# ENVIRONMENTAL ASSESSMENT

## Manhan River Dam Fish Passage Project

## City of Easthampton, Massachusetts

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This Environmental Assessment becomes a federal document when evaluated and signed by the responsible Federal Officials.

04 Jan 2010
Date

Lead Federal Official
Supervisor, New England Field Office
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## EXECUTIVE SUMMARY

This Environmental Assessment (EA) addresses a proposal by the U.S. Fish and Wildlife Service (Service) to restore fish passage beyond the first barrier on the Manhan River in Easthampton, Massachusetts. The Service has adopted and updated the New England District U.S. Army Corps of Engineers (NED) EA for the project, which was publically-noticed on April 24, 2002. In 1998, the NED and the City of Easthampton (City) initiated the project under Section 206 of the Water Resources Development Act of 1996 (WRDA). However, due to the inability of the City to secure the required nonfederal funding match, the project did not proceed to construction. In the spring of 2009, the project was selected as a candidate for Service funding through the American Recovery and Reinvestment Act (ARRA).

The purpose of the project is to allow passage of anadromous fish beyond this first migration barrier to historical upstream spawning and nursery areas in the mainstem and north branches of the Manhan River and associated tributaries in the watershed. The project will result in a net ecological benefit to the Manhan River, and would complement ongoing interagency efforts to restore migratory fish to the Connecticut River watershed.

This EA analyzes the potential environmental impacts that would result from the implementation of the Proposed Action. The EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the regulations of the Council on Environmental Quality (CEQ) for implementing NEPA [40 Code of Federal Regulation (CFR) 1500-1508], and the implementing regulation (36 CRF 800).

This EA analyzes the impacts of four alternatives on the human environment in accordance with NEPA. These include a No Action Alternative, the Proposed Action, and two additional action alternatives. Under the Proposed Action, a fish ladder and downstream bypass will be constructed at the Manhan River Dam, to facilitate the upstream and downstream passage of migratory fishes, as well as resident riverine species. The Proposed Action will have negligible, if any, impacts on natural and cultural resources such as air quality, geology, water quality, riverine processes and sediment chemistry, threatened and endangered species, essential fish habitat, and cultural and economic resources.

The Proposed Action substantially adheres to the original 2002 ACOE fish ladder design, which the Massachusetts Historic Commission (MHC) has determined would have "no adverse effect" (36 CFR 800.5 (b)) on the Manhan Dam and Waterworks (State Historic Preservation Office letter, January 24, 2002). The Service has evaluated the current fish ladder design and the MHC decision, and determined that they fulfill the Service's assessment of National Register-eligible or listed cultural resources, pursuant to Section 106 of the National Historic Preservation Act (36 CFR Part 800).

The Proposed Action will temporarily impact state-jurisdictional riverfront resource areas (Bank and Land Under Water). These impacts will be short-term, and any long-term,

unavoidable impacts (e.g., loss of Land Under Water at the ladder entrance) will be offset by the increase in species diversity, biomass, and enhanced food web interactions resulting from the Proposed Action.

The Service finds there will be no significant impacts resulting from the proposed restoration activities of the Project. The Proposed Action provides net benefits that far outweigh its potential impacts on the natural and human environment. Therefore, the Service concludes that a Finding of No Significant Impact (FONSI) be issued for the proposed project.

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## 1.0 INTRODUCTION

The Manhan River Dam is located in Easthampton, Massachusetts on the Manhan River, approximately three miles upstream from its confluence with the Connecticut River in Northampton. It is the most downstream dam on the Manhan River, which flows a distance of 26 miles through the western side of the Connecticut Valley (in Massachusetts) draining parts of the towns of Huntington, Montgomery, Westfield, Holyoke, Westhampton, Southampton, Northampton, and Easthampton. The mainstem of the river is joined by one large tributary, the North Branch, as well as numerous smaller tributaries, within its 48,000 acre watershed (total drainage area of 69 square miles). A total of ten additional dams are located upstream on both the mainstem and North Branch, with the next upstream dams (from Manhan River Dam) located approximately eight miles upstream on the mainstem (Lyman Dam) and three miles upstream on the North Branch (Clear Falls Swimming Dam) (Figure 1). The headwaters of the mainstem are located near Mount Pisgah, in Westhampton and are impounded by a dam that forms the Tighe Carmody Reservoir. This reservoir serves as a water supply for the city of Holyoke (Whitman and Howard, Inc., 1984). The North Branch of the river begins in South Worthington.

The Manhan River Dam consists of a six-foot high open concrete spillway, and is approximately 100 feet long. It is constructed on a bedrock (sandstone) outcrop, which extends approximately 100 feet downstream of the dam and forms the discharge area. The first dam in this location was constructed in approximately 1690, and since that time it has been reconstructed several times to provide waterpower to the various mills which became established at the site. The existing Manhan River Dam (also known as the Waterworks Dam) was constructed in the early 1900's for use as a backup water supply for the City of Easthampton (City), and was later used to generate hydroelectric power; it is no longer used for either of those purposes. Currently, the dam creates an impoundment, which is heavily used as a recreational fishery. The former Waterworks Building on the right-bank is currently unoccupied.

Historically, the Manhan River exhibited runs of anadromous fish, including Atlantic salmon (*Salmo salar*) and American shad (*Alosa sapidissima*), (Roberts, 1906). These runs were eliminated when the first dam was constructed, which formed a barrier to upstream migration of pre-spawning adults. Recent efforts to restore anadromous fish to their historical habitat in the Manhan River have involved the stocking of Atlantic salmon fry at designated sections of the river upstream from the Manhan River Dam. This stocking is part of a cooperative initiative among state and Federal natural resource agencies. Since 1994, 50,000 to 75,000 Atlantic salmon fry per year have been stocked in the Manhan River in support of eventually restoring a self-sustaining anadromous population. Prior to 1994, stocking was conducted in 1987 and 1988, with an approximate five year period of no stocking. Surveys of the Manhan River watershed have indicated the presence of suitable habitat conducive to Atlantic salmon growth and survival, with estimates of survival for age 0+ (33.5%) being comparable to those noted for the same age class in many of the other rivers and tributaries in the Connecticut River


Figure 1. USGS Topographic Locus Map, showing the locations of the Manhan River Dam and the Lyman Dam on the Manhan River, and Clear Falls Swimming Dam on the North Branch.

watershed (*Job performance Report, Massachusetts, Project Number F-45-R-14, Study 1- Connecticut River Anadromous fish Investigations; Job 13- Assessment of Atlantic Salmon Smolt Potential*). These stocked fish become smolts after approximately two years in the river, migrate downstream to mature at sea, and return several years later to spawn. Although there are some barriers to upstream migration in the Connecticut River that are downstream from the Manhan River confluence, those barriers have established fish passage in the form of fish lifts or ladders. No passage facilities exist on the Manhan River Dam; therefore, the dam prevents the upstream migration of returning Atlantic salmon adults to the available spawning habitat in the Manhan River.

There also have been anecdotal reports that anadromous fish (presumed to be American shad) and other resident fish schooling at the base of the Manhan River Dam. These concentrations have been observed in the pool downstream from the dam during spring and appear to be attempting to move upstream to spawn in habitat along the Manhan River. Although anadromous shad are not being stocked in the Manhan River itself, their presence in the pools below the dam indicates that the water quality is suitable to attract these fish to this river for spawning.

## 1.1 Background

In approximately 1686 a dam was constructed on the Manhan River at the existing bedrock falls, in order to provide waterpower for a small corn mill. During the following 200 years, the dam provided waterpower for a succession of other small industries, and was modified and/or reconstructed in order to accommodate these various uses. In the early 1900's, following the purchase of the property by the City, the dam was reconstructed for use as a water supply, and during that time a building housing the water works (*i.e.,* pump and associated equipment) was constructed on the adjacent right stream bank. From approximately 1930 through 1940 a hydroelectric generating plant operated at the dam, but was dismantled in 1947. Since that time the dam has not been used for waterpower. In 1998, the dam was repaired and rehabilitated. Currently the pool behind the dam provides a recreational fishery for trout and other species.

## 1.2 Purpose and Need

Both branches of the Manhan River upstream from the dam once provided historical habitat for various species of anadromous fish (including Atlantic salmon and blueback herring). With the construction of the Manhan River Dam (Waterworks Dam), these anadromous fish have been unable to return to their historical spawning and nursery habitat upstream. Currently, the river upstream of the dam supports a self-sustaining population of brown trout, and is stocked with Atlantic salmon fry. Survival rates of these stocked fish are comparable with other stocked rivers in the Connecticut River watershed, which indicates that the basic habitat requirements necessary for survival and growth of these young fish are present in the Manhan River. Habitat assessments have shown that in addition to acceptable water quality, salmonid spawning habitat is present in the watershed. Therefore, it is expected that this area would be utilized by anadromous

Atlantic salmon for reproduction and nursery if they could pass upstream beyond the first barrier of the Manhan River Dam. In addition, the presence of anadromous alosid species (*i.e.,* shad, blueback herring,) in the pools below the dam indicates that if fish passage was provided, it would be utilized by these species to access the spawning and nursery habitat upstream from the dam.

Additional benefits to the ecosystem would also be incurred by the provision of fish passage on the Manhan River Dam. A fishway on the Westfield River (the next lower tributary to the Connecticut River in Massachusetts) has passed, in addition to the species noted above, American eel, white sucker, largemouth bass, smallmouth bass, brook trout, brown trout, rainbow trout, carp and striped bass (Slater, 2001). These have been observed using the fishway for spawning and/or seasonal migrations, (*i.e.,* during high temperatures and lower flows, many salmonid species will seek refuge in colder water tributaries upstream from a larger river). It is presumed that if any of those species occur within the project area and fish passage were to be provided, they would use the fish passage facilities to move through the Manhan River. It should be noted that during a site visit in April, 2002, numerous white sucker were observed on the sandstone ledge on the right bank, immediately downstream of the Manhan River Dam attempting to pass upstream to spawn, however they were unable to continue upstream due to the dam.

Other ecological benefits include the increase in productivity associated with the re-establishment of anadromous fish to their historical habitat. If shad and blueback herring become established in this river, the out-migrating juveniles could provide forage for resident warmwater fish in the Connecticut River (and/or in the Manhan River), while the returning adults could provide forage for larger predatory fish in the lower estuarine areas of the Connecticut such as striped bass, which move into the lower river around the same time as many of the returning alosid species. In addition, migratory fish are a Federal trust resource; therefore, the project outputs are in the Federal interest.

Providing fish passage at the dam is also in accordance with an interagency cooperative effort to restore anadromous fish to the Northeast, especially in the Connecticut River Watershed. Goal 2 in Section III of the Strategic Plan for the Restoration of Atlantic Salmon to the Connecticut River (Connecticut River Atlantic Salmon Commission, 1998) is to "Enhance and maintain the quantity, quality and accessibility of salmon habitat necessary to support re-established spawning populations". Objective 2.B in that section is to "provide adult Atlantic salmon access to selected upstream spawning habitat in the Connecticut River and 13 identified tributaries", including the Manhan River. Accordingly, plans are underway to implement fish passage at several other tributaries to the Connecticut River, including the Deerfield and Westfield Rivers. Providing fish passage on the Manhan River would complete another step toward the goal of restoring anadromous fish populations in the Connecticut River and would support the resource objectives of other Federal, State, and local natural resource agencies.

