a survey of coastal streams to determine the existence of anadromous fish resources and the potential for restoration and enhancement. The results of that survey, published as a Federal Aid completion report in 1972, have served as the basis for anadromous fish management in Massachusetts since that time. The recommendations that resulted from the survey have provided a work plan for DMF's anadromous fish project over the last 30 years. In the three decades since the completion of the survey, numerous changes have taken place. Some fishways have deteriorated or their designs have become obsolete. Dams have failed, eliminating spawning or nursery habitats. Impoundments have degraded due to eutrophication, and water withdrawals have raised fish passage issues. Other changes have been positive. Many fishways have been constructed, replaced, or repaired and designs have improved dramatically. Stocking programs have resulted in new populations and the restoration of others. Water quality has improved in many systems. Most of the recommendations made in the 1972 report have been successfully carried out.

Because of these changed conditions, continued effective management of coastal anadromous fish resources in Massachusetts required a new survey and report that would generate an updated set of recommendations. This document presents the results of a new anadromous fishway survey conducted in 2001 and 2002. The information and recommendations presented are intended to form the basis of an action plan for future DMF anadromous fish work. Recommendations are presented and prioritized for each watershed to enable the DMF to better execute its statutory mandate to develop and manage the anadromous fish resources of the Commonwealth.

This report is the first in a four part series that covers the coast of Massachusetts. Findings from watersheds in Southeastern Massachusetts are presented here including the Narragansett Bay Drainage area, Taunton River Watershed, and Buzzards Bay Drainage area. Part 2 in the series covers the Cape Cod watersheds and the Islands of Martha's Vineyard and Nantucket. The South Shore watersheds comprise part 3 of the series and part 4 includes Boston Harbor and the North Shore watersheds.

MATERIALS AND METHODS

All rivers and streams flowing into Massachusetts's coastal waters, from the Rhode Island to New Hampshire borders, were considered. Most were surveyed from mouth to headwaters. General physical characteristics were noted and data of specific importance to anadromous fish were recorded.

All known or encountered obstructions and fishways were photographed using a high resolution digital camera, and their locations were recorded using handheld Global Positioning System (GPS) units. Site specific details were documented for the first impassable obstruction and its impoundment area to assist in the evaluation of future alterations or fish passage possibilities. On some streams, information was gathered on additional impassable obstructions as well. River obstruction type, construction material, and structural and hydraulic heights were recorded. When a fishway was present, the type of design, construction materials, number of baffles, pools and weirs as well as operational condition were noted. Measurements including length, inside width (IW) and outside width (OW), baffle height, pool length, steep notch width and pool depth were also recorded for each fishway.

Total stream length, obstruction river mile, and impoundment acreage were calculated for all systems using Map Tech Terrain Pro Navigator Software, version 5.02. To calculate impoundment acreage, the impoundment boundary was traced three times and resultant values averaged to achieve a better area estimate.

Water pH was tested at one point on each system using either a Horiba U-10 Waterchecker, an Oakton Waterproof pH Testr2 or a LaMotte Wide Range pH kit (model P-3100). These data should be used with caution since they represent only a single point measurement.

Distances and heights were documented via tape measures and telescoping rods or an Opti-Logic 400 LH Hypsometryx Rangefinder, Sonin Combo PRO ultrasonic electronic measurer and a DISTO classic hand-held laser meter. The electronic measuring devices were utilized when the distance was very large or physical obstructions limited access to the object to be measured.

The presence of anadromous species in a system was determined from a variety of sources including past Division surveys, regional biologist accounts, and local herring and shellfish wardens and harbormaster accounts. If alewives or blueback herring have not been specifically identified, the generic term river herring is used in the species present listing.

For the purposes of this report, an obstruction was defined as any feature, natural or manmade, that negatively effects the upstream or downstream movement of anadromous fish species. While dams were considered most often, the term also applied to natural elevation changes such as those caused by falls and severe rapids or less dramatic gradients that may result in extremely shallow stream depths. Culverts that create elevation changes, cause fish to hesitate due to abrupt lighting changes, restrict stream flow or have submerged outlets were also considered obstructions and impediments to passage.

When present, fishways were rated based on their condition and function. Condition, which was listed as poor, fair, good or excellent, described the physical structure and referred to the level of deterioration of the ladder. Function, rated as not passable, inefficient passage, or passable, described how well the structure can pass fish. A fishway was listed as not passable if fish are unable to utilize it. If there is any room for improvement in the design or placement of the ladder that would enable the structure to better pass fish, it was listed as inefficient passage. If the fishway passes fish at optimum levels and no improvements could be made to it, it was listed as passable.

LIFE HISTORIES

There are seventeen species of anadromous fish in the Commonwealth of Massachusetts (see Appendix 1). Below we discuss the life history of the four species that have been the focus of DMF's restoration efforts through the improvement of fish passage.

River Herring:

The river herring are actually two closely related members of the family *Clupeidae*, the alewife (*Alosa pseudoharengus*) and the blueback (*Alosa aestivalis*) herring. The two species are very difficult to tell apart and, short of a study of their morphometric characteristics, the best method to distinguish them is the color of the peritoneum, the body cavity lining. In the alewife this tissue is gray or silvery while in the blueback herring it is a sooty black color. Although the alewife tends to be larger, up to about 12 inches, there is much overlap in size.

While both species are capable of spawning in riverine or lacustrine environments, there is a decided preference for the latter on the part of alewives while bluebacks generally choose a stream or river type of habitat. In general, most systems contain both species.

Alewives tend to spawn 3 to 4 weeks earlier than bluebacks in the same system. Although actual spawning probably occurs much later, alewives have been observed in Massachusetts streams as early as February and, in one instance, January. Alewives begin spawning when water temperatures reach 51

and bluebacks 57 degrees F. Both species cease spawning when the water warms to 81°F. Blueback eggs are semi-buoyant and tend to drift with the current while alewife eggs will remain in contact with the substrate or current. After utilizing the freshwater habitat for a nursery area for most of the summer, the juvenile herring undertake a massive migration to the ocean in the fall. In the case of alewives, a smaller but significant out migration in late spring/early summer has been documented in some systems.

Once in the marine environment, river herring feed on zooplankton such as microcrustaceans, fish eggs and fish larvae. Maturity occurs at 3 to 5 years and the fish return to their natal streams utilizing their olfactory sense to guide them to the home waters. Repeat spawning occurs more often in northern than in southern populations. Mortality during a spawning season in the south may reach up to 90%.

Formerly an important local food source, river herring were smoked, salted or pickled. Human consumption is now a minor use and the fish are primarily sought after as bait for commercial and sport fishing.

American shad:

The American shad (*Alosa sapidissima*) is also a member of the *Clupeidae* and, with the exception of its size, closely resembles the river herring. The series of 4 to 6 lateral dark spots on the shad's side, posterior to the gill cover, and the fact that its upper jaw extends beyond the eye serve to distinguish it from alewives and blueback herring. Adult males may weigh up to 6 pounds and females can grow to 8 pounds although larger specimens are occasionally reported. Shad may grow to 2 feet in length although individuals of 30 inches have been recorded.

Shad are river spawners, ascending the larger systems such as the Connecticut and Merrimack Rivers when spring water temperatures reach approximately 62 degrees F. A few smaller Massachusetts streams, notably the Palmer and Indianhead Rivers, support small but important populations. Males reach sexual maturity at 3 to 5 years old and females from 4 to 6. Eggs are semi-buoyant and tumble along the stream bottom until hatched. Juveniles spend their first summer in the river feeding on microscopic zooplankton and insects until they depart for the marine environment in the fall.

New England shad populations overwinter in the mid-Atlantic coastal region and migrate northward in the spring, using their olfactory sense to locate natal rivers. Post-spawn adults and immature fish congregate in the Gulf of Maine and Bay of Fundy during the summer before moving to their wintering grounds. There is no commercial fishery for American shad in Massachusetts, where it is considered a sportfish and is eagerly sought by anglers in rivers where the fish congregate in sufficient numbers.

Rainbow smelt:

Rainbow smelt (*Osmerus mordax*) are small fish that rarely exceed 7 to 9 inches as adults and weigh 1 to 6 ounces. Mature females are larger than their male counterparts. The smelt can be distinguished from other small coastal Massachusetts species by its deeply forked tail and adipose fin anterior to the caudal fin. Both sexes mature at about 2 years of age although some precocious one year olds may participate in spawning. Spawning begins in late winter/early spring in Massachusetts when water temperatures reach 40 to 42 degrees F.

Spawning takes place just above the head of the tide in fast flowing, often turbulent water usually associated with rocky or boulder substrate. Eggs are broadcast, fertilized and immediately become attached to the substrate or vegetation by means of a stalk-like appendage that protrudes from the egg surface. Spawning occurs at night with the adult smelt retreating to deeper water downstream during the day.

Larvae are about 1/4 inch when hatched and are carried downstream to the estuary. The juvenile fish feed on zooplankton, especially microscopic crustaceans. Adults feed on small crustaceans such as shrimp and gammarids as well as crabs, worms and small fish. Adult smelt spend the summer in relatively shallow waters less than a mile from shore and move into bays and estuaries during the fall and winter. Smelt feed actively during the winter and as a result support a small but intense rod

and reel fishery from docks and piers and, when ice conditions permit, ice shanties. No commercial fishery exists and in order to protect the species during its spawning run, possession of smelt during the spring is illegal according to state law.

MANAGEMENT

The management of river herring (alewives and blueback herring), American shad and rainbow smelt in coastal waters and streams is delegated to the Division of Marine Fisheries through Chapter 130 of the Massachusetts General Laws. Anadromous salmonids (trout and Atlantic salmon) come under the jurisdiction of the Division of Fisheries and Wildlife. DMF's management techniques fall into three general categories: regulation, propagation and fishway construction.

Regulations

Fisheries for anadromous fishes are subject to the General Laws of the Commonwealth. Chapter 130 of the General Laws establishes specific laws for the management of river herring, American shad, and rainbow smelt in coastal waters and empowers the Director of the Division of Marine Fisheries to create regulations for the protection of these species. Current state regulations are intended to protect existing populations while allowing reasonable usage of the resource by the public. This is accomplished by the standard fishery management techniques of imposing a no fishing period, daily bag limits, restrictions on methods of catch or some combination of the above. (Specific state regulations for all river herring can be viewed in Appendix 2).

In addition to the generic state regulations, Sections 93 and 94 of Chapter 130 allow cities and towns or anyone who creates a fishery to develop their own river herring regulations with the approval of DMF. Autonomous local control of these fisheries, as was established in the past by numerous Special Acts of Legislature, proved for a number of reasons to be ineffective. Conversely, it is not possible for the state to effectively manage the numerous populations in the Commonwealth. Consequently, the repeal of the Special Acts and an emphasis on local control with oversight by DMF has proved to be a satisfactory compromise.

Perhaps of greatest importance to the protection of anadromous fish resources is Section 19 of Chapter 130. This statute gives the Director of Marine Fisheries the authority to order removal of an obstruction to fish passage or order construction of passage facilities at the expense of the owner. Section 19 is responsible for the existence of many fishways that may not have been built otherwise. Other laws such as Section 95, which prohibits unauthorized taking of herring from created fisheries, and Section 96, which prevents the taking of herring after June 15, also aid in the management of this species.

Other anadromous fish are also protected by state law. According to Section 34, smelt may not be taken or possessed from March 15 to June 15 in order to protect spawning broodstocks. Section 100C prohibits taking of American shad by any means other than hook and line and the daily bag limit is 6 shad. Section 17 enables the Director of the Division of Marine Fisheries to set regulations for the management of anadromous fish in coastal waters as well as for other marine species.

Propagation

Propagation may be the oldest fisheries management technique and has been applied to anadromous fish in Massachusetts since the 17th century if not earlier. DMF's propagation strategy for river herring has been to collect adult fish from productive populations just prior to spawning and transport them to a new potential spawning ground that has been made accessible, usually through fishway construction. The offspring of the transplanted adults become imprinted on this habitat just prior to their seaward migration and return there to spawn when they mature. This technique has been extremely successful and is also used to restore populations that have been depleted by overfishing, drought, fish kills or other causes.

American shad propagation has been carried on by DMF since the late 1960's. Both

fertilized eggs and adult shad have been transported from home streams to potential habitats. While some limited success has been achieved, the shad stocking programs have not matched river herring propagation as an important management tool. Other states have been more successful in this area and refinement of methods and techniques in the future could result in a productive shad restoration program.

Rainbow smelt stocking has been carried on in the Commonwealth for over a hundred years. Early attempts did not take habitat requirements into consideration and accordingly the results were less than satisfactory. Both fertilized eggs and adult brood stock have been used for transplanting in the past, each with success. The current method used by DMF is to collect newly fertilized eggs on trays of sphagnum moss or some other material to which the eggs will attach and survive. Once a sufficient number of eggs have been deposited on the trays they are transported to the host stream on which the larval smelt will become imprinted.

