

**Housatonic River Basin Natural Resources Restoration Plan
Project Proposal**

**Heminway Pond Dam Removal
Steele Brook
Aquatic Natural Resources Restoration/Enhancement**

**Town of Watertown
August, 2011**

Abstract

Heminway Pond Dam is owned by the Town of Watertown. It is a dam located on Steele Brook and is located just upstream of Echo Lake Road in Watertown, CT adjacent to Deland Field and Heminway Park School. The dam currently restricts fish passage in Steele Brook, creates a pond with increased water temperatures and high bacterial levels due to high geese populations, and encourages deposition of iron precipitate in the stream channel just downstream of the dam.

A dam removal Feasibility Analysis has been completed with the goals of; 1) Water Quality improvements in Heminway Pond and Steele Brook downstream of Heminway Pond Dam, 2) Improve fish passage through the dam and pond area, 3) Remove liability of an aged dam from the Town of Watertown and, 4) Encourage incorporation of this project with a larger Town greenway project. The Feasibility Analysis evaluated four alternatives and recommended the full removal of the spillway to address the identified project goals at a cost of \$700,000 to \$1,100,000 dependant on the quantity of sediment that can be utilized on site.

The Town of Watertown has selected a consultant engineer to undertake the design of the dam removal and is currently finalizing the scope and fee. It is anticipated that the design will be completed in 2012. The Town is seeking funds from the Housatonic River Natural Resources Restoration Project for the removal of Heminway Pond Dam.

Project Narrative

Heminway Pond is an impoundment on Steele Brook within the Town of Watertown, CT. It was originally constructed to supply water for a thread/string mill. The impoundment no longer has industrial use as manufacturing operations at the mill have since ceased and current adjacent businesses do not require the impoundment for water supply. The impoundment is shallow with maximum depths around 4 feet. The backwater area of the pond is approximately 5.5 acres in size. The pond is located on Steele Brook upstream of Echo Lake Road and adjacent to Deland Field and Heminway Park School. The school is currently being renovated to serve as the new Town Hall and government center. Significant amounts of sediment have entered the pond area and settled behind the dam and within the impoundment.

The pond, dam and associated upland area totaling approximately 14.5 acres were last owned by the Siemon Company. The Town of Watertown took ownership in 2007. The pond currently serves no purpose for local business and industry and the area is seen as a potential site for future active and passive recreation.

Portions of Steele Brook have been on the Connecticut Department of Energy and Environmental Protection's list of impaired waterbodies since 2002. In the area directly downstream of Heminway Pond the water quality does not meet water quality standards. Between the dam and Echo Lake Road there is a major local impact to water quality through iron precipitate settlement during low flow periods. There has been concern in this area due to orange discoloration of the water, turbidity, and loss of habitat caused by flocculation. The full removal of the spillway has been identified as a solution to improving the water quality and therefore improving habitat in the area downstream of Heminway Pond.

Heminway Pond currently poses a barrier to fish passage in the area. Although there are other fish barriers along Steele Brook and the brook does not support anadromous fish passage at this time, resident fish passage is obtainable in the reach and will be very beneficial to a thriving ecosystem.

The Heminway Pond Dam Removal Feasibility Analysis was completed as an appendix to a larger scale Watershed Based Plan for Steele Brook Watershed. The Watershed Based Plan was completed by the Natural Resources Conservation Service with a Section 319 Grant under the Clean Water Act and assistance from the Town of Watertown. Much of the information presented in this proposal is taken directly from the Dam Removal Feasibility Analysis. (Connecticut NRCS Staff. 2009. Heminway Pond Dam Removal Feasibility Analysis, Steele Brook Watershed, Watertown, Connecticut, CT-TP-2009-2. USDA, Natural Resources Conservation Service, Tolland, CT.)

Aquatic Natural Resources

Fisheries-Existing Conditions

There are a number of fish species found in Steele Brook including Tessellated Darter (*Etheostoma olmstedii*), Black Nosed Dace (*Rhinichthys atratulus*), Creek Chub (*Semotilus atromaculatus*), Common Shiner (*Luxilus cornutus*), White Sucker (*Catostomus commersoni*), Red Breasted Sunfish (*Lepomis auritus*), Black Crappie (*Pomoxis annularis*), among others. Electrofishing surveys have also documented the presence of American Eel (*Anguilla rostrata*) in the watershed; however, they have not been found upstream of the Municipal Stadium sampling location. Brown Trout are also stocked in the brook. Stocking of Trout began in the spring of 2005. Fish community information has been collected at three locations since 2003. These locations are on the upstream side of the Route 6 Bridge, at Municipal Stadium, and at Echo Lake Road. Beginning in the spring of 2005, Brown Trout were stocked in two locations; upstream of the Route 6 Bridge and at Municipal Stadium. Additional stocking was completed at East Aurora Street and at West Street below the golf course in 2006 and 2007 respectively.