## 2.0 PROJECT DESCRIPTION

The project would involve construction of a Denil fish ladder on the right abutment of the Manhan River Dam in order to allow fish passage to spawning areas upstream in the Manhan River (Figure. 2). This will provide anadromous fish access to approximately 11 river miles on both branches of the Manhan River, as well as additional spawning area available in the many tributaries that join the river within that corridor. The ladder would have its downstream entrance on the right bank approximately 150 feet downstream from the dam, run parallel to the existing bank, and notch into the right side of the existing spillway to form the exit channel. The fishway would be operational during periods of upstream fish migration. An additional downstream fish passage structure would be constructed adjacent to the fishway, and would be operational during times of downstream migration. Both structures would have mechanisms through which adequate flows could be maintained and controlled.

During the summer low flow period, an approximately 180 foot long Denil Fishway will be constructed along the right bank of the Manhan River. Excavation will involve the removal of a small amount of stream bank gravel/bedrock (less than three cubic yards) in order to construct the Denil fish ladder supports and footings. Appropriate erosion control methods will be utilized. The fish ladder will consist of an approximately 4-foot-wide and 1.5-foot-deep concrete box conduit, fitted with removable wooden baffles spaced approximately one foot apart along its entire length. The conduit will descend along the right bank for approximately 120 feet, to a 180 degree turning pool, and continue its descent parallel to the stream bank for approximately 55 feet to a second 150 degree turning pool. It will then continue for another five feet to the entrance channel. Footings for the sections downstream from the turning pool will be placed into the existing bedrock channel. In addition, a small amount of the bedrock stream bottom may be excavated in order to provide appropriate depths and flow configuration for the channel in the area of the entrance. Upon completion, excavated areas will be stabilized and/or re-vegetated.

Construction will be pursuant to requirements identified in any Order of Conditions and/or 401 Water Quality Certificate that may be issued by the City or the Commonwealth of Massachusetts, and will be carried out in a manner that minimizes the transport of silt from the work area to the Manhan River. Hay bales, silt fencing, and/or other erosion control measures will be placed prior to the start of construction. Vegetation will be cleared only as required to provide a staging area and an area for stockpiling equipment and materials, access to construction sites, and temporary access around the dam.

The Manhan River Dam fish passage construction will be scheduled to minimize impacts on the Manhan River Dam and Manhan River. A temporary coffer dam will be installed around the location of the downstream fish passage opening. Work will then proceed with excavation of bedrock in the vicinity of the fishway entrance to create an attraction

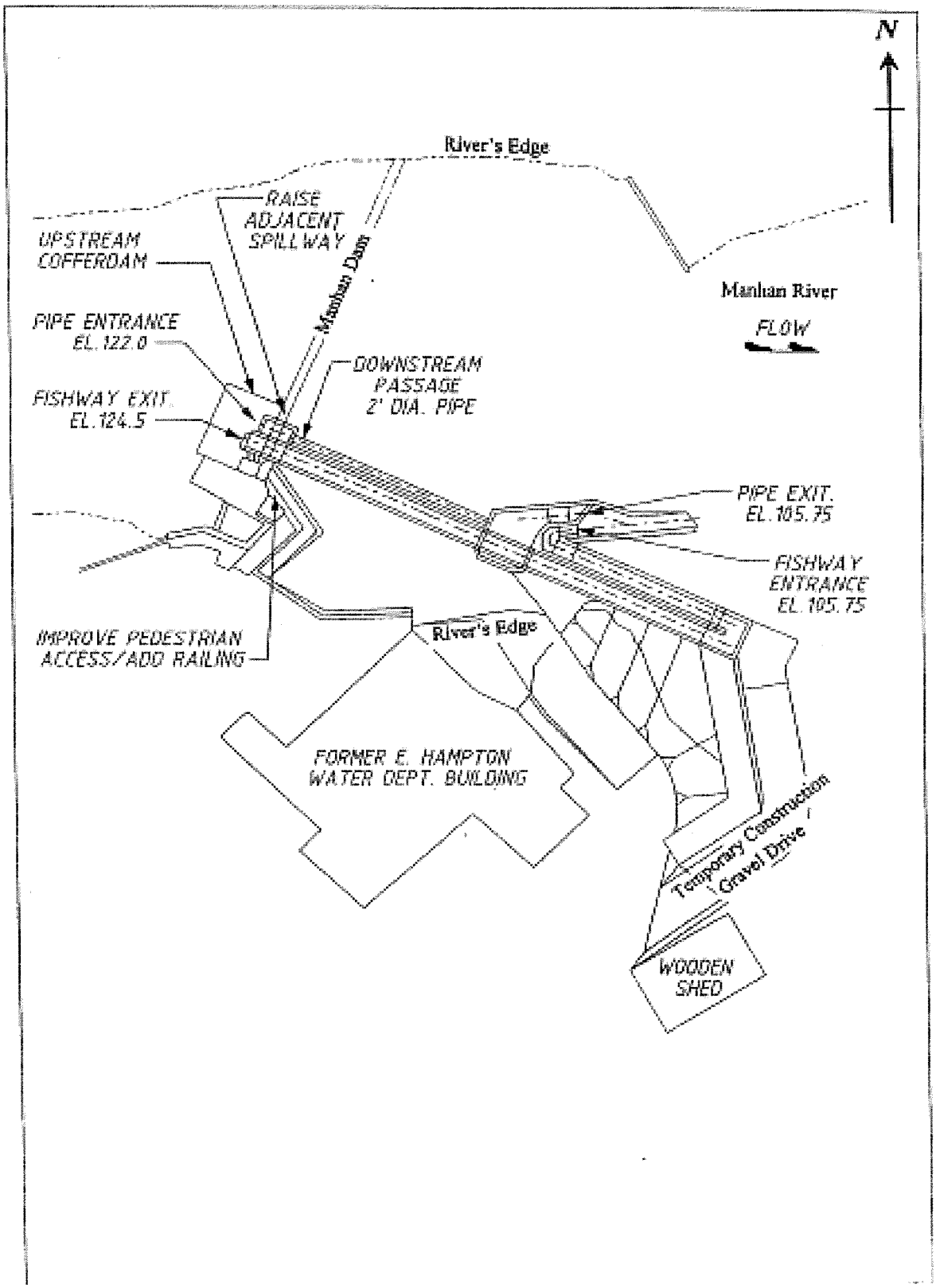


**Figure 2.** Plan of proposed fish passage facilities to be constructed at the Manhan River Dam, Easthampton, Massachusetts.

pool below elevation 105.75 National Geodetic Vertical Datum (NGVD). Along the downstream portion of the former Waterworks Building a 12-foot wide gravel, temporary vehicle ramp will be incorporated to facilitate construction. The construction site will be de-watered using pumps. A detention basin will be employed if the water exhibits high suspended solids. A temporary coffer dam also will be installed on the upstream side of the dam in the area of the proposed exit channel, in order to notch the spillway and construct the exit channel of the fish ladder (and entrance channel of the downstream migration structure).

Once the construction area is de-watered, concrete footings will be placed in the bedrock and the supports for the prefabricated 4-foot wide Denil fish ladder would then be constructed. At the upstream limits of the fish ladder, a 2-foot diameter pipe will be installed to create attraction flow for the fish ladder as well as to provide downstream passage for migrating fish. The pipe will be set at 122 NGVD at the top of the dam. The pipe will be supported by the supports of the fish ladder and terminate at the downstream entrance of the fishway, as shown on Figure 2. To accommodate the temporary access road along the easterly side of the site, minor re-grading will be completed as necessary.

The ladder will be fitted with a 15-foot long removable section. This section is necessary so that dam maintenance can be performed. Once the fishway is completed, the temporary sheeting and construction access road will be removed. The areas which were cleared for the temporary road, staging area, and stockpile area will be re-vegetated as required.

The fish passage facilities will require seasonal and annual maintenance. The City has agreed to be responsible for the operation and maintenance of the fishways. An Operation and Maintenance Plan will be jointly developed by the City, the U.S. Fish and Wildlife Service, and the Massachusetts Division of Fisheries and Wildlife.

## 3.0 ALTERNATIVES

### 3.1 No Action

The No Action Alternative maintains the current condition of the existing Manhan River Dam which would continue to block the upstream migration of anadromous fish and preclude the restoration of self-sustaining runs of Atlantic salmon, American shad, and blueback herring to the Manhan River upstream of the dam. The current Atlantic salmon fry/smolt stocking program upstream of the dam would serve only to provide Atlantic salmon smolts as downstream migrants, which would be unable to return to their historical spawning areas. In addition, shad would continue to concentrate downstream of the dam without being able to utilize spawning and rearing habitat above the dam. Also, the other ecological benefits (see Section 1.2) resulting from the provision of upstream fish passage beyond the dam would not be realized.

Retaining the dam also would continue to hinder downstream movement of migratory and riverine fishes. It is likely that during periods of high flow, depth of spill over the

dam would allow fish to pass downstream. However, under normal and low flow conditions, the depth of spill likely would inhibit (i.e., prohibit or delay) fish movement. In addition, fish that do pass over the dam fall onto the sandstone ledge, which could result in injury or disorientation.

### 3.2 Installation of Fish Lift

In this alternative, a fish lift with a trapping channel would be installed on the right dam abutment. This would allow upstream migration of anadromous fish beyond the dam, but would require a power supply as well as lift operators during the time of active upstream migration. It would also require periodic maintenance in order to ensure its operation during the upstream fish migration periods, as well as construction of an associated area of attraction water, either built into the entrance of the trap, or directed to a nearby location, with higher flow rates designed to attract upstream migrating fish. Installation of a fish lift would create fewer construction impacts to the riverbank, due to the smaller total area required for its installation. For some species, a fish trap is less effective, and may not pass enough adults to establish a viable spawning population upstream. Generally, with a fish lift, although there may be lower initial construction costs, there would be greater long-term operation and maintenance costs. Disadvantages of a fish lift would include the inability to allow passive migration of up-migrating fish because lifts require an operator to be present on-site to mechanically lift the fish at specified intervals.

Installation of a lift with a downstream bypass pipe (to act as both a passage facility and as attraction water for the lift) would enhance downstream fish passage by allowing fish movement over a longer period of time. The downstream pipe also would provide a safer passage route; fish would discharge into a plunge pool rather than fall onto bedrock ledge.