Fishway Construction

Massachusetts has been a leader in the field of fishway construction. Records indicate that 18th century colonists recognized the need for fish passage around newly built dams and passed laws requiring access for fish. This tradition has carried into the 21st century. The Commonwealth has maintained its own fishway construction crew since 1934 and, in 1967, DMF established an Anadromous Fish Project which dealt with fish ladder design as well as all the other aspects of anadromous fish management. The result has been the more than 140 fishways documented by this survey, most of which have been designed and/or constructed by DMF. Typically, funding for materials has been provided by towns, local organizations, or state and federal grants, with design expertise and labor coming from the Division's anadromous fish program.

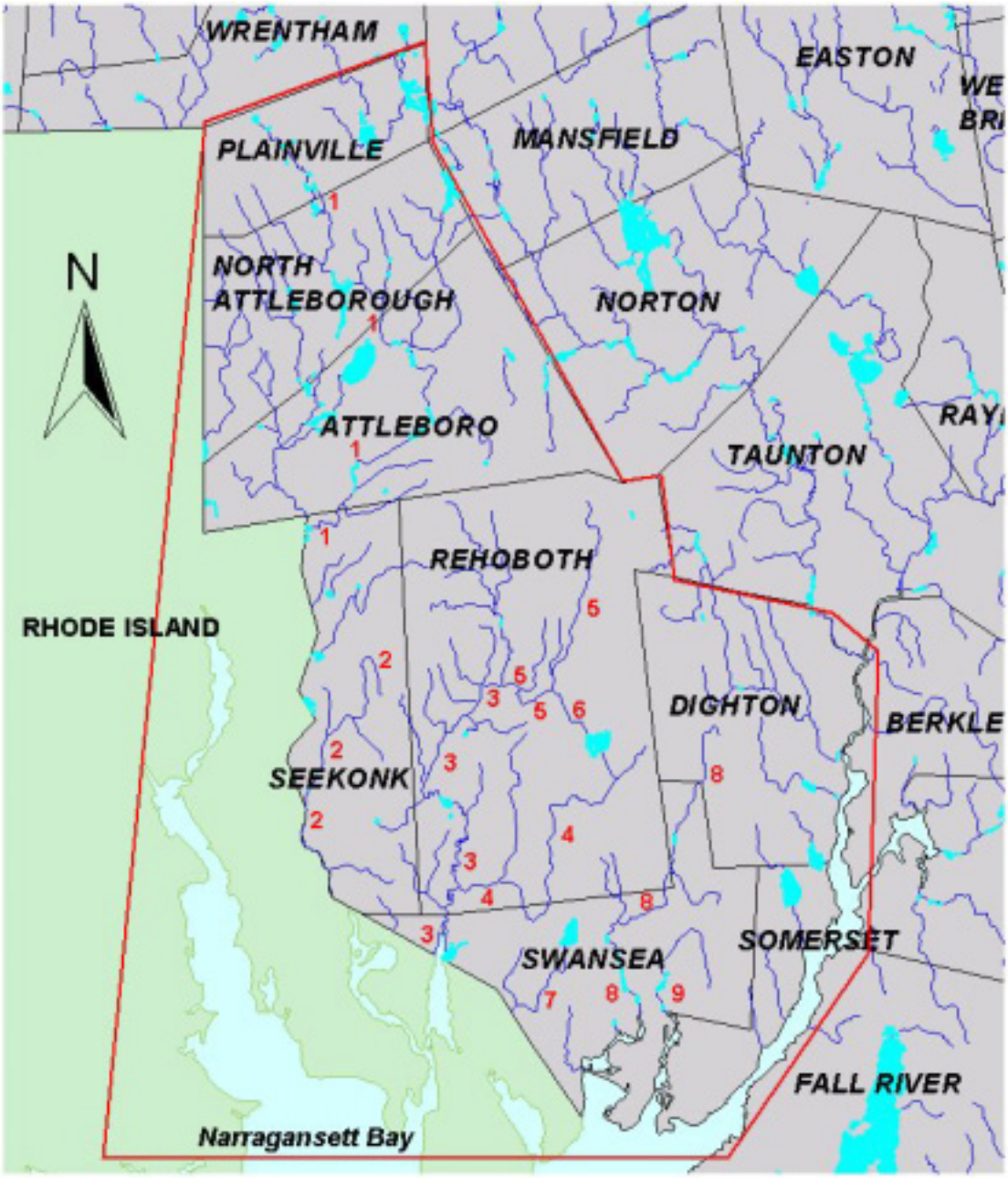
Several fishway types are currently in use on coastal Massachusetts streams. (See Appendix 3 for illustrations and photos of typical fishway designs.) The most common is some variation on the weir-pool design. This style has the advantage of adequate function under low flow regimes and is the favored design when public viewing is desired. Its drawbacks are the need for frequent manual adjustment and its inability to pass species other than river herring with any efficiency. Many of the weir-pool fishways currently in operation have been in place for fifty years or more and are both deteriorated and obsolete in design.

In the late 1960's, DMF began to use a Denil design for most of its newly constructed fishways. This type was more effective in passing species other than river herring and could operate with a minimum of flow adjustment. In addition, fish tended to move through the structure more quickly, creating less backup than is experienced with the weir-pool ladder. The disadvantage is the need for relatively high flow volumes to insure fish passage. The Denil soon became the preferred design where applicable and is still frequently used.

The first installation of a prefabricated, aluminum Alaskan steeppass fishway by DMF took place in 2000. Similar to the Denil in function, this style offered the benefit of reduced costs by eliminating the need for large, labor intensive construction projects. Also, impacts to streambeds, wetlands and adjacent uplands were minimized. In addition, the steeppass has been found to be useful in the modification of dilapidated, inefficient weir-pool ladders. Its disadvantages are similar to those of the Denil type and its cost becomes a factor when many sections are required to overcome an obstruction.

A mechanical fish lift is currently in operation on the Merrimack River. Operated by CHI Energy, the lift at the Essex Dam in Lawrence is primarily designed to pass Atlantic salmon and American shad although other species such as blueback herring utilize it in substantial numbers. Also, a vertical slot or Ice Harbor fishway in addition to a lift is utilized at the Pawtucket Dam in Lowell.

NARRAGANSETT BAY DRAINAGE

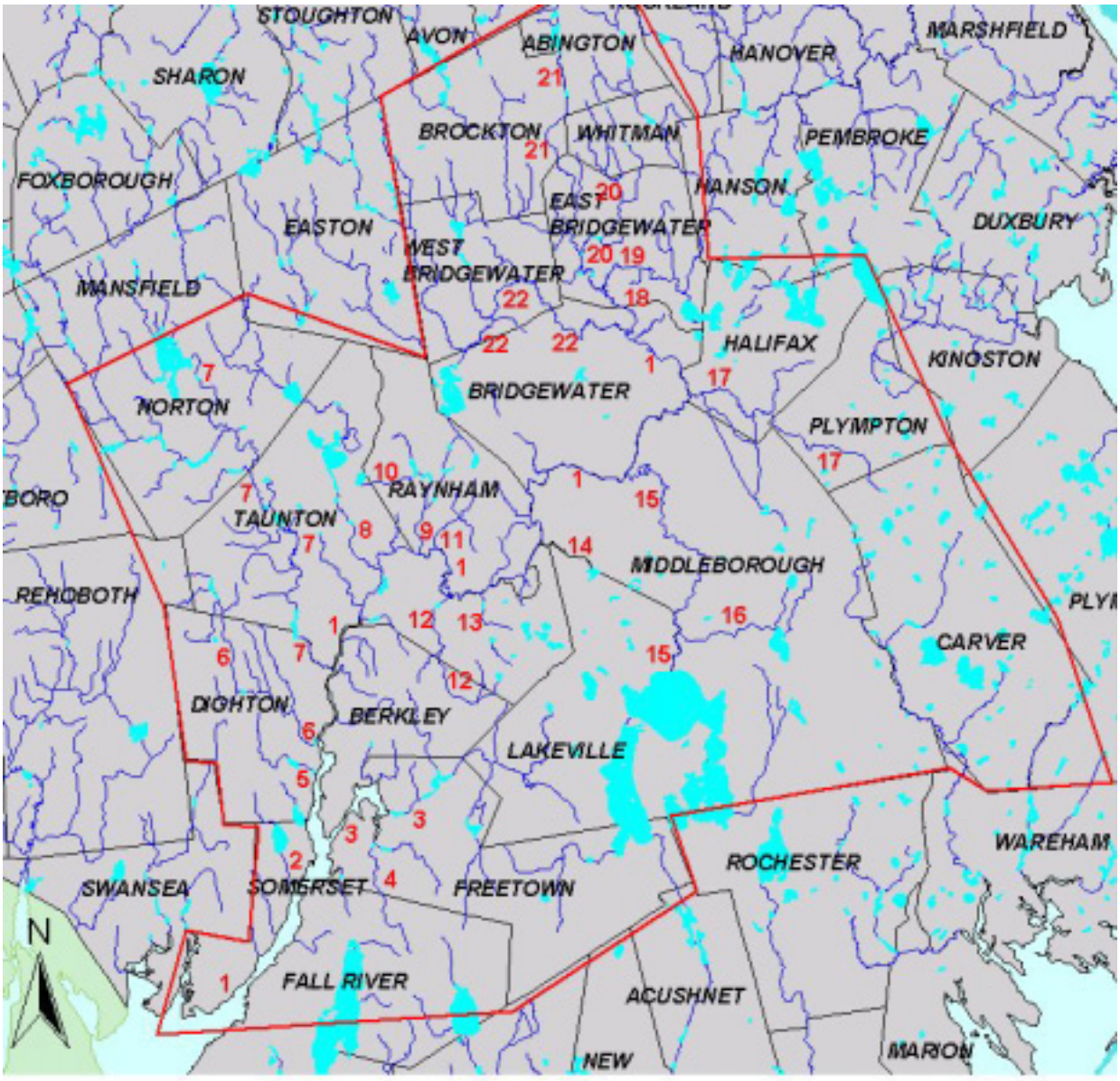


Area ourlined in red represents the Massachusetts towns included in this report as part of the Narrangansett Bay drainage area.

Stream Names:

1 - Tenmile River
2 - Runnins River
3 - Palmer River
4 - Rocky Run
5 - East Branch Palmer River
6 - Bad Luck Brook
7 - Kickamuit River
8 - Cole River
9 - Lee River

TAUNTON RIVER WATERSHED



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

Stream Names:

1 - Taunton River
2 - Labor in Vain Brook
3 - Assonet River
4 - Rattlesnake Brook
5 - Muddy Cove Brook
6 - Segreganset River
7 - Threemile River
8 - Mill River
9 - Forge River
10 - Pine Swamp Brook
11 - Dam Lot Brook
12 - Cotley River
13 - Furnace Brook
14 - Poquoy Brook
15 - Nemasket River
16 - Fall Brook
17 - Winnetuxet River
18 - Matfield River
19 - Satucket River
20 - Meadow Brook
21 - Beaver Brook
22 - Town River

Taunton River Watershed

Taunton River Fall River, Somerset, Dighton, Berkley, Taunton, Raynham, Middleborough, Bridgewater, Halifax

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
38.5	Sixth	7.1	Alewife, blueback, American shad, smelt, white perch, tomcod, lamprey, gizzard shad, Atlantic sturgeon

Obstruction # 1 Plymouth Street Dam Bridgewater

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
38.2	Dam	Steel and wood	75	1.8	0.0	1900	Private	41º 59’ 31.909” N 70º 56’ 19.963” W

Plymouth Street 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
Notched weir-pool	Concrete	122	3.5	6.0	12	-		-	Poor Not passable

Remnants of Plymouth Street Fishway

Remarks:

The Taunton River is formed by the confluence of Town River and the Matfield River in Bridgewater. The only obstruction on the main stem river is immediately downstream of this point. A partially breached dam at Plymouth Street creates an impediment to fish migration during low spring flows. Under most flow conditions, however, river herring are able to pass upstream. Complete removal or further breaching of the remaining dam would insure unencumbered passage to the upper river.

The main stem river possesses considerable potential for American shad development and, beginning in 1969, fertilized eggs and adult shad from the Connecticut River were introduced by DMF into the Taunton. Subsequent monitoring revealed little or no success. More recently, other coastal programs have been able to establish shad populations using other techniques such as fry stocking. Because of the substantial quantity of unobstructed spawning and nursery habitat available in this river, it is highly recommended that Massachusetts explore and develop similar methods to create a population and fishery for American shad.

Labor in Vain Brook Somerset, Dighton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.6	First	7.4	None known

Obstruction # 1 Somerset Reservoir Outlet Somerset

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.9	Elevation change	-	-	-	165.0	-	-	41º 46’ 38.295” N 71º 08’ 29.843” W

Dry Outlet of Somerset Reservoir

Fishway None

Remarks:

The source of this small stream is a public water supply for the Town of Somerset. Widely fluctuating water level in the impoundment, inconsistent flows and lack of access eliminate any potential for development as a river herring run.

