

**Restoring coldwater habitat for brook trout in Hamant Brook,
MA as part of the NFHAP and EBTJV**

Project Location: Sturbridge, Massachusetts, Worcester County

Congressional District: 2nd

EBTJV / NFHAP Funding Requested: \$20,000

Total Project Cost: \$884,450 (estimated)

Total Federal Matching: \$0

Total Non-Federal Matching: \$22,750 (received) + \$861,700 (expected)

Type of Project: dam removal, culvert replacement, fish passage, coldwater stream habitat restoration, connectivity

APPLICANT

Organization: Massachusetts Division of Fisheries & Wildlife

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Sponsoring Fish and Wildlife Service Fisheries Office

Fish and Wildlife Service Office: Central New England Fishery Resources Office

Project Officer: Martha Naley

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Date Submitted: September 30, 2009

I. PROJECT DESCRIPTION, SCOPE OF WORK, AND PARTNER INFORMATION

A. Project Description and Scope of Work (not to exceed 500 words)

Project Summary

The two leading causes of brook trout habitat degradation in Massachusetts have been identified through the EBTJV (2006) as fragmentation by dams and roads. The subwatershed (#25035) containing Hamant Brook was identified as high impact from dam fragmentation and medium impact from road fragmentation, making the current focus on barrier removal within this subwatershed highly relevant to the objectives of EBTJV and NFHAP (EBTJV 2006). This project will remove three dams and one impassable culvert, allowing access from mainstem habitat to a coldwater tributary and converting 70% of the project area from impounded to free-flowing.

Site Description

The project area includes the most downstream section of Hamant Brook, a coldwater stream supporting wild brook trout. The project footprint will directly benefit habitat in 0.75 miles of stream and allow access to more than 8 miles of brook trout habitat (Figure 1). While the land is primarily forested and protected through a conservation restriction, the stream is considerably impacted by dams and an impassable culvert. These structures segment the habitat and impair water quality and temperature regimes suitable to coldwater species.

Property Ownership & Funding History

In Massachusetts, property owners are liable for dams on their property should they become hazardous or unsafe. There are 2 property owners within the project area. The perched culvert and lower dam are owned by Old Sturbridge Village. Both structures function as private road crossings. The upper 2 dams are located on property purchased by the Town of Sturbridge with a conservation restriction purchased by the Massachusetts Division of Fisheries & Wildlife. Letters of support approving the project were received from both property owners.

The majority of funding is expected to come from the Millenium Power Partners, a group established to identify river restoration opportunities in the Quinebaug Watershed as part of a mitigation agreement. Funding sources, like EBTJV, are being sought to supplement this larger funding source and would be used toward purchase of materials for culvert replacement.

Expected Results

At this stage, all barriers are expected to be removed as one project. Replacement of the impassable culvert will restore the connection between Hamant Brook and the Quinebaug River. However, removal of all barriers will restore free-flowing stream habitat within Hamant Brook, extend connected tributary and mainstem habitat, improve water quality in Hamant Brook and the Quinebaug River, reduce stream temperatures, and eliminate invasive pond vegetation. In addition, a 2.6 mile tributary entering upstream of the upper impoundment and 4.5 miles of open mainstem in the Quinebaug River would be re-connected via a restored Hamant Brook, resulting in nearly 8 miles of habitat and providing access to more diverse free-flowing and coldwater habitats for brook trout and riverine fish species. In addition, having an

undeveloped landscape should benefit the restoration process immensely by maintaining stream temperatures and reducing erosion and runoff.

B. Partner Information (not to exceed 100 words)

Partner Name	Contribution In-Kind	Contribution Cash	Federal or Non-Federal	Partner Category	Role of Partner
MDFW	\$18,700	\$5,000	Non-Federal	State Agency	Site Recon, Monitoring, Project Oversight
MA Riverways	\$750	\$5,000	Non-Federal	State Agency	Site Recon Funding, Project Support
Millenium	\$0	\$800,000	Non-Federal	Multi-Partner	Funding, advisory
Trout Unlimited	undetermined	\$0	Non-Federal	NGO	Volunteer

C. Project Timeline

Completed (Sept. 2007-Sept. 2009): Numerous informational town meetings to secure support for project; Site Reconnaissance Study by Inter-fluve Inc. (Sept. 2008); Letter of support received (2009)

On-going: monitoring of fish and temperature

Proposed:

Fall 2009- Seek funding resources

Spring 2010- begin preliminary planning and design

Spring 2011- Final Design

Summer 2011-Construction begins

Fall 2012- Construction completed

II. MAP OF PROJECT AREA (one only)

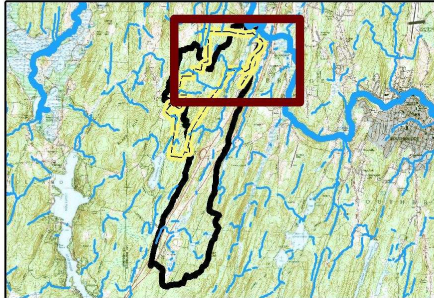


Figure 1. Map of project area for barrier removal on Hamant Brook, MA.