Ponding of water behind the dams, diminished riparian vegetation, and runoff from impervious surfaces are the principal contributors to the warmer water temperatures at the downstream location. Based on the available data, fish abundance increases from upstream to downstream for more tolerant stream specialists, including the Blacknose Dace, Creek Chub, and the Common Shiner. The variety of fish species tends to decline from upstream to downstream. This is to be expected given that the upstream portion of the watershed is much less developed than the downstream portion. Water temperature also increases from upstream to downstream which would contribute to the declining richness of fish varieties. Survival of Brown Trout was much higher upstream of the Route 6 Bridge compared to at Municipal Stadium for all data years (2003-2007).

There is a healthier stream community upstream of the Heminway Pond dam influence for both fisheries and benthic life. Upstream of Route 6 water quality and physical habitat are superior to other locations downstream. In this area there is no influence from ponding, less development, and a wooded stream corridor contributing to enhanced habitat and cooler water temperatures compared to downstream locations. Over summer survival and year to year survival were quite impressive during the dates of testing. In 2007, ten yearling Brown Trout were captured in this location. The survival values seen in this portion of Steele Brook are exceptional for this particular brook but also rank high compared to other streams statewide that are stocked with Brown Trout fry.

Fisheries-Proposed Conditions

Full Removal of Spillway would result in major beneficial impacts and no adverse impacts to fisheries in Steele Brook and the Heminway Pond area. The beneficial impacts would result from complete removal of a major fish barrier, Heminway Pond Dam, elimination of the pond, and the creation of a new channel/floodplain system in the pond area. Fish passage would be accomplished due to the removal of the spillway, and

the construction of a more suitable stream channel above and below the dam. The proposed channel would facilitate the unimpeded migration of the full range of fish species through the entire project reach. Subsequently, implementation of this option allows the maximum amount of fish passage possible at this site. The removal of the spillway would eliminate the thermal impacts associated with the pond and the channel between the dam and Echo Lake Road. There are no adverse impacts to fisheries associated with implementation of this alternative as it would open this stretch of stream to passage which has not been passable since construction of the dam.

Water Quality-Existing Conditions

Steele Brook is a high gradient stream originating in the forested area north of Watertown and flows southeasterly to its confluence with the Naugatuck River in Waterbury. The brook is designated as a Class A surface water from the headwaters to the former outfall of the Watertown Fire District sewage treatment plant upstream of Pin Shop Pond. Below this point, the brook is designated as a Class B surface water stream. Portions of Steele Brook have been on the Connecticut Department of Energy and Environmental Protection's list of impaired water bodies since 2002 for not meeting Aquatic Life Goals. These Aquatic Life Goals are measures of the benthic macroinvertebrate community in the water body. Steele Brook, in this area, had poor benthic macroinvertebrate populations. In the area directly downstream of Heminway Pond the water quality does not meet water quality standards. Between the dam and Echo Lake Road there is a major local impact to water quality through iron precipitate settlement during low flow periods. There has been a concern in this area due to orange discoloration of the water, turbidity, and loss of habitat caused by flocculation. There is a shift in macroinvertebrate communities which occurs below Heminway Pond in the vicinity of Echo Lake Road and extends to the mouth of Steele Brook. Sites upstream of Heminway Pond have good benthic macroinvertebrate communities and meet CT DEEP Water Quality Standards. The orange discoloration of the water exists during low flow periods in the area between the dam and Echo Lake Road. It was first observed at the outlet area of a pipe which drains from the baseball field adjacent to the pond area. Orange discoloration has also been witnessed in the bank area across from the ball field (east side of the channel) and in the rock lined channel to the west of the pond area. Figure 1 is a photograph portraying the orange discoloration in the channel downstream of the dam.

During the summer of 2001, CT DEEP collected 8 rounds of ambient water chemistry from 6 sites from Route 6 to the mouth of the brook. Preliminary sediment grab samples and water chemistry were taken from 3 locations in Heminway Pond. The orange discoloration ends approximately at the end of the broken wall on the west bank of the brook. CT DEEP has anecdotal evidence that the area occupied by the baseball field was once a landfill. There is also evidence that the area was at one time a wetland. Other water quality concerns, particularly elevated bacteria levels, exist within the basin. A TMDL (Total Maximum Daily Load) was developed for Steele Brook, with copper identified as the critical pollutant; however, the primary sources of copper have been addressed.