### 3.3 Dam Removal

Dam removal would generally provide the best way to restore fish passage and instream habitat upstream of the Manhan River. However, the owner of the dam, the City of Easthampton, does not wish to pursue the removal option, but rather wishes to pursue installation of a fish ladder and downstream bypass pipe in order to provide upstream and downstream fish passage. Because removing an otherwise structurally-sound dam requires the owner's approval, this assessment did not rigorously evaluate the dam removal alternative; rather, it provides an overview of the environmental advantages and disadvantages associated with removing the Manhan River Dam.

Benefits of dam removal include: (1) restoration of approximately 0.5 mile of impounded habitat to free-flowing habitat; (2) enhanced riverine connectivity; (3) long-term cost savings to the dam owner due to the removal of a maintenance and liability structure; and (4) improved passage to a range of migratory and resident fish species. In particular, removing the dam would improve downstream passage by eliminating a potential source of injury (i.e., fish would no longer fall many feet onto the ledge below the spillway).

However, there are potential drawbacks to dam removal. The impoundment created by the Manhan River Dam is a valuable recreational asset to the City, which is the sponsor of this environmental restoration project. Brown trout are stocked upstream from the dam and the impoundment is an important recreational asset to the City's residents. The dam also has been renovated relatively recently (1998) and the City has long term plans for it to remain in place for municipal use. In addition there is concern that the currently submerged bridge abutments for Route 10 approximately 350 feet upstream will become exposed and subject to undermining by the free flowing river if the dam is to be removed.

The Manhan River Dam also is included in the Massachusetts Historical Commission's Inventory of Historic and Archaeological Assets of the Commonwealth, and the dam and Waterworks Building are eligible for listing in the National Register of Historic Places as a complex which conveys the history of industrial development in Easthampton (MHC letter dated January 24, 2002; Appendix B). It is likely that removing the dam would require extensive consultation and coordination pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended through 2000).

Lastly, given the present channel configuration, it is likely that even if the dam were removed, some species of fish would not be able to pass upstream of the ledges (or only be able to pass under certain flow conditions), due to the smooth, steep nature of the sandstone. Given that the river has been developed for hydropower at this site since the 1600s, the historical river channel may have been modified at some point in the past; what may have been passable during pre-colonial times may now only be passable under high flow conditions, or to strong-swimming species of fish.

### 3.4 Installation of Fish Ladder

During the design assessment process, seven fish ladder alignments were developed and reviewed. The costs of each design option were found to be approximately equal. The City has selected the preferred design, to be a concrete Denil fish ladder that would be constructed on the right embankment of the Manhan River Dam (Figure 2). The exit pool channel would be notched into the existing concrete spillway, and the ladder would descend along the embankment for a distance of approximately 120 linear feet, to a 180 degree turning pool, and continue its descent parallel to the stream bank for 55 feet to a second 150 degree turning pool. It will then continue for another five (5) feet to the entrance channel downstream from the dam. A stop log structure at the upstream end of the ladder also would be incorporated. Along with being the dam owner's preferred option, it does carry the lowest total cost as compared to the other alternatives considered.

Installation of a Denil ladder with a downstream bypass pipe (to act as both a passage facility and as attraction water for the ladder) would enhance downstream fish passage by allowing fish movement over a longer period of time. The downstream pipe also would provide a safer passage route; fish would discharge into a plunge pool rather than fall onto bedrock ledge.

# 4.0 AFFECTED ENVIRONMENT

## 4.1 General

The Manhan River Dam is located on the Manhan River in the city of Easthampton, Hampshire County, Massachusetts, approximately 14 miles north of Springfield. Major access to the city is by State Routes 10 and 141. Route 10 runs north/south and crosses the Manhan River approximately one half mile upstream from the Manhan River Dam, and Route 141 runs east west and connects to Interstate 91 in Northampton. The city is bordered by the towns of Northampton on the east and northeast, Southampton on the south, Huntington and Montgomery on the west and Westhampton on the northwest. It was incorporated in 1785, with the first settlers arriving as early as 1664. Although originally an agrarian community, it became industrialized in the 1800's. The Manhan River, which flows through the city, provided a ready source of water, initially for agricultural purposes, and then later for industrial applications. Consequently, numerous dams were constructed along its length, the most downstream being the Manhan River Dam. Currently the city is a combination of residential, industrial and recreational/forested land.

## 4.2 Terrestrial Environment

### 4.2.1 Topography

Topography within the 69 square mile watershed of the Manhan River ranges from a relatively flat valley in the vicinity of Easthampton, bordered by the steep slopes of Mount Tom (elevation approximately 700 feet) on the south, to more rolling and steeper terrain near the headwaters of both the mainstem and North Branch. Elevations range from approximately 100 feet at the base of the Manhan River Dam, to approximately 1500 feet at the summit of Mount Pisgah near the headwaters of the mainstem and approximately 1500 feet at the headwaters of the North Branch in South Worthington. The upper regions of the drainage basin border the Berkshire Hills to the west, where the topography rapidly begins to increase. The elevation of the Manhan River itself ranges from approximately 100 feet at its confluence with the Connecticut River in Northampton, to 1300 feet at the headwaters of the mainstem, for a total gain of 1200 feet. The North Branch begins at a slightly higher elevation of approximately 1400 feet, for a total elevational increase of approximately 1300 feet from its confluence with the mainstem. Much of the reach through the City is relatively flat. Major land usage along various segments of the mainstem includes 91% forest in the 15 mile section from the headwaters downstream to the Tighe Carmody Reservoir. For the approximate 11 mile segment from the reservoir downstream to the Connecticut River, the land usage is approximately 73 % forest, 11% agriculture, and 9% industrial (Connecticut River Basin Water Quality Assessment Report, 1998).

### 4.2.2 Geology and Soils

The Manhan River drainage includes the towns of Huntington, Northampton, Worthington, Montgomery, and Holyoke. These are within the western side of the Connecticut River Basin, which borders the Central Massachusetts Plateau on the east and the Berkshire Mountains on the west. The Manhan River drainage is in the vicinity of what is known geologically as the Green Mountain Highlands, which form a belt that extends southward from Vermont across Massachusetts. The western half of this highland is underlain by ancient gneisses and granites, and the eastern section from later schists, with extensive accumulations of glacial till, resulting from the glacial events which formed the prehistoric glacial lakes in that area (*i.e.,* Lake Manhan and Lake Hitchcock). In the immediate vicinity of the Manhan River Dam, the river is underlain by sedimentary rock, including sandstone. The dam is built upon an outcropping of sandstone, and the existing spillway discharges onto a sandstone ledge, which forms the channel bottom of the area immediately downstream from the dam. Prior to the construction of the dam, an area of bedrock rapids existed at this location (see Photos in Appendix A).

Soils within this area include Harmon soils as well as rough stone (in the upper elevations), with sandy loams predominating in the more eastern section of the drainage (U.S. ACOE, 1976).

### 4.2.3 Vegetation

Forested areas within the Manhan River watershed are generally within the northern hardwood forest zone. Typical species include American beech, yellow birch, and sugar maple as the predominant species in the mature woodlands. In addition, associated species such as eastern white pine, eastern hemlock, black cherry, white ash, American elm, oaks and hickories can be found. Generally, the forested areas are second growth forests that have reclaimed land that was once cleared for farming and timber harvesting. In addition to the forested areas, wetland scrub/shrub species can include alder, dogwood, and in forested wetlands, red maple.

Vegetation within the area of the dam includes upland hardwood species along the left bank of the impoundment, as well as downstream from it. The right bank of the impoundment is developed property with the vacant building of the former waterworks immediately adjacent to the dam itself, and a residential dwelling abutting it upstream (Appendix A).

### 4.2.4 Wildlife

The developed location of the Manhan River Dam limits the types and numbers of terrestrial wildlife species to those that can exist in close proximity to areas of human population. These can include smaller mammals such as gray squirrel, eastern chipmunk, muskrat, beaver, otter, cottontail rabbit, woodchuck and raccoon. Further upstream in the watershed of both the mainstem and North Branch, in areas of less human population,

mammalian species can include (in addition to the above) white tailed deer, red fox and gray fox as well as black bear and coyote. In addition, various bat species are known to inhabit the areas of the watershed. Waterfowl species that can be found in the area of the impoundment include mallards, Canada geese as well as domestic ducks and geese. Within the area of the Manhan River drainage, waterfowl that have been observed include wood ducks and hooded mergansers, and during the spring and fall migration period black ducks, blue winged teal, green winged teal and common mergansers have been noted. Upland avian species common to the less populated areas can include a number of forest dependent passerines. Domestic ducks and geese have been observed utilizing the impoundment behind the dam during several site visits.

## 4.3 Aquatic Environment

### 4.3.1 Hydrology

Estimated mean annual discharge from the Manhan River (as calculated by the U.S. Fish and Wildlife Service) is approximately 138 Cubic Feet/Second (CFS). Most of the approximate 69-mile drainage area of the Manhan River (including the North Branch) is rolling to moderately steep topography, and runoff from these surrounding slopes contributes much of the flow. In addition, several larger tributaries as well as numerous smaller feeder streams flow into both branches of the Manhan River along its 26-mile reach. Groundwater seepage appears to feed many of the smaller colder tributaries, which also provide habitat to resident coldwater fish. Some of these smaller streams join the river in Easthampton upstream from the Manhan River Dam. Major tributaries to the North Branch include Sodom Brook and Turkey Brook, which join it in Westhampton, and major tributaries to the mainstem include Bassett Brook and Harnum Brook, which join the river in Easthampton just upstream from the dam. In addition, Tripple Brook, Red Brook, Alder Meadow Brook and Sackett Brook join the mainstem in Southampton. Red Alder Brook flows from Alder Pond, and its confluence with the mainstem is just downstream from the outflow of the Tighe Carmody Reservoir.

A total of five dams are located on both the mainstem and the North Branch of the Manhan River, including the Manhan River Dam in Easthampton, which is approximately 3 miles from its confluence with the Connecticut River. The first upstream barrier along the mainstem is located approximately 8 miles upstream in Southampton forming Lyman Pond, and the first upstream barrier on the North Branch is located approximately three miles upstream forming Clear Falls Pond in Loudville. It should be noted that Clear Falls Pond is created by a seasonally-installed dam to provide a public swimming hole during the summer months only. Two additional dams are located upstream on the mainstem, forming the Tighe Carmody and White reservoirs. No other operating dams exist upstream from Clear Falls on the North Branch. However, the remains of historic dams are present on both branches.

### 4.3.2 Water Quality

The mainstem of the Manhan River is rated Class A for the 15 mile reach from its headwaters northeast of Norwich Pond in Huntington to the outlet of the Tighe Carmody Reservoir in Southampton. It is rated Class B for the remaining 10.9 miles to its confluence with the Connecticut River in Easthampton by the Massachusetts Department of Environmental Protection (DEP) according the Massachusetts Surface Water Quality Standards. These standards designate the most sensitive uses for which the surface waters of the Commonwealth shall be enhanced, maintained and protected; prescribe minimum water quality criteria required to sustain the designated uses; and include provisions for the prohibition of discharges (MA DEP 1996). These regulations undergo public review every three years. The three classes assigned to inland surface water (*i.e.,* freshwater) are described below.