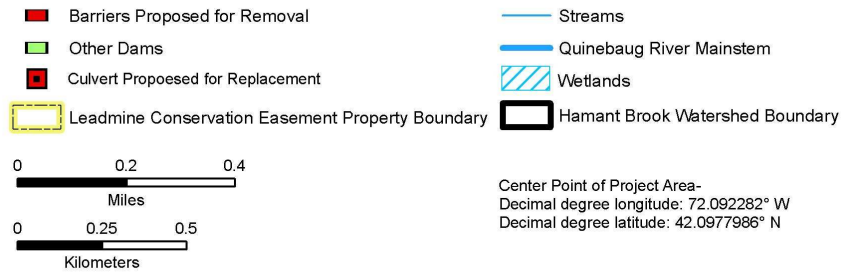
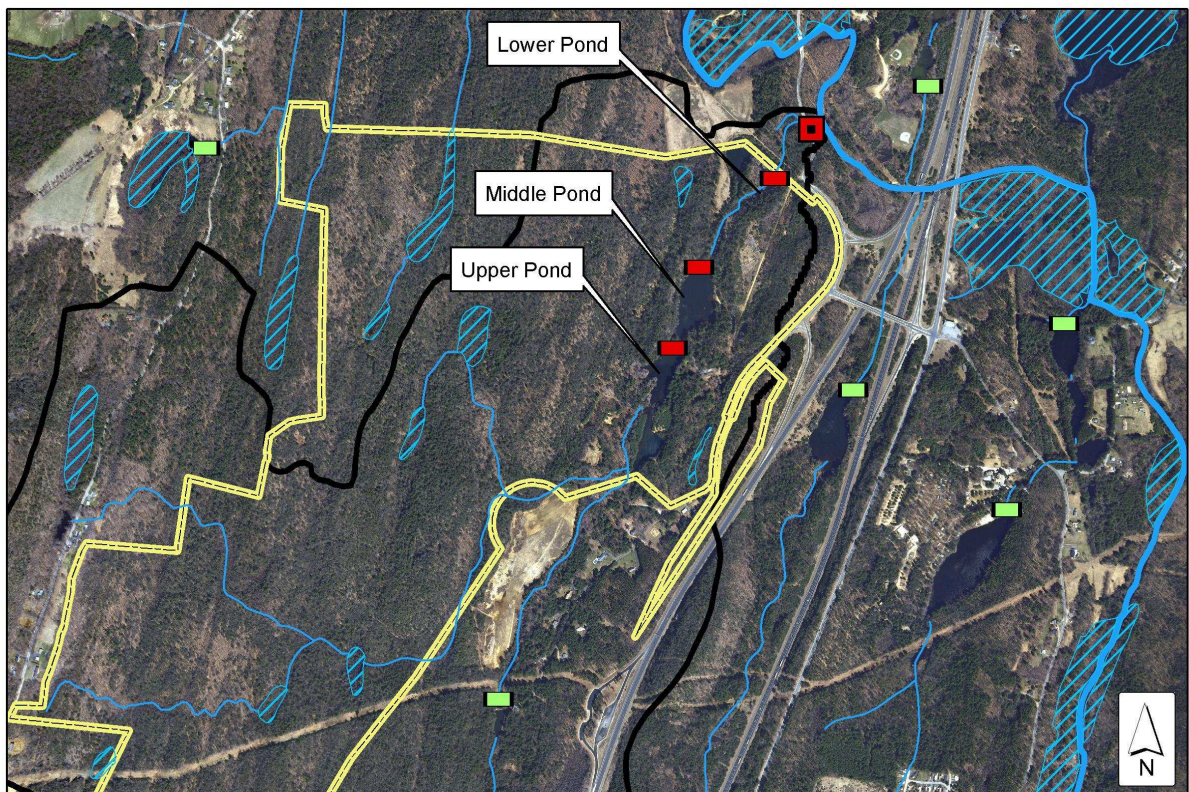