Assonet River — Berkley, Freetown, Lakeville

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
8.9	Fourth	6.3	Alewife, blueback, smelt, white perch

Obstruction # 1 — Tisdale Pond Dam — Freetown

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.6	Dam	Concrete, stone core, metal and wooden boards	3.2 and 9.8	6.5 and 8.4	2.3	1710	Town of Freetown	41º 47’ 45.526” N 71º 03’ 56.750” W


Western Spillway at Tisdale Pond


Eastern Spillway at Tisdale Pond

Fishway None

Obstruction # 2 — Monument Dam — Freetown

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.1	Dam	Concrete, stone core	74.4	9.0	6.7	1695	Town of Freetown	41º 47’ 58.219” N 71º 03’ 33.731” W


Monument Dam

Fishway None

Obstruction # 3 Forge Pond Dam Freetown

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.5	Dam	Concrete and stone core with wooden boards	42	6.4	55.3	1702	Town of Freetown	41º 48’ 08.591” N 71º 03’ 07.546” W

Forge Pond Dam

Fishway None

Remarks:

The Assonet River has 3 dams which obstruct fish passage. The first is at the head of the tide and the last forms the only significant potential spawning area, Forge Pond. The Forge Pond dam is in poor condition and leaks badly resulting in the loss of most of the impounded acreage. The cost of extensive repairs to the dams and fishway construction at all three sites gives this stream a low priority for development. River herring and smelt currently spawn immediately below the first dam and an active white perch fishery is carried on in the estuary. Consideration should be given to protection of existing spawning habitat and removal or breaching of the dams in order to create a free flowing stream habitat.

Rattlesnake Brook Freetown

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.7	Third	5.4	River herring, smelt, white perch

Obstruction # 1a Outlet for Bleachery Reservoir (Western) Freetown

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.1	Dam and foundation wall	Dam - concrete; wall – stone	11.3	4.5	3.9	1872	City of Fall River	41º 46’ 50.976” N 71º 05’ 11.744” W

Bleachery Reservoir- Western Outlet

Fishway None

Obstruction # **1b** Outlet for Bleachery Reservoir (Eastern) Freetown

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.1	Dam and foundation wall	Concrete and stone	12.3	Varied (2.5- 5.0)	3.9	1872	City of Fall River	41º 46’ 51.270” N 71º 05’ 09.356” W

Bleachery Reservoir- Eastern Outlet

Fishway None

Remarks:

Rattlesnake Brook is a tributary to the Assonet River estuary. The stream is impounded at the Bleachery Reservoir. Although river herring and smelt have been observed just above the head of the tide, the impoundment’s small size and the unusually low pH measured in the stream makes the brook a poor candidate for development. The existing spawning area below the reservoir should be protected and harvest of existing runs managed.

Muddy Cove Brook Dighton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.4	Second	6.7	River herring

Obstruction # 1 Gate under railroad tracks just below Route 138 Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.2	Dam control structure	Concrete with wood and steel gate	15.0	5.4	1.1	-	-	41º 48’ 42.586” N 71º 07’ 16.160” W

Gate under Railroad Tracks

Fishway None

Obstruction # 2 Dam on Zeneca Inc. Property Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.4	Dam	Concrete	16.0	4.0	0.0	-	Zeneca Inc.	41º 48’ 48.730” N 71º 07’ 30.860” W

Dam on Zeneca Property

Fishway None

Obstruction # 3 Muddy Cove Pond Dam Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.7	Dam, stepped	Concrete	19.0	17	23.1	1950	Zeneca Inc.	41º 48’ 48.658” N 71º 07’ 44.294” W

Muddy Cove Pond Dam

Fishway None

Remarks:

Muddy Cove Brook is a small tributary to the main stem Taunton River in Dighton. Several obstructions exist, two of which are passable at some tidal stages. The first, a tide gate at the stream mouth has deteriorated and allows fish to get by at higher tidal stages. The second is a concrete dam which has had its wooden stop logs removed and is passable under current water levels. A 17 foot dam blocks fish passage to a 23 acre impoundment. River herring have been reported to ascend to the base of that dam. The habitat available in the impoundment and the fact that the owner has expressed interest in installing fish passage facilities makes this system a good candidate for development.

Segreganset River Dighton, Taunton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
8.7	Second	5.7	River herring, smelt, American shad

Obstruction # 1 First Unnamed Dam Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.9	Dam	Concrete	10.5	1.5	2.8	1964	Town of Somerset	41º 49’ 36.972” N 71º 07’ 40.685” W

First unnamed dam and fishway on the Segreganset

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
Weir-pool	Concrete with aluminum slots and wooden baffles	5.5	3.0	7.3	2	N/A (none in at time of survey)	-	3.3	Excellent Passable

Obstruction # 2 Segreganset River Dam Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.2	Dam	Concrete	154	3.6	1.2	1964	Town of Somerset	41º 49’ 49.085” N 71º 07’ 38.982” W

Segreganset River Dam

Fishway None

Remarks:

The Segreganset River has two obstructions to passage in its lower reaches. The first, a low head concrete and steel structure, was equipped with a steel plate weir-pool fishway which became badly deteriorated and was removed in 2000. A new ladder has been constructed by the Town of Dighton along with volunteer help and appears to be functional. Although this dam creates a spawning habitat of only 2.8 acres, a small population of river herring appears to be maintaining itself with some success. Also, smelt eggs have been observed in the stream below the dam in past years.

A second dam, immediately upstream, blocks further passage. This obstruction creates an impoundment of only 1.2 acres which does not justify construction of fish passage facilities.

Three Mile River — Dighton, Taunton, Norton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
12.8	Fifth	6.9	River herring

Obstruction # 1 — Dam below Harodite factory — Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.1	Dam	Concrete and granite blocks	74	9.0	1.0	-	Harodite Company	41º 51’ 46.323” N 71º 07’ 21.375” W

Dam below Harodite Factory

Fishway None

Obstruction # 2 — Dam above Harodite factory — Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.2	Dam	Concrete	25	4	0.5	-	Harodite Co.	41º 51’ 51.523” N 71º 07’ 18.755” W

Dam above Harodite Factory

Fishway None

Obstruction # 3 Dam at Draka Factory Dighton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.7	Dam	Concrete	150	7.0	45.2	-	-	41º 52’ 05.835” N 71º 07’ 46.801” W

Dam at Draka Factory

Fishway None

Remarks:

This tributary to the Taunton River forms the boundary between Dighton and the City of Taunton. The lower course is impounded by two currently impassable dams. The first, at the Harodite Company was equipped with a prefabricated, wooden Denil ladder. This structure was washed away by high water during the spring of 1998. The upstream impoundment has been stocked by DMF with blueback herring in anticipation of a replacement being installed. A more permanent structure has been designed for the site and is awaiting funding. A second dam at the Harodite location appears to be avoidable by way of a bypass channel a few yards from the spillway. A railroad trestle over the bypass channel, while not forming an obstruction itself, collects a large amount of debris which could impede passage and must be cleaned annually.

A fishway has also been designed for the third obstruction, a dam at the Draka factory. This structure, a concrete and wood Denil style ladder, if funded, would make a significant amount of riverine impoundment and slow flowing river habitat available to anadromous species.

Tributary above Berkley St. Taunton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.2	First	6.5	None known

Obstruction # 1 Unnamed dam above Berkley St. Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.3	Dam	Concrete with wooden boards	6.0	3.4	3.2	-	-	41º 52’ 30.784” N 71º 05’ 21.510” W

Unnamed dam above Berkley Street

Fishway None

Remarks:

Due to the difficulty of providing fish passage and the small impoundment size, anadromous fish development is not warranted.

Oakland Mill Ponds (or Brickyard Ponds) Taunton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
0.3	First	7.8	River herring, white perch, gizzard shad

Obstruction # 1 Oakland Mill Ponds culvert Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.3	Culvert, circular	Concrete	2.0	2.0	16.9	-	-	41º 53’ 20.012” N 71º 04’ 50.273” W

Oakland Mill Ponds culvert

Fishway None

Remarks:

This 17 acre impoundment in the City of Taunton drains directly into the Taunton River through a 2 ft. diameter culvert. In the past, river herring have gained access to the impoundment and a small population has developed. Removal of river debris, periodic cleaning of the culvert and channel maintenance are required at this location. The City should petition the Director of DMF for local control and actively manage the run in order to maximize this resource.

Mill River — Taunton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
4.2	Fifth	6.7	River herring

Obstruction # 1 — Taunton State Hospital Dam — Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.4	Dam	Concrete	35	5.5	5.6	-	-	41º 54’ 54.381” N 71º 05’ 49.104” W

Taunton State Hospital Dam

Fishway None

Obstruction # 2 — West Brittania Dam — Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.8	Dam	Concrete with wooden boards	29	3.5	0.7	-	-	41º 55’ 08.760” N 71º 06’ 05.229” W

West Brittania Dam

Fishway None

Obstruction # **3** Whittenton Street Dam Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.4	Dam	Wood, concrete, asphalt and stone	118	12	20.1	1832	L & O Realty Trust	41º 55’ 27.921” N 71º 06’ 22.845” W

Whittenton Street Dam

Fishway None

Obstruction # **4** Morey's Bridge Dam Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.2	Dam	Wood	28	10	266.4	1832	L & O Realty Trust	41º 56’ 02.684” N 71º 06’ 28.348” W

Morey's Bridge Dam

Fishway None

Remarks:

Mill River flows from its source in Lake Sabbatia through the center of the City of Taunton to the Taunton River. This heavily industrialized river is obstructed by four impassable dams each of which presents difficult fishway installation problems. Although Lake Sabbatia’s 266 acres offer considerable potential for river herring development, the lower impoundments are quite small and the cost of providing fish passage to Sabbatia keeps this stream a low priority for future work.

Forge River Raynham

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
5.5	Third	6.9	River herring

Obstruction # 1 Unnamed dam at Raynham Department of Parks & Recreation Office Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.1	Dam	Concrete with wooden boards	24.0	3.7	1.0	-	-	41º 54’ 54.029” N 71º 03’ 42.535” W

Unnamed dam at Raynham Department of Parks & Recreation Office

Fishway None

Obstruction # 2 Johnson Pond Dam Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.1	Dam	Concrete with wooden boards	3.3	9.0	13.3	-	Town of Raynham	41º 55’ 27.287” N 71º 03’ 10.562” W

Johnson Pond Dam

Fishway None

Obstruction # 3 Tracy Pond Dam Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.0	Dam	Concrete with wooden boards	3.3	5.0	3.1	-	-	41º 56’ 11.154” N 71º 02’ 45.771” W

Tracy Pond Dam

Fishway None

Obstruction # 4 Hewitt Pond Dam Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.7	Dam	Concrete with wooden boards	4.0	5.0	13.8	-	Town of Raynham	41º 56’ 47.341” N 71º 02’ 38.044” W

Hewitt Pond Dam

Fishway None

Remarks:

Forge River flows through the center of Raynham to its junction with the Taunton River. The first obstruction, at river mile 1.1, forms a one acre impoundment. The second dam, at river mile 2.1, impounds the 13 acre Johnson Pond and creates a reasonable amount of potential river herring habitat. However, the spillway configuration at the dam is not conducive to fishway installation. With no abundance of spawning area upstream, the potential for anadromous fish development is poor.

Pine Swamp Brook Raynham

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
3.4	First	6.2	Unknown

Obstruction # 1 King's Pond Dam Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.4	Dam	Concrete	12.0	10.0	12.7	1950	Town of Raynham	41º 55' 57.727" N 71º 03' 12.043" W

King's Pond Dam

Fishway None

Remarks:

This small stream is a tributary to Forge River which it enters below Johnson Pond. It is impounded near Main Street forming Kings Pond. The dam at Kings Pond is 10 feet high, creating another difficult fishway construction challenge and associated costs which negate the potential that the impoundment's 13 acres provide.

Dam Lot Brook Raynham

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.2	First	6.3	Unknown

Obstruction # 1 South Street Culvert Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.2	Culvert, rectangular	Concrete	10	0.0	0.0	Replaced 1999	-	41º 54’ 29.538” N 71º 03’ 04.140” W

South Street Culvert

Fishway None

Obstruction # 2 Orchard Street Dam Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.0	Dam	Concrete with wooden boards	5.0	4.3	2.8	-	-	41º 54’ 56.174” N 71º 02’ 36.573” W

Orchard Street Dam

Fishway None

Remarks:

Dam Lot Brook is another small stream which enters the Taunton River in Raynham. It is obstructed first by a concrete culvert at South Street which has a depth of less the 0.2 feet of water due to its flat, wide floor. The second obstruction is a 4 foot dam at Orchard Street which creates an impoundment of less than 3 acres. This acreage does not justify the cost of providing fish passage.

Cotley River

Taunton, Berkley

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
6.2	First	6.9	Unknown

Obstruction # 1

Barstows Pond Dam

Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.4	Dam	Wood	30.0	5.0	15.1	1920	Private	41º 52’ 56.524” N 71º 02’ 55.103” W

Barstows Pond Dam

Fishway

None

Remarks:

This small stream flows 5.5 miles from swamplands in South Taunton to enter the Taunton River near the village of East Taunton. A 5 foot wooden dam, approximately 0.4 miles from the confluence, forms a 15 acre impoundment called Barstows Pond. The privately owned reservoir appears to provide suitable habitat to develop a river herring population in this tributary. The possibility of fishway construction and stocking of adult alewives should be investigated.