***Class A*** *– These waters are designated as a source of public water supply. To the extent compatible with this use they shall be an excellent habitat for fish, other aquatic life* and *wildlife,* and *suitable for primary* and *secondary contact recreation. These waters shall have excellent aesthetic value. These waters are designated for protection as Outstanding Resource Waters (ORW's) under 314 CMR 4.04(3).*

***Class B*** *– These waters are designated as a habitat for fish, other aquatic life,* and *wildlife,* and *for primary* and *secondary contact recreation. Where designated they shall be suitable as a source of water supply with appropriate treatment. They shall be suitable for irrigation* and *other agricultural uses* and *for compatible industrial cooling* and *process uses. These waters shall have consistently good aesthetic value.*

***Class C*** *– These waters are designated as a habitat for fish, other aquatic life* and *wildlife,* and *for secondary contact recreation. These waters shall be suitable for the irrigation of crops used for consumption after cooking* and *for compatible industrial cooling* and *process uses. These waters shall have good aesthetic value.*

The Class A designation for the reach near the headwaters of the mainstem is necessary since the Tighe Carmody Reservoir is a municipal water supply for the city of Holyoke. Further downstream of the water supply, the Class B standard also indicates water quality sufficient to provide habitat for fish and wildlife. In addition, it is presumed that the North Branch is rated at least Class B since it enters the mainstem of the Manhan River downstream from the Tighe Carmody Reservoir, where it is rated as B and there is no indication of degradation at the confluence. It should be noted that visual observation of the Manhan River upstream from the Waterworks Dam (*i.e.,* both branches) during May of 1999 revealed clear water with no noticeable turbidity or color.

There are no known point sources of pollution along the Manhan River (*i.e.,* both the mainstem and the North Branch); however, there are possible non-point sources from agricultural fields. These non-point sources may involve pollution from animal waste as well as excessive erosion which causes silt to be carried into to the river. In addition, nutrient runoff from agricultural fertilizers has been identified as a potential problem

[National Resource Conservation Service (NRCS) Hampshire County 1998, Environmental Quality Incentives Program, Geographic Priority Area Report].

Both branches of the Manhan River are stocked with salmonid species, including brown trout, brook trout, as well as Atlantic salmon. In addition, data from the Commonwealth of Massachusetts Division of Fisheries and Wildlife (MA DFW) has shown naturally reproducing populations of brook and brown trout in both the North Branch and mainstem, as well as winter holdover of Atlantic salmon, indicating water quality criteria sufficient to support these fish. These genera require clear water with maximum temperatures no greater than 20 $C^{o}$, and minimum dissolved oxygen levels of 5 mg/L with optimal levels of 7–8 mg/L. Water temperatures in both branches of the Manhan River measured by the MA DFW during several fisheries investigations conducted between 1977-1988 have ranged from approximately 15-20$^{o}$ C. These temperatures are within the suitability range noted above for the survival and reproduction of salmonid fish. It also has been reported that the impoundment behind the Manhan River Dam (a.k.a., Waterworks Dam) is fished recreationally for brown trout. This would further indicate the suitability of the water quality (as well as habitat) in that area for supporting these salmonid species.

### 4.3.3 Riverine Processes and Sediment Chemistry

Sediment transported downstream in the Manhan River during higher flow events settles out behind the Manhan River Dam. Generally, depending upon flows, the coarser material is captured, while the finer material is transported over the dam and downstream. Since there are few industries along the Manhan River upstream from the Dam, the material is presumed to be clean and originates from sandy soils along the stream banks, from runoff and storm/erosion events. Downstream, the high flows off the spillway have scoured the bedrock for a distance of approximately 100 feet, and little substrate other than scoured rock is present.

## 4.4 Biological Resources

### 4.4.1 Aquatic Vegetation

Very little aquatic vegetation occurs in the immediate vicinity of the Manhan River Dam, and what does exist is limited to the margins of the impoundment and the streambank downstream from the dam. The steeply sloping banks of the impoundment behind the dam (upstream) as well as the rocky nature of the channel downstream from the dam prevents the establishment of large amounts of emergent wetland vegetation, while the swift flowing water and lack of sandy/muddy substrate prevents the establishment of aquatic bed vegetation. Upstream from the dam, sections of the mainstem and North Branches contain areas of fringing wetland vegetation (*i.e.,* scrub/shrub and emergent), however, very little vegetation occurs within 200 feet upstream from the dam.

Although there may not be large areas of aquatic and/or wetland vegetation in and around the area of the Manhan River Dam, the two branches of the Manhan River run through

areas where there is abundant tree canopy that shades most of the river. This is extremely beneficial for salmonid fish habitat in that it maintains cooler water temperatures by preventing solar warming, while contributing to instream cover (*i.e.,* when trees fall into the river from the stream bank). In addition, the fallen leaves provide nutrients and substrate for the aquatic invertebrates used as food items by resident fish.

### 4.4.2 Fisheries

The Manhan River supports an assemblage characteristic of healthy coldwater streams/rivers. The MA DFW conducted surveys on both the mainstem and the North Branch between 1977 and 1988. Resident fish species in the mainstem include brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), blacknose dace (*Rhinichthys atratulus*), slimy sculpin (*Cottus cognatus*), creek chub (*Semotilus atromaculatus*), fallfish (*Semotilus corporalis*), tesselated darter (*Etheostoma olmstedi*), common shiner (*Notropis cornutus*) and brown bullhead (*Ameiurus nebulosus*). In addition, typical warmwater fish can be found in sections below the dam that forms Lyman Pond, including largemouth bass (*Micropterus salmoides*), pumpkinseed (*Lepomis gibbosus*), bluegill (*Lepomis macrochirus*), golden shiner (*Notemigonus crysoleucas*), and chain pickerel (*Esox niger*). The North Branch contains brown trout, longnose dace (*Rhinichthys cataractae)*, blacknose dace, slimy sculpin, white sucker, American eel, brown bullhead, spottail shiner (*Notropis hudsonius*), creek chub, tesselated darter, fallfish, and brook trout. In addition, Atlantic salmon (*Salmo salar*) were collected, which had been stocked as part of the on-going restoration program for the Connecticut River. A listing of all the species collected is presented in Table 1. The brown and brook trout collected from these surveys were in size classes indicating the occurrence of natural reproduction (Dave Basler, MA DFW, Connecticut Valley Wildlife District, Belchertown MA, Personal Communication, 1999 and 2001). Therefore, the water quality and habitat criteria in both the mainstem and the North Branch of the Manhan River appear to meet habitat criteria necessary for growth, survival and reproduction of salmonids (as well as other stream dwelling species).

The Manhan River is currently being stocked with Atlantic salmon fry by the MA DFW in cooperation with the U.S. Fish and Wildlife Service. These fish will become smolts after approximately two years in the river, and migrate downstream to the ocean. As noted earlier, survival rates for these fish have compared favorably with other rivers in the Connecticut River Basin with survival of 0+ age fish being approximately 33%. This indicates that suitable habitat is present for these fish to survive in the river. In addition, direct survey/observation of the habitat has indicated the presence of sandy pools and riffles and in the North Branch, gravel bottoms with deep pools and rocky gravel riffles with shallow pools. These habitat types are suitable for Atlantic salmon reproduction, as well as reproduction, growth and survival of other Salmonid species.

**Table 1.** Fish species collected from both branches of the Manhan River by Commonwealth of Massachusetts Division of Fisheries and Wildlife from 1977-1988.

| Common Name | Scientific Name |
|---|---|
| American eel | *Anguilla rostrata* |
| Atlantic salmon | *Salmo salar* |
| Blacknose dace | *Rhinichthys atratulus* |
| Bluegill | *Lepomis macrochirus* |
| Brook trout | *Salvelinus fontinalis* |
| Brown bullhead | *Ameiurus nebulosus* |
| Brown trout | *Salmo trutta* |
| Chain pickerel | *Esox niger* |
| Common shiner | *Notropis cornutus* |
| Creek chub | *Semotilus atromaculatus* |
| Fallfish | *Semotilus corporalis* |
| Golden Shiner | *Notemigonus crysoleucas* |
| Table 2. (continued) | |
| **Common Name** | **Scientific Name** |
| Largemouth bass | *Micropterus salmoides* |
| Longnose dace | *Rhynichthys cataractae* |
| Pumpkinseed | *Lepomis gibbosus* |
| Slimy sculpin | *Cottus cognatus* |
| Spottail shiner | *Notropis hudsonius* |
| Tesselated darter | *Etheostoma olmstedi* |
| White sucker | *Catostomus commersoni* |

## 4.5 Threatened and Endangered Species

The U.S. Fish and Wildlife Service has performed intra- and inter-agency (with the National Marine Fisheries Service) Section 7 coordination that indicates no Federally-listed threatened or endangered species under the jurisdiction of either agency occur in the vicinity of the Manhan River Dam (Appendix D). During preparation of the draft environmental assessment, the U.S. Army Corps of Engineers consulted with the Commonwealth of Massachusetts, Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP). At that time, several state-listed rare species had been reported to occur in the vicinity of the project site. Those species were short-nosed sturgeon (*Acipenser brevirostrum*)[1], wood turtle (*Clemmys insculpta*), eastern pondmussel (*Ligumia nasuta*), triangle floater (*Alasmidonta undulata*), zebra clubtail (*Stylurus scudderi*), brook snaketail (*Ophiogomphus aspersus*), and elderberry long-horned beetle (*Desmocerus palliatus*) (see letters dated 20 and 13 June, 2000, Appendix D). However, during preparation of this document, the NHESP Atlas, 13th Edition (effective October 1, 2008) and Mass GIS online mapping (data updated October 2008) were consulted. According to these sources, no proposed work will occur within designated Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife.

[1] By verbal communication on October 1, 2009, Julie Crocker of the National Marine Fisheries Service stated that there was no evidence of sturgeon in the project area and therefore, no need for further consultation with the Office of Protected Resources.

## 4.6 Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation Management Act strengthen the ability of the National Marine Fisheries Service and the New England Fishery Management Council to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat", and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Connecticut River (into which the Manhan River flows) has been designated Essential Fish Habitat for Atlantic salmon Juveniles and Adults for the freshwater areas as well as the mixing and salinity zones (in the estuary). In addition, the Connecticut River estuary has been designated as essential fish habitat (EFH) for at least one or more life stage(s) of several marine, estuarine, and anadromous finfish species. For the 10' x10' square of latitude and longitude which extends from the Connecticut River toward Saltworks Bay, Money Point and Long Rock, the managed EFH species listed are Atlantic salmon, pollock, red hake, windowpane flounder, Atlantic sea herring, bluefish, king mackerel, Spanish mackerel, cobia and sand tiger shark.