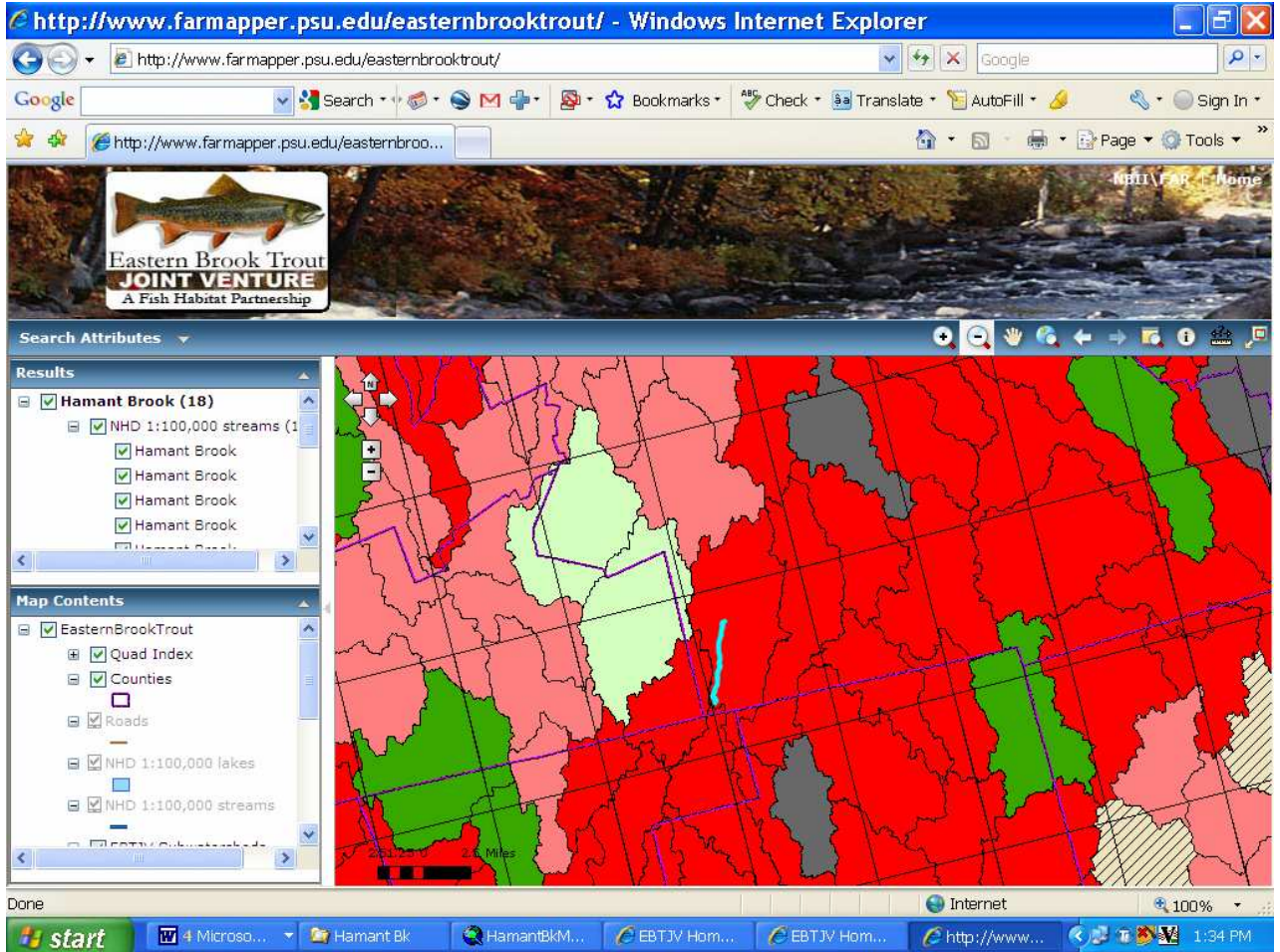