Richmond Pond

Taunton (East Taunton)

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
0.3	First	6.7	Unknown

Obstruction # 1

Richmond Pond Dam

Raynham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.3	Dam	Concrete with wooden boards	7.0	5.0	5.9	-	-	41º 52’ 57.694” N 71º 01’ 27.605” W

Richmond Pond Dam

Fishway

None

Remarks:

Richmond Pond drains into the Taunton River by way of a small unnamed intermittent stream. The difficulty of providing fish passage caused by the spillway/culvert configuration and the small impoundment size give this site a low priority for development.

Furnace Brook Raynham, Taunton

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
1.1	Second	7.4	River herring

Obstruction # 1 Lake Rico Dam Taunton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.1	Dam	Concrete	57	14	215.2	1969	Comm.of-MA - DCR	41º 52’ 46.944” N 71º 00’ 03.382” W

Lake Rico 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
Weir-pool	Concrete	170.0	2.0	4.0	20	Varied	-	Varied (6 – 8)	Good Passable

Lake Rico Fishway

Exit of Lake Rico Fishway

Remarks:

This stream flows for approximately one mile from Lake Rico to the Taunton River. The dam that creates Lake Rico was constructed by the Commonwealth’s Department of Environmental Management in 1969. A fishway was installed at the time of construction but the inability to fill the impoundment to its design elevation caused the ladder to be nonfunctional. In 2000, DMF developed a design to retrofit the fishway with a new exit at the existing lake elevation. DEM funded the modifications and the fishway now passes river herring successfully. With proper maintenance and flow regulation, Lake Rico’s 215 acres should support a sizeable population. Due to the low stream gradient, channel maintenance below the ladder and to the brook mouth is also an important priority.

Poquoy Brook — Raynham, Middleborough, Lakeville

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.2	Second	7.1	River herring

Obstruction # 1 — First Bog Sluice at Ocean Spray Headquarters — Middleborough, Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.7	Bog sluice	Concrete with wooden boards	8.4	7.0	0.0	-	Ocean Spray Cranberries, Inc.	41º 54’ 04.737” N 70º 58’ 06.296” W

First Bog Sluice at Ocean Spray Headquarters

Fishway None

Obstruction # 2 — Second Bog Sluice at Ocean Spray Headquarters — Middleborough, Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.8	Bog sluice	Concrete with wooden boards	8.4	5.9	0.0	-	Ocean Spray Cranberries, Inc.	41º 54’ 01.158” N 70º 57’ 57.929” W

Second Bog Sluice at Ocean Spray Headquarters

Fishway None

Obstruction # 3 Third Bog Sluice at Ocean Spray Headquarters Middleborough, Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.0	Bog sluice	Concrete with wooden boards	8.0	8.1	0.0	-	Ocean Spray Cranberries, Inc.	41º 53’ 52.268” N 70º 57’ 49.968” W

Third Bog Sluice at Ocean Spray Headquarters

Fishway None

Obstruction # 4 Bog Reservoir at Ocean Spray Headquarters Middleborough, Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.2	Bog sluice	Concrete with metal slots and wooden boards	8.4	9.0	34.1	-	Ocean Spray Cranberries, Inc.	41º 53’ 45.855” N 70º 57’ 50.217” W

Bog Reservoir at Ocean Spray Headquarters

Fishway None

Remarks:

The only potential river herring spawning area on this stream is a 34 acre cranberry bog reservoir at the Ocean Spray headquarters in Lakeville. In order for fish to access this habitat fishways would have to be constructed at four obstructions which range in elevation from 6 to 9 feet.

Nemasket River Middleborough, Lakeville

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
11.2	Third	6.0	Alewife, blueback, American shad, gizzard shad, lamprey

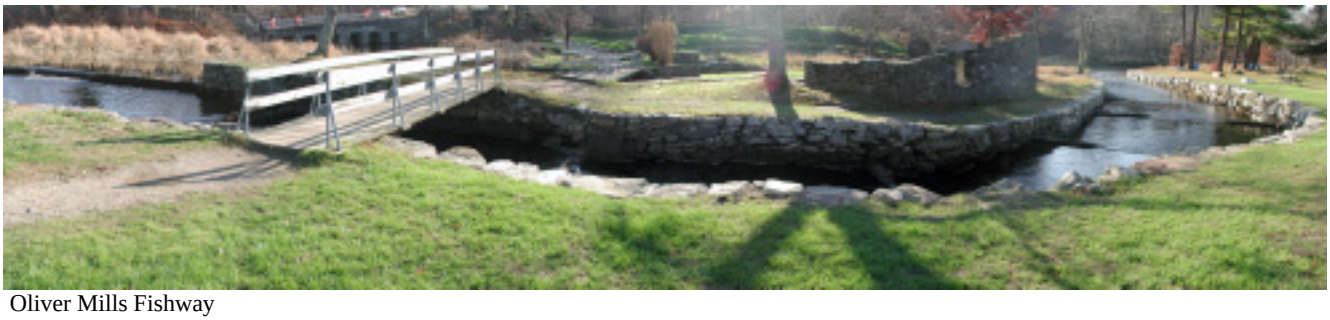
Obstruction # 1 Oliver Mills Dam Middleborough

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
5.3	Dam	Stone and concrete with wooden boards	Varied (3.9-55)	Varied (1.9-4.8)	18.6	~1800	-	41º 54’ 24.864” N 70º 54’ 49.490” W

Two of the 7 spillways at Oliver Mills 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
Notched weir-pool	Stone and concrete	202.0	30-50	30-50	7	2.6	9	Varied (15-20)	Good Passable



Oliver Mills Fishway

Obstruction # 2 Wareham Street Dam Middleborough

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
7.5	Dam, bascule	Concrete with metal gate	27	Variable (highest 9)	4.5	-	Town of Middle-borough	41º 53’ 25.762” N 70º 54’ 15.897” W

Wareham Street 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
Notched weir-pool	Concrete with wooden boards	189.0	6.0	7.5	18	4.1	3.0	11.0	Excellent Passable

Wareham Street Fishway

Obstruction # 3 Assawompset Pond Dam Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Pond Acreage	Year Built	Owner	GPS	
11.5	Dam	Granite with wooden boards	43.0	4.0	2024	1904	New Bedford and Taunton	41º 51’ 07.832” 70º 55’ 07.615”	N W

Assawompset Pond Dam (with Fishway along left edge of the 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	29.5	2.0	4.0	9	4.5	-	-	Good Inefficient passage

Obstruction # 4 Great Quittacas Pond Dam Middleborough

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS	
11.2	Dam	Granite	40	6.5	1185.	-	City of New Bedford	41º 48’ 52.635” 70º 53’ 54.259”	N W

Great Quittacas Pond Dam

Fishway None

Obstruction # 5a Route 18 culvert (larger) Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Pond Acreage	Year Built	Owner	GPS
11.2	Culvert, rectangular	Concrete	8	4	1721	Replaced 1993	Mass-Highway	41º 50’ 00.018” N 70º 56’ 28.780” W

Larger culvert under Route 18

Fishway None

Obstruction # 5b Second Route 18 culvert (smaller) Lakeville

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Pond Acreage	Year Built	Owner	GPS
11.2	Culvert, circular	Concrete	2.5	2.3	1721	1994	Mass-Highway	41º 50’ 00.358” N 70º 56’ 29.044” W

Smaller culvert under Route 18

Fishway None

Remarks:

The Nemasket River supports what is probably the largest coastal river herring population in Massachusetts. Estimates based on visual counts by volunteers have consistently exceeded one million fish per year. The primary reason for this run's large size is the total lacustrine and impoundment spawning and nursery habitat, which exceeds 5000 acres. Three dams form obstructions to passage on the river, each of which is equipped with a fishway. The first, at Oliver Mills, was incorporated into an historic site restoration project and is essentially a highly efficient set of stream baffles. The second, at Wareham Street is a large weir-pool ladder that was designed and constructed by DMF in 1996. The last fishway is at the outlet of Lake Assawompset and is a relatively small Denil type fishway.

The dam at Assawompsett is, in fact, passable for most of the early spring flows since the tailwater pool level rises sufficiently to allow herring to swim over it. When the pool level drops, the migrating herring are able to utilize the fishway. This is an important point since the dam is in poor condition and may be replaced. A dam design that would not allow fish to ascend it could have a dramatic impact on the population because the small Denil ladder is incapable of passing such a large number of fish efficiently. Emergent aquatic vegetation in the impoundment above Wareham Street and other slow moving sections of the river has caused problems for migrating fish in the past and a channel should be maintained through this growth.

A granite structure at the culvert connecting Pocksha and Great Quittacas Ponds has often blocked juvenile out migration during low water periods in late summer and fall. The City of New Bedford, which uses these ponds for a water supply, has altered the structure to allow passage under some lower water levels. The City, with the assistance of EOEA's Taunton River Basin Team has designed a system to reduce sediment build up at this location. The effectiveness of these measures should be monitored.

Two other potential obstructions to passage may be encountered once fish have entered the lake system. A culvert at Route 18 which accommodates the connector stream between Assawompsett and Long Pond was replaced in 1993. The invert elevation of the culvert was too high for downstream migration of juvenile herring and as a result a second smaller culvert was added at a lower elevation. The effectiveness of both these culverts in passing fish has never been assessed. Since Long Pond represents a substantial portion of the total spawning habitat, such an assessment should be conducted.

Lastly, it should be mentioned that the Nemasket River fishery is the only one in the Commonwealth that is under local control other than that granted by Section 94 of Chapter 130. The Towns of Lakeville and Middleborough, through an amendment to an old Special Act of Legislature, have been granted the authority to regulate that fishery. The towns, through their herring committee, have taken on that responsibility with enthusiasm in recent years and they are encouraged to continue to seek professional fisheries management assistance from DMF and or other appropriate state agencies in maintaining and managing the resource.

Fall Brook — Middleborough

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
3.8	Second	6.2	River herring

Obstruction # 1 — Fall Brook Route 28 Dam — Middleborough

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.3	Dam	Concrete with wooden boards	6.0	8.3	5.2	-	-	41º 52’ 10.289” N 70º 52’ 50.325” W

Fall Brook Dam (at Route 28)

Fishway None

Obstruction # 2 Happy Hollow Farm Dam Middleborough

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.6	Dam	Stone and granite	8.0	8.6	0.9	-	-	41º 52’ 16.358” N 70º 52’ 31.454” W

Happy Hollow Farm Dam

Fishway None

Remarks:

Fall Brook is a tributary to the Nemasket River with its source in 175 acre Tispaquin Pond. Although the potential habitat available in the headwater pond is considerable, two dams present difficult fishway installation problems. The first at Route 28 is associated with a culvert which would limit the efficiency of a ladder and the second, at a small private impoundment, is structurally not conducive to fishway construction. In addition, the amount of spawning/nursery area that this pond would add to the system is small when compared to that currently available in the Nemasket’s headwaters.

Winnetuxet River

Halifax, Plympton, Carver

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
11.6	Fourth	6.7	Unknown

Obstruction # 1

Winnetuxet Road Dam — Plympton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
9.2	Dam	Concrete	27.0	9.5	1.1	-	-	41º 56’ 47.182” N 70º 49’ 33.339” W

Winnetuxet Road Dam

Fishway None

Obstruction # 2 Dam at 60 Winnetuxet Rd. Plympton

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
9.5	Dam	Concrete	22.0	9.0	2.0	1913	Private	41º 56’ 41.596” N 70º 49’ 19.378” W

Dam at pond below Parsonage Road

Fishway None

Remarks:

The Winnetuxet River meanders through swamp and marshland for 9 miles from the first obstruction to its confluence with the Taunton River. This 9.5 ft dam forms a small impoundment which is inaccessible to anadromous fish. A second large dam immediately upstream also blocks passage. No significant potential habitat is available to justify fishway construction at these sites. The DMF had introduced bluebacks into the 9 miles of riverine habitat to augment this system. The total number of fish stocked was 6600 during the time period 1989 to 1993. No sampling for fish presence has been conducted since due to lack of personnel and funding.

Satucket River East Bridgewater

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
5.6	Fourth	7.1	River herring

Obstruction # 1 Dam at Route 106 East Bridgewater

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.2	Dam	Concrete and wood	6.0	4.5	0.0	-	15 Whitman St. Corp.	42º 01’ 17.366” N 70º 57’ 03.783” W

Dam at Route 106

Fishway None

Remarks:

The Satucket River flows from 124 acre Robbins Pond for 5.6 miles to the Matfield River. One obstruction, a dam at Route 106, blocks fish passage to this significant habitat. The dam is in poor condition and has been partially breached for safety reasons thereby draining its impoundment. Fish may be able to surmount the remaining elevation but such passage would be less than adequate for the potential population that this system can produce. The current owner is faced with the options of dam repair or removal. If repair is chosen, a fishway should be included in the design. If the removal option is selected, it should be complete and leave no obstruction for migrating fish. Stream channel reconstruction and design should be performed to ensure no elevation differences create blockage at the Route 106 culvert or further upstream.