On the Connecticut River itself the EFH designation extends only as far as Hadam, Connecticut for all designated species except Atlantic salmon. The New England Fisheries Management Council Essential Fisheries Habitat Amendment (October 7, 1998) identifies the Connecticut River upstream from Haddam as EFH, using the criteria for designation as; all rivers where Atlantic salmon are currently present, for any of the life stages of eggs and larvae, juveniles, and adults. As noted previously, the Connecticut River historically supported Atlantic salmon, and has been the subject of ongoing Atlantic salmon restoration efforts, which have resulted in returns of pre-spawning adults to areas upstream of the Holyoke Dam, potentially, including the Manhan River. In addition, the Manhan River upstream from the Manhan River Dam has been stocked with Atlantic salmon fry, which could return there to spawn once fish passage is provided at the Manhan River Dam.

In addition to the EFH designation of its estuary for Atlantic salmon and other species listed above, the Connecticut River supports an existing river herring run (alewives and blueback herring) as well as American shad. With the proposed fishway, an additional 11 miles of river (mainstem and North Branch) are expected to become accessible to these fish with its potential spawning habitat. Although river herring and shad are not designated as EFH species, they are prey for many EFH and/or federally managed species (i.e. bluefish, striped bass), which occur in both the Connecticut River estuary as well as Long Island Sound. Therefore by restoring anadromous fish passage to areas of the Manhan River upstream from the Manhan River Dam, EFH for both Atlantic salmon as well as forage for some of the estuarine and marine species inhabiting the marine and estuarine environments may be positively affected. Further discussion of these effects can be found in the EFH assessment in the Environmental Consequences section of this EA (Section 5.6).

## 4.7 Historical and Archaeological Resources

Easthampton was first settled in approximately 1664, and the town was incorporated in 1785. It was initially an agrarian village, but in the early 1800's became an industrial community as sawmills and various other industries developed along the Manhan River. In 1847 manufacturing became a major part of the local economy with the establishment of the Williston-Knight Button Factory. Following that, several elastic companies became established, and one of these became the first U.S. company to successfully use vulcanized rubber in woven goods. By the early 1900's the town had attracted thousands of new immigrants to work in the growing elastic and fabric manufacturing companies. By 1927, there were approximately twelve factories producing yarn, thread, buttons and elastic materials.

A review of archaeological site files at the Massachusetts Historical Commission (MHC) revealed several documented historic and archaeological properties both within and in the vicinity of the proposed project area. A prehistoric site (19-HS-42) dating from the Woodland and Contact Period and consisting of a palisaded fort built by Native Americans during the first English settlement, was located on a high bluff above the east bank of the Manhan River. The area has been completely built over by modern development. The town of Easthampton has since been incorporated as a city.

The Manhan Waterworks Dam (known as Historic Archaeological Site number 2) comprises the existing dam and appurtenant structures and setting. The following discussion is taken from the Manhan Waterworks Dam Form D (MHC Historic Resources Survey inventory form dated December 1984). In 1686, Samuel Bartlett was given the privilege of setting up a corn mill on the Manhan River at the falls. In 1725, the mill was given to his son, Joseph Bartlett, who was the first settler in the area now known as Easthampton center. The village of Bartlett's Mills had been settled in 1705 in the area where Northampton Street now crosses the Manhan River. Mills at the north side of the dam, beside the corn mill, include gristmills, saw mills, fulling mills, and tanneries amongst others. Mills have been situated at this location from 1636 to around 1900.

A sawmill and accompanying lumberyard, owned by Lemuel Lyman, was in operation on the south side of the dam before 1840. Later, this property became the Mount Tom Thread Company owned by Joel Basset. The mill burnt in a fire in 1882. In 1892, the city of Easthampton Waterworks acquired the property and built a pumping station to provide water pressure for the town's water supply. Reconstruction of the original dam occurred during the early 1900's. In the 1930's and 1940's, a hydroelectric generating station operated at the south end of the dam. Modifications to the dam at that time included the addition of penstocks at the southern end; these are no longer usable. The hydroelectric station was dismantled in 1947. Since that time, the waterpower has not been used. A proposal to build a new hydroelectric station at this location was under study, but found to be economically unfeasible. Throughout the 1800's, the water rights were divided equally between the mills on the north bank and the mills on the south bank.

After the fire of 1882, the town acquired the water rights that went with the mill property. Later the town acquired the remaining water rights.

The Waterworks Dam is listed as approximately 100 feet in length with a 19-foot head. It was constructed of stone and concrete, and as of 1984, its condition was fair to good with some attention needed. In the fall of 1998, Easthampton completed a construction modification project on the dam, including reconstruction and rehabilitation. Most of this work involved concrete repair and modification work.

In addition to the dam itself, various appurtenant structures and land are included in the inventory form. Originally the parcel owned by Lemuel Lyman before 1840, parcels 60, 60a, 61, 62, and 65 of Assessors Map #38 are included within this designation. The original brick pumping station dates from circa 1893, and was formerly occupied by the Easthampton Water Department. This building, currently unoccupied, is characterized as a plain, single-story brick factory-type structure built on an old foundation of rough-cut stone laid in the random ashlar style. The former pumping station building abuts the dam and is located behind and below current residences. Additionally, former mill tenement buildings, currently utilized as dwellings, are located at 31, 35, and 37 Northampton Street. These brick, Federal-style buildings date from circa 1840.

## 4.8 Cultural and Economic Resources

Easthampton is located in western Massachusetts, along the Manhan River, near its confluence with the Connecticut River. It is bordered by the towns of Hadley on the northeast, Holyoke on the south and east, Northampton on the north, and Southampton and Westhampton on the west. It is accessed by Routes 10 and 141, which connect it with Interstate 91. The current population is approximately 16,195 people, and is a combination of suburban residences and industrial uses. Manufacturing companies located in the downtown area create 46% of the jobs for residents of Easthampton as well as the surrounding communities. Manufactured products in the city include felt, brushes and tubed products.

In addition to manufacturing, the city contains numerous opportunities for education and recreation. The 190-acre Nonotuck Park is used for active and passive recreational activities. The Massachusetts Audubon Society manages the Arcadia Wildlife Sanctuary, located at the Oxbow near the confluence of the Manhan and Connecticut rivers, and provides educational programs for adults and children. In addition, the Manhan River itself flows through the center of city, and is fished recreationally, including the pond (impoundment) created by the Manhan River Dam (*i.e.,* Waterworks Dam).

## 4.9 Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires federal agencies to examine proposed actions to determine whether they will have disproportionately high and adverse human health or environmental effects on minority or low income populations.

The Commonwealth of Massachusetts Executive Office of Environmental Affairs defines Environmental Justice populations as those meeting any of the following criteria: 1) having a median household income that is at or below 65% of the statewide median income; 2) 25% or more of the residents are classified as minority; 3) 25% or more of the residents are foreign-born; or 4) 25% or more of the residents lack English language proficiency. A map of environmental justice areas published in 2002 by the above office indicates that no Environmental Justice populations (meeting any of the above criteria) are located in the City of Easthampton Massachusetts (D. Marrier, 10/01/2002, MASS GIS, http://maps.massgis.state.ma.us/ej/ej.pdf).

The Manhan River Dam and the surrounding property on the south side of the river (excluding the currently vacant utility building) are owned by the City of Easthampton. It is abutted by residential property including private dwellings on both sides of the river. Within this area, there are no known specific populations meeting the above criteria that could be disproportionately adversely affected by the construction of a fish ladder, either temporarily during construction, or long-term. In addition, the impoundment behind the dam will remain intact, allowing the existing recreational fishery to continue, which may include use by subsistence fishers who depend upon fishing for supplemental food supply.

## 4.10 Protection of Children

Executive Order 13045 "Protection of Children from Environmental Health Risks and Safety Risks" seeks to protect children from disproportionately incurring environmental health risks or safety risks that might arise as a result of federal policies, programs, activities and standards. Environmental health risks and safety risks include risks to health and safety attributable to products or substances that a child is likely to come in contact with or ingest.

The proposed project involves construction of a fish ladder to provide fish passage over a previously existing dam. There will not be any alteration of the existing safety fences, which limit access to the potential fall areas of the dam. Currently fences are in place on the right dam abutment, as well as a guard-rail at the upstream end of the impoundment. These will remain in place during and after construction activities. In addition, areas of the fish ladder where there may be potential safety hazards will be grated and/or fenced to prevent direct access by children.

## 4.11 Air Quality

The Commonwealth of Massachusetts defines air pollution as the presence in the ambient air space of one or more air contaminants or combinations thereof in such concentrations and of such duration as to: (a) cause a nuisance; (b) be injurious, or be, on the basis of current information, potentially injurious to human or animal life, to vegetation, or to property; or (c) unreasonably interfere with the comfortable enjoyment of life and property or the conduct of business (310 Code of Massachusetts Regulations 7.00).

Under the Federal Clean Air Act and its associated amendments (42 USC 7401 et seq.), the U.S. Environmental Protection Agency (EPA) regulates six "criteria" air pollutants:

Nitrogen dioxide (NO2)
Sulfur dioxide (SO2)
Lead (Pb)
Carbon monoxide (CO)
Particulate matter with a diameter of 10 microns or less (PM10)
Ozone (O3)

Ambient air quality is protected by Federal and state regulations. The EPA has developed National Ambient Air Quality Standards (NAAQS) for certain air pollutants and air quality standards for each state cannot be less stringent than the NAAQS. The NAAQS determined by the EPA set the concentration limits that determine the attainment status for each criteria pollutant. Massachusetts does not attain the public health standard for two pollutants – ozone (O3) for the entire state and carbon monoxide (CO) in a few cities (DEP, 1999). Nitric oxide (NO), hydrocarbons, oxygen ($O_2$), and sunlight combine to form ground level ozone in the atmosphere, the principle component of smog. Nitrogen oxides are released during the combustion of fossil fuels.

The entire state of Massachusetts, including Hampshire County, is designated as a serious non-attainment zone for ozone ($O_3$) according to the 1-hour ground level ozone standard, and is part of the Northeast Ozone Transport Region, which extends northeast from Maryland and includes all six New England states. Non-attainment zones are areas where the National Ambient Air Quality Standards (NAAQS) have not been met.

In July of 1997, based on information that the 1-hour ground-level ozone standard did not adequately protect public health, EPA established the 8-hour ozone standard. Scientific information shows that concentrations of ozone in the air can affect human health at low levels and over longer exposure periods than one hour. The 1-hour standard limits ozone concentrations to 0.12 parts per million (ppm), measured in hourly readings. Much of New England was previously designated non-attainment under the 1-hour standard. The more protective 8-hour standard limits ozone concentrations to 0.08 ppm, averaged over eight hours. On April 15, 2004, EPA took action to let the public know whether their area has a ground-level ozone air quality problem, or is contributing to a problem nearby. This action, known as "designating" areas as meeting or not meeting the more protective 8-hour ozone standards, is an important step in helping State and local governments improve air quality. For areas that do not meet the standards, EPA has classified the degree of the problem and indicated the required actions that non-attainment areas must take.