Water Quality-Proposed Conditions

Full Removal of Spillway would result in major beneficial impacts and negligible adverse impacts to water quality in the pond area and the stream area downstream of the dam. The major beneficial impacts would be the result of continuous flow over the fully removed spillway and through the stream channel downstream of the dam, the construction of channel-floodplain system, and a reduction in the thermal and bacterial loading as a result of the elimination of the pond. It has been documented that during the dry months, flow is reduced to a level that there is no discharge over the spillway. By lowering the elevation of the spillway to the footer and constructing a channel-floodplain system, discharge will continuously flow through the area. This will provide for increased flows within the channel downstream of the dam. The increased flow within the stream channel may aid in decreasing the amount of iron precipitate accumulating between the dam and Echo Lake Road. However, it should be noted that many Connecticut soils and underlying bedrock tend to have high concentrations of iron naturally occurring within them. Ground water percolating through the soils and bedrock in many cases will have elevated levels of iron in solution, which tends to precipitate out when exposed to air or oxygenated water in the stream. The area of the baseball field was most likely at one time a wetland. The combination of decaying organic material and the natural high concentration of iron in the soil and groundwater will not change due to the implementation of this alternative. Iron will continue to discharge into the stream from the natural sources, much of it from the drainage pipes below the field. The negligible adverse impacts would be the result of additional runoff and sediment from areas upstream of the pond area to reach areas downstream of the dam. Currently, the dam acts as a sediment trap, and may allow for the attenuation of some pollutants within the impoundment, preventing them from being transported downstream. With the full removal of the dam, this sediment can be carried downstream and depending on velocities in the channel downstream, may settle in various locations in the brook.

Figure 1 (Photograph courtesy of CT DEEP).



Project Partners

To date the project partners have included the Department of Energy and Environmental Protection, the United States Department of Agriculture, Natural Resources Conservation Service, the Town of Watertown, Watertown Fire District, Watertown Land Trust, Council of Governments of the Central Naugatuck Valley, the Siemon Company, American Rivers, and the National Park Service. A Steele Brook Advisory Committee was established during the development of the Watershed Based Plan for Steel Brook and has continued to meet on a monthly basis to address a broad range of issues within the watershed. There has been significant public support on a number of ongoing initiatives within the Steele Brook Watershed. The Watertown Town Council has actively supported all Steele Brook initiatives with in-kind services through the Department of Public Works as well as with financial support to non-federal cost sharing requirements. The current design effort for the removal of the Heminway Pond Dam is funded with \$126,600 of EPA Section 319 funds, \$35,000 of Town funds, \$34,400 of Town in-kind services and value of \$15,000 in land rights. The Town remains committed to the removal of the dam.

Environmental Effects

In addition to the beneficial environmental effect to the aquatic natural resources including fisheries and water quality as discussed in the Project Narrative section, the proposed Heminway Pond Dam removal will have both beneficial and adverse impacts as discussed below.

Wetlands

The beneficial impacts would be associated with the addition of emergent wetlands as well as a functioning floodplain wetland throughout the stream system. These emergent wetlands and floodplain wetlands would be created due to the newly constructed stream channel in the pond area.

The adverse impacts would be associated with the loss of open water wetlands due to removal of the dam. The pond area would essentially cease to exist. A new stream system would take the place of the pond area. These open water wetlands are man made wetlands and their value is debatable, but there would be a significant loss of open water wetlands due to the removal of the dam.

Wildlife

The beneficial impacts would be the result of additional fish passage through the area. Migrating fish would provide additional feeding for fish-seeking wildlife. Also, stream inhabiting wildlife would return to the area that is currently submerged by the pond. The current lacustrine environment would be replaced with a cool water stream environment. A properly developed floodplain and upland area planted with native plants would provide cover and habitat to a number of different species not currently in the area. Many species of birds inhabit shrub land which would be implemented on the floodplain.

The adverse impacts to wildlife would be the result of the loss of the pond area. The number of geese, beavers, muskrats and other species would decrease in the area due to the transformation of pond to stream. The reduction in the number of geese is considered an adverse impact to wildlife but it should be noted that a reduction in geese numbers would improve the water quality in the area which is a fundamental goal of the project.

Hydrology and Hydraulics

A 1987 Steele Brook Flood Control Study completed by Milone & MacBroom shows that there is minimal storage behind the Heminway Pond Dam so any changes to flood flow amounts of the overall river system would be minimal. Although there would be no overall reduction in flooding in the area, a properly designed channel with access to a floodplain will replicate a natural system and provide flood relief of the channel in the pond area. The creation of a channel floodplain system in the pond area will create a more natural hydrologic condition in this area of Steele Brook. Local flow and flood stage conditions will change as a result of removing the spillway, which will lower flood

stages upstream and hence a larger percentage of flood flow will pass through the remaining dam rather than over the low spots of the embankment and upstream floodplain. This will lead to less flood flow being diverted to the side channel, basketball courts, and ball fields. Large events may still flood the ball fields due to backwater from Echo Lake Road Bridge. The minor adverse impacts to hydrology and hydraulics are the result of a change in flow characteristics of the stream system. The rock lined side channel, which currently carries some overflow through the breached area of the dike, would no longer convey flow during drier months of the year due to the drop in normal water elevation. Additional filling of the rock channel will also reduce conveyance of the channel.