Stump Brook Halifax

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
3.8	Second	5.3	Unknown

Obstruction # 1a Robbins Pond/Bog Reservoir Connection Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.5	Dam	Concrete	14.2	2.8	168.7	-	-	42º 00’ 12.428” N 70º 54’ 06.034” W

Dam at Robbins Pond/Bog Reservoir Connection

Fishway None

Obstruction # 1b Bypass Channel from bogs to Robbins Pond Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.5	Bog sluice	Concrete with wooden boards	6.9	1.9	0.0	-	-	41º 59’ 58.547” N 70º 54’ 06.765” W

No photo available

Fishway None

Obstruction # 1c-I Bog Sluice behind Camp off Quadrille Rd. Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.7	Bog sluice	Steel with wooden boards	3.5	1.2	0.0	-	-	41º 59’ 59.769” N 70º 54’ 13.232” W

Bog Sluice behind Camp off Quadrille Road

Fishway None

Obstruction # 1c-II Bog T Control Structure Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.8	Bog sluice	Concrete with wooden boards	6.1	0.0	0.0	-	-	41º 59’ 58.390” N 70º 54’ 06.684” W

Bog T Control Structure

Fishway None

Obstruction # 1c-III Bog Reservoir Dam Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.8	Bog sluice	Concrete with wooden boards	6.0	4.5	168.7	-	-	41º 59’ 58.390” N 70º 54’ 06.684” W

Bog Reservoir Dam

Fishway None

Obstruction # 2 Dam at Furnace Street Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.4	Dam	Concrete with wooden boards	7.5	5.2	13.7	1917	Town of Halifax	41º 59’ 54.991” N 70º 53’ 15.949” W

Dam at Furnace Street

Fishway None

Obstruction # 3 Stump Brook Dam Halifax

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.0	Dam	Concrete	67.5	4.6	0.0	1964 -1969	City of Brockton	42º 00’ 48.570” N 70º 52’ 10.213” W

Stump Brook 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
Weir-pool	Concrete	19.5	2.0	4.2	6	Varied (0.6-3.0)	-	3.5	Good Passable

Fishway at Stump Brook Dam

Remarks:

Stump Brook flows into Robbins Pond from Monponsett Pond. While over 500 acres of potential habitat are available in Monponsett Pond, fish would have to navigate a complex system of cranberry bogs and reservoirs containing a number of obstructions to passage. In addition, water is diverted from Monponsett Pond to Silver Lake by the City of Brockton, raising issues of suitable flows for downstream passage. Despite the attractive acreage in Monponsett and the fact that a fishway was incorporated into the dam which impounds the pond, resources should be directed at getting adequate passage to Robbins Pond before considering further development.

Meadow Brook East Bridgewater, Whitman

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
6.1	First	6.6	River herring

Obstruction # 1 Willow Avenue Dam East Bridgewater

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.8	Dam	Concrete	14.0	2.0	0.0	-	-	42º 02’ 10.798” N 70º 57’ 43.058” W

Willow Avenue Dam

Fishway None

Obstruction # 2 Forge Pond Dam East Bridgewater

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.8	Dam	Concrete	26.0	6.6	3.0	-	-	42º 02’ 11.867” N 70º 57’ 41.926” W

Forge Pond Dam, with fishway along right edge of the 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
Weir-pool	Concrete with wood baffles	18.0	4.0	6.0	4	N/A (none in at time of survey)	-	Varied (3-6)	Poor Not passable

Remarks:

Before it enters the Matfield River, this stream forms a 3 acre impoundment called Forge Pond. Immediately below the pond is a small dam at Willow Avenue. This 2 foot drop may be passable during spring flows with some adjustment to the notch in the crest. The dam at Forge Pond has a deteriorated fishway which is not currently functional. A population could be restored here if the ladder was repaired, although only a small spawning area would be gained.

Beaver Brook East Bridgewater, Brockton, Abington

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
6.9	First	6.6	Unknown

Obstruction # 1 Hunts Pond Dam (Mill St. Dam) Brockton/Abington line

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
5.4	Dam	Concrete spillway, earthen berm	4.0	5.5	5.3	1920	Cities of Brockton and Abington	42º 05’ 43.384” N 70º 58’ 30.901” W

Hunts Pond Dam

Fishway None

Obstruction # 2 Cleveland Pond Dam Abington

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
6.9	Dam	Concrete	43	6.0	100.0	Repaired 1992	Comm.- of Mass. - DCR	42º 06’ 51.966” N 70º 58’ 42.620” W

Cleveland Pond Dam

Fishway None

Remarks:

Beaver Brook, a tributary of the Matfield, arises in Cleveland Pond (Ames Pond) in Ames Nowell State Park. Along its 7 mile course two obstructions block fish passage. The first is a dam at 5.5 acre, Hunts Pond dam. The second is a 6 foot dam at Cleveland Pond. Both are currently impassable. However, the 100 acres of potential spawning habitat in the upper impoundment suggest that installation of fishways be considered.

Town River West Bridgewater

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
10.5	Fifth	6.4	River herring

Obstruction # 1 High Street Dam West Bridgewater

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.8	Dam	Concrete with wooden boards	61	10.0	28.6	-	APC Corp.	42º 00’ 08.889” N 70º 58’ 55.340” W

Fishway at High Street, with dam in background

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
Notched weir-pool	Concrete	212.0	4.0	6.0	21	3.0	1.0	6.0	Fair Passable

Obstruction # 2 War Memorial Park Dam West Bridgewater

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
6.4	Dam	Concrete with wooden boards	6.0	3.4	1.8	1900	Town of Bridgewater	42º 00’ 57.591” N 71º 00’ 35.454” W

Fishway at War Memorial Park with dam in background

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
Notched weir-pool	Concrete	66.0	4.0	6.0	12	1.3	2.0	Varied (3.8-6.2)	Fair Inefficient passage

Remarks:

Town River flows from 370 acre Lake Nippenicket to the Matfield River. Two dams create two small run-of-the-river impoundments along its course. Each of these is equipped with a functional fishway. The first, at High Street, surmounts a ten foot dam. The water level behind the dam was lowered in the mid-1990’s and accordingly, the fishway exit was modified by DMF to accommodate this new elevation. The weir-pool fishway and its associated barrier dam are currently providing adequate passage.

The second dam received extensive repairs in 2001 and, as part of that work a barrier dam was added to direct fish to the fishway entrance. The effect of the barrier dam on passage efficiency hasn’t been assessed as of this writing but the fishway itself, an early notched weir-pool design is inadequate for the population this system should be producing. Consideration should be given to replacement or modification with an aluminum steeppass insert.

Taunton River Watershed Recommendations:

1. Although the Taunton River watershed is currently abundant in anadromous resources, a number of things could be done to improve its capacity to support these fish. A successful American shad restoration program aimed toward developing an active sport-fishery would be of great value. Alternative techniques which have worked in other states should be employed here and a commitment made to reestablishing this species in the system.

2. Efforts should continue to achieve installation of the two fishways for which designs have been developed in the Three Mile River. Full funding for the first fishway has been secured and installation in 2004 is expected.

3. Work should continue on developing a system to prevent sediment buildup and flow reversal at the Pocksha Pond/ Great Quittacas connection in order to insure downstream passage of juveniles.

4. The possibility of modifying the Veterans Memorial Park fishway in West Bridgewater with an aluminum steeppass insert should be pursued.

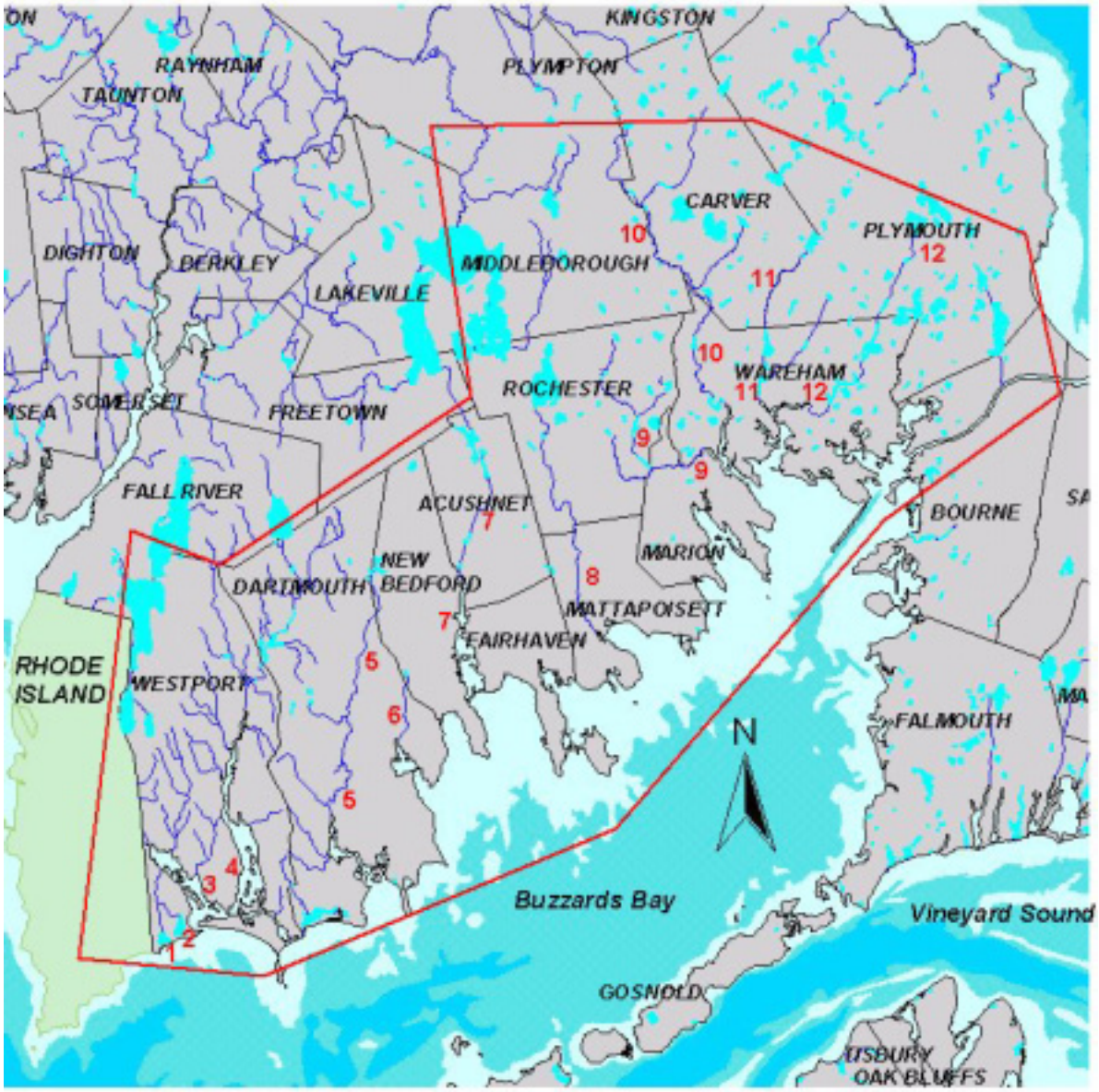
5. Removal or further breaching of the Plymouth Street dam on the Taunton River should be undertaken.

6. The installation of fish passage facilities at the upper impoundment on Muddy Cove Brook should be pursued.

7. The feasibility of removal of some or all of the dams on the Assonet River in order to restore natural stream habitat should be considered.

8. Removal or partial breaching of the Cotton Mill Dam below Route 106 should be assessed for herring access into the Satucket River system.

BUZZARDS BAY DRAINAGE



Area outlined in red represents the Massachusetts towns included in this report as part of the Buzzards Bay drainage area.

Stream Names:

1 - Richmond Pond
2 - Cockeast Pond
3 - West Branch Westport River
4 - East Branch Westport River
5 - Paskamanset River
6 - Buttonwood Brook
7 - Acushnet River
8 - Mattapoisett River
9 - Sippican River
10 - Weweantic River
11 - Wankinco River
12 - Agawam River

Buzzards Bay Drainage

Richmond Pond Westport

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
1.6	First	7.6	River herring

No Obstructions

Richmond Pond outlet to Buzzards Bay

Fishway None

Remarks:

Richmond Pond is a 67 acre salt pond which lies on the Massachusetts / Rhode Island border at the western end of Buzzards Bay. Under high water conditions, the pond drains into the Bay and conversely, salt water enters the pond on higher tides. Apparently there is enough freshwater input to support an annual run of river herring. There is no other significant habitat in the drainage and no opportunity for further development.

Cockeast Pond Westport

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
0.1	First	7.6	River herring, white perch

Obstruction # 1 Cockeast Pond outlet Westport

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Pond Acreage	Year Built	Owner	GPS
0.1	Culvert, circular	Corrugated metal	2	2	99.0	-	-	41º 30’ 35.131” N 71º 05’ 53.262” W

Cockeast Pond outlet/fishway

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
Natural boulder vortex	Stone	5.0	8.0	8.0 (channel width)	1	1.0	1.0	5.0	Fair Passable

Remarks:

This 99 acre salt pond enters the Westport River at its mouth. Herring are able to access the pond through the short connecting stream and, although they appear to prefer higher tidal stages and the darkness of night, there is no real obstruction. Plans for modification of the road culvert have been discussed and care should be taken to insure continued fish passage and maintenance of salinity levels adequate to sustain this population. A small, traditional bait-fishery is carried on at this location.