In New England, EPA has designated all areas in the three southernmost states (Connecticut, Massachusetts, and Rhode Island) as non-attainment, as well as coastal sections of New Hampshire and Maine. The City of Easthampton is designated as moderate non-attainment of the new 8-hour ozone standard, as is all of western Massachusetts (http://www.epa.gov/regon01/airquality/nattainm.html).

# 5.0 ENVIRONMENTAL CONSEQUENCES

## 5.1 General

The proposed installation of a fish ladder at the Manhan River Dam will not have any long-term adverse effects on the existing environment of the Manhan River. It will provide fish passage to sections of the river upstream from the concrete dam. The construction of a fish ladder on the Manhan River Dam (a.k.a., Waterworks Dam) is expected to have a positive effect on the river ecology, as well as the city of Easthampton. The passage of anadromous fish beyond the dam will provide an additional recreational benefit to the city (*i.e.,* observation of fish migration) which already has several large parks and recreational areas.

## 5.2 TERRESTRIAL ENVIRONMENT

### 5.2.1 Topography

Construction of a fish ladder on the Manhan River Dam is not expected to have any significant effects on the topography in the vicinity of the project. The project will involve some alteration of the right bank in order to construct the fishway, as well as some excavation of the existing streambed downstream from the dam. However, this will not significantly alter the overall bank and/or river configuration. Most of the grade and bank will be untouched, and whatever changes are made will not have any significant adverse effects to the overall stream/river morphology.

### 5.2.2 Geology and Soils

The construction of a fishway on the Manhan River Dam is not expected to have any significant adverse effects on the existing geology of the site. The existing dam is built on bedrock (sandstone), which forms the stream bed downstream from the dam. A small section of bedrock may be excavated (by mechanical equipment operating in the wet) in order to create the proper discharge elevation depths for the Denil Fishway, however, this will not significantly alter the overall configuration of the underlying bedrock bottom. The construction will not involve the removal of topsoil in order to place the channel for the fish ladder. Also, there will be no blasting of bedrock in the project area. The section of the fishway descending along the right bank may require anchoring into the bedrock bottom to provide the footings for the section along the bank.

### 5.2.3 Vegetation

The construction of a Denil fishway on the Manhan River Dam is not expected to have any long-term negative effect on the existing vegetation in the vicinity of the project area. The right bank, where the project will be constructed, is formed partially by a concrete wall which extends into a gravel bank. In addition, the downstream location of the streambed at the proposed location of the discharge is exposed un-vegetated rock. Also,

the change in flow resulting from the operation of the fishway will not significantly alter downstream flows, and therefore, is not expected to effect any fringing riverine wetland vegetation downstream from the project.

### 5.2.4 Wildlife

The proposed project is not expected to have any long-term negative impacts upon the existing wildlife in vicinity of the Manhan River Dam, but will have a long- term positive effect on the general wildlife population within the riparian areas of the Manhan River Basin. The construction of the fishway will be in a previously disturbed area of stream bank, which consists of concrete and gravel, without significant habitat value. Access will be via an existing roadway, where there will be little disturbance to the surrounding habitat. Most terrestrial wildlife species that may inhabit the immediate project area are expected to temporarily relocate. Habitat in the immediate footprint of the proposed fish ladder construction consists of bedrock outcrop, concrete abutment and disturbed gravel streambank with very little aquatic and/or terrestrial vegetation. The discharge over the spillway forms a shallow sheet of swift flowing water, which has scoured the discharge area to bedrock. These features are unlikely to provide suitable habitat for resident wildlife species, and it is therefore unlikely that the project will have any long- term negative effects on resident wildlife. Any impacts that may occur will be temporary, and of short duration, lasting only until the project is completed.

The passage of migratory fish beyond the Manhan River Dam into both the mainstem and the North Branch of the Manhan River will have an overall positive effect upon the wildlife population in these areas. Both the upstream migration of pre-spawning adult river herring and shad, as well as the downstream migration of the juveniles, will provide beneficial forage to resident wildlife species, such as birds and predatory terrestrial wildlife. Many birds (including herons, loons, and raptor species) and terrestrial mammals (such as river otter and, to a lesser extent, raccoons and black bear) are piscivorous; many of these species have been found previously in the areas of the Manhan River watershed.

## 5.3 AQUATIC ENVIRONMENT

### 5.3.1 Hydrology

The construction of a fish ladder on the right bank of the Manhan River Dam is not expected to have any significant effect upon the overall hydrology of the Manhan River in the project area. Construction of the ladder will involve notching the spillway on the right side in order to fit the exit of the ladder to the pool elevation behind the dam, and will contain a section of stop logs at the notch to control the spillage through the ladder. Flows will be delivered to the ladder using the stoplogs during migration seasons. However, it is generally expected that flow will continue over the spillway as well due to the high flows experienced during migratory periods. During non-migratory periods, water will be diverted from the fishway and will continue to flow over the spillway. Also, an existing discharge pipe on the right bank may continue to be operated in order to

provide additional attraction water for the up-migrating fish during the spring season, and also may be operated during the down-migration season to provide downstream passage of juveniles and/or post-spawned adults. There will be no change in the volume and flow of water discharging from the Manhan River downstream from the dam.

### 5.3.2 Water Quality

The construction of the proposed Denil fishway on the Manhan River Dam is not expected to have any long-term negative impacts on the water quality of the Manhan River downstream of the project area itself, including the impoundment behind the dam. Discharges will not be significantly altered in the area of the dam itself, and will be unchanged downstream from the fish ladder. The hydraulic residence time of the water behind the impoundment is not expected to change significantly by the construction of the fish ladder; therefore, no deterioration is expected of the existing water quality, either upstream and/or downstream of the impoundment.

During construction of the dam, water quality could be temporarily affected, however, it is anticipated that construction will occur during times of low flow, with erosion control measures in place in order to minimize any impact. Prior to beginning construction activities, a 401 Water Quality Certificate will be obtained. Any impacts resulting from construction are expected to be short-term and minor. Once the project is completed, any excavated banks or stream-bed will be stabilized or restored.

### 5.3.3 Riverine Processes and Sediment Chemistry

The construction of the proposed project is not expected to have any long term negative effects on the riverine processes and sediment transport in the project area downstream from the project or upstream in either of the branches of the Manhan River. Construction will occur during the low flow season, and will not involve altering downstream flows. Although flows may be diverted around the construction area, overall river flows will not be altered. After construction, the operation of the fish ladder may involve slight localized changes where some diversion of flows off the weir and into the fish ladder may occur (during up and down migration seasons) however, these will be for the benefit of the migrating fish. These changes are not expected to mobilize and/or change any of the existing sediment depositional process in the downstream channel.

## 5.4 BIOLOGICAL RESOURCES

### 5.4.1 Aquatic Vegetation

The proposed project is not expected to have any long-term negative effects on the aquatic vegetation in the Manhan River either upstream or downstream from the project area. Part of the right bank downstream from the existing dam is proposed to be excavated; however, as noted previously, most of this area is either rock, concrete or gravel/sand. Access to the project will be via a previously constructed road, which will be temporarily extended beyond the stream-bank. Much of the streambank immediately

downstream from the dam is scoured bedrock, with very little substrate and/or sand and gravel, and consequently little aquatic vegetation. Any impacts will be short term and temporary, and areas disturbed along the bank will be replanted and restored. These are expected to be minor due to the relatively sparse areas of vegetation in the project area.

### 5.4.2 Fisheries

The proposed project will have an overall positive effect upon the fisheries of the Manhan River. The construction of a fish ladder will allow the upstream passage of anadromous (and catadromous) fish to their historical habitat upstream from the dam in the Manhan River watershed. The downstream structure will provide a safer passage route for outmigrating fish. These passage facilities will benefit the existing fishery as well as the ecosystem by not only restoring historical species, but also by the influx of additional forage for the existing fish populations. Generally, in freshwater areas where river herring (*i.e.,* alewives and blueback herring) have been restored, studies show that resident fish populations have been enhanced. The juvenile herring produced in the spawning run serve as food supply for bass and other resident and/or migratory species. All life stages of anadromous herrings are important forage for many freshwater and marine fish (*i.e.,* striped bass) which may occur in the estuary. In addition, the mortality of anadromous alewives also provides an important source of nutrients for headwater ponds (Loesch, 1987).

Restoration of Atlantic salmon to this section of the river will not only enhance the quality of the fishery by restoration of an historical native species, but also have an economic and/or recreational benefit to the downstream areas of the Connecticut River and estuarine area of Long Island Sound. Restoration efforts for this species in the Connecticut River watershed have been ongoing since the 1960's, and represent efforts by the Federal and State governments, as well as numerous local non-profit river associations. In order for these fish to be restored to the Connecticut, as well as their ocean rearing habitat, access to their spawning habitat needs to be provided. The Manhan River represents historical spawning habitat, and the success and survival of the stocked juveniles indicates the presence of sufficient habitat and water quality for these fish to survive and reproduce. Therefore, the provision of fish passage will allow these fish to access this historical habitat and allow for the continued progress of their restoration to the Connecticut River.

## 5.5 Threatened and Endangered Species

It is expected that the construction of a fish ladder on at the Manhan River Dam will not have any long-term negative impact on any Federally listed endangered species. As noted, coordination with the U.S. Fish and Wildlife Service and National Marine Fisheries Service has indicated that no Federally-listed threatened of endangered species under the jurisdiction of either agency occur in the vicinity of the Manhan River Dam (see consultation documentation in Appendix D). Initially, the NHESP had indicated that several state listed rare species protected under the Massachusetts Endangered Species Act and the state's Wetlands Protection Act were known to occur in the vicinity of the

proposed project, with the project itself located within the actual habitat of the wood turtle (*Clemmys insculpta*), eastern pondmussel (*Ligumia nasuta*), triangle floater mussel (*Alasmidonta undulata*), creeper mussel (*Strophitus undulatus*), zebra clubtail dragonfly (*Stylurus scudderi*), and brook snaketail dragonfly (*Ophiogomphus aspersus*). In addition, the shortnose sturgeon (*Acipenser brevirostrum)* and elderberry long-horned beetle (*Desmocerus palliatus*) had been reported in the vicinity of the proposed project. The shortnose sturgeon and the zebra clubtail dragonfly are state-protected as "Endangered" species, while the triangle floater, creeper, Eastern pondmussel, wood turtle, elderberry longhorn beetle and brook snaketail dragonfly are listed as "Special Concern" (see letters dated 13 June, 2000, and 2 August, 2004 in Appendix D). However, after review of the latest NHESP Atlas (13th Edition, effective October 1, 2008) and MassGIS online mapping (data updated October 2008), it appears that the project area is no longer considered to be within designated Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife. Therefore, the proposed construction of a Denil fish ladder at the Manhan River Dam is not expected to have any long term negative affects on any state-listed species of concern and/or threatened or endangered species, and the conditions identified in NHESP's letter of 2 August, 2004 (Appendix D,) are no longer necessary.