Sediment

The beneficial impacts are a result of the dam, which acts as a sediment trap, being fully removed therefore allowing transport of sediment through the system. This will return the stream to a more natural sediment transporting system as it was prior to the dam being built.

The adverse impacts result from the potential for large amounts of sediments to be transported downstream and potentially settled out in areas of low velocity. With the entire discharge flowing through the system, the opportunity for sedimentation downstream will increase. A stable channel-floodplain system will be designed to protect material in the former impoundment, but the normal bedload returning to the system, which is considered beneficial, may also cause adverse impacts downstream.

Sociologic Issues and Recreation

The beneficial impacts are associated with the additional fish passage and the return of the area to a more natural channel, floodplain and upland system. Recreational fishing would be increased and improved in the area. Other possible opportunities for this alternative to be a benefit would be the addition of educational signage and trails referencing the importance of fish passage, fish habitat, and the advantages that natural stream features create for the environment. Implementation of this alternative would result in a major stream restoration of Steele Brook and could serve as an excellent opportunity to educate the community and other visitors about the importance of stream systems and habitat.

There are no adverse impacts to recreation and sociologic affects of people in the community. In its present state, the area provides little recreational or educational benefits to the community. This alternative could lead to additional recreation in the area through fishing, hiking, educational outings, and other active and passive recreation. There may be a small fraction of the community that feels an emotional connection to the pond, but in its current state, the area serves no public service so the additional recreational opportunities would most likely be welcomed by the community.

Cultural and Historic Resources

There are no beneficial impacts to cultural and historic resources resulting from this alternative. The historic side channel would essentially be buried in granular fill and soil. This action eliminates the need to rebuild the dike but will bury the stacked rock channel and wall under fill.

The adverse impacts are related to the action of filling the channel with granular fill and soil. This cultural resource will no longer be visible.

Connecticut State Archeologist Nicholas Bellantoni, Ph.D. visited the site and requested that prior to construction activities the wall should be photo documented to conserve in photo format the historic value of the rock lined channel and mortared stone wall.

Conceptual drawing

Existing Conditions



Conceptual of full removal



Aerial of Existing conditions



Aerial of conceptual full removal



Cost Estimate

Steele Brook Alternate 4 - Full Dam Removal and Channel Restoration						
Item No.	Work or Material	Spec. No.	Est. Quant.	Units	Unit Cost	Amount
1	Mobilization and Demobilization	8	1	Job	\$35,000.00	\$35,000.00
2	Clearing and Grubbing	2	1	Job	\$6,000.00	\$6,000.00
3	Dam Concrete Removal	3	154	CY	\$110.00	\$16,940.00
4	Pollution Control (included in dewatering)	5	1	Job	\$0.00	\$0.00
5	Stabilized Construction Entrance	5	1	Job	\$2,250.00	\$2,250.00
6	Temporary Mulch	5	1	Job	\$0.00	\$0.00
7	Seeding and Mulching	6	23,351	Sq.Yd.	\$1.00	\$23,351.00
8	Removal of Water	11	1	Job	\$50,000.00	\$50,000.00
9	Unclassified Excavation (used on site)	21	6,668	CY	\$15.00	\$100,020.00
10	Unclassified Excavation (hailed off-site)	21	18,755	CY	\$37.00	\$693,935.00
11	Topsoiling (use sandy muck on site)	26	2,500	CY	\$10.00	\$25,000.00
12	Channel armor	61	1,745	CY	\$52.00	\$90,740.00
13	Chain Link Fence	91	60	Ft	\$20.00	\$1,200.00
14	Trees and Shrubs	401	0	Job	\$0.00	\$0.00
				Total =		\$1,044,436.00
				Use =		\$1,100,000.00

It should be noted that a large percentage of the estimated cost is for the removal of material off-site. By using all of the material on-site the cost estimate can be reduced to \$700,000.00.

Summary

The Town of Watertown is committed to significant improvements the Steele Brook watershed. The removal of the Heminway Pond dam will be a major activity towards the goals of water quality improvements, fish passage, and maximizing environmental benefits associated with the dam removal. The design will be completed in 2012 and the Town of Watertown is seeking construction funds to assist with the removal project. The project is fully consistent with the Aquatic Natural Resources Restoration/Enhancement Category of restoration priorities as contained in the Housatonic River Basin Natural Resources Restoration Plan.