West Branch Westport River Westport, MA; Adamsville, RI

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
3.4	Second	6.3	River herring, smelt

Obstruction # 1 Gray's Mill Pond Dam Adamsville, RI

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.4	Dam	Stone and wood	17.5	6.5	3.0	-	-	41º 33' 20.989" N 71º 07' 35.801" W

Gray's Mill Pond Dam and Ladder

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
Alaskan Steeppass	Aluminum	24.0	1.5	-		-	-	-	Excellent Passable

Remarks:

Grays Mill Pond provides the only accessible river herring spawning area in this system. This 3 acre impoundment on the Massachusetts/Rhode Island line was equipped with a wooden Denil ladder, built by the Town of Westport and installed by DMF in 1995. This was washed away by high water in 2001 and replaced with an aluminum Denil fishway in 2002. A small run of river herring has existed here and this population can be expected to increase in size with improved access to the pond.

East Branch Westport River Westport, Dartmouth

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
9.7	Fifth	6.5	River herring, white perch, tomcod, smelt

Obstruction # 1 Forge Pond Dam Westport

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
8.6	Dam	Concrete	73	12	2.9	-	-	41º 37’ 52.384” N 71º 03’ 13.964” W

Forge Pond Dam

Fishway None

Obstruction # 2 Noquochoke Lake Dam Westport, Dartmouth

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
9.7	Dam	Concrete	126	9.0	165.0	1942	City of Fall River	41º 38’ 19.569” N 71º 02’ 48.620” W

Noquochoke Lake Dam

Fishway None

Remarks:

Two large dams obstruct fish passage on this branch of the Westport River. The first, which forms a 3 acre impoundment, is incorporated into a rock ledge, making any attempt at fishway construction difficult and costly. The second, at the outlet of 165 acre Lake Noquochoke, presents similar fishway construction problems due to its height and proximity to a state highway. While the potential habitat in the headwater impoundment is very attractive, the costs of providing passage relegate this stream to a low priority. Lake Noquochoke also exhibits large fluctuations in flow and periodically levels fall below dam crest height, causing discharge to cease.

Paskamanset/Slocum River Dartmouth

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
10.2	First	6.5	Alewife, blueback, smelt

Obstruction # 1 Russells Mills Pond Dam Dartmouth

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.0	Dam	Concrete with wooden boards	25.0	6.0	2.9	Rebuilt 2001	Town of Dartmouth	41º 34’ 16.661” N 71º 00’ 16.430” W

Russells Mills Pond 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 fiberglass baffles	18.0	3.0	4.5	7	6.0	-	-	Good Inefficient passage
Weir-pool	Concrete	61.0	5.0	7.0	12	2.0	3	5.5	Good Passable

Russells Mills Pond Ladder, lower Denil section

Russells Mills Pond Fishway, upper weir-pool section

Obstruction # 2 Smith Mills Dam Dartmouth

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
6.8	Dam	Granite blocks	28	4.0	9.2	-	-	41º 38’ 24.271” N 70º 59’ 06.675” W

Smith Mills Dam

Fishway None

Obstruction # 3 Turner’s Pond Dam New Bedford

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
10.2	Dam	Concrete with wooden boards	6.0	5.6	86.7	1949	City of New Bedford	41º 40’ 43.884” N 70º 58’ 38.814” W

Turner’s Pond Dam

Fishway None

Remarks:

The Paskamanset River originates in swampland and Turners Pond, an 87 acre impoundment on the New Bedford/Dartmouth line. It flows through two additional impoundments, each with an obstructing dam. Only the lowermost, at Russells Mills, is equipped with a fishway. This structure, a weir-pool/Denil combination, has operated ineffectively for years. Modifications to the ladder entrance, done in 2000, deepened the entrance channel and improved passage noticeably. The installation of an additional Denil baffle at the lower end of the ladder would significantly increase efficiency.

A small population of river herring has managed to maintain itself here despite poor access to the impoundment. The recently improved passage should produce an increase in population size. If this results in numbers of river herring reaching the Smith Mills dam, a fishway installation should be considered at that location.

Buttonwood Brook New Bedford

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
3.2	First	6.9	None known

Obstruction # 1 Buttonwood Park Pond Dam New Bedford

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.0	Dam	Concrete	13.0	4.0	11.6	1960	City of New Bedford	41º 37’ 55.852” N 70º 57’ 13.607” W

Buttonwood Park Zoo

Fishway None

Remarks:

This small stream flows through New Bedford's Buttonwood Park and is impounded there, forming an 11.6 acre pond. The spillway configuration makes fishway installation difficult which, combined with the relatively small impoundment size, makes this a low priority site.

Acushnet River — New Bedford, Fairhaven, Acushnet

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
8.2	Third	6.5	Alewife, blueback, smelt

Obstruction # 1 — Acushnet Sawmill Dam — Acushnet

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.4	Dam	Concrete and stone	118	4.6	6.5	1900	Acushnet Sawmill Co.	41º 41’ 03.933” N 70º 55’ 07.191” W

Acushnet Sawmill 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
Notched weir-pool	Concrete	33.0	3.0	4.2	6	1.8	0.8	Varied (2.0-3.0)	Fair Inefficient passage

Acushnet Sawmill Ladder

Obstruction # 2 Hamlin St. Dam Acushnet

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
5.3	Dam	Concrete with wooden boards	4.7	1.7	12.5	1920	Town of Acushnet	41º 41’ 46.484” N 70º 54’ 52.097” W

Hamlin Street Dam

Fishway None

Obstruction # 3 New Bedford Reservoir Dam Acushnet

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
8.1	Dam and elevation change	Granite with wooden boards	50	11	220.0	1867	City of New Bedford	41º 43’ 43.426” N 70º 53’ 54.880” W

New Bedford Reservoir 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	264.0	3.0	5.0	26	5.0	-	-	Excellent Passable

New Bedford Reservoir Ladder

Remarks:

This system has been the focus of much anadromous fish development work in recent years. With funding available through the New Bedford Harbor Cleanup Fund (administered by the New Bedford Harbor Trustees Council) and a large spawning/nursery habitat available in the headwater, the potential for significantly increasing the size of the existing river herring population is considerable. Three dams on the river, although all currently passable to varying degrees, form obstructions which limit the population's productivity.

The first dam, at the Acushnet Sawmill, is equipped with an inefficient weir-pool ladder. Fish have difficulty finding the ladder entrance due to heavy vegetation growing in the tailrace area which has eliminated any defined channel. For a number of reasons including fish passage, environmental benefits and a willing dam owner, the structure is being considered for removal and a feasibility study of that alternative has recently been completed. Should removal not be determined to be a viable option, more efficient fish passage facilities must be provided.

The Hamlin Street dam, the second on the stream, is also the subject of a feasibility study for full or partial breaching. While herring have been able to pass this obstruction under suitable flow conditions it remains a limiting factor in the population’s ability to reach its potential. Again, if removal is decided against, a fishway must be installed at this location.

An 11 foot dam at 220 acre New Bedford Reservoir is the third and last obstruction on the system. Although the spillway at this dam has passed fish under ideal flow conditions, this structure has severely limited the number of fish spawning in the Reservoir. A state-of-the-art Denil fishway, designed by DMF with assistance from the U.S. Fish and Wildlife Service and funded by the New Bedford Harbor Cleanup Fund, was constructed in 2002. In anticipation of the fishway installation, DMF initiated alewife stocking at the Reservoir in 1999 in order to accelerate the recovery of this population.

Mattapoisett River Mattapoisett, Rochester

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
11.1	Fifth	6.0	Alewife, blueback, smelt

Obstruction # 1 Route 6 Crossing Mattapoisett

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.7	Dam	Concrete with metal spillway gates	19.0	7.0	2.5	-	Town of Mattapoisett	41º 39’ 25.533” N 70º 50’ 03.390” W

Dam at Route 6 Crossing

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	58.0	3.0	5.0	16	8.6	-	-	Excellent Passable

Ladder at Route 6 Crossing

Obstruction # 2 Rounseville Road Crossing Rochester

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
8.7	Dam	Stone with wooden boards	11.0	4.0	0.0	-	-	41º 44’ 10.582” N 70º 51’ 45.888” W

Dam at Rounseville Road Crossing

Fishway None

Obstruction # 3 Rochester Fish Hatchery Rochester

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
9.7	Dam	Concrete with wooden boards	7.0	5.6	31.8	-	MA Department of Fish & Wildlife	41º 44’ 53.016” N 70º 51’ 49.382” W

Rochester Fish Hatchery 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
Stream baffle	Stone	1790	10	10	15	Varied (0.5-1)	-	Varied (10-50)	Good Passable

Stream Baffles at Rochester Fish Hatchery

Obstruction # 4 Snipatuit Pond Outlet Rochester

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
11.1	Dam control structure	Concrete with wooden boards	4.0	2.4	710.0	1986	Private	41º 45’ 45.877” N 70º 52’ 09.022” W

Snipatuit Pond Dam and Ladder

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
Weir-pool	Concrete with wooden baffles	44.0	4.0	5.3	6	Varied (2.4)	-	8.0	Excellent Passable

Remarks:

The dam and fishway at the first impoundment on the Mattapoisett River at Route 6 were both replaced in 1996. The new fishway is a Denil design which provides optimal passage around this obstruction. Water levels in the impoundment are controlled by the Fairhaven Water Department and must continue to be regulated with fish passage in mind.

The second obstruction is a concrete flume with wooden stoplogs at Route 105 (Rounseville Road). These boards are reportedly removed annually with the arrival of the herring. Another obstruction occurs at a fish hatchery owned by the Massachusetts Division of Fisheries and Wildlife. Fish avoid this dam by means of a bypass channel with stone stream baffles to overcome the elevation change. A third dam, at the outlet of 710 acre Snipatuit Pond, is surmounted by a concrete and wood weir-pool ladder incorporated into the dam structure.

This fishery is controlled by a Tri-Town Herring Committee representing the towns of Mattapoisett, Marion and Rochester. In addition, a citizens group called Alewives Anonymous has assisted in the maintenance of this run. This organization has also installed an electronic fish counter at the outlet of Snipatuit Pond which has been in place for 14 years. A second counter has been added to the exit end of the first fishway. Estimates based on these counts have ranged from 40,000 to 130,000 fish annually.

Tinkham Pond

Mattapoisett, Acushnet

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
1.2	Second	5.4	None known

Obstruction # 1

Tinkham Pond control structure

Mattapoisett

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.2	Dam control structure	Concrete and stone with wooden boards	2.4	1.6	16.8	1932	Mattapoi-sett Cranberry Co.	41º 40’ 56.092” N 70º 51’ 23.814” W

Dam control structure at Tinkham Pond

Fishway

None

Remarks:

This small stream drains a 16.8 acre impoundment called Tinkham Pond. Flow is diverted through a cranberry bog system before joining the Mattapoisett River. While the potential habitat in the impoundment is considerable, the contribution it would make to the system given the acreage available in Snipatuit is negligible. This and the potential problems created by the bog diversion make this stream a low priority for development.

Sippican River

Wareham, Marion, Rochester

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
5.0	Third	6.0	Alewife

Obstruction # 1

Hathaway Pond Dam — Marion

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
3.6	Dam	Concrete with wooden boards	20.0	5.0	21.5	1900	Private	41º 44’ 02.360” N 70º 47’ 39.373” W

Hathaway Pond 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
Weir-pool	Concrete with wood baffles	85.0	2.0	4.8	8	Varied (2.6)	-	Varied (9.5-30.7)	Fair Inefficient passage

Hathaway Pond Ladder

Obstruction # 2 Leonards Pond Dam Rochester

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
5.0	Dam	Wood	18.0	4.1	42.9	1900	Hiller Brothers Cranberry	41º 44' 53.539" N 70º 48' 16.686" W

Leonards Pond Dam and Ladder

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	Wood	30.0	2.2	2.5	16	3.0	-	-	Fair Inefficient passage

Remarks:

The Sippican River is formed by the confluence of its east and west branches. Each of these tributaries flows through a complex system of cranberry bogs and related reservoirs. The two impoundments on the main stem, Hathaway and Leonards Ponds, comprise the only significant herring habitat on the system. The fishway at Hathaway Pond, though functional, has a 200 foot entrance channel and is incapable of discharging sufficient attraction flow to deflect migrating fish from the main channel. A barrier dam across the stream just above the ladder entrance would solve this problem. The second ladder is a wooden Denil installed in 1993 by DMF. It too is functional but less than optimal due to competing attraction flow from the dam spillway; a barrier dam would be useful here as well. Alewives Anonymous, a local volunteer group, installed a counter at this location in 1995. Counts have ranged from a low of 306 fish in 1995 to a high of 957 in 2000 with an average of 555 per year. The Sippican River fishery is also managed by the Tri-Town Committee of Mattapoisett, Marion and Rochester through Section 94 of Chapter 130.