Figure 2. Location of Hamant Brook within EBTJV HUC6 level watershed (#25035).



III. PHOTOGRAPH(S) OF PROJECT AREA (no more than 2, please provide credits and attach photo release forms)



Perched, undersized culvert at mouth of Hamant Brook. A. Norris, MDFW



Failing dam on upper impoundment. A.Norris, MDFW.

IV. PROJECT BUDGET

A. General Requirements

Our current budget is an estimate based on a site reconnaissance study (Inter-fluve Inc. 2008), where all barriers are removed as one project. Simple drawdown, minor sediment management, minimal pumping, minimal channel excavation, and a moderate level of habitat restoration are assumed. Permitting, historical issues, and construction costs are too variable to accurately estimate at this time. The following table is an estimate for all structures unless otherwise stated.

B. Budget Table

Partner	Activity	NFHAP Request	Non-Fed. Contribution	Federal Contribution	Total	Acres/ miles Affected
MDFW	Site Recon		\$5,000		\$5,000	8 miles
MA Riv. Prog.	Site Recon		\$5,000		\$5,000	8 miles
MDFW	Monitoring		\$6,700		\$6,700	8 miles
Millenium	Proj. Managmnt		\$31,000		\$31,000	8 miles
Millenium	Survey, mapping		\$24,000		\$24,000	8 miles
Millenium	Sediment Managmnt (dams only)		\$11,000		\$11,000	8 miles
Millenium	Hydrology		\$24,000		\$24,000	8 miles
Millenium	Removal Design, Plan		\$17,000		\$17,000	8 miles
Millenium	Permitting		\$38,000		\$38,000	8 miles
Millenium	Historical Assessment (dams only)		\$15,000		\$15,000	8 miles
Millenium	Prelim. Eng. Plans		\$19,000		\$19,000	8 miles
Millenium	Final Des. Plans		\$22,000		\$22,000	8 miles
Millenium	Constrctn. Oversight		\$60,000		\$60,000	8 miles
Millenium	Constrctn.		\$529,000		\$529,000	8 miles
EBTJV	Culvert Materials	\$20,000			\$20,000	4 miles
MET	Riparian Plantings		\$15,000		\$15,000	0.75 miles
MET	Trail Crossings		\$15,000		\$15,000	0.75 miles
MET	Interpret. Trail		\$5,000		\$5,000	0.75 miles

V. EVALUATION QUESTIONS (4 pages maximum)

A. Conservation of Sustainable Brook Trout Populations:

- *Explain how the project sufficiently protects brook trout habitat. Does the project include fee simple land purchase or easements?*

Our project area is located on an 826 acre property purchased for protection by the Town of Sturbridge in conjunction with a conservation restriction purchased by MDFW. On-going efforts are being focused on restoring stream habitat connectivity by concentrating on dam removal and proper stream crossings.

- *List the specific regional or range wide EBTJV habitat objectives addressed by the project and describe how the project will contribute towards them.*

Dam removal and adequate stream crossings will allow fish passage, improve water quality, reduce stream temperature, and increase habitat available to brook trout.

These efforts will directly contribute to the following EBTJV habitat objectives:

Range-wide #3- Change the classification of 30% of the watersheds (EBTJV 2007);

Range-wide #4- Maintain and improve 70% of watersheds (EBTJV 2007);

Regional #4- Improve 10 reduced subwatersheds to healthy classification by 2012 (EBTJV 2008).

Regional #5- Strengthen brook trout populations in 105 subwatersheds classified as reduced by 2012 (EBTJV 2008).

Regional #6- Maintain 1,372 reduced subwatersheds in existing condition by 2012 (EBTJV 2008).

- *List the specific state-level EBTJV habitat objectives addressed by the project and describe how the project will contribute towards them.*

This project not only serves to restore brook trout habitat but also incorporates public outreach, a rich multi-partner collaboration, and recreational fishing, all of which comply with the following state-level EBTJV habitat objectives (priorities; Richards 2007) for Massachusetts:

Priority 1.3: Annually monitor Massachusetts' brook trout population;

Priority 3.1: Outreach, Create/enhance public interest in brook trout;

Priority 3.2: Outreach, Increase landowner participation in habitat improvement projects;

Priority 3.3: Outreach, Develop partnerships that foster brook trout conservation;

Priority 4.0: Brook Trout Protection and Restoration, Develop partnerships with other federal and state agencies, NGOs, and other stakeholders to conduct restoration projects;

Priority 5.1: Recreational Fishing, Make brook trout angling opportunities readily available.

- *List the State Wildlife Action Plan habitat conservation goals that are addressed by the project.*

The presence of brook trout in a small stream like Hamant Brook meets basic requirements of the Massachusetts habitat conservation goals as brook trout are listed as Species of Greatest Conservation Need and Small Streams are listed as a Habitat of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan (MDFW 2006). Dam removals proposed in this project directly apply to the following conservation action identified for small stream habitat:

“Identifying dam removal as a primary restoration tool and encouraging dam removal”.