## 5.6 Essential Fish Habitat Assessment

The proposed construction of a fishway at the Manhan River Dam is not expected to have any significant long-term negative impacts on EFH for the designated life stages of Atlantic salmon (noted previously), as well as the noted life stages of the species listed in Section 4.6 of this EA, which occur in the Connecticut River estuary. The project is designed to further the restoration of Atlantic salmon (as well as river herring and shad) in the Manhan River as well as the Connecticut River by restoring access to upstream spawning areas in the Manhan River, the North Branch of the Manhan River, and their tributaries. During construction, erosion control measures will be in place to minimize negative effects to water quality resulting from silt/sediment runoff. Cofferdams also will be employed in order to isolate the actual areas of in-river work both upstream and downstream of the dam (i.e. the entrance and exit channels). Work will be timed in order to avoid interference with either up-migrating or down-migrating diadromous fish that may be in the area.

The proposed project is expected to have an overall positive effect on EFH for the designated life stages of Atlantic salmon in the Connecticut River. The proposed fishway will enable anadromous species such as Atlantic salmon, river herring and shad to access 11 miles of potential spawning and nursery habitat upstream from the Manhan River Dam on the mainstem and North Branch. The production potential this habitat represents will aid in the restoration of these species to the Manhan and the Connecticut River watershed. The fishway will provide both upstream and downstream passage for pre/post spawning adult Atlantic salmon as well as down-migrating smolts.

The proposed project is also expected to have a positive effect on many of the EFH species that inhabit the Connecticut River estuary as well as Long Island Sound. The fish

ladder will open up additional spawning habitat for blueback herring and shad, which are preyed upon by several of the listed EFH species such as bluefish and Atlantic salmon (Scott and Crossman, 1979). In addition, many other larger marine predator species prey on blueback herring, including striped bass. The additional spawning habitat that will become available for blueback herring from the fish ladder is expected to increase their numbers in the Connecticut River estuary as well as Long Island Sound, thereby having a positive effect on these ecosystems, including the EFH species inhabiting these areas.

## 5.7 Historical and Archeological Resources

The proposed alternative consists of constructing a fish ladder at the Manhan River Dam to provide anadromous fish access to spawning and rearing habitat above the dam along the upper reaches of the Manhan River. This would entail construction of a Denil fish ladder on the right abutment of the Manhan River Dam. Initial excavation of the bedrock bottom and bank material may be required to construct the fish ladder supports and footings. Vegetation will be cleared only as required to provide a staging area, an area for stockpiling equipment and materials, access to construction sites, and for temporary access around the dam. Minor regrading may be needed to accommodate the temporary access road along the eastern side of the dam. A concrete pedestrian ramp may be constructed in the vicinity of the fishway exit to allow visitors viewing opportunities of fish migrations.

Although the Manhan River Dam resource area dates from the late 17$^{th}$ Century, substantial improvements and modifications have been conducted within the project area. The existing dam dates from the early 1900's when the City secured the property. Improvements since that time consist of construction of a pumping station (the former Waterworks Building), a hydroelectric generating station, and the addition of penstocks to the southern end of the dam. Most recently, the City has completed a substantial reconstruction and rehabilitation of the dam in 1998, with plans for possible municipal use. The pond created by the dam upstream has been a valuable recreational asset to the community.

Due to the previous modifications to the dam and surrounding area, construction of the Denil fishway on the right side of the dam is not likely to impact significant cultural resources. Construction will be confined to the limits of the current dam footprint and within the channel both upstream and downstream of the dam. Minor regrading and vegetative clearance of an existing driveway adjacent to the Waterworks Building will provide a staging area, an area for stockpiling equipment and materials, construction access, and temporary access around the dam. A temporary 12-foot wide gravel ramp will be incorporated within this area to facilitate construction. This road will be removed following construction of the fishway.

Given the above, the construction of the fish ladder at the Manhan River Dam will have no effect upon any structure or site of historic, architectural, or archaeological significance as defined by the National Historic Preservation Act of 1966, as amended, and implementing regulations 36 CFR 800. By letter dated January 24, 2002, the

Massachusetts Deputy State Historic Preservation Officer (SHPO) issued a determination that the project will have no adverse effect on the Manhan Dam and Waterworks complex (Appendix B).

## 5.8 Cultural and Economic Resources

Construction of a Denil fishway on the Manhan Rive Dam is expected to have a positive effect on the cultural and economic resources for the City. Along with the City's other recreational/educational resources noted earlier in the Affected Environment section of the EA, the passage of fish over this dam during migration season would provide an additional attraction and/or facility for passive recreation. Currently, the pond behind the dam is recreationally fished, and the proposed fishway will be an additional benefit to people visiting the falls. Potentially this fishway could attract additional visitors to the city, which would be beneficial to the overall economy. Although the concrete pedestrian ramp that was to be constructed in the vicinity of the fishway exit has been removed from the latest designs (a feature that would have enhanced visitor viewing opportunities of fish migrations), the plans now include a video monitoring system that could have a live feed to various media outlets.

## 5.9 Environmental Justice

The proposed project is not expected to pose impacts upon any minority or low income populations adjacent to or in the vicinity of the project pursuant to Executive Order No. 12898. The project involves construction of a fish ladder at the Manhan River Dam in Easthampton to restore fish passage and provide anadromous fish access to historical upstream spawning habitat. This will benefit the ecosystem and have a positive effect upon the fisheries. It will also provide benefits to the recreational angling community in general, including any anglers who may be using the river for subsistence fishing. As noted earlier, there are no known populations located in the immediate vicinity of the proposed project or in the City that meet the Environmental Justice criteria noted in Section 4.9 of this EA.

## 5.10 Protection of Children

EO 13045 requires federal agencies to examine proposed actions to determine whether they will have disproportionately high human health or safety risks on children. During the construction phase of the proposed project, heavy construction equipment and vehicles will be transported to the site. However, the actual site will be fenced off to prevent unauthorized personnel from entering the work area (including children). In addition, there will be a temporary increase in truck traffic transporting materials to and from the site. These trucks will be limited to the public roadways and the existing project access road (right of way), and therefore are not expected to cause any disproportionate direct, indirect or cumulative impact to children associated with environmental health or safety risks. Construction itself is expected to last for approximately five months; therefore, this increased traffic will be for a short duration and temporary.

The proposed project is to construct a fish ladder to provide fish passage upstream and downstream of the dam (improving the aquatic ecosystem). A fence is currently in place in the hazardous fall areas of the dam. The proposed fish ladder will also include fences and/or steel grating over potentially hazardous fall areas to prevent access by unauthorized personnel to these areas. Public access to the project is not expected to disproportionately impact children, since any hazardous areas will be fenced and/or grated to prevent access.

### 5.11 Air Quality

The project will have no long-term impacts on air quality. Construction of the proposed project would cause a temporary reduction in local ambient air quality because of fugitive dust and emissions generated by construction equipment. The extent of dust generated would depend on the level of construction activity and on sand composition and dryness. If proper dust suppression techniques were not employed, dry and windy weather could create a nuisance for nearby residents. Equipment operating on the construction site will emit pollutants that contribute to increased levels of criteria pollutants such as carbon monoxide, nitrogen oxides, and ozone. The emissions from construction vehicles and related equipment should have an insignificant impact to local air quality. No changes in local or regional air quality are likely to occur with the construction and operation of the proposed project.

Construction operations and equipment will be required to comply and file notifications with the Massachusetts Air Pollution Control regulations pertaining to Dust, Odor, Construction and Demolition (310CMR 7.09), Noise (310CMR 7.10), and Motor Vehicle Emissions (310CMR 7.11(1)), as well as any applicable local ordinances. Under 310 Code of Massachusetts Regulations (CMR), an air quality approval will not be required from the Massachusetts Department of Environmental Protection (MA DEP). Therefore, the facility meets the Clean Air Act exemption requirements established by the EPA and is in conformity with the Massachusetts air quality regulations.

## 6.0 CUMULATIVE EFFECTS

Cumulative impacts are those resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. The past and current activities in the Manhan River include the periodic maintenance of the Manhan River Dam, as well as State Route 110 Bridge abutments upstream from the dam. Additionally, it is possible that sedimentation behind the dam could occur from both natural conditions in the watershed (i.e. erosion) and those that might result from future development. Reasonably foreseeable future actions include maintenance of the existing concrete dam and spillway, as well as periodic maintenance of the proposed fish passage structures. Maintenance of the bridge and its associated structures (including the abutments) as well as dam maintenance are generally infrequent, and therefore the effects of these and previous activities would not be expected to significantly cumulatively affect water quality, air quality, hydrology and other biological resources. Maintenance of the fish passage facility, although more frequent, would consist primarily of debris removal,

and replacement and repair of the wooden baffles. Ladder maintenance (other than debris removal) would be done during non-migration times with the flows shut off, and also would not be expected to have any significant cumulative impacts on water quality, air quality, hydrology, and other biological resources. As mentioned previously, the City would assume responsibility for long-term maintenance and operation of the fishways.

This project is expected to benefit the overall ecological health of the Manhan River by restoring anadromous fish passage to areas upstream of the Manhan River Dam. This not only will benefit the anadromous fish populations themselves, but also provide forage for other predator species which utilize river herring, salmon and shad as a food source in the Connecticut River (including the estuary) as well as in the marine environment. These predators include largemouth and smallmouth bass (in the Connecticut River); striped bass (in the river and the estuary), and bluefish (in the estuary and the marine environment). The direct effects of this project are not anticipated to add to any impacts from other actions in the area. Therefore, no adverse cumulative impacts are projected as a result of this project.

## 7.0 ACTIONS TAKEN TO MINIMIZE IMPACTS

Construction of the Denil fishway on the Manhan River Dam is proposed to occur during the summer low flow season outside of the times of any existing anadromous fisheries downstream migration (*i.e.,* Atlantic salmon). Construction windows and time restrictions noted in the 401 Quality Certificate and/or other permits will be followed in order to minimize any impacts to existing and/or migrating fish species. During construction, flows will be diverted around the actual site, and proper erosion control measures will be utilized. This will minimize any potential water quality impacts to the river from silt runoff. It is anticipated that downstream flows will not be altered either during or after construction.

## 8.0 SUSTAINABLE DEVELOPMENT

The project has been designed to sustain the ecological productivity of the Manhan River aquatic system. It will not impart any long-term negative ecological impacts or lower regional biodiversity. It will provide additional aquatic habitat diversity for the overall riverine fisheries and associated wildlife.

## 9.0 CONSULTATION AND COORDINATION

### 9.1 Personal Communication

The following persons were coordinated with in the preparation of this report.

1. Mr. Dave Basler, Massachusetts Division of Fisheries and Wildlife, Connecticut Valley Wildlife District, Belchertown Massachusetts.

2. Mr. Caleb Slater Ph.D., Massachusetts Division of Fisheries and Wildlife, Division Headquarters, Westborough, Massachusetts.