Weweantic River — Wareham, Carver, Middleborough

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
16.6	Fourth	6.3	River herring, smelt, white perch, tomcod

Obstruction # 1 — Horseshoe Pond Dam — Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.3	Dam	Concrete	44.5	6.0	59.0	1920	Private	41º 45’ 55.047” N 70º 44’ 51.047” W

Horseshoe Pond Dam

Fishway None

Obstruction # 2 — Tremont Mill Pond Dam — Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
7.5	Dam	Concrete	32	24	30.5	1920	Town of Wareham	41º 47’ 22.583” N 70º 45’ 51.720” W

Tremont Mill Pond Dam

Fishway None

Remarks:

The Weweantic River has its source in swamplands of Middleborough and Carver. The upper reaches of the system are tied to a complex system of cranberry bogs and their associated reservoirs, obstructing dams and water withdrawals. The lower section, however, does have potential for anadromous fish development.

The first obstruction to fish passage is just above the point of tidal influence. This 6 foot dam creates a 59 acre impoundment called Horseshoe Pond. An old millrace is capable of passing fish under ideal flow conditions although its entrance location is too far downstream of the dam. A Denil fishway has been designed for this location and, until funding for construction is secured, modifications to the millrace could provide improved passage into the pond.

The second obstruction on the stream is at 30 acre Tremont Mill Pond. A 24 foot high dam associated with an unused hydroelectric station would prevent fish passage into this impoundment. Although the acreage is significant, the height of this dam would make any attempt at installing a fishway difficult and expensive. Fishway construction at this site should not be considered until river herring are utilizing the lower impoundment to its greatest potential.

Of special interest on this river is the unique rainbow smelt fishery which takes place each spring. Section 34 of Chapter 130 prohibits fishing for or possessing Massachusetts smelt from March 15th to June 15th. Due to a Special Act of Legislature, however, residents of Wareham, Rochester, Marion and Mattapoisett may take smelt from the Weweantic from the 1st of March through the 1st of April using nets of a specified size. This is the only spring smelt fishery permitted in the Commonwealth and the population appears to be maintaining itself successfully.

Wankinco River Wareham, Carver, and Plymouth

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
7.3	Second	6.1	River herring

Obstruction # 1 Parker Mills Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.7	Dam	Concrete with wooden boards	10.8	7.5	74.7	1900	Town of Wareham	41º 46’ 01.789” N 70º 43’ 19.891” W

Parkers Mills Dam and Ladder

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	123.7	3.0	4.5	42	4.8	-	-	Good Passable

Obstruction # 2a Tihonet Pond Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.5	Dam	Concrete with wooden baffles	8 (including fishway)	8.9	90.0	1977	A.D. Makepeace Co.	41º 47’ 20.413” N 70º 42’ 44.952” W

Tihonet Pond 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 fiberglass and wooden baffles	86.0	2.0	3.8	37	8.0	-	-	Good Inefficient passage
Notched weir-pool	Concrete with wooden baffles	62.0	4.5	8.0	7	1.9	1.5	6.6	Good Inefficient passage

Upper (weir-pool) Section of Tihonet Pond Ladder

Lower (Denil) section of Tihonet Pond Ladder

Obstruction # 2b Tihonet Pond Outlets Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.5	Dam	Earth, stone and concrete	4.5	15	90.0	1900	A.D. Makepeace Co.	41º 47’ 14.612” N 70º 43’ 07.677” W

Tihonet Pond Outlet

Fishway None

Obstruction # 3 At base of impoundment north of Tihonet Pond — Carver/Plymouth

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.0	Bog sluice	Concrete with wooden baffles	10.0	6.2	6.9	1955	A.D. Makepeace Co.	41º 48’ 30.678” N 70º 42’ 59.225” W

Bog Sluice at base of impoundment Upstream of Tihonet Pond

Fishway None

Remarks:

The Wankinco is another southeastern Massachusetts stream which is highly manipulated by cranberry bog diversions. From its source in East Head Pond it flows through a long series of bogs forming several impoundments along its course. The first two, Parker Mills Pond and Tihonet Pond, provide spawning and nursery habitat for river herring. The dam at Parker Mills Pond is provided with a concrete and wood Denil ladder. This ladder functions well but entrance to the structure is difficult at low tidal stages. Also, care must be taken to insure maximum flow through the ladder for optimal attraction to the entrance.

Tihonet Pond has two outlets, the eastern-most of which is equipped with a fishway. This combination weir-pool and Denil style ladder functions adequately with proper flow adjustment. The problem that occurs at this impoundment is the attraction flow from the west outlet which causes migrating herring to be diverted into a dead end channel. Careful adjustment of flows from the two outlets could increase the numbers of fish which reach the spawning area. Further development within this system is not justified due to numerous small obstructions and competing water usage by the cranberry growers.

Agawam River

Wareham, Plymouth

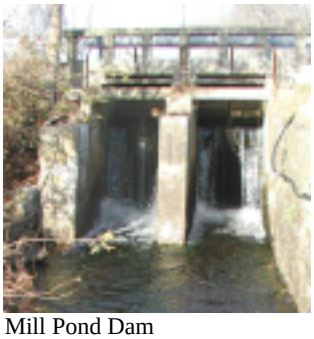
Stream Length (mi)	Stream Order	pH	Anadromous Species Present
11.3	Third	6.8	Alewife, blueback, American shad, smelt, white perch, trout, gizzard shad

Obstruction # 1

Mill Pond Dam

Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
2.9	Dam	Concrete with wooden baffles	6.9	6.6	147.4	1900	Town of Wareham	41º 45’ 44.416” N 70º 40’ 33.584” W



Mill Pond 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
Alaskan Steeppass	Aluminum	20.0	1.2	1.85	-	2.3	-	-	Excellent Passable
Notched weir-pool	Concrete and wood	117.0	6.0	Stream width	10	3.0	1.0	12	Poor Inefficient passage
Stream baffle	Stone	445.0	4.4	6.0	9	1	-	Varied (20-55)	Poor Inefficient passage

Lower (Steeppass) section of at Mill Pond

Upper (stream baffle) section of ladder at Mill Pond

Obstruction # 2 Maple Park Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
5.0	Dam	Earthen with wood pilings	12.7	10.4	2.5	-	-	41º 46’ 58.735” N 70º 39’ 19.076” W

Maple Park 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 and fiberglass baffles	93.0	2.1	3.7	34	5.9	-	-	Good Passable

Ladder at Maple Park Dam

Obstruction # 3 Glen Charlie Pond Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
5.1	Dam	Concrete with wooden boards	33	16	154.9	1900	AD Makepeace Co.	41º 47’ 05.315” N 70º 39’ 15.228” W

Glen Charlie Pond 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 and fiberglass baffles	579.0	2.1	3.7	50	5.9	-	Varied (16.0-43.0)	Good Passable

Glen Charlie Pond Ladder

Obstruction # 4 Besse Bog Reservoir Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
6.9	Dam	Concrete with metal slots and wooden boards	11.85	10.7	27.3	-	A.D. Makepeace Co.	41º 48’ 38.642” N 70º 38’ 28.355” W

Besse Bog Reservoir 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	157.0	3.0	4.5	36	5.0	-	-	Excellent Passable

Ladder at Besse Bog

Obstruction # 5 Kennard Bog Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
9.0	Dam	Concrete with wooden boards	9.0	4.0	16.1	1945	A.D. Makepeace Co.	41º 49’ 59.342” N 70º 37’ 37.489” W

Kennard Bog Dam and Ladder

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
Alaskan Steeppass	Aluminum	42.0	2.0	-	-	2.25	-	-	Excellent Passable

Remarks:

The Agawam system supports a very productive river herring fishery largely due to the more than 500 acres of spawning and nursery habitat available in its ponds and impoundments. The difficulty in maintaining this fishery is that 5 fish ladders are required to enable the herring to reach these habitats including the river's headwaters in Halfway Pond. In recent years much effort has gone into replacing or modifying these structures, most of which were either deteriorated or of inefficient design.

The first fishway, a weir-pool ladder, at Route 6 in Wareham was fitted with an aluminum steeppass insert in 2000. This installation was funded by the National Oceanographic and Atmospheric Administration and designed and installed by DMF with the assistance of the USFWS and the Town of Wareham. Although the steeppass greatly increased the rate of fish passage through this portion of the fishway, an upstream notched weir-pool section beneath the road has eroded baffles and noticeably slows movement into the impoundment.

The next fishway, which actually bypasses two dams at Maple Park, works well. The entrance, however, is often missed by fish due to greater attraction flow from the dam's spillway. In 2002 the Town of Wareham installed a barrier screen to direct fish into the ladder and this approach was successful.

A deteriorated wooden ladder at Besse Bog Reservoir was replaced by DMF in 1994 with a concrete and wood Denil fishway. This ladder functions efficiently but requires careful adjustment of flow to provide sufficient attraction to the entrance.

The final fishway, at Kennard Bog dam, was replaced in 2002 with an aluminum steeppass ladder. This work was also funded by a grant from NOAA, designed by DMF and USFWS. Installation was carried out by the property owner, A.D. Makepeace, Inc.

In addition to the river herring, the Agawam River also supports a small rainbow smelt population, and in recent years numbers of gizzard shad have been observed. The smelt spawn immediately below the first dam. Gizzard shad have been taken at the catching station at Rt. 6 during operation of the herring fishery.

Gibbs Brook Wareham

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
2.0	First	6.2	River herring

Obstruction # 1 Gibbs Brook Culvert Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.1	Culvert	Concrete	4.1	0.0	0.0	-	-	41º 45’ 20.484” N 70º 39’ 12.952” W

Downstream end of Gibbs Brook Culvert

Fishway None

Obstruction # 2 Dick's Pond Dam Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
0.3	Dam	Concrete with wooden boards	3.5	2.1	41.8	-	-	41º 45' 30.383" N 70º 39' 14.729" W

Dick's Pond Dam and Ladder

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
Notched weir-pool	Concrete with wood baffles	23.0	Varied (3.5 and 20)	4.6	6	Varied (1.3 and 2.0)	Varied (0.6 and 1.0)	Varied (3.0 and 4.0)	Poor Inefficient

Remarks:

The only significant spawning area available on this stream is 42 acre Dicks Pond. In order to reach the pond, herring must first enter and traverse more than 500 feet of underground culvert. After exiting the culvert, the fish can enter the pond via a small notched weir-pool fishway. This system has served as a source of fish for the DMF transplant program. While potential for substantial increases in population numbers is limited, the current production is sufficient to warrant diligent management and enforcement.

Red Brook

Wareham, Plymouth

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
5.4	First	6.9	River herring, trout

Obstruction # 1

Stream baffle below Route 25 Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.4	Culvert	-	-	-	0.0	-	-	41º 46’ 34.002” N 70º 37’ 50.599” W

Stream Baffle downstream of Route 25

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
Stream baffle	Granite and stone	N/A	13.0	13.0	1	1.5	1.7	N/A	Fair Inefficient passage

Obstruction # 2 Southbound Route 25 crossing Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.5	Culvert	-	-	-	0.0	-	-	41º 46’ 35.361” N 70º 37’ 51.069” W

Southbound Route 25 Crossing

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
Trench with baffle	Concrete trench, stone stream baffle	88.0	3.0	6.0	1	1.0	-	N/A	Poor Inefficient passage

Obstruction # 3 Northbound Route 25 crossing Wareham

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
1.5	Culvert	-	-	-	0.0	1979	-	41º 46’ 36.353” N 70º 37’ 51.125” W

Northbound Route 25 Crossing

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
Notched weir-pool	Wooden boards, metal slots, stone stream baffle	88.0	6.0	Culvert wall	5	Varied (1.0-1.5)	1.8	Varied (8.0-56)	Fair Inefficient passage

Obstruction # 4 White Island Pond Dam Bourne

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Impoundment Acreage	Year Built	Owner	GPS
4.3	Bog sluice	Concrete and steel with wooden boards	20.0	7.4	294.0	1900, rebuilt 1950	A.D. Makepeace Co.	41º 48’ 16.904” N 70º 37’ 10.375” W

White Island Pond 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	103.0	2.0	3.5	28	Varied (4.3 and 7.0)	-	-	Excellent Inefficient passable

White Island Pond Ladder

Remarks:

River herring migrating up Red Brook have nearly 300 acres of spawning and nursery habitat available in White Island Pond. Despite this large area, the population has never reached its apparent potential. This is possibly due to a combination of poorly maintained fish passage facilities and cranberry bog water diversions.

The first obstruction on the stream is actually a stream baffle which backs water up into the Route 25 culverts. A notch in this baffle allows fish to pass under spring flow conditions. Baffles in the culverts themselves increase water depth for passage but are poorly maintained and create difficulties for migrating fish. The Town of Wareham and DMF are aware of the difficulties in passage here, and attempt to make adjustments as needed. A third ladder at the outlet of White Island Pond enables fish to access the headwater pond if properly adjusted. Sediment deposited at the ladder's exit at the time of this survey made it temporarily inoperable.

Bog operations that have impacted this population include delaying migration by diverting stream flow, stranding of downstream migrating juveniles (see general recommendations) and poor fishway adjustment and regulation. With proper management this system should be capable of increased production.