Furthermore, this project would fall under the following broader conservation strategies identified by the Massachusetts State Wildlife Action Plan (MDFW 2006): proactive habitat protection; habitat restoration and management; coordination and partnerships; conservation and environmental education

B. Threatened and Endangered Species and Species of Conservation or Management Concern:

- *Will the completed project benefit any federally listed threatened or endangered species?*

No federally listed threatened or endangered species are known to benefit from the completion of this project.

- *Will the completed project benefit any state listed threatened or endangered species?*

Wood turtle, triangle floater, and creeper are three state-listed species of special concern that would benefit from restoration in Hamant Brook. These species have been mapped in the Quinebaug River by the Massachusetts Natural Heritage and Endangered Species Program, and the expectation is that all of these species would benefit from access to tributary habitat. Wood turtle are known to prefer free-flowing, coldwater streams, and triangle floater and creeper have potential host species (e.g., fallfish) requiring tributary access.

- *Will the completed project benefit any state or federal species of conservation or management concern?*

Restoration of Hamant Brook will benefit Species of Greatest Conservation Need (SGCN) identified in the Massachusetts State Wildlife Action Plan (MDFW 2006). These species are white sucker, blacknose dace, and fallfish. They require flowing water for all or part of their life history and are found in decreasing species richness and abundance moving upstream into Hamant Brook. Based on the Target Fish Community (Kashiwagi and Richards 2009), a method to score similarity between current and target fish communities, these species are expected to be among the most abundant species found in the Quinebaug River. However, blacknose dace are currently under-represented in the Quinebaug River’s Target Fish Community. Dam removal and culvert replacement in Hamant Brook would provide both increased tributary access for adult spawning and juvenile rearing.

- *Will the project benefit other species of economic importance not included above?*

Besides brook trout, no other aquatic species of economic importance are known to gain from this project. Terrestrial species of economic importance benefiting from converting pond to stream habitat and known to occur on this property are deer, coyote, bear, fisher, mink, grey fox, beaver, ruffed grouse, woodcock, and turkey.

- *How does the project contribute to the conservation of genetically distinct populations or species?*

Hamant Brook contains a native, wild brook trout population, but it is not known to be a genetically distinct strain.

C. Project Benefits:

- *What is the status of the brook trout population (intact, reduced, extirpated) in the watershed (see www.easternbrooktrout.net)?*

The brook trout population status in the watershed is coded as greatly reduced (Figure 2).

- *What is the EBTJV priority ranking for the proposed project watershed (see www.easternbrooktrout.net)?*

As a greatly reduced watershed, this watershed (#25035; Figure 2) is recommended for enhancement and received a priority ranking score of 0.28.

- *Does the project connect to a watershed that is identified as intact or reduced?* Subwatershed #25035 (Figure 2), which contains Hamant Brook, is adjacent to one watershed with intact status and best suited for protection (#25034, score = 0.99), while three other adjacent watersheds also have greatly reduced status and are best suited for enhancement (#25037, score = 0.28; #250258, score = 0.3; #25033, score = 0.16). The Hamant Brook watershed area is a 3.7 mi² stream basin. A total of 38% of the land in the Hamant Brook watershed is protected, and about 33% of the land upstream of the project area is protected.

- *Will the project provide expansion of existing habitat?*

Dam removal and culvert replacement will restore a 0.75 mile section of Hamant Brook from 70% impounded to free-flowing, coldwater stream habitat capable of supporting brook trout.

- *Will the project restore tributary stream or mainstem habitats?*

This project will restore both tributary and mainstem habitats on multiple levels. First, as tributary to the Quinebaug River, 0.75 miles of stream will be restored to free-flowing coldwater stream through barrier removal and culvert replacement. Restoring this section of Hamant Brook will also re-connect 2.6 miles of upstream tributary habitat and nearly 4.5 miles of mainstem in the Quinebaug River. Re-connecting these stream fragments will total about 8 miles of free-flowing habitat.

- *What is the probability of long-term success in supporting a sustainable fishable brook trout population in the project area?*

The probability of long-term success is very high. Removal of dams and the perched culvert will restore and greatly extend coldwater habitat available for brook trout, restore stream function, improve water quality, allow sediment and nutrient transport, and eliminate invasive aquatic (pond) vegetation. Permanently protected land will ensure riparian function remains intact to maintain stream temperatures and reduce runoff.