3. Mr. Tom Maloney, Massachusetts Executive Office of Environmental Affairs, Connecticut River Watershed Coordinator.

4. Mr. Curt Orvis, USFWS, Hadley, Massachusetts.

## 9.2 Site Visit

A coordinated site visit was made by Corps of Engineers personnel on June 19, 2000. The following people attended:

Ms. Barbara Blumeris, USACE Planning Branch
Mr. Ken Levitt, USACE
Mr. Michael Tautznik, Mayor, Easthampton, Massachusetts
Mr. David Shepardson, Massachusetts EOEA/MEPA
Mr. John O'Leary, Massachusetts EOEA, Connecticut River Watershed
Mr. Tom Maloney, Massachusetts EOEA, Connecticut River Watershed

Additional attendees are listed on the attendance list included in Appendix B.

## 9.3 Correspondence

### 9.3.1 Coordination Letters

Project coordination Letters were mailed to the following people prior to the preparation of this report pursuant to the Federal Fish and Wildlife Coordination Act, Federal Endangered Species Act, and the National Historic Preservation Act:

Mr. Michael Bartlett
U.S. Fish and Wildlife Service
70 Commercial Street
Suite 300
Concord N.H. 03301-5087

Mr. Jack Terrill
Asst. Regional Admin. for Habitat Conservation
National Marine Fisheries Service
One Blackburn Drive
Gloucester, Massachusetts 01930

Mark Tisa Ph.D.
Commonwealth of Massachusetts, Division of Fisheries and Wildlife
One Rabbit Hill Road
Westborough, Massachusetts 01581

Ms. Patricia Huckery
Massachusetts Natural Heritage and
Endangered Species Program
Division of Fish and Wildlife
One Rabbit Hill Road
Westborough, Massachusetts 01581

Ms. Amy Maher
Massachusetts Natural Heritage
and Endangered Species Program
One Rabbit Hill Road
Westborough, Massachusetts 01581

Robert Deblinger, Ph.D.
Assistant Director, Wildlife
Division of Fish and Wildlife
One Rabbit Hill Road
Westborough, Massachusetts 01581

Mr. John O'Leary
Team Leader Connecticut River Basin
NRCS Room 39
243 King Street
Northampton, Massachusetts 01060

Mr. Thomas Skinner
Massachusetts Coastal Zone Management
100 Cambridge Street
Boston, Massachusetts 02202

Mr. Robert A. Durand, Secretary
Executive Office of Environmental Affairs
MEPA Office
100 Cambridge Street
Boston, Massachusetts 02202

Ms. Lois Bruinooge
Division of Water Management
Massachusetts Department of Environmental Protection
One Winter Street
Boston, Massachusetts 02108

Mr. Paul Diodati, Director
Massachusetts Division of Marine Fisheries
100 Cambridge Street
Boston, Massachusetts 02202

Caleb Slater, Ph.D.
Anadromous Fish Team Leader
Massachusetts Division of Fisheries and Wildlife
Field Headquarters
Westborough, MA 01581

Mr. David Webster
Director, Massachusetts Office of Ecosystem Protection
EPA – New England, Region 1
One Congress Street, Suite 1100 (CMA)
Boston, Massachusetts 02114-2023

Mr. Curt Orvis
US Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589

Ms. Jan Rowan
Connecticut River Coordinator
US Fish and Wildlife Service
103 East Plumtree Road
Sunderland, MA 01375-9175

Mr. Tom Maloney
Connecticut River Watershed Council
One Ferry Street
East Hampton, MA 01027

Mr. Richard Thibedeau, Director
Bureau of Resource Protection
Massachusetts Department of Environmental Management
100 Cambridge Street, Room 1404

Mr. Michael Tautznik, Mayor
43 Main Street
Easthampton, MA 01027

### 9.3.2 Public Notice

A Public Notice describing the project was distributed by the ACOE on April 24, 2002. A copy is included in Appendix C of this EA.

### 9.3.3 Correspondence Received

Correspondence received in response to the Public Notice is included in Appendix D of this EA.

## 10.0 REFERENCES


Basler, David. Massachusetts Division of Fisheries and Wildlife. Connecticut Valley Wildlife District, Belchertown MA. Personal Communication, 1999-2001.

Connecticut River Basin 1998 Water Quality Assessment Report. Commonwealth of Massachusetts Department of Environmental Protection, Division of Watershed Management. Westborough, MA.

Loesch, J.G. 1987. Overview of Life History Aspects of Anadromous Alewife and Blueback Herring in Freshwater Habitats. American Fisheries Society Symposium 1:89-103.

MA DEP. 1996. (Revision of 1995 report). Massachusetts Surface Water Quality Standards. Massachusetts Department of Environmental Protection, Division of Water Pollution Control, Technical Services Branch. Westborough, MA (Revision of 314 CMR 4.00, effective June 23, 1996).

Roberts, George S. 1906. Historic Towns of the Connecticut River Valley.

Slater, Caleb, 2001. Job Performance Report, Massachusetts, Project Number F-45-R-19, Study 1-Connecticut River Anadromous Fish Investigations; Job 2W – Westfield Fish Passage. Massachusetts Division of Fisheries and Wildlife, Field Headquarters, 1 Rabbit Hill Road, Westborough, MA 01581.

Strategic Plan for the Restoration of Atlantic Salmon to the Connecticut River, Revised July, 1998. Connecticut River Atlantic Salmon Commission, 103 East Plumtree Road, Sunderland, Massachusetts 01375-9467.

U.S. Army Corps of Engineers, New England Division, 1976. Knightville Dam, Huntington, Massachusetts. Master Plan for Resources Development.

Whitman and Howard, Inc., 1984. Hydropower Feasibility Study, Waterworks Dam, Manhan River, Easthampton, Massachusetts. Prepared by Whitman and Howard Inc. 45 Williams Street, Wellesley, Massachusetts, 02181.

## 11.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES AND EXECUTIVE ORDERS

### 11.1 Federal Statutes

1. Archaeological Resources Protection Act of 1979, as amended, 16 USC 470 et seq.

Compliance: Issuance of a permit from the Federal land manager to excavate or remove archaeological resources located on public or Indian lands signifies compliance.

2. Preservation of Historic and Archeological Data Act of 1974, as amended, 16 U.S.C. 469 et seq.

Compliance: Project will be coordinated with the State Historic Preservation Officer. Impacts to archaeological resources will be mitigated.

3. American Indian Religious Freedom Act of 1978, 42 U.S.C. 1996.

Compliance: Must ensure access by Native Americans to sacred sites, possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

4. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: Public notice of the availability of this report to the Environmental Protection Agency is required for compliance pursuant to Sections 176c and 309 of the Clean Air Act.

5. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 U.S.C. 1251 et seq.

Compliance: A Section 404(b)(1) Evaluation and Compliance Review will been incorporated into the project report. An application shall be filed for State Water Quality Certification pursuant to Section 401 of the Clean Water Act.

6. Coastal Zone Management Act of 1782, as amended, 16 U.S.C. 1451 et seq.

Compliance: Not applicable. Project is not located in the Massachusetts designated coastal zone.

7. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Coordination with the U.S. Fish and Wildlife Service (FWS) and/or National Marine Fisheries Service (NMFS) has determined no formal consultation requirements are necessary pursuant to Section 7 of the Endangered Species Act.

8. Estuarine Areas Act, 16 U.S.C. 1221 et seq.

Compliance: Applicable only if report is being submitted to Congress.

9. Federal Water Project Recreation Act, as amended, 16 U.S.C. 4601-12 et seq.

Compliance: Public notice of availability of this report to the National Park Service (NPS) and Office of Statewide Planning relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

10. Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.

Compliance: Coordination with the FWS, NMFS, and State fish and wildlife agencies signifies compliance with the Fish and Wildlife Coordination Act.

11. Land and Water Conservation Fund Act of 1965, as amended, 16 U.S.C. 4601-4 et seq.

Compliance: Public notice of the availability of this report to the National Park Service (NPS) and the Office of Statewide Planning relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

12. Marine Protection, Research, and Sanctuaries Act of 1971, as amended, 33 U.S.C. 1401 et seq.

Compliance: Not applicable, the project does not involve the transportation or disposal of dredged material in ocean waters pursuant to Sections 102 and 103 of the Act, respectively.

13. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

Compliance: Coordination with the State Historic Preservation Officer signifies compliance.

14. Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. 3000-3013, 18 U.S.C. 1170

Compliance: Regulations implementing NAGPRA will be followed if discovery of human remains and/or funerary items occur during implementation of this project.

15. National Environmental Policy Act of 1969, as amended, 42 U.S.C 4321 et seq.

Compliance: Preparation of an Environmental Assessment signifies partial compliance with NEPA. Full compliance shall be noted at the time the Finding of No Significant Impact or Record of Decision is signed.

16. Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.

Compliance:. An application will be filed for a General Permit with the U.S. Army Corps of Engineers in compliance with this Act.

17. Watershed Protection and Flood Prevention Act as amended, 16 U.S.C 1001 et seq.

Compliance: Floodplain impacts must be considered in project planning.

18. Wild and Scenic Rivers Act, as amended, 16 U.S.C 1271 et seq.

Compliance: Coordination with the Department of the Interior to determine project's impacts on designated Wild and Scenic Rivers has occurred.

19. Magnuson-Stevens Act, as amended, 16 U.S.C. 1801 et seq.

Compliance: Coordination with the National Marine Fisheries Service and preparation of an Essential Fish Habitat (EFH) Assessment signifies compliance with the EFH provisions of the Magnuson-Stevens Act. No assessment was required for this inland project.

## 11.2 Executive Orders

1. Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971.

Compliance: Coordination with the State Historic Preservation Officer signifies compliance.

2. Executive Order 11988, Floodplain Management, 24 May 1977 amended by Executive Order 12148, 20 July 1979.

Compliance: Public notice of the availability of this report or public review fulfills the requirements of Executive Order 11988, Section 2(a)(2).

3. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: Public notice of the availability if this report for public review fulfills the requirements of Executive Order 11990, Section 2(b).

4. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979.

Compliance: Not applicable to projects located within the United States.

5. Executive Order 12898, Environmental Justice, 11 February 1994.

Compliance: Not applicable if the project is not expected to have a significant impact on minority or low income population, or any other population in the United States.

6. Executive 13007, Accommodation of Sacred Sites, 24 May 1996

Compliance: Not applicable unless on Federal lands, then agencies must accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and avoid adversely affecting the physical integrity of such sacred sites.

7. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. 21 April, 1997.

Compliance: Not applicable if the project would not create a disproportionate environmental health or safety risk for children.

8. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000.

Compliance: Consultation with Indian Tribal Governments, where applicable, and consistent with executive memoranda, DoD Indian policy, and USFWS Tribal Policy Principles signifies compliance.

### 11.3 Executive Memoranda

Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, 11 August 1980.

Compliance: Not applicable if the project does not involve or impact agricultural lands.

White House Memorandum, Government-to-Government Relations with Indian Tribes, 29 April 1994.

Compliance: Consultation with Federally Recognized Indian Tribes, where appropriate, signifies compliance.