Bourne Pond Brook Bourne

Stream Length (mi)	Stream Order	pH	Anadromous Species Present
0.4	First	7.7	Alewife

Obstruction # 1 Bourne Pond outlet Bourne

River Mile	Type	Material	Spillway W (ft)	Spillway H (ft)	Pond Acreage	Year Built	Owner	GPS
0.4	Dam control structure	Concrete with wooden boards	1.1	1.0	10.6	-	-	41º 44’ 56.681” N 70º 35’ 53.879” W

Bourne Pond outlet

Fishway None

Remarks:

This small stream flows from 10.6 acre Bourne Pond to the Cape Cod Canal. A concrete outlet structure has functioned as a fish ladder. The tide-dependent entrance to the stream and the lack of adequate outflow from the pond give this stream a low priority for future work.

Buzzards Bay Drainage Recommendations:

1. Fish passage at the first two dams on the Acushnet River must be improved either by full or partial removal of the obstructions or by construction of efficient fishways.

2. An additional Denil baffle should be added to the entrance of the fishway on the Paskamanset River at Russells Mills in Dartmouth.

3. A short-term solution to the fish passage issue at Horseshoe Pond on the Weweantic River is to modify the existing millrace, possibly by inserting a section of aluminum steeppass. A long term answer, should funding become available, is to install a permanent Denil ladder.

4. Improvements should be made to the section of fishway under Route 6 on the Agawam River in Wareham in order to allow this system to reach its potential.

5. Cranberry bog owners on streams that have anadromous fish runs should be made aware of the impacts their operations have on these populations as well what measures can be taken to avoid them. Appropriate screening methods, flow regulation and mandatory fish kill reporting should be included in the conditions section of all state issued permits.

General Recommendations

1. With a small number of exceptions, the important river herring spawning/nursery habitats on coastal streams have been made accessible through the construction of fishways. Many of these structures have become deteriorated and are often of obsolete design. The emphasis of future work should be on the replacement of these fish ladders in order to preserve or augment the populations they serve rather than to create new populations by accessing minor habitats.

2. Most river herring fisheries are under local control through the authority granted by Section 94 of Chapter 130. Many towns having this control, however, are unaware that approval of the Director of the Division of Marine Fisheries is required by the statute and often change their regulations without consulting DMF. In order to insure biologically sound and legally valid local management, the Director should inform cities and towns of this condition and request them to submit current regulations and subsequent changes for approval.

3. River herring passage issues have dealt primarily with upstream migration of adults. Downstream passage of adults and more importantly juveniles has been largely ignored and, in some systems, may be an important limiting factor in population productivity. Future work should take this into consideration and place appropriate emphasis on this phase of the life cycle and the problems which are associated with it.

4. Large numbers of juvenile herring are killed each year due to cranberry bog operations. A simple, inexpensive screening system has been developed which will prevent most of these losses. Despite publicizing the availability of this system through industry media, growers have been reluctant to utilize it. Appropriate screening of water withdrawal intakes to prevent stranding, mutilation, entrainment or impingement of young herring should be made a condition of any state permits required for the agricultural operation.

5. Shoaling of pond outlets and encroachment of vegetation has seriously impacted river herring populations in some systems. Deposition of sandy material at the outlets in combination with low late summer/fall water levels has prevented the escapement of large segments of year classes and caused them to be lost to the population either through winter kill or greatly reduced growth rates. Outlet structures which would retain depth, reduce deposition and provide for easier maintenance should be developed and installed at stream outlets where appropriate.

6. The emphasis of anadromous fish management in coastal streams has been on river herring, American shad and rainbow smelt. Consequently little is known about white perch and tomcod populations in the Commonwealth. In the future more attention should be directed toward these species and management strategies which would protect them should be developed.

7. Several large coastal streams, notably the Taunton, Charles and Neponset Rivers, appear to have excellent potential for development of American shad populations. Many years of stocking with adult fish and eggs have yielded negligible results, however. Other states have had success through hatchery egg taking and rearing to fry size before release. This technique should be developed in Massachusetts and applied to the above streams.

8. Removal of dams should be considered as an alternative to fishway construction where appropriate.

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	Wareham	
West Branch Westport River	Adamsville, RI	80
	Westport	
Weweantic River	Carver	98
	Middleborough	
	Wareham	
Winnetuxet River	Carver	63
	Halifax	
	Plympton	

Alphabetical Index of Towns

Appendix 1: Anadromous species of the Commonwealth of Massachusetts

Alewife (*Alosa psuedoharengus*)
Blueback (*Alosa aestivalis*)
American shad (*Alosa sapidissima*)
Rainbow smelt (*Osmerus mordax*)
White perch (*Morone americana*)
Atlantic salmon (*Salmo salar*)
Brook trout (aka Salter trout) (*Salvelinus fontinalis*)
Rainbow trout (aka Steelhead trout) (*Oncorhynchus mykiss*)
Brown trout (sea run) (*Salmo trutta*)
Coho salmon *(Oncorhynchus kisutch*)
Lamprey (*Petromyzon marinus*)
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)
Shortnose sturgeon (*Acipenser brevirostrum*)
Gizzard shad (*Dorosoma cepedianum*)
Hickory shad (*Alosa mediocris*)
Tomcod (*Microgadus tomcod*)
Striped bass (*Morone saxatilis*)

Appendix 2: State River Herring Regulations

The following regulations affect the catch of river herring (alewives and bluebacks) in cities and towns without local control. These regulations establish catching days, daily catch limits, and gear restrictions and are being promulgated to establish consistent state management of river herring not under the local control of a city or town by operation of M. G. L. c. 130, s.94. These regulations are easily understood, readily enforceable, and will help assure adequate escapement of river herring for spawning.

Below is section 6.17 of 322 CMR:

6.17 River Herring

1) Purpose. This regulation is promulgated to establish consistent state management of river herring fisheries not under local control of a city or town by operation of M. G. L. c. 130 s. 94.

2) Definition. For purpose of this regulation, the term River Herring means those species of fish known as alewives (*Alosa pseudoharengus*) and bluebacks (*Alosa aestivalis*).

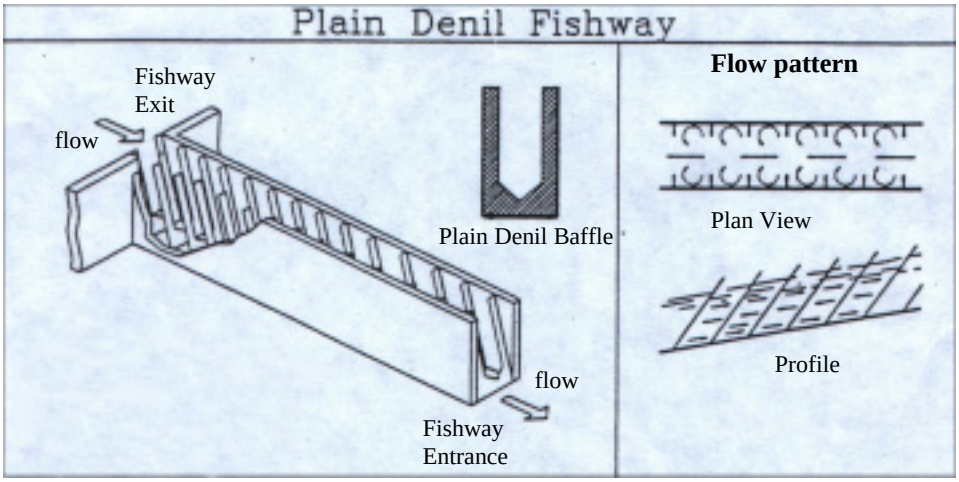
3) Catching Days. It is prohibited and unlawful for any person to catch river herring on Tuesdays, Thursdays, and Sundays.

4) Daily Catch Limit. It is prohibited and unlawful for any person to catch more than 25 river herring per day.

5) Gear Restrictions. It is prohibited and unlawful to catch river herring with any net other than hand-held dip nets.

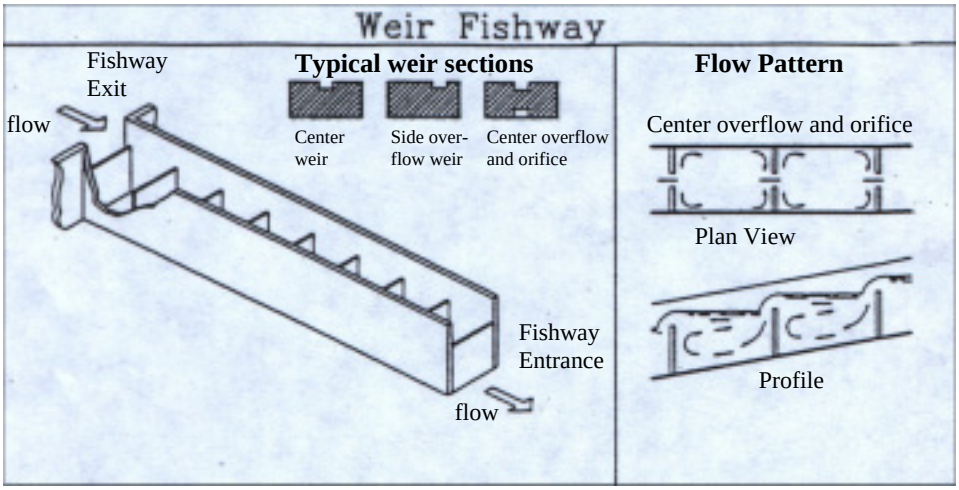
6) Exception. These regulations shall not apply to the catching of river herring in cities and towns which have acquired local control by operation of M. G. L. c. 130, section 94, or to the catching of herring authorized by the Director under 322 CMR 4.02 (1)(b) and (1)(c).

Appendix 3: Fishway Designs and Examples



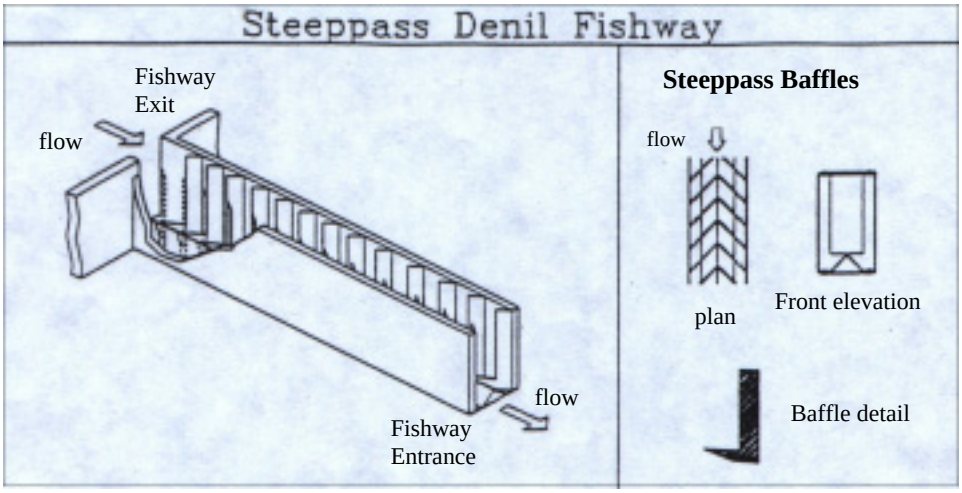
Denil Fishway

- Slope: 10-25%
- Resting pools are required between long segments
- Limited by large water depths
- Greater discharge of water than the other fishways, and therefore a greater attraction capability.



Weir Fishway

- Slope usually 10%
- Sensitive to water level fluctuations



Steeppass Fishway

Fishway designs taken from:

Fish Passageways and Diversion Structures
Section 3
United States Fish & Wildlife Service
Presented by:
Branch of Aquatic Resources Training
National Education and Training Center
June 17-21, 1996
Richland, Washington

Examples of fishways in use:

Denil Fishways

Denil – Newton Lower Falls Dam, Newton

Denil – Ipswich Mills Dam, Ipswich

Weir pool fishways

Notched weir pool fishway – Pleasant St. Dam, Weymouth

Notched weir-pool – Broad St. Dam, Weymouth

Weir pool – Triphammer Pond Dam, Hingham

Weir pool – Benoit's Pond Dam, Bourne

Steeppass Fishways

Alaskan Steeppass – Newfield St. Dam, Plymouth

Alaskan Steeppass – Elm St. Dam, Kingston

Stream Baffles

Stream baffles – Brook St. Culvert, Kingston

Vertical Slot Fishways

Modified Ice Harbor vertical slot fishway – Pawtucket Dam, Lowell

Fish Lifts

Fish lift – hopper rising with fish – Essex Dam, Lawrence

Appendix 4: Abbreviations used in this publication:

DCR**	Department of Conservation and Recreation
DMF	Division of Marine Fisheries
DPW	Department of Public Works
EOEA	Executive Office of Environmental Affairs
GPS	Global Positioning System
NOAA	National Oceanic and Atmospheric Administration
USFWS	United States Fish and Wildlife Service

**DCR is a new agency that was once two separate agencies: Department of Environmental Management (DEM) and the Metropolitan District Commission (MDC)