D. Endurance of Benefits:

- *What percentage of the watershed above the proposed project is protected in perpetuity?*

Upstream of the project area, 33% of the watershed is protected in perpetuity, which includes four parcels. The Leadmine Conservation Easement is a municipal-owned property in the immediate project area. Other parcels are the state-owned Leadmine Wildlife Management Area and portions of two parcels comprising Breakneck Brook Wildlife Management Area. One is a state-owned parcel, and the other is a private-for-profit owned parcel.

- *What are the root causes of the watershed degradation and which of these are addressed by the project?*

Dam fragmentation was listed as the most common disturbance with fragmentation and sedimentation from roads being the next greatest disturbances to brook trout habitat in Massachusetts. These disturbances are represented in subwatershed #25035, which contains Hamant Brook and was identified as high impact from dams and medium impact from roads (EBTJV 2006).

- *Are there competitive non-native or invasive fish in the watershed with access (no barrier) to the proposed project?*

Largemouth bass, a species not native in Massachusetts, but commonly found in impounded streams and rivers in Massachusetts, was collected within this watershed. Dam removal and culvert replacement will reduce the amount of habitat suitable for these competing species.

- *What species of trout or other aquatic species are currently stocked within the proposed project watershed?*

Hamant Brook is not stocked with trout or other aquatic species, and no stocking would occur post-barrier removal.

E. Management Assets:

- *Describe the plans for monitoring and evaluation.*

Fish monitoring for a minimum of 3 years pre- and post-barrier removal will be conducted by MDFW fisheries biologists. Monitoring began in 2007, and sites are located between each barrier in the project area. Sites on the upstream tributary were added in 2009. Additionally, temperature loggers will be deployed upstream and downstream of barriers in Fall 2009.

- *Describe the plans for public fishing access at the project site.*

After being under private ownership for nearly a century, this property was formally opened to the public in 2008. Fishing is an allowed use under the conservation restriction, and access to the stream is via three trailhead parking areas and an existing trail system.

Describe any outreach or educational components of the project?

The town constructed informational kiosks in the parking areas. Information on brook trout, the sensitivity of coldwater streams to impairments, and the on-site stream restoration process are anticipated topics for a self-guided interpretive trail. Along with local school and scout groups, the town has an interest in restoring trail connections at deteriorated stream crossings. Additional funding will be sought for this endeavor.

- *How will the project improve the recreational fishery?*

A size range of brook trout were collected in a small fragment of coldwater stream upstream of the third pond. A few individuals in the 9-10 inch range indicated that this stream has the potential to produce a fishable population of brook trout. Restoring and expanding coldwater habitat in this stream should increase production of fishable brook trout and improve recreational fishing opportunities.

- *Describe the long-term maintenance plan for the project.*

Because the riparian area is forested, little maintenance of in-stream and riparian habitat is anticipated, but some riparian plantings are planned to limit the opportunity for invasive species and reduce erosion in former impoundment areas. Fish and habitat monitoring will indicate a need for adaptive management strategies, which may include in-stream habitat (e.g., large wood placement, etc.) restoration to promote fish habitat. Additionally, the conditions of the conservation restriction require the Town of Sturbridge to establish a Forestry Management or Stewardship Plan within three years of purchase.

F. Other Special Considerations:

G. Supporting Documentation and Management Plans:

- *Literature Cited*

EBTJV. 2008. [Conserving the eastern brook trout: action strategies](#).

EBTJV. 2007. [Eastern brook trout: roadmap to restoration](#). 12 p.

EBTJV. 2006. [Eastern brook trout: status and threats](#). Prepared by Trout Unlimited, Arlington, Virginia, for the Eastern Brook Trout Joint Venture. 36 p.

Inter-fluve Inc. 2008. Technical Memorandum: Hamant Brook Dams Site Reconnaissance.

Kashiwagi, M. and T. Richards. 2009. Development of Target Fish Community Models for Massachusetts Mainstem Rivers: Technical Report. Massachusetts Division of Fisheries and Wildlife. 85 p.

Richards, T. 2007. Massachusetts Eastern Brook Trout Conservation Strategies. 4 p.

Massachusetts Division of Fisheries and Wildlife. 2006. Massachusetts State Wildlife Action Plan.

- *References to published interagency fishery or aquatic resource management plans.*
- *Please attach a letter of support from the state fishery management agency responsible for the project area. The letter must show state support for the project, identify how the project meets the state's goals and objectives and address how the recreational value of the population will be affected.*